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Investigation Report for S-Site Aggregate Area



Prepared by the Environmental Programs Directorate

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EXECUTIVE SUMMARY

This investigation report presents the results of Los Alamos National Laboratory's investigation activities at solid waste management units (SWMUs) and areas of concern (AOCs) located within the S-Site Aggregate Area. These sites are potentially contaminated with hazardous chemicals and radionuclides. The objective of this investigation is to define the nature and extent of potential contamination at these sites and, if defined, to determine whether past operations pose a potential unacceptable risk to human health or the environment.

The S-Site Aggregate Area consists of 105 individual SWMUs and AOCs in Technical Area 11 (TA-11), former TA-13, TA-16, and TA-25. Of the 105 SWMUs and AOCs, 37 are not included in this report. The current regulatory status of these 37 sites is as follows:

- Nine sites were removed from Module VIII of the Laboratory's Hazardous Waste Facility Permit by the New Mexico Environment Department (NMED).
- Eleven sites have no further action (NFA) approval by the U.S. Environmental Protection Agency.
- One site has an NFA proposal pending action by NMED.
- Two sites are addressed in another investigation work plan approved by NMED.
- Fourteen sites are deferred from investigation pursuant to Table IV-2 of the Compliance Order on Consent.

The remaining 68 SWMUs and AOCs are included in this investigation report. Of these, three sites required no additional investigation and will be proposed for NFA, two were sampled with nearby sites, and two were not sampled because of historic preservation constraints. The remaining 61 sites were sampled to determine the nature and extent of contamination. Additional locations were sampled in the Extended Drainages to determine if off-site transport of contaminants is taking place in the Fishladder Canyon and Martin Spring Canyon drainages.

The 2009–2010 investigation activities included collecting soil, sediment, and rock samples from the surface to a maximum depth of 30 ft below ground surface. Data from samples collected during the investigation were evaluated with data collected during previous investigations that meet current Laboratory data quality requirements.

The sampling data presented in this report indicated that the extent of contamination has been defined at six sites [SWMUs 16-004(a), 16-004(e), 16-026(b), 16-029(d), 16-029(g2), and 16-017(p)-99]. Human health and ecological risk assessments were performed for these sites, which have not been removed or previously remediated and reported in other documents. Five sites [SWMUs 16-004(a), 16-004(e), 16-029(d), 16-029(g2), and 16-017(p)-99] do not pose a potential unacceptable risk to human health and the environment under the current or reasonably foreseeable future land use and are recommended for corrective action complete. SWMU 16-026(b) has been found to pose potential carcinogenic risk to human health, and corrective actions are recommended.

The nature and extent of contamination were not defined at the Courtyard Periphery Area (located in V-Site). However, risk was evaluated because of the use of the site by visitors and guides for historical tours. The Courtyard Periphery Area does not pose a potential unacceptable risk to human health and the environment under the current or reasonably foreseeable future land use and is not recommended for corrective action.

Three sites (AOC C-16-049, AOC C-16-062 and AOC C-16-063) were recommended for NFA on the basis that there is no history or evidence of releases of hazardous constituents.

The nature and extent of contamination have not been defined at the remaining 59 sites. Additional sampling is needed to define the lateral and/or vertical extent of contamination at each of these sites. The Laboratory will provide a Phase II investigation work plan to address the additional sampling required to complete the characterization of these sites. Once additional data are available and the extent is defined, human health and ecological risk-screening assessments will be conducted to determine if the sites pose unacceptable risk to human health and the environment.

CONTENTS

1.0 INTRODUCTION 1
1.1 General Site Information 1
1.1.1 Division into Four Subaggregates 1
1.2 Investigation Overview 3
1.3 S-Site Aggregate Area Sites Not Included in Report 4
1.4 Document Organization 4

2.0 SITE CONDITIONS 4
2.1 Surface Conditions and Topography 4
2.2 Surface Water 5
2.3 Soil Types 6
2.4 Subsurface Conditions 6
2.4.1 Stratigraphy 6
2.4.2 Cliff Retreat and Fractures 9
2.4.3 Hydrogeology 10

3.0 SCOPE OF ACTIVITIES 13
3.1 Geodetic Surveys 13
3.2 Radiological Walkover Surveys 14
3.3 Surface Sampling 14
3.4 Subsurface Sampling 14
3.4.1 Hand Auger 14
3.4.2 Backhoe-Mounted Auger 15
3.4.3 Drilling and Subsurface Borehole Sampling 15
3.5 Field Screening for Organic Vapors 17
3.6 Field Screening for Radioactivity 17
3.7 Field Screening for RDX 17
3.8 Field Screening for Metals by XRF 17
3.9 Chemical and Radiological Analyses 17
3.9.1 Sample Collection 17
3.9.2 Analytical Suites 18
3.10 General Deviations from Approved Work Plan 18

4.0 REGULATORY CRITERIA 19
4.1 Current and Future Land Uses 19
4.2 Human Health Screening Levels 19
4.3 Ecological Screening Levels 19
4.4 Cleanup Goals 20

5.0 DATA REVIEW PROCESS 20
5.1 Historical Soil, Tuff, and Sediment Sampling Summary 20
5.2 Overview of Investigation Data 20
5.3 COPC Identification 21

6.0 K-SITE SUBAGGREGATE SITE INVESTIGATIONS 22
6.1 Soil, Tuff, and Sediment Sampling Summary 22
6.2 AOC C-11-002—Area of Potential Soil Contamination 23
6.2.1 Site Description and Operational History 23
6.2.2 Summary of Previous Investigations 23

6.2.3 Field-Screening Results 23
6.2.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 23
6.2.5 Spatial Distribution 24
6.2.6 Summary of Human Health Risk Assessment Results 25
6.2.7 Summary of Ecological Risk Assessment Results 25
6.3 SWMU 11-005(a)—Septic System 25
6.3.1 Site Description and Operational History 25
6.3.2 Summary of Previous Investigations 25
6.3.3 Field-Screening Results 26
6.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 26
6.3.5 Spatial Distribution 26
6.3.6 Summary of Human Health Risk Assessment Results 29
6.3.7 Summary of Ecological Risk Assessment Results 29
6.4 SWMU 11-005(b)—Septic System 29
6.4.1 Site Description and Operational History 29
6.4.2 Summary of Previous Investigations 29
6.4.3 Field-Screening Results 29
6.4.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 29
6.4.5 Spatial Distribution 30
6.4.6 Summary of Human Health Risk Assessment Results 33
6.4.7 Summary of Ecological Risk Assessment Results 33
6.5 SWMU 11-006(a)—HE Sump 33
6.5.1 Site Description and Operational History 33
6.5.2 Summary of Previous Investigations 33
6.5.3 Field-Screening Results 33
6.5.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 34
6.5.5 Spatial Distribution 34
6.5.6 Summary of Human Health Risk Assessment Results 36
6.5.7 Summary of Ecological Risk Assessment Results 36
6.6 SWMU 11-006(b)—Catch Basin 36
6.6.1 Site Description and Operational History 36
6.6.2 Summary of Previous Investigations 36
6.6.3 Field-Screening Results 37
6.6.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 37
6.6.5 Spatial Distribution 37
6.6.6 Summary of Human Health Risk Assessment Results 41
6.6.7 Summary of Ecological Risk Assessment Results 42
6.7 SWMU 11-006(c)—Catch Basin 42
6.7.1 Site Description and Operational History 42
6.7.2 Summary of Previous Investigations 42
6.7.3 Field-Screening Results 42
6.7.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 43
6.7.5 Spatial Distribution 43

6.7.6 Summary of Human Health Risk Assessment Results 46
6.7.7 Summary of Ecological Risk Assessment Results 46
6.8 SWMU 11-006(d)—Catch Basin 46
6.8.1 Site Description and Operational History 46
6.8.2 Summary of Previous Investigations 46
6.8.3 Field-Screening Results 47
6.8.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 47
6.8.5 Spatial Distribution 48
6.8.6 Summary of Human Health Risk Assessment Results 50
6.8.7 Summary of Ecological Risk Assessment Results 50
6.9 SWMU 11-005(c)—Outfall and Drainline 50
6.9.1 Site Description and Operational History 50
6.9.2 Summary of Previous Investigations 50
6.9.3 Field-Screening Results 50
6.9.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 51
6.9.5 Spatial Distribution 51
6.9.6 Summary of Human Health Risk Assessment Results 53
6.9.7 Summary of Ecological Risk Assessment Results 53
6.10 SWMU 11-011(a)—Outfall and Drainline 53
6.10.1 Site Description and Operational History 53
6.10.2 Summary of Previous Investigations 54
6.10.3 Field-Screening Results 54
6.10.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 54
6.10.5 Spatial Distribution 54
6.10.6 Summary of Human Health Risk Assessment Results 58
6.10.7 Summary of Ecological Risk Assessment Results 58
6.11 SWMU 11-011(b)—Outfall and Drainline 58
6.11.1 Site Description and Operational History 58
6.11.2 Summary of Previous Investigations 58
6.11.3 Field-Screening Results 58
6.11.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 59
6.11.5 Spatial Distribution 59
6.11.6 Summary of Human Health Risk Assessment Results 61
6.11.7 Summary of Ecological Risk Assessment Results 62
6.12 SWMU 11-011(d)—Outfall 62
6.12.1 Site Description and Operational History 62
6.12.2 Summary of Previous Investigations 62
6.12.3 Field-Screening Results 62
6.12.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 62
6.12.5 Spatial Distribution 63
6.12.6 Summary of Human Health Risk Assessment Results 65
6.12.7 Summary of Ecological Risk Assessment Results 65

7.0 P-SITE SUBAGGREGATE SITE INVESTIGATION 65
7.1 Soil, Tuff, and Sediment Sampling Summary 66
7.2 SWMU 16-035—Potential Soil Contamination Associated with Former Building 16-476 66
7.2.1 Site Description and Operational History 66
7.2.2 Summary of Previous Investigations 66
7.2.3 Field-Screening Results 66
7.2.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 66
7.3 SWMU 16-036—Potential Soil Contamination Associated with Former Structures 16-477 and 16-478 67
7.3.1 Site Description and Operational History 67
7.3.2 Summary of Previous Investigations 67
7.3.3 Field-Screening Results 67
7.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 67
7.4 SWMU 16-025(d2)—Potential Soil Contamination Associated with Former Building 16-480 67
7.4.1 Site Description and Operational History 67
7.4.2 Summary of Previous Investigations 67
7.4.3 Field-Screening Results 68
7.4.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 68
7.4.5 Spatial Distribution 68
7.4.6 Summary of Human Health Risk Assessment Results 71
7.4.7 Summary of Ecological Risk Assessment Results 71
7.5 SWMU 16-031(h)—Outfall 71
7.5.1 Site Description and Operational History 71
7.5.2 Summary of Previous Investigations 71
7.5.3 Field-Screening Results 71
7.5.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 71
7.5.5 Spatial Distribution 72
7.5.6 Summary of Human Health Risk Assessment Results 74
7.5.7 Summary of Ecological Risk Assessment Results 74
7.6 AOC 16-024(a)—Potential Soil Contamination Associated with Former Magazine 16-488 75
7.6.1 Site Description and Operational History 75
7.6.2 Summary of Previous Investigations 75
7.6.3 Field-Screening Results 75
7.6.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 75
7.6.5 Spatial Distribution 76
7.6.6 Summary of Human Health Risk Assessment 78
7.6.7 Summary of Ecological Risk Assessments 78
7.7 AOC 16-024(u)—Potential Soil Contamination Associated with Former Magazine 16-481 78
7.7.1 Site Description and Operational History 78
7.7.2 Summary of Previous Investigations 78
7.7.3 Field-Screening Results 78

7.7.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 79
7.7.5 Spatial Distribution 79
7.7.6 Summary of Human Health Risk Assessment Results 81
7.7.7 Summary of Ecological Risk Assessment Results 81
7.8 AOC C-16-050—Former Building 16-482 81
7.8.1 Site Description and Operational History 81
7.8.2 Summary of Previous Investigations 81
7.8.3 Field-Screening Results 81
7.8.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 82
7.8.5 Spatial Distribution 82
7.8.6 Summary of Human Health Risk Assessment Results 83
7.8.7 Summary of Ecological Risk Assessment Results 83
7.9 AOC C-16-060—Former Building 16-479 84
7.9.1 Site Description and Operational History 84
7.9.2 Summary of Previous Investigations 84
7.9.3 Field-Screening Results 84
7.9.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 84
7.9.5 Spatial Distribution 85
7.9.6 Summary of Human Health Risk Assessment Results 86
7.9.7 Summary of Ecological Risk Assessment Results 86
7.10 SWMU 13-001—Firing Site 87
7.10.1 Site Description and Operational History 87
7.10.2 Summary of Previous Investigations 87
7.10.3 Field-Screening Results 87
7.10.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 87
7.10.5 Spatial Distribution 88
7.10.6 Summary of Human Health Risk Assessment Results 92
7.10.7 Summary of Ecological Risk Assessment Results 92
7.11 SWMU 13-002—Surface Disposal Area 93
7.11.1 Site Description and Operational History 93
7.11.2 Summary of Previous Investigations 93
7.11.3 Field-Screening Results 93
7.11.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 93
7.11.5 Spatial Distribution 94
7.11.6 Summary of Human Health Risk Assessment Results 95
7.11.7 Summary of Ecological Risk Assessment Results 95
7.12 SWMU 16-029(h)—Outfall and Drainlines 96
7.12.1 Site Description and Operational History 96
7.12.2 Summary of Previous Investigations 96
7.12.3 Field-Screening Results 96
7.12.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 96
7.12.5 Spatial Distribution 97
7.12.6 Summary of Human Health Risk Assessment Results 101

7.12.7 Summary of Ecological Risk Assessment Results 101
7.13 AOC 16-003(p)—Sump 101
7.13.1 Site Description and Operational History 101
7.13.2 Summary of Previous Investigations 102
7.13.3 Field-Screening Results 102
7.13.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 102
7.13.5 Spatial Distribution 103
7.13.6 Summary of Human Health Risk Assessment Results 105
7.13.7 Summary of Ecological Risk Assessment Results 106
7.14 SWMU 13-004—Burning Pits 106
7.14.1 Site Description and Operational History 106
7.14.2 Summary of Previous Investigations 106
7.14.3 Field-Screening Results 106
7.14.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 106
7.15 SWMU 16-004(a)—Imhoff Tank 106
7.15.1 Site Description and Operational History 106
7.15.2 Summary of Previous Investigations 107
7.15.3 Field-Screening Results 107
7.15.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 107
7.15.5 Spatial Distribution of COPCs 108
7.15.6 Summary of Human Health Risk Assessment Results 109
7.15.7 Summary of Ecological Risk Assessment Results 109
7.16 SWMU 16-004(b)—Trickling Filter 110
7.16.1 Site Description and Operational History 110
7.16.2 Summary of Previous Investigations 110
7.16.3 Field-Screening Results 110
7.16.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 110
7.16.5 Spatial Distribution 111
7.16.6 Summary of Human Health Risk Assessment Results 112
7.16.7 Summary of Ecological Risk Assessment Results 112
7.17 SWMU 16-004(c)—Tank 112
7.17.1 Site Description and Operational History 112
7.17.2 Summary of Previous Investigations 113
7.17.3 Field-Screening Results 113
7.17.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 113
7.17.5 Spatial Distribution 114
7.17.6 Summary of Human Health Risk Assessment Results 115
7.17.7 Summary of Ecological Risk Assessment Results 115
7.18 SWMU 16-004(d)—Sludge Drying Bed 115
7.18.1 Site Description and Operational History 115
7.18.2 Summary of Previous Investigations 115
7.18.3 Field-Screening Results 116
7.18.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 116

7.18.5 Spatial Distribution 116
7.18.6 Summary of Human Health Risk Assessment 118
7.18.7 Summary of Ecological Risk Assessment 118
7.19 SWMU 16-004(e)—Filter Screen 118
7.19.1 Site Description and Operational History 118
7.19.2 Summary of Previous Investigations 118
7.19.3 Field-Screening Results 119
7.19.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 119
7.19.5 Spatial Distribution of COPCs 120
7.19.6 Summary of Human Health Risk Assessment Results 121
7.19.7 Summary of Ecological Risk Assessment Results 121
7.20 SWMU 16-004(f)—Sludge Drying Bed 121
7.20.1 Site Description and Operational History 121
7.20.2 Summary of Previous Investigations 121
7.20.3 Field-Screening Results 121
7.20.4 Soil and Tuff Sampling Analytical Results and COPC Identification 122
7.20.5 Spatial Distribution 122
7.20.6 Summary of Human Health Risk Assessment Results 124
7.20.7 Summary of Ecological Risk Assessment Results 124
7.21 AOC C-16-049–Former Building 124
7.21.1 Site Description and Operational History 124
7.21.2 Summary of Previous Investigations 124
7.21.3 Field Screening Results 125
7.21.4 Investigation Status 125
7.22 AOC C-16-062–Former Manhole 125
7.22.1 Site Description and Operational History 125
7.22.2 Summary of Previous Investigations 125
7.22.3 Field Screening Results 125
7.22.4 Investigation Status 125
7.23 AOC C-16-063–Former Manhole 125
7.23.1 Site Description and Operational History 125
7.23.2 Summary of Previous Investigations 125
7.23.3 Field Screening Results 125
7.23.4 Investigation Status 126

8.0 300s LINE SUBAGGREGATE SITE INVESTIGATIONS 126
8.1 Soil, Tuff, and Sediment Sampling Summary 127
8.2 SWMU 16-026(z)—Outfall 127
8.2.1 Site Description and Operational History 127
8.2.2 Summary of Previous Investigations 127
8.2.3 Field-Screening Results 127
8.2.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 128
8.2.5 Spatial Distribution 128
8.2.6 Summary of Human Health Risk Assessment Results 130
8.2.7 Summary of Ecological Risk Assessment Results 130

8.3 SWMU 16-001(e)—Dry Well 130
8.3.1 Site Description and Operational History 130
8.3.2 Summary of Previous Investigations 130
8.3.3 Field-Screening Results 131
8.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 131
8.3.5 Spatial Distribution 131
8.3.6 Summary of Human Health Risk Assessment Results 134
8.3.7 Summary of Ecological Risk Assessment Results 135
8.4 SWMU 16-003(d)—Sumps 135
8.4.1 Site Description and Operational History 135
8.4.2 Summary of Previous Investigations 135
8.4.3 Field-Screening Results 135
8.4.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 135
8.4.5 Spatial Distribution 136
8.4.6 Summary of Human Health Risk Assessment Results 138
8.4.7 Summary of Ecological Risk Assessment Results 138
8.5 SWMU 16-003(e)—Sumps 138
8.5.1 Site Description and Operational History 138
8.5.2 Summary of Previous Investigations 138
8.5.3 Field-Screening Results 138
8.5.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 138
8.5.5 Spatial Distribution 139
8.5.6 Summary of Human Health Risk Assessment Results 141
8.5.7 Summary of Ecological Risk Assessment Results 141
8.6 SWMU 16-003(f)—Sumps 141
8.6.1 Site Description and Operational History 141
8.6.2 Summary of Previous Investigations 141
8.6.3 Field-Screening Results 142
8.6.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 142
8.6.5 Spatial Distribution 142
8.6.6 Summary of Human Health Risk Assessment Results 145
8.6.7 Summary of Ecological Risk Assessment Results 145
8.7 SWMU 16-003(g)—Sumps 145
8.7.1 Site Description and Operational History 145
8.7.2 Summary of Previous Investigations 145
8.7.3 Field-Screening Results 145
8.7.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 146
8.7.5 Spatial Distribution 146
8.7.6 Summary of Human Health Risk Assessment Results 148
8.7.7 Summary of Ecological Risk Assessment Results 148
8.8 SWMU 16-026(b)—Outfall 148
8.8.1 Site Description and Operational History 148
8.8.2 Summary of Previous Investigations 148

8.8.3 Field-Screening Results 148
8.8.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 149
8.8.5 Spatial Distribution of COPCs 150
8.8.6 Summary of Human Health Risk Screening Assessment 153
8.8.7 Summary of Ecological Risk Screening Assessment 153
8.9 SWMU 16-026(c)–Outfall 154
8.9.1 Site Description and Operational History 154
8.9.2 Summary of Previous Investigations 154
8.9.3 Field-Screening Results 154
8.9.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 154
8.9.5 Spatial Distribution 155
8.9.6 Summary of Human Health Risk Screening Assessment 157
8.9.7 Summary of Ecological Risk Screening Assessment 157
8.10 SWMU 16-026(d)—Outfall 157
8.10.1 Site Description and Operational History 157
8.10.2 Summary of Previous Investigations 158
8.10.3 Field-Screening Results 158
8.10.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 158
8.10.5 Spatial Distribution 159
8.10.6 Summary of Human Health Risk Assessment 162
8.10.7 Summary of Ecological Risk Assessment 162
8.11 SWMU 16-026(e)—Outfall 162
8.11.1 Site Description and Operational History 162
8.11.2 Summary of Previous Investigations 163
8.11.3 Field-Screening Results 163
8.11.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 164
8.11.5 Spatial Distribution 164
8.11.6 Summary of Human Health Risk Assessment Results 168
8.11.7 Summary of Ecological Risk Assessment Results 168
8.12 SWMU 16-029(a)—Sumps 169
8.12.1 Site Description and Operational History 169
8.12.2 Summary of Previous Investigations 169
8.12.3 Field-Screening Results 169
8.12.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 169
8.12.5 Spatial Distribution 170
8.12.6 Summary of Human Health Risk Assessment Results 173
8.12.7 Summary of Ecological Risk Assessment Results 173
8.13 SWMU 16-029(b)—Sumps 173
8.13.1 Site Description and Operational History 173
8.13.2 Summary of Previous Investigations 174
8.13.3 Field-Screening Results 174
8.13.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 174
8.13.5 Spatial Distribution 175

8.13.6 Summary of Human Health Risk Assessment Results 176
8.13.7 Summary of Ecological Risk Assessment Results 176
8.14 SWMU 16-029(c)—Sumps 176
8.14.1 Site Description and Operational History 176
8.14.2 Summary of Previous Investigations 176
8.14.3 Field-Screening Results 176
8.14.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 177
8.14.5 Spatial Distribution 177
8.14.6 Summary of Human Health Risk Assessment Results 178
8.14.7 Summary of Ecological Risk Assessment Results 178
8.15 SWMU 16-029(d)—Sumps 179
8.15.1 Site Description and Operational History 179
8.15.2 Summary of Previous Investigations 179
8.15.3 Field-Screening Results 179
8.15.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 179
8.15.5 Spatial Distribution of COPCs 180
8.15.6 Summary of Human Health Risk Assessment Results 181
8.15.7 Summary of Ecological Risk Assessment Results 181
8.16 Shared Drainages 181
8.16.1 Site Description and Operational History 182
8.16.2 Summary of Previous Investigations 182
8.16.3 Field-Screening Results 182
8.16.4 Soil and Tuff Sampling Analytical Results and COPC Identification 182
8.17 Liquid Waste Trunk Line 188
8.17.1 Site Description 188
8.17.2 Summary of Previous Investigations 188
8.17.3 Field-Screening Results 189
8.17.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 189
8.17.5 Spatial Distribution 190

9.0 V-SITE SUBAGGREGATE SITE INVESTIGATIONS 193
9.1 Soil, Tuff, and Sediment Sampling Summary 194
9.2 AOC C-16-068 Former Building 194
9.2.1 Site Description and Operational History 194
9.2.2 Summary of Previous Investigations 194
9.2.3 Field-Screening Results 194
9.2.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 195
9.2.5 Spatial Distribution 195
9.2.6 Summary of Human Health Risk Assessment Results 198
9.2.7 Summary of Ecological Risk Assessment Results 198
9.3 SWMU 16-029(g2)—Pit 198
9.3.1 Site Description and Operational History 198
9.3.2 Summary of Previous Investigations 198
9.3.3 Field-Screening Results 198

9.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 199
9.3.5 Spatial Distribution of COPCs 199
9.3.6 Summary of Human Health Risk Assessment Results 200
9.3.7 Summary of Ecological Risk Assessment Results 200
9.4 AOC C-16-074—Storage Area 200
9.4.1 Site Description and Operational History 200
9.4.2 Summary of Previous Investigations 201
9.4.3 Field-Screening Results 201
9.4.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 201
9.4.5 Spatial Distribution 202
9.4.6 Summary of Human Health Risk Assessment Results 203
9.4.7 Summary of Ecological Risk Assessment Results 203
9.5 SWMU 16-029(x) 203
9.5.1 Site Description and Operational History 203
9.5.2 Summary of Previous Investigations 204
9.5.3 Field-Screening Results 204
9.5.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 204
9.5.5 Spatial Distribution 205
9.5.6 Summary of Human Health Risk Assessment Results 209
9.5.7 Summary of Ecological Risk Assessment Results 209
9.6 SWMU 16-029(w)—Sump (Former) and Outfall 210
9.6.1 Site Description and Operational History 210
9.6.2 Summary of Previous Investigations 210
9.6.3 Field-Screening Results 210
9.6.4 Tuff Sampling Analytical Results and COPC Identification 210
9.6.5 Spatial Distribution 211
9.6.6 Summary of Human Health Risk Assessment Results 213
9.6.7 Summary of Ecological Risk Assessment Results 213
9.7 SWMU 16-025(x)—Potential Soil Contamination Associated with Former Building 16-100 213
9.7.1 Site Description and Operational History 213
9.7.2 Summary of Previous Investigations 213
9.7.3 Field-Screening Results 214
9.7.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 214
9.7.5 Spatial Distribution 215
9.7.6 Summary of Human Health Risk Assessment Results 216
9.7.7 Summary of Ecological Risk Assessment Results 216
9.8 SWMU 16-017(p)-99—Former Storage Magazine 16-61 216
9.8.1 Site Description and Operational History 216
9.8.2 Summary of Previous Investigations 216
9.8.3 Field Screening Results 216
9.8.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 217
9.8.5 Spatial Distribution of COPCs 219
9.8.6 Summary of Human Health Risk Assessment Results 219

9.8.7 Summary of Ecological Risk Assessment Results 220
9.9 SWMU 16-017(w)-99—Former Storage Magazine 16-073 220
9.9.1 Site Description and Operational History 220
9.9.2 Summary of Previous Investigations 220
9.9.3 Field-Screening Results 220
9.9.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 220
9.9.5 Spatial Distribution 221
9.9.6 Summary of Human Health Risk Assessment Results 222
9.9.7 Summary of Ecological Risk Assessment Results 222
9.10 SWMU 16-034(m)—Potential Soil Contamination Associated with Former Building 16-86 222
9.10.1 Site Description and Operational History 222
9.10.2 Summary of Previous Investigations 223
9.10.3 Field-Screening Results 223
9.10.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 223
9.10.5 Spatial Distribution 224
9.10.6 Summary of Human Health Risk Assessment Results 226
9.10.7 Summary of Ecological Risk Assessment Results 226
9.11 AOC 16-024(n)—Potential Soil Contamination Associated with Former HE Magazine 16-84 226
9.11.1 Site Description and Operational History 226
9.11.2 Summary of Previous Investigations 226
9.11.3 Field-Screening Results 226
9.11.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 227
9.11.5 Spatial Distribution 227
9.11.6 Summary of Human Health Assessment Results 229
9.11.7 Summary of Ecological Risk Assessment Results 229
9.12 SWMU 16-034(n)—Potential Soil Contamination Associated with Former Building 16-83 229
9.12.1 Site Description and Operational History 229
9.12.2 Summary of Previous Investigations 229
9.12.3 Field-Screening Results 229
9.12.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 229
9.12.5 Spatial Distribution 230
9.12.6 Summary of Human Health Risk Assessment Results 232
9.12.7 Summary of Ecological Risk Assessment Results 232
9.13 AOC 16-024(m)—Potential Soil Contamination Associated with Former HE Magazine 16-66 232
9.13.1 Site Description and Operational History 232
9.13.2 Summary of Previous Investigations 232
9.13.3 Field-Screening Results 232
9.13.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 233
9.13.5 Spatial Distribution 233
9.13.6 Summary of Human Health Risk Assessment Results 236

9.13.7 Summary of Ecological Risk Assessment Results 236
9.14 SWMU 16-017(v)-99—Former HE Processing Building 16-515 236
9.14.1 Site Description and Operational History 236
9.14.2 Summary of Previous Investigations 237
9.14.3 Field-Screening Results 237
9.14.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 237
9.14.5 Spatial Distribution 237
9.14.6 Summary of Human Health Risk Assessment Results 239
9.14.7 Summary of Ecological Risk Assessment Results 239
9.15 Courtyard Periphery Area 239
9.15.1 Site Description and Operational History 240
9.15.2 Summary of Previous Investigations 241
9.15.3 Field-Screening Results 241
9.15.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 241
9.15.5 Spatial Distribution 245
9.15.6 Summary of Human Health Risk Assessment Results 248
9.15.7 Summary of Ecological Risk Assessment Results 248
9.16 SWMU 16-006(g)—Former Septic System 248
9.16.1 Site Description and Operational History 248
9.16.2 Summary of Previous Investigations 248
9.16.3 Investigation Status 248
9.17 SWMU 16-031(c)—Former Drainline 248
9.17.1 Site Description and Operational History 248
9.17.2 Summary of Previous Investigations 249
9.17.3 Investigation Status 249

10.0 EXTENDED DRAINAGES 249
10.1 Summary of Tuff, Soil, and Sediment Sampling 249
10.2 Fishladder Canyon Drainages 249
10.2.1 Site Description 249
10.2.2 Field-Screening Results 250
10.2.3 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 250
10.2.4 Spatial Distribution 251
10.2.5 Summary of Human Health Risk Assessment Results 254
10.2.6 Summary of Ecological Risk Assessment Results 254
10.3 Martin Spring Canyon Drainages 254
10.3.1 Site Description and Operational History 254
10.3.2 Summary of Previous Investigations 254
10.3.3 Field-Screening Results 255
10.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification 255
10.3.5 Spatial Distribution 256
10.3.6 Summary of Human Health Risk Assessment Results 258
10.3.7 Summary of Ecological Risk Assessment Results 258

11.0 CONCLUSIONS 258
11.1 Nature and Extent of Contamination 258
11.1.1 K-Site Subaggregate Area 259
11.1.2 P-Site Subaggregate Area 259
11.1.3 300s Line Subaggregate Area 260
11.1.4 V-Site Subaggregate Area 262
11.1.5 Extended Drainages 263
11.2 Summary of Risk-Screening Assessments 263
11.2.1 Human Health Risk Screening Assessment 263
11.2.2 Ecological Risk Screening Assessment 263

12.0 RECOMMENDATIONS 264
12.1 Additional Field Characterization Activities 264
12.2 Recommendations for Corrective Actions Complete 264
12.3 Recommendations for Delayed Characterization 265
12.4 Schedule for Recommended Activities 265

13.0 REFERENCES AND MAP DATA SOURCES 265
13.1 References 265
13.2 Map Data Sources 272

Figures

Figure 1.1-1 Location of the S-Site Aggregate Area 275
Figure 2-4.1 Stratigraphy and geologic correlations at selected borings (west-northwest to east-southeast) 276
Figure 2-4.2 Stratigraphy and geologic correlations at selected borings (north to south) 277
Figure 2-4.3 Hydrogeologic conceptual model for the S-Site Aggregate Area 278
Figure 2-4.4 Generalized east-west hydrostratigraphic cross-section through the Pajarito Plateau 279
Figure 6.2-1 Locations sampled for AOC C-11-002 280
Figure 6.2-2 Inorganic chemicals detected above BVs at AOC C-11-002 281
Figure 6.2-3 Organic chemicals detected in samples at AOC C-11-002 282
Figure 6.3-1 Locations sampled for SWMU 11-005(a) 283
Figure 6.3-2 Inorganic chemicals detected above BVs at SWMU 11-005(a) 284
Figure 6.3-3 Organic chemicals detected in samples at SWMU 11-005(a) 285
Figure 6.3-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-005(a) 286
Figure 6.4-1 Locations sampled for SWMU 11-005(b) 287
Figure 6.4-2 Inorganic chemicals detected above BVs at SWMU 11-005(b) 288
Figure 6.4-3 Organic chemicals detected in samples at SWMU 11-005(b) 289
Figure 6.4-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-005(b) 290
Figure 6.5-1 Locations sampled for SWMU 11-006(a) 291
Figure 6.5-2 Inorganic chemicals detected above BVs at SWMU 11-006(a) 292
Figure 6.5-3 Organic chemicals detected in samples at SWMU 11-006(a) 293
Figure 6.6-1 Locations sampled for SWMU 11-006(b) 294
Figure 6.6-2 Inorganic chemicals detected above BVs at SWMU 11-006(b) 295

Figure 6.6-3 Organic chemicals detected in samples at SWMU 11-006(b) 296
Figure 6.6-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-006(b) 297
Figure 6.7-1 Locations sampled for SWMU 11-006(c) 298
Figure 6.7-2 Inorganic chemicals detected above BVs or detected without BVs at SWMU 11-006(c) 299
Figure 6.7-3 Organic chemicals detected in samples at SWMU 11-006(c) 300
Figure 6.7-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-006(c) 301
Figure 6.8-1 Locations sampled for SWMU 11-006(d) 302
Figure 6.8-2 Inorganic chemicals detected above BVs at SWMU 11-006(d) 303
Figure 6.8-3 Organic chemicals detected in samples at SWMU 11-006(d) 304
Figure 6.8-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-006(d) 305
Figure 6.9-1 Locations sampled for SWMU 11-005(c) 306
Figure 6.9-2 Inorganic chemicals detected above BVs at SWMU 11-005(c) 307
Figure 6.9-3 Organic chemicals detected in samples at SWMU 11-005(c) 308
Figure 6.9-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-005(c) 309
Figure 6.10-1 Locations sampled for SWMU 11-011(a) 310
Figure 6.10-2 Inorganic chemicals detected above BVs at SWMU 11-011(a) 311
Figure 6.10-3 Organic chemicals detected in samples at SWMU 11-011(a) 312
Figure 6.10-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-011(a) 313
Figure 6.11-1 Locations sampled for SWMU 11-011(b) 314
Figure 6.11-2 Inorganic chemicals detected above BVs at SWMU 11-011(b) 315
Figure 6.11-3 Organic chemicals detected in samples at SWMU 11-011(b) 316
Figure 6.11-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-011(b) 317
Figure 6.12-1 Locations sampled for SWMU 11-011(d) 318
Figure 6.12-2 Inorganic chemicals detected above BVs at SWMU 11-011(d) 319
Figure 6.12-3 Organic chemicals detected in samples at SWMU 11-011(d) 320
Figure 6.12-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-011(d) 321
Figure 7.4-1 Locations sampled for SWMU 16-025(d2) 322
Figure 7.4-2 Inorganic chemicals detected above BVs at SWMU 16-025(d2) 323
Figure 7.4-3 Organic chemicals detected in samples at SWMU 16-025(d2) 324
Figure 7.4-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-025(d2) 325
Figure 7.5-1 Locations sampled for SWMU 16-031(h) 326
Figure 7.5-2 Inorganic chemicals detected above BVs at SWMU 16-031(h) 327
Figure 7.5-3 Organic chemicals detected in samples at SWMU 16-031(h) 328
Figure 7.6-1 Locations sampled for AOC 16-024(a) 329
Figure 7.6-2 Inorganic chemicals detected above BVs at AOC 16-024(a) 330
Figure 7.6-3 Organic chemicals detected in samples at AOC 16-024(a) 331
Figure 7.6-4 Radionuclides detected or detected above BVs/FVs at AOC 16-024(a) 332
Figure 7.7-1 Locations sampled for AOC 16-024(u) 333
Figure 7.7-2 Inorganic chemicals detected above BVs at AOC 16-024(u) 334

Figure 7.7-3 Organic chemicals detected in samples at AOC 16-024(u) 335
Figure 7.8-1 Locations sampled for AOC C-16-050 336
Figure 7.8-2 Inorganic chemicals detected above BVs at AOC C-16-050 337
Figure 7.8-3 Organic chemicals detected in samples at AOC C-16-050 338
Figure 7.9-1 Locations sampled for AOC C-16-060 339
Figure 7.9-2 Inorganic chemicals detected above BVs at AOC C-16-060 340
Figure 7.9-3 Organic chemicals detected in samples at AOC C-16-060 341
Figure 7.9-4 Radionuclides detected or detected above BVs/FVs at AOC C-16-060 342
Figure 7.10-1 Locations sampled for SWMU 13-001 343
Figure 7.10-2 Radionuclides detected or detected above BVs/FVs at SWMU 13-001 344
Figure 7.11-1 Locations sampled for SWMU 13-002 345
Figure 7.11-2 Inorganic chemicals detected above BVs at SWMU 13-002 346
Figure 7.11-3 Organic chemicals detected in samples at SWMU 13-002 347
Figure 7.12-1 Locations sampled for SWMU 16-029(h) 348
Figure 7.12-2 Radionuclides detected or detected above BVs/FVs at SWMU 16-029(h) 349
Figure 7.13-1 Locations sampled for AOC 16-003(p) 350
Figure 7.13-2 Inorganic chemicals detected above BVs at AOC 16-003(p) 351
Figure 7.13-3 Organic chemicals detected in samples at AOC 16-003(p) 352
Figure 7.13-4 Radionuclides detected or detected above BVs/FVs at AOC 16-003(p) 353
Figure 7.15-1 Locations sampled for SWMU 16-004(a) 354
Figure 7.15-2 Inorganic chemicals detected above BVs at SWMU 16-004(a) 355
Figure 7.15-3 Organic chemicals detected in samples at SWMU 16-004(a) 356
Figure 7.16-1 Locations sampled for SWMU 16-004(b) 357
Figure 7.16-2 Inorganic chemicals detected above BVs at SWMU 16-004(b) 358
Figure 7.16-3 Organic chemicals detected in samples at SWMU 16-004(b) 359
Figure 7.16-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-004(b) 360
Figure 7.17-1 Locations sampled for SWMU 16-004(c) 361
Figure 7.17-2 Inorganic chemicals detected above BVs at SWMU 16-004(c) 362
Figure 7.17-3 Radionuclides detected or detected above BVs/FVs at SWMU 16-004(c) 363
Figure 7.18-1 Locations sampled for SWMU 16-004(d) 364
Figure 7.18-2 Inorganic chemicals detected above BVs at SWMU 16-004(d) 365
Figure 7.18-3 Organic chemicals detected in samples at SWMU 16-004(d) 366
Figure 7.18-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-004(d) 367
Figure 7.19-1 Locations sampled for SWMU 16-004(e) 368
Figure 7.19-2 Inorganic chemicals detected above BVs at SWMU 16-004(e) 369
Figure 7.19-3 Organic chemicals detected in samples at SWMU 16-004(e) 370
Figure 7.20-1 Locations sampled for SWMU 16-004(f) 371
Figure 7.20-2 Inorganic chemicals detected above BVs at SWMU 16-004(f) 372
Figure 7.20-3 Organic chemicals detected in samples at SWMU 16-004(f) 373
Figure 7.20-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-004(f) 374

Figure 8.2-1 Locations sampled for SWMU 16-026(z) 375
Figure 8.2-2 Inorganic chemicals detected above BVs at SWMU 16-026(z) 376
Figure 8.2-3 Organic chemicals detected in samples at SWMU 16-026(z) 377
Figure 8.3-1 Locations sampled for SWMU 16-001(e) 378
Figure 8.3-2 Inorganic chemicals detected above BVs at SWMU 16-001(e) 379
Figure 8.3-3 Organic chemicals detected in samples at SWMU 16-001(e) 380
Figure 8.3-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-001(e) 381
Figure 8.4-1 Locations sampled for SWMU 16-003(d) 382
Figure 8.4-2 Inorganic chemicals detected above BVs at SWMU 16-003(d) 383
Figure 8.4-3 Organic chemicals detected in samples at SWMU 16-003(d) 384
Figure 8.5-1 Locations sampled for SWMU 16-003(e) 385
Figure 8.5-2 Inorganic chemicals detected above BVs at SWMU 16-003(e) 386
Figure 8.5-3 Organic chemicals detected in samples at SWMU 16-003(e) 387
Figure 8.6-1 Locations sampled for SWMU 16-003(f) 388
Figure 8.6-2 Inorganic chemicals detected above BVs at SWMU 16-003(f) 389
Figure 8.6-3 Organic chemicals detected in samples at SWMU 16-003(f) 390
Figure 8.6-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-003(f) 391
Figure 8.7-1 Locations sampled for SWMU 16-003(g) 392
Figure 8.7-2 Inorganic chemicals detected above BVs at SWMU 16-003(g) 393
Figure 8.7-3 Organic chemicals detected in samples at SWMU 16-003(g) 394
Figure 8.8-1 Locations sampled for SWMU 16-026(b) 395
Figure 8.8-2 Inorganic chemicals detected above BVs at SWMU 16-026(b) 396
Figure 8.8-3 Organic chemicals detected in samples at SWMU 16-026(b) 397
Figure 8.9-1 Locations sampled for SWMU 16-026(c) 398
Figure 8.9-2 Inorganic chemicals detected above BVs at SWMU 16-026(c) 399
Figure 8.9-3 Organic chemicals detected in samples at SWMU 16-026(c) 400
Figure 8.10-1 Locations sampled for SWMU 16-026(d) 401
Figure 8.10-2 Inorganic chemicals detected above BVs at SWMU 16-026(d) 402
Figure 8.10-3 Organic chemicals detected in samples at SWMU 16-026(d) 403
Figure 8.10-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-026(d) 404
Figure 8.11-1 Locations sampled for SWMU 16-026(e) 405
Figure 8.11-2 Radionuclides detected or detected above BVs/FVs at SWMU 16-026(e) 406
Figure 8.12-1 Locations sampled for SWMU 16-029(a) 407
Figure 8.12-2 Inorganic chemicals detected above BVs at SWMU 16-029(a) 408
Figure 8.12-3 Organic chemicals detected in samples at SWMU 16-029(a) 409
Figure 8.13-1 Locations sampled for SWMU 16-029(b) 410
Figure 8.13-2 Inorganic chemicals detected above BVs at SWMU 16-029(b) 411
Figure 8.13-3 Organic chemicals detected in samples at SWMU 16-029(b) 412
Figure 8.14-1 Locations sampled for SWMU 16-029(c) 413
Figure 8.14-2 Inorganic chemicals detected above BVs at SWMU 16-029(c) 414

Figure 8.14-3 Organic chemicals detected in samples at SWMU 16-029(c) 415
Figure 8.15-1 Locations sampled for SWMU 16-029(d) 416
Figure 8.15-2 Inorganic chemicals detected above BVs at SWMU 16-029(d) 417
Figure 8.15-3 Organic chemicals detected in samples at SWMU 16-029(d) 418
Figure 8.16-1 Locations sampled for the Shared Drainages 419
Figure 8.16-2 Inorganic chemicals detected above BVs at the Shared Drainages 420
Figure 8.17-1 Locations sampled for the Liquid Waste Trunk Line 421
Figure 8.17-2 Radionuclides detected or detected above BVs/FVs at the Liquid Waste Trunk Line 422
Figure 9.2-1 Locations sampled for AOC C-16-068 423
Figure 9.2-2 Inorganic chemicals detected above BVs at AOC C-16-068 424
Figure 9.2-3 Organic chemicals detected in samples at AOC C-16-068 425
Figure 9.3-1 Locations sampled for SWMU 16-029(g2) and AOC C-16-074 426
Figure 9.3-2 Inorganic chemicals detected above BVs at SWMU 16-029(g2) and AOC C-16-074 427
Figure 9.3-3 Organic chemicals detected in samples at SWMU 16-029(g2) and AOC C-16-074 428
Figure 9.5-1 Locations sampled for SWMU 16-029(x) 429
Figure 9.5-2 Radionuclides detected or detected above BVs/FVs at SWMU 16-029(x) 430
Figure 9.6-1 Locations sampled for SWMU 16-029(w) 431
Figure 9.6-2 Inorganic chemicals detected above BVs at SWMU 16-029(w) 432
Figure 9.6-3 Organic chemicals detected in samples at SWMU 16-029(w) 433
Figure 9.6-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-029(w) 434
Figure 9.7-1 Locations sampled for SWMU 16-025(x) 435
Figure 9.7-2 Inorganic chemicals detected above BVs at SWMU 16-025(x) 436
Figure 9.7-3 Organic chemicals detected in samples at SWMU 16-025(x) 437
Figure 9.8-1 Locations sampled for SWMU 16-017(p)-99 438
Figure 9.8-2 Inorganic chemicals detected above BVs at SWMU 16-017(p)-99 439
Figure 9.8-3 Organic chemicals detected in samples at SWMU 16-017(p)-99 440
Figure 9.9-1 Locations sampled for SWMU 16-017(w)-99 441
Figure 9.9-2 Inorganic chemicals detected above BVs at SWMU 16-017(w)-99 442
Figure 9.9-3 Organic chemicals detected in samples at SWMU 16-017(w)-99 443
Figure 9.10-1 Locations sampled for SWMU 16-034(m) 444
Figure 9.10-2 Inorganic chemicals detected above BVs at SWMU 16-034(m) 445
Figure 9.10-3 Organic chemicals detected in samples at SWMU 16-034(m) 446
Figure 9.11-1 Locations sampled for AOC 16-024(n) 447
Figure 9.11-2 Inorganic chemicals detected above BVs at AOC 16-024(n) 448
Figure 9.11-3 Organic chemicals detected in samples at AOC 16-024(n) 449
Figure 9.12-1 Locations sampled for SWMU 16-034(n) 450
Figure 9.12-2 Inorganic chemicals detected above BVs at SWMU 16-034(n) 451
Figure 9.12-3 Organic chemicals detected in samples at SWMU 16-034(n) 452
Figure 9.13-1 Locations sampled for AOC 16-024(m) 453
Figure 9.13-2 Inorganic chemicals detected above BVs at AOC 16-024(m) 454

Figure 9.13-3 Organic chemicals detected in samples at AOC 16-024(m) 455
Figure 9.14-1 Locations sampled for SWMU 16-017(v)-99 456
Figure 9.14-2 Inorganic chemicals detected above BVs at SWMU 16-017(v)-99 457
Figure 9.14-3 Organic chemicals detected in samples at SWMU 16-017(v)-99 458
Figure 9.15-1 Locations sampled at the V-Site Courtyard Periphery and the drainage north of the Courtyard 459
Figure 10.2-1 Locations sampled for Fishladder Canyon Drainages 460
Figure 10.2-2 Radionuclides detected or detected above BVs/FVs for the Fishladder Canyon Drainages 461

Tables

Table 1.1-1 S-Site Aggregate Area List of Consolidated Units, SWMUs, and AOCs 463
Table 6.2-1 Summary of Samples Collected and Analyses Requested at AOC C-11-002 470
Table 6.2-2 Summary of Inorganic Chemicals above BVs at AOC C-11-002 471
Table 6.2-3 Summary of Organic Chemicals Detected at AOC C-11-002 472
Table 6.3-1 Summary of Samples Collected and Analyses Requested at SWMU 11-005(a) 473
Table 6.3-2 Summary of Inorganic Chemicals above BVs at SWMU 11-005(a) 474
Table 6.3-3 Summary of Organic Chemicals Detected at SWMU 11-005(a) 475
Table 6.3-4 Summary of Radionuclides Detected at SWMU 11-005(a) 475
Table 6.4-1 Summary of Samples Collected and Analyses Requested at SWMU 11-005(b) 476
Table 6.4-2 Summary of Inorganic Chemicals above BVs at SWMU 11-005(b) 477
Table 6.4-3 Summary of Organic Chemicals Detected at SWMU 11-005(b) 478
Table 6.4-4 Summary of Radionuclides Detected at SWMU 11-005(b) 479
Table 6.5-1 Summary of Samples Collected and Analyses Requested at SWMU 11-006(a) 479
Table 6.5-2 Summary of Inorganic Chemicals above BVs at SWMU 11-006(a) 480
Table 6.5-3 Summary of Organic Chemicals Detected at SWMU 11-006(a) 481
Table 6.6-1 Summary of Samples Collected and Analyses Requested at SWMU 11-006(b) 482
Table 6.6-2 Summary of Inorganic Chemicals above BVs at SWMU 11-006(b) 483
Table 6.6-3 Summary of Organic Chemicals Detected at SWMU 11-006(b) 487
Table 6.6-4 Summary of Radionuclides Detected at SWMU 11-006(b) 488
Table 6.7-1 Summary of Samples Collected and Analyses Requested at SWMU 11-006(c) 489
Table 6.7-2 Summary of Inorganic Chemicals above BVs at SWMU 11-006(c) 490
Table 6.7-3 Summary of Organic Chemicals Detected at SWMU 11-006(c) 492
Table 6.7-4 Summary of Radionuclides Detected at SWMU 11-006(c) 494
Table 6.8-1 Summary of Samples Collected and Analyses Requested at SWMU 11-006(d) 495
Table 6.8-2 Summary of Inorganic Chemicals above BVs at SWMU 11-006(d) 496
Table 6.8-3 Summary of Organic Chemicals Detected at SWMU 11-006(d) 497
Table 6.8-4 Summary of Radionuclides Detected at SWMU 11-006(d) 498
Table 6.9-1 Summary of Samples Collected and Analyses Requested at SWMU 11-005(c) 499
Table 6.9-2 Summary of Inorganic Chemicals above BVs at SWMU 11-005(c) 500

Table 6.9-3 Summary of Organic Chemicals Detected at SWMU 11-005(c) 501
Table 6.9-4 Summary of Radionuclides Detected at SWMU 11-005(c) 502
Table 6.10-1 Summary of Samples Collected and Analyses Requested at SWMU 11-011(a) 503
Table 6.10-2 Summary of Inorganic Chemicals above BVs at SWMU 11-011(a) 504
Table 6.10-3 Summary of Organic Chemicals Detected at SWMU 11-011(a) 505
Table 6.10-4 Summary of Radionuclides Detected at SWMU 11-011(a) 507
Table 6.11-1 Summary of Samples Collected and Analyses Requested at SWMU 11-011(b) 507
Table 6.11-2 Summary of Inorganic Chemicals above BVs at SWMU 11-011(b) 508
Table 6.11-3 Summary of Organic Chemicals Detected at SWMU 11-011(b) 509
Table 6.11-4 Summary of Radionuclides Detected at SWMU 11-011(b) 511
Table 6.12-1 Summary of Samples Collected and Analyses Requested at SWMU 11-011(d) 511
Table 6.12-2 Summary of Inorganic Chemicals above BVs at SWMU 11-011(d) 512
Table 6.12-3 Summary of Organic Chemicals Detected at SWMU 11-011(d) 513
Table 6.12-4 Summary of Radionuclides Detected at SWMU 11-011(d) 514
Table 7.4-1 Summary of Samples Collected and Analyses Requested at SWMU 16-025(d2) 514
Table 7.4-2 Summary of Inorganic Chemicals above BVs at SWMU 16-025(d2) 515
Table 7.4-3 Summary of Organic Chemicals Detected at SWMU 16-025(d2) 516
Table 7.4-4 Summary of Radionuclides Detected at SWMU 16-025(d2) 517
Table 7.5-1 Summary of Samples Collected and Analyses Requested at SWMU 16-031(h) 518
Table 7.5-2 Summary of Inorganic Chemicals above BVs at SWMU 16-031(h) 519
Table 7.5-3 Summary of Organic Chemicals Detected at SWMU 16-031(h) 520
Table 7.6-1 Summary of Samples Collected and Analyses Requested at AOC 16-024(a) 521
Table 7.6-2 Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at AOC 16-024(a) 522
Table 7.6-3 Summary of Organic Chemicals Detected at AOC 16-024(a) 523
Table 7.6-4 Summary of Radionuclides Detected at AOC 16-024(a) 523
Table 7.7-1 Summary of Samples Collected and Analyses Requested at AOC 16-024(u) 524
Table 7.7-2 Summary of Inorganic Chemicals above BVs at AOC 16-024(u) 525
Table 7.7-3 Summary of Organic Chemicals Detected at AOC 16-024(u) 526
Table 7.8-1 Summary of Samples Collected and Analyses Requested at AOC C-16-050 528
Table 7.8-2 Summary of Inorganic Chemicals above BVs at AOC C-16-050 529
Table 7.8-3 Summary of Organic Chemicals Detected at AOC C-16-050 530
Table 7.9-1 Summary of Samples Collected and Analyses Requested at AOC C-16-060 532
Table 7.9-2 Summary of Inorganic Chemicals above BVs at AOC C-16-060 533
Table 7.9-3 Summary of Organic Chemicals Detected at AOC C-16-060 534
Table 7.9-4 Summary of Radionuclides Detected at AOC C-16-060 535
Table 7.10-1 Summary of Samples Collected and Analyses Requested at SWMU 13-001 536
Table 7.10-2 Summary of Inorganic Chemicals above BVs at SWMU 13-001 538
Table 7.10-3 Summary of Organic Chemicals Detected at SWMU 13-001 540
Table 7.10-4 Summary of Radionuclides Detected at SWMU 13-001 542

Table 7.11-1 Summary of Samples Collected and Analyses Requested at SWMU 13-002 542
Table 7.11-2 Summary of Inorganic Chemicals above BVs at SWMU 13-002 543
Table 7.11-3 Summary of Organic Chemicals Detected at SWMU 13-002 544
Table 7.12-1 Summary of Samples Collected and Analyses Requested at SWMU 16-029(h) 545
Table 7.12-2 Summary of Inorganic Chemicals above BVs at SWMU 16-029(h) 546
Table 7.12-3 Summary of Organic Chemicals Detected at SWMU 16-029(h) 548
Table 7.12-4 Summary of Radionuclides Detected at SWMU 16-029(h) 551
Table 7.13-1 Summary of Samples Collected and Analyses Requested at AOC 16-003(p) 551
Table 7.13-2 Summary of Inorganic Chemicals above BVs at AOC 16-003(p) 552
Table 7.13-3 Summary of Organic Chemicals Detected at AOC 16-003(p) 553
Table 7.13-4 Summary of Radionuclides Detected at AOC 16-003(p) 554
Table 7.15-1 Summary of Samples Collected and Analyses Requested at SWMU 16-004(a) 554
Table 7.15-2 Summary of Inorganic Chemicals above BVs at SWMU 16-004(a) 555
Table 7.15-3 Summary of Organic Chemicals Detected at SWMU 16-004(a) 556
Table 7.16-1 Summary of Samples Collected and Analyses Requested at SWMU 16-004(b) 556
Table 7.16-2 Summary of Inorganic Chemicals above BVs at SWMU 16-004(b) 557
Table 7.16-3 Summary of Organic Chemicals Detected at SWMU 16-004(b) 558
Table 7.16-4 Summary of Radionuclides Detected at SWMU 16-004(b) 558
Table 7.17-1 Summary of Samples Collected and Analyses Requested at SWMU 16-004(c) 559
Table 7.17-2 Summary of Inorganic Chemicals above BVs at SWMU 16-004(c) 559
Table 7.17-3 Summary of Radionuclides above BVs at SWMU 16-004(c) 560
Table 7.18-1 Summary of Samples Collected and Analyses Requested at SWMU 16-004(d) 560
Table 7.18-2 Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at SWMU 16-004(d) 561
Table 7.18-3 Summary of Organic Chemicals Detected at SWMU 16-004(d) 562
Table 7.18-4 Summary of Radionuclides above BVs at SWMU 16-004(d) 562
Table 7.19-1 Summary of Samples Collected and Analyses Requested at SWMU 16-004(e) 563
Table 7.19-2 Summary of Inorganic Chemicals above BVs at SWMU 16-004(e) 563
Table 7.19-3 Summary of Organic Chemicals Detected at SWMU 16-004(e) 564
Table 7.20-1 Summary of Samples Collected and Analyses Requested at SWMU 16-004(f) 564
Table 7.20-2 Summary of Inorganic Chemicals above BVs at SWMU 16-004(f) 565
Table 7.20-3 Summary of Organic Chemicals Detected at SWMU 16-004(f) 566
Table 7.20-4 Summary of Radionuclides Detected at SWMU 16-004(f) 566
Table 8.2-1 Summary of Samples Collected and Analyses Requested at SWMU 16-026(z) 567
Table 8.2-2 Summary of Inorganic Chemicals above BVs at SWMU 16-026(z) 567
Table 8.2-3 Summary of Organic Chemicals Detected at SWMU 16-026(z) 568
Table 8.3-1 Summary of Samples Collected and Analyses Requested at SWMU 16-001(e) 569
Table 8.3-2 Summary of Inorganic Chemicals above BVs at SWMU 16-001(e) 570
Table 8.3-3 Summary of Organic Chemicals Detected at SWMU 16-001(e) 571
Table 8.3-4 Summary of Radionuclides Detected at SWMU 16-001(e) 574

Table 8.4-1 Summary of Samples Collected and Analyses Requested at SWMU 16-003(d) 574
Table 8.4-2 Summary of Inorganic Chemicals above BVs at SWMU 16-003(d) 575
Table 8.4-3 Summary of Organic Chemicals Detected at SWMU 16-003(d) 576
Table 8.5-1 Summary of Samples Collected and Analyses Requested at SWMU 16-003(e) 576
Table 8.5-2 Summary of Inorganic Chemicals above BVs at SWMU 16-003(e) 577
Table 8.5-3 Summary of Organic Chemicals Detected at SWMU 16-003(e) 578
Table 8.6-1 Summary of Samples Collected and Analyses Requested at SWMU 16-003(f) 578
Table 8.6-2 Summary of Inorganic Chemicals above BVs at SWMU 16-003(f) 579
Table 8.6-3 Summary of Organic Chemicals Detected at SWMU 16-003(f) 580
Table 8.6-4 Summary of Radionuclides Detected at SWMU 16-003(f) 582
Table 8.7-1 Summary of Samples Collected and Analyses Requested at SWMU 16-003(g) 582
Table 8.7-2 Summary of Inorganic Chemicals above BVs at SWMU 16-003(g) 583
Table 8.7-3 Summary of Organic Chemicals Detected at SWMU 16-003(g) 583
Table 8.8-1 Summary of Samples Collected and Analyses Requested at SWMU 16-026(b) 585
Table 8.8-2 Summary of Inorganic Chemicals above BVs at SWMU 16-026(b) 586
Table 8.8-3 Summary of Organic Chemicals Detected at SWMU 16-026(b) 587
Table 8.9-1 Summary of Samples Collected and Analyses Requested at SWMU 16-026(c) 589
Table 8.9-2 Summary of Inorganic Chemicals above BVs at SWMU 16-026(c) 590
Table 8.9-3 Summary of Organic Chemicals Detected at SWMU 16-026(c) 591
Table 8.10-1 Summary of Samples Collected and Analyses Requested at SWMU 16-026(d) 593
Table 8.10-2 Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at SWMU 16-026(d) 594
Table 8.10-3 Summary of Organic Chemicals Detected at SWMU 16-026(d) 595
Table 8.10-4 Summary of Radionuclides Detected at SWMU 16-026(d) 596
Table 8.11-1 Summary of Samples Collected and Analyses Requested at SWMU 16-026(e) 597
Table 8.11-2 Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at SWMU 16-026(e) 599
Table 8.11-3 Summary of Organic Chemicals Detected at SWMU 16-026(e) 601
Table 8.11-4 Summary of Radionuclides Detected at SWMU 16-026(e) 603
Table 8.12-1 Summary of Samples Collected and Analyses Requested at SWMU 16-029(a) 604
Table 8.12-2 Summary of Inorganic Chemicals above BVs at SWMU 16-029(a) 604
Table 8.12-3 Summary of Organic Chemicals Detected at SWMU 16-029(a) 605
Table 8.13-1 Summary of Samples Collected and Analyses Requested at SWMU 16-029(b) 606
Table 8.13-2 Summary of Inorganic Chemicals above BVs at SWMU 16-029(b) 607
Table 8.13-3 Summary of Organic Chemicals Detected at SWMU 16-029(b) 607
Table 8.14-1 Summary of Samples Collected and Analyses Requested at SWMU 16-029(c) 608
Table 8.14-2 Summary of Inorganic Chemicals above BVs at SWMU 16-029(c) 608
Table 8.14-3 Summary of Organic Chemicals Detected at SWMU 16-029(c) 609
Table 8.15-1 Summary of Samples Collected and Analyses Requested at SWMU 16-029(d) 609
Table 8.15-2 Summary of Inorganic Chemicals above BVs at SWMU 16-029(d) 610
Table 8.15-3 Summary of Organic Chemicals Detected at SWMU 16-029(d) 610

Table 8.16-1 Summary of Samples Collected and Analyses Requested at Shared Drainages 611
Table 8.16-2 Summary of Inorganic Chemicals above BVs at Shared Drainages 612
Table 8.16-3 Summary of Organic Chemicals Detected at Shared Drainages 615
Table 8.17-1 Summary of Samples Collected and Analyses Requested at the Liquid Waste Trunk Line 619
Table 8.17-2 Summary of Inorganic Chemicals above BVs at the Liquid Waste Trunk Line 621
Table 8.17-3 Summary of Organic Chemicals Detected at the Liquid Waste Trunk Line..... 625
Table 8.17-4 Summary of Radionuclides Detected at the Liquid Waste Trunk Line 628
Table 9.2-1 Summary of Samples Collected and Analyses Requested at AOC C-16-068 629
Table 9.2-2 Summary of Inorganic Chemicals above BVs at AOC C-16-068 629
Table 9.2-3 Summary of Organic Chemicals Detected at AOC C-16-068..... 630
Table 9.3-1 Summary of Samples Collected and Analyses Requested at SWMU 16-029(g2) 630
Table 9.3-2 Summary of Inorganic Chemicals above BVs at SWMU 16-029(g2) 631
Table 9.3-3 Summary of Organic Chemicals Detected at SWMU 16-029(g2) 631
Table 9.4-1 Summary of Samples Collected and Analyses Requested at AOC C-16-074 632
Table 9.4-2 Summary of Inorganic Chemicals above BVs at AOC C-16-074 632
Table 9.4-3 Summary of Organic Chemicals Detected at AOC C-16-074..... 633
Table 9.5-1 Summary of Samples Collected and Analyses Requested at SWMU 16-029(x) 634
Table 9.5-2 Summary of Inorganic Chemicals above BVs at SWMU 16-029(x) 638
Table 9.5-3 Summary of Organic Chemicals Detected at SWMU 16-029(x)..... 645
Table 9.5-4 Summary of Radionuclides Detected at SWMU 16-029(x)..... 652
Table 9.6-1 Summary of Samples Collected and Analyses Requested at SWMU 16-029(w) 652
Table 9.6-2 Summary of Inorganic Chemicals above BVs at SWMU 16-029(w)..... 653
Table 9.6-3 Summary of Organic Chemicals Detected at SWMU 16-029(w)..... 654
Table 9.6-4 Summary of Radionuclides Detected at SWMU 16-029(w)..... 658
Table 9.7-1 Summary of Samples Collected and Analyses Requested at SWMU 16-025(x) 658
Table 9.7-2 Summary of Inorganic Chemicals above BVs at SWMU 16-025(x) 659
Table 9.7-3 Summary of Organic Chemicals Detected at SWMU 16-025(x)..... 660
Table 9.8-1 Summary of Samples Collected and Analyses Requested at SWMU 16-017(p)-99..... 660
Table 9.8-2 Summary of Inorganic Chemicals above BVs at SWMU 16-017(p)-99 661
Table 9.8-3 Summary of Organic Chemicals Detected at SWMU 16-017(p)-99 662
Table 9.9-1 Summary of Samples Collected and Analyses Requested at SWMU 16-017(w)-99 662
Table 9.9-2 Summary of Inorganic Chemicals above BVs at SWMU 16-017(w)-99 663
Table 9.9-3 Summary of Organic Chemicals Detected at SWMU 16-017(w)-99..... 664
Table 9.10-1 Summary of Samples Collected and Analyses Requested at SWMU 16-034(m) 665
Table 9.10-2 Summary of Inorganic Chemicals above BVs at SWMU 16-034(m) 666
Table 9.10-3 Summary of Organic Chemicals Detected at SWMU 16-034(m) 667
Table 9.11-1 Summary of Samples Collected and Analyses Requested at AOC 16-024(n)..... 667
Table 9.11-2 Summary of Inorganic Chemicals above BVs at AOC 16-024(n)..... 668
Table 9.11-3 Summary of Organic Chemicals Detected at AOC 16-024(n) 669

Table 9.12-1 Summary of Samples Collected and Analyses Requested at SWMU 16-034(n) 669
Table 9.12-2 Summary of Inorganic Chemicals above BVs at SWMU 16-034(n) 670
Table 9.12-3 Summary of Organic Chemicals Detected at SWMU 16-034(n) 671
Table 9.13-1 Summary of Samples Collected and Analyses Requested at AOC 16-024(m) 672
Table 9.13-2 Summary of Inorganic Chemicals above BVs at AOC 16-024(m) 673
Table 9.13-3 Summary of Organic Chemicals Detected at AOC 16-024(m) 675
Table 9.14-1 Summary of Samples Collected and Analyses Requested at SWMU 16-017(v)-99 676
Table 9.14-2 Summary of Inorganic Chemicals above BVs at SWMU 16-017(v)-99 676
Table 9.14-3 Summary of Organic Chemicals Detected at SWMU 16-017(v)-99 677
Table 9.15-1 Summary of Samples Collected and Analyses Requested at the Courtyard Periphery Area 678
Table 9.15-2 Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at the Courtyard Periphery Area 680
Table 9.15-3 Summary of Organic Chemicals Detected at the Courtyard Periphery Area 685
Table 10.2-1 Summary of Samples Collected and Analyses Requested at the Fishladder Canyon Drainages 689
Table 10.2-2 Summary of Inorganic Chemicals above BVs at Fishladder Canyon Drainages 691
Table 10.2-3 Summary of Organic Chemicals Detected at Fishladder Canyon Drainages 695
Table 10.2-4 Summary of Radionuclides Detected at Fishladder Canyon Drainages 698
Table 10.3-1 Summary of Samples Collected and Analyses Requested at Martin Spring Canyon Drainages 699
Table 10.3-2 Summary of Inorganic Chemicals above BVs at Martin Spring Canyon Drainages 705
Table 10.3-3 Summary of Organic Chemicals Detected at Martin Spring Canyon Drainages 719
Table 10.3-4 Summary of Radionuclides Detected at Martin Spring Canyon Drainages 731

Appendixes

Appendix A Acronyms and Abbreviations, Metric Conversion Table, and Data Qualifier Definitions
Appendix B Box Plots and Statistical Results
Appendix C Field Methods
Appendix D Field-Screening Data (on CD included with this document)
Appendix E Analytical Program
Appendix F Analytical Suites and Results and Analytical Reports (on DVDs included with this document)
Appendix G Management Plan for Investigation-Derived Waste
Appendix H Risk Assessments
Appendix I Site Photographs
Appendix J Borehole Logs (on CD included with this document)

Plates

Plate 1 S-Site Aggregate Area
Plate 2 K-Site Subaggregate Area
Plate 3 P-Site Subaggregate Area
Plate 4 300s Line Subaggregate Area
Plate 5 V-Site Subaggregate Area
Plate 6 Summary of inorganic chemicals above BVs at SWMU 13-001
Plate 7 Organic chemicals detected in samples at SWMU 13-001
Plate 8 Summary of inorganic chemicals above BVs at SWMU 16-029(h)
Plate 9 Organic chemicals detected in samples at SWMU 16-029(h)
Plate 10 Summary of inorganic chemicals above BVs at SWMU 16-026(e)
Plate 11 Organic chemicals detected in samples at SWMU 16-026(e)
Plate 12 Organic chemicals detected in samples at the Shared Drainages
Plate 13 Summary of inorganic chemicals above BVs at the Liquid Waste Trunk Line
Plate 14 Organic chemicals detected in samples at the Liquid Waste Trunk Line
Plate 15 Summary of inorganic chemicals above BVs at SWMU 16-029(x)
Plate 16 Organic chemicals detected in samples at SWMU 16-029(x)
Plate 17 Summary of inorganic chemicals above BVs at the V-Site Courtyard Periphery and the Drainage North of the Courtyard
Plate 18 Organic chemicals detected in samples at the V-Site Courtyard Periphery and the Drainage North of the Courtyard
Plate 19 Summary of inorganic chemicals above BVs at the Fishladder Canyon Drainages
Plate 20 Organic chemicals detected in samples at the Fishladder Canyon Drainages
Plate 21 Locations sampled for Martin Spring Canyon Drainages Area 1
Plate 22 Locations sampled for Martin Spring Canyon Drainages Area 2
Plate 23 Locations sampled for Martin Spring Canyon Drainages Area 3
Plate 24 Locations sampled for Martin Spring Canyon Drainages Area 4
Plate 25 Summary of inorganic chemicals above BVs at Martin Spring Canyon Drainages Area 1
Plate 26 Summary of inorganic chemicals above BVs at Martin Spring Canyon Drainages Area 2
Plate 27 Summary of inorganic chemicals above BVs at Martin Spring Canyon Drainages Area 3
Plate 28 Summary of inorganic chemicals above BVs at Martin Spring Canyon Drainages Area 4
Plate 29 Organic chemicals detected in samples at Martin Spring Canyon Drainages Area 1
Plate 30 Organic chemicals detected in samples at Martin Spring Canyon Drainages Area 2
Plate 31 Organic chemicals detected in samples at Martin Spring Canyon Drainages Area 3
Plate 32 Organic chemicals detected in samples at Martin Spring Canyon Drainages Area 4

1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by Los Alamos National Security, LLC. The Laboratory is located in north-central New Mexico, approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers 40 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas that are separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above mean sea level (amsl).

The Laboratory's Environmental Programs (EP) Directorate is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of EP is to ensure that past operations do not pose an unacceptable risk to human health or the environment in and around Los Alamos County, New Mexico. To achieve this goal, EP is currently investigating sites potentially contaminated by past Laboratory operations. These sites are designated as either solid waste management units (SWMUs) or areas of concern (AOCs).

This investigation report addresses SWMUs and AOCs within the S-Site Aggregate Area (Figure 1.1-1) at the Laboratory. These sites are potentially contaminated with hazardous chemicals and radionuclides. Corrective actions at the Laboratory are subject to the March 1, 2005, Compliance Order on Consent (the Consent Order). Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the New Mexico Environment Department (NMED) in accordance with DOE policy.

1.1 General Site Information

Located in the western portion of the Laboratory, the S-Site Aggregate Area includes portions of Technical Area 16 (TA-16), TA-11, TA-37, and former TA-13 (Plate 1). Table 1.1-1 identifies the SWMUs and AOCs in the S-Site Aggregate Area and their status. The S-Site Aggregate Area consists of 105 SWMUs and AOCs (also referred to as sites). The sites are either located in the S-Site Canyon subwatershed or they discharge directly to the Water Canyon watershed from the mesa tops. Note that S-Site Canyon is also referred to as Martin Spring Canyon. The latter reference is used throughout the rest of the document and in all figures. Topographically, the area consists of roughly east- to southeast-trending, flat-topped mesas that drain predominantly into the Martin Spring Canyon subwatershed of the Water Canyon watershed. Plate 1 shows the local topography of TA-16 and TA-11.

1.1.1 Division into Four Subaggregates

Of the 105 S-Site Aggregate Area SWMUs and AOCs, 65 SWMUs and AOCs were included in the investigation and have been subdivided into four subaggregates according to their location and operational histories. This investigation report addresses the sites by the subaggregates described below.

- **K-Site Subaggregate:** The TA-11 firing sites were constructed in 1944 for research on implosion symmetry using x-rays and the magnetic method. K-Site was originally used to house the Betatron Facility and the Cloud Chamber, two devices used during the Manhattan Project (1942–1945). K-Site has also been home to photofission experiments, an air gun firing facility, a mortar impact area, a burning ground, laboratories, storage buildings, sumps, and Material Disposal Area (MDA) S. Until recently, a drop tower and vibration table used for conducting environmental and effects tests on high explosives (HE) systems and components were in

operation. The 11 SWMUs and AOCs investigated in the K-Site Subaggregate are as follows (Plate 2):

- AOC C-11-002
- SWMU 11-005(a–c)
- SWMU 11-006(a–d)
- SWMU 11-011(a,b,d)

- **P-Site Subaggregate:** The P-Site Subaggregate consists of inactive sites at TA-16 and former TA-13. Former TA-13 was used for a wide variety of Laboratory activities dating back to World War II. Former TA-13 was constructed in 1944 to support the HE portion of the Manhattan Project. Manhattan Project activities conducted included counter x-ray diagnostics of HE lens configurations, testing of initiator assemblies, and HE assembly and research in the magnetic method program. Because of its remote location, the area was also used to machine toxic or extremely sensitive explosives. P-Site included a firing site, a firing site debris area, control bunkers, firing bunkers, storage buildings, purported burn pits, and an experiment chamber. The majority of the buildings in the western half of former TA-13 were demolished in the early 1950s to make way for the construction of the TA-16-340 Complex. A wastewater treatment plant (WWTP) was constructed in 1953 and served all of TA-16. The WWTP was disconnected in 1992 when the sanitary sewer system was connected to a Laboratory-wide system (LANL 1993, 020948, pp. 5–228). The 19 SWMUs and AOCs investigated in the P-Site Subaggregate are as follows (Plate 3):
  - AOC 16-003(p)
  - AOC 16-024(a,u)
  - AOCs C-16-050 and C-16-060
  - SWMUs 13-001 and 13-002
  - SWMU 13-004
  - SWMU 16-004(a–f)
  - SWMU 16-025(d2)
  - SWMU 16-029(h)
  - SWMU 16-031(h)
  - SWMUs 16-035 and 16-036

- **300s Line Subaggregate:** The 300s Line Subaggregate consists of HE-processing buildings 16-300, 16-302, 16-304, and 16-306 along with their associated rest houses (structures 16-301, 16-303, 16-305, and 16-307). The HE-processing buildings are located on the east side of the 300s Line, and the rest houses are located on the west side of the 300s Line. Construction of the 300s Line began at the end of 1951 and was completed in 1953. The primary function of this facility was casting HE such as 2,4,6-trinitrotoluene (TNT), Composition B, and Baratol. The 300s Line Subaggregate comprises the following 14 SWMUs and AOCs (Plate 4):
  - SWMU 16-001(e)
  - SWMU 16-003(d–g)

- ❖ SWMU 16-026(b–e,z)
- ❖ SWMU 16-029(a–d)

- **V-Site Subaggregate:** The V-Site Subaggregate is a historic site located at the eastern edge of the World War II era complex. V-Site included HE-processing, -machining, and -casting buildings; HE magazines; material storage buildings; and the recently restored High Bay assembly building. The V-Site was a critical area during the Manhattan Project, during which operations included handling, loading, and testing of replicas or mockups of the first atomic bomb. This subaggregate burned during the 2000 Cerro Grande fire, razing its remaining structures except for buildings 16-516 and 16-517. Building 16-516 [SWMU 16-017(t)-99] is the historic High Bay assembly building, where components of the first atomic bomb were fit tested before its transport and detonation at the Trinity Site. All V-Site operations have long since ceased; however, the High Bay building has been restored for historical purposes (LANL 2000, 066885, p. 2). The 21 SWMUs and AOCs, as well as the drainage north of the Courtyard, investigated in the V-Site Subaggregate are as follows (Plate 5):
  - ❖ AOC 16-024(m,n)
  - ❖ AOC 16-034(m,n)
  - ❖ AOC C-16-068
  - ❖ SWMU 16-006(g,h)
  - ❖ SWMU 16-013
  - ❖ SWMU 16-017(p,q,r,s,t,v,w)-99
  - ❖ SWMU 16-025(x)
  - ❖ SWMU 16-029(w,x)
  - ❖ SWMU 16-029(g2)/AOC C-16-074
  - ❖ SWMU 16-031(c)

In addition to the 65 SWMUs and AOCs within the four subaggregates included in the investigation, an area defined as the Extended Drainages that runs through the canyon bottom among the sites was also included in sampling activities.

1.2 Investigation Overview

The sites included in this investigation report are listed in section 1.1.1 of this document. These sites have undergone sampling to determine the nature and extent of contaminants. The sampling included surface and subsurface soil, fill, sediment, and tuff samples. Groundwater and surface-water investigations were outside the scope of this investigation report. Martin Spring and several intermediate-depth groundwater wells (MSC-16-06293, MSC-16-06294, and MSC-16-09295) in the S-Site Aggregate Area are monitored as part of the Laboratory's annual Interim Facility Site-Wide Groundwater Monitoring Plan. In addition, several automated surface-water gauging stations within the S-Site Aggregate Area are sampled so that runoff from SWMUs and AOCs can be monitored. Data are presented in the periodic monitoring reports for Water / Cañon de Valle watershed (LANL 2010, 108758).

At the time of the S-Site Aggregate Area investigation work plan approval (LANL 2007, 102216), the K-Site drop tower was still active, and therefore, a limited sampling campaign was proposed and

implemented at the K-Site Subaggregate SWMUs and AOCs. The K-Site drop tower is no longer active and was recently removed.

In addition, this report includes results from the investigation of potential contamination of canyon alluvial sediment, soil, and tuff outside and downgradient of the S-Site subaggregate areas within the ephemeral drainage channels (the Extended Drainages). The drainages were sampled to determine whether contaminants are migrating off of the individual SWMUs and AOCs and whether those contaminants are migrating down the canyons.

1.3 S-Site Aggregate Area Sites Not Included in Report

The following sites are not discussed in this investigation report.

- Nine sites were removed from Module VIII of the Laboratory's Hazardous Waste Facility Permit by NMED [SWMU 11-007, SWMU 11-011(c), SWMU 16-005(i), SWMU 16-012(i–m), SWMU 16-034(g)] (NMED 1998, 063042).
- Eleven sites have no further action (NFA) approval by the U.S. Environmental Protection Agency (EPA) [AOC 11-003(a), AOC 11-008, AOC 11-010(a,b), AOC 25-001, AOC C-11-003, AOC C-16-007, AOC C-16-056, AOC C-16-057, AOC C-16-059, AOC C-25-001] (EPA 2005, 088464).
- One site has received a certificate of completion (NMED 2008, 100116).
- Two sites are addressed in another investigation work plan approved by NMED [AOC 13-003(b) and SWMU 13-003(a)] (LANL 2004, 087345).
- Fourteen sites are deferred from investigation pursuant to Table IV-2 of the Consent Order [AOC 11-004(f), SWMU 11-004(a–e), AOC C-11-001, SWMU 11-001(a), SWMU 11-002, AOC 11-003(b), AOC 11-012(c,d), SWMU 11-001(b), SWMU 11-009].

1.4 Document Organization

Section 1 of this report presents introductory information. Section 2 presents site conditions, Section 3 presents the scope of the activities conducted during the 2009–2010 sampling work and provides the field-investigation results and conditions encountered at the sites. Section 4 covers the regulatory criteria. Section 5 presents the data review process. Sections 6–10 present the background, historical sampling, summary of sampling results, and summary of the human health and ecological risk assessments. Section 11 presents the conclusions of the investigation, section 12 presents the recommendations for each site, and section 13 provides references and map data sources. The appendixes present the acronyms and abbreviations, metric conversion table, and data qualifier definitions used in this report (Appendix A); the statistical tables and box plots (Appendix B); field methods (Appendix C); field screening data (Appendix D); analytical program description and data (Appendixes E and F); waste management plan, (Appendix G); human health and ecological risk assessments (Appendix H); site photographs (Appendix I); and borehole logs (Appendix J).

2.0 SITE CONDITIONS

2.1 Surface Conditions and Topography

The S-Site Aggregate Area consists of roughly east- to southeast-trending, flat-topped mesas that drain predominantly into Martin Spring Canyon subwatershed of the Water Canyon watershed. Martin Spring

Canyon subwatershed terminates at the confluence with Water Canyon. Source waters are predominantly from local storm and snowmelt runoff and mountain-storm and snowmelt runoff flow from perennial springs.

The mesa tops, which range from 7600 ft amsl at the western Laboratory boundary to 7200 ft amsl at the southern tip of the mesa, overlook the confluence of Martin Spring Canyon. Martin Spring Canyon is fairly shallow near its inception between V-Site and the 300s Line Subaggregate areas; it steepens and narrows 100 ft east of the 300s Line Subaggregate. Martin Spring Canyon widens as it gets deeper to a low elevation of 6890 ft at its convergence point with Water Canyon.

The Martin Spring Canyon subwatershed is located between the Cañon de Valle and Water Canyon watersheds. The S-Site Aggregate Area sits primarily at TA-16 and crosses through the northern half of TA-11 and TA-37.

The P-Site, V-Site, and 300s Line Subaggregate areas are within the Martin Spring Canyon subwatershed. The P-Site Subaggregate is located in the north-central portion of TA-16 and is also within the Fishladder Canyon subwatershed. The Fishladder Canyon subwatershed is within the Cañon de Valle watershed, located along the northern portion of TA-16. The K-Site Subaggregate, however, is located in the east-central portion of TA-16 and has Martin Spring Canyon to the north and Water Canyon to the south. Elevations range from 7250 to 7400 ft amsl. The majority of the SWMUs and AOCs in the K-Site Subaggregate are located on the mesa top. In May 2000, the Cerro Grande fire burned areas in and around K-Site but did not damage any structures.

The surface vegetation community at TA-16 consists of species typical of the Rocky Mountain montane conifer forest, which contains several distinct habitat types (LANL 1998, 059891, pp. B-41–B-43). The most prevalent habitat type on the mesa tops is ponderosa pine / Gambel oak. Canyon bottoms may grade into ponderosa pine / Douglas fir. Dominant trees within the mesa overstory canopy are ponderosa pine and aspen; the mesa-top shrub layer is primarily Gambel oak and New Mexico locust. Dominant forbs and grasses include bluegrass, mountain muhly, blue gramma, pine dropseed, wormwood, false tarragon, tall lupine, and cinquefoil. Additional details on the vegetation communities and habitat types at TA-16 are presented in Appendix B of the Phase II Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report for Consolidated Unit 16-021(c)-99 (LANL 1998, 059891, pp. B-32–B-43).

2.2 Surface Water

The S-Site Aggregate Area is bordered to the north by Fishladder Canyon, a tributary of Cañon de Valle, and to the south by Water Canyon. Both the Water Canyon / Cañon de Valle watershed heads are on the flanks of the Sierra de Los Valles on U.S. Forest Service land. The Cañon de Valle Drainage terminates at its confluence with Water Canyon, which extends across the Laboratory to the Rio Grande (Collins et al. 2005, 092028, pp. 2-104–2-107; LANL 2006, 094043, p. 6-1). The Martin Spring Canyon subwatershed is a smaller watershed located wholly within the Water Canyon / Cañon de Valle watersheds (Plate 1).

Surface water is ephemeral in most of the Martin Spring Canyon subwatershed. Martin Spring Canyon is located near the P-Site and 300s Line Subaggregate areas; it is a perennial spring that feeds a perennial reach of the Martin Spring Canyon subwatershed. In addition, hydrophilic vegetation has been observed near the 300s Line and K-Site Subaggregate areas (Plate 1) (LANL 1996, 055077). Surface water in the S-Site Aggregate Area consists of stormwater, snowmelt runoff, and spring flow in small drainages or by sheet flow into Martin Spring Canyon, Fishladder Canyon, or Water Canyon. These canyons contain flowing water during snowmelt and storm events.

The following permanent gauging stations are located near the confluence of Martin Spring Canyon: Water above Martin Spring Canyon (E262) (Plate 1) and Martin Spring Canyon above Water (E261) (LANL 2006, 094043; LANL 2006, 093713).

Surface-water runoff and associated infiltration into soil are probably the most important hydrologic transport pathways at S-Site Aggregate Area. The following six aspects of the surface hydrology at S-Site Aggregate Area may be relevant to contaminant transport (LANL 1998, 059891, pp. B-16–B-17):

- location of surface-water runoff and associated sediment deposition;
- rates of soil erosion, transport, and sedimentation;
- effects of operational or fire disturbances on surface hydrology;
- relative importance of surface runoff versus infiltration as transport pathways in different soil types;
- solubility and sorption behavior of the chemicals of potential concern (COPCs); and
- ultimate fate of surface water at S-Site Aggregate Area.

Surface-water runoff, alluvial water flow, and associated sediment transport represent key potential migration pathways by which contaminants may be transported off-site.

2.3 Soil Types

The soil types of the mesa top are derived from the weathering of the Tshirege Member of the Bandelier Tuff and from the El Cajete Pumice (including contributions from phenocrysts and phenocryst fragments, devitrified glasses, and minor lithic fragments) and from wind-blown sources. Native soil has been disturbed by the construction of various facilities.

A detailed discussion of soil types in the vicinity of the S-Site Aggregate Area and TA-16 is provided in the Phase II RFI report for Consolidated Unit 16-021(c)-99 (LANL 1998, 059891, pp. B-12–B-15).

2.4 Subsurface Conditions

2.4.1 Stratigraphy

The Laboratory drilled, cored, and sampled several intermediate and deep boreholes to interpret the subsurface stratigraphy across TA-16 (Figures 2.4-1 and 2.4-2). These include regional wells R-25 (total depth [TD] of 1942 ft below ground surface [bgs]), R-26 (TD of 1490.5 ft bgs), and CdV-R-37-2 (TD of 1664 ft bgs). Intermediate depth wells include CdV-16-1(i) (TD of 683 ft bgs), CdV-16-2(i)r (TD of 874.4 ft bgs), and R-48 (formerly CdV-16-3(i)) (TD of 1405 ft bgs) (Collins et al. 2005, 092028, Table 1-2). Wells R-48 and CdV-R-37-2 are the most relevant to the subsurface stratigraphy at TA-16. The stratigraphy beneath TA-16 includes Bandelier Tuff, Cerro Toledo interval, Puye Formation, and Tschicoma Formation (Figure 2.4-3). Descriptions of the stratigraphic units beneath TA-16 are provided in this section. They rely heavily on the stratigraphy observed in wells R-25 (Broxton et al. 2002, 072640, pp. 20-–30); CdV-16-1(i) (Kleinfelder 2004, 087844, pp. 12–13); CdV-16-2(i)r (Kleinfelder 2005, 093665, p. 8); and R-48 (LANL 2002, 073211, pp. 10–14; Kleinfelder 2004, 087845, p. 4). More detailed descriptions of the stratigraphy, mineralogy, chemistry, and other properties of the rock units described in this section are presented in the Laboratory's hydrogeologic studies of the Pajarito Plateau (Collins et al. 2005, 092028, pp. 2-10–2-29).

2.4.1.1 Bandelier Tuff

The Bandelier Tuff is a chemically zoned ignimbrite that exhibits complex zones of welding and crystallization subdivided into four major cooling units. The term welding is used to distinguish between tuffs that are noncompacted and porous (nonwelded) and tuffs that are more compacted and dense (welded). In the field or in borehole cuttings, the degree of welding is quantified by the degree of flattening of pumice fragments (a higher degree of flattening and elongation equals a higher degree of welding). Petrographically, welded tuffs show adhesion (welding) of grains, and nonwelded tuffs do not. The term devitrified is applied to tuffs in which volcanic glass has crystallized (LANL 2006, 091698).

2.4.1.2 Tshirege Member

The Tshirege Member of the Bandelier Tuff is a compound cooling unit that resulted from several successive ash-flow depositions separated by periods of inactivity that allowed partial cooling of each unit. Properties related to water flow and contaminant migration (e.g., density, porosity, degree of welding, fracture content, and mineralogy) vary both vertically and laterally because of localized variations in emplacement temperature, cooling history, thickness, gas content, and chemical composition. The Tshirege Member of the Bandelier Tuff is 383 ft thick in well R-48 (LANL 2006, 091698) and approximately 450 ft thick in well CdV-R-37-2.

2.4.1.3 Tshirege Member Unit 4 (Qbt 4)

Unit 4 of the Tshirege Member of the Bandelier Tuff comprises a series of variably welded vitric to devitrified ash-flow tuffs that extend from near surface to a depth of 84 ft bgs in well R-25, from surface to a depth of 56 ft bgs in well CdV-16-2(i)r, and from surface to a depth of 56 ft bgs in well R-48. Unit 4 is characterized by localized thin, discontinuous, crystal-rich, fine- to coarse-grained, volcanic surge deposits. The lower, more indurated parts of unit 4 are also significantly fractured. These fractures and surge beds are potential groundwater pathways (LANL 2006, 091698).

2.4.1.4 Tshirege Member Unit 3 (Qbt 3 and Qbt 3t)

Unit 3 of the Tshirege Member of the Bandelier Tuff is poorly to moderately welded and indurated to slightly indurated. It tends to be a cliff-forming unit of the Pajarito Plateau. In well R-25 and at TA-16 in general, it is typically divided into two subunits, Qbt 3t (t for transitional) and Qbt 3. Qbt 3t is a devitrified ignimbrite that grades from partially welded at the top to moderately welded at the base. Qbt 3 is a second devitrified ignimbrite that grades from moderately welded at the top to nonwelded at the base. Qbt 3t and upper Qbt 3 also contain localized thin, discontinuous, crystal-rich, fine- to coarse-grained, surge deposits that may represent potential groundwater pathways. Unit 3 (including both subunits Qbt 3 and Qbt 3t) is 198 ft thick in well R-25, extending from 84 to 229 ft bgs. Unit 3 extends from 9 to 85 ft bgs in well CdV-16-1(i), from 56 to 195 ft bgs in well CdV-16-2(i)r, and from 77 to 195 ft bgs in well R-48 (LANL 2006, 091698).

2.4.1.5 Tshirege Member Unit 2 (Qbt 2)

Unit 2 of the Tshirege Member of the Bandelier Tuff is a competent, resistant unit that forms cliffs where it is exposed on the sides of the mesa. It is a moderately welded, well-indurated, devitrified ignimbrite. Welding grades from moderately welded at the top of the unit to partially welded at the base. Unit 2 is 103 ft thick in well R-25, extending from 229 to 332 ft bgs. Qbt 2 extends from 85 to 195 ft bgs in well CdV-16-1(i), from 195 to 305 ft bgs in well CdV-16-2(i)r, and from 195 to 305 ft bgs in well R-48 (LANL 2006, 091698).

Unit 2 of the Tshirege Member is extensively fractured in many outcrops across the Laboratory as a result of contraction during postdepositional cooling. The cooling fractures are visible on mesa edges. In general, such fractures are vertical to subvertical and dissipate near the bottom of the unit. Near the base of unit 2 is a series of thin, discontinuous, crystal-rich, fine- to coarse-grained, surge deposits. Bedding structures are often observed in these deposits. These surge beds mark the base of unit 2 (LANL 2006, 091698).

2.4.1.6 Tshirege Member Unit 1v (Qbt 1v)

Unit 1v of the Tshirege Member is a vapor-phase-altered cooling unit that underlies unit 2. This unit forms sloping outcrops that contrast with the near-vertical cliffs of unit 2. Qbt 1v is further subdivided into units 1vu and 1vc in many parts of the Laboratory. Qbt 1v is 29.5 ft thick in well R-25, extending from 332 to 361.5 ft bgs but is not broken out into subunits based on the cuttings from that borehole. In addition, Qbt 1v (not broken out into subunits) extends from 305 to 348 ft bgs in well CdV-16-2(i)r, from 305 to 348 ft bgs in well R-48, and from 236 to 290 ft bgs in well CV-R-15-3 (LANL 2006, 091698).

Unit 1vu (u for upper) is the uppermost portion of unit 1v. It is devitrified and consists of vapor-phase-altered ash-fall and ash-flow tuff. Unit 1vu is unconsolidated at its base and becomes moderately welded near overlying unit 2. Only the most prominent cooling fractures that originate in unit 2 continue into the more welded upper section of unit 1vu; however, these end in the less consolidated lower section of the unit (LANL 2006, 091698).

Unit 1vc (c for colonnade) is named for the columnar jointing visible in cliffs formed from this unit. Unit 1vc is a poorly welded, devitrified ash-flow tuff at its base and top, becoming more welded in its interior.

2.4.1.7 Tshirege Member Unit 1g (Qbt 1g)

Unit 1g of the Tshirege Member is a massive, poorly consolidated, vitric ash-flow tuff. Few fractures are observed in outcrops of this unit, and the weathered cliff faces have a distinct Swiss-cheese appearance that reflects the variable hardness of the unit. The upper portion of Qbt 1g is resistant to erosion, which helps to preserve the vapor-phase notch in the outcrop. A distinctive pumice-poor surge bed forms the base of Qbt 1g. Qbt 1g is 20.3 ft thick in well R-25 and extends from 361.5 to 381.8 ft bgs. Qbt 1g extends from 223 to 240 ft bgs in well CdV-16-1(i), from 348 to 398 ft bgs in well CdV-16-2(i)r, and from 348 to 395 ft bgs in well R-48 (LANL 2006, 091698).

2.4.1.8 Tsankawi Pumice Bed

The Tsankawi Pumice Bed is the basal Plinian, air-fall deposit of the Tshirege Member of the Bandelier Tuff. It is a thin bed of gravel-sized vitric pumice. The unit is 2.2 ft thick in well R-25 and extends from 381.8 to 384 ft bgs. The Tsankawi Pumice Bed extends from 223 to 240 ft bgs in well CdV-16-1(i) (LANL 2006, 091698).

2.4.1.9 Cerro Toledo Interval (Qct)

The Cerro Toledo interval separates the Tshirege and Otowi members of the Bandelier Tuff and consists of thin beds of tuffaceous sandstones, paleosols, siltstones, ash, and pumice falls. The Cerro Toledo interval also includes localized gravel- and cobble-rich fluvial deposits predominantly derived from intermediate-composition lavas eroded from the Jemez Mountains west of the Pajarito Plateau. Numerous large lithics, including native dacites, are present in well R-25. The interval is 125 ft thick in the well R-25 borehole and extends from 384 to 509 ft bgs. This degree of thickness indicates that well R-25

is located in a paleodrainage on the surface of the underlying Otowi Member of the Bandelier Tuff. The Cerro Toledo extends from 240 to 457 ft bgs in well CdV-16-1(i), from 395 to 570 ft bgs in well CdV-16-2(i)r, and from 395 to 570 ft bgs in well R-48 (LANL 2006, 091698).

2.4.1.10 Otowi Member and Guaje Pumice Bed (Qbo)

The Otowi Member tuffs are 341.5 ft thick in well R-25, extending from 509 to 843.8 ft bgs. The tuffs are a massive, poorly consolidated, nonwelded, pumice-rich, and mostly vitric ash flow. The pumices are fully inflated and support tubular structures that have not collapsed as a result of welding. The matrix is an unsorted mix of glass shards, phenocrysts, perlite clasts, and broken pumice fragments. The Otowi member extends from 457 ft bgs to below the TD of 683 ft bgs in well CdV-16-1(i), from 195 to 223 ft bgs in well CdV-16-1(i), from 570 to 802 ft bgs in well CdV-16-2(i)r, and from 570 to 802 ft bgs in well R-48 (LANL 2006, 091698).

The Guaje Pumice Bed forms the lowermost 6.7 ft of the Otowi Member in well R-25, extending from 843.8 to 850.5 ft bgs. It is the basal air-fall deposit of the Otowi Member of the Bandelier Tuff. The occurrence of the Guaje Pumice Bed at well R-25 is thinner than occurrences farther to the east and north, indicating either that this area was south of the main dispersal axis for this fall deposit or that this deposit was partly eroded before, or during, emplacement of the main Otowi ignimbrite. Two cycles of pumice fall were noted in well R-25. The Guaje Pumice Bed extends from 802 to 818 ft bgs in well CdV-16-2(i) and from 802 to 818 ft bgs in well R-48 (LANL 2006, 091698).

2.4.1.11 Puye Formation Fanglomerates (Tpf)

The Puye Formation in well R-25 is an alluvial fan deposit made up primarily of coarse, clastic rocks derived from the rhyodacite units of the Tschicoma Formation that crop out in the Jemez Mountains west of the Pajarito fault. Because of the proximity of these source rocks, these fanglomerate deposits consist of poorly consolidated and poorly sorted boulders, cobble, gravels, and sands. Boulders up to 2 ft in diameter are present in well R-25 (LANL 2006, 091698).

Based on cuttings and lithologic description, the Puye Formation exists in well R-25 from 852 ft to below the TD of 1942 ft bgs, in well CdV-16-2(i)r from 818 ft bgs to below the TD of 1063 ft bgs, and in well R-48 from 900 to 995 ft bgs (LANL 2006, 091698).

2.4.1.12 Tschicoma Formation Dacite Lavas

Lava flows of the Tschicoma Formation occur in both well CdV-R-37-2 and well R-48 to the southeast of well R-25 but were not found in well R-25. The dacite lavas are massive, apparently homogeneous, locally rubbly intermediate lavas. Minor siltstones are present in the upper 142 ft at the CdV-R-37-2 borehole. The Tschicoma dacite lavas extend from a depth of 1072 ft bgs to TD (1664 ft bgs) in well CdV-R-37-2 and from 995 ft bgs to TD (1405 ft bgs) in well R-48 (LANL 2006, 091698).

2.4.2 Cliff Retreat and Fractures

Minimal cliff retreat is evident in the TA-16 vicinity as a result of the generally shallow nature of most of the surrounding canyons. SWMUs and AOCs within the S-Site Aggregate Area are unlikely to be exposed by cliff retreat. Fracture studies completed for the nearby Cañon de Valle watershed identified and analyzed hundreds of fractures and small faults across a bedrock exposure and indicated a link between the fracture density and proximity to the Pajarito fault zone (LANL 2005, 092251). Martin Spring is also an example of the manifestation of the intermediate-depth perched groundwater present primarily in tuff

discontinuities such as fractures and surge beds in the S-Site Aggregate Area (LANL 2003, 077965, pp. iv, 5-4).

2.4.3 Hydrogeology

The hydrogeologic conceptual model for the S-Site Aggregate Area is shown in Figure 2.4-3. The model postulates infiltration of water into the subsurface and subsequent transport of water, natural solutes, and contaminants at multiple recharge zones at the S-Site Aggregate Area. Shallow transport pathways are heterogeneous, with water transport primarily along fast pathways such as surge beds and fracture zones. Perched and regional groundwater flow directions are generally from west to east, but there are significant complexities in flow in the deep aquifers at the S-Site Aggregate Area.

2.4.3.1 Infiltration

Surface-water infiltration is a potential mechanism for surface-contaminant migration into subsurface soil and tuff and eventually into perched or regional aquifers. In general, the hydrologic conditions on the surface and within the mesas of the Pajarito Plateau lead to slow, unsaturated flow and transport. The mesas shed precipitation as surface runoff to the surrounding canyons such that most deep infiltration occurs episodically following snowmelt. Much of the water entering the soil zone is lost through evapotranspiration. As a result, annual net infiltration rates for dry mesas are less than 10 mm/yr and are more often estimated to be about 1 mm/yr or less. Flow is likely to be matrix-dominated as a result of the nonwelded to moderately welded tuffs with low water content that are located near the surface of the mesa (Collins et al. 2005, 092028, pp. 2–89).

Anthropogenic discharges and surface disturbances resulting from Laboratory operations can drive infiltration rates higher in usually dry mesas. In some cases, multiple disturbances of mesa sites through liquid waste disposal, asphalt covers, and/or devegetation have caused mesa infiltration rates to increase temporarily to near-wet canyon levels. Fracture flow has occurred in a few instances beneath long-term liquid disposal sites with ponded conditions; however, fracture flow ceases once liquid releases stop. Infiltration rates return to low, near-background levels when the surface and vegetation return to normal conditions(Collins et al. 2005, 092028, pp. 2–89).

Surface-water infiltration recharges perched aquifers at TA-16 (LANL 1998, 059891, p. B-18; LANL 2003, 077965, p. B-16). The presence of HE in well R-25 indicates that transport from surface water to the deep perched, and possibly the regional, aquifer at the S-Site Aggregate Area is relatively rapid (less than 50 yr). The surface water and alluvial groundwater present in Cañon de Valle are hypothesized to be the major source of these contaminated waters. Geophysical surveys and other lines of evidence presented in the Phase III RFI report for Consolidated Unit 16-021(c)-99 (LANL 2003, 077965) indicate that a key area of infiltration is a zone of Cañon de Valle west of MDA P. Surface-water infiltration, whether through matrix or fracture flow, is an important contaminant transport pathway at TA-16 in Cañon de Valle.

The studies of the hydrogeology of the Pajarito Plateau reported that focused infiltration is expected in the faulted regions associated with the Pajarito fault zone within S-Site Aggregate Area with local infiltration rates up to 1000 mm/yr(Collins et al. 2005, 092028, p. 4-A-5). The report concluded that the highest net infiltration rates are estimated to occur in canyons, especially those that head in the mountains with magnitudes of up to a few hundred mm/yr caused by channel runoff. Much lower net infiltration rates occur across the mesas and in the smaller canyons that head on the Pajarito Plateau(Collins et al. 2005, 092028, p. 5-3).

2.4.3.2 Groundwater

Groundwater beneath the Laboratory occurs in the regional aquifer at a depth of approximately 1286 ft bgs (well R-25) (Figures 2.4-3 and 2.4-4) and in perched aquifers at both shallow (less than 200 ft) and deep (up to approximately 1000 ft) depths (Collins et al. 2005, 092028, pp. 2-B-10–2-B-12)). Canyon and mesa topography and the internal structures (surge beds, fracture zones, and permeable units) of the Bandelier Tuff and other subsurface units control the hydrogeology of the S-Site Aggregate Area. The hydrology (occurrence and movement of water in the surface and subsurface environments) of individual sites is controlled by the physiographic location (e.g., in canyon bottoms, on canyon edges, or on mesa tops) of each SWMU and AOC.

2.4.3.3 Perched Intermediate Waters

Perched groundwater systems beneath the Pajarito Plateau are identified primarily from direct observation of saturation in boreholes, wells, and piezometers or from borehole geophysics (Collins et al. 2005, 092028, p. 2-96). Perched water has been identified in the following wells: R-25, CdV-16-1(i), CdV-16-2(i)r, and R-26 (tentative identification).

A deep-sounding, surface-based magnetotelluric survey was conducted in the Cañon de Valle / Water Canyon area. The survey results indicated that perched groundwater is discontinuous laterally, occurring instead as vertical, finger-like groundwater bodies (Collins et al. 2005, 092028, pp. 2-96–2-97).

The following conditions are necessary to support perched groundwater (Collins et al. 2005, 092028, pp. 2-97–2-100).

- A surface source must exist, either natural or anthropogenic, that supplies water to alluvial systems. The alluvial groundwater acts as storage for groundwater entering underlying bedrock units at high infiltration rates. A special situation exists in the mountain-front region at TA-16. In contrast to the dry mesas prevalent farther east, these mesas receive greater precipitation (e.g., 500 mm/yr) and increased runoff and infiltration. The wet mountain-front mesas contain numerous perennial and ephemeral springs.
- In addition to high local infiltration rates, low-permeability barriers to downward vertical flow are required to induce perched groundwater. Deep, perched groundwater occurs most frequently in the Puye Formation and the Cerros del Rio basalt, but some of the thickest and/or most laterally extensive zones involve units of the Bandelier Tuff. Perching horizons include a wide variety of layered geologic lithologies, including unfractured basalt flows; clay-rich interflow zones in basalt; buried soil and other fine-grained deposits in fanglomerate; clay-altered, tuffaceous sediments; and lake deposits. An alternative hypothesis is that the deepest perched water occurrences are a manifestation of complex groundwater flow within the phreatic zone at the top of the regional aquifer. An important hydrostratigraphic feature in the mountain-front region of TA-16 is that the upper tuff units are often moderately to strongly welded, but the fracture densities are relatively high. Fracturing appears to control the locations of springs along the mountain-front mesas, and fracture flow is indicated by water content and contaminant distributions in tuff near outfalls and wastewater lagoons.

Perched groundwater flow conditions were categorized by the following conceptual site models (Collins et al. 2005, 092028, p. 2-100).

- Low-velocity, virtually stagnant water resting in a perching horizon within a local structural or stratigraphic depression. Water percolates very slowly out of the bottom of this zone, or spills

over the sides of the depression. Once the stagnant water is depleted, the recharge is not sufficient to keep the zone saturated.

- High-velocity, laterally migrating fluid that travels on top of the perching horizon. This conceptualization indicates that once groundwater reaches a perched zone, it rapidly percolates laterally along high-permeability pathways until the perching horizon pinches out or is breached by high-permeability features such as fractures or later changes in lithology. In this scenario, water could move in stairstep fashion from one perching horizon to another. There are nonconfirmed instances of large-scale, lateral vadose zone pathways beneath the Pajarito Plateau at depths greater than the alluvial groundwater. The case of lateral flow through the wet, mountain-front mesas at TA-16 indicates that this possibility exists at greater depths.

2.4.3.4 Regional Aquifer

The regional aquifer of the Pajarito Plateau is the groundwater zone most directly accessible to humans through municipal water-supply wells or springs issuing to the Rio Grande. Additionally, the regional aquifer is a major source of drinking water and agricultural water supply for northern New Mexico (Collins et al. 2005, 092028, p. 2-103; LANL 2006, 091698). The regional aquifer, extending throughout the Española Basin (an area of roughly 6000 km^2), consists of basin-fill sediment reaching a maximum thickness near the basin axis (>9800 ft in thickness) (Cordell 1979, 076049, p. 61). The aquifer is predominantly composed of Santa Fe Group rock, which is weakly consolidated basin-fill sediment more than 3000 m in thickness (Collins et al. 2005, 092028, p. 2-103). However, in the area directly beneath the S-Site Aggregate, the massive Tschicoma dacite is observed in wells R-48 and CdV-R-37-2 and may strongly change the hydrogeologic behavior locally.

Depths to the regional aquifer range from approximately 1300 ft bgs (along the western edge of the Pajarito Plateau) to 600 ft bgs (to the east). The depths to the regional aquifer at TA-16 that have been determined by drilling are 1197 ft bgs at well CdV-R-37-2 southeast of TA-16, 1286 ft bgs at well R-25 (LANL 2003, 077965, p. B-20), 604 ft bgs at well R-26 (Collins et al. 2005, 092028, p. 1-B-22), and 1350 ft bgs at well R-48 (Kleinfelder 2004, 087845). The regional aquifer was not penetrated at a depth of 1400 ft bgs in the R-48 borehole. The nearest production well to TA-16 is PM-2 in Pajarito Canyon, 4 to 5 mi east of the operational areas at TA-16. Figure 2.4-4 depicts water table elevations in the regional aquifer across the Pajarito Plateau.

The regional aquifer model proposed in the report of the hydrogeology of the Pajarito Plateau (Collins et al. 2005, 092028, pp. 4-1–4-60) was used to produce a map of velocities at the water table. The velocities, which are considered highly uncertain, were used to illustrate the following key points.

- The aquifer is heterogeneous, and groundwater velocity is likely to vary considerably over short distances.
- The flow in the eastern portion of the Laboratory is predicted to be very slow.
- The regional aquifer around water-supply well PM-2 is vertically anisotropic with pronounced resistance to vertical propagation of drawdown at shallower depths.
- Hydraulically, the regional aquifer exhibits semiconfined characteristics at depth, with leaky units located above (and perhaps below) a highly conductive layer. It appears that water-table conditions exist near the water table but at greater depths, the regional aquifer becomes semiconfined.

2.4.3.5 Vadose Zone

The region beneath the ground surface and above the regional aquifer is called the vadose (unsaturated) zone. This discussion focuses on the vadose zone beneath the mesa top underlying TA-16 and the adjacent alluvial canyons. The principal sources of moisture in the vadose zone are precipitation (much of which is removed as runoff), evaporation and transpiration, and infiltration from canyon bottoms. Characteristics of infiltration in the vadose zone are described in the preceding sections that address infiltration and perched intermediate groundwater. Subsurface movement of moisture is predominantly vertical in direction and is influenced by the properties and conditions of the vadose zone. Lateral flow can also occur when significant contrasts in hydrologic properties occur between adjacent units. Surge beds may be a particularly favorable zone of lateral mobility because of their high porosity.

The geologic properties of the Bandelier Tuff that most influence fluid flow in the vadose zone are the degree of welding and hydraulic conductivity. Significant heterogeneities occur in both of these properties within the TA-16 vadose zone. Welded tuffs tend to have less matrix porosity and more fractures than nonwelded tuffs. Fractures in welded tuffs may include relatively closely spaced cooling joints as well as tectonic fractures. Nonwelded tuffs also have fractures but generally fewer than welded tuffs. Saturated hydraulic conductivities in the Bandelier Tuff beneath the mesa top range by more than 5 orders of magnitude between subunits in Tshirege units 4 and 3t (LANL 2003, 077965, p. 4-58). In boreholes drilled at TA-16, saturated hydraulic conductivity ranges from 3.8×10^{-3} cm/s in a surge unit to 9.8×10^{-9} cm/s in a densely welded subunit (LANL 2006, 091698).

Several competing effects determine the moisture content, degree of saturation, and resultant likelihood of flow and contaminant transport. In the western portion of TA-16, some of the Tshirege units of the Bandelier Tuff have densely welded intervals as a result of being closer to the volcanic source. These more welded units are less porous, with porosities ranging from 17% to 40%, and have low saturated hydraulic conductivities (e.g., 10^{-6} to 10^{-9} cm/s) (LANL 2006, 091698). These units are also more fractured and can support fracture flow and transport when sufficient water is present (Collins et al. 2005, 092028, p. 2-92). Because of the higher precipitation levels at TA-16, volumetric moisture levels at TA-16 tend to be higher than at TAs east of TA-16. Several zones in boreholes at TA-16 were at, or near, saturation, particularly the intermittent saturated zones in boreholes located near both the 90s Line Pond and the head of Martin Spring Canyon (LANL 2003, 077965, p. 4-55).

3.0 SCOPE OF ACTIVITIES

3.1 Geodetic Surveys

Before samples were collected, proposed sampling locations were surveyed and staked out, as mapped in figures presented in section 4.0 of the approved work plan (LANL 2007, 102216). Coordinates were derived after georegistration of work plan figures and digitization of proposed locations in geographic information system (GIS) software. Sampling locations that were relocated from their proposed coordinates, as well as those locations supplemental to the proposed suite defined in the work plan, were surveyed after sample collection. Locations were marked on the ground with pin flags or laths denoting field identification to facilitate sampling and surveying efforts.

All land surveys were conducted using survey-grade instrumentation, including the real-time kinematic global positioning system (GPS) unit. This unit consists of a Trimble 5700 base station receiver, Trimble Zephyr base station antenna, Trimble HPB450 base station radio, Trimble TSC2 survey controller, Pacific Crest HPB450 repeater radio, and Trimble R8 integrated rover radio/antenna/receiver. A Trimble VX

Spatial Station (total station), paired with a TSC2 survey controller, was employed when the GPS was not available and to fulfill surveying requirements that were not possible to meet using GPS technology.

Survey coordinates were processed and subjected to quality control procedures using a combination of Trimble Geomatics Office and GIS. Final coordinates were submitted to the Sample Management Database with corresponding accuracy statements, according to standard operating procedure (SOP) 5028, Coordinating and Evaluating Geodetic Surveys.

3.2 Radiological Walkover Surveys

Surface radiological surveys were to be conducted at selected sites to confirm worker safety according to the approved work plan (LANL 2007, 102216). However, walkover surveys were not required for safety purposes by Radiation Protection 1 (RP-1) because the V-Site, 300s Line, K-Site, and P-Site Subaggregate areas are not radiological areas and such surveys were not required for safety purposes.

3.3 Surface Sampling

Where conditions allowed, surface soil or sediment samples were collected using the spade-and-scoop method in accordance with LANL procedure SOP-06.09, Spade and Scoop Method for Collection of Soil Samples. At some locations where surface soil was too compacted, soil was collected using the hand-auger method. Sample-collection methods were noted in the sample collection logs (SCLs).

All samples were field screened for metals using x-ray fluorescence (XRF) and for hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX). All samples from each site were sent for off-site laboratory analysis except for SWMU 13-001 (bullseye grid).

At SWMU 13-001, samples were collected at 30% of the locations selected at random. Biased samples were not collected, because RDX, radiological, and metals field screening did not identify releases. Random selection of locations ensures that statistical analyses can be done on the off-site laboratory results to assess contamination at the sites and to correlate the field-screening results with results from the off-site analytical laboratory. The selection was done by randomly choosing 30% of the locations and including samples from the selected locations for laboratory analysis.

3.4 Subsurface Sampling

When conditions did not allow use of the spade-and-scoop method, hand augering was used to collect samples when practicable. At some locations, the subsurface media were too hard, or the samples had to be collected at depths too deep, for hand augering. Samples at those locations were collected using a backhoe-mounted auger in conjunction with a hand auger or by drill rig as described in the following sections.

3.4.1 Hand Auger

Whenever feasible, hand augering was used to collect samples at depths below the ground surface in accordance with LANL procedure SOP-06.10, Hand Auger and Thin-Wall Tube Sampler. This method involved hand turning a stainless-steel bucket auger, which created a vertical hole that was advanced to the desired sample depth.

3.4.2 Backhoe-Mounted Auger

For areas accessible by backhoe, a 6-in.-diameter, backhoe-mounted power auger was used to assist with the collection of hand-augered samples in frozen ground and tuff, in accordance with SOP-06.10. The power auger was used to dig down to the desired top of the planned sample depth, at which point an extended hand auger was used to collect the sample. After the desired bottom depth was reached with the hand auger, the power auger was used to reach the next sample's top depth. Depths were verified using a tape measure.

3.4.3 Drilling and Subsurface Borehole Sampling

During all drilling operations, continuous core was collected with 5-ft-long, stainless-steel, split-spoon, core-barrel samplers. Sampling media were visually inspected and field screened for organic vapor with an 11.7-electron-volt (-eV) photoionization detector (PID) and for alpha and beta/gamma radioactivity with an Eberline E-600 radiation meter. Sample media were placed into stainless-steel bowls, crushed, and placed in the appropriate sampling containers. The sampling containers were labeled, documented, preserved, and submitted to the Sample Management Office (SMO) for off-site fixed laboratory analyses as stipulated in the approved work plan (LANL 2007, 102216). Field-data collection, including visual examination, headspace vapor screening, health-and-safety monitoring, and general daily activities, was recorded in field logbooks.

Sampling equipment and tools were decontaminated after each sample was collected. The drilling core-barrel samplers were decontaminated after each 5-ft barrel was retrieved from below ground surface. All drilling and sampling equipment was decontaminated using dry methods per SOP-5061, Field Decontamination of Equipment.

Investigation-derived waste that was generated during drilling operations conducted at the V-Site, 300s Line, P-Site, and K-Site Subaggregate areas was properly containerized in 55-gal. steel and polyethylene drums, labeled, and stored in its associated <90-d waste storage areas, as described in Appendix G.

All core material was visually inspected in the field and borehole logged. The borehole logs were prepared in accordance with SOP-06.26, Core-Barrel Sampling for Subsurface Earth Materials. Lithologic units and descriptions, field-screening results, sample recovery percentages, sample identification numbers, and significant events during the drilling process are documented in the borehole logs and are presented in Appendix E.

3.4.3.1 V-Site Subaggregate

Drilling operations for 26 boreholes at the V-Site Subaggregate began on March 1, 2010, and concluded on March 18, 2010. During this period, one borehole (location 16-609456) was drilled within SWMU 16-029(g2) and AOC C-16-074; four boreholes (locations 16-609486 through 16-609489) were drilled within SMWU 16-029(w); and 21 boreholes (locations 16-60961 through 16-60968 and 16-609473 through 16-609485) were drilled within SWMU 16-029(x). The objective of the advancement of boreholes at the V-Site Subaggregate was to define the nature and extent of COPCs. The locations and sampling criteria for the boreholes are detailed in the approved work plan (LANL 2007, 102216, p. 41).

A Boart Longyear Delta Base 540 (DB 540) hollow-stem auger (HSA) drill rig was used to advance these 26 boreholes using 7.25-in.-outside-diameter (O.D.), 5-ft-long auger flights. A hex-rod core-retrieval system with a 4-in.-O.D., stainless-steel, split-spoon core barrel was used for sampling. A nominal 9-in.-diameter drill bit was used during HSA boring operations. During borehole advancement, the

5-ft-long auger flights were connected to one another until the target depth specified in the approved work plan (LANL 2007, 102216) was reached or to auger refusal.

3.4.3.2 300s Line Subaggregate

Drilling operations for 10 boreholes at the 300s Line Subaggregate began on December 18, 2009, at borehole location 16-609197 in SWMU 16-026(c) and borehole location 16-609192 in SWMU 16-026(b), and drilling operations concluded on March 18, 2010, at SWMU 16-001(e). During this period, two boreholes (locations 16-609192 and 16-609197) were drilled within the low-lying Shared Drainages area between buildings 16-306 and 16-307; one borehole (location 16-609229) was drilled on the east side of HE Road in the Shared Drainages near the confluence of the outfalls associated with the rest houses and the HE-processing facilities; five boreholes (locations 16-609170 through 16-609174) were drilled in and around the footprint of the inoperable dry well located in SMWU 16-001(e); and two boreholes (locations 16-611883 and 16-611884) were drilled north of building 16-300 in SWMU 16-003(d). The objective of the borehole advancement within the Shared Drainages and SWMU 16-001(e) was to quantify the nature and extent of contamination at depths greater than 10 ft bgs. The objective of borehole advancement within SMWU 16-003(d) was to quantify the horizontal and vertical delineation of COPCs in samples collected from location 16-609176 and associated with the historical HE sumps previously located on the north side of building 16-300. Sampling criteria for the boreholes are detailed in the approved work plan (LANL 2007, 102216, pp. 48–50).

The boreholes drilled in and adjacent to the inoperable dry well at SWMU 16-001(e) were advanced using the Boart Longyear DB 540 HSA drill rig with 7.25-in.-O.D., 5-ft-long auger flights. A hex-rod core-retrieval system with a 4-in.-O.D., stainless-steel, split-spoon core barrel was used for sampling. A nominal 9-in.-diameter drill bit was used during HSA boring operations. During borehole advancement, the 5-ft-long auger flights were connected to one another until the target depth specified in the approved work plan (LANL 2007, 102216) was reached or to auger refusal.

The boreholes drilled in the Shared Drainages and north of building 16-300 in SWMU 16-003(d) were advanced using a Central Mine Equipment 85 (CME-85) HSA drill rig with 4.25-in.-inside-diameter, nominal 8.625-in.-O.D., 5-ft-long auger flights. A hex-rod core-retrieval system with a 4-in.-O.D., stainless-steel, split-spoon core barrel was used for sampling.

3.4.3.3 P-Site Subaggregate

Drilling operations for 12 boreholes at the P-Site Subaggregate (former WWTP) began on February 1, 2010, and concluded on February 11, 2010. During this period, four boreholes (locations 16-608673 through 16-608676) were drilled adjacent to the Imhoff tank structure [SWMU 16-004(a)], four boreholes (locations 16-608684 through 16-608687) were drilled adjacent to the trickling filter structure [SWMU 16-004(b)], and four boreholes (locations 16-608884 through 16-608887) were drilled adjacent to the final tank structure [SWMU 16-004(c)]. The objective of the borehole advancement at the P-Site Subaggregate was to define the nature and extent of COPCs below the SWMUs. The locations and sampling criteria for the boreholes are detailed in the approved work plan (LANL 2007, 102216, p. 47).

The Boart Longyear DB 540 HSA drill rig was used to advance these 12 boreholes using 7.25-in.-O.D., 5-ft-long auger flights. A hex-rod core-retrieval system with a 4-in.-O.D., stainless-steel, split-spoon core barrel was used for sampling. A nominal 9-in.-diameter drill bit was used during HSA boring operations. During borehole advancement, the 5-ft-long auger flights were connected to one another until the target depth specified in the approved work plan (LANL 2007, 102216) was reached.

3.5 Field Screening for Organic Vapors

All samples were field screened for volatile organic compounds (VOCs). Organic vapor screening of samples was conducted on-site using a PID equipped with an 11.7-eV lamp and sensitivity reading to 1 ppm. Before each day's fieldwork began, the PID was calibrated to the manufacturer's standard for instrument operation, and all daily calibration results were documented in the PID calibration log. After collecting the sample, field screening was conducted by immediately placing soil or rock from sample media into a sterile plastic Ziploc bag, sealing the bag, and allowing the sealed bag to rest for a minimum of 5 min while the vapors equilibrated. Any vapors present were measured by inserting the PID instrument probe into a small opening in the Ziploc bag and collecting a measurement. All PID readings were recorded on the applicable SCL in accordance with SOP-06.33, Headspace Vapor Screening with a Photo Ionization Detector (Appendix F).

3.6 Field Screening for Radioactivity

All samples were field screened for radioactivity by RP-1 personnel using handheld instruments before transfer to the SMO and the American Radiation Services, Inc. (ARS) laboratory in White Rock, New Mexico. Further screening for gross-alpha, -beta, and -gamma radiation was conducted at ARS. Upon receipt at ARS, samples were screened for dose using a Ludlum Model 3 survey meter with a 44-2 sodium iodide scintillation tube probe (units in µR/h) and for removable contamination using a Ludlum 2 model survey meter with a 44-9 pancake probe (units in counts per minute [cpm]). Samples were homogenized, and an aliquot was removed from the sample container and placed in a weighing dish. The material was spread thin and screened for alpha/beta radiation using the Ludlum Model 2 survey meter with the 44-9 pancake probe. The count time was at least 1 min. The highest cpm reading was recorded on the applicable SCL as outlined in SOP-06.33. For the gamma screening, the result obtained at the time of sample receipt was used and recorded on the worksheet (Appendixes D and F)

3.7 Field Screening for RDX

Screening for RDX was conducted at the ARS laboratory using Strategic Diagnostics' EnSys RDX Soil Test System Immunoassay test kits. All assays were conducted following the manufacturer's instructions, including equipment calibration, equipment use, sample dilution, and reagent storage. The minimum detection limit for the test kits was 0.8 ppm for RDX (see Appendix D). Results were recorded using the methods outlined in SOP-06.33.

3.8 Field Screening for Metals by XRF

Screening for metals using XRF was conducted at the ARS laboratory and recorded in accordance with TPR-5014, General Field Work and Documentation for S-Site Aggregate Area. All operations and calibration of the XRF equipment were performed according to the manufacturer's recommendations provided in the instrument manual (see Appendix D).

3.9 Chemical and Radiological Analyses

3.9.1 Sample Collection

Samples were screened for organic vapors as described in section 3.5. Sample media were placed into stainless-steel bowls and crushed if necessary. The samples were then placed in appropriate sample bottles obtained from the Laboratory's SMO. After the samples were bottled, labeled, recorded in the SCL, and sealed for custody, the completed sample kits were placed in a cooler with ice. Before any

samples left the site, they were screened for radiation by a radiation control technician and then taken to the SMO. In cases where the samples were held overnight, the coolers were kept in a locked storage trailer at 4°C (see Appendix C).

3.9.2 Analytical Suites

Analytical suites varied from site to site. The analytical suite for each site is presented in the approved work plan (LANL 2007, 102216, Tables 4.0-1−4.0-5) as well as Appendix F. General analytical suites requested included anions (including nitrate), cyanide, target analyte list (TAL) metals, perchlorate, VOCs, semivolatile organic compounds (SVOCs), gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, americium-241, explosive compounds, boron, and pesticides.

3.10 General Deviations from Approved Work Plan

This section describes deviations from the approved work plan (LANL 2007, 102216). Appendix C provides additional detail on work plan deviations.

Per section 5.1.2 of the approved work plan (LANL 2007, 102216), surface radiological surveys were to be performed at selected sites before fieldwork began to ensure worker health and safety and to assist in targeting sample locations. Preparation for fieldwork included coordination with RP-1 regarding worker safety requirements for radiation. No work sites required site radiation surveys or work under radiation permits.

The lack of walkover surveys did not result in any planned sample not being collected. Radiation screening of samples at the site, as well as at ARS, did not identify any above-background samples. These results are also reflected in the very low number of analytical results above background value (BV) or fallout value (FV) and the low concentrations reported.

The original SWMU boundaries at SWMUs 11-005(a) and 11-006(a) were incorrect. Field verification at each SWMU involved removing soil to locate the septic tank and associated drainlines at SWMU 11-005(a) and the sump and asphalt apron at SWMU 11-006(a). The boundary and proposed sample locations were then resurveyed, and samples were collected at the new sample locations. Sample depths were also adjusted after determining the true location of structures associated with historical site activity at SWMUs 11-005(a), 11-005(b), 16-004(e), and 16-001(e). Sample locations were also moved because of the presence of underground utility lines at SWMUs 16-004(a), 16-004(b), 16-004(c), 16-026(c), 16-026(d), and 16-026(e).

Samples were either not collected or depth intervals were changed at several SWMUs/AOCs when refusal was met during drilling or because the location was not accessible. Sample depth intervals were also adjusted to collect samples beneath asphalt at SWMU 11-006(a) and AOC 16-003(p).

The V-Site Subaggregate was a top-secret area during the Manhattan Project and is now a historic site. Building 16-516 is the High Bay assembly building and was recently restored for historical purposes. Historic building management at LANL is a requirement of the National Historic Preservation Act (NHPA). Compliance with the NHPA is regulated by the New Mexico State Historic Preservation Division (NMHPD). All formal consultation under the NHPA regarding LANL historic buildings is conducted between the Los Alamos Site Office (National Nuclear Security Administration, DOE) and the NMHPD. Because of the historical significance of the area, some or all of the samples outlined in the approved work plan (LANL 2007, 102216) were not collected at several SWMUs within the V-Site Subaggregate.

In addition to samples identified in the approved work plan (LANL 2007, 102216) step-out samples were collected when elevated field-screening criteria were met (Appendix D).

4.0 REGULATORY CRITERIA

This section describes the criteria used to screen COPCs and evaluate potential risks to ecological and human receptors. Regulatory criteria identified in the Consent Order include cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium at the subject sites.

4.1 Current and Future Land Uses

The current or reasonably foreseeable future use for the K-Site, P-Site, and 300s Line Subaggregate areas is industrial. The current or reasonably foreseeable future use for the V-Site Subaggregate is recreational because of the tours by visitors to the historically significant areas. Risk-screening assessments were conducted only for sites having the nature and extent of contamination defined for all COPCs. Human health and ecological risk-screening assessments were completed for four sites. These SWMUs and AOCs were evaluated for risk under the industrial and residential scenarios. As explained in Appendix H, the recreational soil screening levels (SSLs) are protective for potential exposures to visitors in the V-Site Subaggregate and were used to screen the Courtyard Area. The Extended Drainages lie within the ephemeral stream channel below the P-Site and 300s Line Subaggregate areas, and the current and reasonably foreseeable future land use is recreational. The residential scenario is evaluated per the Consent Order for all sites.

4.2 Human Health Screening Levels

Human health risk-screening assessments for chemical COPCs were conducted using SSLs for the industrial and residential scenarios from NMED guidance (NMED 2006, 092513). NMED SSLs are based on a hazard quotient of 1.0 and a cancer risk of 1×10^{-5} (NMED 2006, 092513). If SSLs were not available from NMED guidance, EPA regional screening levels were used (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm). The EPA SSLs for carcinogens were multiplied by 10 to adjust from a 10^{-6} cancer risk level to the NMED target cancer risk level of 10^{-5}. Recreational SSLs for the V-Site Courtyard were obtained from Laboratory guidance (LANL 2010, 108613) and have the same risk bases as the NMED and EPA values. Radionuclide screening action levels (SALs) were obtained from Laboratory guidance (LANL 2005, 088493; LANL 2009, 107655) for each scenario and are based on a 15-mrem/yr dose (DOE 2000, 067489). The SSLs and SALs are presented in data tables for each site.

4.3 Ecological Screening Levels

All of the sites for which the nature and extent of contamination are defined [SWMUs 16-004(a), 16-004(e), 16-026(b), 16-029(d), 16-029(g2), and 16-017(p)-99] were evaluated for potential ecological risk. Ecological screening levels (ESLs) were obtained from the ECORISK Database, Version 2.4 (LANL 2008, 103352). The ESLs are based on similar species and are derived from experimentally determined no observed adverse effect levels, lowest observed adverse effect levels (LOAEL), or doses determined to be lethal to 50% of the test population. Information relevant to the calculation of ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and toxicity reference values, are presented in the ECORISK Database, Version 2.4 (LANL 2009, 107524).

4.4 Cleanup Goals

As specified in Section VIII.B.1 of the Consent Order, screening levels are used as soil cleanup levels unless they are determined to be impracticable or values do not exist for the current and reasonably foreseeable future land use. Screening assessments compare COPC concentrations for each site with SSLs and SALs depending on the current and foreseeable future land use at each site.

As stated above, the cleanup goals specified in Section VIII of the Consent Order are a target cancer risk of 1×10^{-5} and a hazard index (HI) of 1.0. For radionuclides, the target dose is 15 mrem/yr based on DOE guidance (DOE 2000, 067489). The screening levels presented in data tables for each site are based on these cleanup goals.

5.0 DATA REVIEW PROCESS

5.1 Historical Soil, Tuff, and Sediment Sampling Summary

Subsequent subsections of this report provide the number of samples collected from soil, sediment, and tuff at each site investigated. For most sites, the results include only data collected during the 2009–2010 investigation. Decision-level historical data are included for only the Extended Drainages; 300s Line Subaggregate: SWMUs 16-003(e), 16-026(b), 16-026(e), 16-029(a), and Shared Drainages; K-Site Subaggregate: SWMUs 11-006(b), 11-006(c), and 11-006(d); and V-Site Subaggregate: AOC C-16-068, Courtyard Area, SWMUs 16-024(m), 16-025(x), 16-029(g2), 16-029(w), 16-029(x), 16-034(m), and 16-034(n). The historical data were collected in 1995, 1997, 1998, 2005, and 2008. Sampling at these sites included a wide range of depths.

5.2 Overview of Investigation Data

The data obtained from the sites are used to identify COPCs and assess the nature and extent of contamination at each SWMU and AOC. The final data set and the COPCs identified are also evaluated in the human health and ecological risk-screening assessments presented in Appendix H. The final data set includes analytical results from both historical sampling activities and the 2009–2010 investigation. Only data determined to be of decision-level quality following the data quality assessment (Appendix E) are included in the final data set. All investigation data are presented in Appendix F (on DVD).

A principal objective of the data review and assessment is to evaluate the spatial distribution of COPCs and to determine whether the nature and extent of COPCs are defined by the existing data. The extent of a COPC is defined if the data show decreasing concentrations or activities vertically and laterally from the source. Chemicals are frequently detected at or near the estimated quantitation limit (EQL) for organic chemicals and the estimated detection limit (EDL) for inorganic chemicals. Concentrations at or near the EQL and EDL are considered “trace” concentrations. An organic or inorganic COPC concentration that decreased to trace levels is sufficient to demonstrate that the extent is defined.

Historical data are available for some of the sites in the S-Site Aggregate Area. All historical and recent 2009–2010 data have been validated according to LANL standard operating procedures, and only the data that passed the validation process were included in the data review, the evaluation of nature and extent, and the risk assessments. Data quality issues, including rejected analytical results, are discussed in Appendix E.

5.3 COPC Identification

The COPC identification process includes comparison with the media-specific background for inorganic chemical and radionuclide BVs or FVs provided in Laboratory guidance (LANL 1998, 059730). For inorganic chemicals, the site data are compared with a BV for the appropriate media type and identified as a COPC if at least one result or the analytical detection limit exceeds the BV. An FV for fallout radionuclides applies only to surface soil samples, generally from depths of 0.0–1.0 ft; the fallout radionuclides are tritium, cesium-137, americium-241, plutonium-238, plutonium-239, and strontium-90. Fallout radionuclides detected in site soil samples collected below 1 ft or detected in tuff were retained as COPCs. In some cases, background data and/or a BV or FV were unavailable; in these cases, the inorganic chemicals and radionuclides were evaluated according to detection status. Any organic chemical detected in site samples is designated as a COPC regardless of the media type.

Because the BV is an upper tolerance limit (UTL) and not an absolute upper bound on the background distribution, a small fraction of background observations are expected to exceed the BV. Therefore, the data set for inorganic chemicals exceeding the BV and with greater than 50% detects in the sample data set was compared with the data set for background for the same analyte using the Gehan and quantile tests (Gehan 1965, 055611; Gilbert and Simpson 1990, 055612). Comparisons between data sets that might represent different concentration distributions, such as site-specific data and Laboratory background data, are performed using a variety of statistical methods. Background comparisons begin with a simple comparison of site-specific data with a UTL estimated from the background data (UTL [95, 95] or the 95% upper confidence bound on the 95th quantile). The UTLs are used to represent the upper end of concentration distribution and are also referred to as BVs (LANL 1998, 059730). The UTL comparisons are followed, when appropriate, by statistical tests that evaluate potential differences between the distributions. These tests are used for testing hypotheses about data from two potentially different distributions (e.g., a test of the hypothesis that site concentrations are elevated above background levels). Nonparametric tests most commonly performed include the Gehan test (modification of the Wilcoxon Rank Sum test) and the quantile test (Gehan 1965, 055611; Gilbert and Simpson 1990, 055612). The Gehan test is recommended when nondetects are relatively frequent (greater than 10% and less than 50%). It handles data sets with nondetects reported at multiple detection limits in a statistically robust manner (Gehan 1965, 055611; Millard and Deverel 1988, 054953). The Gehan test is not recommended if either of the two data sets has more than 50% nondetects. If there are no nondetected concentrations in the data, the Gehan test is equivalent to the Wilcoxon Rank Sum test. The Gehan test is the preferred test because of its applicability to a majority of environmental data sets and because of its recognition and recommendation in EPA-sponsored workshops and publications.

The quantile test is better suited to assessing shifts of a subset of the data. The quantile test determines whether more of the observations in the top 20% (chosen percentile) of the combined data set come from the site data set than would be expected by chance, given the relative sizes of the site and background data sets. If the relative proportion of the two populations being tested is different in the top 20% of the data than in the remainder of the data, the distributions may be partially shifted because of a subset of site data. This test is capable of detecting a statistical difference when only a small number of concentrations are elevated (Gilbert and Simpson 1992, 054952). The quantile test is the most useful distribution shift test where samples from a release represent a small fraction of the overall data collected. The quantile test is applied at a prespecified quantile or threshold, usually the 80th percentile. The test cannot be performed if more than 80% (or, in general, more than the chosen percentile) of the combined data are nondetected values. It can be used when the frequency of nondetects is approximately the same as the quantile being tested. For example, in a case with 75% nondetects in the combined background and site data set, application of a quantile test comparing 80th percentiles is appropriate. The threshold percentage can be adjusted to accommodate the detection rate of an analyte or to look for differences

further into the distribution tails. The quantile test is more powerful than the Gehan test for detecting differences when only a small percentage of the site concentrations are elevated. If both tests indicated that concentrations of the inorganic chemical at the site were not significantly different from background, the analyte was eliminated as a COPC.

Appendix B presents box plots for all analytes excluded as COPCs based on background comparison at each site. A box plot consists of a box, a line across the box, whiskers (lines extended beyond the box and terminated with a short perpendicular line), and points outside the whiskers. The box area of the plot is the region between the 25th percentile and the 75th percentile of the data, the interquartile range, or middle half of the data. The horizontal line within the box represents the median (50th percentile) of the data. The whiskers give an interval of 1.5 times the interquartile range, outside of which data may be evaluated for their potential to be outliers. The concentrations are plotted as points overlying the box plot.

Excavated samples are excluded from the COPC identification discussion, because they are no longer representative of current site conditions. However, excavated sampling results are provided in Appendix F (on DVD).

Inorganic chemicals, organic chemicals, and radionuclides are identified as COPCs for an entire site if they are COPCs in any of the media sampled at the site. The media-specific identification of COPCs for each site is discussed in sections 6 through 10.

6.0 K-SITE SUBAGGREGATE SITE INVESTIGATIONS

The K-Site Subaggregate consists of 11 sites (Plate 2): SWMUs 11-005(a), 11-005(b), 11-005(c), 11-006(a), 11-006(b), 11-006(c), 11-006(d), 11-011(a), 11-011(b), 11-011(d), and AOC C-11-002. K-Site was constructed toward the end of 1944 for research of implosion symmetry using x-rays and the magnetic method. When K-Site was built, it originally housed the Betatron Facility and the Cloud Chamber. These two devices were kept in separate buildings (11-2 and 11-3) and were used during the Manhattan Project (1942–1945).

K-Site is the location of the Laboratory's environmental testing facilities. Activities involve vibration analysis and drop testing materials and components under a variety of extreme physical environments. Components and assemblies undergo vibration, shock, and thermal testing.

K-Site is home to MDA S. The major facility at K-Site was a now-removed drop tower and vibration table facility used to conduct environmental and effects tests on HE systems and components.

6.1 Soil, Tuff, and Sediment Sampling Summary

Ten SWMUs and one AOC were sampled during the 2009–2010 sampling campaign. In the 2009–2010 investigations, 95 soil, 13 fill, 1 sediment, and 115 tuff (Qbt 4) samples were collected within the K-Site Subaggregate. Samples were analyzed for inorganic chemicals (TAL metals, perchlorate, anions, and total cyanide), organic chemicals (VOCs, SVOCs, and explosive compounds), and radionuclides (americium-241, isotopic uranium, and isotopic plutonium). The 2009−2010 sample data are combined with historical decision-making data, and sampling results are evaluated on a site-by-site basis in sections 6.2 through 6.12.

6.2 AOC C-11-002—Area of Potential Soil Contamination

6.2.1 Site Description and Operational History

AOC C-11-002 is an area of potential soil contamination located at TA-11 approximately 250 ft south of building 11-24 (Figure 6.2-1). This area is associated with former building 11-12, which was of wood-frame construction and measured 7 × 9 ft. Building 11-12 operated from 1944–1957 and possibly housed a darkroom and laboratory that were used to support photofission experiments. The building was removed during decontamination and decommissioning (D&D) activities conducted in 1959.

6.2.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-11-002.

6.2.3 Field-Screening Results

Fourteen samples, collected at seven locations, were field screened on-site for organic vapors using a PID equipped with an 11.7–eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic constituents analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

6.2.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for AOC C-11-002 are shown in Figure 6.2-1. Table 6.2-1 summarizes the samples collected and analyses requested.

6.2.4.1 Inorganic Chemicals

Six soil samples and eight tuff (Qbt 4) samples were collected and analyzed for TAL metals, total cyanide, anions, and perchlorate (Table 6.2-1). Inorganic chemicals above BVs are presented in Table 6.2-2. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.2-2. Because the extent of contamination is not defined, COPCs have not been identified.

6.2.4.2 Organic Chemicals

Six soil samples and eight tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each sample was analyzed for SVOCs, explosive compounds, and VOCs (Table 6.2-1). Detected organic chemicals are presented in Table 6.2-3. Detected concentrations of organic chemicals are shown in Figure 6.2-3. Because the extent of contamination is not defined, COPCs have not been identified.

6.2.4.3 Radionuclides

Six soil samples and eight tuff (Qbt 4) samples were collected and analyzed for isotopic uranium, isotopic plutonium, and americium-241. No radionuclides were detected or detected above the BVs/FVs.

6.2.5 Spatial Distribution

Fourteen samples were collected from two depths (0.0–0.5 and 5.5–6.0 ft bgs) at seven locations (Figure 6.2-1). The extent of contamination at AOC C-11-002 is evaluated in the following sections.

6.2.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC C-11-002 is shown in Figure 6.2-2. Analytical results are presented in Table 6.2-2.

- Aluminum, arsenic, beryllium, calcium, cobalt, copper, total cyanide, iron, lead, magnesium, nickel, and vanadium were detected above Qbt 2, Qbt 3, and Qbt 4 BVs in the surface sample at location 11-608722. Concentrations decreased with depth. The inorganic COPCs were not detected above BVs in downgradient locations. Therefore, the extent is defined.
- Antimony, cadmium, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, and selenium is defined.
- Barium and chromium were detected above Qbt 2, Qbt 3, and Qbt 4 BVs in the surface sample at location 11-608722 and in the subsurface sample (5.5–6.0 ft bgs) at location 11-608717. Barium and chromium concentrations decreased with depth at location 11-608722. Barium and chromium concentrations at location 11-608717 were less than the maximum tuff (Qbt 4) background concentrations. Barium and chromium were not detected above BVs in the furthest downgradient locations. Therefore, the lateral extent of barium and chromium is defined.
- Nitrate was detected in two surface samples at two locations, and fluoride was detected in all samples at all locations. Both nitrate and fluoride are naturally occurring, and the detected concentrations (1.30–1.48 and 1.11–4.46 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate and fluoride is defined.
- Perchlorate was detected in the surface sample at location 11-608719. Perchlorate was not detected in any subsurface samples or at the furthest downgradient locations. Therefore, the extent of perchlorate is defined.

6.2.5.2 Organic Chemicals

The distribution of organic chemicals at AOC C-11-002 is shown in Figure 6.2-3. Analytical results are presented in Table 6.2-3.

- Bis(2-ethylhexyl)phthalate was detected in the surface samples at four locations. Concentrations decreased with depth at all locations. Bis(2-ethylhexyl)phthalate was not detected at the furthest downgradient location (16-608721). Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- 1,3,5,7-Tetranitro-1,3,5,7-tetrazocine (HMX) was detected in the surface samples at locations 11-608722 and 11-608720. Concentrations decreased with depth at both locations. HMX was not detected at the furthest downgradient location (11-608721). Therefore, the extent of HMX is defined.

- 4-Isopropyltoluene and toluene were detected in surface samples at three locations. Concentrations decreased with depth at all locations. Concentrations were below EQLs at the furthest downgradient location. Therefore, the extent of 4-isopropyltoluene and toluene is defined.
- Methylene chloride was detected in three surface and two subsurface samples at four locations. Concentrations are at or below the EQLs. Concentrations increased downgradient and are above the EQL. Therefore, the vertical extent of methylene chloride is defined, but the lateral extent is not defined.

6.2.5.3 Radionuclides

No radionuclides were detected or detected above the BVs/FVs.

6.2.5.4 Summary of Extent

The extent of all inorganic chemicals and radionuclides, and the majority of the organic chemicals, is defined. The lateral extent of methylene chloride is not defined. Therefore, the extent of contamination at AOC C-11-002 is not defined.

6.2.6 Summary of Human Health Risk Assessment Results

Because the extent of contamination is not defined, human health risk was not evaluated for AOC C-11-002.

6.2.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for AOC C-11-002.

6.3 SWMU 11-005(a)—Septic System

6.3.1 Site Description and Operational History

SWMU 11-005(a) is an active septic system located at TA-11 approximately 70 ft southwest of building 11-24 (Figure 6.3-1). This septic system consists of a septic tank (structure 11-20), associated drainlines from buildings 11-1 and 11-4, and a tile drain field that extends to an outfall on a sloped area to the south of the septic tank. The septic system began operation in 1944. The drainline from building 11-1 has been plugged. Currently, discharge to the septic system comes only from a restroom in building 11-4. Building 11-1 is currently a storage area for electrical equipment but was originally used as a control building for the Betatron Facility (building 11-2) and the Cloud Chamber (building 11-3). Building 11-4 is currently the control building for the Vibration-Test Facility (building 11-30), though it was historically used as a machine shop and photo-processing facility. A memorandum from 1950 indicated a mercury spill occurred in building 11-4; however, the location, source, and extent of the spill are unknown (LANL 1993, 020948, p. 5-97).

6.3.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 11-005(a).

6.3.3 Field-Screening Results

Twenty-three samples, collected at 12 locations (Appendix C, section C-7.1.1), were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed, except chromium, had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

At location 11-608724, chromium was reported at 319 mg/kg in sample RE11-10-1587. Based on this result, two additional step-out samples (RE11-10-1609 and RE11-10-1610) were collected (Appendix C, section C-7.1.1).

6.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 11-005(a) are shown in Figure 6.3-1. Table 6.3-1 summarizes the samples collected and analyses requested.

6.3.4.1 Inorganic Chemicals

Four soil, 1 sediment, and 18 tuff (17 Qbt 4 and 1 Qbt 3) samples were collected and analyzed for inorganic chemicals. Each of the 23 samples was analyzed for TAL metals, perchlorate, total cyanide, and anions. Table 6.3-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.3-2. Because the extent is not defined, COPCs have not been identified.

6.3.4.2 Organic Chemicals

Four soil, 1 sediment, and 18 tuff (17 Qbt 4 and 1 Qbt 3) samples were collected and analyzed for organic chemicals. Each of the 23 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 6.3-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 6.3-3. Because the extent is not defined, COPCs have not been identified.

6.3.4.3 Radionuclides

Four soil, 1 sediment, and 18 tuff (17 Qbt 4 and 1 Qbt 3) samples were collected and analyzed for radionuclides. Each of the 23 samples was analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 6.3-4 lists the radionuclides detected or detected above BVs/FVs. Activities of radionuclides detected or detected above BVs/FVs are shown in Figure 6.3-4. Because the extent is not defined, COPCs have not been identified.

6.3.5 Spatial Distribution

Twenty-three samples were collected from 12 locations (Figure 6.3-1). Surface and subsurface samples were collected in and around the boundary of the SWMU and within the drainage between

SWMUs 11-005(a) and 11-005(b). Surface and subsurface samples were collected at the following depth intervals: three samples at 0.0–0.5 ft bgs, two samples at 0.5–1.0 ft bgs, three samples at 1.0–1.5 ft bgs, one sample at 3.0–3.5 ft bgs, three samples at 3.5–4.0 ft bgs, one sample at 4.0–4.5 ft bgs, three samples at 5.5–6.0 ft bgs, four samples at 6.5–7.0 ft bgs, one sample at 8.0–8.5 ft bgs, and two samples at 8.5–9.0 ft bgs. At location 11-608733, only one depth was collected (Appendix C, section C-7.1.1).

The extent of contamination at SWMU 11-005(a) is evaluated in the following sections.

6.3.5.1 Inorganic Chemicals

The distribution of inorganic chemicals above BVs at SWMU 11-005(a) is shown in Figure 6.3-2. Analytical results are presented in Table 6.3-2.

- Antimony was detected above BVs at location 11-608724. Concentrations decreased with depth, and antimony was not detected above BVs at the furthest downgradient locations (11-608735 and 11-608734). Therefore, the extent of antimony is defined.
- Cadmium and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of cadmium and selenium is defined.
- Chromium was detected above BV at location 11-608724. Chromium concentrations decreased with depth and downgradient toward location 11-608734. Chromium was not detected above background in the surface but was detected in the subsurface at two locations (11-608729 and 11-608734). Both concentrations are below the maximum background concentration (13 mg/kg). Chromium concentrations decreased with depth at the remaining sample locations. Therefore, the extent of chromium is defined.
- Copper was detected above BV at 34.6 and 9.26 mg/kg at location 11-608724; concentrations decreased with depth. Concentrations decreased at the furthest downgradient location (11-608734). Copper was not detected above background in the surface (0.0–0.5 ft bgs) at location 11-608734; however, the concentration in the subsurface (4.0–4.5 ft bgs) was below the maximum background concentration (6.2 mg/kg). Therefore, the extent of copper is defined.
- Total cyanide was detected above BV at 4.03 mg/kg at location 11-608724. Concentrations decreased with depth and downgradient at the furthest downgradient location (11-608734). Total cyanide was not detected above background in the surface but was slightly above background (0.5 mg/kg versus 0.504 mg/kg) in the subsurface at location 11-608735. Total cyanide was not detected in the remaining subsurface samples collected at this SWMU. Therefore, the extent of total cyanide is defined.
- Fluoride was detected in 21 samples and nitrate was detected in 10 samples at SWMU 11-005(a). Fluoride and nitrate are naturally occurring, and the concentrations detected (1.06–3.37 and 1.21–4.0 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Lead was detected above BV at 222 mg/kg at location 11-608724. Concentrations decreased with depth and at the furthest downgradient location (11-608734). Concentrations also decreased with depth at location 11-608735. Therefore, the extent of lead is defined.
- Mercury was detected above BV at 0.362 mg/kg and at 0.3 mg/kg at locations 11-608724 and 11-608735, respectively. Concentrations decreased with depth at both locations and at the furthest downgradient location (11-608734). Therefore, the extent of mercury is defined.

- Silver was detected above BV at 60.5 mg/kg at location 11-608724. Concentrations decreased at the furthest downgradient location (11-608734). Silver concentrations decreased with depth at locations 11-608729, 11-608728, 11-60726, 11-608724, and 11-608735. Therefore, the extent of silver is defined.
- Zinc was detected above BV at locations 11-608724, 11-608734, and 11-608735. Concentrations decreased with depth and at the furthest downgradient location (11-608734). Therefore, the extent of zinc is defined.

6.3.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 11-005(a) is shown in Figure 6.3-3. Analytical results are presented in Table 6.3-3.

- Detected concentrations for acetone, HMX, and methylene chloride were below the EQLs. Therefore, the extent of acetone, HMX, and methylene chloride is defined.
- RDX was detected at 0.592 mg/kg at location 11-608728. Concentrations increased with depth at this location. However, concentrations decreased at the furthest downgradient location (11-608734). Therefore, the lateral extent of RDX is defined but the vertical extent is not defined.

6.3.5.3 Radionuclides

The distribution of radionuclides at SWMU 11-005(a) is shown in Figure 6.3-4. Analytical results are presented in Table 6.3-4.

- Americium-241 was detected at 0.0427 pCi/g at location 11-608734, which is the furthest downgradient location. It was not detected above the FV at locations upgradient of location 11-608734, nor was it detected in any subsurface samples collected at this SWMU. Therefore, the lateral extent of americium-241 is not defined, but the vertical extent is defined.
- Plutonium-239/240 was detected at 0.168 pCi/g at location 11-608724 and increased to 0.193 pCi/g at the furthest downgradient location (11-608734). Concentrations decreased with depth at both locations. Therefore, the lateral extent of plutonium-239/240 is not defined, but the vertical extent is defined.
- Uranium-234 was detected at 3.92 pCi/g at location 11-608724. It was not detected above BV in any subsurface samples or at the furthest downgradient location (11-608734). Therefore, the extent of uranium-234 is defined.
- Uranium-235/236 was detected at 0.103 pCi/g at location 11-608727 and 0.226 pCi/g at location 11-608724. Concentrations decreased with depth and at the furthest downgradient location (11-608734). Therefore, the extent of uranium-235/236 is defined.
- Uranium-238 was detected at 3.78 pCi/g at location 11-608724 and 2.57 pCi/g at location 11-608735. Concentrations of uranium-238 decreased with depth and downgradient. Therefore, the extent of uranium-238 is defined.

6.3.5.4 Summary of Extent

The lateral extent of americium-241 and plutonium-239/240 is not defined, and the vertical extent of RDX is not defined. The extent of the remaining inorganic chemicals, organic chemicals, and radionuclides is defined. Therefore, the overall extent is not defined for SWMU 11-005(a).

6.3.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 11-005(a).

6.3.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 11-005(a).

6.4 SWMU 11-005(b)—Septic System

6.4.1 Site Description and Operational History

SWMU 11-005(b) is an active septic system located at TA-11, approximately 70 ft south of building 11-3 (Figure 6.4-1). This septic system consists of a septic tank (structure 11-43), an outlet drainline to an outfall to the south of the septic tank, and a drain field west of the drainline. The septic system serves the restroom added to the exterior of building 11-3 and possibly may have served building 11-24, a former air gun facility that now houses a machine shop.

6.4.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 11-005(b).

6.4.3 Field-Screening Results

Twenty-six samples, collected at 13 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX was detected at 6.9 ppm in sample RE11-10-1755 at location 11-608787. Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on the RDX field-screening results, two additional step-out samples (RE11-10-1771 and RE11-10-1772) were collected (Appendix C, section C-7.1.2).

6.4.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 11-005(b) are shown in Figure 6.4-1. Table 6.4-1 summarizes the samples collected and analyses requested.

6.4.4.1 Inorganic Chemicals

Eight soil, 4 fill, and 14 tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the 26 samples was analyzed for TAL metals, perchlorate, total cyanide, and anions. Table 6.4-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.4-2. Because the extent is not defined at SWMU 11-005(b), COPCs have not been identified.

6.4.4.2 Organic Chemicals

Eight soil, 4 fill, and 14 tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the 26 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 6.4-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 6.4-3. Because the extent is not defined at SWMU 11-005(b), COPCs have not been identified.

6.4.4.3 Radionuclides

Eight soil, 4 fill, and 14 tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 26 samples was analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 6.4-4 lists the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 6.4-4. Because the extent is not defined at SWMU 11-005(b), COPCs have not been identified.

6.4.5 Spatial Distribution

Twenty-six samples were collected from 13 locations (Figure 6.4-1). Surface and subsurface samples were collected in and near the SWMU 11-005(b) boundary and within the drainage between SWMUs 11-005(b) and 11-006(d). Four samples were collected at 0.0–0.5 ft bgs, and 22 samples were collected at the following depth intervals: one sample at 1.0–1.5 ft bgs, one sample at 1.5–2.0 ft bgs, two samples at 3.0–3.5 ft bgs, five samples at 3.5–4.0 ft bgs, one sample at 5.0–5.5 ft bgs, three samples at 5.5–6.0 ft bgs, one sample at 6.5–7.0 ft bgs, one sample at 7.0–7.5 ft bgs, five samples at 8.5–9.0 ft bgs, and two samples at 9.0–9.5 ft bgs (Appendix C, section C-7.1.2).

The extent of contamination at SWMU 11-005(b) is evaluated in the following sections.

6.4.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-005(b) is shown in Figure 6.4-2. Analytical results are presented in Table 6.4-2.

- Aluminum and cobalt were detected above BVs at 9720 and 6.01 mg/kg, respectively, at location 11-608795. Concentrations increased slightly with depth (7.0–7.5 ft bgs) at this location. Concentrations decreased at the furthest downgradient location (11-608792). Therefore, the lateral extent of aluminum and cobalt is defined, but the vertical extent is not defined at location 11-608795.
- Antimony, cadmium, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, and selenium is defined.
- Arsenic, iron, and magnesium were detected above BVs at 3.75, 15,400, and 2450 mg/kg, respectively, at location 11-608795. Concentrations decreased with depth at this location and at the furthest downgradient location (11-608792). Therefore, the extent of arsenic, iron, and magnesium is defined.
- Barium had a maximum detected concentration of 398 mg/kg at location 11-608795 at a depth of 1.5–2.0 ft. The concentration decreased slightly to 380 mg/kg in the 7.0- to 7.5-ft sample at this location. Barium was detected at 120 mg/kg at location 11-608790 in the deeper sample. Concentrations also increased with depth at locations 11-608785, 11-608791, and 11-608793. Barium concentrations decreased at the furthest downgradient location (11-608792). Therefore, the vertical extent of barium is not defined, but the lateral extent is defined.

- Calcium was detected above BV at 14,100 mg/kg at location 11-608790. Calcium concentrations decreased with depth at this location and at the furthest downgradient location (11-608792). Therefore, the extent of calcium is defined.
- Chloride was detected above BV at 217 mg/kg at location 11-608788 and 321 mg/kg at location 11-608790. Although chloride was not detected above background in the 3.5- to 4-ft-bgs interval at these locations, both concentrations are below the maximum Qbt 2, Qbt 3, and Qbt 4 background concentration (465 mg/kg). Chloride was not detected above BV at the furthest downgradient location (11-608792). Therefore, the extent of chloride is defined.
- Chromium was detected above BV at 17.6 mg/kg at location 11-608785 and 19.5 mg/kg at location 11-608791. Concentrations increased with depth at both locations. Chromium was detected at six other locations in the deeper samples at or below the maximum Qbt 2, Qbt 3, and Qbt 4 background concentration (13 mg/kg). Concentrations decreased at the furthest downgradient location (11-608792). Therefore, the vertical extent of chromium is not defined at two locations, but the lateral extent is defined.
- Copper was detected above BV at 9.15 and 9.34 mg/kg at location 11-608795. Concentrations remained essentially constant in the 7.0- to 7.5-ft-bgs interval at this location. Copper was detected at three other locations in the deeper sample at or below the maximum Qbt 2, Qbt 3, and Qbt 4 background concentration (6.2 mg/kg). Concentrations decreased at the furthest downgradient location (11-608792). Therefore, the vertical extent of copper is not defined at one location, but the lateral extent is defined.
- Total cyanide was detected above BV at 1.09 mg/kg at location 11-608783. Concentrations decreased with depth and at the furthest downgradient location (11-608792). Therefore, the extent of total cyanide is defined.
- Fluoride was detected in all samples, and nitrate was detected in 13 samples. Fluoride and nitrate are naturally occurring, and the concentrations detected (0.857–11.3 and 1.27–10.5 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Lead was detected above BV at 12.1 mg/kg at location 11-608790, which is below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (15.5 mg/kg). Concentrations decreased with depth at location 11-608795. Lead was not detected above background at the furthest downgradient location (11-608792). Therefore, the extent of lead is defined.
- Nickel and vanadium were detected at 10.6 and 28.6 mg/kg, respectively, at location 11-608795. Concentrations decreased with depth (7.0–7.5 ft bgs) at this location. Concentrations also decreased at the furthest downgradient location (11-608792). Therefore, the extent of nickel and vanadium is defined.
- Perchlorate was detected at 0.0021 mg/kg at location 11-608785. The concentrations were below the EQL and decreased with depth at this location, and all other locations except location 11-608795. Perchlorate was detected at a concentration of 0.000642 mg/kg at location 11-608795 in the deepest sample. Therefore, the extent of perchlorate is defined.
- Silver was detected at 1.75 mg/kg at location 11-608791. Concentrations decreased with depth and at the furthest downgradient location (11-608792). Therefore, the extent of silver is defined.
- Zinc was detected at 49.8 and 55.1 mg/kg at location 11-608784. Both concentrations are below the soil maximum background concentration (75.5 mg/kg). Concentrations decreased with depth at the furthest downgradient location (11-608792). Therefore, the extent of zinc is defined.

6.4.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 11-005(b) is shown in Figure 6.4-3. Analytical results are presented in Table 6.4-3.

- Concentrations of benzo(a)pyrene, benzo(k)fluoranthene, and benzoic acid decreased with depth and at the furthest downgradient location (11-608792); therefore, the extent of these organic chemicals is defined.
- Benzo(b)fluoranthene was detected at three locations. Concentrations decreased with depth at locations 11-608783 and 11-608793. Concentrations at location 11-608795 were below the EQL. Concentrations decreased at the furthest downgradient location (11-608792). Therefore, the extent of benzo(b)fluoranthene is defined.
- Bis(2-ethylhexyl)phthalate was detected at 0.396 mg/kg in sample RE11-10-1769 (0–0.5 ft bgs) at location 11-608794. It was not detected in any subsurface samples collected at this location and at the furthest downgradient location (11-608792). Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- Chrysene, fluoranthene, and pyrene were detected at 0.0297, 0.0397, and 0.0425 mg/kg, respectively, at location 11-608795. Concentrations were below the EQL. Concentrations decreased with depth at location 11-608783 and at the furthest downgradient location (11-608792). Therefore, the extent of these organic chemicals is defined.
- HMX was detected at nine locations. Concentrations increased with depth at locations 11-608789 and 11-608790, and decreased with depth elsewhere. Concentrations also increased at the furthest downgradient location (11-608792). Therefore, the extent of HMX is not defined.
- 1,1,1-Trichloroethane was detected at 0.00213 mg/kg at location 11-608793. Concentrations decreased with depth and downgradient at the furthest downgradient location (11-608792). Therefore, the extent of 1,1,1-trichloroethane is defined.
- Trichloroethene was detected at 0.00293 mg/kg at location 11-608791 and 0.00342 mg/kg at location 11-608793. Concentrations decreased with depth at both locations and were below the EQL at location 11-608790. Trichloroethene was not detected at the furthest downgradient location (11-608792). Therefore, the extent of trichloroethene is defined.

6.4.5.3 Radionuclides

The distribution of radionuclides at SWMU 11-005(b) is shown in Figure 6.4-4. Analytical results are presented in Table 6.4-4.

- Plutonium-239/240 was detected at 0.0326 pCi/g at location 11-608791. Concentrations decreased with depth and at the furthest downgradient location (11-608792). Therefore, the extent of plutonium-239/240 is defined.
- Uranium-238 was detected above the BV at locations 11-608793 and 11-608794. Concentrations decreased with depth and at the furthest downgradient location (11-608792). Therefore, the extent of uranium-238 is defined.

6.4.5.4 Summary of Extent

The vertical extent of aluminum, cobalt, barium, chromium, and copper is not defined, and the extent of HMX is not defined. The extent of the remaining inorganic and organic chemicals and all radionuclides is defined. Therefore, the overall extent is not defined for SWMU 11-005(b).

6.4.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 11-005(b).

6.4.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 11-005(b).

6.5 SWMU 11-006(a)—HE Sump

6.5.1 Site Description and Operational History

SWMU 11-006(a) is an inactive HE sump (structure 11-39) located at TA-11 on the east side of the drop tower (Figure 6.5-1). The concrete sump measures 4.5 × 5.3 × 4.25 ft. The sump was installed in 1961 and drained across the concrete pad and asphalt apron at the base of the drop tower to one of three catch basins [SWMU 11–006(c)]. The sump's upper rim was level with the concrete pad to receive wash-down water during cleanup of HE from the pad. Larger fragments of HE were first collected by hand prior to washing the concrete pad with high-pressure washers. Any remaining HE particles were then rinsed into the sump's screening filter, where smaller particles exited through an asphalt apron and catch basin [SWMU 11-006(c)]. Waste collected from the concrete pad and sump filter were disposed of at the TA-16 burning ground (LANL 1993, 020948). The sump has been inactive for several years, and the drop tower was recently removed.

6.5.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 11-006(a).

6.5.3 Field-Screening Results

Sixteen samples, collected at eight locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations were less than the action level of 2 ppm, which is approximately 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216) for all samples except RE16-10-1727. This sample contained RDX at 3.24 mg/kg. Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Because of the restrictions placed on field activities in a Mexican spotted owl habitat, a step-out sample that would normally have been collected for the elevated RDX screening detection was not collected.

6.5.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 11-006(a) are shown in Figure 6.5-1. Table 6.5-1 summarizes the samples collected and analyses requested.

6.5.4.1 Inorganic Chemicals

Eight tuff (Qbt 4), two fill, and four soil samples were collected and analyzed for inorganic chemicals. Each of the samples was analyzed for TAL metals, total cyanide, anions, and perchlorate. Table 6.5-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.5-2. Because the extent is not defined for the site, COPCs have not been identified.

6.5.4.2 Organic Chemicals

Eight tuff (Qbt 4), two fill, and four soil samples were collected and analyzed for organic chemicals. Each of the samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 6.5-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 6.5-3. Because the extent of contamination is not determined for this site, COPCs have not been identified.

6.5.4.3 Radionuclides

Eight tuff (Qbt 4), two fill, and four soil samples were collected and analyzed for radionuclides. Each of the samples was analyzed for isotopic uranium, isotopic plutonium, and americium-241. There were no radionuclides detected or detected above BVs/FVs at this site.

6.5.5 Spatial Distribution

Eight tuff (Qbt 4), two fill, and four soil samples were collected at eight locations (Figure 6.5-1). Three locations were sampled at 0.5–1.0 and 6.0–6.5 ft bgs. Two locations were sampled at 4.5–5.0 and 10.0–10.5 ft bgs, one location was sampled at 5.0–5.5 and 10.0–10.5 ft bgs, and the remaining two locations were sampled only at 4.5–5.0 ft bgs (Appendix C, section C-7.1.3). The extent of contamination at SWMU 11-006(a) is evaluated in the following sections.

6.5.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-006(a) is shown in Figure 6.5-2. Analytical results are presented in Table 6.5-2.

- Antimony and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and selenium is defined.
- Cadmium and zinc were detected above BVs at 0.585 and 71.2 mg/kg, respectively, at location 11-608776. Concentrations decreased with depth and are less than the maximum background. Therefore, the extent of cadmium and zinc is defined.
- Calcium was detected above BV at 2930 mg/kg at location 11-608776. The concentration of calcium increased with depth, but location 16-608776 is the farthest downgradient sample location. Therefore, the extent of calcium is not defined.

- Chromium was detected above BV at 8.87 and 7.43 mg/kg at location 11-608778 and 9.07 mg/kg at location 11-608780. Concentrations decreased at location 11-608778, and all concentrations are below the maximum background concentration (13 mg/kg). Therefore, the extent of chromium is defined.
- Copper and lead were detected above BVs at 22 and 34.4 mg/kg, respectively, at location 11-608776. Copper and lead concentrations at this location decreased with depth, but location 16-608776 is the farthest downgradient sample location. Therefore, the vertical extent of copper and lead is defined, but the lateral extent is not defined.
- Fluoride was detected at all four sample locations. Fluoride is naturally occurring, and the concentrations detected (0.755–2.01 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.

6.5.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 11-006(a) is shown in Figure 6.5-3. Analytical results are presented in Table 6.5-3.

- Acenaphthene and anthracene were detected at 0.0132 and 0.0322 mg/kg, respectively, at location 11-608776. These concentrations were below their respective EQLs. Therefore, the extent of acenaphthene and anthracene is defined.
- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected at location 11-608776. Concentrations decreased with depth, but location 16-608776 is the farthest downgradient sample location. Therefore, the vertical extent of these organic chemicals is defined, but the lateral extent is not defined.
- Bis(2-ethylhexyl)phthalate was detected at 0.168 mg/kg at location 11-608779 below the EQL. Concentrations decreased with depth. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- HMX was detected at six locations. Concentrations decreased with depth at three locations. HMX increased slightly with depth at location 11-608780. HMX was also detected in the only depth sampled at locations 11-608781 and 11-608782. Therefore, the extent of HMX is not defined.
- Triaminotrinitrobenzene (TATB) was detected at three locations. Concentrations decreased with depth at location 11-608776, but location 16-608776 is the farthest downgradient sample location. TATB was detected at the only depth sampled at locations 11-608781 and 11-608782 at concentrations below the EQL. Therefore, the vertical extent of TATB is defined and the lateral extent of TATB is not defined.
- 1,2,4-Trimethylbenzene was detected at 0.000433 mg/kg at location 11-608782, which is below the EQL. Therefore, the extent of 1,2,4-trimethylbenzene is defined.
- 1,3-Xylene+1,4-xylene was detected at 0.000689 mg/kg at location 11-608780, which is below the EQL. Therefore, the extent of 1,3-xylene+1,4-xylene is defined.

6.5.5.3 Radionuclides

Radionuclides were not detected or detected above BVs/FVs.

6.5.5.4 Summary of Extent

The lateral extent of calcium, copper, lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, HMX, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and TATB is not defined. The vertical extent of calcium and HMX is not defined. There were no radionuclides detected or detected above BVs/FVs. Therefore, the overall extent of contamination at SWMU 11-006(a) is not defined.

6.5.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 11-006(a).

6.5.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 11-006(a).

6.6 SWMU 11-006(b)—Catch Basin

6.6.1 Site Description and Operational History

SWMU 11-006(b) is one of three catch basins and its associated outfall located at TA-11 near the drop tower complex (Figure 6.6-1). The SWMU 11-006(b) catch basin is located on the north side of the drop tower complex and consists of a concrete basin (structure 11–50) measuring 6 × 4 × 2 ft, an overflow drain, and a former National Pollutant Discharge Elimination System (NPDES)-permitted outfall (EPA 05A069) located to the northeast that drains into Water Canyon. Historically, SWMU 11-006(b) received wash-down water from the concrete pad and asphalt apron at the base of the drop tower via an HE sump [SWMU 11-006(a)]. Any HE particles remaining in the wash-down water after it exited the sump were further filtered out in the catch basin. After exiting the catch basin, the remaining wash water was channeled to a drainage and NPDES-permitted outfall on the northeast side of the catch basin (LANL 1993, 020948). Waste collected from the catch basin was disposed of at the TA-16 burning ground (LANL 1993, 020948). The outfall was removed from the NPDES permit in May 1998 (Madsen 2007, 098271). Currently, the catch basin is capped and sealed; however, the outfall still receives stormwater runoff. Due to the removal of EPA-05A069 from the NPDES permit, any runoff collected in the concrete pad and asphalt apron is now diverted to the other two catch basins associated with the former drop tower [SWMUs 11-006(c) and 11–006(d)] (Madsen 2007, 098271).

6.6.2 Summary of Previous Investigations

In 1998, one surface sample (0.0–0.5 ft bgs) was collected within the outfall at SWMU 11-006(b) at location 16-05904. The sample was submitted for laboratory analysis of TAL metals, HE, and SVOCs (LANL 2005, 100704, p. 3). Decision-level data from the 1998 investigation are included in this report.

Inorganic chemicals detected above sediment BVs included arsenic, barium, and uranium. No SVOCs were detected. Table 6.6-1 presents the samples collected and analyses requested at SWMU 11-006(b). Tables 6.6-2 and 6.6-3 summarize the analytical results. Sampling locations and results for inorganic chemicals detected above BVs are shown in Figure 6.6-2.

6.6.3 Field-Screening Results

A total of 33 samples, collected at 17 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb (Appendix C, section C-7.1.4). ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic constituents analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

6.6.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 11-006(b) are shown in Figure 6.6-1. Table 6.6-1 summarizes the samples collected and analyses requested.

6.6.4.1 Inorganic Chemicals

Sixteen soil, 1 fill, 1 sediment, and 16 tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals and total cyanide. Thirty-three of the samples were also analyzed for anions and perchlorate. Table 6.6-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.6-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.6.4.2 Organic Chemicals

Sixteen soil, 1 fill, 1 sediment, and 16 tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each sample was analyzed for SVOCs and explosive compounds. Thirty-three of the samples were also analyzed for VOCs. Table 6.6-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 6.6-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.6.4.3 Radionuclides

Sixteen soil, 1 fill, and 16 tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 33 samples was analyzed for isotopic uranium, isotopic plutonium, and americium-241. Table 6.6-4 lists the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 6.6-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.6.5 Spatial Distribution

Thirty-four samples were collected from 18 sample locations (Figure 6.6-1). One surface (0.0–0.5, 1.0–1.5, or 1.5–2.0 ft bgs) and one subsurface (2.5–3.0, 3.0–3.5, 4.5–5.0, 5.5–6.0, or 8.0–8.5 ft bgs) sample was collected from each sample location except locations 11-608817 and 16-05904, where only a

surface sample was collected (Appendix C, section C-7.1.4). Flow has two apparent pathways: one drainage channel toward location 11-608817 and another drainage channel toward location 11-608816. The drainages run parallel to each other and to the northeast. The extent of contamination at SWMU 11-006(b) is evaluated in the following sections.

6.6.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-006(b) is shown in Figure 6.6-2. Analytical results are presented in Table 6.6-2.

- Aluminum was detected above BV at six locations. Concentrations increased with depth at locations 11-608820, 11-608823, and 11-608829, and decreased at the other locations and downgradient (toward locations 11-608816 and 11-608817). Therefore, the vertical extent of aluminum is not defined, and the lateral extent is defined.
- Antimony was detected above BVs at four locations. Antimony concentrations increased with depth at location 11-608820 and increased downgradient (location 11-608816). Concentrations decreased with depth at the other locations. Therefore, the extent of antimony is not defined.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at three locations. Concentrations were all below the maximum background concentration (5 mg/kg). Arsenic was also detected above the sediment BV at location 16-05904 in the surface sample (the only sample collected at this location) but was not detected above BV in the surrounding samples. Concentrations decreased downgradient. Therefore, the extent of arsenic is defined.
- Barium was detected above the respective Qbt 2, Qbt 3, and Qbt 4 BVs in eight tuff samples and one sediment sample. Barium was detected at the only depth sampled at location 16-05904, but concentrations decreased with depth in the surrounding samples. Barium concentrations increased with depth at location 11-608820 and decreased downgradient. Concentrations decreased with depth at the other locations. Therefore, the vertical extent of barium is not defined, and the lateral extent is defined.
- Beryllium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in tuff samples at 1.4 mg/kg at location 11-608829 and 2.97 mg/kg at location 11-608832. Beryllium concentrations increased with depth at both locations and decreased at the furthest locations downgradient (11-608817 and 11-608816). Therefore, the vertical extent of beryllium is not defined, and the lateral extent is defined.
- Bromide was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in three tuff samples at locations 11-608820, 11-608827, and 11-608829. Bromide concentrations increased with depth at each location and were not detected at the furthest locations downgradient (11-608817 and 11-608816). Therefore, the vertical extent of bromide is not defined, and the lateral extent is defined.
- Cadmium, mercury, selenium, silver, and thallium were detected below the BVs but had detection limits above the BVs. Therefore, the extent of these inorganic chemicals is defined.
- Calcium was detected in five samples above the Qbt 2, Qbt 3, and Qbt 4 BV. Calcium concentrations increased with depth at locations 11-608820, 11-608827, and 11-608832, and decreased downgradient at location 11-608817. Concentrations decreased with depth at the other two locations. Therefore, the vertical extent of calcium is not defined, and the lateral extent is defined.

- Chloride was detected at 118 mg/kg at location 11-608829. This concentration is below the maximum background concentration (465 mg/kg). Therefore, the extent of chloride is defined.
- Chromium was detected in 10 samples above the Qbt 2, Qbt 3, and Qbt 4 BV. Concentrations at eight locations were below the maximum background concentration (13 mg/kg). Concentrations increased with depth at locations 11-608822 and 11-608818. Concentrations decreased downgradient between locations 11-608822 and 11-608816. Therefore, the vertical extent of chromium is not defined, and the lateral extent is defined.
- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 11-608816 and 11-608822. Concentrations increased with depth at location 11-608822 and decreased with depth at location 11-608816. Concentrations decreased downgradient between locations 11-608822 and 11-608816. Therefore, the vertical extent of cobalt is not defined, and the lateral extent is defined.
- Copper was detected above BVs for soil and tuff in eight samples. Concentrations increased with depth at most locations and decreased downgradient between locations 11-608824 and 11-608816. Concentrations decreased with depth at location 11-608824 and were less than the maximum background concentration at locations 11-608820 and 11-608821. Therefore, the vertical extent of copper is not defined, and the lateral extent is defined.
- Total cyanide was detected above BV at 4.87 and 0.687 mg/kg at locations 11-608828 and 11-608829. Concentrations decreased with depth and downgradient (locations 11-608817 and 11-608816). Therefore, the extent of total cyanide is defined.
- Fluoride was detected in both surface and subsurface samples at all locations. Fluoride is naturally occurring, and the concentrations detected (1.18–7.61 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Iron was detected above BV at 23,000 mg/kg at location 11-608816 and 17,400 mg/kg at location 11-608822. Concentrations increased with depth at both locations and increased at location 11-608816, which is one of the furthest locations downgradient. Therefore, the extent of iron is not defined.
- Lead was detected at 21 mg/kg at location 11-608816 and 11.7 mg/kg at location 11-608822. Concentrations increased both with depth and at location 11-608816, which is one of the furthest locations downgradient. Therefore, the extent of lead is not defined.
- Magnesium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in three tuff samples at locations 11-608822, 11-608829, and 11-608832. Concentrations were below or equivalent to the maximum background concentration (2820 mg/kg) and decreased downgradient. Therefore, the extent of magnesium is defined.
- Nickel was detected above the BVs in four tuff samples and one soil sample. Concentrations increased with depth at locations 11-608822, 11-608827, and 11-608832, and decreased downgradient. Concentrations decreased with depth at location 11-608830. Therefore, the vertical extent of nickel is not defined, and the lateral extent is defined.
- Nitrate was detected in multiple samples. Nitrate is naturally occurring, and the concentrations detected (1.47–4.0 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected in four tuff samples at locations 11-608820, 11-608823, 11-608827, and 11-608829. Concentrations increased with depth and decreased downgradient at locations

11-608817 and 11-608816. Therefore, the vertical extent of perchlorate is not defined, and the lateral extent is defined.

- Sulfate was detected above BV at 169 mg/kg at location 11-608827. The concentration was below the maximum background concentration (1430 mg/kg). Therefore, the extent of sulfate is defined.
- Uranium was detected above BV at 2.84 mg/kg at location 16-05904. The concentration was below the maximum background concentration (7.2 mg/kg). Therefore, the extent of uranium is defined.
- Vanadium was detected above the BV in four tuff samples at locations 11-608816, 11-608820, 11-608822, and 11-608832. Concentrations increased with depth at locations 11-608816 and 11-608822, and concentrations increased downgradient at location 11-608816. Therefore, the extent of vanadium is not defined.
- Zinc was detected above the soil BV at 88.1 mg/kg at location 11-608824. The concentration decreased with depth and at the furthest locations downgradient (11-608816 and 11-608817). Therefore, the extent of zinc is defined.

6.6.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 11-006(b) is shown in Figure 6.6-3; the analytical results are presented in Table 6.6-3.

- Acetone was detected at five locations. Concentrations decreased with depth and downgradient (location 11-608817). Therefore, the extent of acetone is defined.
- Bis(2-ethylhexyl)phthalate was detected at six locations. Concentrations decreased with depth and downgradient (locations 11-608817 and 11-608816). Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- 1,1-Dichloroethene was detected at location 11-608829. Concentrations decreased with depth and downgradient of location 11-608829. Therefore, the extent of 1,1-dichloroethene is defined.
- Fluoranthene was detected in surface soil and fill at locations 11-608831 and 11-608832. Concentrations were below the EQL, decreased with depth, and decreased at the furthest location downgradient (11-608817). Therefore, the extent of fluoranthene is defined.
- HMX was detected at 13 locations. Concentrations increased with depth at location 11-608831 and downgradient (locations 11-608817 and 11-608816). Concentrations decreased with depth at all other locations. Therefore, the vertical extent of HMX is not defined, and the lateral extent is defined.
- 4-Isopropyltoluene was detected in surface soil and tuff at locations 11-608818 and 11-608816. Concentrations were below the EQL and decreased with depth at location 11-608818 and downgradient at location 11-608816. Therefore, the extent of 4-isopropyltoluene is defined.
- Pyrene was detected in fill at location 11-608832. Concentrations were below the EQL and decreased with depth and downgradient. Therefore, the extent of pyrene is defined.
- RDX was detected in surface soil at locations 11-608826 and 11-608827, and in subsurface tuff at location 11-608832. Concentrations decreased with depth at locations 11-608826 and 11-608827. Concentrations increased with depth at location 11-608832. Concentrations decreased downgradient (locations 11-608817 and 11-608616). Therefore, the vertical extent of RDX is not defined, and the lateral extent is defined.

- TATB was detected at locations 11-608826 and 11-608831. Concentrations increased with depth at location 11-608831 and decreased downgradient (locations 11-608817 and 11-608816). Concentrations decreased with depth at location 11-608826. Therefore, the vertical extent of TATB is not defined, and the lateral extent is defined.
- Toluene was detected at locations 11-608818, 11-608817, and 11-608816. Concentrations decreased with depth at locations 11-608817 and 11-608818, and decreased at the furthest downgradient locations (11-608816 and 11-608817). Concentrations at location 11-608816 were below the EQL. Therefore, the extent of toluene is defined.
- Trichloroethene was detected in one surface soil sample at location 11-608826. The concentration was below the EQL and decreased with depth and downgradient. Therefore, the extent of trichloroethene is defined.

6.6.5.3 Radionuclides

The distribution of radionuclides at SWMU 11-006(b) is shown in Figure 6.6-4. The analytical results are presented in Table 6.6-4.

- Plutonium-238 was detected above the FV in two soil samples at locations 11-608816 and 11-608820. Concentrations decreased with depth and downgradient. Therefore, the extent of plutonium-238 is defined.
- Plutonium-239/240 was detected above the FV in one fill sample at location 11-608832. Concentrations decreased with depth and at the furthest locations downgradient. Therefore, the extent of plutonium-239/240 is defined.
- Uranium-234 was detected above the BV in three soil samples at locations 11-608817, 11-608824, and 11-608827. Concentrations decreased with depth and at the furthest locations downgradient. Therefore, the vertical extent of uranium-234 is defined, but the lateral extent is not defined.
- Uranium-238 was detected above the BV in four soil samples at locations 11-608817, 11-608822, 11-608824, and 11-608827. Concentrations decreased with depth, increased downgradient at location 11-608817, but decreased at location 11-608816. Therefore, the vertical extent of uranium-238 is defined, and the lateral extent is not defined.

6.6.5.4 Summary of Extent

The vertical extent of aluminum, antimony, barium, beryllium, bromide, calcium, chromium, cobalt, copper, iron, lead, nickel, perchlorate, vanadium, HMX, RDX, and TATB is not defined. The lateral extent of antimony, iron, lead, vanadium, uranium-234, and uranium-238 is not defined. Therefore, the overall extent of contamination at SWMU 11-006(b) is not defined.

6.6.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 11-006(b).

6.6.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 11-006(b).

6.7 SWMU 11-006(c)—Catch Basin

6.7.1 Site Description and Operational History

SWMU 11-006(c) is one of three catch basins and its associated outfall located at TA-11 near the drop tower complex (Figure 6.7-1). The SWMU 11-006(c) catch basin is located on the southeast side of the drop tower complex and consists of a concrete basin (structure 11-51) measuring 6 × 4 × 2 ft and a former NPDES-permitted outfall (EPA05A096) located to the southeast that drains into Water Canyon. Historically, SWMU 11-006(c) received wash-down water from the concrete pad and asphalt apron at the base of the drop tower via an HE sump [SWMU 11-006(a)]. Any HE particles remaining in the wash-down water after it exited the sump were further filtered out in the catch basin. After exiting the catch basin, the remaining wash-down water flowed through an asphalt-lined drainage to a natural drainage and the NPDES-permitted outfall. The outfall is located on the southeast side of the catch basin and flows east into Water Canyon (LANL 1993, 020948). Waste collected from the catch basin was disposed of at the TA-16 burning ground (LANL 1993, 020948). The outfall was removed from the NPDES permit in May 1998 (Madsen 2007, 098271). Currently, this catch basin collects stormwater runoff that is pumped to SWMU 11-006(d) (Madsen 2007, 098271).

6.7.2 Summary of Previous Investigations

In 1998, one surface sample (0.0–0.5 ft bgs) was collected within the outfall at SWMU 11-006(c) at location 16-05902, and one surface sample was collected downgradient of SWMU 11-006(c) at location 16-05903. Samples were submitted for laboratory analysis of TAL metals, HE, and SVOCs (LANL 2005, 100704, p. 3). Decision-level data from the 1998 investigation are included in this report.

Table 6.7-1 presents the samples collected and analyses requested at SWMU 11-006(c). Tables 6.7-2 and 6.7-3 summarize the analytical results. Inorganic chemicals detected above sediment BVs included barium and copper. Sampling locations and results for inorganic chemicals above BVs are shown in Figure 6.7-2. HMX was detected in one sample; SVOCs were not detected. Sampling locations and results for detected organic chemicals are shown in Figure 6.7-3.

6.7.3 Field-Screening Results

A total of 32 samples, collected at 16 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb.). ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX was detected at 18 ppm in sample RE11-10-1625 at location 11-608738 and at 338 ppm in sample RE11-10-1633 at location 11-608742. Review of the XRF results indicates that process-related inorganic chemicals had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on the RDX field-screening results, four additional step-out samples (RE11-10-1649, RE11-10-1650, RE11-10-13789, and RE11-10-13790) were collected (Appendix C, section C-7.1.5).

6.7.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 11-006(c) are shown in Figure 6.7-1. Table 6.7-1 summarizes the samples collected and analyses requested.

6.7.4.1 Inorganic Chemicals

Thirty-two samples at 18 locations were collected and analyzed for inorganic chemicals. The samples were analyzed for TAL metals, perchlorate, total cyanide, and anions. Table 6.7-2 lists the inorganic chemicals above the BVs. Detected concentrations of inorganic chemicals above BVs and those detected without BVs are shown in Figure 6.7-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.7.4.2 Organic Chemicals

Thirty-two samples at 18 locations were collected and analyzed for organic chemicals. The samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 6.7-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 6.7-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.7.4.3 Radionuclides

Thirty-two samples at 18 locations were collected and analyzed for radionuclides. The samples were analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 6.7-4 lists the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 6.7-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.7.5 Spatial Distribution

Thirty-two samples were collected from 18 sample locations (Figure 6.7-1). One surface (0.0–0.5 ft bgs) and one subsurface (1.0–1.5, 2.0–2.5, 2.5–3.0, 3.0–3.5, 3.5–4.0, 4.5–5.0, 5.5–6.0, or 8.0–8.5 ft bgs) sample was collected from each sample location (Appendix C, section C-7.1.5) except locations 16-05902 and 16-05903, where only a surface sample was collected. The extent of contamination at SWMU 11-006(c) is evaluated in the following sections.

6.7.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-006(c) is shown in Figure 6.7-2. Analytical results are presented in Table 6.7-2.

- Antimony, cadmium, mercury, selenium, silver, and thallium were not detected above BVs but had detection limits above BVs. Therefore, the extent of these inorganic chemicals is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at three locations and above the soil BV at one location (Figure 6.7-2). Barium was also detected above the sediment BV at location 16-05902. Barium concentrations decreased with depth at locations 11-608736 and 11-608740. The concentration at location 11-608744 was less than the maximum background concentration (51.6 mg/kg). At Locations 11-608745, 11-608749, 11-608750, 11-608742, and 11-608741, sampled to a depth of 5.0–6.0 ft surrounding historical sample location 16-05902, barium was not

detected above BVs in the subsurface samples. Barium concentrations decreased downgradient. Therefore, the extent of barium is defined.

- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at five locations at locations 11-608748 and 11-608749. At both locations, concentrations increased with depth; therefore, the vertical extent of chromium is not defined. Chromium concentrations decreased with distance from the originating HE sump [SWMU 11-006(c)] at downgradient location 11-608744. Therefore, the lateral extent of chromium is defined.
- Copper was detected above the sediment BV at location 16-05902. Copper was also detected above the Qbt 2, Qbt 3, and Qbt 4 BV at five locations. Concentrations decreased with depth at location 11-608736 and were below the maximum background concentration (6.2 mg/kg) at two locations. Copper concentrations decreased with depth in locations surrounding location 16-05902. Copper concentrations increased with depth at locations 11-608748 and 11-608749. The vertical extent of copper is not defined. Concentrations decreased with distance from the originating HE sump [SWMU 11-006(a)] at downgradient location 11-608744. Therefore, the lateral extent of copper is defined.
- Fluoride was detected in 31 of the 32 samples analyzed. Fluoride is naturally occurring, and the concentrations detected (1.06–3.81 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Nitrate was detected in 13 of the 32 samples analyzed. Nitrate is naturally occurring, and the concentrations detected (1.4–5.27 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected in four tuff samples at locations 11-608741, 11-608742, 11-608749, and 11-608750. Concentrations were below the EQL and decreased downgradient. Therefore, the extent of perchlorate is defined.
- Zinc was detected above the soil BV at location 11-608737. Concentrations decreased with depth and downgradient. Therefore, the extent of zinc is defined.

6.7.5.2 Organic Chemicals

The distribution of organic chemicals detected at SWMU 11-006(c) is shown in Figure 6.7-3. Analytical results are presented in Table 6.7-3.

- Acenaphthene was detected in four samples at SWMU 11-006(c). Concentrations decreased with depth at three locations and downgradient. Concentrations increased at location 11-608749. The lateral extent of acenaphthene is defined, but the vertical extent is not defined.
- Acetone was detected in the surface samples at locations 11-608742, 11-608745, and 11-608748. Acetone was also detected in the 1.0- to 1.5-ft interval at location 11-608748. All concentrations were below the EQLs and decreased with depth. Acetone was not detected downgradient at locations 16-059403 and 11-608744. The extent of acetone is defined.
- Anthracene, benzo(a)pyrene, phenanthrene, and toluene were detected in one surface sample each at locations 11-608738, 11-608747, 11-608747, and 11-608746, respectively. Chrysene was detected in a subsurface sample at location 11-608747. Anthracene, benzo(a)pyrene, phenanthrene, toluene, and chrysene were not detected in any other samples or depths. The concentrations were below the EQLs. The extent of anthracene, benzo(a)pyrene, phenanthrene, toluene, and chrysene is defined.

- Benzo(b)fluoranthene was detected in four surface samples at locations 11-608738, 11-608746, 11-608747, and 11-608749, and in two subsurface samples at locations 11-608743 and 11-608746. Benzo(b)fluoranthene was detected in all samples at concentrations below the EQLs. Benzo(b)fluoranthene was not detected in the surface sample at location 11-608743 and was not detected in the deeper samples at locations 11-608738, 11-608747, and 11-608749. Benzo(b)fluoranthene was not detected downgradient at locations 11-608748, 16-05903, and 11-608744. The extent of benzo(b)fluoranthene is defined.
- Benzoic acid was detected in four surface samples at locations 11-608741, 11-608745, 11-608747, and 11-608748, and in two subsurface samples at locations 11-608747 and 11-608748. Benzoic acid was detected in all samples at concentrations less than the EQLs, and concentrations decreased with depth. Benzoic acid was not detected downgradient at locations 16-05903 and 11-608744. The extent of benzoic acid is defined.
- Bis(2-ethylhexyl)phthalate was detected at locations 11-608743, 11-608744, 11-608746, and 11-608747. Bis(2-ethylhexyl)phthalate was detected in the surface samples at locations 11-608744 and 11-608747, and in subsurface samples at locations 11-608743, 11-608744, and 11-608746. Bis(2-ethylhexyl)phthalate was detected in all samples at concentrations less than the EQLs. The extent of bis(2-ethylhexyl)phthalate is defined.
- Fluoranthene and pyrene were detected in the surface samples at locations 11-608738, 11-608746, and 11-608747. Concentrations were below the EQLs and decreased with depth and downgradient at locations 16-05903 and 11-608744. The extent of fluoranthene and pyrene is defined.
- HMX was detected at all but two locations. HMX was also detected in the surface sample at location 16-05902, which is the only sample collected at that location. HMX concentrations decreased with depth in all surrounding locations. Concentrations decreased with depth at all locations but 11-608736, near the outfall. Concentrations also decreased downgradient. Therefore, the vertical extent of HMX is not defined, but the lateral extent is defined.
- 4-Isopropyltoluene was detected in the surface samples at locations 11-608742 and 11-608747. Both concentrations were below the EQLs, decreased with depth, and decreased downgradient at locations 16-05903 and 11-608744. The extent of 4-isopropyltoluene is defined.
- Methylene chloride was detected in surface samples at locations 11-608742 and 11-608745. It was also detected in a subsurface sample at location 11-611743. All concentrations were below the EQLs. Methylene chloride decreased with depth and at location 11-608742 and downgradient. The extent of methylene chloride is defined.
- RDX was detected in the surface samples at locations 11-608744 and 11-608750, and in the subsurface sample at location 11-608746. Concentrations at locations 11-608746 and 11-608750 were below EQLs. Concentrations increased at the furthest sampling location down the drainage (11-608744) but decreased with depth. The vertical extent of RDX is defined, and the lateral extent is not defined.
- TATB was detected at 10 locations. Concentrations decreased with depth at all locations except location 11-608746. However, concentrations at location 11-608746 were below the EQLs. Concentrations decreased downgradient. The extent of TATB is defined.

6.7.5.3 Radionuclides

The distribution of radionuclides detected at SWMU 11-006(c) is shown in Figure 6.7-4. Analytical results are presented in Table 6.7-4.

- Plutonium-239/240 was detected above the FV in surface soil at locations 11-608744 and 11-608750. It was also detected at location 11-608746 at depth. This radionuclide was not detected in any other samples. The lateral extent is not defined at the furthest downgradient sample. The vertical extent is not defined at location 11-608746.

6.7.5.4 Summary of Extent

The lateral extent of all inorganic chemicals at SWMU 11-006(c) is defined. The vertical extent of all inorganic chemicals, except copper and chromium, is defined.

The vertical extent of acenaphthene and HMX is not defined. The lateral extent of all organic chemicals, except RDX, is defined.

The extent of plutonium-239/240 is not defined.

6.7.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination at SWMU 11-006(c) is not defined, human health risk was not evaluated for this site.

6.7.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination at SWMU 11-006(c) is not defined, ecological risk was not evaluated for this site.

6.8 SWMU 11-006(d)—Catch Basin

6.8.1 Site Description and Operational History

SWMU 11-006(d) is one of three catch basins and its associated outfall located at TA-11 near the drop tower complex (Figure 6.8-1). The SWMU 11-006(d) catch basin is located on the south side of the drop tower complex and consists of a concrete basin (structure 11–52) measuring 6 × 4 × 2 ft and a former NPDES-permitted outfall (EPA05A097) located to the southeast of the catch basin. Historically, SWMU 11-006(d) received wash-down water from the concrete pad and asphalt apron at the base of the drop tower via an HE sump [SWMU 11-006(a)]. Any HE particles remaining in the wash-down water after it exited the sump were further filtered out in the catch basin. After exiting the catch basin, the remaining wash-down water flowed through an asphalt-lined drainage to a natural drainage and then east into Water Canyon (LANL 1993, 020948). Waste collected from the catch basin was disposed of at the burning grounds at TA-16 (LANL 1993, 020948). Currently, this catch basin collects stormwater runoff that drains to the outfall.

6.8.2 Summary of Previous Investigations

In 1998, two surface (0.0–0.5 ft bgs) samples were collected; one was collected within the outfall at SWMU 11-006(d) at location 16-05900, and one was collected downgradient of SWMU 11-006(c) at

location 16-05901. Samples were submitted for laboratory analysis of TAL metals, HE, and SVOCs (LANL 2005, 100704, p. 3). Decision-level data from the 1998 investigation are included in this report.

Table 6.8-1 presents the samples collected and analyses requested at SWMU 11-006(d). Tables 6.8-2 and 6.8-3 summarize the analytical results. The only inorganic chemical detected above the sediment BV was uranium. Sampling locations and results for inorganic chemicals above BVs are shown in Figure 6.8-2. HMX was detected in both samples, and SVOCs were not detected. Sampling locations and results for detected organic chemicals are shown in Figure 6.8-3.

6.8.3 Field-Screening Results

Sixteen samples, collected at eight locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

6.8.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled at SWMU 11-006(d) are shown in Figure 6.8-1. Table 6.8-1 summarizes the samples (soil/fill and tuff [Qbt 4]) collected and analyses requested.

6.8.4.1 Inorganic Chemicals

Eight soil, one fill, two sediment, and seven tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. The soil, fill, and tuff (Qbt 4) samples were analyzed for anions, total cyanide, perchlorate, and TAL metals. The historical sediment samples were analyzed for TAL metals only. Table 6.8-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.8-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.8.4.2 Organic Chemicals

Eight soil, one fill, two sediment, and seven tuff (Qbt 4) samples were collected and analyzed for organic chemicals. The soil, fill, and tuff (Qbt 4) samples were analyzed for SVOCs, VOCs, and explosive compounds. The historical sediment samples were analyzed for SVOCs and HE. Table 6.8-3 presents the organic chemicals detected at SWMU 11-006(d). The sampling locations and detected concentrations of organic chemicals are shown in Figure 6.8-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.8.4.3 Radionuclides

Eight soil, one fill, and seven tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the samples was analyzed for isotopic uranium, isotopic plutonium, and americium-241. Table 6.8-4 presents the radionuclides detected or detected above BVs/FVs at SWMU 11-006(d). The sampling locations and radionuclides detected or detected above BVs/FVs are shown in Figure 6.8-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.8.5 Spatial Distribution

Eighteen samples (nine surface and nine subsurface) from ten locations in and around the SWMU boundary (Figure 6.8-1) were evaluated to determine the extent of contamination. Of the 18 samples, two subsurface samples were collected beneath the catch basin (location 11-608767) at depths of 2.5–3.0 and 8.0–8.5 ft bgs; two samples (one surface and one subsurface) were collected from one location (11-608769) within the drainage between SWMUs 11-006(d) and 11-006(c); two sediment samples at 0.0–0.5 ft bgs were collected in 1998 from two locations (16-05900 and 16-05901); and the remaining samples (six surface and six subsurface) were collected from six locations (11-608766, 11-608768, 11-608770, 11-608771, 11-608772, and 11-608773) (Appendix C, section C-7.1.6).

The extent of contamination at SWMU 11-006(d) is evaluated in the following sections.

6.8.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-006(d) is shown in Figure 6.8-2; the analytical results are presented in Table 6.8-2.

- Antimony, cadmium, mercury, selenium, silver, and thallium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, mercury, selenium, silver, and thallium is defined.
- Barium was detected (52.2 mg/kg) above the Qbt 2, Qbt 3, and Qbt 4 BV at location 11-608767, which is the furthest upgradient sample location and beneath the catch basin. Concentrations decreased toward the furthest downgradient location (11-608769). Therefore, the vertical extent of barium is not defined, and the lateral extent is defined.
- Chromium was detected (7.67 mg/kg) above the Qbt 2, Qbt 3, and Qbt 4 BV but below the maximum background concentration (13 mg/kg) at location 11-608773. Chromium was not detected above background in the remaining subsurface samples or at the furthest downgradient location (11-608769). Therefore, the extent of chromium is defined.
- Copper was detected (19.5 mg/kg) above the Qbt 2, Qbt 3, and Qbt 4 BV at location 11-608770. Concentrations decreased with depth at location 11-608770. Copper was not detected above the BVs at locations farther downgradient (16-05901 and 11-608769). Therefore, the extent of copper is defined.
- Total cyanide was detected (0.901 mg/kg in soil and 3.78 mg/kg in tuff) above the respective BVs at locations 11-608769 and 11-608773. Concentrations decreased with depth at locations 11-608769 and 11-608773 but increased toward the furthest downgradient location (11-608769). Therefore, the vertical extent of total cyanide is defined, and the lateral extent is not defined.
- Fluoride and nitrate were detected in most samples collected at SWMU 11-006(d). Fluoride and nitrate are naturally occurring, and the concentrations detected (0.985–4.72 and

1.17–12.3 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.

- Perchlorate was detected at locations 11-608766 and 11-608773. Concentrations increased with depth at location 11-608773 but decreased toward the furthest downgradient location (11-608769). The concentrations are below the EQL. Therefore, the extent of perchlorate is defined.
- Uranium was detected at 2.79 mg/kg at location 16-05900. This concentration is above the sediment BV. Uranium was not detected above the BV downgradient (location 16-05901) and was not analyzed in the remaining samples collected at this site. Therefore, the extent of uranium is defined.

6.8.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 11-006(d) is shown in Figure 6.8-3. The analytical results are presented in Table 6.8-3.

- Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, pyrene, benzo(a)pyrene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene were detected in two or three samples. Concentrations decreased with depth and downgradient. The extent of these organic chemicals is defined.
- Benzoic acid was detected at two locations. Concentrations decreased with depth at location 11-608766, increased with depth at location 11-608773, and decreased downgradient. Therefore, the lateral extent of benzoic acid is defined, and the vertical extent is not defined.
- Bis(2-ethylhexyl)phthalate was detected at two locations. Concentrations decreased with depth and downgradient. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- 2-Butanone and 4-isopropyltoluene were detected at one location. Concentrations decreased with depth and were below the EQLs. Therefore, the extent of 2-butanone and 4-isopropyltoluene is defined.
- 1,1-Dichloroethene was detected at one location. The concentration decreased with depth and was below the EQL. Therefore, the extent of 1,1-dichloroethene is defined.
- RDX was detected at location 11-608770. Concentrations decreased with depth and downgradient. Therefore, the extent of RDX is defined.
- Acetone was detected at locations 11-608773 and 11-608771. The concentration at location 11-608771 was below the EQL. Concentrations increased with depth at location 11-608773 but decreased downgradient. Therefore, the lateral extent of acetone is defined, and the vertical extent is not defined.
- HMX was detected at nine locations. Concentrations decreased with depth except at location 11-608767. Concentrations decreased downgradient. Therefore, the lateral extent of HMX is defined, and the vertical extent is not defined.
- TATB was detected at five locations. Concentrations of TATB decreased with depth at all but location 11-608767 and decreased downgradient. Therefore, the lateral extent of TATB is defined, and the vertical extent is not defined.

6.8.5.3 Radionuclides

The distribution of radionuclides at SWMU 11-006(d) is shown in Figure 6.8-4. The analytical results are presented in Table 6.8-4.

- Plutonium-239/240 was detected at location 11-608767, which is the furthest upgradient location and beneath the catch basin. Activities decreased with depth and downgradient. Therefore, the extent of plutonium-239/240 is defined.
- Uranium-234 and uranium-238 were detected above BVs at the furthest downgradient location (11-608769). Activities increased downgradient but decreased with depth. Therefore, the lateral extent of uranium-234 and uranium-238 is not defined, and the vertical extent is defined.

6.8.5.4 Summary of Extent

The lateral extent of total cyanide, uranium-234, and uranium-238 is not defined, and the vertical extent of acetone, barium, benzoic acid, HMX, and TATB is not defined. The extent of the remaining inorganic chemicals, organic chemicals, and radionuclides is defined. Therefore, the overall extent of contamination at SWMU 11-006(d) is not defined.

6.8.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SMWU 11-006(d).

6.8.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SMWU 11-006(d).

6.9 SWMU 11-005(c)—Outfall and Drainline

6.9.1 Site Description and Operational History

SWMU 11-005(c) is an inactive outfall at TA-11 located approximately 50 ft north of former building 11-2, the Betatron Building (Figure 6.9-1). The outfall received discharge from a drainline in building 11-2. The drainline was installed in 1944 and served a sink, water heater, and floor drain. During construction of the drop tower complex in 1956, the drainline was capped, making the outfall inactive (LANL 1993, 020948, p. 5-260).

6.9.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 11-005(c).

6.9.3 Field-Screening Results

Twenty-two samples, collected at 11 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX was detected at 27 ppm in sample RE11-10-1667 at location 11-608754. Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, four additional step-out samples (RE11-10-1677, RE11-10-1678, RE11-10-13791, and RE11-10-13792) were collected (Appendix C, section C-7.1.7).

6.9.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 11-005(c) are shown in Figure 6.9-1. Table 6.9-1 summarizes the samples collected and analyses requested.

6.9.4.1 Inorganic Chemicals

Twenty-two (12 soil and 10 tuff [Qbt 4]) samples were collected and analyzed for inorganic chemicals. The samples were analyzed for TAL metals, perchlorate, total cyanide, and anions. Table 6.9-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.9-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.9.4.2 Organic Chemicals

Twenty-two (12 soil and 10 tuff [Qbt 4]) samples were collected and analyzed for organic chemicals. The samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 6.9-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 6.9-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.9.4.3 Radionuclides

Twenty-two (12 soil and 10 tuff [Qbt 4]) samples were collected and analyzed for radionuclides. The samples were analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 6.9-4 presents the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 6.9-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.9.5 Spatial Distribution

Twenty-two samples from 11 sample locations (Figure 6.9-1) were evaluated to determine the extent of contamination at SWMU 11-005(c). Eleven surface samples were collected from 0.0 to 0.5 ft, one subsurface sample was collected at 1.0–1.5 ft, one subsurface sample was collected at 2.5–3.0 ft, and nine subsurface samples were collected at 5.5–6.0 ft (Appendix C, section C-7.1.7). The extent of contamination at SWMU 11-005(c) is evaluated in the following sections.

6.9.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-005(c) is shown in Figure 6.9-2. Analytical results are presented in Table 6.9-2.

- Antimony and selenium were not detected above their respective soil and Qbt 2, Qbt 3, and Qbt 4 BVs but had detection limits above BVs. Therefore, the extent of antimony and selenium is defined.
- Fluoride was detected in 22 samples at 11 locations, and nitrate was detected in 7 samples at 5 locations. Fluoride and nitrate are naturally occurring elements, and the concentrations detected (0.867–7.57 and 1.76–9.74 mg/kg, respectively) most likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Perchlorate was detected in two surface samples at locations 11-608703 and 11-608756. Concentrations decreased with depth and downgradient. The extent of perchlorate is defined.
- Cadmium, lead, and zinc were detected above soil BVs in two surface samples each at locations 11-608751, 11-608753, and 11-608756. Mercury was detected in one sample at location 11-608756 above its soil BV. Concentrations decreased with depth and were not detected in any of the other downgradient locations. Therefore, the extent of cadmium, lead, mercury, and zinc is defined.
- Copper was detected at five locations above its soil and Qbt 2, Qbt 3, and Qbt 4 BVs. At locations 11-608751, 11-608752, 11-608754, and 11-608756, concentrations decreased with depth. At location 11-608757, concentrations increased with depth. Copper was not detected at the two locations furthest downgradient (11-608758 and 11-608760). Therefore, the lateral extent of copper is defined, but the vertical extent is not defined.
- Aluminum and barium were detected in one sample at location 11-608751 above the Qbt 2, Qbt 3, and Qbt 4 BVs in the subsurface sample. Chromium was detected at locations 11-608754, 11-608757, and 11-611744 above its Qbt 2, Qbt 3, and Qbt 4 BV in the subsurface samples. There are no detects farther downgradient. Therefore, the lateral extent of aluminum, barium, and chromium is defined, but the vertical extent is not defined.

6.9.5.2 Organic Chemicals

The distribution of organic chemicals in SWMU 11-005(c) is shown in Figure 6.9-3. The analytical results are presented in Table 6.9-3.

- Acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, pyrene, RDX, TATB, and 1,1,1-trichlorethane were detected in one surface sample each at three locations (11-608753, 11-608757, and 11-608759). Trichloroethene was detected in two surface samples at locations 11-608759 and 11-611744. Concentrations decreased with depth at all locations. The 12 organic chemicals were not detected farther downgradient. Therefore, the extent of the 12 organic chemicals is defined.
- Acetone was detected in two samples at locations 11-608754 and 11-608758, and bis(2-ethylhexyl)phthalate and 4-isopropyltoluene were detected in one sample each at locations 11-608756 and 11-608758, respectively. Concentrations were below the EQLs for all three organic chemicals. Therefore, the extent of acetone, bis(2-ethylhexyl)phthalate, and 4-isopropyltoluene is defined.

- Methylene chloride was detected in four samples at locations 11-608753, 11-608754, and 11-608755. The concentrations were below the EQL. Therefore, the extent of methylene chloride is defined.
- HMX was detected at six locations. Concentrations decreased with depth at five locations. Concentrations increased with depth at location 11-608756. Concentrations decreased downgradient. Therefore, the lateral extent of HMX is defined, but the vertical extent is not defined.

6.9.5.3 Radionuclides

The distribution of radionuclides detected at SWMU 11-005(c) is shown in Figure 6.9-4. Analytical results are presented in Table 6.9-4.

- Uranium-234 and uranium-238 were detected in surface samples at six locations above their respective BVs. Concentrations decreased with depth and farther downgradient. Therefore, the extent of uranium-234 and uranium-238 is defined.
- Uranium-235/236 was detected in three samples at locations 11-608751, 11-608753, and 11-608756 above BVs. At location 11-608751, concentrations increased with depth. Concentrations decreased with depth at the other locations. Therefore, the vertical extent is not defined. Uranium-235/236 was not detected above BVs downgradient. Therefore, the lateral extent of uranium-235/236 is defined.

6.9.5.4 Summary of Extent

The extent of nine of the 13 inorganic chemicals is defined, and the vertical extent of aluminum, barium, chromium, and copper is not defined. The vertical extent of HMX is not defined. The extent of two of three radionuclides is defined, and the vertical extent of uranium-235/236 is not defined. Therefore, the overall extent of contamination at SWMU 11-005(c) is not defined.

6.9.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 11-005(c).

6.9.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 11-005(c).

6.10 SWMU 11-011(a)—Outfall and Drainline

6.10.1 Site Description and Operational History

SWMU 11-011(a) is an active NPDES-permitted outfall (EPA-03A130) located at TA-11 north of the K-Site complex and approximately 6 ft northeast of the Electrodynamics Vibration Test Facility (building 11-30) (Figure 6.10-1). The outfall consists of a 2-in. pipe that discharges to a drainage channel. The outfall receives untreated cooling tower blowdown and discharges from floor drains in building 11-30A (an adjunct of building 11-30).

6.10.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 11-011(a).

6.10.3 Field-Screening Results

A total of 18 samples, collected at 9 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

6.10.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 11-011(a) are shown in Figure 6.10-1. Table 6.10-1 summarizes the samples collected and analyses requested.

6.10.4.1 Inorganic Chemicals

Ten soil and eight tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the 18 samples was analyzed for TAL metals, perchlorate, and anions. Table 6.10-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.10-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.10.4.2 Organic Chemicals

Ten soil and eight tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the 18 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 6.10-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 6.10-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.10.4.3 Radionuclides

Ten soil and eight tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 18 samples was analyzed for gamma-emitting radionuclides, americium-241, isotopic plutonium, and isotopic uranium. Table 6.10-4 lists the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 6.10-4.

6.10.5 Spatial Distribution

Eighteen samples were collected from nine locations (Figure 6.10-1). Surface and subsurface samples were collected within and near the SWMU 11-011(a) boundary and within the drainage north and

downgradient of the SWMU. Nine surface samples were collected at a depth of 0.0–0.5 ft bgs, and nine subsurface samples were collected at the following depth intervals: one at 1.0–1.5 ft bgs, one at 3.0–3.5 ft bgs, two at 3.5–4.0 ft bgs, one at 4.5–5.0 ft bgs, one at 5.0–5.5 ft bgs, and three at 5.5–6.0 ft bgs (Appendix C, section C-7.1.8).

The extent of contamination at SWMU 11-011(a) is evaluated in the following sections.

6.10.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-011(a) is shown in Figure 6.10-2. Analytical results are presented in Table 6.10-2.

- Aluminum, barium, and nickel were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-608803. Concentrations increased with depth and decreased at the furthest downgradient locations along the tributary that flows northeast of SWMU 11-011(a) (locations 11-608797 and 11-608802). Therefore, the vertical extent of aluminum, barium, and nickel is not defined, and the lateral extent is defined.
- Antimony and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and selenium is defined.
- Cadmium was detected above the soil BV at locations 11-608805 and 11-608804. Concentrations decreased with depth and at the furthest downgradient locations (11-608797 and 11-608802). Therefore, the extent of cadmium is defined.
- Calcium was detected above the soil BV at location 11-608805 and above the Qbt 2, Qbt 3, and Qbt 4 BV at location 11-608803. Concentrations decreased with depth at location 11-608805 and downgradient at the furthest downgradient locations (11-608797 and 11-608802). Concentrations increased with depth at location 11-608803. Therefore, the lateral extent of calcium is defined, and the vertical extent is not defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at eight locations. Concentrations at five locations were less than the maximum background concentration for tuff (Qbt 4) (13 mg/kg). Chromium was not detected above the BV at the furthest downgradient location (11-608802). Concentrations increased with depth at locations 11-608797, 11-608803, and 11-608804. Therefore, the lateral extent of chromium is defined, and the vertical extent is not defined.
- Copper was detected above the BVs at five locations. Concentrations decreased with depth at four locations and downgradient at the furthest downgradient location (11-608802). Concentrations increased with depth at location 11-608797. Therefore, the lateral extent of copper is defined, and the vertical extent is not defined.
- Fluoride was detected in all 18 samples, and nitrate was detected in 12 of the 18 samples collected at SWMU 11-011(a). Fluoride and nitrate are naturally occurring, and the concentrations detected (1.08–7.37 and 1.1–12.1 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Iron and vanadium were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-608803. Concentrations were below the maximum Qbt 2, Qbt 3, and Qbt 4 background concentrations (19,500 and 21 mg/kg) Therefore, the extent of iron and vanadium is defined.
- Magnesium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 11-608803. The concentration was below the maximum Qbt 2, Qbt 3, and Qbt 4 background concentration

(2820 mg/kg), decreased with depth, and decreased downgradient at the furthest downgradient location (11-608802). Therefore, the extent of magnesium is defined.

- Mercury was detected above the BVs at five locations. Concentrations decreased with depth at all locations and at the furthest downgradient locations (11-608797 and 11-608802). Therefore, the extent of mercury is defined.
- Perchlorate was detected in soil samples at five locations. Concentrations decreased with depth and downgradient (locations 11-608797 and 11-608802). Therefore, the extent of perchlorate is defined.
- Zinc was detected above the soil BV at locations 11-608799 and 11-608804. Concentrations decreased downgradient at the furthest downgradient locations (16-608797 and 16-608802) and decreased with depth. Therefore, the extent of zinc is defined.

6.10.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 11-011(a) is shown in Figure 6.10-3. Analytical results are presented in Table 6.10-3.

- Acenaphthene and fluorene were detected below the EQL in one surface sample. Concentrations decreased with depth and downgradient. Therefore, the extent of acenaphthene and fluorene is defined.
- Anthracene was detected below the EQL in two surface samples. Concentrations decreased with depth and downgradient. Therefore, the extent of anthracene is defined.
- Acetone was detected above the EQL in two surface samples at locations 11-608803 and 11-608805. Concentrations decreased with depth and downgradient of location 11-608803. Therefore, the extent of acetone is defined.
- Benzo(a)anthracene and phenanthrene were detected in two and three surface samples, respectively. Concentrations decreased with depth and downgradient. Therefore, the extent of benzo(a)anthracene and phenanthrene is defined.
- Benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene were detected at four locations. Concentrations decreased at the furthest downgradient locations (11-608797 and 11-608802) and decreased with depth. Therefore, the extent of these organic chemicals is defined.
- 2-Butanone was detected below the EQL in one surface sample. Concentrations decreased with depth and downgradient. Therefore, the extent of 2-butanone is defined.
- Chloroform was detected in one surface sample at location 11-608805. Concentrations decreased at the furthest downgradient locations (11-608797 and 11-608802) and decreased with depth. Therefore, the extent of chloroform is defined.
- Styrene was detected below the EQL in one surface sample. Concentrations decreased at the furthest downgradient locations (11-608797 and 11-608802) and decreased with depth. Therefore, the extent of styrene is defined.
- Chrysene was detected at five locations. Concentrations decreased at the furthest downgradient locations (11-608797 and 11-608802) and decreased with depth. Therefore, the extent of chrysene is defined.

- Fluoranthene and pyrene were detected at six locations. Concentrations decreased at the furthest downgradient locations (11-608797 and 11-608802) and decreased with depth. Therefore, the extent of fluoranthene and pyrene is defined.
- 1,1-Dichloroethene was detected in one surface sample at location 11-608801. Concentrations decreased with depth and at the furthest downgradient locations (11-608797 and 11-608802). Therefore, the extent of 1,1-dichloroethene is defined.
- Ethylbenzene was detected below the EQL in the surface sample at location 11-608802. The concentration decreased with depth and was below the EQL at the furthest location downgradient (11-608802). Therefore, the extent of ethylbenzene is defined.
- 4-Isopropyltoluene was detected in the surface samples at locations 11-608797 and 11-608805. Concentrations decreased with depth and at the furthest locations downgradient (11-608797 and 11-608802). Therefore, the extent of 4-isopropyltoluene is defined.
- Toluene was detected in the surface samples at locations 11-608797 and 11-608805. Concentrations decreased with depth and at the furthest locations downgradient (11-608797 and 11-608802). Therefore, the extent of toluene is defined.
- Methylene chloride was detected below the EQL in one surface sample and one subsurface sample. Concentrations decreased downgradient from location 11-608803, and methylene chloride was not detected in the furthest downgradient location (11-608802). Therefore, the extent of methylene chloride is defined.
- Trichloroethene was detected below the EQL in one surface sample at location 11-608804. Concentrations were not detected in any subsurface samples or at the furthest downgradient locations (11-608797 and 11-608802). Therefore, the extent of trichloroethene is defined.
- 1,3-Xylene+1,4-xylene was detected below the EQL in one surface and one subsurface sample at location 11-608803. Concentrations decreased at the furthest downgradient locations (11-608797 and 11-608802) and decreased with depth. Therefore, the extent of 1,3-xylene+1,4-xylene is defined.

6.10.5.3 Radionuclides

The distribution of radionuclides at SWMU 11-011(a) is shown in Figure 6.10-4. Analytical results are presented in Table 6.10-4.

- Plutonium-239/240 was detected above the FV at location 11-608805. Concentrations decreased with depth and downgradient of this location. Therefore, the extent of plutonium-239/240 is defined.
- Uranium-235/236 was detected above the BV at location 11-608805. Concentrations decreased with depth and downgradient of this location. Therefore, the extent of uranium-235/236 is defined.
- Uranium-234 was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at locations 11-608805 and 11-608798, respectively. Concentrations decreased with depth at location 11-608805 and at the furthest downgradient locations (11-608797 and 11-608802). Concentrations increased with depth at location 11-608798. Therefore, the lateral extent of uranium-234 is defined, and the vertical extent is not defined.

- Uranium-238 was detected above the soil BV at locations 11-608797 and 11-608805. Uranium-238 was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 11-608798. Concentrations decreased with depth and at the furthest downgradient location (11-608802). Concentrations increased with depth at location 11-608798. Therefore, the lateral extent of uranium-238 is defined, and the vertical extent is not defined.

6.10.5.4 Summary of Extent

The vertical extent of aluminum, barium, calcium, chromium, copper, nickel, uranium-234, and uranium-238 is not defined. The extent of the remaining inorganic chemicals, organic chemicals, and radionuclides is defined. Therefore, the overall extent of contamination is not defined for SWMU 11-011(a).

6.10.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 11-011(a).

6.10.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 11-011(a).

6.11 SWMU 11-011(b)—Outfall and Drainline

6.11.1 Site Description and Operational History

SWMU 11-011(b) is an outfall located at TA-11 north of the Electrodynamics Vibration Test Facility (building 11-30) (Figure 6.11-1). The outfall consists of a 3-in. pipe that extends about 10 in. beyond the side of a hill. The outfall receives discharge from floor drains in building 11-30. A sink drain that formerly discharged to the outfall has been removed.

6.11.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 11-011(b).

6.11.3 Field-Screening Results

A total of 16 samples, collected at 8 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

6.11.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 11-011(b) are shown in Figure 6.11-1. Table 6.11-1 summarizes the samples collected and analyses requested.

6.11.4.1 Inorganic Chemicals

Eight soil, one fill, and seven tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the 16 samples was analyzed for TAL metals, perchlorate, and anions. Table 6.11-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.11-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

6.11.4.2 Organic Chemicals

Eight soil, one fill, and seven tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the 16 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 6.11-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 6.11-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

6.11.4.3 Radionuclides

Eight soil, one fill, and seven tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 16 samples was analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 6.11-4 lists the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 6.11-4. Because the extent of contamination is not defined for the site, COPCs have not been identified.

6.11.5 Spatial Distribution

Sixteen samples were collected from eight locations (Figure 6.11-1). Surface and subsurface samples were collected within and near the SWMU 11-011(b) boundary and within the drainage north and downgradient of the SWMU. Eight surface samples were collected at an interval of 0.0–0.5 ft bgs, and eight subsurface samples were collected at the following depth intervals: one at 1.0–1.5 ft bgs, one at 2.0–2.5 ft bgs, one at 2.5–3.0 ft bgs, and five at 5.5–6.0 ft bgs (Appendix C, section C-7.1.9).

The extent of contamination at SWMU 11-011(b) is evaluated in the following sections.

6.11.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-011(b) is shown in Figure 6.11-2. Analytical results are presented in Table 6.11-2.

- Antimony, cadmium, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, and selenium is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 11-608808. This location is immediately southwest of the SWMU 11-011(b) boundary and upgradient of the outfall. Because barium was not detected above background in subsurface samples collected downgradient of the outfall (locations 11-608811, 11-608810, and 11-608814), the lateral extent of barium is defined. Barium was detected below the BV (295 mg/kg) at 62.7 mg/kg in the surface

sample at location 11-608808. Because barium concentrations decreased with depth, the vertical extent of barium is defined.

- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Chromium was detected at concentrations below the maximum Qbt 2, Qbt 3, and Qbt 4 background concentration (13 mg/kg) at five locations and above the maximum background concentration at location 11-608808. Chromium concentrations decreased downgradient from location 11-608808. Therefore, the lateral extent is defined. Because chromium concentrations increased with depth at location 11-608808, the vertical extent of chromium is not defined.
- Cobalt was detected above the soil BV at locations 11-608810 and 11-608807. Concentrations decreased with depth at both locations. Locations 11-608807 and 11-608810 are immediately downgradient of the outfall, and concentrations decreased downgradient from these locations. Therefore, the extent of cobalt is defined.
- Copper was detected above the soil BV at locations 11-608807 and 11-608810. Copper was also detected in the subsurface above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 11-608810 and 11-608808. Concentrations decreased with depth at locations 11-608807 and 11-608810. Copper concentrations increased with depth at upgradient location 11-608808. Copper concentrations decreased downgradient at locations 11-608814 and 11-608813. Therefore, the lateral extent of copper is defined, and the vertical extent of copper is not defined.
- Fluoride was detected in 15 samples and nitrate was detected in 11 samples collected at SWMU 11-011(b). Fluoride and nitrate are both naturally occurring, and the concentrations detected (1.03–2.9 and 1.14-12.2 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Mercury was detected above the soil BV at locations 11-608810 and 11-608811. Concentrations decreased with depth at both locations and decreased at downgradient locations 11-608614 and 11-608813. Therefore, the extent of mercury is defined.
- Perchlorate was detected in five samples. Perchlorate concentrations increased with depth at locations 11-608807 and 11-608810. Concentrations decreased downgradient. All concentrations are below the EDL. Therefore, the extent of perchlorate is defined.
- Zinc was detected above the soil BV at locations 11-608807 and 11-608811. Concentrations decreased with depth and downgradient. Therefore, the extent of zinc is defined.

6.11.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 11-011(b) is shown in Figure 6.11-3. Analytical results are presented in Table 6.11-3.

- Acenaphthene, fluorene, and 2-methylnaphthalene were detected in the surface sample at location 11-608808. Concentrations decreased with depth and downgradient. Therefore, the extent of acenaphthene, fluorene, and 2-methylnaphthalene is defined.
- Acetone, 4-isopropyltoluene, and styrene were detected in the subsurface sample at location 11-608812. The styrene concentration is below the EQL; acetone and 4-isopropyltoluene were detected above their respective EQLs. Location 11-608812 is the furthest downgradient location. However, acetone, 4-isopropyltoluene, and styrene were not detected in the Extended Drainages just downgradient of this site in Martin Spring Canyon Drainages at location 16-608559 (Plate 27 and Table 10.3-3). Therefore, the lateral extent of these organic chemicals is defined, and the

vertical extent of styrene is defined. However, the vertical extent of acetone and 4-isopropyltoluene is not defined.

- Anthracene was detected in the surface samples at three locations. Concentrations decreased with depth and downgradient. Therefore, the extent of anthracene is defined.
- Benzo(a)anthracene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, phenanthrene, and indeno(1,2,3-cd)pyrene were detected in the surface samples at three locations. Concentrations decreased with depth and at the furthest downgradient locations (11-608809 and 11-608812). Therefore, the extent of benzo(a)anthracene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, phenanthrene, and indeno(1,2,3-cd)pyrene is defined.
- Benzo(b)fluoranthene, fluoranthene, and pyrene were detected at four locations. Concentrations decreased with depth and at the furthest downgradient locations (11-608809 and 11-608812). Therefore, the extent of benzo(b)fluoranthene, fluoranthene, and pyrene is defined.
- Methylene chloride was detected in surface samples at three locations. Concentrations decreased with depth and downgradient. The extent of methylene chloride is defined.
- Toluene was detected in the surface and subsurface samples at location 11-608812. Concentrations increased with depth. Therefore, the vertical extent of toluene is not defined. Location 11-608812 is the furthest downgradient location. Toluene was not detected at upgradient locations (11-608808 and 11-608807). Concentrations increased downgradient. Therefore, the lateral extent of toluene is not defined.

6.11.5.3 Radionuclides

The distribution of radionuclides at SWMU 11-011(b) is shown in Figure 6.11-4. Analytical results are presented in Table 6.11-4.

- Americium-241 was detected above the FV at location 11-608813. The concentration decreased with depth and decreased at the furthest downgradient locations (11-608809 and 11-608812). Therefore, the extent of americium-241 is defined.
- Uranium-238 was detected above the soil BV at location 11-608812. Concentrations decreased with depth. Location 11-608812 is the furthest downgradient location at SWMU 11-011(b). However, uranium-238 was not detected above the BV in the Extended Drainages just downgradient of this site in Martin Spring Canyon Drainages at location 16-608559 (Table 10.3-4). Therefore, the extent of uranium-238 is defined.

6.11.5.4 Summary of Extent

The vertical extent of chromium, copper, acetone, and 4-isopropyltoluene is not defined, and the extent of toluene is not defined. The extent of the remaining inorganic and organic chemicals and all radionuclides is defined. Therefore, the overall extent is not defined for SWMU 11-011(b).

6.11.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 11-011(b).

6.11.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 11-011(b).

6.12 SWMU 11-011(d)—Outfall

6.12.1 Site Description and Operational History

SWMU 11-011(d) is an outfall located at TA-11 south of building 11-24, the air gun facility (Figure 6.12-1). The outfall consisted of a 4-in. steel pipe and serviced the air gun facility. Originally, operations at building 11-24 consisted of acceleration and impact tests on full-scale warhead mockups. After World War II, building 11-24 was converted to an office and light machine shop.

6.12.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 11-011(d).

6.12.3 Field-Screening Results

A total of 10 samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX was detected at 3 ppm in sample RE11-10-1692 at location 11-608763. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h. Review of the XRF results indicates that process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3), except for uranium. Uranium was measured at 16 ppm in sample RE11-10-1688 at location 11-608761.

Based on the RDX results, two additional step-out samples (RE11-10-1694 and RE11-10-1695) were collected. The step-out sample for the elevated uranium was not initially identified in the screening review, and the step-out sample based on this screening result was not collected (Appendix C, section C-7.1.10).

6.12.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled at SWMU 11-011(d) are shown in Figure 6.12-1. Table 6.12-1 summarizes the samples collected (soil/fill and tuff [Qbt 4]) and analyses requested.

6.12.4.1 Inorganic Chemicals

Three soil, three fill, and four tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of these samples was analyzed for anions, total cyanide, perchlorate, and TAL metals. Table 6.12-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 6.12-2. Because the extent is not defined for the site, COPCs have not been identified.

6.12.4.2 Organic Chemicals

Three soil, three fill, and four tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of these samples was analyzed for SVOCs, VOCs, and explosive compounds. Table 6.12-3 presents the organic chemicals detected at SWMU 11-011(d). The sampling locations and detected concentrations of organic chemicals are shown in Figure 6.12-3. Because the extent is not defined for the site, COPCs have not been identified.

6.12.4.3 Radionuclides

Three soil, three fill, and four tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of these samples was analyzed for isotopic uranium, isotopic plutonium, and americium-241. Table 6.12-4 presents the radionuclides detected or detected above BVs/FVs at SWMU 11-011(d). The sampling locations and radionuclides detected or detected above the BVs/FVs are shown in Figure 6.12-4. Because the extent is not defined for the site, COPCs have not been identified.

6.12.5 Spatial Distribution

The soil, fill, and tuff (Qbt 4) samples from five sampling locations in and around the inactive outfall (Figure 6.12-1), which is south of building 11-024 and directly north of SWMU 11-005(b), were evaluated to determine the extent of contamination at SWMU 11-011(d). Samples were collected from two depths at each sample location: 0.0–0.5 ft bgs (fill) and 6.0–6.5 ft bgs (tuff [Qbt 4]) at locations 11-608761 and 11-608763; 0.0–0.5 ft bgs (fill) and 5.5–6.0 ft bgs (tuff [Qbt 4]) at location 11-608762; 0.0–0.5 ft bgs (soil) and 3.5–4.0 ft bgs (tuff [Qbt 4]) at location 11-608764; and 2.0–2.5 ft bgs (soil) and 7.5–8.0 ft bgs (soil) at location 11-608765 (Appendix C, section C-7.1.10). Location 11-608765 was sampled beneath the buried pipe leading to the outfall. The point source (inactive outfall) is located 5 ft upgradient or north of location 11-608763.

The extent of contamination at SWMU 11-011(d) is evaluated in the following sections.

6.12.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 11-011(d) is shown in Figure 6.12-2; the analytical results are presented in Table 6.12-2.

- Antimony and total cyanide were not detected above BVs, but each was reported with at least one detection limit above the respective BVs. Therefore, the extent of antimony and selenium is defined.
- Barium and magnesium were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 11-608763. These concentrations are below the maximum Qbt 2, Qbt 3, and Qbt 4 background concentrations (51.6 and 2820 mg/kg) Therefore, the extent of barium and magnesium is defined.
- Chromium and nickel were each detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 11-608764. Location 11-608764 is at the site boundary, south of the point source. Chromium and nickel concentrations increased with depth at location 11-608764. Therefore, the extent of chromium and nickel is not defined.
- Cadmium, lead, and zinc were each detected in at least one soil/fill sample above the soil BVs at location 11-608762 (east of the point source) for cadmium; location 11-608761 (west of the point source) for lead; and locations 11-608762 and 11-608764 for zinc. The concentrations at these locations decreased with depth and decreased downgradient. In addition, the zinc concentrations

were below the maximum background concentration (75.5 mg/kg) at both locations. The extent of cadmium, lead, and zinc is defined.

- Copper was detected above the BVs at four locations. Copper concentrations decreased with depth, but increased with distance downgradient. Therefore, the lateral extent of copper is not defined, but the vertical extent is defined.
- Fluoride and nitrate were detected in all 10 samples analyzed. Fluoride and nitrate are naturally occurring, and the concentrations detected (1.1–2.3 and 0.1–5.62 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and the extent of nitrate are defined.
- Perchlorate was detected at location 11-608763. The concentrations were below the EQL and decreased with depth and downgradient. Therefore, the extent of perchlorate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 11-608764, which is the most downgradient sample location. Selenium also had detection limits above BV at three locations. Concentrations increased with depth. The extent of selenium is not defined.

6.12.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 11-011(d) is shown in Figure 6.12-3. The analytical results are presented in Table 6.12-3.

- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in surface samples at one or two locations. Concentrations decreased with depth and downgradient. The extent of these organic chemicals is defined.
- Acetone, 4-isopropyltoluene, and methylene chloride were detected in tuff at one location each. Concentrations were below EQLs and decreased downgradient. The extent of acetone, 4-isopropyltoluene, and methylene chloride is defined.
- HMX was detected in the soil samples at location 11-608765, which is upgradient of the inactive outfall, and was not detected in the other samples downgradient. The detected concentrations decreased with depth. The extent of HMX is defined.

6.12.5.3 Radionuclides

The distribution of radionuclides at SWMU 11-011(d) is shown in Figure 6.12-4; the analytical results are presented in Table 6.12-4.

- Plutonium-239/240 was detected at locations 11-608761 through 11-608764, above the FV. Plutonium-239/240 activities decreased with depth and distance (away from the point source). Therefore, the extent of plutonium-239/240 is defined.
- Uranium-234 and uranium-238 were each detected above the BV in two fill samples. The activities decreased with depth. The highest activities of both radionuclides were detected in the fill sample from location 11-608761, located west of the point source. Therefore, the lateral extent of uranium-234 and uranium-238 is not defined, but the vertical extent is defined.
- Uranium-235/236 was detected above the BV in one fill and one tuff (Qbt 4) sample collected from locations 11-608762 and 11-608761, respectively. At these locations, the activities decreased with depth. The highest activity was detected in the fill sample at location 11-608762,

located east of the point source. Therefore, the lateral extent of uranium-235/236 is not defined, but the vertical extent is defined.

6.12.5.4 Summary of Extent

The extent of most inorganic chemicals and plutonium-239/240 is defined. The lateral extent of chromium, nickel, copper, selenium, uranium-234, uranium-238, and uranium-235/236 is not defined, and the vertical extent of chromium, nickel, and selenium at location 11-608764 is not defined. The extent of all organic chemicals is defined. Therefore, the overall extent of contamination at SWMU 11-011(d) is not defined.

6.12.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 11-011(d).

6.12.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 11-011(d).

7.0 P-SITE SUBAGGREGATE SITE INVESTIGATION

The P-Site Subaggregate consists of 22 sites (inactive SWMUs and AOCs) (Plate 3) located at TA-16 and former TA-13, and includes a firing site, debris disposal area, sump and drainline, unlocated burning pit, and the former WWTP: SWMUs 13-001, 13-002, 13-004, 16-004(a), 16-004(b), 16-004(c), 16-004(d), 16-004(e), 16-004(f), 16-029(h), 16-035, 16-036, 16-003(p), 16-025(d2), and 16-031(h), and AOCs 16-024(a), 16-024(u), C-16-049, C-16-050, C-16-060, C-16-062, and C-16-063.

Former TA-13 was constructed in 1944 to support the HE project of the Manhattan Project during World War II (Kistiakowsky 1944, 004680). Former TA-13 was originally used to study x-ray diagnostics of HE lens configurations. Supporting activities included the operation of counter x-ray equipment, assembly of HE, and research in the magnetic method program. The battleship bunkers contained the x-ray and magnetic equipment and were capped with steel nose cones to protect them from explosives detonations that occurred between the bunkers. Buildings constructed at former TA-13 included an office and shop building (13-001), a firing site control laboratory structure 16-476 (former structure 13-2), battleship bunkers 16-477 and 16-478 (former structures 13-003 and 13-004), an experimental chamber (building 13-006), a magazine (building 13-007), and two storage buildings (13-005 and 13-008). P-Site was later used for a wide variety of Laboratory activities. Because of its remote location, the area was used to machine toxic or extremely sensitive explosives (LANL 1993, 020948, p. 5-226).

Former TA-13 was converted to initiator testing in mid-1945. Initiator assemblies consisted of HE, beryllium, polonium (polonium decays away quickly with a half-life of 138 d), and other metals. A bulldozer was used to clean up the radioactive residues of these initiator tests. Shot debris was bulldozed to the south and east of the firing point, creating the debris disposal area (SWMU 13-002) (LANL 1993, 020948).

During 1944 and 1945, HE shots were fired at former TA-13 at a rapid pace, with firings every 10 min during the first 2 mo of 1945. A 203-lb shot fired in September 1944 damaged the steel plates in front of structures 13-003 and 13-004 (Parratt 1945, 028308). Assemblies contained HE lenses (primarily Baratol

and Composition B), uranium, and other materials. The counter x-ray program was suspended in March 1945 (LANL 1993, 020948, pp. 5-226, 5-228).

The buildings in the western half of TA-13 (buildings 13-001, 13-005, 13-006, 13-007, and 13-008) were demolished in the early 1950s to make way for the construction of the TA-16-340 Complex. Former TA-13 was located at the east end of the current TA-16 explosives-manufacturing area and was incorporated into TA-16 in 1957 (LANL 1993, 020948, pp. 5-226, 5-228).

After an HE machining accident in 1959 elsewhere at TA-16 (building 16-260), building 16-478 was used for remote HE-machining tests, specifically high-speed machining tests on experimental HE compounds for characterization purposes. High-speed machining tests were done approximately 15 times a year during the 1970s and 1980s (Paige 1994, 052964.607; LANL 1995, 057225, pp.5-29-1–5-29-3). Unenriched uranium or tuballoy/niobium laminates were also machined at building 16-478, because their toxicity, radioactivity, and pyrophoric nature required a remote location. In July 1995, it was noted that building 16-478 was rarely used; the water and power were turned off, and the building was scheduled for decommissioning (LANL 1995, 057225, pp. 5-29-1–5-29-4).

7.1 Soil, Tuff, and Sediment Sampling Summary

Thirteen SWMUs and six AOCs at the P-Site Subaggregate were sampled during the 2009–2010 sampling campaign. A total of 69 soil, 51 fill, and 104 tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals (TAL metals, perchlorate, anions, and total cyanide), organic chemicals (VOCs, SVOCs, and explosive compounds), and radionuclides (americium-241, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides). The 2009−2010 sample data are combined with historical decision-making data, and sampling results are evaluated on a site-by-site basis in sections 7.2 through 7.20.

7.2 SWMU 16-035—Potential Soil Contamination Associated with Former Building 16-476

7.2.1 Site Description and Operational History

SWMU 16-035 is an area of potential soil contamination located approximately 200 ft east of former building 16-340 (Plate 3). The soil contamination is associated with a former control bunker (former structure 13-2 renumbered to 16-476) (LANL 1993, 020948, p. 5-229). The control bunker was one of several buildings constructed at TA-13 in 1944 to support the Manhattan Project (Kistiakowsky 1944, 004680). The control bunker was removed during D&D activities in 2005.

7.2.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-035.

7.2.3 Field-Screening Results

SWMU 16-035 sample locations were incorporated into SWMU 13-001 (section 7.10).

7.2.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

SWMU 16-035 is completely within the grid sampling conducted for SWMU 13-001. The nature and extent of contamination at this SWMU are addressed in section 7.10 with the SWMU 13-001 bullseye grid sampling discussion.

7.3 SWMU 16-036—Potential Soil Contamination Associated with Former Structures 16-477 and 16-478

7.3.1 Site Description and Operational History

SWMU 16-036 is an area of potential soil contamination located approximately 270 ft east of former building 16-340 (Plate 3). The soil contamination is associated with two former bunkers (former structures 13-3 and 13-4 renumbered to 16-477 and 16-478). Bunker 16-477 contained x-ray and magnetic equipment (LANL 1993, 020948, p. 5-226). Bunker 16-478 was used for photographing explosives testing and was later modified for testing the effects of machining HE (LANL 1998, 059685, p. 6-8). After 1959, bunker 16-478 was used for remote HE-machining tests as well as machining tuballoy/nubium laminates. Both bunkers were removed during D&D activities in 2005.

7.3.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-036.

7.3.3 Field-Screening Results

SWMU 16-036 sample locations were incorporated into SWMU 13-001 (section 7.10).

7.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

SWMU 16-036 is completely within the grid sampling conducted for SWMU 13-001. The nature and extent of contamination at this SWMU are addressed in section 7.10 with the SWMU 13-001 bullseye grid sampling discussion.

7.4 SWMU 16-025(d2)—Potential Soil Contamination Associated with Former Building 16-480

7.4.1 Site Description and Operational History

SWMU 16-025(d2) is an area of potential soil contamination located approximately 125 ft southwest of former building 16-340 (Figure 7.4-1). The soil contamination is associated with a former mockup chamber (former building 16-480). Built in 1947, the mockup chamber was an octagonal structure, measuring 16 ft in diameter and constructed of logs on a concrete floor. The mockup building simulated explosives testing chambers used elsewhere at the Laboratory. Detonation never occurred in the mockup chamber itself (LASL 1947, 005581; LANL 1995, 057225, pp. 5-26-6–5-26-9). In addition to radioactive components, equipment used at the structure is believed to have contained mercury (Morgan 1994, 054782.75) as well as HE and uranium-238 (Blackwell 1983, 005823; LANL 1995, 057225, pp. 5-26-6–5-26-9). The mockup chamber was dismantled in 1951. It is likely that SWMU 16-025(d2) was disturbed during construction of the former TA-16-340 Complex, which was built after the chamber was dismantled. Drainage from the site tends to flow east, north, and south due to the higher elevation of the site in relation to the current roadbed as well as construction of berms, roads, and walkways.

7.4.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-025(d2).

7.4.3 Field-Screening Results

A total of 10 samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.4.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-025(d2) are shown in Figure 7.4-1. Table 7.4-1 summarizes the samples (soil and fill) collected and analyses requested.

7.4.4.1 Inorganic Chemicals

Two soil and eight fill samples were collected and analyzed for inorganic chemicals. Each of these 10 samples was analyzed for anions, perchlorate, and TAL metals. Table 7.4-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.4-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.4.4.2 Organic Chemicals

Two soil and eight fill samples were collected and analyzed for inorganic chemicals. Each of the 10 samples was analyzed for SVOCs, VOCs, and explosive compounds. Table 7.4-3 presents the organic chemicals detected at SWMU 16-025(d2). The sampling locations and detected concentrations of organic chemicals are shown in Figure 7.4-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.4.4.3 Radionuclides

Two soil samples and eight fill samples were collected and analyzed for radionuclides. Each of these 10 samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. Table 7.4-4 presents the radionuclides detected or detected above BVs/FVs at SWMU 16-025(d2). The sampling locations and radionuclides detected or detected above BVs/FVs are shown in Figure 7.4-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.4.5 Spatial Distribution

Ten samples (two soil and eight fill) were collected from five sample locations at two depth intervals per location: surface (0.0–0.5 ft bgs) and subsurface (5.5–6.0 ft bgs) (Figure 7.4-1 and Table 7.4-1). One

sample location (16-608952) was at the middle of the former building footprint of mockup chamber 16-480. Four sample locations (16-608950, 16-608951, 16-608953, and 16-608954) immediately surrounded the former building footprint. This site appeared to consist mainly of fill material and disturbed soil. The extent of contamination at SWMU 16-025(d2) is evaluated in the following sections.

7.4.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-025(d2) is shown in Figure 7.4-2; the analytical results are presented in Table 7.4-2.

- Antimony and cadmium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and cadmium is defined.
- Fluoride was detected in all subsurface samples at the site. Fluoride is naturally occurring, and the concentrations detected (2.5–3.72 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Nitrate was detected in one surface and four subsurface samples at the site. Nitrate is naturally occurring, and the concentrations detected (1.24–2.88 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected near the detection limit at a concentration of 0.00103 mg/kg in one upgradient surface sample collected at location 16-608953. Concentrations decreased with depth. Therefore, the extent of perchlorate is defined.

7.4.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-025(d2) is shown in Figure 7.4-3. Analytical results are presented in Table 7.4-3.

- 2-Butanone, 1,2-dibromoethane, 4-isopropyltoluene, methylene chloride, and pentachlorophenol were each detected in a surface sample. Concentrations decreased with depth and were below their respective EQLs. Therefore, the extent of these organic chemicals is defined.
- Acenaphthene was detected at four locations. The concentrations of acenaphthene decreased downgradient. Therefore, the lateral extent is defined. Acenaphthene concentrations decreased with depth at all sample locations except location 16-608954. Therefore, the vertical extent is not defined.
- Anthracene was detected at three locations. Anthracene concentrations decreased downgradient and with depth except at location 16-608954. Therefore, the vertical extent of anthracene is not defined, but the lateral extent is defined.
- Benzo(a)anthracene was detected at five locations. Benzo(a)anthracene concentrations decreased downgradient and with depth except at location 16-608954. Therefore, the vertical extent of benzo(a)anthracene is not defined, but the lateral extent is defined.
- Benzo(a)pyrene was detected at four locations. Benzo(a)pyrene concentrations decreased downgradient and with depth. Therefore, the extent of benzo(a)pyrene is defined.
- Benzo(b)fluoranthene was detected at five locations. Benzo(b)fluoranthene concentrations decreased downgradient and with depth. Therefore, the extent of benzo(b)fluoranthene is defined.

- Benzo(g,h,i)perylene was detected at locations 16-608950 and 16-608954. Benzo(g,h,i)perylene concentrations decreased downgradient and with depth. Therefore, the extent of benzo(g,h,i)perylene is defined.
- Benzo(k)fluoranthene was detected at locations 16-608950 and 16-608951. Benzo(k)fluoranthene concentrations decreased downgradient and with depth. Therefore, the extent of benzo(k)fluoranthene is defined.
- Chrysene was detected at five locations. Chrysene concentrations decreased downgradient and with depth. Therefore, the extent of chrysene is defined.
- Fluoranthene was detected at five locations. Fluoranthene concentrations decreased downgradient and with depth except at location 16-608954. Therefore, the lateral extent is defined, and the vertical extent of fluoranthene is not defined.
- Fluorene was detected in one subsurface sample collected at location 16-608954. Fluorene was not detected in any samples collected downgradient. Therefore, the lateral extent of fluorene is defined. Fluorene concentrations increased with depth. Therefore, the vertical extent of fluorene is not defined.
- Indeno(1,2,3-cd)pyrene was detected in surface samples at three locations. Indeno(1,2,3-cd)pyrene concentrations decreased downgradient and with depth. The extent of indeno(1,2,3-cd) pyrene is defined.
- 2-Methylnaphthalene and naphthalene were each detected in the subsurface fill sample at location 16-608954. 2-Methylnaphthalene and naphthalene were not detected in any other samples. Therefore, the lateral extent of 2-methylnaphthalene and naphthalene is defined, but the vertical extent is not defined.
- Phenanthrene and pyrene were detected at five locations. Concentrations decreased downgradient and with depth except at location 16-608954. Therefore, the lateral extent of phenanthrene and pyrene is defined, but the vertical extent is not defined.
- TATB was detected in two surface samples at locations 16-608952 and 16-608953. TATB concentrations decreased downgradient and with depth. Therefore, the extent of TATB is defined.

7.4.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-025(d2) is shown in Figure 7.4-4. Analytical results are presented in Table 7.4-4.

- Cesium-137 was detected in a subsurface fill sample at location 16-608952 below the soil FV. Cesium-137 was not detected in the surrounding samples. The vertical extent of cesium-137 is not defined.

7.4.5.4 Summary of Extent

The extent of all inorganic chemicals is defined. The vertical extent of acenaphthene, anthracene, benzo(a)anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and cesium-137 is not defined. Therefore, the overall extent of contamination is not defined at SWMU 16-025(d2).

7.4.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination at SWMU 16-025(d2) is not defined, human health risk was not evaluated for SWMU 16-025(d2).

7.4.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination at SWMU 16-025(d2) is not defined, ecological risk was not evaluated for SWMU 16-025(d2).

7.5 SWMU 16-031(h)—Outfall

7.5.1 Site Description and Operational History

SWMU 16-031(h) is an outfall located approximately 300 ft northeast of former building 16-340 (Figure 7.5-1). The outfall was formerly NPDES permitted (EPA04A134) and received discharge from the sink, vacuum pump, and floor drain of a utility room within former building 16-478. Initially, former building 16-478 was used for photographing explosives testing and was later used for testing the effects of machining on HE products. A water-sealed/water-cooled vacuum pump was located in the utility room and served a vacuum system in another area of the building. The vacuum system held HE pieces in place for machining. The vacuum line contained a water filter to prevent HE from reaching the vacuum pump lines (LANL 1998, 059685, pp. 6-8–6-9).

7.5.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-031(h).

7.5.3 Field-Screening Results

A total of 10 samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3), except for barium, which was measured at 847 ppm in duplicate sample RE16-10-1510 at location 16-608695. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, four additional step-out samples (RE16-10-15344 through RE16-10-15347) were collected at locations 16-611905 and 16-611906 (Appendix C, section C-7.2.1).

7.5.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-031(h) are shown in Figure 7.5-1. Table 7.5-1 summarizes the samples collected and analyses requested.

7.5.4.1 Inorganic Chemicals

Five fill and five tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for anions, perchlorate, and TAL metals. Table 7.5-2 presents the inorganic chemicals above BVs for SWMU 16-031(h). Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.5-2. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.5.4.2 Organic Chemicals

Five fill and five tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of these samples was analyzed for SVOCs, VOCs, and explosive compounds. Table 7.5-3 presents the organic chemicals detected for SWMU 16-031(h). The sampling locations and detected concentrations of organic chemicals are shown in Figure 7.5-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.5.4.3 Radionuclides

Five fill and five tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of these 10 samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. No radionuclides were detected or detected above BVs/FVs.

7.5.5 Spatial Distribution

Five fill samples (0.0–0.5 ft bgs) and five tuff (Qbt 4) samples (5.5–6.0 ft bgs) were collected from five locations (16-608695, 16-608696, 16-608697, 16-611905, and 16-611906) to examine the nature and extent of contamination.

7.5.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-031(h) is shown in Figure 7.5-2. Analytical results are presented in Table 7.5-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (7340 mg/kg) at location 16-608696. Aluminum was not detected above the BVs in any of the upgradient locations within the SWMU. Concentrations increased with depth at the outfall location. Therefore, the vertical extent is not defined. Location 16-608696 is furthest downgradient, so the lateral extent is not defined.
- Antimony was detected above the soil BV at location 16-611905 and above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611906. Antimony was not detected above BVs in any of the other samples collected within the SWMU boundary. Because concentrations increased at the east and west step-out sample locations (16-611905 and 16-611906), the lateral extent of antimony is not defined. At location 16-611906, concentrations increased with depth. Therefore, the vertical extent of antimony is not defined.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (2.79 mg/kg) at location 16-608696. The concentration was below the maximum background concentration (5 mg/kg). Therefore, the extent of arsenic is defined.

- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (46 mg/kg) at locations 16-608696, 16-608697, and 16-611905. At locations 16-608696 and 16-611906, barium concentrations decreased with depth. At location 16-608697, the concentration of barium increased with depth. Therefore, the extent of barium is not defined.
- Cadmium was detected above the soil BV, but below the maximum BV (2.6 mg/kg) at location 16-608695. The concentration decreased downgradient and with depth. Therefore, the extent of cadmium is defined.
- Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (2200 mg/kg) at location 16-608696. Calcium was also detected above the soil BV (6120 mg/kg) at location 16-608697. Calcium concentrations decreased with depth at both sample locations, including 16-608696, and decreased downgradient. Therefore, the extent of calcium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (7.14 mg/kg) at location 16-608696. The concentration was below its maximum background concentration (13 mg/kg). Chromium was not detected above the BV in any other surface or subsurface samples. Therefore, the extent of chromium is defined.
- Copper was detected above the soil BV (14.7 mg/kg) at locations 16-608695 and 16-611905. Copper was detected above Qbt 2, Qbt 3, and Qbt 4 BV (4.66 mg/kg) at location 16-608696. At all sample locations, copper concentrations decreased with depth. Therefore, the vertical extent of copper is defined. Copper concentrations decreased in the step-out locations to the east and west of central location 16-608695 and in downgradient location 16-608696. Therefore, the extent of copper is defined.
- Fluoride was detected in all samples. Fluoride is naturally occurring, and the concentrations detected (0.64–1.89 mg/kg in fill and 6.9–17.9 mg/kg in tuff [Qbt 4]) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil BV (22.3 mg/kg) at three locations. Concentrations decreased with depth at all locations. Therefore, the vertical extent of lead is defined. Lead concentrations decreased in the step-out samples and in the samples collected at the outfall (location 16-608696). Therefore, the lateral extent of lead is defined.
- Magnesium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (1690 mg/kg) at location 16-608696. The concentration was below the maximum background concentration (2870 mg/kg). Therefore, the extent of magnesium is defined.
- Mercury was detected above the soil BV (0.1 mg/kg) at locations 16-608695, 16-608696, and 16-608697. Mercury was not detected in any subsurface samples. Therefore, the vertical extent of mercury is defined, but the lateral extent is not defined.
- Nitrate was detected in 7 of the 10 samples analyzed. Nitrate is naturally occurring, and the concentrations detected (0.31–2.61 mg/kg in fill and 0.076–0.15 mg/kg in tuff [Qbt 4]) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected in one subsurface sample at outfall location 16-608696. The concentration is below the EQL. Therefore, the extent of perchlorate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (0.3 mg/kg) in the subsurface step-out locations 16-611905 and 16-611906. Concentrations increased with depth and laterally. The extent of selenium is not defined.

- Silver was detected above the soil BV (1 mg/kg) at location 16-608695. Concentrations decreased downgradient and with depth. Therefore, the extent of silver is defined.
- Zinc was detected above the soil BV (48.8 mg/kg) at location 16-608695. Concentrations decreased downgradient and with depth. Therefore, the extent of zinc is defined.

7.5.5.2 Organic Chemicals

The distribution of organic chemicals at AOC 16-031(h) is shown in Figure 7.5-3. Analytical results are presented in Table 7.5-3.

- Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene were detected. All concentrations were below their respective EQLs and decreased with depth. Therefore, the extent of these chemicals is defined.
- HMX was detected in the surface sample at location 16-611905 and in the subsurface sample at location 16-608695. Concentrations are below the EQLs and decreased with depth at location 16-611905 and decreased downgradient. Therefore, the extent of HMX is defined.
- TATB was detected in the surface sample at the SWMU outfall location (16-608696). The concentration decreased with depth. Therefore, the vertical extent of TATB is defined. Location 16-608696 is furthest downgradient and the lateral extent is not defined.
- Bis(2-ethylhexyl)phthalate was detected in surface samples at two locations, and diethylphthalate was detected in surface samples at one location. Concentrations decreased with depth and were below the EQLs. Therefore, the extent of bis(2-ethylhexyl)phthalate and diethylphthalate is defined.

7.5.5.3 Radionuclides

No radionuclides were detected or detected above the BVs/FVs.

7.5.5.4 Summary of Extent

The extent of all organic chemicals, except TATB, is defined. Because TATB was detected only in the surface at the outfall, the lateral extent of TATB down the drainage is not defined. The lateral and vertical extent of aluminum, antimony, barium, and selenium are not defined. The lateral extent of mercury is not defined. Therefore, the overall extent of contamination is not defined for SWMU 16-031(h).

7.5.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-031(h).

7.5.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU16-031(h).

7.6 AOC 16-024(a)—Potential Soil Contamination Associated with Former Magazine 16-488

7.6.1 Site Description and Operational History

AOC 16-024(a) is an area of potential soil contamination located approximately 250 ft southwest of former building 16-343 (Figure 7.6-1). The soil contamination is associated with a former HE magazine (former building 16-488) built in 1944 to support the Manhattan Project. The former magazine stored HE and was decommissioned and removed in 1951 to make way for the construction of former building 16-340.

7.6.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC 16-024(a).

7.6.3 Field-Screening Results

A total of 10 samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb and for gross alpha, beta, and gamma radiation using handheld instruments. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than 2 ppm, which is the action level defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.6.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for AOC 16-024(a) are shown in Figure 7.6-1. Table 7.6-1 summarizes the samples collected and analyses requested.

7.6.4.1 Inorganic Chemicals

Five soil, three fill, and two tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the 10 samples was analyzed for TAL metals, nitrate, and perchlorate (Table 7.6-1). Table 7.6-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.6-2. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.6.4.2 Organic Chemicals

Five soil, three fill, and two tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the 10 samples was analyzed for SVOCs, explosive compounds, and VOCs (Table 7.6-1). Table 7.6-3 presents the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 7.6-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.6.4.3 Radionuclides

Five soil, three fill, and two tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 10 samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241 (Table 7.6-1). Table 7.6-4 presents the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 7.6-4. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.6.5 Spatial Distribution

Ten samples were collected from five sample locations (Figure 7.6-1). Surface (0.0–0.5 ft bgs) and subsurface (5.5–6.0 ft bgs) samples were collected at the five locations.

7.6.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC 16-024(a) is shown in Figure 7.6-2. Table 7.6-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs.

- Antimony, cadmium, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, and selenium is defined.
- Aluminum, calcium, and vanadium were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-608909. Aluminum and calcium concentrations increased with depth at this location. Vanadium concentrations decreased with depth at this location. Aluminum, calcium, and vanadium were not detected above BVs at any other sample locations. Therefore, the lateral extent of vanadium is not defined. The vertical and lateral extent of aluminum and calcium are not defined.
- Iron, lead, and magnesium were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-608909. The concentrations were below the maximum background concentrations (19,500, 15.4, and 2820 mg/kg). Iron, lead, and magnesium were not detected above BVs at the other locations. Therefore, the extent of iron, lead, and magnesium are defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in subsurface samples at locations 16-608909 and 16-608910. Concentrations increased with depth. Barium was not detected above BVs at other locations. Therefore, the vertical and lateral extent of barium are not defined.
- Bromide and sulfate were detected in one subsurface sample at location 16-608906. Location 16-608906 is at the center of the AOC, and these inorganic chemicals were not detected in any surrounding surface or subsurface samples. Therefore, the vertical extent is not defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in subsurface 5.5−6.0-ft-bgs samples at locations 16-608909 and 16-608910. Concentrations were below the maximum background concentration (13 mg/kg). Chromium was not detected above BVs at other locations. Therefore, the extent is defined.
- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608909 and above the soil BV at location 16-608910. Cobalt was not detected above BVs at other locations. Concentrations increased with depth at location 16-608909 and decreased with depth at location 16-608910. Therefore, the vertical and lateral extent of cobalt are not defined.
- Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608909 and 16-608910. Concentrations increased with depth at location 16-608909 and were below the

maximum background concentration (6.2 mg/kg) at location 16-608910. Copper was not detected above BVs in any other surface or subsurface samples at the other locations. Therefore, the vertical and lateral extent of copper are not defined.

- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608909 and 16-608910. Concentrations increased with depth at location 16-608910 and were below the maximum background concentration (7 mg/kg) at location 16-608909. Nickel was not detected above BVs in any other surface or subsurface samples at the other locations. Therefore, the vertical and lateral extent of nickel are not defined.
- Perchlorate was detected in one surface sample and in five subsurface samples at five locations. Perchlorate concentrations increased with depth at all locations but decreased laterally. Therefore, the vertical extent of perchlorate is not defined.
- Nitrate was detected in one surface sample, and fluoride was detected in all samples. Nitrate and fluoride are naturally occurring, and the concentrations detected (1.57 and 1.21–8.69 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate and fluoride is defined.

7.6.5.2 Organic Chemicals

The distribution of organic chemicals at AOC 16-024(a) is shown in Figure 7.6-3. Organic chemicals detected are presented in Table 7.6-3.

- Benzo(a)anthracene, benzo(a)pyrene, and chrysene were detected in the surface sample at location 16-608906. Concentrations decreased with depth and were below the respective EQLs. Therefore, the extent of benzo(a)anthracene, benzo(a)pyrene, and chrysene is defined.
- Benzoic acid was detected in the surface sample at location 16-608907. Concentrations decreased with depth and were below the EQL. Therefore, the extent of benzoic acid is defined.
- 2-Butanone was detected in the subsurface sample at location 16-608907 at a concentration below the EQL. 2-Butanone was not detected in any other sample. Therefore, the extent of 2-butanone is defined.
- Fluoranthene was detected in the surface samples at locations 16-608906 and 16-608910. Concentrations decreased with depth and were below the EQL. Therefore, the extent of fluoranthene is defined.
- 4-Isopropyltoluene was detected in the surface samples at locations 16-608907, 16-608909, and 16-608910. Concentrations decreased with depth and were below the EQL. Therefore, the extent of 4-isopropyltoluene is defined.
- Pyrene was detected in the surface samples at locations 16-608906, 16-608907, and 16-608910. Concentrations decreased with depth and were below the EQL. Therefore, the extent of pyrene is defined.

7.6.5.3 Radionuclides

The distribution of radionuclides at AOC 16-024(a) is shown in Figure 7.6-4. Radionuclides detected or detected above BVs/FVs are presented in Table 7.6-4.

- Cesium-137 was detected in the subsurface sample at location 16-608908. Although the surface concentration at this location was below the FV, the concentration (0.586 pCi/g) was higher than the concentration detected in the subsurface sample. Cesium-137 was not detected or not detected above the FV in any surface or subsurface samples at other locations. Therefore, the lateral extent of cesium-137 is not defined.
- Plutonium-239/240 was detected above the soil FV at location 16-608908. Concentrations decreased with depth at this location. Plutonium-239/240 was not detected or not detected above the FV in other surface or subsurface samples. Therefore, the lateral extent of plutonium-239/240 is not defined.

7.6.5.4 Summary of Extent

The extent of all organic chemicals is defined. The lateral extent of cesium-137, plutonium-239/240, and vanadium is not defined. The vertical extent of bromide, perchlorate, and sulfate is not defined. The lateral and vertical extent of aluminum, calcium, barium, cobalt, copper, and nickel are not defined. Therefore, the overall extent of contamination is not defined.

7.6.6 Summary of Human Health Risk Assessment

Because the extent of contamination is not defined, human health risk was not evaluated at AOC 16-024(a).

7.6.7 Summary of Ecological Risk Assessments

Because the extent of contamination is not defined, ecological risk was not evaluated at AOC 16-024(a).

7.7 AOC 16-024(u)—Potential Soil Contamination Associated with Former Magazine 16-481

7.7.1 Site Description and Operational History

AOC 16-024(u) is an area of potential soil contamination located approximately 15 ft west of former building 16-341 (Figure 7.7-1). The soil contamination is associated with a former HE storage magazine (former building 16-481) built in 1944 to support the Manhattan Project. The former magazine was decommissioned and removed in 1951 to make way for the construction of former building 16-340.

7.7.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC 16-024(u).

7.7.3 Field-Screening Results

A total of 10 samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.7.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled at AOC 16-024(u) are shown in Figure 7.7-1. Table 7.7-1 summarizes the samples collected and analyses requested.

7.7.4.1 Inorganic Chemicals

Ten soil/fill samples were collected and analyzed for inorganic chemicals. Each of the samples was analyzed for anions, perchlorate, and TAL metals. Table 7.7-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.7-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.7.4.2 Organic Chemicals

Ten soil/fill samples were collected and analyzed for organic chemicals. Each of the samples was analyzed for SVOCs, VOCs, and explosive compounds. Table 7.7-3 presents the organic chemicals detected at AOC 16-024(u). The sampling locations and detected concentrations of organic chemicals are shown in Figure 7.7-3. Because the extent is not defined for the site, COPCs have not been identified.

7.7.4.3 Radionuclides

Ten soil/fill samples were collected and analyzed for radionuclides. Each of these samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. No radionuclides were detected or detected above the BVs/FVs at AOC 16-024(u).

7.7.5 Spatial Distribution

Ten soil/fill samples from five sampling locations (Figure 7.7-1) were evaluated to determine the extent of contamination at AOC 16-024(u). One sampling location (16-608919) was at the center of the site. The other four sampling locations (16-608917, 16-608918, 16-608920, and 16-08921) were located on the outer boundaries of the site. Samples were collected from two depths at each sample location (0.0–0.5 and 5.5–6.0 ft bgs).

The extent of contamination at AOC 16-024(u) is evaluated in the following sections.

7.7.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC 16-024(u) is shown in Figure 7.7-2. The analytical results are presented in Table 7.7-2.

- Antimony and cadmium were not detected above the BV in any sample. The extent of antimony and cadmium is defined.
- Fluoride was detected in 6 of the 10 samples analyzed. Fluoride is naturally occurring, and the concentrations detected (0.627–5.08 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Perchlorate was detected in three samples at three locations. Concentrations were below the EQLs. Therefore, the extent of perchlorate is defined.

7.7.5.2 Organic Chemicals

The distribution of organic chemicals at AOC 16-024(u) is shown in Figure 7.7-3; the analytical results are presented in Table 7.7-3.

- Aniline, dimethyl phthalate, 4,6-dinitro-2-methylphenol, 2,4-dinitrotoluene, isophorone, and n-nitroso-di-n-propylamine were detected at location 16-608921 in the subsurface sample. Concentrations were below the EQLs. Therefore, the extent of these organic chemicals is defined.
- Acetone was detected in the surface sample at location 16-608920. The concentration decreased with depth and was below the EQL. The extent of acetone is defined.
- Methylene chloride was detected at locations 16-608920 and 16-608921. Concentrations decreased with depth and were below the EQL. The extent of methylene chloride is defined.
- Acenaphthene, anthracene, dibenz(a,h)anthracene, dibenzofuran, fluorene, 2-methylnaphthalene, and naphthalene were each detected in one or more samples at one to two locations. The concentrations decreased with depth. The detected results were found in the surface fill and soil samples collected from the sample locations on the east edge of the site (locations 16-608920 and 16-608921). The highest concentrations were detected in the surface fill sample collected from location 16-608920 (northeast boundary). The vertical extent is defined, but the lateral extent of these organic chemicals is not defined.
- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were each detected at two to four locations. Increased concentrations were all found in the surface fill and soil samples collected from the sample locations on the east edge of the site (locations 16-608920 and 16-608921). The highest concentrations were detected in the surface fill sample closest to the partially paved asphalt road, at location 16-608920 (northeast boundary). The concentrations decreased with depth except at location 16-608917. Therefore, the lateral and vertical extent of these organic chemicals are not defined.

7.7.5.3 Radionuclides

There were no radionuclides detected or detected above the BVs/FVs at AOC 16-024(u).

7.7.5.4 Summary of Extent

The extent of inorganic chemicals and acetone, aniline, dimethyl phthalate, 4,6-dinitro-2-methylphenol, 2,4-dinitrotoluene, isophorone, methylene chloride, and n-nitroso-di-n-propylamine is defined for AOC 16-024(u). However, the lateral extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene is not defined. The vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at location 16-608917. Therefore, the overall extent of contamination at AOC 16-024(u) is not defined.

7.7.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for AOC 16-024(u).

7.7.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for AOC 16-024(u).

7.8 AOC C-16-050—Former Building 16-482

7.8.1 Site Description and Operational History

AOC C-16-050 is the footprint of former building 16-482 located approximately 75 ft southeast of former building 16-343 (Figure 7.8-1). Former building 16-482 was of wood-frame construction and measured 16 ft square. The building was used for storage; however, no archival records describe what was stored. In July 1949, the storage building was relocated to TA-11 and renumbered as building 11-09.

7.8.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-16-050.

7.8.3 Field-Screening Results

Fourteen samples, collected at six locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX was detected at 2.178 ppm in sample RE16-10-1447 at location 16-609518. Review of the XRF results indicates that all 30 inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than their minimal detectable activities (100 cpm), and gross gamma was reported at less than its minimal detectable activity (20 µR/h).

Based on these results, four additional step-out samples (RE16-10-1448 through RE16-10-1451) were collected below the original sample at location 16-609518 and from three depths at location 16-609519 (Appendix C, section C-7.8.3).

7.8.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for AOC C-16-050 are shown in Figure 7.8-1. Table 7.8-1 summarizes the samples collected and analyses requested.

7.8.4.1 Inorganic Chemicals

Fourteen (four soil, two fill, and eight tuff [Qbt 4]) samples were collected and analyzed for TAL metals, perchlorate, and nitrate. Table 7.8-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.8-2. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.8.4.2 Organic Chemicals

Fourteen (four soil, two fill, and eight tuff [Qbt 4]) samples were collected and analyzed for SVOCs, VOCs, and explosive compounds. Table 7.8-3 presents the organic chemicals detected at AOC C-16-050. The sample locations and detected concentrations of organic chemicals are shown in Figure 7.8-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.8.4.3 Radionuclides

Fourteen (four soil, two fill, and eight tuff [Qbt 4]) samples were collected and analyzed for radionuclides. Each of the 14 samples was analyzed by gamma spectroscopy and for isotopic uranium, isotopic plutonium, and americium-241. No radionuclides were detected or detected above the BVs/FVs at AOC C-16-050.

7.8.5 Spatial Distribution

Fourteen samples from six locations (Figure 7.8-1) were evaluated to determine the extent of contamination at AOC C-16-050. Six surface samples were collected at 0.0–0.5 ft bgs, six subsurface samples were collected at 5.5–6.0 ft bgs, and two subsurface samples were collected at 8.5–9.0 ft bgs.

7.8.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC C-16-050 is shown in Figure 7.8-2. The analytical results are presented in Table 7.8-2.

- Antimony and cadmium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and cadmium is defined.
- Fluoride was detected in 11 samples at 6 locations, and nitrate was detected in 1 sample at 1 location. Both nitrate and fluoride are naturally occurring, and the concentrations detected (0.421–5.0 and 1.25 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate and fluoride is defined.
- Calcium was detected in three samples at two locations (16-609514 and 16-609515) above its soil or Qbt 2, Qbt 3, and Qbt 4 BV. Concentrations decreased with depths at both locations. Therefore, the lateral extent of calcium is not defined, but the vertical extent is defined.

- Perchlorate was detected in two samples at two locations (16-609515 and 16-609518). Concentrations decreased with depth at both locations. Therefore, the lateral extent of perchlorate is not defined.
- Selenium was detected in three samples above the Qbt 2, Qbt 3, and Qbt 4 BV at two locations. Concentrations increased with depth at both locations. Therefore, the extent of selenium is not defined.

7.8.5.2 Organic Chemicals

The distribution of organic chemicals detected at AOC C-16-050 is shown in Figure 7.8-3. The analytical results are presented in Table 7.8-3. Twenty of the 22 organic chemicals detected had maximum detected concentrations at location 16-609514 or 16-609515, located within what is now an unpaved roadway/lay-down area.

- Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene were detected at one to six locations. Concentrations decreased with depth and downgradient toward the southeast. The extent of these organic chemicals is defined.
- 1,2,4-Trimethylbenzene was detected at locations 16-609514 and 16-609515 in the 0.0−0.5-ft interval at concentrations below the EQL. 1,3,5-Trimethylbenzene was detected at location 16-609515 in the 0.0−0.5-ft interval at a concentration below the EQL. No other detections of these two chemicals were reported. The extent of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene is defined.
- Acetone was detected in a surface sample at location 16-609518 and was near the EQL. Therefore, the extent of acetone is defined.
- Aniline was detected in the surface sample at location 16-609519. Concentrations decreased with depth and were below the EQL. The extent of aniline is defined.

7.8.5.3 Radionuclides

Radionuclides were not detected or detected above BVs/FVs at any sample location.

7.8.5.4 Summary of Extent

The extent of selenium is not defined. The lateral extent of calcium and perchlorate is not defined. The extent of all other inorganic chemicals, organic chemicals, and radionuclides is defined. Therefore, the overall extent of contamination at AOC C-16-050 is not defined.

7.8.6 Summary of Human Health Risk Assessment Results

Because the extent of contamination is not defined, human health risk was not evaluated for AOC C-16-050.

7.8.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for AOC C-16-050.

7.9 AOC C-16-060—Former Building 16-479

7.9.1 Site Description and Operational History

AOC C-16-060 is the footprint of former building 16-479, located approximately 180 ft southwest of former building 16-340 (Figure 7.9-1). Former building 16-479 was 16 ft square with a wooden floor. The building was constructed in 1945 and used as a receiving magazine for the storage of finished HE product and packaged, raw HE (LANL 1995, 057225, p. 5-26-6). Building 16-479 was moved to TA-33 in 1949.

7.9.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-16-060.

7.9.3 Field-Screening Results

A total of 10 samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.9.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled at AOC C-16-060 are shown in Figure 7.9-1. Table 7.9-1 summarizes the samples collected and analyses requested.

7.9.4.1 Inorganic Chemicals

One soil and nine fill samples were collected and analyzed for inorganic chemicals. Each of the 10 samples was analyzed for anions, perchlorate, and TAL metals. Table 7.9-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.9-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.9.4.2 Organic Chemicals

One soil and nine fill samples were collected and analyzed for organic chemicals. Each of the 10 samples was analyzed for explosive compounds, SVOCs, and VOCs. Table 7.9-3 presents the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 7.9-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.9.4.3 Radionuclides

One soil and nine fill samples were collected and analyzed for radionuclides. Each of the 10 samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. Table 7.9-4 presents radionuclides detected or detected above BVs/FVs. Radionuclides detected or detected above BVs/FVs are shown in Figure 7.9-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.9.5 Spatial Distribution

Ten samples were collected from two depths (0.0–0.5 and 5.5–6.0 ft bgs) at five locations (Figure 7.9-1). The extent of contamination at AOC C-16-060 is evaluated in the following sections.

7.9.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC C-16-060 is shown in Figure 7.9-2. The analytical results are presented in Table 7.9-2.

- Antimony and cadmium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and cadmium is defined.
- Fluoride was detected in the surface and subsurface samples at all five locations. Nitrate was detected in the surface sample at locations 16-609503, 16-609505, 16-609506, and 16-609507. Nitrate and fluoride are naturally occurring, and the concentrations detected (1.05–11.2 and 1.33–2.67 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate and fluoride is defined.
- Perchlorate was detected in surface and subsurface samples at location 16-609505. Concentrations decreased with depth and at the downgradient location. Therefore, the extent of perchlorate is defined.
- Barium, cobalt, and manganese were detected above soil BVs in the surface sample at location 16-609505. Concentrations decreased with depth and at the downgradient location. Therefore, the extent of barium, cobalt, and manganese is defined.

7.9.5.2 Organic Chemicals

The distribution of organic chemicals at AOC C-16-060 is shown in Figure 7.9-3. The analytical results are presented in Table 7.9-3.

- Acetone was detected in the subsurface samples at locations 16-609504 and 16-609505 at concentrations below the EQL. Acetone was not detected in the surface samples or downgradient. Therefore, the extent of acetone is defined.
- Aniline was detected in the surface sample at location 16-609504. Aniline was not detected in the subsurface sample or downgradient of this location. Therefore, the extent of aniline is defined.
- Acenaphthene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and benzo(k)fluoranthene were detected in the surface samples at locations 16-609503, 16-609506, and 16-609507. Concentrations decreased with depth but increased downgradient. Therefore, the vertical extent is defined, and the lateral extent is not defined.

- Anthracene and naphthalene were detected in the surface samples at locations 16-609503, 16-609504, and 16-609506. Concentrations decreased with depth but increased downgradient. Therefore, the vertical extent is defined, and the lateral extent is not defined.
- Benzo(a)anthracene, benzo(a)pyrene, chrysene, and indeno(1,2,3-cd)pyrene were detected in the surface samples at four locations. Concentrations decreased with depth but increased downgradient. Therefore, the vertical extent is defined, but the lateral extent is not defined.
- Benzoic acid and dibenzofuran were detected in the surface sample at location 16-609503 and decreased with depth. Therefore, the vertical extent of benzoic acid and dibenzofuran is defined, but the lateral extent is not defined.
- Fluoranthene, phenanthrene, and pyrene were detected in the surface samples at five locations. Concentrations decreased with depth but increased downgradient. Therefore, the vertical extent is defined, but the lateral extent is not defined.
- Fluorene and 2-methylnaphthalene were detected in the surface samples at locations 16-609503 and 16-609506. Concentrations decreased with depth but increased downgradient. Therefore, the vertical extent is defined, but the lateral extent is not defined.
- Methylene chloride was detected in the surface sample at location 16-609505. Methylene chloride was not detected in the subsurface sample or downgradient of this sample location. Therefore, the extent of methylene chloride is defined.

7.9.5.3 Radionuclides

The distribution of radionuclides at AOC C-16-060 is shown in Figure 7.9-4. The analytical results are presented in Table 7.9-4.

- Cesium-137 was detected in the subsurface sample at location 16-609507. Cesium-137 was detected below the FV at this location. Concentrations decreased with depth and downgradient. Therefore, the vertical extent of cesium-137 is defined.

7.9.5.4 Summary of Extent

The extent of all inorganic chemicals and radionuclides is defined. The vertical extent of all organic chemicals is defined. The lateral extent of acenaphthene, anthracene, benzoic acid, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene is not defined. Therefore, the extent of contamination at AOC C-16-060 is not defined.

7.9.6 Summary of Human Health Risk Assessment Results

Because the extent of contamination is not defined, human health risk was not evaluated for AOC C-16-060.

7.9.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for AOC C-16-060.

7.10 SWMU 13-001—Firing Site

7.10.1 Site Description and Operational History

SWMU 13-001 is an inactive firing site located east of former building 16-340 (Figure 7.10-1). The firing site is associated with firing activities conducted at P-Site (former TA-13). The area contains shrapnel and debris, including firing cables, lead balls, and chunks of steel and copper (LANL 1993, 020948, pp. 5-228–5-229).

7.10.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 13-001.

7.10.3 Field-Screening Results

Before collecting samples for off-site fixed laboratory analyses, a total of 150 screening samples were collected at 76 locations. These samples were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is approximately 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Review of the screening results did not identify any patterns of contamination to direct biased fixed laboratory sample collection. Based on the lack of obvious contamination, and in accordance with the approved work plan (LANL 2007, 102216), samples were collected at 30% of the screening sample locations. These sample locations were randomly selected.

7.10.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 13-001 are shown in Figure 7.10-1. Table 7.10-1 summarizes the samples collected and analyses requested.

7.10.4.1 Inorganic Chemicals

Twenty-nine soil, 20 tuff (Qbt 4), and 2 fill samples were collected and analyzed for inorganic chemicals. Each of the 51 samples was analyzed for TAL metals, anions, and perchlorate. Table 7.10-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown on Plate 6. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.10.4.2 Organic Chemicals

Twenty-nine soil, 20 tuff (Qbt 4), and 2 fill samples were collected and analyzed for organic chemicals. Each of the 51 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 7.10-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown on Plate 7. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.10.4.3 Radionuclides

Twenty-nine soil, 20 tuff (Qbt 4), and 2 fill samples were collected and analyzed for radionuclides. Each of these 51 samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. Radionuclides detected or detected above BVs/FVs are listed in Table 7.10-4 and shown in Figure 7.10-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.10.5 Spatial Distribution

The bullseye grid (Figure 7-10.1) was chosen to define the nature and extent of contamination at SWMU 13-001 based on the radial dispersion of potential contaminants from the firing point. SWMUs 16-035 and 16-036 lie within the bullseye sampling grid (Figure 7-10.1), and SWMU 13-004 (Plate 3) is also believed to lie within the bullseye sampling grid. A total of 150 field-screening samples were taken at a total of 76 locations. A total of 51 samples were collected from 26 randomly selected sample locations (Figure 7.10-1) and were submitted for fixed laboratory analysis. One surface (0.0–0.5 ft bgs) sample and one subsurface sample (between 1.5–2.0 and 5.5–6.0 ft bgs) were collected at all but one of the 26 sample locations (Appendix C, section C-7.2.3).

The extent of contamination at SWMU 13-001 is evaluated in the following sections. Analytical results from the Fishladder Canyon Drainages to the north and the Martin Spring Canyon Drainages to the southeast were incorporated as needed to evaluate the extent of contamination.

7.10.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 13-001 is shown on Plate 6. Analytical results are presented in Table 7.10-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in a single subsurface sample at location 16-608607. At location 16-608607, the concentration increased with depth. Therefore, the vertical extent of aluminum is not defined. Aluminum was not detected above the BV in any other sample location within the bullseye range. Therefore, the lateral extent is defined.
- Antimony was detected above the soil BV (0.83 mg/kg) in the deeper sample at location 16-608608. The detection limit for antimony exceeded the BV for soil and tuff (Qbt 4) in 44 of the 51 samples analyzed. Location 16-608608 is near the center of the grid and surrounded by samples that did not detect antimony above the BVs. Therefore, the lateral extent of antimony is defined, but the vertical extent is not defined.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in the subsurface samples at locations 16-608612, 16-608607, and 16-608609. Concentrations at locations 16-608607 and 16-608609 also exceeded the maximum background concentration (5 mg/kg). Because the concentration increased with depth at all three sample locations, the vertical extent of arsenic is not defined. Arsenic concentrations decreased from the center of the bullseye grid outward. Therefore, the lateral extent of arsenic is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in the subsurface samples at five locations (16-608609, 16-608612, 16-608617, 16-608628, and 16-608632). At all five locations, barium concentrations decreased with depth. Therefore, the vertical extent is defined. Barium concentrations decreased from the firing point area to the north and west, and increased and slightly decreased to the south and southeast, respectively. Barium contamination continued into

the Martin Spring Canyon Drainages below the bullseye range, increasing at location 16-608526 (Plate 6 and Table 10.3-2). Therefore, the lateral extent of barium is not defined.

- Cadmium was detected above the soil BV at location 16-608610. The concentration decreased with depth, and cadmium was not detected above BV at any other location. Therefore, the extent of cadmium is defined.
- Calcium was detected in fill samples collected near former bunker SWMU 16-036 at the center of the bullseye grid. The calcium concentrations in the fill samples were 45,200 mg/kg in the 1.5−2.0-ft-bgs sample at location 16-608608 and 88,400 mg/kg in the 5.5−6.0-ft-bgs sample at location 16-608624. Concrete and building materials were noted in the field notes for both samples. The vertical extent of calcium is not defined. Calcium was not detected above BVs at any other sample locations. Therefore, the lateral extent of calcium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in the subsurface samples at locations 16-608607 and 16-608630. Concentrations at locations 16-608607 and 16-608630 were below the maximum background (13 mg/kg). Chromium concentrations increased with depth at location 16-608620. Therefore, the extent of chromium is not defined.
- Cobalt was detected above the soil BV in the surface sample at location 16-608627. Cobalt was not detected above background in the subsurface sample. Therefore, the vertical extent of cobalt is defined. Cobalt concentrations were highest at the edge of the bullseye sampling grid south of the firing point; however, concentrations decreased at the downgradient Martin Spring Canyon Drainages at locations 16-608528, 16-608529, and 16-608530 (Table 10.3-2 and Plate 25). Therefore, the lateral extent of cobalt is defined.
- Copper was detected above the soil or Qbt 2, Qbt 3, and Qbt 4 BV in the subsurface sample at four locations and above the soil BV in the surface sample at one location. Concentrations at locations 16-608632 and 16-608607 were at or below the respective maximum background concentrations (16 mg/kg in soil and 6.2 mg/kg in tuff [Qbt 4]). The highest concentration of copper was 28 mg/kg in the subsurface sample at the sampling location closest to the former firing point (location 16-608624). Because concentrations increased with depth at locations 16-608608, 16-608624, and 16-608628, the vertical extent of copper is not defined. The lateral extent of copper is defined, because concentrations of copper decreased with distance from the firing point in the northern downgradient samples and at the farthest downgradient southeast location (16-608628).
- Fluoride was detected at all 26 sample locations, and nitrate was detected at 11 sample locations. Nitrate and fluoride are naturally occurring, and the concentrations detected (0.35–13.5 and 1.18–7.07 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Lead was detected above the soil BV (22.3 mg/kg) in the surface samples at locations 16-608612, 16-608623, and 16-608630. Lead was also detected above the soil BV at depth at location 16-608608. The concentration was below the maximum background concentration for Qbt 2, Qbt 3, and Qbt 4 (15.5 mg/kg) at location 16-608628. Concentrations increased with depth at location 16-608608 but decreased with depth at all other locations. The vertical extent is not defined at location 16-608608. Lead concentrations decreased downgradient from location 16-608608; therefore, the lateral extent of lead is defined.
- Manganese was detected above the soil BV in the surface sample at location 16-608627. Concentrations decreased with depth and downgradient. Therefore, the extent of manganese is defined.

- Mercury was detected above the soil BV in the subsurface sample at location 16-608608. The concentration of mercury increased with depth. Therefore, the vertical extent of mercury is not defined. Because location 16-608608 is centrally located within the bullseye sampling grid and there were no additional concentrations of mercury above BVs, the lateral extent is defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in the subsurface sample at location 16-608607. The concentration is below maximum background concentration (7 mg/kg). Therefore, the extent of nickel is defined.
- Perchlorate was detected in both the surface and subsurface samples at location 16-608622, where concentrations increased with depth. It was also detected in five subsurface samples and two surface samples at seven additional sample locations, including downgradient sample location 16-608626. Concentrations were generally below the EQL and decreased downgradient. Therefore, the lateral extent of perchlorate is defined, but the vertical extent is not defined.
- Selenium was not detected above BVs but had detection limits above BVs. Therefore, the extent of selenium is defined.
- Sodium was detected above the soil BV in the subsurface sample at location 16-608624. The concentration was well below the maximum background concentration (1800 mg/kg). Therefore, the extent of sodium is defined.
- Zinc was detected above the soil BV (48.8 mg/kg) in the surface samples at four locations. Concentrations decreased with depth at each location. Zinc was also detected above the soil BV at depth at location 16-608608 and above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608624. Concentrations increased with depth at these locations. Therefore, the vertical extent of zinc is not defined. Concentrations decreased with distance from the center locations. Therefore, the lateral extent is defined.

7.10.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 13-001 is shown on Plate 7. Analytical results are presented in Table 7.10-3.

- Acenaphthene was detected at locations 16-608614, 16-608609, 16-608606, 16-608612, 16-608615, and 16-608633. Acenaphthene was not detected at locations farthest downgradient. Therefore, the lateral extent is defined. Concentrations increased with depth at sample location 16-608615 and decreased with depth at the other locations. Therefore, the vertical extent of acenaphthene is not defined.
- Acetone was detected near SWMU 16-036 in two fill samples at locations 16-608608 and 16-608624. Because acetone was not detected in the surface sample at each of these locations, the vertical extent of acetone is not defined. It was not detected in any of the surrounding sample locations. Therefore, the lateral extent of acetone is defined.
- Anthracene was detected in the surface samples at locations 16-608614, 16-608612, 16-608616, and 16-608610. It was detected in both the surface and subsurface samples at location 16-608633 and in the subsurface sample at location 16-608615. Concentrations were below the EQLs. Therefore, the extent of anthracene is defined.
- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and benzo(k)fluoranthene were detected at 6 to 13 locations. Concentrations decreased with depth and downgradient. Concentrations were below EQLs at location 16-608615. Therefore, the extent of these organic chemicals is defined.

- Benzoic acid and butylbenzylphthalate were each detected in one surface sample at locations 16-608629 and 16-608610, respectively. Dibenz(a,h)anthracene and 2-methylnaphthalene were also detected in the surface sample at location 16-608612. Concentrations of these organic chemicals were below the EQL. They were not detected in the subsurface or downgradient of locations where they were detected in the surface. Therefore, the extent of benzoic acid, butylbenzylphthalate, dibenz(a,h)anthracene, and 2-methylnaphthalene is defined.
- Bis(2-ethylhexyl)phthalate was detected in the surface samples at locations 16-608607, 16-608610, and 16-608620. Concentrations decreased with depth at each location. Bis(2-ethylhexyl)phthalate was also detected in the subsurface sample at location 16-608630, below the EQL. Bis(2-ethylhexyl)phthalate was not detected at the farthest downgradient locations. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- 2-Butanone was detected below the EQL near SWMU 16-036 in two fill samples at locations 16-608608 and 16-608624. 2-Butanone was not detected in the farthest downgradient sample locations. Therefore, the extent of 2-butanone is defined.
- Chrysene was detected in the surface samples at 11 locations. Concentrations decreased with depth at all locations. Chrysene was also detected in the subsurface sample at location 16-608615 below the EQL. Chrysene was not detected at the farthest downgradient locations toward the northeast and southeast. The extent of chrysene is defined.
- Di-n-butylphthalate was detected in the surface sample at location 16-608630, and the concentration decreased with depth. It was also detected in the subsurface sample at location 16-608608 below the EQL. It was not detected at downgradient sample locations to the southeast. Therefore, the extent of di-n-butylphthalate is defined.
- Fluoranthene, phenanthrene, and pyrene were detected at 11 to 12 locations. The maximum concentration for each of these organic chemicals was detected in the surface sample at location 16-608612. They were not detected in the farthest downgradient locations east of the road. Therefore, the lateral extent of fluoranthene, phenanthrene, and pyrene is defined. Concentrations of fluoranthene, phenanthrene, and pyrene increased with depth at location 16-608615, where the vertical extent is not defined. Concentrations decreased with depth at all other locations.
- Fluorene was detected at location 16-608612 in the surface sample and at location 16-608633 in the subsurface sample at concentrations below the EQL. Methylene chloride and naphthalene were also detected in the subsurface samples at two locations each (methylene chloride at locations 16-608617 and 16-608620, and naphthalene at locations 16-608615 and 16-608633) at concentrations below the EQL. They were not detected at the farthest downgradient locations toward the northeast and southeast. Therefore, the extent of these organic chemicals is defined.
- HMX and RDX were detected in the surface samples at location 16-608620. HMX was also detected at location 16-608612. HMX and RDX concentrations decreased with depth and were not detected at the farthest downgradient locations. Therefore, the extent of HMX and RDX is defined.
- Indeno(1,2,3-cd)pyrene was detected at eight locations, with concentrations decreasing at the farthest downgradient locations to the northeast and southeast. Therefore, the lateral extent is defined. Indeno(1,2,3-cd)pyrene was detected at locations 16-608615 and 16-608633. Concentrations increased with depth to above the EQL at location 16-608633. Therefore, the vertical extent of indeno(1,2,3-cd)pyrene is not defined.

- Styrene was detected in the surface sample at location 16-608612. It was not detected at downgradient sample locations or in subsurface samples. Therefore, the extent of styrene is defined.
- TATB was detected in the surface samples at seven locations. Concentrations of TATB decreased with depth and downgradient in the Martin Spring Canyon Drainages. Therefore, the extent of TATB is defined.
- Toluene and 4-isopropyltoluene were each detected in the subsurface sample at one location (16-608628) at concentrations below the EQLs. Therefore, the extent of toluene and 4-isopropyltoluene is defined.

7.10.5.3 Radionuclides

The distribution of radionuclides at SWMU 13-001 is shown in Figure 7.10-2. Analytical results are presented in Table 7.10-4.

- Americium-241 was detected above the FV in surface samples at locations 16-608622 and 16-608630. It was not detected downgradient at location 16-608625 or in subsurface samples. Therefore, the extent of americium-241 is defined.
- Cesium-137 was detected above the FV in the surface sample at location 16-608630. It was not detected and decreased with depth at the farthest downgradient location, in the Fishladder Canyon Drainages (Figure 7.10-2), or in subsurface samples. The extent of cesium-137 is defined.
- Plutonium-239/240 was detected above the FV in the surface sample at locations 16-608622, 16-608625, and 16-608630. Activities of plutonium-239/240 decreased downgradient to sample location 16-608625 and decreased with depth. Therefore, the extent of plutonium-239/240 is defined.

7.10.5.4 Summary of Extent

The lateral extent of barium and chromium is not defined. The vertical extent of aluminum, antimony, arsenic, calcium, chromium, copper, lead, mercury, perchlorate, zinc, acenaphthene, acetone, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined. The extent of the remaining inorganic chemicals, organic chemicals, and radionuclides is defined. Therefore, the overall extent of contamination at SWMU 13-001 is not defined.

7.10.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 13-001.

7.10.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 13-001.

7.11 SWMU 13-002—Surface Disposal Area

7.11.1 Site Description and Operational History

SWMU 13-002 is a surface disposal area located east of former building 16-340 (Figure 7.11-1). The disposal area contains debris and shrapnel associated with firing activities conducted at P-Site (former TA-13) (LANL 1993, 020948, pp. 5-228-–5-229). A portion of the TA-16 WWTP [Consolidated Unit 16-004(a)-99] is located on top of the southern tip of the surface disposal area.

7.11.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 13-002.

7.11.3 Field-Screening Results

Thirteen samples, collected at seven locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.11.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 13-002 are shown in Figure 7.11-1. Table 7.11-1 summarizes the samples collected and analyses requested for each sample.

7.11.4.1 Inorganic Chemicals

Seven soil and six tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. All samples were analyzed for TAL metals, anions, and perchlorate. Table 7.11-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.11-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.11.4.2 Organic Chemicals

Seven soil and six tuff (Qbt 4) samples were collected and analyzed for organic chemicals. The samples were all analyzed for VOCs, SVOCs, and explosive compounds. Table 7.11-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 7.11-3. Because the extent of contamination is not determined for the site, COPCs have not been identified.

7.11.4.3 Radionuclides

Seven soil and six tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the samples was analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. No radionuclides were detected or detected above BVs/FVs.

7.11.5 Spatial Distribution

The northern portion of SWMU 13-002 was sampled within the bullseye grid surrounding the firing point (SWMU 13-001). The nature and extent of contamination within the southern portion of the disposal area are examined in this section. Thirteen samples were collected from seven locations within the southern portion of SWMU 13-002. One surface sample (0.0–0.5 ft bgs) and one subsurface sample (2.5–3.0 or 5.5–6.0 ft bgs) were collected at all but one location (Appendix C, section C-7.2.4). Analytical results from the Martin Spring Canyon Drainages to the east are incorporated as needed to evaluate the extent of contamination from SWMU 13-002.

7.11.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 13-002 is shown in Figure 7.11-2. The analytical results are presented in Table 7.11-2.

- Antimony, cadmium, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, and selenium is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608659 and 16-608657. The barium concentration decreased with depth at location 16-608657 and increased with depth at location 16-608659. Therefore, the vertical extent of barium is not defined. Barium concentrations decreased with distance from the SWMU 13-001 firing point at downgradient locations 16-608660, 16-608661, and 16-608658. Therefore, the lateral extent of barium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608658 and16-608661. Concentrations increased with depth at both locations. Therefore, the vertical extent is not defined. Sample locations 16-608658 and 16-608661 are two of the farthest downgradient locations. Concentrations increased downgradient of SWMU 13-001. Therefore, the lateral extent of chromium is not defined.
- Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608661. This concentration was below the maximum background concentration (6.2 mg/kg). Therefore, the extent of copper is defined.
- Fluoride was detected in all samples at all sample locations. Fluoride is naturally occurring, and the concentrations detected (0.603–3.41 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil BV at location 16-608657. Concentrations decreased with depth and downgradient. Therefore, the extent of lead is defined.
- Mercury was detected above the soil BV at location 16-608661. Concentrations decreased with depth but increased downgradient. Therefore, the lateral extent of mercury is not defined.
- Nitrate was detected at locations 16-608656, 16-608658, 16-608659, and 16-608661. Nitrate is naturally occurring, and the concentrations detected (1.26–3.52 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.

- Perchlorate was detected at locations 16-608656 and 16-608658. At both locations, concentrations decreased with depth and downgradient. Therefore, the extent of perchlorate is defined.

7.11.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 13-002 is shown in Figure 7.11-3; the analytical results are presented in Table 7.11-3.

- Acenaphthene was detected above the soil EQL at location 16-608656. Concentrations decreased with depth at both locations and downgradient to below the EQL. Therefore, the extent of acenaphthene is defined.
- Acetone was detected at locations 16-608657 and 16-608662. Concentrations decreased with depth and downgradient. Therefore, the extent of acetone is defined.
- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were all detected at one to two locations. Concentrations decreased with depth at all locations and decreased downgradient. Therefore, the extent of these organic chemicals is defined.
- Methylene chloride, toluene, and 1,1,1-trichloroethane were detected at two to four locations. Concentrations decreased with depth at all locations. Concentrations decreased or did not change downgradient. The extent of these organic chemicals is defined.
- Trichloroethene was detected at locations 16-608659, 16-608661, and 16-608662. Concentrations decreased with depth at all locations. Therefore, the vertical extent of trichloroethene is defined. Concentrations increased downgradient at location 16-608661. Therefore, the lateral extent of trichloroethene is not defined.

7.11.5.3 Radionuclides

No radionuclides were detected or detected above BVs/FVs.

7.11.5.4 Summary of Extent

The vertical extent of all inorganic chemicals, except barium and chromium, is defined. The lateral extent of all inorganic chemicals, except chromium and mercury, is defined. The lateral extent of all organic chemicals, except trichloroethene, is defined, and the vertical extent of all organic chemicals is defined. No radionuclides were detected or detected above the BVs/FVs. Therefore, the overall extent of contamination at SWMU 13-002 is not defined.

7.11.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 13-002.

7.11.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 13-002.

7.12 SWMU 16-029(h)—Outfall and Drainlines

7.12.1 Site Description and Operational History

SWMU 16-029(h) consists of the outfall and two inactive drainlines (one known and one alleged) from the HE sump [AOC 16-003(p)] located on the south side of former building 16-478 (Figure 7.12-1). The known drainline exits the southeast corner of the sump and extends 80 ft east of the sump to the rim of Cañon de Valle. This drainline discharged directly into Cañon de Valle before the drainline was plugged in 1987. A second drainline is alleged to be present. The second drainline is reportedly a French drain that extends south of the sump. Former building 16-478 was used as a bunker, utility room, control room, and high-speed machining room for tests on experimental HE. When the building was removed in 2005, the sump was left in place. During the investigation activities conducted in 2009–2010, no evidence of the French drain was found.

It should be noted that SWMU 16-029(h) was identified as an HE sump in the 1990 SWMU Report (LANL 1990, 007512). The SWMU Report identified this sump twice: once as an inactive HE sump designated as SWMU 16-029(h) and also as an active HE sump designated as AOC 16-003(p). Addendum 2 to the Operable Unit 1082 Work Plan (LANL 1995, 057225) redefined SWMU 16-029(h) to be the drainlines and outfall associated with the sump adjacent to former building 16-478.

7.12.2 Summary of Previous Investigations

Between 1970 and 1986, sampling investigations were conducted in association with the NPDES permit. Samples were collected from 0.0–10.0 ft bgs near a berm and culvert from the sump effluent outlet of former building 16-478. Samples collected near the former building 16-478 culvert (<4 in. bgs) contained RDX and HMX. Samples collected at the outfall contained HE contamination (Baytos 1970, 058911; Baytos 1975, 034568; Baytos 1985, 058910; Baytos 1986, 005834). Data from the NPDES investigation samples are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

7.12.3 Field-Screening Results

A total of 36 samples, collected at 17 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX was detected at 12 ppm in sample RE16-10-1544 at location 16-608714. Review of the XRF results indicates that process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Four additional step-out samples (RE16-10-1514 and RE16-10-13141 through RE16-10-13143) were collected below the original sample at location 16-608714 and at three depths at location 16-611541 to determine the extent of RDX contamination (Appendix C, section C-7.2.5).

7.12.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-029(h) are shown in Figure 7.12-1. Table 7.12-1 summarizes the samples collected and analyses requested.

7.12.4.1 Inorganic Chemicals

Twelve soil, 6 fill, and 18 tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the 36 samples was analyzed for TAL metals, perchlorate, and anions. Table 7.12-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown on Plate 8. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.12.4.2 Organic Chemicals

Twelve soil, 6 fill, and 18 tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the 36 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 7.12-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown on Plate 9. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.12.4.3 Radionuclides

Twelve soil, 6 fill, and 18 tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 36 samples was analyzed for gamma-emitting radionuclides, americium-241, isotopic plutonium, and isotopic uranium. Table 7.12-4 lists the radionuclides detected or detected above BVs/FVs. Radionuclide concentrations detected or detected above BVs/FVs are shown in Figure 7.12-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.12.5 Spatial Distribution

Thirty-six samples were collected from 17 locations (Figure 7.12-1). Surface and subsurface samples were collected within the vicinity of the inactive drainlines and outfall. Seventeen surface samples were collected at an interval of 0.0–0.5 ft bgs, and 21 subsurface samples were collected at the following depth intervals: three samples at 3.0–3.5 ft bgs, one sample at 4.0–4.5 ft bgs, 15 samples at 5.5–6.0 ft bgs, and two samples at 9.0–9.5 ft bgs (Appendix C, section C-7.2.5).

The extent of contamination at SWMU 16-029(h) is evaluated in the following sections.

7.12.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-029(h) is shown on Plate 8. Analytical results are presented in Table 7.12-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608703 and 16-608708. Concentrations increased with depth at both locations. Therefore, the vertical extent of aluminum is not defined. Aluminum was not detected above the BV in the remaining samples, including the farthest downgradient locations (16-608713 and 16-608701). Therefore, the lateral extent of aluminum is defined.
- Antimony was detected above the soil BV at location 16-608704 and decreased with depth. Antimony was also detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608712. Antimony was not detected in the surface interval (0.0–0.5 ft bgs) at location 16-608712. Therefore, the vertical extent of antimony is not defined. Antimony was not detected above BVs at the farthest downgradient locations (16-608713 and 16-608701). Therefore, the lateral extent of antimony is defined.

- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at five locations. Concentrations decreased downgradient at locations 16-608713 and 16-608701. Therefore, the lateral extent of arsenic is defined. Arsenic concentrations increased with depth at these locations except for location 16-608705. Therefore, the vertical extent of arsenic is not defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Because concentrations decreased downgradient of locations 16-608703 and 16-611541, the lateral extent of barium is defined. Concentrations of barium increased with depth except at location 16-611541. Therefore, the vertical extent of barium is not defined.
- Cadmium and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of cadmium and selenium is defined.
- Calcium was detected above the soil BV at locations 16-608715 and 16-608704. Calcium was not detected above BVs at the farthest downgradient sample locations (16-608713 and 16-608701) or in subsurface samples at locations 16-608715 and 16-608704. Therefore, the extent of calcium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608712. Chromium was not detected above BVs in the surface at this location. Therefore, the vertical extent of chromium is not defined. Location 16-608712 is one of the farthest downgradient locations. Because chromium was not detected above BVs at upgradient locations 16-608715 and 16-608703, the lateral extent of chromium is not defined.
- Cobalt and manganese were detected above the soil BVs at location 16-608702. These inorganic chemicals were not detected above BVs in the remaining samples collected at SWMU 16-029(h), including the subsurface sample at location 16-608702 and at the farthest downgradient locations (16-608713 and 16-608701). Therefore, the extent of cobalt and manganese is defined.
- Copper was detected above the soil BV at six locations. Concentrations decreased with depth at all locations. Copper was detected above the soil BV at locations along or near the tributary running through the southern portion of SWMU 16-029(h) (locations 16-608704, 16-608706, 16-608709, 16-608711, and 16-608713). Concentrations decreased downgradient from location 16-608711 to location 16-608713. Therefore, the lateral extent of copper is defined. Copper was also detected above the Qbt 2, Qbt 3, and Qbt 4 BV in the subsurface at location 16-608712. Because concentrations increased with depth at this location, the vertical extent of copper is not defined.
- Fluoride was detected at location 16-608703. Fluoride is naturally occurring, and the concentrations detected (1.05–23.9 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Iron was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608703. Iron was not detected above BVs in the remaining samples collected at this site. Because concentrations increased with depth at this location, the vertical extent of iron is not defined. Iron was not detected above BVs at the farthest downgradient locations (16-608713 and 16-608701). Therefore, the lateral extent of iron is defined.
- Lead was detected above the soil BV at eight locations. Lead concentrations decreased downgradient at location 16-608713 but increased downgradient at location 16-608701. Therefore, the lateral extent of lead to the east is not defined. Lead was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608703 and 16-608707. Concentrations at these two locations were below the maximum background concentrations (15.5 mg/kg). Therefore, the vertical extent of lead is defined.

- Mercury was detected above the soil BV at three locations. Concentrations decreased downgradient from these locations, and mercury was not detected above the BV in the subsurface. Therefore, the extent of mercury is defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608708 and 16-608701. Nickel was not detected above the BV in the surface sample at each of these locations. The concentration at location 16-608701 was below the maximum background concentration (7 mg/kg). Concentrations increased with depth at location 16-608708. The vertical extent is not defined. Concentrations decreased down the south drainage. Location 16-608701 is one of the farthest downgradient locations to the south. Therefore, the lateral extent of nickel is defined.
- Nitrate was detected in 11 surface samples collected at SWMU 16-029(h). Nitrate is naturally occurring, and the concentrations detected (1.37–8.85 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected at these locations. Concentrations are below the EQL. Therefore, the extent of perchlorate is defined.
- Silver was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608703. This concentration is below the maximum background concentration (1.9 mg/kg). Therefore, the vertical extent of silver is defined. Concentrations of silver decreased down the south drainage. Therefore, the lateral extent of silver is defined.
- Thallium was detected above the soil BV at location 16-608705. Thallium was not detected above BVs in the remaining samples from SWMU 16-029(h), which includes all subsurface samples and the samples collected at the farthest downgradient location (16-608713). Therefore, the extent of thallium is defined.
- Zinc was detected above the soil BV at locations 16-608704, 16-608711, and 16-608715. Concentrations decreased with depth at all locations. Zinc was not detected above BVs in any subsurface or down the south drainage. Therefore, the extent of zinc is defined.

7.12.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-029(h) is shown on Plate 9. Analytical results are presented in Table 7.12-3.

- Acenaphthene was detected at location 16-608707. Acenaphthene was not detected in the subsurface sample at this location. Therefore, the vertical extent of acenaphthene is defined. Because acenaphthene was not detected at the farthest downgradient locations (16-608713 and 16-608701), the lateral extent is also defined.
- Acetone was detected at locations 16-608703, 16-608714, and 16-611541. Concentrations were below the EQL at locations 16-608714 and 16-611541. Because acetone concentrations increased with depth at location 16-608703, the vertical extent is not defined. Acetone was not detected at the farthest downgradient locations (16-608713 and 16-608701). Therefore, the lateral extent of acetone is defined.
- Benzo(a)anthracene was detected in surface samples at locations 16-608704, 16-608709, 16-608710, 16-608711, and 16-608713, and in the subsurface sample at location 16-608715. Concentrations decreased with depth at all five locations, decreased downgradient, and were below the EQL. Therefore, the extent of benzo(a)anthracene is defined.

- Benzo(a)pyrene, chrysene, and phenanthrene were detected in surface samples at locations 16-608700, 16-608701, 16-608704, 16-608705, 16-608709, 16-608710, 16-608711, and 16-608713. Phenanthrene was also detected in the surface sample at location 16-608712. All concentrations decreased with depth and are below the EQL. Therefore, the extent of benzo(a)pyrene, chrysene, and phenanthrene is defined.
- Benzo(b)fluoranthene was detected in surface samples at locations 16-608700, 16-608701, 16-608704, 16-608709, 16-608710, 16-608713, and 16-608715. All concentrations decreased with depth and are below the EQL. Therefore, the extent of benzo(b)fluoranthene is defined.
- Benzo(g,h,i)perylene was detected in surface samples at locations 16-608701, 16-608704, and 16-608705. All concentrations decreased with depth and are below the EQL. Therefore, the extent of benzo(g,h,i)perylene is defined.
- Benzo(k)fluoranthene was detected in surface samples at locations 16-608701, 16-608704, 16-608710, and 16-608713. Concentrations decreased with depth and are below the EQL. Therefore, the extent of benzo(k)fluoranthene is defined.
- Benzoic acid was detected in the subsurface sample at location 16-608702 and in the surface samples at locations 16-608710 and 16-608712. Concentrations decreased with depth and are below the EQL. Therefore, the extent of benzoic acid is defined.
- Bis(2-ethylhexyl)phthalate was detected in the subsurface sample at location 16-608714 and in the surface sample at location 16-608715. Concentrations decreased with depth and are below the EQL. Therefore, the extent of bis(2-ethylhexl)phthalate is defined.
- 2-Butanone was detected in the tuff sample (5.5–6.0 ft bgs) at location 16-608703. The concentration was above the EQL. There were no other detections of 2-butanone. The vertical extent of 2-butanone is not defined, but the lateral extent is defined.
- Di-n-butylphthalate and indeno(1,2,3-cd)pyrene were detected in surface samples at locations 16-608704 and 16-608705, and indeno(1,2,3-cd)pyrene was detected in the surface sample at location 16-608709. Concentrations decreased with depth and were below their respective EQLs. Therefore, the extent of di-n-buylphthalate and indeno(1,2,3-cd)pyrene is defined.
- Fluoranthene and pyrene were detected in 11 surface samples. All concentrations decreased with depth and were below the EQLs. Therefore, the extent of fluoranthene and pyrene is defined.
- HMX and RDX were detected at locations 16-608703 and 16-608714. Concentrations decreased with depth at location 16-608714. Concentrations were below EQLs at location 16-608703. Locations 16-608714 and 16-608703 are two of the locations closest to building 16-478. HMX and RDX were not detected at downgradient locations 16-608713 and 16-608701. Therefore, the extent of HMX and RDX is defined.
- 4-Isopropyltoluene, 1,2,4-trimethylbenzene, and tris(o-cresyl)phosphate were each detected in a surface sample. Concentrations decreased with depth and were below their respective EQLs. Therefore, the extent of 4-isopropyltoluene, 1,2,4-trimethylbenzene, and tris(o-cresyl)phosphate is defined.
- Methylene chloride was detected in subsurface samples at locations 16-608705, 16-608707, 16-608708, and 16-608713. Methylene chloride was also detected in surface samples at locations 16-608700, 16-608704, and 16-608714. All concentrations are below the EQLs. Therefore, the extent of methylene chloride is defined.
- TATB was detected at location 16-608715, which is nearest building 16-478, and two other locations. Concentrations decreased with depth at all locations. TATB was also detected in the

subsurface sample at location 16-608714. Concentrations decreased with depth and were below the EQL. TATB was not detected at the farthest downgradient locations (16-608713 and 16 608701). Therefore, the extent of TATB is defined.

7.12.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-029(h) is shown in Figure 7.12-2. Analytical results are presented in Table 7.12-4.

- Americium-241 was detected above the soil FV at locations 16-608711, 16-608712, and 16-608713. These are three of the farthest downgradient locations and are near the tributary running through the southern portion of SWMU 16-029(h). Because activities were not detected at upgradient locations 16-608715 and 16-608703, the lateral extent of americium-241 is not defined. Americium-241 was not detected in any subsurface samples at SWMU 16-029(h). Therefore, the vertical extent of americium-241 is defined.
- Cesium-137 was detected in the subsurface tuff at location 16-608710. Cesium-137 was not detected at the farthest downgradient locations (16-608712 and 16-608713). Therefore, the lateral extent of cesium-137 is defined. Because it was not detected in the surface sample at location 16-608710, the vertical extent of cesium-137 is not defined.
- Plutonium-239/240 was detected above the soil FV at location 16-608710. Plutonium-239/240 was not detected at the subsurface at this location or at the farthest downgradient locations (16-608712 and 16-608713). Therefore, the extent of plutonium-239/240 is defined.

7.12.5.4 Summary of Extent

The lateral extent of all organic chemicals is defined, and the vertical extent of all organic chemicals, except acetone and 2-butanone, is defined. The lateral extent of all inorganic chemicals, except chromium and lead, is defined. The vertical extent of all inorganic chemicals, except aluminum, antimony, arsenic, barium, chromium, copper, iron, and nickel, is defined. The lateral extent of americium-241 is not defined, and the vertical extent of cesium-137 is not defined. Therefore, the overall extent is not defined for SWMU 16-029(h).

7.12.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-029(h).

7.12.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-029(h).

7.13 AOC 16-003(p)—Sump

7.13.1 Site Description and Operational History

AOC 16-003(p) is an inactive HE sump located on the south side of the footprint of former building 16-478 (Figure 7.13-1). The outlet drainline of the sump was plugged in 1987. Prior to its removal in 2005, building 16-478 was used as a bunker, utility room, control room, and high-speed machining room for

tests on experimental HE. During the investigation activities conducted during the 2009–2010 field investigation, the sump was found to be filled with water.

7.13.2 Summary of Previous Investigations

Between 1970 and 1986, sampling investigations were conducted in association with the NPDES permit. Samples were collected from 0.0 to 10.0 ft bgs near a berm and culvert from the sump effluent outlet of former building 16-478. Samples collected near the former building 16-478 culvert (<4 in. bgs) contained RDX and HMX. Samples collected at the outfall contained HE contamination (Baytos 1970, 058911; Baytos 1975, 034568; Baytos 1985, 058910; Baytos 1986, 005834). Data from the NPDES investigation samples are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

7.13.3 Field-Screening Results

Six samples and two duplicate samples, collected at three locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for metals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3) except for barium, which was measured at 1051.91 ppm in duplicate sample RE16-10-1144 at location 16-608666. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Two additional step-out samples (RE16-10-15355 and RE16-10-15356) were collected at location 16-611909 (Appendix C, section C-7.2.6).

7.13.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for AOC 16-003(p) are shown in Figure 7.13-1. Table 7.13-1 summarizes the samples collected and analyses requested.

7.13.4.1 Inorganic Chemicals

One tuff (Qbt 4) and seven fill samples were collected and analyzed for inorganic chemicals. Each of the eight samples was analyzed for TAL metals, anions, and perchlorate. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.13-2. Table 7.13-2 lists the inorganic chemicals above the BV. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.13.4.2 Organic Chemicals

One tuff (Qbt 4) and seven fill samples were collected and analyzed for organic chemicals. Each of the eight samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 7.13-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 7.13-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.13.4.3 Radionuclides

One tuff (Qbt 4) and seven fill samples were collected and analyzed for radionuclides. Each of the eight samples was analyzed for gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and americium-241. Table 7.13-4 lists the radionuclides detected or detected above BVs/FVs. Radionuclides detected or detected above BVs/FVs are shown in Figure 7.13-4. Because the extent of contamination is not determined for this site, COPCs have not been identified.

7.13.5 Spatial Distribution

Eight samples were collected from four sample locations (Figure 7.13-1). Samples were collected from two depths at each sample location from 0.0–0.5 and 5.5–6.0 ft bgs.

SWMU 16-029(h) contains the drainlines and outfalls for this area and will be used to help define lateral extent on the edge of AOC 16-003(p) wherever possible. SWMU 16-029(h) is presented in section 7.12. The locations sampled for SWMU 16-029(h) are shown in Figure 7.12-1. Table 7.12-1 summarizes the samples collected and analyses requested. Table 7.12-2 lists the inorganic chemicals above BVs, and detected concentrations of inorganic chemicals above BVs are shown in Plate 8 for SWMU 16-029(h). Table 7.12-3 lists the organic chemicals detected, and detected concentrations of organic chemicals are shown in Plate 9 for SWMU 16-029(h).

The extent of contamination at AOC 16-003(p) is evaluated in the following sections.

7.13.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC 16-003(p) is shown in Figure 7.13-2. The analytical results are presented in Table 7.13-2.

- Cadmium and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of cadmium and selenium is defined.
- Fluoride was detected in both surface (0.0–0.5 ft bgs) and subsurface (5.5–6.0 ft bgs) samples at locations 16-608666, 16-608667, 16-608668, and 16-611909. Fluoride is naturally occurring, and the concentrations detected (0.47–12.1 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Antimony was detected above the soil BV at location 16-608666. Concentrations decreased with depth. Antimony was not detected above BVs to the east and the west at locations 16-608667 and 16-611909, respectively. Therefore, the extent of antimony is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608667. Concentrations increased with depth. Barium was not detected above the BV at location 16-608715 in SWMU 16-029(h), the closest sample location to the south. Therefore, the vertical extent of barium is not defined, and the lateral extent is defined.
- Calcium was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs in three locations. Concentrations decreased with depth at each location. Concentrations decreased laterally above the drainages from the sump. Therefore, the extent of calcium is defined.
- Chromium was detected above the soil BV at location 16-608667. Concentrations decreased with depth and laterally. Therefore, the extent of chromium is defined.

- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608667. Concentrations increased with depth. Cobalt was not detected above the BV in the sample location to the east (location 16-608714) in SWMU 16-029(h). Therefore, the vertical extent of cobalt is not defined, and the lateral extent is defined.
- Copper was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-608667. Concentrations decreased with depth. Copper was not detected above the BV in the sample location to the east (location 16-608714) in SWMU 16-029(h). Therefore, the extent of copper is defined.
- Lead was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in four locations. Concentrations decreased with depth at each location. Concentrations decreased laterally from location 16-608666. Therefore, the extent of lead is defined.
- Manganese was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608667. Concentrations were below maximum background concentrations (752 mg/kg). Concentrations decreased laterally and down the drainages at SWMU 16-029(h). Therefore, the extent of manganese is defined.
- Nickel was detected above the soil BV at locations 16-608667 and 16-611909. Concentrations decreased with depth but increased toward location 16-611909 at the western AOC boundary. Concentrations decreased down the drainages at SWMU 16-029(h). Therefore, the vertical extent of nickel is defined, and the lateral extent is not defined.
- Nitrate was detected at locations 16-608666, 16-608667, and 16-611909. Nitrate is naturally occurring, and the concentrations detected (0.9–2.0 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected at location 16-608667. Concentrations decreased with depth and decreased laterally and down the drainages at SWMU 16-029(h). Therefore, the extent of perchlorate is defined.
- Zinc was detected above the soil BV at locations 16-608666 and 16-608667. Concentrations decreased with depth. Concentrations decreased toward location 16-611909 at the western AOC boundary and down the drainages at SWMU 16-029(h). Therefore, the extent of zinc is defined.

7.13.5.2 Organic Chemicals

The distribution of organic chemicals at AOC 16-003(p) is shown in Figure 7.13-3. The analytical results are presented in Table 7.13-3.

- Acetone was detected at locations 16-608666, 16-608667, and 16-611909. Concentrations increased with depth at location 16-611909 and decreased with depth at the other two locations. Concentrations increased toward location 16-611909 at the western AOC boundary but decreased down the drainages at SWMU 16-029(h). Therefore, the extent of acetone is not defined.
- Bis(2-ethylhexyl)phthalate was detected at locations 16-608666 and 16-608667. Concentrations decreased with depth and decreased laterally and down the drainages at SWMU 16-029(h). Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- 2-Butanone was detected at locations 16-608666, 16-608667, and 16-611909. Concentrations decreased with depth at location 16-608667 and were below the EQL at location 16-608666. Concentrations increased with depth at location 16-611909. Concentrations decreased down the

drainages at SWMU 16-029(h) at location 16-608667. Therefore, the extent of 2-butanone is not defined.

- Butylbenzylphthalate was detected at location 16-608667. Concentrations decreased with depth and decreased laterally and down the drainages at SWMU 16-029(h). Therefore, the extent of butylbenzylphthalate is defined.
- HMX was detected at locations 16-608666 and 16-608667. Concentrations decreased with depth at location 16-608666 and increased with depth at location 16-608667. HMX decreased laterally and down the drainages at SWMU 16-029(h). Therefore, the lateral extent of HMX is defined, but the vertical extent is not defined.
- 4-Isopropyltoluene was detected at location 16-611909 at a concentration below the EQL. Therefore, the extent of 4-isopropyltoluene is defined.
- 4-Methyl-2-pentanone was detected at location 16-608667. The concentration decreased with depth and was below the EQL. Therefore, the extent of 4-methyl-2-pentanone is defined.
- RDX was detected at location 16-608667. The concentrations increased with depth and decreased laterally and down the drainages at SWMU 16-029(h). Therefore, the lateral extent of RDX is defined, but the vertical extent is not defined.
- TATB was detected at locations 16-608666 and 16-608667. Concentrations decreased with depth and decreased laterally and down the drainages at SWMU 16-029(h). Therefore, the extent of TATB is defined.

7.13.5.3 Radionuclides

The distribution of radionuclides at AOC 16-003(p) is shown in Figure 7.13-4. The analytical results are presented in Table 7.13-4.

- Cesium-137 was detected in the subsurface fill sample at location 16-611909. Because it is fill material, the FV applies and concentrations were less than the soil BV. Therefore, the extent of cesium-137 is defined.
- Plutonium-239/240 was detected at location 16-608668. Concentrations decreased with depth and decreased down the drainage at SWMU 16-029(h). Therefore, the extent of plutonium-239/240 is defined.

7.13.5.4 Summary of Extent

The vertical extent of barium, cobalt, acetone, 2-butanone, HMX, and RDX is not defined. The lateral extent of nickel, acetone, and 2-butanone is not defined. Therefore, the overall extent of contamination at AOC 16-003(p) is not defined.

7.13.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for AOC 16-003(p).

7.13.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for AOC 16-003(p).

7.14 SWMU 13-004—Burning Pits

7.14.1 Site Description and Operational History

SWMU 13-004 consists of an unknown number of burning pits located at former TA-13 (Plate 3). The pit locations are also unknown. The pits are not depicted on engineering drawings of former TA-13 or in aerial photographs dated 1948. Constructed in 1944, former TA-13 was a small area, occupying about 12 acres. In 1951, the TA-16-340 Complex was constructed over the western and central portions of former TA-13, disturbing three-quarters of the TA. This area was further disturbed when the TA-16-340 Complex was removed during D&D activities in 2005. The undisturbed eastern portion of former TA-13 extended approximately 360 ft to the east of former building 16-340.

7.14.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 13-004.

7.14.3 Field-Screening Results

SWMU 13-004 sample locations were incorporated into SWMU 13-001 (section 7.10). Review of the screening data from the 76 locations of the SWMU 13-001 bullseye grid identified no pattern of release that indicated the location of a burning pit had been found. Because of this, no biased samples were collected.

See field-screening results for SWMU 13-001 (section 7.10.3).

7.14.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

Although the exact pit locations are unknown, it is known that the pits were within the boundaries of former TA-13. The only undisturbed portion of TA-13 is the eastern portion of the TA, which lies completely within the grid sampling conducted for SWMU 13-001. The nature and extent for SWMU 13-004 are addressed in sections 7.10.4 through 7.10.5 with the SWMU 13-001 bullseye grid sampling discussion.

7.15 SWMU 16-004(a)—Imhoff Tank

7.15.1 Site Description and Operational History

SWMU 16-004(a) is the inactive Imhoff tank (structure 16-530) that was used for sewage treatment at the TA-16 sanitary WWTP (Figure 7.15-1). Located southeast of the former TA-16-340 Complex and north of the communitor (a cutting device for sewage solids), the Imhoff tank received effluent that flowed over a weir into a dosing siphon. Any sludge that may have collected in the tank was digested before being discharged to drying beds [SWMUs 16-004(d) and 16-004(f)] (LANL 1993, 020948, p. 5-134).

7.15.2 Summary of Previous Investigations

The TA-16 WWTP was monitored routinely, though it is unknown whether hazardous releases occurred from the WWTP structures (LANL 1990, 007512). The NPDES-permitted outfall (EPA-SSS03S) was monitored for inorganic chemicals, organic chemicals, and pesticides. Effluent was monitored bimonthly for radionuclides and standard parameters for wastewater systems (e.g., biological oxygen demand, chemical oxygen demand, and total dissolved solids). Sludge and soil samples from the drying beds were also tested periodically. In 1988, cesium-137 was detected in three sludge samples that were screened for gamma radiation, and analytical results from the soil indicated the presence of cesium-137, plutonium-238, plutonium-239, and plutonium-240 in all three samples (DOE 1989, 015364, p. 4.10-15). Historical analytical data also indicated the presence of beryllium above the BV. Data from the NPDES monitoring, and from the historical sludge and soil samples, are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

7.15.3 Field-Screening Results

A total of eight samples, collected at four locations, were field screened on-site for headspace organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments. Step-out sample decisions were based on review of the RDX and XRF screening results, because they measure the principal contaminants likely to be found at SWMU 16-004(a).

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (see Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.15.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-004(a) are shown in Figure 7.15-1. Table 7.15-1 summarizes the samples collected and analyses requested for each sample.

7.15.4.1 Inorganic Chemicals

Eight tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. All were analyzed for TAL metals, anions, total cyanide, and perchlorate. Table 7.15-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.15-2. The nature and extent of inorganic contamination are defined at SWMU 16-004(a).

Antimony, nickel, and selenium were identified as COPCs in tuff at SWMU 16-004(a).

- Antimony was not detected above the Qbt 2, Qbt 3, and Qbt 4 BV (0.5 mg/kg), but had detection limits (0.65–1.17 mg/kg) above the BV in seven tuff samples. Antimony is identified as a COPC in tuff.

- Barium was detected above Qbt 2, Qbt 3, and Qbt 4 BV (46 mg/kg) in two samples with a maximum concentration of 48.6 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration was below the maximum background concentration (51.6 mg/kg). Barium is not identified as a COPC in tuff.
- Beryllium was detected above Qbt 2, Qbt 3, and Qbt 4 BV (1.21 mg/kg) in one sample with a maximum concentration of 1.41 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration was below the maximum background concentration (1.8 mg/kg). Beryllium is not identified as a COPC in tuff.
- Fluoride was detected at all locations. Fluoride is naturally occurring and the concentrations detected (0.955–1.53 mg/kg) likely reflect naturally occurring concentrations, Therefore, fluoride is not identified as a COPC.
- Nickel was detected above Qbt 2, Qbt 3, and Qbt 4 BV (6.58 mg/kg) in one sample with a maximum concentration of 8.07 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration was above the maximum background concentration (7 mg/kg). Nickel is identified as a COPC in tuff.
- Nitrate was detected at two locations. Nitrate is naturally occurring and the concentrations detected (1.26–1.71 mg/kg) likely reflect naturally occurring concentrations. Therefore, nitrate is not identified as a COPC.
- Selenium was not detected above the Qbt 2, Qbt 3, and Qbt 4 BV (0.3 mg/kg), but had detection limits (1.07–1.18 mg/kg) above the BV in eight tuff samples. Selenium is identified as a COPC in tuff.

7.15.4.2 Organic Chemicals

Eight tuff (Qbt 4) samples were collected and analyzed for organic chemicals. The samples were all tested for VOCs, SVOCs, and explosive compounds. Table 7.15-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 7.15-3.

Methylene chloride was detected in tuff and is identified as a COPC.

7.15.4.3 Radionuclides

Eight tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of these samples was analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. Radionuclide COPCs are not presented in this section, because the extent of contamination is not determined for this site. There were no radionuclides detected or detected above BVs/FVs. No radionuclides were retained as COPCs at SWMU 16-004(a).

7.15.5 Spatial Distribution of COPCs

Because the direction of potential contaminant migration is into the subsurface below the Imhoff tank, four boreholes were drilled surrounding the structure. Samples were collected at two depths between 20.0 and 30.0 ft bgs at each borehole. Because of the presence of underground utilities in the area of the tank, borehole locations were adjusted. The borehole to the southeast of the tank was moved out approximately 30.0 ft to the south. As a result, the lateral extent is defined by the borehole locations.

Because of the presence of the structure, the original five location points proposed, after communication with NMED, were changed to four location points (Appendix C, section C-7.2.7). One proposed location in

the center of and beneath the existing structure was not sampled because the location was not accessible. Two samples had been planned from this location.

7.15.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-004(a) is shown in Figure 7.15-2; the analytical results are presented in Table 7.15-2. Because there are less than 10 samples per medium sampled, comparison to the maximum background concentration is appropriate to determine whether an inorganic chemical is different from background.

- Antimony and selenium were not detected above the Qbt 2, Qbt 3, and Qbt 4 BV but had detection limits above the BV. Therefore, the extent of antimony and selenium is defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608675. This concentration decreased with depth. Therefore, the extent of nickel is defined.

7.15.5.2 Organic Chemicals

The distribution of organic COPCs at SWMU 16-004(a) is shown in Figure 7.15-3; the analytical results are presented in Table 7.15-3.

- Methylene chloride was at detected at location 16-608675. Therefore, the extent of methylene chloride is defined.

7.15.5.3 Radionuclides

No radionuclides were detected or detected above their BVs/FVs at any SWMU 16-004(a) sample location.

7.15.5.4 Summary of Extent

The vertical extent is defined for all COPCs. No radionuclides were detected. Therefore, the overall extent of contamination at SWMU 16-004(a) is defined.

7.15.6 Summary of Human Health Risk Assessment Results

The potential contamination at SWMU 16-004(a) is associated with samples collected at greater than 20 ft bgs. Therefore, no complete pathways to human receptors are present at this site, and a human health risk evaluation was not conducted for SWMU 16-004(a).

7.15.7 Summary of Ecological Risk Assessment Results

The potential contamination at SWMU 16-004(a) is associated with samples collected at greater than 20 ft bgs. Therefore, no complete exposure pathways to ecological receptors are present at this site, and an ecological risk evaluation was not conducted for SWMU 16-004(a).

7.16 SWMU 16-004(b)—Trickling Filter

7.16.1 Site Description and Operational History

SWMU 16-004(b) is the inactive trickling filter (structure 16-531) used for sewage treatment at the TA-16 sanitary WWTP (Figure 7.16-1). The trickling filter is located east of the Imhoff tank. The filter received effluent from a dosing siphon and digested organic waste via microorganisms that coated the pebble bed. At full capacity, the trickling filter could manage 100,000 gal./d (LANL 1993, 020948, p. 5-133).

7.16.2 Summary of Previous Investigations

The formerly NPDES-permitted outfall (EPA-SSS03S) for the WWTP was monitored for inorganic chemicals, organic chemicals, and pesticides. Effluent was monitored bimonthly for radionuclides and standard parameters for wastewater systems (e.g., biological oxygen demand, chemical oxygen demand, and total dissolved solids). Sludge and soil samples from the drying beds were also tested periodically. In 1988, cesium-137 was detected in sludge samples, and cesium-137, plutonium-238, plutonium-239, and plutonium-240 were detected in three soil samples (DOE 1989, 015364, p. 4.10-15). Historical analytical data also indicate the presence of beryllium above the BV. Data from the NPDES monitoring, and from the historical sludge and soil samples, are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

7.16.3 Field-Screening Results

Eight samples, collected at four locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.16.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-004(b) are shown in Figure 7.16-1. Table 7.16-1 summarizes the samples collected and analyses requested.

7.16.4.1 Inorganic Chemicals

Eight tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. The samples were analyzed for TAL metals, perchlorate, total cyanide, and anions. Table 7.16-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.16-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.16.4.2 Organic Chemicals

Eight tuff (Qbt 4) samples were collected and analyzed for organic chemicals. The samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 7.16-3 presents the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 7.16-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.16.4.3 Radionuclides

Eight tuff (Qbt 4) samples were collected and analyzed for radionuclides. The samples were analyzed for gamma-emitting radionuclides, americium-241, isotopic plutonium, and isotopic uranium. Table 7.16-4 presents the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 7.16-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.16.5 Spatial Distribution

Because the direction of potential contaminant migration is into the subsurface below the Imhoff tank, four boreholes were drilled surrounding the structure. Samples were collected at two depths between 20.0 and 30.0 ft bgs at each borehole. Because of the presence of underground utilities in the area of the tank, borehole locations were adjusted. The borehole to the southeast of the tank was moved out approximately 30.0 ft to the south. As a result, the lateral extent is also considered in relation to the distance from the tank.

Because of the presence of the structure, the original five location points proposed, after communication with NMED, were changed to four location points (Appendix C, section C-7.2.8). One proposed location in the center of and beneath the existing structure was not sampled because the location was not accessible. Two samples had been planned from this location. Eight samples were collected from four locations (Figure 7.16-1). Samples were collected beneath the inactive trickling filter that received effluent from the dosing siphon chamber. One sample was collected at 20.0–22.0 ft bgs, three samples were collected at 20.0–24.0 ft bgs, and four samples were collected at 28.0–30.0 ft bgs.

The extent of contamination at SWMU 16-004(b) is evaluated in the following sections.

7.16.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-004(b) is shown in Figure 7.16-2. Analytical results are presented in Table 7.16-2.

- Antimony and selenium were not detected above the Qbt 2, Qbt 3, and Qbt 4 BVs but had detection limits above BVs. Therefore, the extent is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608685. The concentration decreased with depth. Therefore, the extent of barium is defined.
- Fluoride and nitrate were detected at three locations. Both fluoride and nitrate are naturally occurring, and the concentrations detected (1.06–3.22 and 1.21–2.04 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.

7.16.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-004(b) is shown in Figure 7.16-3. Analytical results are presented in Table 7.16-3.

- Benzoic acid was detected at location 16-608686. Concentrations decreased with depth. Therefore, the extent of benzoic acid is defined.
- Bis(2-ethylhexyl)phthalate was detected at location 16-608684. Concentrations decreased with depth and were below the EQL. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- Methylene chloride was detected at location 16-608687. Methylene chloride was not detected in the deeper depth at this location. Therefore, the extent of methylene chloride is defined.

7.16.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-004(b) is shown in Figure 7.16-4. Analytical results are presented in Table 7.16-4.

- Uranium-235/236 was detected at locations 16-608687 and 16-608685 above the Qbt 2, Qbt 3, and Qbt 4 BV. Concentrations increased with depth at both locations. The extent of uranium-235/236 is not defined.

7.16.5.4 Summary of Extent

The extent of all inorganic chemicals and organic chemicals is defined. The extent of uranium-235/236 is not defined. Therefore, the extent is not defined for SWMU 16-004(b).

7.16.6 Summary of Human Health Risk Assessment Results

Because the extent of contamination is not defined, human health risk was not evaluated for SWMU 16-004(b).

7.16.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-004(b).

7.17 SWMU 16-004(c)—Tank

7.17.1 Site Description and Operational History

SWMU 16-004(c) is the inactive clarifier or final tank (structure 16-532) used for sewage treatment at the TA-16 sanitary WWTP (Figure 7.17-1). The clarifier was located southeast of the trickling filter. The clarifier received discharge from the trickling filter; water flowed through an outlet in the clarifier and discharged to formerly NPDES-permitted outfall EPA-SSS03S and eventually into a tributary of Water Canyon. At full capacity, structure 16-532 could manage 117,600 gal./d (LANL 1993, 020948, p. 5-133).

7.17.2 Summary of Previous Investigations

The formerly NPDES-permitted outfall (EPA-SSS03S) for the WWTP was monitored for inorganic chemicals, organic chemicals, and pesticides. Effluent was monitored bimonthly for radionuclides and standard parameters for wastewater systems (e.g., biological oxygen demand, chemical oxygen demand, and total dissolved solids). Sludge and soil samples from the drying beds were also tested periodically. In 1988, cesium-137 was detected in three sludge samples that were screened for gamma radiation, and analytical results from the soil indicated the presence of cesium-137, plutonium-238, plutonium-239, and plutonium-240 in all three samples (DOE 1989, 015364, p. 4.10-15). Historical analytical data also indicate the presence of beryllium above the BV; however, sludge was regularly removed and disposed of at MDA G (LANL 1993, 020948, pp. 5-135–5-138). Data from the NPDES monitoring, and from the historical sludge and soil samples, are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

7.17.3 Field-Screening Results

Eight samples, collected at four locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.17.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-004(c) are shown in Figure 7.17-1. Table 7.17-1 summarizes the samples collected and analyses requested.

7.17.4.1 Inorganic Chemicals

Eight tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the eight samples was analyzed for TAL metals, total cyanide, anions, and perchlorate. Table 7.17-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.17-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.17.4.2 Organic Chemicals

Eight tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the eight samples was analyzed for VOCs, SVOCs, and explosive compounds. No organic chemicals were detected at this site.

7.17.4.3 Radionuclides

Eight tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the eight samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. Table 7.17-3 presents the radionuclides detected or detected above BVs/FVs. Concentrations of radionuclides detected or detected above BVs/FVs are shown in Figure 7.17-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.17.5 Spatial Distribution

Because the direction of potential contaminant migration is into the subsurface below the Imhoff tank, four boreholes were drilled surrounding the structure. Samples were collected at two depths between 20.0 and 30.0 ft bgs at each borehole. Because of the presence of underground utilities in the area of the tank, borehole locations were adjusted. The borehole to the southeast of the tank was moved out approximately 30.0 ft to the south. As a result, the lateral extent is also considered in relation to the distance from the tank.

Because of the presence of the structure, the original five location points proposed, after communication with NMED, were changed to four location points (Appendix C, section C-7.2.9). One proposed location in the center of and beneath the existing structure was not sampled because the location was not accessible. Two samples had been planned from this location. Eight samples were collected from two depths (20.0–24.0 and 28.0–30.0 ft bgs) at four locations (Figure 7.17-1). The extent of contamination at SWMU 16-004(c) is evaluated in the following sections.

7.17.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-004(c) is shown in Figure 7.17-2. Analytical results are presented in Table 7.17-2.

- Antimony and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and selenium is defined.
- Lead was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608887. Lead concentrations decreased with depth at this location. Therefore, the extent of lead is defined.
- Fluoride was detected at all four locations, and nitrate was detected at one location. Fluoride and nitrate are naturally occurring, and the concentrations detected (0.952–3.35 and 1.42 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.

7.17.5.2 Organic Chemicals

Organic chemicals were not detected at SWMU 16-004(c).

7.17.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-004(c) is shown in Figure 7.17-3. Analytical results are presented in Table 7.17-3.

- Uranium-235/236 was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at three locations. The activity of uranium-235/236 increased with depth at locations 16-608885 and 16-608886, and decreased with depth at location 16-609887. Therefore, the extent of uranium-235/236 is not defined.

7.17.5.4 Summary of Extent

The extent of uranium-235/236 is not defined. Therefore, the extent of contamination at SWMU 16-004(c) is not defined.

7.17.6 Summary of Human Health Risk Assessment Results

Because the extent of contamination is not defined, human health risk was not evaluated for SWMU 16-004(c).

7.17.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-004(c).

7.18 SWMU 16-004(d)—Sludge Drying Bed

7.18.1 Site Description and Operational History

SWMU 16-004(d) is one of two inactive sludge drying beds (structure 16-533) at the TA-16 sanitary WWTP (Figure 7.18-1). This drying bed is located southeast of the former TA-16-340 Complex and southeast of the Imhoff tank. The drying bed received sludge from the Imhoff tank. Sludge was monitored for radioactivity and tritium before being removed for disposal at MDA G (LANL 1993, 020948, p. 5-133).

7.18.2 Summary of Previous Investigations

The formerly NPDES-permitted outfall (EPA-SSS03S) for the WWTP was monitored for inorganic chemicals, organic chemicals, and pesticides. Effluent was monitored bimonthly for radionuclides and standard parameters for wastewater systems (e.g., biological oxygen demand, chemical oxygen demand, and total dissolved solids). Sludge and soil samples from the drying beds were also tested periodically. In 1988, cesium-137 was detected in three sludge samples that were screened for gamma radiation, and analytical results from the soil indicated the presence of cesium-137, plutonium-238, plutonium-239, and plutonium-240 in all three samples (DOE 1989, 015364, p.4.10-15). Historical analytical data also indicate the presence of beryllium above the BV; however, sludge was regularly removed and disposed of at MDA G (LANL 1993, 020948, pp. 5-135–5-138). Data from the NPDES monitoring, and from the historical sludge and soil samples, are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

7.18.3 Field-Screening Results

A total of 10 samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, as defined in the approved work plan (LANL 2007, 102216). XRF screening was performed on all samples collected. Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

7.18.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-004(d) are shown in Figure 7.18-1. Table 7.18-1 summarizes the samples collected and analyses requested.

7.18.4.1 Inorganic Chemicals

Ten tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the 10 samples was analyzed for TAL metals, total cyanide, nitrate, and perchlorate. Table 7.18-2 presents the inorganic chemicals detected above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.18-2. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.18.4.2 Organic Chemicals

Ten tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the 10 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 7.18-3 presents the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 7.18-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.18.4.3 Radionuclides

Ten tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of these 10 samples was analyzed for gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and americium-241. Table 7.18-4 lists the radionuclides detected or detected above BVs/FVs. Radionuclides detected or detected above BVs/FVs are shown in Figure 7.18-4. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.18.5 Spatial Distribution

Ten samples were collected from five locations (Figure 7.18-1). Sample depths were shifted from 3.0 to 4.0 ft bgs in order to sample the environmental media beneath the drying beds. This coincided with the sand/Qbt 4 interface. Two subsurface samples were collected at each location; three samples were collected at 3.0–3.5 ft bgs, one sample was collected at 3.5–4.0 ft bgs, one sample was collected at 4.0–4.5 ft bgs, one sample was collected at 9.0–9.5 ft bgs, and four samples were collected at

9.5–10.0 ft bgs (Appendix C, section C-7.2.10). Because the drying beds would leak to the unsaturated zone beneath them, contaminant migration from the beds is vertical, and the lateral extent is defined by the physical limits of the drying bed.

7.18.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-004(d) is shown in Figure 7.18-2. Inorganic chemicals above BVs and detected with no BVs are presented in Table 7.18-2.

- Antimony was not detected above the BV but had detection limits above the BV. Therefore, the extent of antimony is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608941 and 16-608943. Concentrations increased with depth at both locations. Therefore, the extent of barium is not defined.
- Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608942 and increased with depth. Therefore, the extent of calcium is not defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in the center of the drying bed at location 16-608943. The concentration is below the maximum background concentration (13 mg/kg). Therefore, the extent of chromium is defined.
- Copper and selenium were detected above the Qbt 2, Qbt 3, and Qbt 4 BV near the inlet at locations 16-608941 and 16-608939, respectively. Concentrations decreased with depth. Therefore, the extent of copper and selenium is defined.
- Fluoride was detected in all samples. Fluoride is naturally occurring, and the concentrations detected (1.19–3.36 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Mercury was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608940 and 16-608941. Concentrations decreased with depth. Therefore, the extent of mercury is defined.
- Nitrate was detected at location 16-608939. Nitrate is naturally occurring, and the concentration detected (2.61 mg/kg) likely reflects naturally occurring concentrations. Therefore, the extent of nitrate is defined.

7.18.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-004(d) is shown in Figure 7.18-3. Organic chemicals detected are presented in Table 7.18-3.

- Acetone was detected in one subsurface sample near the inlet valve at location 16-608941. The concentration decreased with depth and was below the EQL. Therefore, the extent of acetone is defined.
- TATB was detected near the inlet valve at location 16-608941 and to the south at location 16-608940. Concentrations decreased with depth and were below the EQL. The extent of TATB is defined.

7.18.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-004(d) is shown in Figure 7.18-4. Radionuclides detected or detected above BVs/FVs are presented in Table 7.18-4.

- Cesium-137 was detected near the inlet valve at location 16-608941. Concentrations decreased with depth. Therefore, the extent of cesium-137 is defined.
- Uranium-235/236 was detected above the Qbt 2, Qbt 3, and Qbt 4 BV near the inlet valve at location 16-608989. Concentrations decreased with depth. Therefore, the extent of uranium-235/236 is defined.

7.18.5.4 Summary of Extent

The extent of all organic chemicals and radionuclides is defined. The extent of all inorganic chemicals except barium and calcium, is defined. Therefore, the overall extent of contamination at SWMU 16-004(d) is not defined.

7.18.6 Summary of Human Health Risk Assessment

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-004(d).

7.18.7 Summary of Ecological Risk Assessment

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-004(d).

7.19 SWMU 16-004(e)—Filter Screen

7.19.1 Site Description and Operational History

SWMU 16-004(e) is the inactive bar screen (structure 16-534) at the TA-16 sanitary WWTP (Figure 7.19-1). The bar screen was located southeast of the former 16-340 Complex. The 5- × 5-ft screen was used to filter out large solids but was later replaced with the communitor (a cutting device for sewage solids) and moved to the northwest corner of the site (LANL 1993, 020948, p. 5-133). During a site visit in 2007, the bar screen was missing and could not be located (Birdsall 2007, 097416).

7.19.2 Summary of Previous Investigations

The formerly NPDES-permitted outfall (EPA-SSS03S) for the WWTP was monitored for inorganic chemicals, organic chemicals, and pesticides. Effluent was monitored bimonthly for radionuclides and standard parameters for wastewater systems (e.g., biological oxygen demand, chemical oxygen demand, and total dissolved solids). Sludge and soil samples from the drying beds were also tested periodically. In 1988, cesium-137 was detected in three sludge samples that were screened for gamma radiation, and analytical results from the soil indicated the presence of cesium-137, plutonium-238, plutonium-239, and plutonium-240 in all three samples (DOE 1989, 015364, p. 4.10-15). Historical analytical data also indicate the presence of beryllium above the BV; however, sludge was regularly removed and disposed of at MDA G (LANL 1993, 020948, pp. 5-135–5-138). Data from the NPDES monitoring, and from the historical sludge and soil samples, are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

7.19.3 Field-Screening Results

Eight samples, collected at four locations, were field screened on-site for headspace organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments. Step-out sample decisions were based on review of the RDX and XRF screening results, because they measure the principal contaminants likely to be found at SWMU 16-004(e).

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all 30 inorganic chemicals analyzed had concentrations that were less than the established criteria (see Appendix C, section 2.3). Gross alpha and beta were reported at less than the minimal detectable activities (100 cpm), and gross gamma was reported at less than the minimal detectable activity (20 µR/h).

Based on these results, no additional step-out samples were required.

7.19.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled at SWMU 16-004(e) are shown in Figure 7.19-1. Table 7.19-1 summarizes samples collected and analyses requested for each sample. Decision-level data collected at SWMU 16-004(e) consists of eight samples (one soil and seven fill) collected at four locations.

7.19.4.1 Inorganic Chemicals in Soil and Fill

One soil and seven fill samples were collected and analyzed for anions (nitrate), perchlorate, total cyanide, and TAL metals. Table 7.19-2 presents detected inorganic chemicals above the BV. These detections are shown in Figure 7.19-2. The nature and extent of inorganic contamination are defined at SWMU 16-004(e).

No inorganic chemicals are identified as COPCs in soil at SWMU 16-004(e).

- Antimony was not detected above the soil BV (0.83 mg/kg) but had detection limits (1.04–1.28 mg/kg) above the BV in eight soil/fill samples. The detection limits were also slightly above the maximum background concentration (1 mg/kg). Because the detection limits are similar to the maximum background concentration, antimony is not identified as a COPC in soil.
- Cadmium was not detected above the soil BV (0.4 mg/kg) but had detection limits (0.521–0.641 mg/kg) above the BV in eight soil/fill samples. The detection limits were below the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC in soil.
- Calcium was detected above the soil BV (6120 mg/kg) in one sample with a maximum concentration of 7630 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration was below the maximum background concentration (14,000 mg/kg). Calcium is not identified as a COPC in soil.
- Fluoride was detected at all locations. Fluoride is naturally occurring and the concentrations detected (1.42–2.46 mg/kg) likely reflect naturally occurring concentrations. Therefore, fluoride is not identified as a COPC.
- Nitrate was detected at one location. Nitrate is naturally occurring and the concentrations detected (1.22–1.36 mg/kg) likely reflect naturally occurring concentrations, Therefore, nitrate is not identified as a COPC.

7.19.4.2 Organic Chemicals in Soil and Fill

One soil and seven fill samples were collected and analyzed for explosive compounds, SVOCs, and VOCs. Organic chemicals detected are presented in Table 7.19-3 and are shown in Figure 7.19-3. The nature and extent of organic contamination are defined at SWMU 16-004(e).

Benzo(a)anthracene, benzo(b)fluoranthene, fluoranthene, and pyrene were detected in soil and fill and are identified as COPCs.

7.19.4.3 Radionuclides in Soil and Fill

One soil and seven fill samples were collected and analyzed for radionuclides. Each of these nine samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. There were no radionuclides detected or detected above BVs/FVs at SWMU 16-004(e); therefore, no radionuclide COPCs were identified.

7.19.5 Spatial Distribution of COPCs

Because of the presence of the structure, the original five location points proposed, after communication with NMED, were changed to four location points (Appendix C, section C-7.2.11). One proposed location in the center of and beneath the existing structure was not sampled because the location was not accessible. Two samples had been planned from this location. Eight soil and fill samples from four sampling locations (Figure 7.19-1) were evaluated to determine the extent of contamination for SWMU 16-004(e). Because the direction of potential contaminant migration is into the subsurface below the bar screen, four boreholes were drilled surrounding the structure. Samples were collected from each sample location at depths of 3.0–3.5 and 8.5–9.0 ft bgs. As a result, the lateral extent is defined by the borehole locations.

7.19.5.1 Inorganic Chemicals

No inorganic COPCs were identified at SWMU 16-004(e). The distribution of inorganic chemicals at SWMU 16-004(e) is shown in Figure 7.19-2; the analytical results are presented in Table 7.19-2.

- Antimony and cadmium were not detected above BVs but had detection limits above the BV. Therefore, the extent of antimony and cadmium is defined.

7.19.5.2 Organic Chemicals

The distribution of organic COPCs at SWMU 16-004(e) is shown in Figure 7.19-3; the analytical results are presented in Table 7.19-3.

- Benzo(a)anthracene, benzo(b)fluoranthene, fluoranthene, and pyrene were detected at location 16-608929. Concentrations decreased with depth. Benzo(b)fluoranthene was also detected at location 16-608930. Concentrations decreased with depth. Therefore, the extent of benzo(a)anthracene, benzo(b)fluoranthene, fluoranthene, and pyrene is defined.

7.19.5.3 Radionuclides

No radionuclides were detected or detected above the BVs/FVs at SWMU 16-004(e).

7.19.5.4 Summary of Extent

The extent of contamination is defined for all COPCs. Therefore, the overall extent of contamination at SWMU 16-004(e) is defined.

7.19.6 Summary of Human Health Risk Assessment Results

Based on the results of the risk-screening assessment presented in Appendix H, there are no potential unacceptable risks at SWMU 16-004(e) from COPCs for the residential scenario. The industrial scenario was not evaluated because no samples were collected from 0 to 1 ft bgs. The total excess cancer risk for the residential scenario is 5×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.00002, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

7.19.7 Summary of Ecological Risk Assessment Results

Based on the results of the risk-screening assessment presented in Appendix H, no potential ecological risk was found for any receptor at SWMU 16-004(e) based on minimum ESL comparisons.

7.20 SWMU 16-004(f)—Sludge Drying Bed

7.20.1 Site Description and Operational History

SWMU 16-004(f) is one of two inactive sludge drying beds (structure 16-535) at the TA-16 sanitary WWTP (Figure 7.20-1). This drying bed is located southeast of the Imhoff tank. The drying bed received sludge from the Imhoff tank. Sludge was monitored for radioactivity and tritium before being removed for disposal at MDA G (LANL 1993, 020948, p. 5-133).

7.20.2 Summary of Previous Investigations

The formerly NPDES-permitted outfall (EPA-SSS03S) for the WWTP was monitored for inorganic chemicals, organic chemicals, and pesticides. Effluent was monitored bimonthly for radionuclides and standard parameters for wastewater systems (e.g., biological oxygen demand, chemical oxygen demand, and total dissolved solids). Sludge and soil samples from the drying beds were also tested periodically. In 1988, cesium-137 was detected in three sludge samples that were screened for gamma radiation, and analytical results from the soil indicated the presence of cesium-137, plutonium-238, plutonium-239, and plutonium-240 in all three samples (DOE 1989, 015364, p. 4.10-15). Historical analytical data also indicate the presence of beryllium above the BV; however, sludge was regularly removed and disposed of at MDA G (LANL 1993, 020948, pp. 5-135–5-138). Data from the NPDES monitoring, and from the historical sludge and soil samples, are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

7.20.3 Field-Screening Results

Ten samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the

XRF results indicates that process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were collected.

7.20.4 Soil and Tuff Sampling Analytical Results and COPC Identification

The locations sampled at SWMU 16-004(f) are shown in Figure 7.20-1. Table 7.20-1 summarizes the samples collected and analyses requested.

7.20.4.1 Inorganic Chemicals

Ten tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the samples was analyzed for anions, total cyanide, perchlorate, and TAL metals. Table 7.20-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 7.20-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.20.4.2 Organic Chemicals

Ten tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the samples was analyzed for SVOCs, VOCs, and explosive compounds. Table 7.20-3 presents the organic chemicals detected at SWMU 16-004(f). The sampling locations and detected concentrations of organic chemicals are shown in Figure 7.20-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

7.20.4.3 Radionuclides in Soil

Ten tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. Table 7.20-4 presents the radionuclides detected or detected above BVs/FVs, and these are shown in Figure 7.20-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

7.20.5 Spatial Distribution

Because the direction of potential contaminant migration is into the subsurface below the Imhoff tank, four boreholes were drilled surrounding the structure. Samples were collected at two depths between 20.0 and 30.0 ft bgs at each borehole. Because of the presence of underground utilities in the area of the tank, borehole locations were adjusted. The borehole to the southeast of the tank was moved out approximately 30.0 ft to the south. As a result, the lateral extent is also considered in relation to the distance from the tank.

Ten tuff (Qbt 4) samples from five locations (Figure 7.20-1) were evaluated to determine the extent of contamination at SWMU 16-004(f). Samples were collected from two depths under the concrete structure at each location: 2.5–3.0 and 8.5–9.0 ft bgs at locations 16-608895 and 16-608898; 3.5–4.0 and 9.5–10.0 ft bgs at location 16-608896; 3.5–4.0 and 7.5–8.0 ft bgs at location 16-608897; and 4.0–4.5 and 10.0–10.5 ft bgs at location 16-608899. Locations 16-608895 and 16-608896 were near the sludge inlet

pipe (from the Imhoff tank), while locations 16-608897, 16-608898, and 16-608899 were near the underdrainage system. Because of the nature of operation of the sludge drying bed, the primary potential release mechanism for this SWMU is infiltration; that is, lateral migration is not a transport mechanism.

The extent of contaminants at SWMU 16-004(f) is evaluated in the following sections.

7.20.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-004(f) is shown in Figure 7.20-2. The analytical results are presented in Table 7.20-2.

- Antimony and selenium were not detected above BVs but had detection limits above the BVs. Therefore, the extent of antimony and selenium is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608896. The concentration decreased with depth. Therefore, the extent of barium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608898 and 16-608899. The concentration was below the maximum background concentration (13 mg/kg) at location 16-608899. Chromium concentrations increased with depth at location 16-608898. Therefore, the extent of chromium is not defined.
- Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-608896 and 16-608897. Concentrations decreased with depth at both locations. Therefore, the extent of copper is defined.
- Fluoride was detected in all tuff (Qbt 4) samples. Fluoride is naturally occurring, and the concentrations detected (1.15–2.15 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Mercury was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608897. The concentrations decreased with depth. Therefore, the extent is defined.

7.20.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-004(f) is shown in Figure 7.20-3. The analytical results are presented in Table 7.20-3.

- Acetone was detected at three locations. All concentrations were below the EQL. Therefore, the extent of acetone is defined.
- Benzo(b)fluoranthene, fluoranthene, and pyrene were detected at location 16-608897 in the deepest sample. Concentrations were below the EQLs. Therefore, the extent of benzo(b)fluoranthene, fluoranthene, and pyrene is defined.
- TATB was detected at location 16-608897 in the shallower sample. The concentration decreased with depth. Therefore, the extent of TATB is defined.

7.20.5.3 Radionuclides

The distribution of radionuclides at SWMU 16.004(f) is shown in Figure 7.20-4. The analytical results are presented in Table 7.20-4.

- Uranium-235/236 was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-608895. The activities of uranium-235/236 decreased with depth. Therefore, the extent of uranium-235/236 is defined.

7.20.5.4 Summary of Extent

At SWMU 16-004(f), the extent of all organic chemicals and radionuclides is defined. The extent of all inorganic chemicals except for chromium is defined. Therefore, the extent of contamination at SWMU 16-004(f) is not defined.

7.20.6 Summary of Human Health Risk Assessment Results

Because the extent of contamination is not defined, human health risk was not evaluated for SWMU 16-004(f).

7.20.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-004(f).

7.21 AOC C-16-049–Former Building

7.21.1 Site Description and Operational History

AOC C-16-049 is a former workshop (building 13-1 renumbered to 16-475) that was located at TA-16, approximately 100 ft south of former building 16-340 (Figure 7.4-1). The workshop was located at P-Site, in the area of TA-16 that eventually became the 340 Line. Built at TA-13 in early 1944, the workshop measured 19 x 38.5 ft and consisted of an office, laboratory, workroom, lavatory, darkroom, and storage room that housed a generator and water tank. The building was of wood-frame construction on a concrete slab. The office, laboratory, and workroom contained no plumbing fixtures or drains (Engineering Drawing ENG-C 1643 [3 of 7], LASL 1944, 097497). The lavatory contained a sink and toilet, the darkroom contained a lead sink, and the storage room contained a 940-gal. water tank. All of these fixtures drained to a single 4-in. drainline that connected to a septic tank (structure 13-12 renumbered to 16-486) and its associated drain field, which were located approximately 100 ft north of the workshop. In late 1944, an addition measuring 30 x 23.5 ft and equipped with workbenches and storage shelving was added to the workshop. The addition was of wood-frame construction on a concrete-slab floor and contained no plumbing fixtures or drains. The workshop was removed in 1951 to make way for the construction of the buildings in the 340 Line. Septic tank 16-486 (now removed) and the 100-ft drainline connecting the building to the septic tank are being investigated as SWMU 13-003(a); the associated drain field is being investigated as AOC 13-003(b).

7.21.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-16-049.

7.21.3 Field Screening Results

Not applicable.

7.21.4 Investigation Status

No sampling was conducted at AOC C-16-049 per the approved work plan (LANL 2007, 102216).

7.22 AOC C-16-062–Former Manhole

7.22.1 Site Description and Operational History

AOC C-16-062 is a former access manhole (structure 16-889) that was located at P-Site in TA-16, approximately 100 ft south of former building 16-340 (Figure 7.10-1). Maintenance personnel used this manhole to access underground electrical conduits. The manhole was installed in 1950 and removed in 1972. Its removal was confirmed during a site visit by field team investigation personnel in 1994 (LANL 1995, 057225).

7.22.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-16-062.

7.22.3 Field Screening Results

Not applicable.

7.22.4 Investigation Status

No sampling was conducted at AOC C-16-062 per the approved work plan (LANL 2007, 102216).

7.23 AOC C-16-063–Former Manhole

7.23.1 Site Description and Operational History

AOC C-16-063 is a former access manhole (structure 16-888) that was located at P-Site in TA-16, approximately 80 ft south of former building 16-340 (Figure 7.4-1). Maintenance personnel used this manhole to access underground electrical conduits. The manhole was installed in 1950 and removed in 1972. Its removal was confirmed during a site visit by field team investigation personnel in 1994 (LANL 1995, 057225).

7.23.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-16-063.

7.23.3 Field Screening Results

Not applicable.

7.23.4 Investigation Status

No sampling was conducted at AOC C-16-063 per the approved work plan (LANL 2007, 102216).

8.0 300s LINE SUBAGGREGATE SITE INVESTIGATIONS

The 300s Line Subaggregate consists of 14 sites: SWMUs 16-001(e), 16-003(d), 16-003(e), 16-003(f), 16-003(g), 16-026(b), 16-026(c), 16-026(d), 16-026(e), 16-026(z), 16-029(a), 16-029(b), 16-029(c), and 16-029(d) (Plate 4).

The 300s Line Subaggregate consists of HE-processing buildings 16-300, 16-302, 16-304, and 16-306, along with their associated rest houses (buildings 16-301, 16-303, 16-305, and 16-307). Construction of the 300s Line began in 1951 and was completed in 1953. The HE-processing buildings are located on the east side of the facility, and the rest houses are located on the west side. The primary function of this facility was casting HE such as TNT, Composition B, and Baratol. These explosives were used as lenses in the first implosion-type nuclear weapons developed during the Manhattan Project and during the Cold War.

Over the years, the function of 300s Line evolved as technologies in explosives advanced. In 1958, the 300s Line facility changed from casting HE to developing plastic-bonded explosives. Only one building (16-302) continued its function of casting HE after 1958. Building 16-300, the northernmost building in the facility, was converted to an inert processing facility in 1962 or 1963 (Barr 1992, 052964.4). Concerns were reported about explosives seeping into the cracks of floors at processing bays and in the drainage troughs feeding the sumps in buildings 16-300 and 16-302.

A shared liquid waste trunk line is located on the northeast side of buildings 16-300, 16-302, 16-304, and 16-306, and drainlines are present. Effluents from these buildings entered this trunk line to the northeast of the buildings and discharged through an NPDES-permitted outfall (EPA-05A058). The outfall discharged into a well-defined drainage across HE Road and southeast of building 16-306. Solvents are no longer discharged to the sumps or other drains in the 300s Line. The most recent practice is to process the solvents directly into steel drums before they reach the sumps and dispose of them off-site (LANL 1993, 020948). SWMUs 16-001(e), 16-003(d), 16-003(e), 16-003(f), 16-003(g), and 16-026(z) are related to operations at the HE-processing buildings.

The rest houses in the 300s Line (buildings 16-301, 16-303, 16-305, and 16-307) are located to the southwest of the processing buildings. The rest houses were built in 1951 and 1952 to store HE and other weapons components used at the processing buildings. Each rest house has an associated pair of HE sumps. The HE sumps are rectangular concrete tanks with removable quarter-inch aluminum lids. The HE sumps are approximately 12 × 4 × 5 ft. Initially, HE was collected in a cloth filter bag secured inside a metal filter basket. The baskets and filter bags were collected regularly and cleaned at the basket-washing facility (building 16-390). HE too small to be collected by the filter bags settled to the bottom of the sump. To help separate the suspended solids, the water flowed under an aluminum baffle and over a concrete weir before it discharged through an outfall. HE in the bottom of the sump was periodically removed and burned. In 1966, the sumps were modified to improve their effectiveness and to reduce HE handling overall. Watertight aluminum tanks were installed in the sumps, and the filter baskets and cloth bags were eliminated. Each tank had two baffle and weir separation stages on the long axis of the sump. Waste products in the sumps were periodically removed and burned in the sand beds at the TA-16 burning ground. The effluent from each sump drained to the gutter adjacent to the roadway west of the rest houses. Each individual sump associated with the rest houses had an individual outfall.

SWMUs 16-026(b), 16-026(c), 16-026(d), 16-026(e), 16-029(a), 16-029(b), 16-029(c), and 16-029(d) are related to the operations at the rest houses (LANL 1993, 020948).

The shared liquid waste trunk line discharges through an NPDES-permitted outfall (EPA-05A058) into a well-defined drainage across HE Road, southeast of building 16-306. The drainage generally flows toward the east in the direction of Water Canyon (section 10.3). The locations sampled in the drainage are used to bound the extent of contamination, when necessary, for the Liquid Waste Trunk Line [SWMUs 16-026(b), 16-026(c) and16-026(z)].

8.1 Soil, Tuff, and Sediment Sampling Summary

Fourteen SWMUs, the Liquid Waste Trunk Line, and the Shared Drainages in the 300s Line Subaggregate were sampled during the 2009–2010 sampling campaign. In total, 78 soil, 35 fill, and 85 tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals (TAL metals, perchlorate, anions, and total cyanide), organic chemicals (VOCs, SVOCs, and explosive compounds), and radionuclides (americium-241, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides). The 2009−2010 sample data are combined with historical decision-making data, and sampling results are evaluated on a site-by-site basis in sections 8.2 through 8.17.

8.2 SWMU 16-026(z)—Outfall

8.2.1 Site Description and Operational History

SWMU 16-026(z) is an outfall from a plastics-component development facility (building 16-306) (Figure 8.2-1). The outfall is located on the southeast side of the building. Runoff from building 16-306 roof drains flows via an asphalt-lined culvert and natural drainages to Water Canyon.

8.2.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-026(z).

8.2.3 Field-Screening Results

Eight samples, collected at four locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.2.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-026(z) are shown in Figure 8.2-1. Table 8.2-1 summarizes the samples collected and analyses requested.

8.2.4.1 Inorganic Chemicals

One soil, four fill, and three tuff (Qbt 4) samples were collected and analyzed for anions (nitrate), total cyanide, perchlorate, and TAL metals. Table 8.2-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.2-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.2.4.2 Organic Chemicals

One soil, four fill, and three tuff (Qbt 4) samples were collected and analyzed for VOCs, SVOCs, and explosive compounds. Table 8.2-3 presents the organic chemicals detected. The sampling locations and detected concentrations of organic chemicals are shown in Figure 8.2-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.2.4.3 Radionuclides

One soil, four fill, and three tuff (Qbt 4) samples were collected and analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. There were no radionuclides detected or detected above BVs/FVs.

8.2.5 Spatial Distribution

Eight samples were collected from two depths (0.0–0.5 and 5.5–6.0 ft bgs) at four locations (Figure 8.2-1). The extent of contamination at SWMU 16-026(z) is evaluated in the following sections.

8.2.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-026(z) is shown in Figure 8.2-2. The analytical results are presented in Table 8.2-2.

- Antimony, cadmium, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, and selenium is defined.
- Fluoride and nitrate were detected at all four locations. Both fluoride and nitrate are naturally occurring, and the concentrations detected (1.2–13.2 and 1.29–1.42 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Lead was detected above BVs at three locations. Concentrations decreased with depth at locations 16-609205 and 16-609206. The concentration in the deeper sample at location 16-609204 was below the maximum background concentration (15.5 mg/kg). Concentrations also decreased downgradient. Therefore, the extent of lead is defined.
- Aluminum and cobalt were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs in subsurface samples at locations 16-609205 and 16-609204, respectively. Aluminum was detected below the BV in the surface sample at location 16-609205 but at a concentration higher than the subsurface sample. Therefore, the vertical extent of aluminum is defined. Cobalt increased with depth.

Therefore, the vertical extent of cobalt is not defined. Aluminum and cobalt were not detected above BVs at any other location. Therefore, the lateral extent of aluminum and cobalt is defined.

- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in three subsurface samples at locations 16-609204, 16-609205, and 16-609207. Barium was detected below the BV in the surface sample at location 16-609205 but at a concentration higher than the subsurface samples. Therefore, the vertical extent of barium is defined at location 16-609205. However, barium concentrations increased with depth at locations 16-609204 and 16-609207, so the vertical extent of barium is not defined. Concentrations decreased away from location 16-609205. Therefore, the lateral extent of barium is defined.
- Zinc was detected above the soil BV in the surface sample at location 16-609207. The concentration decreased with depth. Therefore, the extent of zinc is defined.

8.2.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-026(z) is shown in Figure 8.2-3. The analytical results are presented in Table 8.2-3.

- Anthracene was detected at locations 16-609204, 16-609205, 16-609206, and 16-609207. Concentrations decreased with depth except at location 16-609205. Anthracene concentrations increased slightly downgradient at location 16-609207. Therefore, the extent of anthracene is not defined.
- Phenanthrene was detected at locations 16-609204, 16-609205, 16-609206, and 16-609207. Concentrations decreased with depth at three locations but increased slightly at location 16-609205. Concentrations also increased downgradient at location 16-609207. Therefore, the extent of phenanthrene is not defined.
- Benzo(b)fluoranthene was detected at locations 16-609204, 16-609205, 16-609206, and 16-609207. Concentrations decreased with depth but increased downgradient at location 16-609207. Therefore, the vertical extent of benzo(b)fluoranthene is defined, but the lateral extent is not defined.
- Naphthalene was detected at locations 16-609205, 16-609206, and 16-609207. Concentrations decreased with depth except at location 16-609205. Concentrations decreased slightly downgradient at location 16-609207. Therefore, the vertical extent of naphthalene is not defined, but the lateral extent is defined.
- Fluoranthene and pyrene were detected at locations 16-609204, 16-609205, 16-609206, and 16-609207. Concentrations decreased with depth but increased downgradient at location 16-609207. Therefore, the vertical extent of fluoranthene and pyrene is defined, but the lateral extent is not defined.
- Fluorene was detected at locations 16-609205, 16-609206, and 16-609207. Concentrations decreased with depth at locations 16-609206, 16-609205, and 16-609207, and increased downgradient at location 16-609207. Therefore, the vertical extent of fluorene is defined, but the lateral extent is not defined.
- Benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were detected at locations 16-609204, 16-609205, 16-609206, and 16-609207. Concentrations decreased with depth at all locations. Concentrations increased downgradient at location 16-609207. Therefore, the vertical extent of these organic chemicals is defined, but the lateral extent is not defined.

- Acenaphthene was detected at locations 16-609205, 16-609206, and 16-609207. Concentrations decreased with depth and were below the EQL. Therefore, the extent of acenaphthene is defined.
- 2-Methylnaphthalene was detected at location 16-609205. The concentration was below the EQL, and 2-methylnaphthalene was not detected downgradient. Therefore, the extent of 2-methylnaphthalene is defined.
- 1,1,1-Trichloroethane was detected at location 16-609207. The concentration decreased with depth and was below the EQL. Therefore, the extent of 1,1,1-trichloroethane is defined.

8.2.5.3 Radionuclides

No radionuclides were detected or detected above BVs/FVs.

8.2.5.4 Summary of Extent

The lateral extent is defined for all inorganic chemicals. The vertical extent is defined for all inorganic chemicals except for barium and cobalt. The vertical extent is defined for all organic chemicals except anthracene, naphthalene, and phenanthrene. The lateral extent is not defined for anthracene, phenanthrene, benzo(b)fluoranthene, fluoranthene, fluorene, pyrene, benzo(a)anthracene, benzo(a)pyrene, chrysene, benzo(g,h,i)perylene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene. There were no radionuclides detected or detected above BVs/FVs. Therefore, the extent of contamination at SWMU 16-026(z) is not defined.

8.2.6 Summary of Human Health Risk Assessment Results

Because the extent of contamination is not defined, human health risk was not evaluated for SWMU 16-026(z).

8.2.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-026(z).

8.3 SWMU 16-001(e)—Dry Well

8.3.1 Site Description and Operational History

SWMU 16-001(e) is an inactive dry well located at TA-16 approximately 170 ft east of HE processing building 16-306 (Figure 8.3-1). Constructed in the 1980s, the dry well never functioned properly, because it drained to impermeable tuff (Qbt 4). Eventually, the dry well was filled with soil and capped with concrete.

8.3.2 Summary of Previous Investigations

During the 1995 RFI conducted at SWMU 16-001(e), three samples were collected and field screened for VOCs and radioactivity. Data from the 1995 RFI are screening-level data and are presented in Appendix D of the HIR (LANL 2008, 100693). Organic vapors were detected in one sample, and gross radioactivity was detected above background in all three samples. No samples were submitted for laboratory analysis.

8.3.3 Field-Screening Results

Fourteen samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is approximately 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-001(e) are shown in Figure 8.3-1. Table 8.3-1 summarizes the samples collected and analyses requested.

8.3.4.1 Inorganic Chemicals

Six fill samples and eight tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the samples was analyzed for anions, perchlorate, total cyanide, and TAL metals. Table 8.3-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.3-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.3.4.2 Organic Chemicals

Six fill samples and eight tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the samples was analyzed for SVOCs, VOCs, and explosive compounds. Table 8.3-3 presents the organic chemicals detected at SWMU 16-001(e). The sampling locations and detected concentrations of organic chemicals are shown in Figure 8.3-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.3.4.3 Radionuclides

Six fill samples and eight tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the samples was analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. Table 8.3-4 presents the radionuclides detected or detected above BVs/FVs. Radionuclides detected or detected above BVs/FVs are shown in Figure 8.3-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.3.5 Spatial Distribution

Fourteen samples (six fill and eight tuff [Qbt 4]) were collected from five sampling locations in and around the footprint of the former dry well and associated T-pipe (Figure 8.3-1). Location 16-609174 was drilled, and a sample was collected from beneath the center of the former dry well. Location 16-609173 was

drilled, and samples were collected beneath the associated T-pipe. Locations 16-609170, 16-609171, and 16-609172 were drilled, and samples were collected immediately east, north, and south of the dry-well footprint.

This site appeared to consist mainly of fill material and disturbed soil. These 14 samples were evaluated to determine the extent of contamination at SWMU 16-001(e). Because of the nature of the structure's operation, contamination migration is vertical and the lateral extent is not assessed. The vertical extent of contamination at SWMU 16-001(e) is evaluated in the following sections.

8.3.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-001(e) is shown in Figure 8.3-2. The analytical results are presented in Table 8.3-2.

- Antimony, cadmium, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, and selenium is defined.
- Barium was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at locations 16-609172 and 16-609173. Barium concentrations increased with depth at all three locations. Therefore, the extent of barium is not defined.
- Copper was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at locations 16-609170, 16-609171, and 16-609173. Copper concentrations decreased with depth at all three locations. Therefore, the extent of copper is defined.
- Fluoride was detected in samples collected at locations 16-609170, 16-609171, 16-609172, and 16-609173. Fluoride is naturally occurring, and the concentrations detected (0.868–2.12 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Mercury was detected above the soil BVs at all four locations. Mercury concentrations decreased with depth at all locations except at location 16-609174, where only one depth was sampled. Therefore, the extent of mercury is not defined.
- Nitrate was detected in surface (0.0–0.5 ft bgs) samples at locations 16-609170, 16-609171, and 16-609172. Nitrate is naturally occurring, and the concentrations detected (1.09–1.76 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Zinc was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at all four locations. Zinc concentrations decreased with depth except at location 16-609174, where only one depth was sampled. Therefore, the extent of zinc is defined.

8.3.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-001(e) is shown in Figure 8.3-3. The analytical results are presented in Table 8.3-3.

- Acenaphthene was detected at all four locations. Acenaphthene concentrations decreased with depth at all locations except location 16-609174, where only one depth was sampled. Samples collected at nearby locations at depths deeper than 21 ft did not detect acenaphthene. Therefore, the extent of acenaphthene is defined.
- Acetone was detected at all four locations. Acetone concentrations increased with depth at these locations. Therefore, the extent of acetone is not defined.

- 4-Amino-2,6-dinitrotoluene was detected at three locations. 4-Amino-2,6-dinitrotoluene concentrations decreased with depth. Therefore, the extent of 4-amino-2,6-dinitrotoluene is defined.
- 2-Amino-4,6-dinitrotoluene was detected at locations 16-609171 and 16-609173. 2-Amino-4,6-dinitrotoluene concentrations decreased with depth. Therefore, the extent of 2-amino-4,6-dinitrotoluene is defined.
- Anthracene was detected at all five locations. Anthracene concentrations decreased with depth except at location 16-609174, where only one depth was sampled. Samples collected at nearby locations at depths greater than 21 ft did not detect anthracene. Therefore, the extent of anthracene is defined.
- Benzo(a)anthracene, benzo(a)pyrene, chrysene, and phenanthrene concentrations were detected at four locations. Benzo(a)anthracene, benzo(a)pyrene, chrysene, and phenanthrene concentrations decreased with depth except at location 16-609174, where only one depth was sampled. Samples collected at nearby locations at depths greater than 21 ft did not detect benzo(a)anthracene, benzo(a)pyrene, chrysene, and phenanthrene. Therefore, the extent of these organic chemicals is defined.
- Benzo(b)fluoranthene was detected at locations 16-609170 and 16-609172 below the EQL. Benzo(b)fluoranthene concentrations decreased with depth. Only one depth was sampled at location 16-609174, and samples collected at nearby locations at depths greater than 21 ft did not detect benzo(b)fluoranthene. Therefore, the extent of benzo(b)fluoranthene is defined.
- Benzo(g,h,i)perylene was detected at locations 16-609170, 16-609171, 16-609172, 16-609173, and 16-609174. Benzo(g,h,i)perylene concentrations decreased with depth except at location 16-609174, where only one depth was sampled. Samples collected at nearby locations at depths greater than 21 ft did not detect benzo(g,h,i)perylene. Therefore, the extent of benzo(g,h,i)perylene is defined.
- Benzo(k)fluoranthene was detected at four locations. Benzo(k)fluoranthene concentrations decreased with depth. Therefore, the extent of benzo(k)fluoranthene is defined.
- Bis(2-ethylhexyl)phthalate was detected at location 16-609173. Bis(2-ethylhexyl)phthalate concentrations decreased with depth. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- Dibenz(a,h)anthracene was detected at four locations. Dibenz(a,h)anthracene concentrations decreased with depth. Therefore, the extent of dibenz(a,h)anthracene is defined.
- Dibenzofuran, ethylbenzene, TATB, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-xylene, and 1,3-xylene+1,4-xylene were detected at location 16-609173. Concentrations were below their respective EQLs. These organic chemicals were not detected in the deepest sample collected at location 16-609173. Therefore, the extent for dibenzofuran, ethylbenzene, TATB, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-xylene, and 1,3-xylene+1,4-xylene is defined.
- 1,1-Dichloroethane, tetrachloroethene, toluene, and trichloroethene were detected at location 16-609173. Concentrations were above their respective Qbt 2, Qbt 3, and Qbt 4, EQLs. These organic chemicals were not detected in the deepest sample collected at location 16-609173. Therefore, the extent of 1,1-dichloroethane, tetrachloroethene, toluene, and trichloroethene is defined.

- Fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene were detected at four locations. Concentrations decreased with depth at all locations except location 16-609174, where only one depth was sampled. Samples collected at nearby locations greater than 21 ft did not detect any of these organic chemicals. Therefore, the vertical extent of these organic chemicals is defined. Methylene chloride was detected at locations 16-609170, 16-609170, 16-609171, 16-609172, and 16-609173 below the EQLs. Therefore, the extent for methylene chloride is defined.
- 2-Methylnaphthalene was detected at 0.0445 mg/kg in sample RE16-10-2782 (0.0–0.5 ft bgs) from location 16-609171 and was also detected at locations 16-609173 and 16-609174. 2-Methylnaphthalene concentrations decreased with depth at all locations except location 16-609174, where only one depth was sampled. Samples collected at nearby locations greater than 21 ft did not detect 2-methylnaphthalene. Therefore, the extent of 2-methylnaphthalene is defined.
- RDX was detected at locations 16-609171 and 16-609173. Concentrations were below the EQLs. Therefore, the extent of RDX is defined.
- 1,1,1-Trichloroethane was detected at 0.000694 mg/kg in sample RE16-10-14146 (20.0–21.5 ft bgs) from location 16-609170 and was also detected at locations 16-609173 and 16-609174. 1,1,1-Trichloroethane concentrations decreased with depth at all locations except location 16-609174, where only one depth was sampled. Samples collected from nearby locations deeper than 21 ft either detected 1,1,1-trichloroethane at or near the EQL or not at all. Therefore, the extent of 1,1,1-trichloroethane is defined.
- 2,4,6-Trinitrotoluene was detected at locations 16-609173 and 16-609174. This concentration was below the respective soil EQL. 2,4,6-Trinitrotoluene concentrations increased downgradient; therefore, the lateral extent is not defined. 2,4,6-Trinitrotoluene concentrations decreased with depth except at location 16-609174, where only one depth was sampled. Samples collected from nearby locations greater than 21 ft did not detect 2,4,6-trinitrotoluene. Therefore, the vertical extent of 2,4,6-trinitrotoluene is defined.

8.3.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-001(e) is shown in Figure 8.3-4. The analytical results are presented in Table 8.3-4.

- Plutonium-239/240 was detected at location 16-609170 and decreased with depth. Therefore, the extent of plutonium-239/240 is defined.

8.3.5.4 Summary of Extent

The extent is defined for all inorganic chemicals except barium and mercury. The vertical extent is defined for all organic chemicals except acetone. The extent is defined for all radionuclides. Therefore, the overall extent of contamination at SWMU 16-001(e) is not defined.

8.3.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-001(e).

8.3.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-001(e).

8.4 SWMU 16-003(d)—Sumps

8.4.1 Site Description and Operational History

SWMU 16-003(d) consists of two inactive HE sumps that served building 16-300 (Figure 8.4-1). The sumps are located on the exterior north side of the building. Building 16-300 was initially an HE-casting facility and was later converted to a mock (inert) explosives-preparation facility in 1962 (Barr 1992, 052964.4).

8.4.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-003(d).

8.4.3 Field-Screening Results

Four samples, collected at two locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX was detected at 3 ppm in sample RE16-10-2798 at location 16-609176. Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (see Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Four additional step-out samples (RE16-10-14899, RE16-10-14902, RE16-10-14903, and RE16-10-14904) at locations 16-611883 and 16-611884 were collected to determine the extent of RDX contamination.

8.4.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-003(d) are shown in Figure 8.4-1. Table 8.4-1 summarizes the samples collected and analyses requested.

8.4.4.1 Inorganic Chemicals

Two soil, four fill, and two tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. All samples were analyzed for TAL metals, anions, and perchlorate. Table 8.4-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.4-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.4.4.2 Organic Chemicals

Two soil, four fill, and two tuff (Qbt 4) samples were collected and analyzed for organic chemicals. All samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 8.4-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.4-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.4.4.3 Radionuclides

Two soil, four fill, and two tuff (Qbt 4) samples were collected and analyzed for radionuclides. All samples were analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. No radionuclides were detected. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.4.5 Spatial Distribution

8.4.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-003(d) is shown in Figure 8.4-2. The analytical results are presented in Table 8.4-2.

- Antimony and cadmium were not detected above BVs but had detection limits above BVs. Therefore, the extent of these inorganic chemicals is defined.
- Chloride was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-611884. Concentrations decreased with depth. Therefore, the extent of chloride is defined.
- Fluoride was detected at all locations. Fluoride is naturally occurring, and the concentrations detected (0.76–4.6 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil BV at location 16-611884. Lead was not detected in the sample collected from within the footprint of SWMU 16-003(d) or in the first step-out from the SWMU. Concentrations decreased with depth. Therefore, the extent of lead is defined.
- Nitrate was detected at all locations. Nitrate is naturally occurring, and the concentrations detected (0.1–7.1 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Phosphorus, orthophosphate (expressed as PO_4) was detected at location 16-611884. Concentrations decreased with depth and were not detected in the sample collected from within the footprint of SWMU 16-003(d) or in the first step-out from the SWMU. Therefore, the extent of phosphorous, orthophosphate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611884. Selenium was not detected in the footprint of the sump or the closest step-out location, and concentrations increased with depth. Therefore, the extent of selenium is not defined.
- Thallium was detected above the soil BV at location 16-611884. Thallium was not detected in the footprint of the sump or the closest step-out location, and concentrations decreased with depth. Therefore, the extent of thallium is not defined.

8.4.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-003(d) is shown in Figure 8.4-3. The analytical results are presented in Table 8.4-3.

- Acetone was detected at locations 16-609177 and 16-611884. Concentrations decreased with depth at both locations. Concentrations increased laterally from location 16-609177 to 16-611884. Therefore, the vertical extent of acetone is defined, but the lateral extent is not defined.
- Anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were detected at locations 16-609176 and 16-609177. Concentrations decreased with depth at both locations and were below the EQL. Concentrations also decreased laterally. The extent of these organic chemicals is defined.
- Benzo(a)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene were detected at location 16-609176. Concentrations decreased with depth and decreased laterally. The extent of these organic chemicals is defined.
- Bis(2-ethylhexyl)phthalate and 1,2,4-trimethylbenzene were detected at location 16-611884. Concentrations decreased with depth and were below EQLs. The extent of bis(2-ethylhexyl)phthalate and 1,2,4-trimethylbenzene is defined.
- Fluoranthene was detected at locations 16-609176 and 16-609177. Concentrations decreased with depth and laterally. Therefore, the extent of fluoranthene is defined.
- HMX was detected at locations 16-609176 and 16-611883. Concentrations decreased with depth based on the deeper sample at location 16-611883. Concentrations decreased laterally at location 16-611884. Therefore, the extent of HMX is defined.
- Phenanthrene was detected at locations 16-609176 and 16-609177. These concentrations were below the EQL and decreased with depth and laterally. The extent of phenanthrene is defined.
- Pyrene was detected at locations 16-609176 and 16-609177. Concentrations decreased with depth and decreased laterally. Therefore, the extent of pyrene is defined.
- RDX was detected at locations 16-609176 and 16-611883. Concentrations decreased with depth based on the deeper sample at location 16-611883. Concentrations decreased laterally at location 16-611884. Therefore, the extent of RDX is defined.
- 2,4,6-Trinitrotoluene was detected at location 16-609176. This concentration was below the EQL. 2,4,6-Trinitrotoluene was not detected in the deeper sample at locations 16-611883 and 16-611884. Therefore, the extent of 2,4,6-trinitrotoluene is defined.

8.4.5.3 Radionuclides

No radionuclides were detected or detected above BVs/FVs.

8.4.5.4 Summary of Extent

The extent is defined for all inorganic chemicals except selenium and thallium. The vertical extent is defined for all organic chemicals. The lateral extent is defined for all organic chemicals except acetone. No radionuclides were detected or detected above BVs/FVs. Therefore, the overall extent of contamination at SWMU 16-003(d) is not defined.

8.4.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-003(d).

8.4.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-003(d).

8.5 SWMU 16-003(e)—Sumps

8.5.1 Site Description and Operational History

SWMU 16-003(e) consists of two inactive HE sumps at TA-16 associated with building 16-302 (Figure 8.5-1). The sumps are located on the exterior northeast side of the building. Building 16-302 was constructed between 1951 and 1953. It originally operated as an HE-casting facility where Composition B, Baratol, and TNT were cast. Casting equipment was cleaned using steam and high-temperature wash water. The wash water drained to the sumps. Currently, building 16-302 is a non-HE operations facility.

8.5.2 Summary of Previous Investigations

In 1979, eight water samples were collected from the two HE sumps over a 4-d period and analyzed for HE. HMX, RDX, and TNT were detected in the water samples (LASL (Los Alamos Scientific Laboratory) 1979, 057081). During the 1995 RFI, two samples were collected from two locations, 16-01443 and 16-01647, near the southernmost sump from depths of 3.5–5.0 and 3–4.5 ft bgs and submitted for analysis of TAL metals, HE, VOCs, and SVOCs. Metals detected or detected above BVs included cobalt, copper, nickel, and zinc. Numerous VOCs and SVOCs were detected along with HMX, RDX, and TNT.

8.5.3 Field-Screening Results

A total of three samples, collected at two locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (see Appendix C, section 2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.5.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-003(e) are shown in Figure 8.5-1. Table 8.5-1 summarizes the samples collected and analyses requested.

8.5.4.1 Inorganic Chemicals

Three soil, one fill, and one tuff (Qbt 4) sample were collected and analyzed for inorganic chemicals. Two soil samples were analyzed for TAL metals and total cyanide. The remaining samples were analyzed for TAL metals, total cyanide, anions, and perchlorate. Table 8.5-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.5-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.5.4.2 Organic Chemicals

Three soil, one fill, and one tuff (Qbt 4) sample were collected and analyzed for organic chemicals. All samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 8.5-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.5-3. Because the extent of contamination is not determined for the site, COPCs have not been identified.

8.5.4.3 Radionuclides

One soil, one fill, and one tuff (Qbt 4) sample were collected and analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. There were no radionuclides detected or detected above BVs/FVs.

8.5.5 Spatial Distribution

The function of the sump is such that leaks migrate vertically into the unsaturated zone. Therefore, lateral migration is not a transport mechanism and the lateral extent was not evaluated.

8.5.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-003(e) is shown in Figure 8.5-2. The analytical results are presented in Table 8.5-2.

- Antimony, cadmium, total cyanide, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of these inorganic chemicals is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609179. Barium was detected at 116 mg/kg in the shallower sample (5.0–5.5 ft bgs) below the soil BV. The concentration decreased with depth. Therefore, the extent of barium is defined.
- Cobalt was detected at location 16-01443. No deeper sample was taken at this location. Therefore, the extent of cobalt is not defined.
- Copper was detected above the soil BV at location 16-01443. Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609179. This concentration was below the maximum background concentration (6.2 mg/kg). Copper was detected below its soil BV at 7.78 mg/kg in the shallower sample. At location 16-609179, concentrations decreased with depth, but at location 16-01443 no deeper sample was taken. Therefore, the extent of copper is not defined.
- Fluoride was detected at locations 16-609179 and 16-609180. Fluoride is naturally occurring, and the concentrations detected (3.54–5.4 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Nickel was detected above the soil BV at location 16-01443. No deeper sample was taken at this location. Therefore, the extent of nickel is not defined.

- Nitrate was detected at location 16-609180. Nitrate is naturally occurring, and the concentration detected (0.26 mg/kg) likely reflects naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Zinc was detected above the soil BV at location 16-01443. No surface sample was taken at this location. Therefore, the extent of zinc is not defined.

8.5.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-003(e) is shown in Figure 8.5-3; the analytical results are presented in Table 8.5-3.

- Acenaphthene, anthracene, fluorene, and indeno(1,2,3-cd)pyrene were detected at location 16-01647. These concentrations were below the respective EQLs. Acenaphthene, anthracene, fluorene, and indeno(1,2,3,-cd)pyrene were not detected in a deeper (4.5–5.0 ft bgs) collocated sample at location 16-609180. Concentrations decreased with depth; therefore, the extent of these organic chemicals is defined.
- Benzo(a)anthracene was detected at locations 16-01647, 16-609179, and 16-609180. These concentrations are all below the respective EQLs. The extent of benzo(a)anthracene is defined.
- Benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene were detected at locations 16-01647 and 16-609180. Concentrations are below the respective EQLs and decreased with depth based on the collocated sample at location 16-609180. Therefore, the extent of these organic chemicals is defined.
- Benzo(g,h,i)perylene was detected at location 16-01647 but was not detected in the deeper collocated sample immediately to the southeast at location 16-609180. Benzo(g,h,i)perylene was also detected at location 16-609179, below the EQL. Therefore, the extent of benzo(g,h,i)perylene is defined.
- Bis(2-ethylhexyl)phthalate was detected at locations 16-01443 and 16-01647. The concentration at location 16-01443 was below the EQL. Bis(2-ethylhexyl)phthalate was not detected in the deeper collocated sample at location 16-609180 taken immediately to the southeast of location 16-01647. Concentrations decreased with depth between locations 16-01647 and 16-609180. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- Chrysene was detected at location 16-01443, below the EQL. It was also detected at location 16-01647 and in the deeper collocated sample at location 16-609180. Chrysene was detected at location 16-609179 but not in the deeper sample collected at this location. Concentrations decreased with depth. Therefore, the extent of chrysene is defined.
- Fluoranthene was detected at location 16-01443, below the EQL. It was detected at location 16-01647 and in the deeper collocated sample at location16-609180. Fluoranthene was detected at location 16-609179. Concentrations were below the respective EQLs. Concentrations decreased with depth. Therefore, the extent of fluoranthene is defined.
- HMX was detected at locations 16-01443 and 16-609180. The concentration at location 16-609180 was below the EQL. Because a deeper sample was not collected at location 16-01443, the vertical extent of HMX is not defined.
- Methylene chloride was detected at locations 16-01443 and 16-01647, below the EQL. Therefore, the extent of methylene chloride is defined.

- 2-Methylnaphthalene was detected at location 16-609179. The concentration decreased with depth and was below the EQL. Therefore, the extent of 2-methylnaphthalene is defined.
- Phenanthrene and pyrene were detected at location 16-01443 below the EQLs. Both were detected at location 16-01647 and in the deeper collocated sample at location 16-609180. Phenanthrene and pyrene were detected at location 16-609179. Concentrations decreased with depth. Therefore, the extent of phenanthrene and pyrene is defined.
- RDX was detected at location 16-01443. No deeper sample was collected at this location. Therefore, the extent of RDX is not defined.

8.5.5.3 Radionuclides

No radionuclides were detected or detected above their BVs/FVs.

8.5.5.4 Summary of Extent

The extent is defined for all inorganic chemicals except cobalt, copper, nickel, and zinc. The extent is defined for all organic chemicals except HMX and RDX. No radionuclides were detected or detected above BVs/FVs. Therefore, the overall extent of contamination at SWMU 16-003(e) is not defined.

8.5.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-003(e).

8.5.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-003(e).

8.6 SWMU 16-003(f)—Sumps

8.6.1 Site Description and Operational History

SWMU 16-003(f) consists of two inactive HE sumps at TA-16 associated with building 16-304 (Figure 8.6-1). The sumps are located on the exterior northeast side of the building. Constructed between 1951 and 1953, building 16-304 was used for developing and fabricating plastic components for the weapons program. Chemical solvents were used in the building.

8.6.2 Summary of Previous Investigations

During the 1995 RFI conducted at SWMU 16-003(f), 11 samples were collected and field screened for organic chemicals and radionuclides. Two surface samples (0.0–0.5 ft bgs) were subsequently collected from two locations at SWMU 16-003(f) and submitted for analysis of HE, TAL metals, total cyanide, and SVOCs. Data from the 1995 RFI are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693). Field-screening results were nondetects or below the BVs. Metals detected or detected above the BVs included barium, chromium, copper, lead, mercury, selenium, vanadium, and zinc. Numerous SVOCs and HE were also detected.

8.6.3 Field-Screening Results

A total of six samples, collected at three locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic constituents analyzed had concentrations that were less than the established criteria (see Appendix C, section 2.3) except for barium, which was measured at 885.93 ppm in sample RE16-10-2768 at location 16-609166. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, step-out samples RE16-10-2980 and RE16-10-2981 at location 16-609239 were taken.

8.6.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-003(f) are shown in Figure 8.6-1. Table 8.6-1 summarizes the samples collected and analyses requested.

8.6.4.1 Inorganic Chemicals

Three soil, two fill, and one tuff (Qbt 4) sample were collected and analyzed for inorganic chemicals. Each of these six samples was analyzed for TAL metals, anions, and perchlorate. In addition, three of these samples were also analyzed for total cyanide. Table 8.6-2 lists the inorganic chemicals detected above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.6-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.6.4.2 Organic Chemicals

Three soil, two fill, and one tuff (Qbt 4) sample were collected and analyzed for organic chemicals. Each of these six samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 8.6-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.6-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.6.4.3 Radionuclides

Three soil samples, two fill samples, and one tuff (Qbt 4) sample were collected and analyzed for radionuclides. Each of these six samples was analyzed for isotopic uranium, isotopic plutonium, and americium-241. Table 8.6-4 presents the radionuclides detected or detected above the BVs/FVs, which are shown in Figure 8.6-4. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.6.5 Spatial Distribution

The function of the sump is such that leaks migrate vertically into the unsaturated zone. Therefore, lateral migration is not a transport mechanism and the lateral extent was not evaluated.

Six samples were collected from three sample locations (Figure 8.6-1). Two subsurface samples were collected at each location. Samples were collected at depths of 1.0–1.5 and 6.5–7.0 ft bgs at location 16-609239, 5.0–5.5 and 8.5–9.0 ft bgs at location 16-609166, and 5.0–5.5 and 9.0–9.5 ft bgs at location 16-609167. The extent of contamination at SWMU 16-003(f) is evaluated in the following sections.

8.6.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-003(f) is shown in Figure 8.6-2. Analytical results are presented in Table 8.6-2.

- Antimony, cadmium, and selenium were not detected above the applicable BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium and selenium is defined.
- Arsenic was detected above the soil BV at location 16-609167. Arsenic was not detected above background in the remaining samples collected at SWMU 16-003(f). Concentrations increased with depth at location 16-609167. Therefore, the extent of arsenic is not defined.
- Barium was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-609166. Barium was not detected above background in the remaining samples collected at SWMU 16-003(f). Concentrations decreased with depth; therefore, the extent of barium is defined.
- Chromium was detected above the soil BV at location 16-609239 and above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609116. Concentrations increased with depth at both locations; therefore, the extent of chromium is not defined.
- Cobalt was detected above the soil BV at location 16-609239. Cobalt was not detected in the deeper sample at this location. Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609166, the deepest sample collected at this location. Therefore, the extent of cobalt is not defined.
- Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609166, below the maximum background concentration (6.2 mg/kg). Therefore, the extent of copper is defined.
- Fluoride was detected in all six samples collected at SWMU 16-003(f), and nitrate was detected in five of the six samples. Both fluoride and nitrate are naturally occurring, and the concentrations detected (1.1–4.1 and 1.5–5.48 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Lead and thallium were detected above the soil BVs at location 16-609167. Lead and thallium concentrations increased with depth. Therefore, the extent of lead and thallium is not defined.
- Sodium was detected at above the soil BV at location 16-609239. The concentration decreased with depth and was below the maximum background concentration (1800 mg/kg). Therefore, the extent of sodium is defined.

8.6.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-003(f) is shown in Figure 8.6-3. Analytical results are presented in Table 8.6-3.

- Acenaphthene and fluorene were detected at locations 16-609239, 16-609166, and 16-609167. Acenaphthene and fluorene concentrations increased with depth at locations 16-609166 and 16-609167, and decreased at location 16-609239. Therefore, the extent of acenaphthene and fluorene is not defined.

- Acetone was detected at location 16-609166. Acetone was not detected at the remaining sample locations at SWMU 16-003(f). Because acetone concentrations decreased with depth at location 16-609166, the extent of acetone is defined.
- 4-Amino-2,6-dinitrotoluene, HMX, and TNT were detected at location 16-609166. Concentrations decreased with depth and were below their respective EQLs. Therefore, the extent of 4-amino-2,6-dinitrotoluene, HMX, and TNT is defined.
- Anthracene was detected at locations 16-609166 and 16-609167. Anthracene concentrations increased with depth at two of the three sample locations (16-609166 and 16-609167). Therefore, the extent of anthracene is not defined.
- Benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene were detected at locations 16-609239, 16-609166, and 16-609167. Concentrations increased with depth at locations 16-609166 and 16-609167. Therefore, the extent of benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene is not defined.
- Benzo(a)pyrene and benzo(b)fluoranthene were detected at locations 16-609166, 16-609239, and 16-609167. Concentrations increased with depth at locations 16-609166 and 16-609167. Therefore, the extent of benzo(a)pyrene and benzo(b)fluoranthene is not defined.
- Benzo(g,h,i)perylene was detected at locations 16-609239, 16-609166, and 16-609167 (at 5.0−5.5 ft bgs and 9.0−9.5 ft bgs). Concentrations increased with depth at locations 16-609166 and 16-609167. Therefore, the extent of benzo(g,h,i)perylene is not defined.
- Benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, and 2-methylnaphthalene were detected at location 16-609167. Concentrations of 2-methylnaphthalene are below the EQL. Benzo(k)fluoranthene and bis(2-ethylhexyl)phthalate concentrations increased with depth. Therefore, the extent of benzo(k)fluoranthene and bis(2-ethylhexyl)phthalate is not defined, but the extent of 2-methylnaphthalene is defined.
- Dibenz(a,h)anthracene and 1,2-xylene were detected at location 16-609239. Concentrations decreased with depth and were below their respective EQLs. Therefore, the extent of dibenz(a,h)anthracene and 1,2-xylene is defined.
- Indeno(1,2,3-cd)pyrene was detected at locations 16-609239, 16-609166, and 16-609167. Concentrations of indeno(1,2,3-cd)pyrene decreased with depth at location 16-609239 and increased at locations 16-609166 and 16-609167. Therefore, the extent of indeno(1,2,3-cd)pyrene is not defined.
- Naphthalene was detected at locations 16-609166 and 16-609167. Naphthalene concentrations increased with depth at locations 16-609166 and 16-609167. Therefore, the extent of naphthalene is not defined.
- RDX was detected at locations 16-609166 and 16-609167. RDX concentrations increased with depth at location 16-609167 and decreased with depth at location 16-609166. Therefore, the extent of RDX is not defined.
- 1,3,5-Trinitrobenzene was detected at location 16-609166, below the EQL. Therefore, the extent of 1,3,5-trinitrobenzene is defined.

8.6.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-003(f) is shown in Figure 8.6-4. The analytical results are presented in Table 8.6-4.

- Plutonium-239/240 was detected at location 16-609239. Plutonium-239/240 is not detected in the deeper sample at this location. Therefore, the extent of plutonium-239/240 is defined.

8.6.5.4 Summary of Extent

The extent is defined for all inorganic chemicals except arsenic, chromium, cobalt, lead, and thallium. The extent is defined for all organic chemicals except acenaphthene, anthracene, benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, pyrene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, and RDX. The extent of all radionuclides is defined. Therefore, the overall extent of contamination at SWMU 16-003(f) is not defined.

8.6.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-003(f).

8.6.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-003(f).

8.7 SWMU 16-003(g)—Sumps

8.7.1 Site Description and Operational History

SWMU 16-003(g) consists of two inactive HE sumps associated with building 16-306 (Figure 8.7-1). The sumps are located approximately 6 ft from the exterior northeast side of the building. Constructed between 1951 and 1953, building 16-306 was used for developing plastic components for the weapons program, including polysiloxane foam and polyurethane components, intrusion molding, and epoxy and laminate work. Chemical solvents were used in the building and historically discharged directly into the sumps.

8.7.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-003(g).

8.7.3 Field-Screening Results

A total of four samples, collected at two locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section 2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.7.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-003(g) are shown in Figure 8.7-1. Table 8.7-1 summarizes the samples collected and analyses requested.

8.7.4.1 Inorganic Chemicals

Two soil and two tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. All of the samples were analyzed for TAL metals, anions, total cyanide, and perchlorate. Table 8.7-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.7-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.7.4.2 Organic Chemicals

Two soil and two tuff (Qbt 4) samples were collected and analyzed for organic chemicals. All samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 8.7-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.7-3. Because the extent of contamination is not determined for the site, COPCs have not been identified.

8.7.4.3 Radionuclides

Two soil and two tuff (Qbt 4) samples were collected and analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. There were no radionuclides detected or detected above BVs/FVs.

8.7.5 Spatial Distribution

The functional assumption is that leaks below the sump migrated vertically into the unsaturated zone. Therefore, lateral migration is not a transport mechanism and the lateral extent was not evaluated.

8.7.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-003(g) is shown in Figure 8.7-2. The analytical results are presented in Table 8.7-2.

- Antimony, cadmium, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, and selenium is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609187. Concentrations increased with depth. Therefore, the extent of barium is not defined.

- Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609187. Concentrations increased with depth. Therefore, the extent of calcium is not defined.
- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609186. Concentrations increased with depth. Therefore, the extent of cobalt is not defined.
- Fluoride was detected at both locations (16-609186 and 16-609187). Fluoride is naturally occurring, and the concentrations detected (0.999–5.72 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609186. Concentrations increased with depth. Therefore, the extent of lead is not defined.
- Nitrate was detected at both locations (16-609186 and 16-609187). Nitrate is naturally occurring, and the concentrations detected (1.58–6.73 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent for nitrate is defined.

8.7.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-003(g) is shown in Figure 8.7-3; the analytical results are presented in Table 8.7-3.

- Acenaphthene, anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, pyrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, and chrysene were detected at both locations (16-609186 and 16-609187). Concentrations increased with depth at location 16-609186 and decreased with depth at location 16-609187. Therefore, the extent of these organic chemicals is not defined.
- Bis(2-ethylhexyl)phthalate, 2-methylnaphthalene, naphthalene, 1,2-xylene, and 1,3-xylene+1,4-xylene were detected at location 16-609187, below the EQLs. Concentrations decreased with depth. Therefore, the extent of these organic chemicals is defined.
- Methylene chloride was detected at location 16-609186, below the EQL. Concentrations decreased with depth. Therefore, the extent of methylene chloride is defined.
- 1,2,4-Trimethylbenzene and 1,3,5-trimethylbenzene were detected at location 16-609187. Concentrations decreased with depth. Therefore, the extent of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene is defined.

8.7.5.3 Radionuclides

Radionuclides were not detected or detected above BVs/FVs.

8.7.5.4 Summary of Extent

The extent is defined for all inorganic chemicals except barium, calcium, cobalt, and lead. The extent is not defined for the following organic chemicals: acenaphthene, anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, pyrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, and chrysene. No radionuclides were detected or detected above BVs/FVs. Therefore, the overall extent of contamination at SWMU 16-003(g) is not defined.

8.7.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-003(g).

8.7.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-003(g).

8.8 SWMU 16-026(b)—Outfall

8.8.1 Site Description and Operational History

SWMU 16-026(b) is an outfall located to the east of a rest house (building 16-307) (Figure 8.8-1). The outfall formerly received discharge from two HE sumps [SWMU 16-029(a)] located near the exterior southeast wall of the rest house. The outfall discharged to Water Canyon. The sumps were plugged in 1990−1991. Used to store molds and materials for plastics development, the rest house also previously housed a solvent disassembly tank used to remove HE from test devices (LANL 1989, 068685).

8.8.2 Summary of Previous Investigations

During the 1995 RFI conducted at SWMU 16-026(b), eight samples were collected from five locations from depths of 0.0–0.5, 0.25–1.0, and 5.0–6.0 ft bgs. All samples were field-screened by an HE spot test, PID, and sodium-iodide scintillation detector and submitted for analysis of total cyanide, TAL metals, and SVOCs. All but one of the surface samples were also analyzed for HE, and the two samples collected from depths of 0.25–1.0 and 5.0–6.0 ft bgs were also analyzed for VOCs. Field-screening results showed gross gamma radiation at 5.0–6.0 ft bgs, HE in one surface sample, and organic vapors in one surface and one subsurface sample. Metals detected above BVs included barium, copper, and uranium. Numerous VOCs, SVOCs, and HE were also detected.

8.8.3 Field-Screening Results

A total of 14 new and historical samples, collected at 7 locations, were used in the investigation to characterize the site. Eight samples collected for the current investigation were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is approximately 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section 2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.8.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-026(b) are shown in Figure 8.8-1. Table 8.8-1 summarizes the samples collected and analyses requested.

8.8.4.1 Inorganic Chemicals

Three soil, four sediment, and seven tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the 14 samples was analyzed for TAL metals. In addition, 10 samples were analyzed for total cyanide, and 8 samples were analyzed for nitrate and perchlorate. Table 8.8-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.8-2. The nature and extent of inorganic contamination are defined at SWMU 16-026(b).

Antimony, barium, total cyanide, selenium, and uranium are identified as COPCs at SWMU 16-026(b).

- Antimony was not detected above the soil, sediment, and Qbt 2, Qbt 3, and Qbt 4 BVs (0.83, 0.83, and 0.5 mg/kg, respectively) but had detection limits (1.02–5.6 mg/kg) above the BVs in 14 samples. Antimony is identified as a COPC.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (2.79 mg/kg) in one sample with a maximum concentration of 3.24 mg/kg. Because there were less than 10 tuff samples, statistical tests could not be performed. The maximum concentration was below the maximum background concentration (5 mg/kg). Arsenic is not identified as a COPC in tuff.
- Barium was detected above the sediment and Qbt 2, Qbt 3, and Qbt 4 BVs (127 and 46 mg/kg) in three and five samples, respectively, with a maximum concentration of 1190 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration was above the maximum background concentrations (127 and 51.6 mg/kg). Barium is identified as a COPC.
- Cadmium was not detected above the soil and sediment BVs (0.4 mg/kg) but had detection limits (0.52 to 0.585 mg/kg) above the BVs in seven samples. The detection limits were below the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (7.14 mg/kg) in one sample with a maximum concentration of 23.6 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration was below the maximum background concentration (13 mg/kg). Chromium is not identified as a COPC in tuff.
- Total cyanide was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (0.5 mg/kg) in one sample with a maximum concentration of 0.647 mg/kg. Total cyanide also had detection limits above the sediment and Qbt 2, Qbt 3, and Qbt 4 BVs (0.82 and 0.5 mg/kg). Total cyanide is identified as a COPC.
- Fluoride was detected at three locations. Fluoride is naturally occurring and the concentrations detected (0.652–2.53 mg/kg) likely reflect naturally occurring concentrations, Therefore, fluoride is not identified as a COPC.
- Iron was detected above Qbt 2, Qbt 3, and Qbt 4 BV (14,500 mg/kg) in one sample with a maximum concentration of 14,800 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration was below the maximum background concentration (19,500 mg/kg). Iron is not identified as a COPC in tuff.

- Nitrate was detected at two locations. Nitrate is naturally occurring and the concentrations detected (1.51–1.68 mg/kg) likely reflect naturally occurring concentrations. Therefore, nitrate is not identified as a COPC.
- Selenium was not detected above the Qbt 2, Qbt 3, and Qbt 4 BV (0.3 mg/kg), but had detection limits (1.04–1.08 mg/kg) above the BV in five tuff samples. Selenium is identified as a COPC in tuff.
- Uranium was detected above the sediment BV (2.22 mg/kg) in three samples with a maximum concentration of 3.86 mg/kg. Uranium is identified as a COPC in sediment.

8.8.4.2 Organic Chemicals

Three soil, four sediment, and seven tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of these 14 samples was analyzed for SVOCs, and 13 samples were analyzed for explosive compounds. In addition, 10 samples were analyzed for VOCs. Table 8.8-3 presents the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.8-3. The nature and extent of organic contamination are defined at SWMU 16-026(b).

The following organic chemicals were detected in soil/fill and are identified as COPCs: acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, chrysene, di-n-butylphthalate, dibenz(a,h)anthracene, dibenzofuran, 2,4-dinitrotoluene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, 4-nitroaniline, phenanthrene, pyrene, RDX, and 2,4,6-trinitrotoluene.

8.8.4.3 Radionuclides

Three soil samples and five tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the eight samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. There were no radionuclides detected or detected above BVs/FVs.

8.8.5 Spatial Distribution of COPCs

Fourteen samples were collected from seven locations (Figure 8.8-1). Three surface samples (0.0–0.5 ft bgs) were collected at three locations. Two surface samples (0.0–0.5 and 0.25–1.0 ft bgs) and one subsurface sample (5.0–6.0 ft bgs) were collected at one location. Two surface samples (0.0–0.5 ft bgs) and two subsurface samples (5.0–6.0 ft bgs) were collected at two locations. In addition, one 20-ft borehole was drilled between buildings 16-306 and 16-307 within the drainage. Four samples were collected at 0.0–0.5, 5.0–6.0, 11.0–12.0, and 19.0–20.0 ft bgs from the borehole.

8.8.5.1 Inorganic Chemicals

The distribution of inorganic COPCs at SWMU 16-026(b) is shown in Figure 8.8-2. Analytical results are presented in Table 8.8-2.

- Antimony and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and selenium is defined.
- Barium was detected above the sediment and Qbt 2, Qbt 3, and Qbt 4 BVs at locations 16-609189 and 16-01456. Only surface samples were collected at locations 16-01654 and

16-01456. The deeper samples at locations 16-609192 and 16-609190 revealed that concentrations decreased with depth. Because conditions throughout the SWMU 16-026(b) drainage are similar, infiltration rates are expected to be similar. Barium was not detected above the BV in the deepest sample collected from location 16-609192. The borehole at location 16-609192 is within 25 ft of the other locations and has samples collected at 11–12 and 19–20 ft bgs. Barium concentrations at these depths are less than at shallower depths. Because of the close proximity of the borehole to other locations, the deeper samples define the vertical extent of barium. Concentrations of barium decreased from location 16-609189, nearest the outfall, and location 16-01456 downgradient to locations 16-609190 and 16-01456. In addition, the barium concentrations in the drainage just downgradient of this site at location 16-609215 (Figure 8.8-2) decreased from those within the SWMU 16-026(b) boundary. Therefore, the lateral extent of barium is defined.

- Total cyanide was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609189, nearest the outfall. Total cyanide was not detected above the BV in any samples at the other sample locations, including borehole location 16-609192. Total cyanide was not detected above the BV in the deepest sample analyzed for total cyanide at location 16-609192. Total cyanide was not detected above the BV in the drainage at location 16-609215. Therefore, the extent of total cyanide is defined.
- Uranium was detected at locations 16-01454, 16-01455, and 16-01456 above the sediment BV. Uranium was not detected above the BV in any samples at the other sample locations. Uranium was not detected above the BV in the deepest sample collected from location 16-609192; therefore, the vertical extent for uranium is defined. Uranium concentrations decreased in the drainage downgradient of the site at location 16-609215 (Figure 8.8-2). Therefore, the lateral extent of uranium is defined.

8.8.5.2 Organic Chemicals

The distribution of organic COPCs detected at SWMU 16-026(b) is shown in Figure 8.8-3. Analytical results are presented in Table 8.8-3.

- Acenaphthene was detected at locations 16-01654, 16-609189, and 16-609190. Concentrations decreased with depth at all locations and decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of acenaphthene is defined.
- Acetone and 2,4,6-trinitrotoluene were detected at location 16-01654. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of acetone and 2,4,6-trinitrotoluene is defined.
- Antrhacene was detected at locations 16-01454, 16-01455, 16-01654, 16-609189, 16-609190, and 16-609192. Only one depth was sampled at locations 16-01454 and 16-01455. Concentrations decreased with depth at locations 16-01654, 16-609189, 16-609190, and 16-609192. The borehole at location 16-609192 is within 25 ft of the other locations and has samples collected from 11–12 and 19–20 ft bgs. Anthracene was not detected at these depths at location 16-609192, which defines the extent at locations 16-01454 and 16-01455. Concentrations decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of anthracene is defined.
- Benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected at locations 16-01455, 16-01456, 16-01654, 16-609189, 16-609190, and 16-609192. Only one depth was sampled at locations 16-01455 and 16-01456.

Concentrations decreased with depth at locations 16-01654, 16-609189, 16-609190, and 16-609192. The borehole at location 16-609192 is within 25 ft of the other locations and has samples collected from 11–12 and 19–20 ft bgs. Benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene were not detected at these depths at location 16-609192, which defines the extent at locations 16-01455 and 16-01456. Concentrations decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene is defined.

- Benzo(b)fluoranthene, fluoranthene, and pyrene were detected at locations 16-01454, 16-01455, 16-01456, 16-01654, 16-609189, 16-609190, and 16-609192. Only one depth was sampled at locations 16-01454, 16-01455, and 16-01456. Concentrations decreased with depth at locations 16-01654, 16-609189, 16-609190, and 16-609192. The borehole at location 16-609192 is within 25 ft of the other locations and has samples collected from 11–12 and 19–20 ft bgs. Benzo(b)fluoranthene, fluoranthene, and pyrene were not detected at these depths at location 16-609192, which defines the extent at locations 16-01454, 16-01455, and 16-01456. Concentrations decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of benzo(b)fluoranthene, fluoranthene, and pyrene is defined.
- Benzo(k)fluoranthene was detected at locations 16-01456, 16-01654, and 16-609189. Only one depth was sampled at location 16-01456. Concentrations decreased with depth at location 16-01654. The borehole at location 16-609192 is within 25 ft of the other locations and has samples collected from 11–12 and 19–20 ft bgs. Benzo(k)fluoranthene was not detected at these depths at location 16-609192, which defines the extent at locations 16-01456 and 16-609189. Concentrations decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of benzo(k)fluoranthene is defined.
- Dibenz(a,h)anthracene was detected at locations 16-01654 and 16-609189. Concentrations decreased with depth at location 16-01654. Dibenz(a,h)anthracene was only detected in the deeper sample at location 16-609189. The borehole at location 16-609192 is within 25 ft of location 16-609189 and has samples collected from 11–12 and 19–20 ft bgs. Dibenz(a,h)anthracene was not detected at these depths at location 16-609192, which defines the extent at location 16-609189. Concentrations decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of dibenz(a,h)anthracene is defined.
- Dibenzofuran was detected at locations 16-01654 and 16-609189. Concentrations decreased with depth at both locations and decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of dibenzofuran is defined.
- Fluorene was detected at locations 16-01654, 16-609189, and 16-609190. Concentrations decreased with depth at all locations and decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of fluorene is defined.
- 2-Methylnaphthalene and naphthalene were detected at location 16-609189. Concentrations decreased with depth and decreased downgradient at locations 16-01456 and 16-609190. Therefore, the extent of 2-methylnaphthalene and naphthalene is defined.
- Benzoic acid and 2,4-dinitrotoluene were detected at location 16-01456. Only one depth was sampled at location 16-01456. Locations 16-609189, 16-609190, and 16-609192 are within 25 ft of location 16-01456 and have samples collected from deeper depths. Benzoic acid and 2,4-dinitrotoluene were not detected at these depths at the other locations, which define the extent at location 16-01456. Concentrations decreased downgradient. Therefore, the extent of benzoic acid and 2,4-dinitrotoluene is defined.

- Bis(2-ethylhexyl)phthalate was detected at locations 16-01454 and 16-01455. Only one depth was sampled at these locations. Locations 16-609189, 16-609190, and 16-609192 are within 25 ft of locations 16-01454 and 16-01455 and have samples collected from deeper depths. Bis(2-ethylhexyl)phthalate was not detected at these depths at the other locations, which define the extent at locations 16-01454 and 16-01455. Concentrations decreased downgradient. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- Di-n-butylphthalate and 4-nitroaniline were detected at location 16-01455. Only one depth was sampled at location 16-01455. Locations 16-609189, 16-609190, and 16-609192 are within 25 ft of location 16-01455 and have samples collected from deeper depths. Di-n-butylphthalate and 4-nitroaniline were not detected at these depths at the other locations, which define the extent at location 16-01455. Concentrations decreased downgradient. Therefore, the extent of di-n-butylphthalate and 4-nitroaniline is defined.
- HMX was detected at locations 16-01454, 16-01455, 16-01654, 16-609189, and 16-609192. Only one depth was sampled at locations 16-01454 and 16-01455. Concentrations decreased with depth at locations 16-01654, 16-609189, and 16-609192. The borehole at location 16-609192 is within 25 ft of the other locations and has samples collected from 11–12 and 19–20 ft bgs. HMX was detected at lower concentrations at these depths at location 16-609192, which defines the extent at locations 16-01454 and 16-01455. Concentrations decreased downgradient at location 16-609190. Therefore, the extent of HMX is defined.
- RDX was detected at locations 16-01654 and 16-609192. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of RDX is defined.

8.8.5.3 Radionuclides

Radionuclides were not detected or not detected above BVs/FVs. Therefore, there are no radionuclide COPCs at SWMU 16-026(b).

8.8.5.4 Summary of Extent

The extent is defined for all COPCs at SWMU 16-026(b). Therefore, the overall extent of contamination at SWMU 16-026(b) is defined.

8.8.6 Summary of Human Health Risk Screening Assessment

Based on the results of the risk-screening assessments presented in Appendix H, there are potential unacceptable risks at SWMU 16-026(b) from COPCs for the industrial and residential scenarios. The total excess cancer risks for the industrial and residential scenarios are 2×10^{-5} and 4×10^{-5}, respectively, which are above the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). These risks are driven by benzo(a)pyrene. The HIs are 0.03 and 0.4, respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

8.8.7 Summary of Ecological Risk Screening Assessment

Based on the results of the risk-screening assessments presented in Appendix H, no potential ecological risk was found for any receptor at SWMU 16-026(b) following evaluations based on minimum ESLs, HI analyses, potential effects to populations (individuals for threatened and endangered [T&E] species), and LOAEL analyses.

8.9 SWMU 16-026(c)–Outfall

8.9.1 Site Description and Operational History

SWMU 16-026(c) is an outfall located at TA-16 to the south of a rest house (building 16-305) (Figure 8.9-1). The outfall formerly received discharge from two HE sumps [SWMU 16-029(b)] located near the exterior southwest wall of the rest house. The outfall discharged to Water Canyon. The sumps were plugged in 1990-1991. Used to store chemicals and solvents for plastics development and production, the rest house was also used for filament winding of developmental weapons components.

8.9.2 Summary of Previous Investigations

During the 1995 RFI conducted at SWMU 16-026(c), 11 samples were collected from 7 locations from depths of 0.0–0.5, 1.0–1.5, 1.75–2.25, and 3.5–4.5 ft bgs. All samples were screened by an HE spot test, PID, and sodium iodide scintillation detector. Data from the 1995 RFI are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693). Field-screening results were all nondetects or below BVs. Metals detected or detected above BVs included barium, chromium, cobalt, copper, iron, lead, nickel, vanadium, and zinc. Numerous VOCs, SVOCs, and HE were also detected.

8.9.3 Field-Screening Results

A total of 10 samples, collected at 4 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments. Step-out sample decisions were based on review of the RDX and XRF screening results, because they measure the principal contaminants likely to be found at this SWMU.

The RDX concentrations for all samples were less the action level of 2 ppm, which is defined in the approved work plan (LANL 2007, 102216). XRF screening was performed on all samples collected. Review of the XRF results indicates that all process-related inorganic constituents analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.9.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-026(c) are shown in Figure 8.9-1. Table 8.9-1 summarizes the samples collected and analyses requested.

8.9.4.1 Inorganic Chemicals

Four soil and six tuff (Qbt 4) samples were collected and analyzed for nitrate, total cyanide, perchlorate, and TAL metals. Table 8.9-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.9-2. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.9.4.2 Organic Chemicals

Four soil and six tuff (Qbt 4) samples were collected and analyzed for SVOCs, VOCs, and explosive compounds. Table 8.9-3 presents the organic chemicals detected at SWMU 16-026(c). The sample locations and detected concentrations of organic chemicals are shown in Figure 8.9-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.9.4.3 Radionuclides

Four soil and six tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 10 samples was analyzed for gamma-emitting radionuclides and for isotopic uranium, isotopic plutonium, and americium-241. No radionuclides were detected or detected above the BVs/FVs at SWMU 16-026(c).

8.9.5 Spatial Distribution

Ten samples from four locations (Figure 8.9-1) were evaluated to determine the extent of contamination at SWMU 16-026(c). Samples were collected at three locations at two depths: surface (0.0–0.5 ft bgs) and subsurface (5.5–6.0 ft bgs). A 20-ft borehole was drilled at location 16-609197. Four samples were collected from the borehole at 0.0–0.5, 5.0–6.0, 11.0–12.0, and 19.0–20.0 ft bgs.

8.9.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-026(c) is shown in Figure 8.9-2; the analytical results are presented in Table 8.9-2.

- Antimony and cadmium were not detected above the BVs but had detection limits above BVs. Therefore, the extent of antimony and cadmium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01459, 16-01655, and 16-609194 in the deepest samples. Chromium was not detected above BVs in the downgradient samples. Therefore, the lateral extent of chromium is defined, but the vertical extent is not defined.
- Cobalt was detected above the soil BV at locations 16-01459 and 16-609194. Concentrations decreased with depth and downgradient. Therefore, the extent of cobalt is defined.
- Copper was detected above soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at locations 16-01459, 16-01655, and 16-609193. Concentrations decreased with depth at all locations and laterally to the end of the drainage. Therefore, the extent of copper is defined.
- Manganese was detected above the soil BV at location 16-609194. Concentrations decreased with depth and downgradient. Therefore, the extent of manganese is defined.
- Barium was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at nine locations. Barium decreased from the maximum (633 mg/kg) at the end of the drainage to 561 mg/kg at location 16-609197. Concentrations decreased with depth at all locations where multiple depths were sampled except for location 16-609194. Therefore, the vertical and lateral extent of barium are not defined.
- Nitrate was detected in two surface samples, and fluoride was detected in four surface and three subsurface samples. Both nitrate and fluoride are naturally occurring, and the concentrations detected (1.67–1.82 and 0.617–2.423 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate and fluoride is defined.

- Iron and nickel were detected above the sediment BVs at location 16-01459. Iron and nickel were not detected above BVs laterally to the end of the drainage or in any deeper samples. Therefore, the extent of iron and nickel is defined.
- Perchlorate was detected in two surface samples at locations 16-609194 and 16-609197. Concentrations decreased with depth and downgradient. Therefore, the extent of perchlorate is defined.
- Zinc was detected above the soil and sediment BVs at five locations. Concentrations of zinc decreased laterally to the end of the drainage at location 16-609197 (52 mg/kg). Concentrations decreased with depth at all locations where deeper samples were collected. Therefore, the extent of zinc is defined.
- Lead was detected above sediment BVs at locations 16-01459 and 16-01655. Concentrations decreased with depth and downgradient. Therefore, the extent of lead is defined.
- Magnesium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609197. Concentrations decreased with depth and were below the maximum building concentrations (2820 mg/kg). Therefore, the extent of magnesium is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01655 and 16-609197. Concentrations decreased with depth at both locations. Concentrations increased at the end of the drainage (location 16-609197). Therefore, the vertical extent of selenium is defined, but the lateral extent is not defined.
- Vanadium was detected above the sediment BV at location 16-01462. Vanadium was not detected above BV in any of the deeper samples collected. Concentrations decreased downgradient. Therefore, the extent of vanadium is defined.

8.9.5.2 Organic Chemicals

The distribution of organic chemicals detected at SWMU 16-026(c) is shown in Figure 8.9-3. The analytical results are presented in Table 8.9-3.

- Acenaphthene was detected at locations 16-01459, 16-01655, 16-609193, and 16-609195. Concentrations decreased with depth at all locations and decreased downgradient to the end of the drainage. Therefore, the extent of acenaphthene is defined.
- Acetone was detected at location 16-01655. The concentration decreased with depth and decreased downgradient to the end of the drainage. Therefore, the extent of acetone is defined.
- Anthracene and fluorene were detected at locations 16-01655, 16-609193, 16-609194, and 16-609195. Concentrations decreased with depth at all locations and decreased downgradient to the end of the drainage. Therefore, the extent of anthracene and fluorene is defined.
- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene were detected at locations 16-01655, 16-609193, 16-609194, 16-609195, and 16-609197, as well as some or all of the 1995 locations where only a surface sample was collected. Concentrations decreased with depth at all locations where deeper samples were collected and decreased downgradient to the end of the drainage. Therefore, the extent of these organic chemicals is defined.
- Dibenz(a,h)anthracene was detected at locations 16-01459 and 16-01655. Concentrations decreased with depth at all locations and decreased downgradient to the end of the drainage. Therefore, the extent of dibenz(a,h)anthracene is defined.

- Dibenzofuran, 2-methylnaphthalene, and naphthalene were detected at location 16-01459. Concentrations decreased with depth at all locations and decreased downgradient to the end of the drainage. Therefore, the extent of dibenzofuran, 2-methylnaphthalene, and naphthalene is defined.
- Phenanthrene was detected at locations 16-01655, 16-609193, 16-609194, and 16-609195, as well as some of the 1995 locations where only a surface sample was collected. Concentrations decreased with depth at all locations where deeper samples were collected and decreased downgradient to the end of the drainage. Therefore, the extent of phenanthrene is defined.
- HMX was detected at location 16-609195. Concentrations decreased with depth at all locations and decreased downgradient to the end of the drainage. Therefore, the extent of HMX is defined.
- Benzoic acid was detected at locations 16-01655 and 16-609197. Concentrations decreased with depth at both locations. Concentrations increased downgradient to the end of the drainage at location 16-609197. Therefore, the vertical extent of benzoic acid is defined, but the lateral extent is not defined.
- Styrene was detected at location 16-609193, RDX was detected at location 16-609195, and 2,4,6-trinitrotoluene was detected at location 16-01655. Concentrations decreased with depth at all locations and decreased downgradient to the end of the drainage. Therefore, the extent of RDX, styrene, and 2,4,6-trinitrotoluene is defined.

8.9.5.3 Radionuclides

Radionuclides were not detected or detected above BVs/FVs.

8.9.5.4 Summary of Extent

The lateral extent is not defined for barium, selenium, and benzoic acid. The vertical extent is not defined for barium and chromium. Therefore, the extent of contamination at SWMU 16-026(c) is not defined.

8.9.6 Summary of Human Health Risk Screening Assessment

Because the extent of contamination is not defined, human health risk was not evaluated for SWMU 16-026(c).

8.9.7 Summary of Ecological Risk Screening Assessment

Because the extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-026(c).

8.10 SWMU 16-026(d)—Outfall

8.10.1 Site Description and Operational History

SWMU 16-026(d) is an outfall located to the southeast of a rest house (building 16-303) (Figure 8.10-1). The outfall formerly received discharge from two HE sumps [SWMU 16-029(c)] located on the exterior southwest wall of the rest house. The outfall discharged to Martin Spring Canyon. The sumps were plugged in 1990-1991.

8.10.2 Summary of Previous Investigations

During the 1995 RFI conducted at SWMU 16-026(d), 11 samples were collected from locations 16-01465, 16-01466, 16-01467, 16-01468, 16-01469, 16-01470, and 16-01656 from depths of 0.0–0.5, 0.58–1.0, 0.5–0.83, 3.0–5.0, and 5.0–6.5 ft bgs. All samples were field screened by the HE spot test, PID, and sodium-iodide scintillation detector and submitted for analysis of total cyanide, TAL metals, HE, and SVOCs; the four subsurface samples were also analyzed for VOCs. Field-screening results were all nondetects or below background. Metals detected or detected above BVs included barium, chromium, cobalt, copper, lead, vanadium, and zinc. Numerous VOCs, SVOCs, and HE were also detected. Decision-level data from the 1995 investigation are included in this report.

8.10.3 Field-Screening Results

A total of 16 samples, collected at 7 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3) except for arsenic, barium, and lead. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Arsenic was measured at 313 ppm and lead at 7688 ppm in sample RE16-10-2820 at location 16-609184, and lead was measured at 7473 ppm in field duplicate sample RE16-10-2823 at location 16-609184. Barium was measured at 843 ppm in sample RE16-10-2818 at location 16-609183.

Based on these results, eight additional step-out samples (RE16-10-2821, RE16-10-2822, and RE16-10-10118 through RE16-10-10123) were collected. Inadvertently, no additional step-out samples were collected around location 16-609183.

8.10.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-026(d) are shown in Figure 8.10-1. Table 8.10-1 summarizes the samples collected and analyses requested.

8.10.4.1 Inorganic Chemicals

In 1995, seven sediment and four tuff (Qbt 4) samples were collected and analyzed for TAL metals and total cyanide. In 2009–2010, two soil and six tuff (Qbt 4) samples were collected and analyzed for TAL metals, nitrate, total cyanide, and perchlorate. Three soil, one tuff (Qbt 4), and two fill samples were collected and analyzed for TAL metals, nitrate, and perchlorate. Two soil samples were collected and analyzed for total cyanide only. Table 8.10-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.10-2. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.10.4.2 Organic Chemicals

In 1995, four tuff (Qbt 4) samples were collected and analyzed for VOCs, SVOCs, and explosive compounds. Seven sediment samples were collected and analyzed for SVOCs and explosive compounds. In 2009–2010, five soil, two fill, and seven tuff (Qbt 4) samples were collected and analyzed for VOCs, SVOCs, and explosive compounds. Table 8.10-3 presents the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.10-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.10.4.3 Radionuclides

In 2009–2010, five soil, two fill, and seven tuff (Qbt 4) samples were collected and analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. Table 8.10-4 presents the radionuclides detected or detected above BVs/FVs. Radionuclides detected or detected above BVs/FVs are shown in Figure 8.10-4. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.10.5 Spatial Distribution

Twenty-seven samples were collected from 14 locations (Figure 8.10-1). The extent of contamination at SWMU 16-026(d) is evaluated in the following sections.

8.10.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-026(d) is shown in Figure 8.10-2. Table 8.10-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs.

- Antimony was detected above the soil BV at location 16-609183. Antimony was not detected above the BV in any subsurface samples or at the most downgradient sample locations. Therefore, the extent of antimony is defined.
- Barium was detected above the soil, sediment, and/or Qbt 2, Qbt 3, and Qbt 4 BVs at 11 locations. Concentrations decreased with depth at locations 16-01465, 16-609184, and 16-609185. Concentrations increased at locations 16-01656 and 16-609183; barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV in the deepest sample at location 16-611017. Concentrations decreased downgradient. Therefore, the lateral extent of barium is defined, but the vertical extent is not defined.
- Cadmium and total cyanide were not detected above BVs but had detection limits above BVs. Therefore, the extent of cadmium and total cyanide is defined.
- Calcium was detected above the soil BV in the surface sample at location 16-611017. Calcium was not detected above the BV in any subsurface samples, including that from downgradient location 16-611017. Therefore, the extent of calcium is defined.
- Chloride was detected above the soil BV in the surface sample at location 16-611016. Chloride was not detected above the BV in the subsurface sample at location 16-611016 or at downgradient location 16-611017. Therefore, the extent of chloride is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01465 and 16-01656. Concentrations increased with depth at both locations but decreased downgradient. Therefore, the lateral extent of chromium is defined, but the vertical extent is not defined.

- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-01465. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of cobalt is defined.
- Copper was detected above the soil BV at location 16-611017 and above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01465 and 16-01656. Concentrations decreased with depth at all locations. Concentrations increased downgradient at location 16-611017. Therefore, the vertical extent of copper is defined, but the lateral extent is not defined.
- Lead was detected above the soil BV at location 16-609182 and above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01465 and 16-01656. Concentrations decreased with depth at all locations and decreased downgradient. Therefore, the extent of lead is defined.
- Mercury was detected above the soil BV at location 16-611017. The concentration decreased with depth but increased downgradient at location 16-611017. Therefore, the vertical extent of mercury is defined, but the lateral extent is not defined.
- Both nitrate and fluoride are naturally occurring, and the concentrations detected (0.863–3.84 and 1.37–3.18 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609185. Selenium was not detected at other downgradient locations. Therefore, the lateral extent for selenium is defined. Selenium was detected in the deeper subsurface sample collected at location 16-609185. Therefore, the vertical extent of selenium is not defined.
- Zinc was detected above the soil, sediment, or Qbt 2, Qbt 3, and Qbt 4 BVs at five locations. The concentration of zinc decreased with depth at all locations where deeper samples were collected. Zinc concentrations decreased at downgradient locations. Therefore, the extent of zinc is defined.
- Vanadium was detected above the sediment BV at location 16-01467. Only a surface sample was collected at this location. Vanadium was not detected above BVs in any other samples. Therefore, the extent of vanadium is defined.

8.10.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-026(d) is shown in Figure 8.10-3. Organic chemicals detected are presented in Table 8.10-3.

- 3,5-Dinitroaniline, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, and bis(2-ethylhexyl)phthalate were detected at location 16-609184, and 4-amino-2,6-trinitrotoluene was also detected at location 16-01656. Concentrations decreased with depth and downgradient. The extent of these organic chemicals is defined.
- Acenaphthene and fluorene were detected at locations 16-01465, 16-01470, and 16-609182. Concentrations decreased with depth at location 16-01465 and were below EQLs at location 16-609182 (only one surface sample was collected at location 16-01470). Acenaphthene and fluorene were not detected in the other samples or at downgradient sample locations. Therefore, the extent of acenaphthene and fluorene is defined.
- Anthracene was detected at six locations. Concentrations decreased with depth at all locations where deeper samples were collected except location 16-609182, where concentrations were below the EQL. Concentrations decreased downgradient. Therefore, the extent of anthracene is defined.

- Benzo(a)anthracene and chrysene were detected at eight locations. Concentrations increased with depth at location 16-609182 but decreased with depth at locations where a deeper sample was collected. Concentrations decreased downgradient. Therefore, the vertical extent of benzo(a)anthracene and chrysene is not defined, but the lateral extent is defined.
- Benzoic acid and bis(2-ethylhexyl)phthalate were detected at locations 16-01465 and 16-609184, respectively. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of benzoic acid and bis(2-ethylhexyl)phthalate is defined.
- Dibenz(a,h)anthracene and di-n-butylphthalate were detected at locations 16-01468 and 16-01465, respectively, below the EQLs. Dibenz(a,h)anthracene and di-n-butylphthalate were not detected at any other locations. Therefore, the extent of dibenz(a,h)anthracene and di-n-butylphthalate is defined.
- Diethylphthalate was detected at locations 16-01465 and 16-01656. The concentrations at location 16-01465 are below the EQL. The concentrations at location 16-01656 increased with depth. Diethylphthalate concentrations decreased downgradient. Therefore, the lateral extent of diethylphthalate is defined, but the vertical extent is not defined.
- Fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected at seven to nine locations. Concentrations increased with depth at location 16-609182. Concentrations decreased with depth at the other locations where deeper samples were collected. Concentrations decreased downgradient to location 16-611017. Therefore, the vertical extent of these organic chemicals is not defined, but the lateral extent is defined.
- Benzo(k)fluoranthene was detected at four locations. Concentrations increased at location 16-609182 and decreased with depth where deeper samples were collected. Benzo(k)fluoranthene was not detected at the furthest downgradient location. The lateral extent of benzo(k)fluoranthene is defined, but the vertical extent is not defined.
- Benzo(a)pyrene was detected at eight locations. Concentrations decreased or remained essentially the same with depth where deeper samples were collected and decreased downgradient. Therefore, the extent is defined for benzo(a)pyrene.
- Benzo(b)fluoranthene was detected at eight locations. Concentrations increased with depth at location 16-609182, and they decreased with depth at other locations where a deeper sample was collected. Therefore, the vertical extent of benzo(b)fluoranthene is not defined. Concentrations decreased downgradient to location 16-611017. Therefore, the lateral extent for benzo(b)fluoranthene is defined.
- Benzo(g,h,i)perylene was detected at seven locations. Concentrations increased with depth at location 16-609182 and decreased with depth at other locations where a deeper sample was collected. Concentrations decreased downgradient to location16-611017. Therefore, the lateral extent of benzo(g,h,i)perylene is defined, but the vertical extent is not defined.
- HMX was detected at location 16-609184. HMX was also detected in the subsurface sample at locations 16-609183 and 16-611017, below the EQL. Concentrations decreased with depth at location 16-609184 and downgradient. Therefore, the extent of HMX is defined.
- Naphthalene was detected at location 16-01465. Concentrations decreased with depth and downgradient. Therefore, the extent of naphthalene is defined.
- RDX was detected at locations 16-609184, 16-01467, 16-609182, and 16-609183. Concentrations decreased with depth at locations 16-609182 and 16-609184 but increased with depth at location 16-609183; only a surface sample was collected at location 16-01467. RDX was

not detected downgradient at location 16-611017. Therefore, the lateral extent of RDX is defined, but the vertical extent is not defined.

- 2,4,6-Trinitrotoluene was detected at locations 16-01465 and 16-01656. Concentrations decreased with depth and downgradient. Therefore, the extent of 2,4,6-trinitrotoluene is defined.
- 1,3-Xylene+1,4-xylene was detected at location 16-609183, below the EQL. 1,3-Xylene+1,4-xylene was not detected at any other locations. Therefore, the extent of 1,3-xylene+1,4-xylene is defined.

8.10.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-026(d) is shown in Figure 8.10-4. Radionuclides detected or detected above BVs/FVs are presented in Table 8.10-4.

- Cesium-137 was detected at location 16-611017. The activity of cesium-137 decreased with depth. Sample location 16-611017 is the furthest downgradient sample location. Therefore, the lateral extent of cesium-137 is not defined, but the vertical extent is defined.

8.10.5.4 Summary of Extent

The lateral extent of copper, mercury, and cesium-137 is not defined. The vertical extent is not defined for barium, chromium, selenium, benzo(a)anthracene, chrysene, diethylphthalate, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and RDX. Therefore, the overall extent of contamination at SWMU 16-026(d) is not defined.

8.10.6 Summary of Human Health Risk Assessment

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-026(d).

8.10.7 Summary of Ecological Risk Assessment

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-026(d).

8.11 SWMU 16-026(e)—Outfall

8.11.1 Site Description and Operational History

SWMU 16-026(e) is an outfall located to the south of building 16-301 (Figure 8.11-1). The outfall formerly received discharge from two HE sumps [SWMU 16-029(d)] located on the exterior west side of building 16-301. The outfall discharged to Martin Spring Canyon. The sumps were plugged in 1990-1991. Building 16-301 originally housed mock-HE processing operations and stored raw materials that were used to prepare mock HE. Building 16-301 was later used as an environmental testing laboratory for research into the effects of temperature, pressure, and humidity on weapons and components (LANL 1993, 020948, p. 5-28).

8.11.2 Summary of Previous Investigations

During the 1995 RFI conducted at SWMU 16-026(e), 11 samples were collected from locations 16-01471, 16-01472, 16-01473, 16-01474, 16-01475, 16-01476, and 16-01657 from depths of 0.0–0.5, 0.75–1.25, 1.75–2.25, and 5.5–7.0 ft bgs. All samples were screened by an HE spot test, PID, and sodium-iodide scintillation detector and submitted for analysis of total cyanide, HE, TAL metals, and SVOCs. The four subsurface samples were also analyzed for VOCs. Field-screening results were all nondetects or below BVs. Metals detected or detected above BVs included barium, chromium, cobalt, copper, lead, vanadium, and zinc. Numerous VOCs, SVOCs, and HE were also detected. Decision-level data from the 1995 investigation are included in this report.

During the 1997 Phase II RFI conducted at SWMU 16-026(e), two samples were collected from one location from the 1995 RFI (location 16-01657) at depths of 8.0–8.5 and 10.5–11.5 ft bgs and submitted for analysis of TAL metals. Decision-level data from the 1997 investigation are included in this report. Metals detected above BVs included aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, vanadium, and zinc.

Table 8.11-1 presents the samples collected and analyses requested at SWMU 16-026(e). Table 8.11-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Sampling locations and results for inorganic chemicals above BVs or detected with no BVs are shown on Plate 10.

8.11.3 Field-Screening Results

A total of 29 samples, collected at 11 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3) except for arsenic, barium, and lead. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Arsenic and lead were detected in the 4.5- to 6.0-ft bgs samples at each of the three locations. Arsenic was measured at 281 ppm and lead at 7752 ppm in sample RE16-10-2877 at location 16-609200. Sample RE16-10-2879 at location 16-609201 contained arsenic at 331 ppm and lead at 11790 ppm. Sample RE16-10-2881 at location 16-609202 contained arsenic at 298 ppm and lead at 7856 ppm.

Based on these results, 21 step-out samples (RE16-10-14202 through RE16-10-14222) were collected. Step-out samples were collected below, to the east, and to the west of the original sample locations. Step-out samples for location 16-609201 were moved to the north because of utility locations. Arsenic and lead had concentrations that were less than the established criteria (Appendix C, section C-2.3) in all of the step-out samples.

At location 16-611814, barium had a concentration greater than the established criteria (Appendix C, section C-2.3) in sample RE16-10-14205 (1212 ppm), and associated field duplicate sample RE16-10-14227 contained barium measured at 945 ppm.

Based on these results, two additional step-out samples (RE16-10-14884 and RE16-10-14885) were collected.

8.11.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-026(e) are shown in Figure 8.11-1. Table 8.11-1 summarizes the samples collected and analyses requested.

8.11.4.1 Inorganic Chemicals

In 1995, seven sediment and four tuff (Qbt 4) samples were collected and analyzed for TAL metals and total cyanide. In 1997, two tuff (Qbt 4) samples were collected and analyzed for TAL metals. In 2009–2010, 17 tuff (Qbt 4) samples, 11 soil samples, and 1 fill sample were collected and analyzed for TAL metals, total cyanide, anions, and perchlorate. Table 8.11-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown on Plate 10. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.11.4.2 Organic Chemicals

In 1995, four tuff (Qbt 4) samples were collected and analyzed for VOCs, SVOCs, and explosive compounds. Seven sediment samples were collected and analyzed for SVOCs and explosive compounds. In 2009–2010, 17 tuff (Qbt 4) samples, 11 soil samples, and 1 fill sample were collected and analyzed for VOCs, SVOCs, and explosive compounds. Table 8.11-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown on Plate 11. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.11.4.3 Radionuclides

In 2009–2010, 11 soil samples, 1 fill sample, and 17 tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the samples was analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. Table 8.11-4 lists the radionuclides detected or detected above BVs/FVs. Radionuclides detected or detected above BVs/FVs are shown in Figure 8.11-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.11.5 Spatial Distribution

Forty-two samples were collected at 18 locations (Figure 8.11-1). The extent of contamination at SWMU 16-026(e) is evaluated in the following sections.

8.11.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-026(e) is shown on Plate 10. The analytical results are presented in Table 8.11-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609201. Aluminum was not detected above BV in the 8.5- to 9.0-ft-bgs samples at nearby locations 16-611816, 16-611815, and 16-611819. Concentrations decreased downgradient. Therefore, the extent of aluminum is defined.

- Antimony, total cyanide, selenium, and thallium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, total cyanide, selenium, and thallium is defined.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01657, 16-609201, 16-611814, and 16-611815. Arsenic was not detected above BV in the 8.5- to 9.0-ft-bgs samples at location 16-611815 and adjacent locations 16-611816 and 16-611819. Concentrations decreased with depth at locations 16-01657 and 16-611815. Arsenic was not detected above BV at 9.0–9.5 ft bgs at location 16-611813 and at 10.5–11.5 ft bgs at location 16-01657, both of which are less than 15 ft from location 16-611814. Arsenic was not detected further downgradient. Concentrations decreased downgradient. Therefore, the extent of arsenic is defined.
- Barium was detected above the BVs at 15 locations. Concentrations decreased with depth at eight locations. Only a surface sample was collected at five locations and concentrations decreased with depth in adjacent or nearby locations except at location 16-01475. At location 16-01475, barium concentrations increased with depth at nearby location 16-609201. Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV only in the deepest samples at locations 16-609201 and 16-611816. Nearby locations 16-611815 and 16-611819 (within approximately 25 ft or less) did not detect barium above BVs in the 8.5- to 9.0-ft-bgs samples. Concentrations decreased downgradient. Therefore, the vertical extent of barium is not defined, but the lateral extent is defined.
- Cadmium was detected above the soil BV at location 16-609200. Concentrations decreased with depth and downgradient. Therefore, the extent of cadmium is defined.
- Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-01471. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of calcium is defined.
- Chloride was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609200 and 16-609202. Concentrations were below the maximum background concentration (465 mg/kg), and chloride was not detected elsewhere. Therefore, the extent of chloride is defined.
- Chromium was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at five locations. Concentrations decreased with depth at locations 16-01657, 16-609200, and 16-609202. Chromium was detected in only the deepest samples at locations 16-01471 and 16-609201 but was not detected at any of the locations at deeper than 8.5 ft bgs. This includes location 16-01657, which is within approximately 15 ft of location 16-01471, and locations 16-611815, 16-611816, and 16-611819, which are within approximately 25 ft of location 16-609201. Concentrations decreased downgradient. Therefore, the extent of chromium is defined.
- Cobalt was detected above the sediment and Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-01471, 16-01472, and 16-01657. Concentrations decreased with depth at locations 16-01471 and 16-01657. At locations 16-01472 only a surface sample was collected. Cobalt was not detected above BVs in adjacent locations 16-611813 and 16-611814 at deeper depths. Concentrations also decreased downgradient. Therefore, the extent of cobalt is defined.
- Copper was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at locations 16-01471, 16-01657, and 16-609200. Concentrations decreased with depth at all locations and decreased downgradient. Therefore, the extent of copper is defined.

- Fluoride was detected at all locations. Fluoride is naturally occurring, and the concentrations detected (0.877–17.1 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil, sediment, or Qbt 2, Qbt 3, and Qbt 4 BVs at eight locations. Concentrations decreased with depth at five locations. Only a surface sample was collected at locations 16-01473 and 16-01474, but lead was not detected above BVs at depth in nearby locations. Lead was detected above the Qbt 2, Qbt 3, and Qbt 4 BV only in the deepest sample at location 16-609201. Nearby locations 16-611815 and 16-611819 (within approximately 25 ft or less) did not detect lead above BVs in the 8.5- to 9.0-ft-bgs samples. Concentrations also decreased downgradient. Therefore, the extent of lead is defined.
- Manganese was detected above sediment or soil BVs at locations 16-01657 and 16-611815. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of manganese is defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-10657. Nickel was not detected above BV in the deepest sample at this location and concentrations decreased with depth. Nickel was not detected in any samples collected downgradient, and concentrations decreased downgradient. Therefore, the extent of nickel is defined.
- Nitrate was detected at locations 16-609201, 16-609202, 16-611813, 16-611814, 16-611818, and 16-611878. Nitrate is naturally occurring, and the concentrations detected (0.15–2.27 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent for nitrate is defined.
- Phosphorus, orthophosphate (expressed as PO_4) was detected at location 16-611878. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of Phosphorus, orthophosphate is defined.
- Silver was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01657 and 16-611817. Concentrations decreased with depth at location 16-01657 and increased with depth at location 16-611817. Therefore, the vertical extent of silver is not defined. Silver was not detected above BV at location 16-01476, the furthest downgradient location. Therefore, the lateral extent of silver is defined.
- Vanadium was detected above the sediment BV at locations 16-01471 and 16-01473. Only a surface sample was collected at location 16-01473, but vanadium was not detected above BV in any samples from 5.5 ft bgs or deeper. Concentrations decreased with depth at location 16-01471. Concentrations also decreased downgradient. Therefore, the extent of vanadium is defined.
- Zinc was detected above the sediment, soil, or Qbt 2, Qbt 3, and Qbt 4 BVs at seven locations. Concentrations decreased with depth at four locations. Only a surface sample was collected at locations 16-01472 and 16-01473, and concentrations increased with depth at location 16-611878. Concentrations at nearby or adjacent locations to these three locations (16-611813 and 16-611814) did not detect zinc above BVs in deeper samples. Zinc was not detected above BVs in the furthest downgradient locations and decreased downgradient. Therefore, the extent of zinc is defined.

8.11.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-026(e) is shown on Plate 11. The analytical results are presented in Table 8.11-3.

- 3,5-Dinitroaniline was detected at location 16-611878. The concentration decreased with depth and downgradient. Therefore, the extent of 3,5-dinitroaniline is defined.
- Acenaphthene was detected at locations 16-01471, 16-01472, and 16-611878. Concentrations decreased with depth at locations 16-01471 and 16-611818. All concentrations were below the EQL. Therefore, the extent of acenaphthene is defined.
- Acetone was detected at location 16-611813, and 1,3-xylene+1,4-xylene was detected at location 16-609201. Concentrations for both organic chemicals were below the EQLs. Therefore, the extent of acetone and 1,3-xylene+1,4-xylene is defined.
- 4-Amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene were detected at six and five locations, respectively. Concentrations decreased with depth at four locations. Only surface samples were collected at locations 16-01473, 16-01474, and 16-01475, but 4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene were not detected at deeper depths at nearby locations. In addition, all concentrations were below the EQLs. Concentrations decreased downgradient for both organic chemicals. Therefore, the extent of 4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene is defined.
- Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected at 2 to 11 locations. Concentrations decreased with depth at most locations. Only surface samples were collected at locations 16-01472, 16-01473, 16-01474, and 16-01475, but these organic chemicals were either not detected or detected at lower concentrations at deeper depths at nearby locations. Benzo(b)fluoranthene concentrations increased slightly at locations 16-609200 and 16-611814, but these concentrations were below the EQLs. Concentrations also decreased downgradient. Therefore, the extent of these organic chemicals is defined.
- Dibenz(a,h)anthracene was detected at locations 16-01471 and 16-01472. Concentrations decreased with depth at location 16-01471. Only a surface sample was collected at location 16-01472, but dibenz(a,h)anthracene was not detected in any deeper samples. Concentrations also decreased downgradient. Therefore, the extent of dibenz(a,h)anthracene is defined.
- Fluorene was detected at locations 16-01471, 16-01472, and 16-611878. Concentrations decreased with depth at locations 16-01471 and 16-611878. Only a surface sample was collected at location 16-01472, but fluorene was not detected in any deeper samples. Concentrations also decreased downgradient. Therefore, the extent of fluorene is defined.
- Bis(2-ethylhexyl)phthalate was detected at location 16-611878. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- Diethylphthalate was detected in only the deepest sample at location 16-01471, below the EQL. Diethylphthalate was not detected in deeper samples at any other locations, including at nearby location 16-01657. Concentrations decreased downgradient. Therefore, the extent of diethylphthalate is defined.
- HMX was detected at five locations. Concentrations decreased with depth at three locations. HMX was detected in the deepest samples at locations 16-609201 (5.5–6.0 ft bgs) and 16-611815 (8.5–9.0 ft bgs). HMX was not detected in nearby location 16-611819 at 8.5–9.0 ft bgs

(within approximately 25 ft or less). Concentrations decreased downgradient. Therefore, the vertical extent of HMX is not defined, but the lateral extent is defined.

- Methylene chloride was detected at five locations. Concentrations decreased with depth at four locations. Methylene chloride was detected only in the deepest sample at location 16-609201, below the EQL. In addition, methylene chloride was detected at nearby locations 16-611815, 16-611816, and 16-611819 at 8.5–9.0 ft bgs (within approximately 25 ft or less). Concentrations decreased downgradient. Therefore, the extent of methylene chloride is defined.
- RDX was detected at three locations. Concentrations decreased with depth at all locations. RDX was detected in the deepest sample at location 16-609201 (5.5–6.0 ft bgs) but was not detected in nearby location 16-611819 at 8.5–9.0 ft bgs (within approximately 25 ft or less). Concentrations decreased downgradient. Therefore, the extent of RDX is defined.
- Tetrachloroethene was detected at two locations. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of tetrachloroethene is defined.
- 2,4,6-Trinitrotoluene was detected at six locations. Concentrations decreased with depth at four locations. Only surface samples were collected at locations 16-01473 and 16-01474, but 2,4,6-trinitrotoluene was either not detected or detected at lower concentrations at deeper depths at nearby locations. Concentrations decreased downgradient. Therefore, the extent of 2,4,6-trinitrotoluene is defined.

8.11.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-026(e) is shown in Figure 8.11-2. The analytical results are presented in Table 8.11-4.

- Americium-241 was detected above the soil FV at location 16-609200. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of americium-241 is defined.
- Plutonium-239/240 was detected at locations 16-611813 and 16-611817. Concentrations increased with depth. Therefore, the vertical extent of plutonium-239/240 is not defined. Concentrations decreased downgradient. Therefore, the lateral extent of plutonium-239/240 is defined.

8.11.5.4 Summary of Extent

The lateral extent is defined for all inorganic chemicals, organic chemicals, and radionuclides. The vertical extent is defined for all inorganic chemicals except barium and silver. The vertical extent is defined for all the organic chemicals except HMX. The vertical extent is also not defined for plutonium-239/240. Therefore, the extent is not defined for SWMU 16-026(e).

8.11.6 Summary of Human Health Risk Assessment Results

Since the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-026(e).

8.11.7 Summary of Ecological Risk Assessment Results

Since the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-026(e).

8.12 SWMU 16-029(a)—Sumps

8.12.1 Site Description and Operational History

SWMU 16-029(a) consists of two inactive HE sumps located on the southeast side of a rest house (building 16-307) (Figure 8.12-1). The sumps were plugged in 1990. Used to store molds and materials for plastics development, the rest house also housed a solvent disassembly tank used to remove HE from test devices (LANL 1989, 068685).

8.12.2 Summary of Previous Investigations

During the 1995 RFI conducted at SWMU 16-029(a), three samples were collected at location 16-01453 from depths of 0.0–0.5, 0.33–1.33, and 3.0–4.0 ft bgs. All samples were screened by an HE spot test, PID, and sodium-iodide scintillation detector and submitted for analysis of total cyanide, TAL metals, HE, and SVOCs; the two subsurface samples were also analyzed for VOCs. Field-screening results were all nondetects or below BVs. Fixed laboratory data from the 1995 RFI presented here are decision-level data. Metals detected above BVs included arsenic, barium, cadmium, chromium, and copper. Numerous VOCs, SVOCs, and HE were also detected.

8.12.3 Field-Screening Results

A total of four samples, collected at two locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan(LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.12.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-029(a) are shown in Figure 8.12-1. Table 8.12-1 summarizes the samples collected and analyses requested.

8.12.4.1 Inorganic Chemicals

One sediment, one fill, one soil, and four tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Four samples were analyzed for TAL metals, anions, perchlorate, and total cyanide. Three samples were analyzed for TAL metals and total cyanide only. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.12-2. Table 8.12-2 lists the inorganic chemicals detected above BVs. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.12.4.2 Organic Chemicals

One sediment, one fill, one soil, and four tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Six samples were analyzed for VOCs, SVOCs, and explosive compounds. One sample was analyzed for SVOCs and explosive compounds only. Table 8.12-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.12-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.12.4.3 Radionuclides

One fill, one soil, and two tuff (Qbt 4) samples were collected and analyzed for radionuclides. One sediment and two tuff (Qbt 4) samples were not analyzed for radionuclides. Each of the four samples was analyzed for gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and americium-241. There were no radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.12.5 Spatial Distribution

Seven samples were collected from three sample locations (Figure 8.12-1). One surface (0.0–0.5 or 0.33–1.33 ft bgs) and one subsurface (3.0–4.0, 5.0–5.5, or 9.0–9.5 ft bgs) sample was collected at each sample location. Because of the nature of operation of the HE sumps, the primary potential release mechanism for the sumps is infiltration; thus, lateral migration is not a transport mechanism for locations 16-609209 and 16-609210. For location 16-01453 at the northeast side of the outfall, lateral migration is an appropriate transport mechanism. The next location downgradient from location 16-01453 is location 16-609189, which is included among the sample locations at SWMU 16-026(b). SWMU 16-026(b) is discussed in section 8.8. Location 16-609189 is shown in Figure 8.8-2 for inorganic chemicals and in Figure 8.8-3 for organic chemicals. Tables 8.8-2 and 8.8-3 list inorganic chemicals above BV and organic chemical detected at location 16-609189, respectively The extent of contamination at SWMU 16-029(a) is evaluated in the following sections.

8.12.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-029(a) is shown in Figure 8.12-2. The analytical results are presented in Table 8.12-2.

- Antimony, cadmium, total cyanide, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, total cyanide, and selenium is defined.
- Arsenic was detected above the soil BV at location 16-609209. Concentrations decreased with depth. Therefore, the extent of arsenic is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609209, and below the soil BV at 255 mg/kg in the shallower sample. Concentrations decreased with depth at the southwest sump (location 16-609209). Barium concentrations also decreased with depth at location 16-01453. Concentrations of barium decreased downgradient. Therefore, the extent of barium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-01453. Concentrations increased with depth at this location and decreased downgradient. Therefore, the vertical extent of chromium is not defined and the lateral extent is defined.

- Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-01453. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of copper is defined.
- Fluoride was detected at locations 16-609209 and 16-609210. Fluoride is naturally occurring and the concentrations detected (4.08–13.7 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Nitrate was detected at location 16-609210. Nitrate is naturally occurring and the concentrations detected (1.42–1.56 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.

8.12.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-029(a) is shown in Figure 8.12-3; the analytical results are presented in Table 8.12-3.

- Acenaphthene was detected at location 16-01453. Concentrations decreased with depth and increased downgradient. Therefore, the vertical extent of acenaphthene is defined, but the lateral extent is not defined.
- Acetone was detected at locations 16-01453 and 16-609210. Concentrations did not change with depth at location 16-01453 and decreased with depth at location 16-609210. Acetone was not detected in the next sample location downgradient (16-609189); therefore, concentrations decreased downgradient. Therefore, the vertical extent of acetone is not defined, but the lateral extent is defined.
- 4-Amino-2,6-dinitrotoluene was detected at location 16-01453. Concentrations increased with depth, but 4-amino-2,6-dinitrotoluene was not at deeper depths at location 16-609210 and was not detected in the next sample location downgradient. Therefore, the extent of 4-amino-2,6-dinitrotoluene is defined.
- 2-Amino-4,6-dinitrotoluene was detected at location 16-01453. Concentrations decreased with depth. Concentrations also decreased downgradient. Therefore, the extent of 2-amino-4,6-dinitrotoluene is defined.
- Anthracene was detected at locations 16-01453 and 16-609209. Concentrations increased with depth and downgradient. Therefore, the extent of anthracene is not defined.
- Benzo(a)anthracene was detected at locations 16-01453 and 16-609209. Concentrations were unchanged with depth at location 16-01453, increased slightly with depth at location 16-609209, and increased downgradient. Therefore, the vertical extent of benzo(a)anthracene is not defined, and the lateral extent is not defined.
- Benzo(a)pyrene was detected at locations 16-01453, 16-609209, and 16-609210. Concentrations decreased with depth at locations 16-01453 and 16-609210. Concentrations increased in the downgradient surface sample. Therefore, the vertical extent of benzo(a)pyrene is not defined, and the lateral extent is not defined.
- Benzo(b)fluoranthene was detected at location 16-01453. Concentrations decreased with depth. Benzo(b)fluoranthene was also detected at locations 16-609209 and 16-609210. Concentrations increased with depth at location 16-609209 and decreased with depth at location 16-609210. Concentrations increased in the downgradient surface sample. Therefore, the vertical extent of benzo(b)fluoranthene is not defined, and the lateral extent is not defined.

- Benzo(g,h,i)perylene was detected at location 16-01453. Concentrations decreased with depth. Benzo(g,h,i)perylene was also detected at locations 16-609209 and 16-609210. Concentrations increased with depth at location 16-609209 and decreased with depth at location 16-609210. Concentrations increased in the downgradient surface sample. Therefore, the vertical and lateral extent of benzo(g,h,i)perylene are not defined.
- Benzo(k)fluoranthene was detected at location 16-01453. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of benzo(k)fluoranthene is defined.
- Chrysene was detected at locations 16-01453 and 16-609209. Concentrations decreased with depth at location 16-01453 and increased at location 16-609209. Concentrations increased downgradient. Therefore, the vertical and lateral extent of chrysene are not defined.
- Dibenz(a,h)anthracene was detected at location 16-01453. Concentrations decreased with depth and downgradient. Therefore, the extent of dibenz(a,h)anthracene is defined.
- Diethylphthalate was detected at location 16-01454. Concentrations increased with depth and downgradient. Therefore, the extent of diethylphthalate is not defined.
- 2,4-Dinitrotoluene was detected at location 16-01453. Concentrations decreased with depth and downgradient. Therefore, the extent of 2,4-dinitrotoluene is defined.
- Ethylbenzene was detected at location 16-609209. Concentrations decreased with depth and downgradient. Therefore, the extent of ethylbenzene is defined.
- Fluoranthene was detected at three locations. Concentrations increased with depth at location 16-609209 and decreased with depth at location 16-609210. Concentrations decreased with depth at location 16-01453. Concentrations increased downgradient. Therefore, the extent of fluoranthene is not defined.
- Fluorene was detected at location 16-01453. Concentrations increased with depth and increased downgradient. Therefore, the extent of fluorene is not defined.
- HMX was detected at location 16-01453. Concentrations decreased with depth and downgradient. Therefore, the extent of HMX is defined.
- Indeno(1,2,3-cd)pyrene was detected at three locations. Concentrations increased with depth at location 16-609209 and decreased with depth at location 16-609210. Concentrations decreased with depth at location 16-01453. Concentrations increased downgradient. Therefore, the extent of indeno(1,2,3-cd)pyrene is not defined.
- Nitrobenzene and 3-nitrotoluene were detected at location 16-01453. Concentrations decreased with depth and were not detected in the next location downgradient. Therefore, the extent of 3-nitrobenzene and nitrotoluene is defined.
- Phenanthrene and pyrene were detected at three locations. Concentrations increased with depth at location 16-609209 and decreased with depth at location 16-609210. At location 16-01453, concentrations decreased with depth. Concentrations increased downgradient. Therefore, the extent of phenanthrene and pyrene is not defined.
- RDX was detected at location 16-01453. Concentrations decreased with depth. RDX was not detected in the next sample location downgradient. Therefore, the extent of RDX is defined.
- Toluene was detected at location 16-609209. Concentrations decreased with depth. Therefore, the extent of toluene is defined.

- 1,3,5-Trinitrobenzene was detected at location 16-01453. Concentrations decreased with depth. 1,3,5-Trinitrobenzene was not detected in the next location downgradient. Therefore, the extent of 1,3,5-trinitrobenzene is defined.
- 2,4,6-Trinitrotoluene was detected at location 16-01453. Concentrations decreased with depth. 2,4,6-Trinitrotoluene was not detected in the next location downgradient. Therefore, the extent of 2,4,6-trinitrotoluene is defined.
- 1,2-Xylene was detected at location 16-609209. Concentrations decreased with depth. Therefore, the extent of 1,2-xylene is defined.
- 1,3-Xylene+1,4-xylene was detected at location 16-609209. Concentrations decreased with depth. Therefore, the extent of 1,3-xylene+1,4-xylene is defined.

8.12.5.3 Radionuclides

No radionuclides were detected or detected above BVs/FVs.

8.12.5.4 Summary of Extent

The vertical extent is defined for all inorganic chemicals except chromium. The lateral extent is defined for all inorganic chemicals. The vertical extent is defined for all organic chemicals except acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, diethylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. The lateral extent is defined for all organic chemicals except acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, diethylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. No radionuclides were detected or detected above BVs/FVs. Therefore, the extent of contamination at SWMU 16-029(a) is not defined.

8.12.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-029(a).

8.12.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-029(a).

8.13 SWMU 16-029(b)—Sumps

8.13.1 Site Description and Operational History

SWMU 16-029(b) consists of two inactive HE sumps located on the exterior west wall of a rest house (building 16-305) (Figure 8.13-1). The sumps were plugged in 1990. Used to store chemicals and solvents for plastics development and production, the rest house was also used for filament winding of developmental weapons components.

8.13.2 Summary of Previous Investigations

During the 1995 RFI conducted at SWMU 16-029(b), one sample was collected and field screened by HE spot test, PID, and sodium-iodide scintillation detector. Data from the 1995 RFI are field-screening-level data and are presented in Appendix D of the HIR (LANL 2008, 100693). Field-screening results were all nondetects or below background.

8.13.3 Field-Screening Results

A total of four samples, collected at two locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.13.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-029(b) are shown in Figure 8.13-1. Table 8.13-1 summarizes the samples collected and analyses requested.

8.13.4.1 Inorganic Chemicals

Four tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. All samples were analyzed for metals, total cyanide, anions, and perchlorate. Table 8.13-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.13-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.13.4.2 Organic Chemicals

Four tuff (Qbt 4) samples were collected and analyzed for organic chemicals. All samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 8.13-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.13-3. Because the extent of contamination is not determined for the site, COPCs have not been identified.

8.13.4.3 Radionuclides

Four tuff (Qbt 4) samples were collected and analyzed for radionuclides. All samples were analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. No radionuclides were detected or detected above BVs/FVs at the site.

8.13.5 Spatial Distribution

Because of the nature of operation of the HE sumps, the primary potential release mechanism for this SWMU is infiltration; thus, lateral migration is not a transport mechanism and lateral extent was not evaluated.

8.13.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-029(b) is shown in Figure 8.13-2. The analytical results are presented in Table 8.13-2.

- Aluminum, chloride, and copper were detected or detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609199. Concentrations decreased with depth. Therefore, the extent of aluminum, chloride, and copper is defined.
- Antimony was not detected above BV but had detection limits above BV. Therefore, the extent of antimony is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609198 and 16-609199. Concentrations decreased with depth. Therefore, the extent of barium is defined.
- Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609199. Concentrations increased with depth. Therefore, the extent of calcium is not defined.
- Fluoride was detected at all locations. Fluoride is naturally occurring, and the concentrations detected (1.5–5.05 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609199. Because the detection limit in the shallower sample is higher than the detected concentration, it is not possible to determine if concentrations decreased with depth. Therefore, the extent of selenium is not defined.

8.13.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-029(b) is shown in Figure 8.13-3. The analytical results are presented in Table 8.13-3.

- Acenaphthene and fluorene were detected at location 16-609198. Concentrations decreased with depth and were below the EQLs. Therefore, the extent of acenaphthene and fluorene is defined.
- Acetone was detected at locations 16-609198 and 16-609199. Concentrations decreased with depth at location 16-609198 and increased with depth at location 16-609199. Therefore, the extent of acetone is not defined.
- Anthracene was detected at locations 16-609198 and 16-609199. Concentrations were below the EQL. Therefore, the extent of anthracene is defined.
- Benzo(a)anthracene, fluoranthene, phenanthrene, and pyrene were detected at locations 16-609198 and 16-609199. Concentrations decreased with depth at location 16-609198 and increased with depth at location 16-609199. Therefore, the extent for benzo(a)anthracene, fluoranthene, phenanthrene, and pyrene is not defined.
- Benzo(a)pyrene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene were detected at locations 16-609198 and 16-609199. Concentrations decreased with depth at location 16-609198.

Concentrations were below EQLs at location 16-609199. Therefore, the extent of benzo(a)pyrene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene is defined.

- Benzo(b)fluoranthene and chrysene were detected at locations 16-609198 and 16-609199. Concentrations decreased with depth at location 16-609198 and increased with depth at location 16-609199. Therefore, the extent of benzo(b)fluoranthene and chrysene is not defined.

8.13.5.3 Radionuclides

No radionuclides were detected or detected above their BVs/FVs.

8.13.5.4 Summary of Extent

The extent is defined for all inorganic chemicals except calcium and selenium. The extent is not defined for the following organic chemicals: acetone, benzo(a)anthracene, fluoranthene, phenanthrene, pyrene, benzo(b)fluoranthene, and chrysene, No radionuclides were detected or detected above BVs/FVs. Therefore, the overall extent of contamination at SWMU 16-029(b) is not defined.

8.13.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-029(b).

8.13.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-029(b).

8.14 SWMU 16-029(c)—Sumps

8.14.1 Site Description and Operational History

SWMU 16-029(c) consists of two inactive HE sumps located on the exterior west wall of a rest house (building 16-303) (Figure 8.14-1). The sumps formerly discharged to an outfall [SWMU 16-026(d)] located southeast of the rest house. The sumps were plugged in 1990. The rest house was used for storing raw materials for the HE casting facility (building 16-302).

8.14.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-029(c).

8.14.3 Field-Screening Results

Four samples, collected at two locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the

XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.14.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-029(c) are shown in Figure 8.14-1. Table 8.14-1 summarizes the samples collected and analyses requested.

8.14.4.1 Inorganic Chemicals

Four tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. The samples were analyzed for TAL metals, perchlorate, total cyanide, and anions. Table 8.14-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.14-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.14.4.2 Organic Chemicals

Four tuff (Qbt 4) samples were collected and analyzed for organic chemicals. The samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 8.14-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.14-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.14.4.3 Radionuclides

Four tuff (Qbt 4) samples were collected and analyzed for radionuclides. The samples were analyzed for gamma-emitting radionuclides, americium-241, isotopic plutonium, and isotopic uranium. Radionuclides were not detected or detected above BVs/FVs at the site.

8.14.5 Spatial Distribution

Four samples from two sample locations (Figure 8.14-1) were evaluated to determine the extent of contamination at SWMU 16-029(c). Two subsurface samples were collected at 5.0–5.5 ft, one subsurface sample was collected at 9.0–9.5 ft, and one subsurface sample was collected at 9.5–10.0 ft. Because of the nature of operation of the HE sumps, the primary potential release mechanism is infiltration; thus, lateral migration is not a transport mechanism and lateral extent was not evaluated.

The vertical extent of contamination at SWMU 16-029(c) is evaluated in the following sections.

8.14.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-029(c) is shown in Figure 8.14-2. Analytical results are presented in Table 8.14-2.

- Antimony was not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony is defined.

- Fluoride was detected at both locations. Fluoride is naturally occurring and the concentrations detected (1.28–1.38 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609214. Concentrations increased with depth at location 16-609214. Therefore, the extent of selenium is not defined.

8.14.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-029(c) is shown in Figure 8.14-3. The analytical results are presented in Table 8.14-3.

- Acenaphthene, benzo(a)anthracene, fluorene, 2-methylnaphthalene, and naphthalene were detected at location 16-609214. Concentrations decreased with depth. Therefore, the extent of acenaphthene, benzo(a)anthracene, fluorene, 2-methylnaphthalene, and naphthalene is defined.
- Benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected at location 16-609214. Concentrations decreased with depth. Therefore, the extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene is defined.
- Anthracene, fluoranthene, and pyrene were detected at locations 16-609213 and 16-609214. Concentrations decreased with depth. Therefore, the extent of anthracene, fluoranthene, and pyrene is defined.
- Bis(2-ethylhexyl)phthalate was detected at location 16-609213. Concentrations decreased with depth and were below the EQL. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.

8.14.5.3 Radionuclides

Radionuclides were not detected or detected above the BVs/FVs.

8.14.5.4 Summary of Extent

The extent is not defined for selenium. Therefore, the overall extent of contamination at SWMU 16-029(c) is not defined.

8.14.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-029(c).

8.14.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-029(c).

8.15 SWMU 16-029(d)—Sumps

8.15.1 Site Description and Operational History

SWMU 16-029(d) consists of two inactive HE sumps located on the exterior west wall of a mock-HE-processing building (building 16-301) (Figure 8.15-1). The sumps formerly discharged to an outfall [SWMU 16-026(e)] located to the south of the mock-HE-processing building. The sumps were plugged in 1990. Building 16-301 was also used as a raw materials storage area for building 16-300 (LANL 1993, 020948, p. 5-28).

8.15.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-029(d).

8.15.3 Field-Screening Results

Four samples, collected at two locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C 2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

8.15.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-029(d) are shown in Figure 8.15-1. Table 8.15-1 summarizes the samples collected and analyses requested.

8.15.4.1 Inorganic Chemicals

Four (one soil, one fill, and two tuff [Qbt 4]) samples were collected and analyzed for inorganic chemicals. The samples were analyzed for TAL metals, perchlorate, total cyanide, and anions. Table 8.15-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 8.15-2. The nature and extent of inorganic contamination are defined at SWMU 16-029(d).

Antimony and selenium are identified as COPCs in tuff at SWMU 16-029(d).

- Antimony was not detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs (0.83 and 0.5 mg/kg), but had detection limits (1.04–1.12 mg/kg) above the BVs in three samples. The detection limits were also slightly above the maximum soil background concentration (1 mg/kg). Because the detection limits are similar to the maximum soil background concentration, antimony is not identified as a COPC in soil but is identified as a COPC in tuff.

- Cadmium was not detected above soil BV (0.4 mg/kg), but had a detection limit (0.557 mg/kg) above the BV in one sample. The detection limit was below the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC.
- Fluoride was detected at two locations. Fluoride is naturally occurring and the concentrations detected (1.49–2.13 mg/kg) likely reflect naturally occurring concentrations, Therefore, fluoride is not identified as a COPC.
- Nitrate was detected at one location. Nitrate is naturally occurring and the concentrations detected (1.22–1.41 mg/kg) likely reflect naturally occurring concentrations. Therefore, nitrate is not identified as a COPC.
- Selenium was not detected above the Qbt 2, Qbt 3, and Qbt 4 BV (0.3 mg/kg), but had detection limits (1.08–1.15 mg/kg) above the BV in two tuff samples. Selenium is identified as a COPC in tuff.

8.15.4.2 Organic Chemicals

Four (one soil, one fill, and two tuff [Qbt 4]) samples were collected and analyzed for organic chemicals. The samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 8.15-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 8.15-3. The nature and extent of organic contamination are defined at SWMU 16-029(d).

The following organic chemicals were detected in soil and/or tuff and are identified as COPCs: acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and tetrachloroethene.

8.15.4.3 Radionuclides

Four (one soil, one fill, and two tuff [Qbt 4]) samples were collected and analyzed for radionuclides. The samples were analyzed for gamma-emitting radionuclides, americium-241, isotopic plutonium, and isotopic uranium. There were no radionuclides detected or detected above BVs/FVs.

No radionuclides are retained as COPCs at SWMU 16-029(d).

8.15.5 Spatial Distribution of COPCs

Four samples from two sample locations (Figure 8.15-1) were evaluated to determine the extent of contamination at SWMU 16-029(d). Two subsurface samples were collected at 5.0–5.5 ft and two subsurface samples were collected at 9.0–9.5 ft. Because of the nature of operation of the HE sumps, the primary potential release mechanism for this SWMU is infiltration; thus, lateral migration is not a transport mechanism.

The extent of contamination at SWMU 16-029(d) is evaluated in the following sections.

8.15.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-029(d) is shown in Figure 8.15-2. Analytical results are presented in Table 8.15-2. Because there are less than 10 samples per medium sampled, comparison with the maximum background concentration is appropriate to determine if an inorganic chemical is different from background.

- Antimony and selenium were not detected above the Qbt 2, Qbt 3, and Qbt 4 BV but had detection limits above the BV. Therefore, the extent for antimony and selenium is defined.

8.15.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-029(d) is shown in Figure 8.15-3. Analytical results are presented in Table 8.15-3. Fifteen organic COPCs were identified for SWMU 16-029(d).

- Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and tetrachloroethene were detected in almost all samples at location 16-609211. Concentrations decreased with depth for all organic chemicals. Therefore, the extent for all organic COPCs is defined.

8.15.5.3 Radionuclides

Radionuclides were not detected or detected above the BVs/FVs at either sample location. Therefore, there are no radionuclide COPCs at SWMU 16-029(d).

8.15.5.4 Summary of Extent

The extent is defined for all inorganic and organic COPCs. Therefore, the overall extent of contamination at SWMU 16-029(d) is defined.

8.15.6 Summary of Human Health Risk Assessment Results

Based on the results of the risk-screening assessments presented in Appendix-H, there are no potential unacceptable risks at SWMU 16-029(d) from COPCs for the residential scenario. The industrial scenario was not evaluated because no samples were collected from 0−1 ft bgs. The total excess cancer risk for the residential scenario is 4×10^{-6}, which is below the NMED target risk level of 1×10^{-5} ((NMED 2009, 108070). The HI is 0.004, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

8.15.7 Summary of Ecological Risk Assessment Results

The samples at SWMU 16-029(d) were collected from depths greater than 5.5 ft bgs. Therefore, no complete exposure pathways to ecological receptors are present, and an ecological risk-screening evaluation was not conducted.

8.16 Shared Drainages

Shared Drainages is not a SWMU or AOC. Samples were collected to assess off-site migration of contamination from 300s Line sumps and outfalls to the Extended Drainages area.

8.16.1 Site Description and Operational History

Buildings 16-300, -302, -304, and -306 shared a liquid waste trunk line situated to the northeast of the buildings (Figure 8.16-1). The shared liquid waste trunk line discharged through an NPDES-permitted outfall (EPA-05A058) into a well-defined drainage across HE Road, southeast of building 16-306. The drainage generally flows toward the east in the direction of Martin Springs Canyon (section 10.3).

8.16.2 Summary of Previous Investigations

In 1989, three water and three sediment samples were collected as part of the NPDES permit for the outfall (EPA-05A058) associated with building 16-306 (LANL 2007, 097685, Appendix E). These samples were analyzed for HE, radionuclides, asbestos, inorganic chemicals, and organic chemicals. Organic and inorganic chemicals, as well as HE, were detected in all water and sediment samples. Radionuclides were detected only in the sediment samples (DOE 1989, 015364, pp. 4.10-30-4, 10-43). Data from the NPDES monitoring are screening-level data and are presented in Appendix E of the HIR (LANL 2007, 097685).

In 1995, 16 samples were collected from locations 16-01411, 16-01434, 16-01435, 16-01436, 16-01437, 16-01438, 16-01439, 16-01457, 16-01458, and 16-01653. Metals were detected above BVs. Organic chemicals and HE were detected in depths ranging from 0.0 to 5.5 ft bgs.

8.16.3 Field-Screening Results

A total of 20 samples, collected at ten locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicate that all 30 inorganic chemicals analyzed had concentrations less than 3 times the standard deviation above the mean (Appendix C, section C-2.3). Gross-alpha/beta radiation, reported at <100 cpm, and gross-gamma radiation, reported at <20 µR/h, were below the minimum detectable activity level.

Based on these results, no additional step-out samples were required.

8.16.4 Soil and Tuff Sampling Analytical Results and COPC Identification

The locations sampled for the Shared Drainages are shown in Figure 8.16-1. Table 8.16-1 summarizes the samples collected and analyses requested. Tables 8.16-2 and 8.16-3 summarize the analytical results and present decision-level data from previous investigations.

8.16.4.1 Inorganic Chemicals

In 1995, 10 sediment, 3 tuff (Qbt 4), 2 soil, and 1 fill sample were collected and analyzed for TAL metals and total cyanide. In 2009–2010, eight soil, seven tuff (Qbt 4), and two fill samples were collected and analyzed for anions, total cyanide, perchlorate, and TAL metals. Two tuff (Qbt 4) and one fill sample were collected and analyzed for anions, perchlorate, and TAL metals. Table 8.16-2 presents the inorganic chemicals above BVs for the Shared Drainages. Detected concentrations of inorganic chemicals above

BVs are shown in Figure 8.16-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.16.4.2 Organic Chemicals

In 1995, three tuff (Qbt 4), two soil, and one sediment sample were collected and analyzed for VOCs, SVOCs, and explosive compounds. Nine sediment and one fill sample were collected and analyzed for SVOCs and explosive compounds. In 2009–2010, nine tuff (Qbt 4), eight soil, and three fill samples were collected and analyzed for VOCs, SVOCs, and explosive compounds. Table 8.16-3 presents the organic chemicals detected in the Shared Drainages. The sampling locations and detected concentrations of organic chemicals are shown on Plate 12. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.16.4.3 Radionuclides

In 2009–2010, 11 soil/fill and 9 tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 20 samples was analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. No radionuclides were detected or detected above the BVs/FVs in the Shared Drainages.

8.16.5 Spatial Distribution in the Shared Drainages

Fourteen soil/fill, 10 sediment, and 12 tuff (Qbt 4) samples (Figure 8.16-1) were evaluated to determine the extent of contamination in the Shared Drainages.

Three surface (0.0–0.5 ft bgs) and two subsurface (5.5–6.0 ft bgs) samples were collected from two locations (16-609215 and 16-609216) in the low-lying area and shared drainages between the rest houses and HE-processing facilities west of HE Road. Five surface samples (0.0–0.5 ft bgs) and four subsurface samples (varying depths) were collected from five locations (16-609217, 16-609218, 16-609219, 16-609220, and 16-609221) in the drainages along the east side of HE Road [across from building 16-306 and upgradient of SWMU 16-001(e)] that converge and run into Martin Spring Canyon. Subsurface (tuff [Qbt 4]) samples were not collected at location 16-609221. One surface (0.0–0.5 ft bgs) and four subsurface samples (4.0–5.5, 10.0–12.0, 17.5–20.0, and 23.0–25.0 ft bgs) were collected from one borehole (location 16-609229). The lateral and vertical extent of contamination in the Shared Drainages are evaluated in the following sections.

8.16.5.1 Inorganic Chemicals

The distribution of inorganic chemicals in the Shared Drainages is shown in Figure 8.16-2. The analytical results are presented in Table 8.16-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01653, 16-609215, and 16-609219. The concentration at location 16-609215 was below the maximum background concentration (8370 mg/kg). Concentrations increased with depth at the other two locations and decreased downgradient. Therefore, the vertical extent of aluminum is not defined, but the lateral extent is defined.
- Antimony and total cyanide were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and total cyanide is defined.

- Arsenic was detected above the sediment BV at two locations and above the Qbt 2, Qbt 3, and Qbt 4 BV at two locations. Arsenic concentrations decreased with depth at location 16-01434, and the concentration was below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (5 mg/kg) at location 16-609215. Concentrations increased with depth at location 16-609217, and only one depth was sampled at location 16-01439. Concentrations increased downgradient. Therefore, the extent of arsenic is not defined.
- Barium was detected above the soil BV at one location, above the sediment BV at five locations, and above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations decreased with depth at locations 16-01434 and 16-01653. Concentrations were below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (51.6 mg/kg) at locations 16-609216 and 16-609217. Only a surface sample was collected at locations 16-01436, 16-01437, 16-01439, and 16-01457. Location 16-609229, which is within approximately 25 ft of locations 16-01436 and 16-01437, had lower concentrations of barium at deeper depths. Location 16-609215, which is within approximately 10 ft of location 16-01457, had lower concentrations of barium at a deeper depth. Concentrations increased with depth at locations 16-01439 (no nearby location) and 16-609219. Concentrations increased downgradient to location 16-01439. Therefore, the extent of barium is not defined.
- Cadmium was detected above the sediment BV at location 16-60434. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of cadmium is defined.
- Calcium was detected above the sediment BV at two locations and above the Qbt 2, Qbt 3, and Qbt 4 BV at two locations. Only a surface sample was collected at locations 16-01435 and 16-01439. Locations 16-01653 and 16-609229, which are within approximately 25 ft or less of location 16-01435, had lower concentrations of calcium at deeper depths. Concentrations increased with depth at locations 16-01439 (no nearby location), 16-609215, and 16-609219. Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of calcium is not defined, but the lateral extent is defined.
- Chloride was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609215. The concentration was below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (465 mg/kg). Concentrations decreased downgradient to location 16-01439. Therefore, the extent of chloride is defined.
- Chromium was detected above the sediment BV at six locations and the Qbt 2, Qbt 3, and Qbt 4 BV at three locations. Concentrations decreased with depth at location 16-01434, and the concentration was below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (13 mg/kg) at locations 16-01653, 16-609215, and 16-609219. Only a surface sample was collected at locations 16-01436, 16-01437, 16-01438, and 16-01439. Location 16-609229, which is within approximately 25 ft of locations 16-01436, 16-01437, and 16-01438, had lower concentrations of chromium at deeper depths. Concentrations increased with depth at locations 16-01439 (no nearby location) and 16-609218. Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of chromium is not defined, but the lateral extent is defined.
- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at three locations. Concentrations increased with depth and decreased downgradient to location 16-01439. Therefore, the vertical extent of cobalt is not defined, but the lateral extent is defined.

- Copper was detected above the soil BV at three locations, above the sediment BV at eight locations, and above the Qbt 2, Qbt 3, and Qbt 4 BV at two locations. Concentrations decreased with depth at locations 16-01434, 16-01653, 16-609216, and 16-609220. Only a surface sample was collected at locations 16-01435, 16-01436, 16-01437, 16-01438, 16-01439, and 16-01458. Location 16-609229, which is within approximately 25 ft of locations 16-01435, 16-01436, 16-01437, and 16-01438, had lower concentrations of copper at deeper depths. Location 16-609220, which is within approximately 20 ft of location 16-01458, had lower concentrations of copper at a deeper depth. Concentrations increased with depth at locations 16-01439 and 16-609221 (no nearby locations), and locations 16-609218 and 16-609219. Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of copper is not defined, but the lateral extent is defined.
- Fluoride was detected at seven locations, and nitrate was detected at three locations. Fluoride and nitrate are naturally occurring and the concentrations detected (0.612–9.24 and 1.2–1.57 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Iron was detected above the sediment BV at three locations and the Qbt 2, Qbt 3, and Qbt 4 BV at one location. Concentrations decreased with depth at location 16-01434. The concentration was below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (19,500 mg/kg) at location 16-609219. Only a surface sample was collected at location 16-01439. Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of iron is not defined, but the lateral extent is defined.
- Lead was detected above the soil BV at two locations, above the sediment BV at seven locations, and above the Qbt 2, Qbt 3, and Qbt 4 BV at two locations. Concentrations decreased with depth at locations 16-01434, 16-01653, 16-609216, and 16-609220. Only a surface sample was collected at locations 16-01435, 16-01436, 16-01437, 16-01438, 16-01439, and 16-01458. Location 16-609229, which is within approximately 25 ft of locations 16-01435, 16-01436, 16-01437, and 16-01438, had lower concentrations of lead at deeper depths. Location 16-609220, which is within approximately 20 ft of location 16-01458, had lower concentrations of copper at a deeper depth. Concentrations increased with depth at locations 16-01439 and 16-609221 (no nearby locations), and location 16-609219. Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of lead is not defined, but the lateral extent is defined.
- Magnesium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01653 and 16-609219. Concentrations were below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (2820 mg/kg) at both locations. Concentrations decreased downgradient to location 16-01439. Therefore, the extent of magnesium is defined.
- Manganese was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609219. The concentration was below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (2820 mg/kg). Concentrations decreased downgradient to location 16-01439. Therefore, the extent of manganese is defined.
- Mercury was detected above the soil BV at one location and above the sediment BV at seven locations. Concentrations decreased with depth at locations 16-01434 and 16-01653. Only a surface sample was collected at locations 16-01435, 16-01436, 16-01437, 16-01438, 16-01439, and 16-609221. Location 16-609229, which is within approximately 25 ft of locations 16-01435, 16-01436, 16-01437, and 16-01438, had lower concentrations of mercury at deeper depths. Concentrations increased with depth at locations 16-01439 and 16-609221 (no nearby locations).

Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of mercury is not defined, but the lateral extent is defined.

- Nickel was detected above the sediment BV at location 16-01434 and above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609219. Concentrations decreased with depth at location 16-01434. Concentrations increased with depth at location 16-609219. Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of nickel is not defined, but the lateral extent is defined.
- Perchlorate was detected at locations 16-609215 and 16-609219. Concentrations were below the EQL and were not detected elsewhere. Concentrations decreased downgradient to location 16-609221. Therefore, the extent of perchlorate is defined.
- Selenium was detected above the sediment BV at locations 16-01434 and 16-01437. Concentrations decreased with depth at location 16-01434. Only a surface sample was collected at location 16-01437. Location 16-609229, which is within approximately 25 ft of location 16-01437, had lower concentrations of selenium at deeper depths. Concentrations decreased downgradient to location 16-01439. Therefore, the extent of selenium is defined.
- Silver was detected above the sediment BV at location 16-01434. Concentrations decreased with depth and decreased downgradient to location 16-01439. Therefore, the extent of silver is defined.
- Uranium was detected above the sediment BV at location 16-01458. Only a surface sample was collected at location 16-01458. Uranium was not analyzed for in the 2009–2010 samples, but isotopic uranium was not detected above BVs in any samples. Therefore, the extent of uranium is defined.
- Vanadium was detected above the sediment BV at five locations and above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-01653 and 16-609219. Concentrations decreased with depth at location 16-01434. Only a surface sample was collected at locations 16-01436, 16-01437, 16-01438, and 16-01439. Location 16-609229, which is within approximately 25 ft of locations 16-01436, 16-01437, and 16-01438, had lower concentrations of mercury at deeper depths. The concentration at location 16-01653 was below the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration (21 mg/kg). Concentrations increased with depth at locations 16-01439 (no nearby locations) and 16-609219. Concentrations increased downgradient to location 16-01439. Therefore, the extent of vanadium is not defined.
- Zinc was detected above the soil BV at three locations and above the sediment BV at eight locations. Concentrations decreased with depth at locations 16-01434, 16-01653, 16-609216, and 16-609219. Only a surface sample was collected at locations 16-01435, 16-01436, 16-01437, 16-01438, 16-01439, 16-01458, and 16-609221. Location 16-609229, which is within approximately 25 ft of locations 16-01435, 16-01436, 16-01437, and 16-01438, had lower concentrations of zinc at deeper depths. Location 16-609220, which is within approximately 20 ft of location 16-01458, had lower concentrations of zinc at a deeper depth. Concentrations increased with depth at locations 16-01439 and 16-609221 (no nearby locations). Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of zinc is not defined, but the lateral extent is defined.

8.16.5.2 Organic Chemicals

The distribution of organic chemicals in the Shared Drainages is shown on Plate 12. The analytical results are presented in Table 8.16-3.

- Acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and naphthalene were detected at 4 to 14 locations. Concentrations decreased with depth at all locations where deeper samples were collected. Only a surface sample was collected at locations 16-01435, 16-01436, 16-01437, 16-01438, 16-01439, 16-01457, and 16-01458. Location 16-609229, which is within approximately 25 ft of locations 16-01435, 16-01436, 16-01437, and 16-01438, did not have detected concentrations of these organic chemicals at deeper depths. Location 16-609215, which is within approximately 10 ft of location 16-01457, had lower concentrations at a deeper depth. Location 16-01458, which is within approximately 25 ft of location 16-609220, did not have detected concentrations of these organic chemicals at deeper depths. Concentrations increased with depth at location 16-01439 (no nearby location). Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of some of these organic chemicals is not defined at location 16-01439, but the lateral extent of all of these organic chemicals is defined.
- Benzo(b)fluoranthene, fluoranthene, phenanthrene, and pyrene were detected at 14 to 17 locations. Concentrations decreased with depth at all locations where deeper samples were collected. Only a surface sample was collected at locations 16-01435, 16-01436, 16-01437, 16-01438, 16-01439, 16-01457, 16-01458, and 16-609221. Location 16-609229, which is within approximately 25 ft of locations 16-01435, 16-01436, 16-01437, and 16-01438, did not have detected concentrations of these organic chemicals at deeper depths. Location 16-609215, which is within approximately 10 ft of location 16-01457, had lower concentrations at a deeper depth. Location 16-01458, which is within approximately 25 ft of location 16-609220, did not have detected concentrations of these organic chemicals at deeper depths. Concentrations increased with depth at locations 16-01439 and 16-609221 (no nearby location). Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of these organic chemicals is not defined at locations 16-01439 and 16-609221, but the lateral extent is defined.
- Acenaphthene, di-n-butylphthalate, dibenzofuran, 2,4-dimethylphenol, 2,4-dinitrotoluene, TATB, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, trichlorofluoromethane, and 1,3,5-trinitrobenzene were detected at one to three locations. Concentrations decreased with depth at all locations and decreased downgradient. Therefore, the extent of these organic chemicals is defined.
- 4-Amino-2,6-dinitritoluene, benzoic acid, and dibenz(a,h)anthracene were detected at locations where only one depth was sampled. Nearby locations did not detect these organic chemicals at deeper depths. Concentrations decreased downgradient to location 16-01439. Therefore, the extent of these organic chemicals is defined.
- Acetone, 4-isopropyltoluene, methylene chloride, toluene, and 1,3-xylene+1,4-xylene were detected at two to six locations. Concentrations decreased with depth and/or were below EQLs. Concentrations decreased downgradient and/or were below EQLs. Therefore, the extent of these organic chemicals is defined.
- Dibenzofuran, HMX, 2-methylphenol, 4-methylphenol, RDX, tetryl, and 2,4,6-trinitrotoluene were detected at two to eight locations. Concentrations decreased with depth and/or were below EQLs at all locations where deeper samples were collected. Only a surface sample was collected at locations 16-01436, 16-01437, 16-01438, 16-01439, 16-01457, and 16-609221. Location 16-609229, which is within approximately 25 ft of locations 16-01436, 16-01437, and 16-01438,

did not have detected concentrations of these organic chemicals at deeper depths. Location 16-609215, which is within approximately 10 ft of location 16-01457, did not have detected concentrations of these organic chemicals at a deeper depth. Concentrations increased with depth at locations 16-01439 and 16-609221 (no nearby location). Concentrations decreased downgradient to location 16-01439 except for 2-methylphenol. Therefore, the vertical extent of these organic chemicals is not defined at locations 16-01439 and 16-609221, but the lateral extent is defined except for 2-methylphenol.

- 2-Amino-4,6-dinitrotoluene was detected at five locations. Concentrations decreased with depth at location 16-01434. 2-Amino-4,6-dinitrotoluene was detected only in the deepest sample at location 16-01653. Only a surface sample was collected at locations 16-01436, 16-01439, and 16-01457. Location 16-609229, which is within approximately 25 ft of location 16-01436, did not have detected concentrations of this organic chemical at deeper depths. Location 16-609215, which is within approximately 10 ft of location 16-01457, did not have detected concentrations of this organic chemical at a deeper depth. Concentrations increased with depth at location 16-01439 (no nearby location). Concentrations decreased downgradient to location 16-01439. Therefore, the vertical extent of 2-amino-4,6-dinitrotoluene is not defined at location 16-01439, but the lateral extent is defined.

8.16.5.3 Radionuclides

There were no radionuclides detected or detected above BVs/FVs in the Shared Drainages.

8.16.5.4 Summary of Extent

The vertical extent is not defined for aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, mercury, nickel, vanadium, zinc, acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluorene, indeno(1,2,3-cd)pyrene, fluoranthene, phenanthrene, pyrene, dibenzofuran, HMX, 2-methylphenol, 4-methylphenol, RDX, tetryl, 2,4,6-trinitrotoluene, and 2-amino-4,6-dinitrotoluene. The lateral extent is not defined for arsenic, barium, vanadium, and 2-methyphenol. Therefore, the overall extent of contamination is not defined for Shared Drainages.

8.17 Liquid Waste Trunk Line

Liquid Waste Trunk Line is not an SWMU or AOC. Samples were collected to assess off-site migration of contamination from 300s Line sumps and outfalls to the Extended Drainages area.

8.17.1 Site Description

HE-processing buildings (16-300, 16-302, 16-304, and 16-306) are located on the east side of the 300s Line Subaggregate (Figure 8.17-1). Each building has two inactive HE sumps. HE-contaminated water from the buildings flowed into the sumps and discharged into a shared liquid waste trunk line on the northeast side of the buildings. The effluent flowed along the waste trunk line into a well-defined drainage discharging through an NPDES-permitted outfall (EPA-05A058) across the road and southeast of building 16-306.

8.17.2 Summary of Previous Investigations

In 1989, three water and three sediment samples were collected in accordance with the NPDES permit for the outfall (EPA-05A058) associated with building 16-300 (LANL 2007, 097685, Appendix E). The

samples were submitted for analysis of HE, radionuclides, asbestos, TAL metals, VOCs, and SVOCs. Organic chemicals, inorganic chemicals, and HE were detected in all of the water and sediment samples. Radionuclides were detected in the sediment samples (DOE 1989, 015364, pp.4.10-30–4.10-43). Data from the NPDES-monitoring samples are screening-level data and are presented in Appendix E of the HIR (LANL 2008, 100693).

8.17.3 Field-Screening Results

Fifty-eight samples, collected at 20 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3) except for barium and zinc. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Barium was measured at 745 ppm in sample RE16-10-2968 at location 16-609233, 1375 ppm in sample RE16-10-2973 at location 16-609235, and 850 ppm in sample RE16-10-2983 at location 16-609240. Zinc was measured at 307 ppm in sample RE16-10-2966 at location 16-609232. Based on these results, 15 additional step-out samples (RE16-10-2986 through RE16-10-2991, RE16-10-14801, and RE16-10-14806 through RE16-10-14813) were collected. Inadvertently, no step-out samples were collected at location 16-609240.

On-site PID screening revealed multiple detections of organic vapors, indicating a potential pattern of release. VOCs were detected at locations 16-609235, 16-609236, and 16-609237, with the highest measurement at 25 ppm. Eleven additional step-out samples (RE16-10-14802 and RE16-10-14814 through RE16-10-14823) were collected to the east and west of each location.

8.17.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for the Liquid Waste Trunk Line are shown in Figure 8.17-1. Table 8.17-1 summarizes the samples collected and analyses requested.

8.17.4.1 Inorganic Chemicals

Thirty-six soil, 10 fill, and 12 tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Thirty-three samples were analyzed for TAL metals, anions, perchlorate, and total cyanide. Thirteen samples were analyzed for TAL metals, anions, and perchlorate. Twelve samples were analyzed for total cyanide only. Table 8.17-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown on Plate 13. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.17.4.2 Organic Chemicals

Twenty-nine soil, 6 fill, and 11 tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the 46 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 8.17-3 presents the organic chemicals detected at the Liquid Waste Trunk Line. Detected concentrations of

organic chemicals are shown on Plate 14. Because the extent of contamination is not defined for the site, COPCs have not been identified.

8.17.4.3 Radionuclides

Twenty-nine soil, 6 fill, and 11 tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the 46 samples was analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, and americium-241. Table 8.17-4 presents the radionuclides detected or detected above BVs/FVs. Radionuclides detected or detected above BVs/FVs are shown in Figure 8.17-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

8.17.5 Spatial Distribution

Fifty-eight samples were collected from 20 locations along the Liquid Waste Trunk Line. Locations spanned the entirety of the line with samples collected near the originating sump for each building and within the drainages between the buildings. One surface (0.0–0.5 ft bgs) and one subsurface (1.5–7.0 ft bgs) sample were collected at each location. Additional samples were collected to the east and west of five of the original locations, along with samples at 8.5–9.0 ft bgs at six locations, because of elevated field-screening results. Surface samples near the originating sumps were collected below the surrounding concrete and/or pavement at HE-processing buildings (16-300, 16-302, 16-304, and 16-306).

The approved work plan (LANL 2007, 102216) required surface and subsurface samples to determine if potential contaminants are present in the area of the Liquid Waste Trunk Line. As chemicals were present in surface and subsurface samples in the estimated vicinity of the trunk line, the extent of contamination within the surface and subsurface is evaluated.

The locations sampled for the Liquid Waste Trunk Line are shown in Figure 8.17-1. The extent of chemicals in the area of the Liquid Waste Trunk Line is evaluated in the following sections.

8.17.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at the Liquid Waste Trunk Line is shown in Plate 13. The analytical results are presented in Table 8.17-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609238, 16-611851, 16-611853, and 16-611854. Concentrations increased with depth at locations 16-611853, 16-609238, and 16-611851. Aluminum concentrations increased down the drainline. Therefore, the extent of aluminum is not defined.
- Antimony was detected above the soil BV at location 16-609241. The concentration decreased with depth and was below the maximum background concentration (1 mg/kg). Antimony was not detected elsewhere. Therefore, the extent of antimony is defined.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611853. The concentration was below the maximum background concentration (5 mg/kg). Therefore, the extent of arsenic is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations increased with depth at locations 16-609238, 16-609237, 16-611851, and 16-611853 and decreased with depth at locations 16-609244 and 16-611854.Concentrations decreased downgradient. Therefore, the vertical extent of barium is not defined, and the lateral extent is defined.

- Beryllium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611853.The concentration was below the maximum background concentration (1.8 mg/kg). Therefore, the extent of beryllium is defined.
- Cadmium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at four locations. Concentrations decreased with depth and decreased downgradient at all locations. Therefore, the extent of cadmium is defined.
- Calcium was detected above the soil BV at four locations. Concentrations decreased with depth at all four locations. Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at two locations. Concentrations increased with depth at locations 16-609238 and 16-611853. Concentrations decreased downgradient. Therefore, the vertical extent of calcium is not defined, and the lateral extent is defined.
- Chloride was detected above the soil BV at locations 16-609241 and 16-611848. Concentrations decreased with depth at location 16-609241 and increased with depth at location 16-611848. Chloride was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609238. Concentrations increased with depth. Concentrations decreased downgradient. Therefore, the vertical extent of chloride is not defined, and the lateral extent is defined.
- Chromium was detected above the soil BV at location 16-609239. Concentrations increased with depth but decreased downgradient. Therefore, the vertical extent of chromium is not defined, and the lateral extent is defined.
- Cobalt was detected above the soil BV at locations 16-609238 and 16-609239. Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611853. Concentrations decreased with depth and increased downgradient. Therefore, the vertical extent of cobalt is defined and the lateral extent is not defined.
- Copper was detected above the soil BV at locations 16-609244 and 16-609241. Concentrations decreased with depth at both locations. Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-611853 and 16-611854. Concentrations decreased with depth at both locations. Therefore, the extent of copper is defined.
- Total cyanide was not detected above BVs but had detection limits above BVs. Therefore, the extent of total cyanide is defined.
- Fluoride was detected at all but two locations. Fluoride is naturally occurring, and the concentrations detected (0.44–17.7 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil BV at six locations. Concentrations decreased with depth at all of the locations and decreased downgradient. Therefore, the extent of lead is defined.
- Magnesium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611853. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of magnesium is defined.
- Manganese was detected above the soil BV at location 16-611856. Concentrations decreased with depth and downgradient. Therefore, the extent of manganese is defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611851. The concentration was below the maximum background concentration (7 mg/kg). Therefore, the extent of nickel is defined.

- Nitrate was detected at 14 locations. Nitrate is naturally occurring, and the concentrations detected (0.059–3.43 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected at location 16-609238. The concentration decreased with depth and downgradient. Therefore, the extent of perchlorate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations increased with depth at five locations. Concentrations decreased downgradient. Therefore, the vertical extent of selenium is not defined, and the lateral extent is defined.
- Sodium was detected above the soil BV at location 16-609239. Concentrations decreased with depth and downgradient. Therefore, the extent of sodium is defined.
- Zinc was detected above the soil BV at five locations. Concentrations decreased with depth at all locations and decreased downgradient. Therefore, the extent of zinc is defined.

8.17.5.2 Organic Chemicals

The distribution of organic chemicals at the Liquid Waste Trunk Line is shown on Plate 14. The analytical results are presented in Table 8.17-3.

- 3,5-Dinitroaniline, benzene, 2-butanone, n-butylbenzene, dibenz(a,h)anthracene, dibenzofuran, di-n-butylphthalate, 2,4-dinitrotoluene, RDX, toluene, 2,4,6-trinitrotoluene, tri(o-cresyl)phosphate, 1,2-xylene, and 1,3-xylene+1,4-xylene were detected at one to three locations. Concentrations decreased with depth at each location and decreased downgradient. Therefore, the extent of these organic chemicals is defined.
- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected at 12 to 14 locations. Concentrations decreased with depth at all locations except for locations 16-609332, 16-609340, and 16-609851. Concentrations decreased downgradient. Therefore, the vertical extent of these organic chemicals is not defined, but the lateral extent is defined.
- Acenaphthene, anthracene, benzo(g,h,i)perylene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and naphthalene were detected at 3 to 11 locations. Concentrations decreased with depth at all locations except for locations 16-609332 and 16-609340. Concentrations decreased downgradient. Therefore, the vertical extent of these organic chemicals is not defined, but the lateral extent is defined.
- Acetone was detected at three locations. Concentrations decreased with depth at location 16-609240 and increased with depth at locations 16-609238 and 16-609241. Concentrations decreased downgradient. Therefore, the vertical extent of acetone is not defined, but the lateral extent is defined.
- Bis(2-ethylhexyl)phthalate was detected at three locations. Concentrations decreased with depth at locations 16-609248 and 16-609250 and increased with depth at location 16-611851. Concentrations decreased downgradient. Therefore, the vertical extent of bis(2-ethylhexyl)phthalate is not defined, but the lateral extent is defined.
- Methylene chloride was detected at location 16-609240 below the EQL. Therefore, the extent of methylene chloride is defined.
- Phenol was detected at location 16-611848. The concentrations decreased with depth, and concentrations decreased downgradient. Therefore, the extent of phenol is defined.

8.17.5.3 Radionuclides

The distribution of radionuclides at the Liquid Waste Trunk Line is shown in Figure 8.17-2. Radionuclides detected or detected above BVs/FVs are presented in Table 8.17-4.

- Cesium-137 was detected at three locations. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of cesium-137 is defined.
- Plutonium-238 was detected above the soil FV at two locations. Concentrations decreased with depth at both locations. Plutonium-238 was detected at three other locations. Concentrations decreased with depth at location 16-611856 and increased with depth at locations 16-609237 and 16-611849. Concentrations decreased downgradient. Therefore, the vertical extent of plutonium-238 is not defined, and the lateral extent is defined.
- Plutonium-239/240 was detected at two locations. Concentrations decreased with depth and downgradient. Therefore, the extent of plutonium-239/240 is defined.
- Uranium-235/236 was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609237 and 16-609238. Concentrations increased with depth at location 16-609238 and decreased with depth at location 16-609237. Concentrations decreased downgradient. Therefore, the vertical extent of uranium-235/236 is not defined, but the lateral extent is defined.

8.17.5.4 Summary of Extent

The vertical extent of contamination is not defined for aluminum, barium, calcium, chloride, chromium, selenium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, pyrene, acenaphthene, anthracene, benzo(g,h,i)perylene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, acetone, bis(2-ethylhexyl)phthalate, plutonium-238, and uranium-235/236. The lateral extent of contamination is not defined for aluminum and cobalt. The extent is defined for the remaining inorganic chemicals, organic chemicals, and radionuclides. Therefore, the overall extent of contamination at the Liquid Waste Trunk Line is not defined.

9.0 V-SITE SUBAGGREGATE SITE INVESTIGATIONS

The V-Site Subaggregate consists of 21 sites: SWMUs 16-006(h), 16-013, 16-017(q)-99, 16-017(r)-99, 16-017(s)-99, 16-017(t)-99, 16-029(g2), 16-006(g), 16-017(v)-99, 16-025(x), 16-029(w), 16-029(x), 16-031(c), 16-017(p)-99, 16-017(w)-99, 16-034(m), and 16-034(n), and AOCs 16-024(m), 16-024(n), C-16-068, and C-16-074.

V-Site is located in the southwest corner of the K-Site Road and V-Site Road intersection, at the eastern edge of the World War II–era complex in TA-16. The paved road leads 250 ft to an approximately 600-ft^2 paved courtyard. A site visit in March 2007 confirmed that the Cerro Grande fire destroyed all but two buildings (16-516 and 16-517) (LANL 2000, 066885). The remains of building 16-515 (located west of the Courtyard Area) include the iron framework, steel-beam hoist, and concrete pad (LANL 2000, 066885; Birdsall 2007, 097416).

V-Site consists of soil contamination from former buildings 16-519 and 16-520, which were used for varnishing and assembling Fat Man mockups [SWMUs 16-017(r)-99 and 16-017(s)-99]; the historic High Bay (building 16-516), originally used to fit test the Trinity Device, pioneer work in plastic explosives, and store equipment [SWMU 16-017(t)-99]; former building 16-517, which was constructed in 1944 and originally used as a laboratory [SWMU 16-017(q)-99]; a 75-ft^2 storage area paved with asphalt and

located in the courtyard surrounded by buildings 16-516, 16-517, 16-518, 16-519, and 16-520 (SWMU 16-013) and a former pump pit (structure 16-526) (LANL 1994, 039440) [SWMU 16-006(h)]; and the grassy drainage area north of SWMU 16-013 and west of K-Site Road.

This area is of historical importance and could not be sampled adequately to characterize the nature or extent of contamination, because intrusive sampling activities would damage the historic buildings and structures. The Courtyard Area is not a SWMU or AOC but is included in this investigation report to evaluate the potential for off-site migration of contamination from the V-Site Courtyard. Potential risk is assessed for the recreational scenario, which is the most representative of visitors to the historic site.

9.1 Soil, Tuff, and Sediment Sampling Summary

Seventeen SWMUs, four AOCs, and one drainage area were sampled in the 2009–2010 sampling campaign. In the recent data, 496 samples were collected within the V-Site Subaggregate and analyzed for inorganic chemicals (TAL metals, perchlorate, anions, and total cyanide), organic chemicals (VOCs, SVOCs, and explosive compounds), and radionuclides (americium-241, isotopic uranium, and isotopic plutonium). The 2009−2010 sample data are combined with historical decision-making data, and sampling results are evaluated on a site-by-site basis in sections 9.2 through 9.17.

9.2 AOC C-16-068 Former Building

9.2.1 Site Description and Operational History

AOC C-16-068 is former building 16-522 located at V-Site in TA-16 approximately 125 ft southeast of former building 16-515 and just west of former buildings 16-519 and 16-520 (Figure 9.2-1). Building 16-522 was constructed in 1944 and removed in 1945. Building 16-522 does not appear on engineering drawings or in aerial photographs. The RFI investigating field team identified the remnants of a building foundation located west of former buildings 16-519 and 16-520 to be the foundation of building 16-522. The 1990 SWMU report states that building operations involved beryllium (LANL 1990, 007514). A former site worker also indicated that the building was contaminated with beryllium (Blackwell 1983, 005823; LANL 1997, 055653, p. 8).

9.2.2 Summary of Previous Investigations

In 1997, four surface soil samples were collected at AOC C-16-068. All samples were collected within the area of former building 16-522 and field screened for HE, which was not detected. Two samples from locations 16-03028 and 16-03030 were also field screened for TNT and RDX. TNT was not detected, but RDX was detected in one sample at location 16-03028, and barium, copper, and lead were detected in both samples. One sample collected from location 16-03028 was submitted for laboratory analysis of HE, TAL metals, total cyanide, SVOCs, and VOCs.

Table 9.2-1 presents the samples collected at and analyses requested for AOC C-16-068. Tables 9.2-2 and 9.2-3 summarize the analytical results. No metals above BVs were detected in these samples, but bis(2-ethylhexyl)phthalate and polycyclic aromatic hydrocarbons were detected (LANL 1997, 056569, pp. 24–27).

9.2.3 Field-Screening Results

Seven samples, collected at four locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for

explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

9.2.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for AOC C-16-068 are shown in Figure 9.2-1. Table 9.2-1 summarizes the samples collected and analyses requested.

9.2.4.1 Inorganic Chemicals

Five soil samples, one fill sample, and two tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Each of the eight samples was analyzed for TAL metals. In addition, one soil sample was analyzed for total cyanide, and seven samples were analyzed for anions, perchlorate, and boron. Table 9.2-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.2-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.2.4.2 Organic Chemicals

Five soil samples, one fill sample, and two tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the eight samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 9.2-3 presents the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.2-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.2.4.3 Radionuclides

Four soil samples, one fill sample, and two tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the seven samples was analyzed for isotopic uranium, isotopic plutonium, and americium-241. There were no radionuclides detected or detected above their BVs/FVs. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.2.5 Spatial Distribution

Eight samples were collected from five sample locations (Figure 9.2-1). One surface sample (0.0–0.5 ft bgs) was collected at each sample location. In addition, one subsurface sample (5.5–6.0 ft bgs) was collected at three sample locations.

The extent of contamination at AOC C-16-068 is evaluated in the following sections. Because releases from beneath a building would migrate vertically, lateral extent was not evaluated.

9.2.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC C-16-068 is shown in Figure 9.2-2. Analytical results are presented in Table 9.2-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611438. The concentration was below the maximum background concentration (8370 mg/kg). Therefore, the extent of aluminum is defined.
- Antimony, cadmium, total cyanide, and selenium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, cadmium, total cyanide, and selenium is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-611438 and 16-611439. The concentration at location 16-611439 was below the maximum background concentration (51.6 mg/kg). Barium concentrations decreased with depth and laterally. Therefore, the extent of barium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611438. The concentration is below the maximum background concentration (13 mg/kg). Therefore, the extent of chromium is defined.
- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611438. Cobalt concentrations decreased with depth and laterally. Therefore, the extent of cobalt is defined.
- Copper was detected above the soil BV at locations 16-03028, 16-609299, 16-611438, and 16-611439. Copper concentrations decreased with depth. Therefore, the extent of copper is defined.
- Fluoride was detected at locations 16-609298, 16-609299, 16-611438, and 16-611439. Fluoride is naturally occurring, and the concentrations detected (0.642–2.67 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Iron and vanadium were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-611438. These concentrations were below their maximum background concentrations (19,500 and 21 mg/kg, respectively). Therefore, the extent of iron and vanadium is defined.
- Lead was detected above the soil BV at all locations. Lead concentrations decreased with depth. Therefore, the extent of lead is defined.
- Mercury was detected above the soil BV at locations 16-03028, 16-611438, and 16-611439. Mercury concentrations decreased with depth or were equivalent to the soil BV. Therefore, the extent of mercury is defined.
- Perchlorate was detected at location 16-611438. The concentration was below the perchlorate EQL. Therefore, the extent of perchlorate is defined.
- Uranium was detected above the soil BV at location 16-03028. The concentration was below the maximum background concentration (3.6 mg/kg). Therefore, the extent of uranium is defined.
- Zinc was detected above the soil BV at all locations. Concentrations decreased with depth and/or were below the maximum background concentration (75.5 mg/kg). Therefore, the extent of zinc is defined.

9.2.5.2 Organic Chemicals

The distribution of organic chemicals at AOC C-16-068 is shown in Figure 9.2-3. Analytical results are presented in Table 9.2-3.

- Acenaphthene was detected at location 16-03028 below the soil EQL. Therefore, the extent of acenaphthene is defined.
- Acenaphthylene and benzo(a)anthracene were detected at location 16-03028. Acenaphthylene and benzo(a)anthracene were not detected in subsurface (5.5–6.0 ft bgs) samples at any location. Therefore, the extent of acenaphthylene and benzo(a)anthracene is defined.
- Acetone was detected at location 16-611439 in the deeper sample. Therefore, the extent of acetone is not defined.
- Benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, and pyrene were detected at five locations. Concentrations decreased with depth and/or were below the EQLs at four locations. Only a surface sample was collected at location 16-03028, but at nearby location 16-611438 (within approximately 10 ft), these organic chemicals were not detected at a deeper depth. Therefore, the extent of these organic chemicals is defined.
- Benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected at two to three locations. Concentrations decreased with depth at locations 16-611438 and 16-611439. Only a surface sample was collected at location 16-03028, but at nearby location 16-611438 (within approximately 10 ft), benzo(g,h,i)perylene or indeno(1,2,3-cd)pyrene were not detected at a deeper depth. Concentrations decreased laterally from location 16-03028. Therefore, the extent of these organic chemicals is defined.
- Di-n-butylphthalate was detected at locations 16-03028 and 16-609299. Concentrations decreased with depth at location 16-609299. Only a surface sample was collected at location 16-03028, but at nearby location 16-611438 (within approximately 10 ft), di-n-butylphthalate was not detected at a deeper depth. Concentrations decreased laterally from location 16-03028.Therefore, the extent of di-n-butylphthalate is defined.
- Bis(2-ethylhexyl)phthalate was detected at five locations. Concentrations decreased with depth and/or were below the EQLs at three locations. Only a surface sample was collected at location 16-03028, but at nearby location 16-611438 (within approximately 10 ft), bis(2-ethylhexyl)phthalate was not detected at a deeper depth. Concentrations increased with depth. Therefore, the vertical extent of bis(2-ethylhexyl)phthalate is not defined.

9.2.5.3 Radionuclides

Radionuclides were not detected or not detected above BVs/FVs.

9.2.5.4 Summary of Extent

The vertical extent is defined for all inorganic chemicals. The vertical extent is defined for all organic chemicals except bis(2-ethylhexyl)phthalate. The extent is not defined for acetone. Therefore, the overall extent of contamination at AOC C-16-068 is not defined.

9.2.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for AOC C-16-068.

9.2.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for AOC C-16-068.

9.3 SWMU 16-029(g2)—Pit

9.3.1 Site Description and Operational History

SWMU 16-029(g2) is a concrete pit (structure 16-523) located at V-Site in TA-16 directly east of building 16-517 (LANL 1999, 063973, p. 32) (Figure 9.3-1). The pit measures 11 ft long × 16 ft wide × 4 ft deep. Constructed in 1944, the pit was used to house a shaker table for vibration tests of the Fat Man device. Tests on the device were controlled remotely from a bunker west of V-Site due to the HE components in the device. In 1945, the concrete pit was abandoned in place, filled with dirt, and covered with a concrete slab that was later used for drum storage (AOC C-16-074).

9.3.2 Summary of Previous Investigations

In 1998 and 1999, a voluntary corrective measure (VCM) was conducted. Boreholes were drilled at SWMU 16-029(g2) and AOC C-16-074. Three vertical boreholes were drilled to a depth of 2.5 ft bgs through the surface slab (AOC C-16-074) and into the area of the former shaker table pit [SWMU 16-029(g2)]. Six samples were collected from these three boreholes and field screened for HE and metals. These six samples screened positive for silver and barium. Because the concrete in the bottom of the former shaker table pit could not be penetrated, three boreholes were drilled at a 45-degree angle in an attempt to collect samples from below the bottom of the pit [SWMU 16-029(g2)]. One sample was collected from the bottom of each of these angled boreholes and field screened for HE and metals (LANL 2007, 097685, Appendix C). No HE was detected; however, these samples screened positive for barium, copper, and silver. None of the samples collected from the six boreholes was submitted for laboratory analysis (LANL 1999, 063973, pp. 32–51).

9.3.3 Field-Screening Results

Four samples, collected at one location, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

9.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The location sampled for SWMU 16-029(g2) is shown in Figure 9.3-1. Table 9.3-1 summarizes the samples collected and analyses requested. Decision-level data collected at SWMU 16-029(g2) consists of four tuff (Qbt 4) samples collected at one location.

9.3.4.1 Inorganic Chemicals

Four tuff (Qbt 4) samples were analyzed for inorganic chemicals. Each of these samples was analyzed for TAL metals, anions, and perchlorate. Table 9.3-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.3-2. The nature and extent of inorganic contamination are defined at SWMU 16-029(g2).

- Antimony was not detected above the Qbt 2, Qbt 3, and Qbt 4 BV (0.5 mg/kg) but had detection limits (0.54–0.55 mg/kg) above the BV in two samples. The detection limits are similar to the BV, and antimony is not identified as a COPC in tuff.
- Fluoride was detected in four samples. Fluoride is naturally occurring, and the concentrations detected (0.53–4.7 mg/kg) likely reflect naturally occurring concentrations, Therefore, fluoride is not identified as a COPC.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (0.3 mg/kg) in four tuff samples with a maximum concentration of 5.7 mg/kg. Selenium is identified as a COPC in tuff.

9.3.4.2 Organic Chemicals

Four tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Each of the samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 9.3-3 presents the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.3-3. The nature and extent of organic contamination are defined at SWMU 16-029(g2).

2,4,6-Trinitrotoluene was detected in tuff and is identified as a COPC.

9.3.4.3 Radionuclides

Four tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the samples was analyzed for isotopic plutonium, isotopic uranium, and americium-241. There were no radionuclides detected or detected above their BVs/FVs. No radionuclides were retained as COPCs at SWMU 16-029(g2).

9.3.5 Spatial Distribution of COPCs

SWMU 16-029(g2) is a subsurface concrete pit. Because of the nature of operation of the concrete pit and shaker table, the primary potential release mechanism for this SWMU is infiltration; thus, lateral migration is not a transport mechanism. Because of this, SWMU 16-029(g2) is characterized separately from the collocated AOC C-16-074, which is a storage area at the surface from which spills or leaks have both lateral and vertical extent evaluations (see section 9.4).

Four tuff (Qbt 4) samples were collected from one location (Figure 9.3-1). Four subsurface samples were collected at location 16-609456. Samples were collected at depths of 5.0–9.0, 10.0–12.0, 15.0–17.0, and 19.0–20.0 ft bgs. The extent of contamination at SWMU 16-029(g2) is evaluated in the following sections.

9.3.5.1 Inorganic Chemicals

The distribution of inorganic COPCs at SWMU 16-029(g2) is shown in Figure 9.3-2. The analytical results are presented in Table 9.3-2. Because there are fewer than 10 samples per medium sampled, comparison with the maximum background concentration is appropriate to determine whether an inorganic chemical is different from background.

- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609456. Concentrations decreased with depth. Therefore, the extent of selenium is defined.

9.3.5.2 Organic Chemicals

The distribution of organic COPCs at SWMU 16-029(g2) is shown in Figure 9.3-3. The analytical results are presented in Table 9.3-3.

- 2,4,6-Trinitrotoluene was detected at location 16-609456. Concentrations decreased with depth. Therefore, the extent of 2,4,6-trinitrotoluene is defined.

9.3.5.3 Radionuclides

Radionuclides were not detected or detected above BVs/FVs at location 16-609456.

9.3.5.4 Summary of Extent

The extent is defined for all COPCs. Therefore, the overall extent of contamination at SWMU 16-029(g2) is defined.

9.3.6 Summary of Human Health Risk Assessment Results

Based on the results of the risk-screening assessments presented in Appendix H, there are no potential unacceptable risks at SWMU16-029(g2) from COPCs for the residential scenario. No carcinogenic COPCs were retained at SWMU 16-029(g2). The HI is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

9.3.7 Summary of Ecological Risk Assessment Results

SWMU16-029(g2) lies beneath a concrete pad and is expected to continue to remain covered while it continues to be used as an historic location. In addition, the samples collected at this SWMU were from depths greater than 5 ft bgs. Therefore, no complete exposure pathways to ecological receptors are present at SWMU 16-029(g2), and an ecological risk-screening evaluation was not conducted.

9.4 AOC C-16-074—Storage Area

9.4.1 Site Description and Operational History

AOC C-16-074 is a storage area located at V-Site in TA-16 directly east of building 16-517 (Figure 9.3-1) The storage area consists of a concrete pad that covers an abandoned-in-place pit [SWMU 16-029(g2)]. The concrete pad is surrounded by asphalt pavement and was used as a drum storage area beginning in 1945. The 1990 SWMU report (LANL 1990, 007514) states that the drums contained spent HE-contaminated hydraulic oil. It is not known when use of the storage area ceased; however, the pad

was described as being empty in 1997 (LANL 1997, 055653, p. 8). Rust rings from drums are visible, but no oil stains are present on the concrete pad (LANL 1997, 055653, p. 8). Drainage from the pad flows south.

9.4.2 Summary of Previous Investigations

In 1998 and 1999, a VCM was conducted. Boreholes were drilled at SWMU 16-029(g2) and AOC C-16-074. Three vertical boreholes were drilled to a depth of 2.5 ft bgs through the surface slab (AOC C-16-074) and into the area of the former shaker table pit [SWMU 16-029(g2)]. Six samples were collected from these three boreholes and field screened for HE and metals. These six samples screened positive for silver and barium. Because the concrete in the bottom of the former shaker table pit could not be penetrated, three boreholes were drilled at a 45-degree angle in an attempt to collect samples from below the bottom of the pit [SWMU 16-029(g2)]. One sample was collected from the bottom of each of these angled boreholes and field screened for HE and metals (LANL 2007, 097685, Appendix C). No HE was detected; however, these samples screened positive for barium, copper, and silver. None of the samples collected from the six boreholes was submitted for laboratory analysis (LANL 1999, 063973, pp. 32–51). Two vertical boreholes were also drilled outside the boundaries of SWMU 16-029(g2) and AOC C-16-074. At location 16-05820, samples were collected at five depths ranging from 0.0 to 11.0 ft bgs and sent off-site for fixed laboratory analyses. All five samples screened positive for silver and barium.

Table 9.4-1 presents the samples collected and analyses requested at AOC C-16-074. Tables 9.4-2 and 9.4-3 summarize the analytical results and present decision-level data. Aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, and lead were detected above BVs. Acetone was the only organic chemical detected (LANL 1997, 056569, pp. 24–27).

9.4.3 Field-Screening Results

Samples collected in 2009–2010 are discussed in section 9.3.3 above, because the sites are collocated. No screening samples solely associated with AOC C-16-074 were collected.

9.4.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The historic location sampled for AOC C-16-074 is shown in Figure 9.3-1. Table 9.4-1 lists the samples collected and analyses requested for each sample.

9.4.4.1 Inorganic Chemicals

Two soil and three tuff (Qbt 4) samples were collected during the VCM activities conducted between 1998 and 1999, and these samples were analyzed for inorganic chemicals. Each of these samples was analyzed for TAL metals, and one soil sample was analyzed for total cyanide. Table 9.4-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.3-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.4.4.2 Organic Chemicals

One soil and one tuff (Qbt 4) sample were collected during the VCM activities conducted between 1998 and 1999, and these samples were analyzed for organic chemicals. Each of these samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 9.4-3 presents the organic chemicals above BVs.

Detected concentrations of organic chemicals above BVs are shown in Figure 9.3-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.4.4.3 Radionuclides

Historical samples collected from AOC C-16-074 were not analyzed for radionuclides.

9.4.5 Spatial Distribution

Two soil and three tuff (Qbt 4) samples were taken from one location (16-05820) (Figure 9.3-1). Samples collected from location 16-05820 included one surface sample (0.0–0.5 ft bgs) and four subsurface samples (2.0–4.0, 4.0–6.0, 7.6–8.0, and 10.0–11.0 ft bgs). Samples collected from location 16-609456 included four subsurface samples (5.0–9.0, 10.0–12.0, 15.0–17.0, and 19.0–20.0 ft bgs). The extent of contamination at AOC C-16-074 is evaluated in the following sections.

9.4.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC C-16-074 is shown in Figure 9.3-2. The analytical results are presented in Table 9.4-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-05820. The concentration decreased with depth and was below the maximum background concentration (8370 mg/kg). Therefore, the extent of aluminum is defined.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-05820. The concentration was below the maximum background concentration (5 mg/kg). Arsenic was also detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609456, where it decreased with depth. Therefore, the extent of arsenic is defined.
- Barium and lead were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-05820. The concentrations increased with depth. Therefore, the lateral and vertical extent of barium and lead are not defined.
- Antimony, cadmium, total cyanide, mercury, silver, and uranium were not detected above BVs but had detection limits above BVs. Therefore, the extent of these inorganic chemicals is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-05820. Concentrations decreased with depth. Therefore, the lateral extent of chromium is not defined, but the vertical extent of chromium is defined.
- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-05820. Concentrations increased with depth at 16-05820. Therefore, the vertical extent of cobalt is not defined.
- Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-05820. Concentrations decreased with depth. Therefore, the lateral extent of copper is not defined, but the vertical extent is defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-05820. Concentrations decreased with depth. Therefore, the lateral extent of nickel is not defined, but the vertical extent is defined.

9.4.5.2 Organic Chemicals

The distribution of organic chemicals at AOC C-16-074 is shown in Figure 9.3-3. The analytical results are presented in Table 9.4-3.

- Acetone was detected at location 16-05820. Concentrations decreased with depth. Therefore, the lateral extent of acetone is not defined, but the vertical extent is defined.
- 2,4,6-Trinitrotoluene was detected in a single sample at location 16-609456 at concentrations below the EQL. The extent is defined for 2,4,6-trinitrotoluene.

9.4.5.3 Radionuclides

No radionuclides were detected or detected above BV/FVs.

9.4.5.4 Summary of Extent

The vertical extent is not defined for barium, cobalt, and lead. The lateral extent is not defined for barium, lead, chromium, copper, and nickel. The vertical extent is defined for all organic chemicals. The lateral extent is defined for all organic chemicals except acetone. Therefore, the overall extent of contamination at AOC C-16-074 is not defined.

9.4.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for AOC C-16-074.

9.4.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for AOC C-16-074.

9.5 SWMU 16-029(x)

9.5.1 Site Description and Operational History

SWMU 16-029(x) is a former HE sump and outfall located at V-Site in TA-16 (Figure 9.5-1). The sump, which measured 4 × 6 ft, received effluent from former HE-processing building 16-515 [SWMU 16-017(v)-99], former septic tank 16-527 [SWMU 16-006(g)], and former electroplating laboratory 16-100 [SWMU 16-025(x)]. Liquid wastes from these three SWMUs discharged through drainlines into the sump, located approximately 90 ft south of former building 16-515. HE residues were routinely collected from the sump and burned at the TA-16 burning grounds. Effluent flowed from the sump passing through seven manholes (structures 16-793, 16-794, 16-795, 16-796, 16-797, 16-798, and 16-799) to an outfall pond located southeast of V-Site (LANL 2000, 066885). The sump, drainline, and 3 yd^3 of soil were removed in 1997 (IT Corporation 1999, 087145, pp. 98–119). Originally, building 16-515 functioned as a warehouse, shop, and small office. Sometime during the 1950s or 1960s, the building was converted to a laboratory, inspection room, and repair area for HE parts. After the conversion, x-ray work, photo processing, and HE casting were conducted in the building (LANL 1999, 063973, p. 5).

9.5.2 Summary of Previous Investigations

A 1970 hazardous materials survey detected HE in the drainline; however, no other toxic substances or radioactive contamination were found (LANL 1994, 039440, pp. 5-504–5-505; LANL 1997, 055653, p. 77; LANL 1998, 063069, pp. 41–42). Additional sampling of the sump, drainline, and surrounding soil was conducted in 1997 after the sump and drainline were removed. HE was detected inside of the drainline joints but not in the sump concrete. Fifty-two samples were collected from soil 0.0–0.5 ft below the removed drainline. HE contamination was detected at three locations (16-03054, 16-03068, and 16-03072) and resulted in the removal of 3 yd^3 of contaminated soil (IT Corporation 1999, 087145, pp. 98–120). Eighteen samples of subsurface soil and 10 samples of subsurface tuff (Qbt 4) collected from biased locations below the drainline were also submitted for laboratory analysis and resulted in decision-level data.

Table 9.5-1 lists the samples collected and analyses requested. Tables 9.5-2, 9.5-3, and 9.5-4 present the results of inorganic, organic, and radionuclide analyses, respectively. Metals, including boron, barium, silver, and uranium, were detected above the BV. HE, including RDX, HMX, and TNT, as well as methylene chloride and perchloroethylene (PCE) were also detected (IT Corporation 1999, 087145, pp. 98–120).

9.5.3 Field-Screening Results

Seventy-six samples, collected at 25 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX was detected at 5 ppm in sample RE16-10-3764 at location 16-609476. Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on RDX detection at location 16-609476, two additional step-out samples (RE16-10-14023 and RE16-10-14024) were collected (Appendix C, section C-7.4.5).

9.5.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-029(x) are shown in Figure 9.5-1. Table 9.5-1 summarizes the samples collected and analyses requested.

9.5.4.1 Inorganic Chemicals

Two fill, 65 soil, and 50 tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Ninety-two samples were analyzed for TAL metals, 66 samples were analyzed for anions and perchlorate, 72 samples were analyzed for total cyanide, and 3 samples were analyzed for uranium. Detected concentrations of inorganic chemicals above BVs are shown on Plate 15. Table 9.5-2 lists the inorganic chemicals above BVs. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.5.4.2 Organic Chemicals

Two fill, 65 soil, and 50 tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Ninety-two samples were analyzed for SVOCs and explosive compounds, 91 samples were analyzed for VOCs, 70 samples were analyzed for pesticides, 6 samples were analyzed for polychlorinated biphenyls (PCBs), and five samples were analyzed for pesticides and PCBs. Table 9.5-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown on Plate 16. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.5.4.3 Radionuclides

Two fill, 65 soil, and 50 tuff (Qbt 4) samples were collected and analyzed for radionuclides. Sixty-six samples were analyzed for americium-241, isotopic uranium, and isotopic plutonium. Table 9.5-4 lists the radionuclides detected or detected above BVs/FVs. Radionuclides detected or detected above BVs/FVs are shown in Figure 9.5-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.5.5 Spatial Distribution

One hundred fifty-six samples were collected from 46 sample locations (Plate 15). One surface and one subsurface sample were collected at each sample location. The extent of contamination at SWMU 16-029(x) is evaluated in the following sections.

9.5.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-029(x) is shown on Plate 15; the analytical results are presented in Table 9.5-2.

- Antimony, total cyanide, and mercury were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony, total cyanide, and mercury is defined.
- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-03072. Concentrations decreased with depth and downgradient. Therefore, the extent of aluminum is defined.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at locations 16-03072 and 16-03148. Concentrations decreased downgradient and with depth. Therefore, the extent is defined for arsenic.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations and above the soil BV at one location. Concentrations increased with depth at locations 16-03054, 16-03072, 16-03024, and 16-609477 and decreased with depth at locations 16-609473, 16-03077, and 16-03071. Concentrations decreased downgradient. Therefore, the vertical extent of barium is not defined, and the lateral extent is defined.
- Boron was detected at 16 locations. Concentrations decreased with depth at three locations. Only one sample was collected from locations 16-03058, 16-03066, 16-03071, 16-03077, 16-03082, 16-03092, 16-03094, 16-03100, 16-03104, 16-03148, and 16-03174. Boron was not detected or detected at lower concentrations at nearby locations except for locations 16-03082, 16-03092, and 16-03174. Location 16-03148 was in the vicinity of location 16-609461, which was sampled at a deeper depth, and boron concentrations decreased with depth at these locations.

Concentrations decreased downgradient. Therefore, the vertical extent of boron is not defined, but the lateral extent is defined.

- Bromide was detected at locations 16-609484 and 16-609485. Concentrations increased with depth at location 16-609485. Concentrations decreased with depth at location 16-609484 and downgradient. Therefore, the vertical extent of bromide is not defined, and the lateral extent is defined.
- Cadmium was detected above the soil BV at seven locations. Statistical tests could not be conducted because there were too few detected concentrations. Cadmium concentrations were below the maximum soil background concentration (2.1 mg/kg). Therefore, the extent of cadmium is defined.
- Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609467. Concentrations decreased with depth and downgradient. Therefore, the extent of calcium is defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-611771. The concentration increased with depth but decreased downgradient. Therefore, the vertical extent of chromium is not defined, and the lateral extent is defined.
- Cobalt was detected above the soil BV at locations 16-03148 and 16-609478. Statistical tests determined cobalt was not different from background (Appendix B, Table B-1 and Figure B-1). Therefore, the extent of cobalt is defined.
- Fluoride was detected at numerous locations. Concentrations detected (0.32–3.6 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil BV at location 16-03148. Statistical tests determined that the concentrations of lead are not different from background (Appendix B, Table B-1 and Figure B-2). Therefore, the extent of lead is defined.
- Manganese was detected above the soil BV at locations 16-609476, 16-609478, 16-609481, and 16-03148. Concentrations decreased with depth at these locations and downgradient. Manganese was also detected above the soil BV at locations 16-03082 and 16-03148, where only surface samples were collected. Therefore, the vertical extent of manganese is not defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-03072, 16-03077, and 16-611771. Concentrations decreased with depth at locations 16-03072 and 16-03077 and decreased downgradient (location 16-609462). Therefore, the extent of nickel is defined at locations 16-03072 and 16-03077. Concentrations increased with depth at location 16-611771. Therefore, the vertical extent of nickel is not defined at location 16-611771, but the lateral extent is defined.
- Nitrate was detected at numerous locations. Nitrate is naturally occurring, and the concentrations detected (0.064–3.84 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected at locations 16-609478 and 16-609481. Concentrations decreased with depth and downgradient. Therefore, the extent of perchlorate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at seven locations. Concentrations either increased with depth or remained unchanged. Concentrations decreased slightly downgradient. Therefore, the vertical extent of selenium is not defined, and the lateral extent is defined.

- Silver was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at 20 locations. Concentrations decreased with depth and downgradient. Therefore, the extent of silver is defined.
- Thallium was detected above the soil BV at location 16-03068. Statistical tests could not be conducted because there were too few detected concentrations. The thallium concentration was below the maximum soil background concentration (1 mg/kg). The extent of thallium is defined.
- Uranium was detected above the soil BV at eight locations. Concentrations were below maximum background concentrations for soil (3.6 mg/kg) and decreased downgradient. The extent of uranium is defined.
- Vanadium was detected above the soil BV at location 16-03148. Statistical tests determined vanadium concentrations were not different from background (Appendix B, Table B-1 and Figure B-3). The extent of vanadium is defined.
- Zinc was detected above the Qbt 2, Qbt 3, and Qbt 4 BV and soil BV at locations 16-03054 and 16-609482, respectively. Statistical tests determined zinc concentrations were not different from background (Appendix B, Table B-1 and Figure B-4). The extent of zinc is defined.

9.5.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-029(x) is shown on Plate 16; the analytical results are presented in Table 9.5-3.

- 3,5-Dinitroaniline was detected at locations 16-609481 and 16-609482. Concentrations decreased with depth and were below the EQL. Therefore, the extent of 3,5-dinitroaniline is defined.
- Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene were detected at 2 to 10 locations. Concentrations decreased with depth where deeper samples were collected. Location 16-03058 had only one sample collected at 4.65–5.0 ft bgs, and fluoranthene and pyrene were detected at 0.079 and 0.096 mg/kg, respectively. The vertical extent is not defined at this location but is defined at all other locations. Concentrations decreased downgradient; therefore, the lateral extent is defined.
- Acetone was detected at 10 locations. Concentrations decreased with depth except at locations 16-609473 and 16-609476. Concentrations also increased downgradient. Therefore, the extent of acetone is not defined.
- 4-Amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene were detected at 10 and 13 locations, respectively. Concentrations decreased with depth and/or were below the EQLs at most locations. Only one depth was sampled at several locations. Except for locations 16-03058, 16-03082, and 16-03092, concentrations decreased with depth in nearby locations (within 25 ft). Concentrations increased with depth for 2-amino-4,6-dinitrotoluene at location 16-03064. Concentrations decreased downgradient. Therefore, the vertical extent of 4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene is not defined, but the lateral extent is defined.
- Bis(2-chloroethyl)ether was detected at location 16-609480 in the deepest sample. Concentrations increased with depth but decreased downgradient. Therefore, the vertical extent of bis(2-chloroethyl)ether is not defined, but the lateral extent is defined.

- Bis(2-ethylhexyl)phthalate was detected at locations 16-609471, 16-609474, and 16-609475. Concentrations decreased with depth and downgradient. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- 2-Butanone and n-butylbenzene were each detected at one location. The concentrations were below the EQLs, and neither was detected downgradient. Therefore, the extent of 2-butanone and n-butylbenzene is defined.
- 4,4'-dichlorophenyltrichloroethane (4,4'-DDT) and 1,1- dichlorophenyltrichloroethylene (4,4'-DDE) were each detected at one location. Only one sample was collected from locations 16-03100 and 16-03066. However, 4,4'-DDT and 4,4'-DDE were not detected at deeper depths at nearby locations (within approximately 15 ft). Concentrations decreased downgradient. Therefore, the extent of 4,4'-DDT and 4,4'-DDE is defined.
- Di-n-butylphthalate was detected at location 16-03104. Only one depth was sampled at this location, but at nearby location 16-609482 (within approximately 15 ft), di-n-butylphthalate was not detected at a deeper depth. Concentrations decreased downgradient. Therefore, the extent of di-n-butylphthalate is defined.
- 2,4-Dinitrotoluene was detected at locations 16-609481 and 16-609482. Concentrations decreased with depth at location 16-609482 but increased with depth at location 16-609481. Concentrations decreased downgradient. Therefore, the vertical extent of 2,4-dinitrotoluene is not defined, but the lateral extent is defined.
- HMX was detected at six locations. Concentrations decreased with depth and/or were below the EQL at locations 16-609481 and 16-609482. Only one sample was collected from locations 16-03058, 16-03066, 16-03071, and 16-03077. However, HMX was not detected at deeper depths at nearby (within approximately 15 ft) locations 16-03066, 16-03071, and 16-03077. Concentrations decreased downgradient. Therefore, the vertical extent of HMX is not defined, but the lateral extent is defined.
- 4-Isopropyltoluene was detected at location 16-03153. Concentrations decreased with depth and decreased downgradient. Therefore, the extent of 4-isopropyltoluene is defined.
- Methylene chloride was detected at seven locations. Concentrations decreased with depth at location 16-609474. Only one sample was collected from locations 16-03054, 16-03068, 16-03072, 16-03092, 16-03094, and 16-03100. However, methylene chloride was not detected at deeper depths at nearby locations (within approximately 40 ft). Concentrations decreased downgradient. Therefore, the extent of methylene chloride is defined.
- Pentachlorophenol was detected at locations 16-609471 and 16-609472. Concentrations decreased with depth and were below the EQL. Concentrations decreased downgradient. Therefore, the extent of pentachlorophenol is defined.
- RDX was detected at 18 locations. Concentrations decreased with depth at four locations. Concentrations increased with depth at locations 16-03064, 16-609479, 16-609481, 16-609482, and 16-609485. Only one sample was collected from locations 16-03066, 16-03077, 16-03104, 16-03153, and 16-03156. Concentrations decreased downgradient. Therefore, the vertical extent of RDX is not defined, but the lateral extent is defined.
- Tetrachloroethene was detected at 11 locations. Concentrations decreased with depth and/or were below the EQL. Concentrations decreased downgradient. Therefore, the extent of tetrachloroethene is defined.

- Toluene was detected at four locations. Concentrations decreased with depth or were below the EQL at three locations. Only one sample was collected from location 16-03077, but nearby locations 16-609475 and 16-609476 did not detect toluene at deeper depths. Concentrations decreased downgradient. Therefore, the extent of toluene is defined.
- 1,1,2-Trichloro-1,2,2-trifluoroethane was detected at location 16-03054. Only one sample was collected from this location. Location 16-03058 is adjacent to this location and did not detect 1,1,2-trichloro-1,2,2-trifluoroethane at a deeper depth. Concentrations decreased downgradient. Therefore, the extent of 1,1,2-trichloro-1,2,2-trifluoroethane is defined.
- 1,3,5-Trimethylbenzene was detected at five locations. Concentrations decreased with depth at locations 16-609466, 16-609475, and 16-609476 but increased with depth at locations 16-609481 and 16-609482. Concentrations decreased downgradient. Therefore, the vertical extent of 1,3,5-trimethylbenzene is not defined, but the lateral extent is defined.
- 2,4,6-Trinitrotoluene was detected at 10 locations. Concentrations decreased at four locations but increased at locations 16-03064 and 16-03058. Only one sample was collected from locations 16-03066, 16-03071, and 16-03077. However, 2,4,6-trinitrotoluene was not detected at deeper depths at nearby locations (within approximately 30 ft). Therefore, the vertical extent of 2,4,6-trinitrotoluene is not defined, but the lateral extent is defined.

9.5.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-029(x) is shown in Figure 9.5-2. The analytical results are presented in Table 9.5-4.

- Plutonium-238 was detected at locations 16-609465 and 16-609481. Concentrations increased with depth, and plutonium-238 was not detected downgradient. Therefore, the vertical extent of plutonium-238 is not defined, and the lateral extent is defined.

9.5.5.4 Summary of Extent

The vertical extent is not defined for barium, boron, bromide, chromium, manganese, nickel, selenium, plutonium-238, acenaphthene, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, acetone, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-chloroethyl)ether, 2,4-dinitrotoluene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, RDX, 1,3,5-trimethylbenzene, and 2,4,6-trinitrotoluene. The lateral extent is not defined for acetone. Therefore, the overall extent of contamination at SWMU 16-029(x) is not defined.

9.5.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-029(x).

9.5.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-029(x).

9.6 SWMU 16-029(w)—Sump (Former) and Outfall

9.6.1 Site Description and Operational History

SWMU 16-029(w) is a former HE sump and outfall located at V-Site in TA-16 (Figure 9.6-1). The sump measured 6 × 14 ft and was located approximately 10 ft to the east of a former electroplating laboratory (former building 16-100). The sump drained via a 4-in. pipe that passed through two manholes (16-795 and 16-796) to an outfall located approximately 800 ft southeast of the electroplating laboratory. The electroplating laboratory consisted of a utility room and a work room (LANL 1994, 039440, p. 5-504). The sump and associated drainline were removed in 1997 (IT Corporation 1999, 087145, pp.54−56).

9.6.2 Summary of Previous Investigations

In 1997, one subsurface soil sample was collected from 3.0–3.5 ft bgs and analyzed for high explosives, TAL metals, pesticides, PCBs, SVOCs, and VOCs. One sample collected in 1999 from 4.3−5.5 ft bgs was also collected and analyzed for high explosives, TAL metals, SVOCs, and VOCs. These samples were not of decision-level quality and are not presented here.

In 1999, three samples were collected from location 16-03409 from 3.0−3.5, 4.5−5.0, and 5.5−6.0 ft bgs. The shallower two samples were submitted for analyses of high explosives, TAL metals, SVOCs, and VOCs. The deepest sample was analyzed only for VOCs. A single sample was collected at location 16-05985 and analyzed for SVOCs. The samples collected and analyses requested for the 1999 samples are presented in Table 9.6-1. Tables 9.6-2 and 9.6-3 present the results of inorganic and organic analyses. Metals were detected above the BV, and numerous estimated concentrations of organic chemicals were reported in a single sample (IT Corporation 1999, 087145, pp.91-97).

9.6.3 Field-Screening Results

Eight samples, collected at four locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic compounds using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

9.6.4 Tuff Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-029(w) are shown in Figure 9.6-1. Table 9.6-1 summarizes the samples collected and analyses requested.

9.6.4.1 Inorganic Chemicals

Twelve tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Eight tuff (Qbt 4) samples were analyzed for anions, total cyanide, and perchlorate. All 12 tuff (Qbt 4) samples were

analyzed for TAL metals. Table 9.6-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.6-2. Because the extent of contamination is not defined, COPCs have not been identified.

9.6.4.2 Organic Chemicals

Thirteen tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Twelve tuff (Qbt 4) samples were analyzed for explosive compounds. Thirteen tuff (Qbt 4) samples were analyzed for SVOCs and VOCs. Table 9.6-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.6-3. Because the extent of contamination is not defined, COPCs have not been identified.

9.6.4.3 Radionuclides

Eight tuff (Qbt 4) samples were collected and analyzed for radionuclides. Samples were analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 9.6-4 lists the radionuclides detected or detected above BVs/FVs. Radionuclides above BVs/FVs are shown in Figure 9.6-4. Because the extent of contamination is not defined, COPCs have not been identified.

9.6.5 Spatial Distribution

Fourteen tuff (Qbt 4) samples were collected from eight locations (Figure 9.6-1). Subsurface samples were collected in and around the boundary of the SWMU and adjacent to the former drainline. Subsurface samples were collected at the following depth intervals: one sample at 2.0–2.5 ft bgs, one sample at 3.0–3.5 ft bgs, one sample at 4.0–4.33 ft bgs, one sample at 4.5–5.0 ft bgs, two samples at 5.5–6.0 ft bgs, one sample at 5.0–7.0 ft bgs, one sample at 6.0–7.5 ft bgs, one sample at 10.0–14.0 ft bgs, one sample at 11.0–13.0 ft bgs, one sample at 12.0–13.5 ft bgs, one sample at 15.0–17.0 ft bgs, and two samples at 16.0–18.0 ft bgs.

The extent of contamination at SWMU 16-029(w) is evaluated in the following sections.

9.6.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-029(w) is shown in Figure 9.6-2. Analytical results are presented in Table 9.6-2.

- Antimony, total cyanide, and mercury were not detected above their respective BVs but had detection limits above BVs. Therefore, the extent of antimony, total cyanide, and mercury is defined.
- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at three locations. Concentrations decreased with depth at location 16-609487 and increased with depth at the other locations. Concentrations decreased downgradient. Therefore, the vertical extent of aluminum is not defined, and the lateral extent is defined.
- Arsenic, barium, chromium, cobalt, copper, lead, and vanadium were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at locations 16-03409 and 16-05829. Concentrations decreased with depth at location 16-03409 for barium and were below the maximum background concentration for chromium (13 mg/kg) and vanadium (21 mg/kg). Concentrations increased with depth at this location for the other inorganic chemicals. Only one depth was sampled at location 16-05829, and the concentrations were below the maximum background concentration for arsenic (5 mg/kg),

chromium (13 mg/kg), copper (6.2 mg/kg), and lead (15.5 mg/kg). Concentrations decreased downgradient. Therefore, the vertical extent of these inorganic chemicals is not defined except for chromium, and the lateral extent is defined.

- Beryllium, iron, magnesium, nickel, and zinc were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-03409. Concentrations were below the maximum background concentration for beryllium (1.8 mg/kg) and iron (19,500 mg/kg). Concentrations increased with depth at this location for magnesium, nickel, and zinc. Concentrations decreased downgradient. Therefore, the vertical extent of beryllium and iron is defined, but the vertical extent of magnesium, nickel, and zinc is not defined. The lateral extent of beryllium, iron, magnesium, nickel, and zinc is defined.
- Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-03409 and 16-609487. Concentrations decreased with depth at location 16-609487. Concentrations increased with depth at location 16-03409. Concentrations decreased downgradient. Therefore, the vertical extent of calcium is not defined, and the lateral extent is defined.
- Fluoride and nitrate were detected at four locations. Fluoride and nitrate are naturally occurring, and the concentrations detected (0.31–9.0 and 0.056–0.15 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at five locations. Concentrations remained unchanged with depth at locations 16-609486, 16-609488, and 16-609489. Only one depth was sampled at location 16-05829. Concentrations also were unchanged downgradient. Therefore, the extent of selenium is not defined.

9.6.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-029(w) is shown in Figure 9.6-3. Analytical results are presented in Table 9.6-3.

- Acetone was detected at three locations. Concentrations decreased with depth at locations 16-03409 and 16-609487. Concentrations increased at location 16-609489. Concentrations decreased downgradient. Therefore, the vertical extent of acetone is not defined, but the lateral extent of acetone is defined.
- 4-Amino-2,6-dinitrotoluene was detected at location 16-609486. Concentrations decreased with depth and downgradient. Therefore, the extent of 4-amino-2,6-dinitrotoluene is defined.
- Bis(2-ethylhexyl)phthalate was detected at location 16-609487. Concentrations decreased with depth and downgradient. Therefore, the extent of bis(2-ethylhexyl)phthalate is defined.
- 2,4-Dinitrotoluene was detected at location 16- 609488 below the EQL. Therefore, the extent of 2,4-dinitrotoluene is defined.
- 4.4'-Methoxychlor was detected at location 16- 609486 below the EQL. Therefore, the extent of 4.4'-methoxychlor is defined.
- 2,4,6-Trinitrotoluene was detected at location 16- 609488 below the EQL. Therefore, the extent of 2,4,6-trinitrotoluene is defined.
- The following were detected at or below their respective Qbt 2, Qbt 3, and Qbt 4 EQLs: benzene, benzoic acid, bromobenzene, bromochloromethane, bromodichloromethane, bromoform, bromomethane, 2-butanone, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, carbon disulfide, carbon tetrachloride, chlorobenzene, chlorodibromomethane, chloroethane, chloroform, chloromethane, 2-chlorotoluene, 4-chlorotoluene, 1,2-dibromo-3-chloropropane,

1,2-dibromoethane, dibromomethane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, dichlorodifluoromethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane, 1,3-dichloropropane, 2,2-dichloropropane, 1,1-dichloropropene, cis-1,3-dichloropropene, trans-1,3-dichloropropene, di-n-butylphthalate, ethylbenzene, 2-hexanone, iodomethane, isopropylbenzene, 4-isopropyltoluene, 4-methyl-2-pentanone, 1-propylbenzene, styrene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethene, toluene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, vinyl chloride, and xylene. Therefore, the extent of these organic chemicals is defined.

9.6.5.3 Radionuclides

The distribution of radionuclides at SWMU 16-029(w) is shown in Figure 9.6-4. Analytical results are presented in Table 9.6-4.

- Plutonium-238 was detected at location 16-609489. Concentrations decreased with depth and downgradient. Therefore, the extent of plutonium-238 is defined.

9.6.5.4 Summary of Extent

The vertical extent of aluminum, arsenic, barium, calcium, cobalt, copper, magnesium, lead, nickel, selenium, vanadium, zinc, and acetone is not defined. The lateral extent of selenium is not defined. Therefore, the overall extent is not defined for SWMU 16-029(w).

9.6.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-029(w).

9.6.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-029(w).

9.7 SWMU 16-025(x)—Potential Soil Contamination Associated with Former Building 16-100

9.7.1 Site Description and Operational History

SWMU 16-025(x) is an area of potentially contaminated soil located at V-Site in TA-16, approximately 250 ft southwest of former building 16-515 (Figure 9.7-1). The potential soil contamination is associated with a former electroplating laboratory (former building 16-100). The electroplating laboratory, a 25 × 33 ft building of wood-frame construction, contained a utility room and work room (LANL 1994, 039440, p. 5-504). In 1960, the building was removed by intentional burning.

9.7.2 Summary of Previous Investigations

In 1997, concurrent with D&D activities, eight samples were collected at SWMU 16-025(x) and screened for HE and inorganic chemicals. The samples tested positive for RDX, barium, copper, and lead (LANL 2007, 097685, Appendix C). Based on the screening results, three samples from locations

16-03015, 16-03017, and 16-03022 were submitted for laboratory analysis of TAL metals, HE, SVOCs, and VOCs and resulted in decision-level data.

Table 9.7-1 presents the samples collected and the analyses requested. Tables 9.7-2 and 9.7-3 present the decision-level data for SWMU 16-025(x). Lead and uranium were detected above BVs. Anthracene, 4-methylnaphthalene, naphthalene, and phenanthrene were also detected.

9.7.3 Field-Screening Results

A total of six samples, collected at three locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

9.7.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-025(x) are shown in Figure 9.7-1. Table 9.7-1 summarizes the samples collected and analyses requested for each sample.

9.7.4.1 Inorganic Chemicals

Four soil, two fill, and three tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. The three samples collected in 1997 were analyzed for TAL metals only, and the other six samples were analyzed for TAL metals, total cyanide, anions, and perchlorate. Table 9.7-2 lists the inorganic chemicals above BVs, which are shown in Figure 9.7-2. Because the extent of contamination is not defined for the site, COPCs have not been identified.

9.7.4.2 Organic Chemicals

Four soil, two fill, and three tuff (Qbt 4) samples were collected and analyzed for organic chemicals. The samples were tested for VOCs, SVOCs, and explosive compounds. Table 9.7-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.7-3. Because the extent of contamination is not defined for the site, COPCs have not been identified.

9.7.4.3 Radionuclides

Three soil and three tuff (Qbt 4) samples were collected and analyzed for radionuclides. Each of the samples was analyzed for isotopic plutonium, isotopic uranium, and americium-241. No radionuclides were detected or detected above BVs/FVs.

9.7.5 Spatial Distribution

Nine samples (four from soil, two from fill, and three from tuff [Qbt 4]) from six sample locations (Figure 9.7-1) were evaluated to determine the extent of contamination at SWMU 16-025(x). The extent of contamination at SWMU 16-025(x) is evaluated in the following sections. The primary potential release mechanism for this SWMU is infiltration beneath the footprint of the building; thus, lateral migration is not a transport mechanism, and the lateral extent was not evaluated.

9.7.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-025(x) is shown in Figure 9.7-2. The analytical results are presented in Table 9.7-2.

- Antimony was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609492. Concentrations at location 16-609492 increased with depth. Therefore, the extent of antimony is not defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at two locations. The concentrations at location 16-609493 were below the maximum background concentration (51.6 mg/kg). Barium concentrations increased with depth at location 16-609494. Therefore, the extent of barium is not defined.
- Bromide was detected at location 16-609494. The concentration increased with depth. Therefore, extent of bromide is not defined.
- Cadmium, mercury, selenium, silver, and thallium were not detected above the BVs but had detection limits above BVs. Therefore, the extent of cadmium, mercury, selenium, silver, and thallium is defined.
- Fluoride was detected at three locations. Fluoride concentrations detected (estimated at 1.53–19.2 mg/kg) likely reflect naturally occurring levels. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil BV at location 16-03017 below the maximum background concentration (28 mg/kg). Lead was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609494. Lead concentrations increased with depth at this location; therefore, the extent of lead is not defined.
- Uranium was detected above the soil BV at locations 16-03015 and 16-03017. Therefore, the extent of uranium is not defined.

9.7.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-025(x) is shown in Figure 9.7-3. The analytical results are presented in Table 9.7-3.

- Anthracene and phenanthrene were detected at location 16-03017 below their respective EQLs. Therefore, the extent is defined for anthracene and phenanthrene.
- 2-Butanone, 4-isopropyltoluene, tetrachloroethene, and toluene were detected at two to three locations. The concentrations decreased with depth at each location. Therefore, the extent of 2-butanone, 4-isopropyltoluene, tetrachloroethene, and toluene is defined.

- 4-Methylnaphthalene and naphthalene were detected below their EQLs at location 16-03015. The extent of contamination is defined for 4-methylnaphthalene and naphthalene.
- Acetone was detected at three locations. The concentrations of acetone decreased with depth at locations 16-609492 and 16-609493, and the concentrations were below the EQL at location 16-609494. Therefore, the extent of acetone is defined.

9.7.5.3 Radionuclides

No radionuclides were detected or detected above their BVs/FVs.

9.7.5.4 Summary of Extent

The vertical extent is not defined for antimony, barium, bromide, lead, and uranium. The vertical extent is defined for all organic chemicals. No radionuclides were detected above background. Therefore, the overall extent of contamination at SWMU 16-025(x) is not defined.

9.7.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-025(x).

9.7.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-025(x).

9.8 SWMU 16-017(p)-99—Former Storage Magazine 16-61

9.8.1 Site Description and Operational History

SWMU 16-017(p)-99 is a former storage magazine (structure 16-61) that was located at the end of Pressing Road (Figure 9.8-1). The magazine measured 20 × 60 ft and was of wood-frame construction surrounded by an earthen berm on three sides. The magazine was removed during 1996 D&D activities. This SWMU was originally designated as SWMU 16-017, a group of several structures in central TA-16. In 1999, SWMU 16-017 was separated into 24 SWMUs, each of which consists of a single structure.

9.8.2 Summary of Previous Investigations

No previous sampling has been conducted at SWMU 16-017(p)-99.

9.8.3 Field Screening Results

A total of 10 samples, collected at 5 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than 2 ppm, which is the action level defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related

inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

9.8.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-017(p)-99 are shown in Figure 9.8-1. Table 9.8-1 summarizes the samples collected and analyses requested. Results of statistical background comparison for SWMU 16-017(p)-99 are presented in Appendix B, Table B-2.

9.8.4.1 Inorganic Chemicals

Four soil and six fill samples were collected and analyzed for anions, perchlorate, and TAL metals. Table 9.8-2 presents the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.8-2. The nature and extent of inorganic contamination are defined at SWMU 16-017(p)-99.

Perchlorate and selenium are identified as COPCs in soil at SWMU 16-017(p)-99.

- Antimony was not detected above the soil BV (0.83 mg/kg), but had detection limits (0.843–1.31 mg/kg) above the BV in seven soil/fill samples. The detection limits were either slightly above or below the maximum background concentration (1 mg/kg). Because the detection limits are similar to the maximum background concentration, antimony is not identified as a COPC in soil.
- Cadmium was not detected above the soil BV (0.4 mg/kg), but had detection limits (0.548–0.634 mg/kg) above the BV in eight soil/fill samples. The detection limits were below the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC in soil.
- Cobalt was detected above the soil BV (8.64 mg/kg) in two samples with a maximum concentration of 11.6 mg/kg. Statistical tests were performed to determine if the site sampling results for cobalt are different from background. The statistical test results are presented in Appendix B, Table B-2. The results of the tests indicate site data may be different from background. The box plot for cobalt is presented in Appendix B, Figure B-5. Cobalt is not identified as a COPC.
- Copper was detected above the soil BV (14.7 mg/kg) in one sample with a maximum concentration of 17.7 mg/kg. Statistical tests were performed to determine if the site sampling results for copper are different from background. The statistical test results are presented in Appendix B, Table B-2. The results of the tests indicate site data may be different from background. The box plot for copper is presented in Appendix B, Figure B-6. Copper is not identified as a COPC.
- Fluoride was detected at five locations. Fluoride is naturally occurring, and the concentrations detected (1.24–7.95 mg/kg) likely reflect naturally occurring concentrations, Therefore, fluoride is not identified as a COPC.
- Lead was detected above the soil BV (22.3 mg/kg) in two samples with a maximum concentration of 25.9 mg/kg. Statistical tests were performed to determine if the site sampling results for lead are different from background. The statistical test results are presented in Appendix B, Table B-2.

The results of the tests indicate site data are not different from background. The box plot for lead is presented in Appendix B, Figure B-7. Lead is not identified as a COPC.

- Manganese was detected above the soil BV (671 mg/kg) in two samples with a maximum concentration of 942 mg/kg. Statistical tests were performed to determine if the site sampling results for manganese are different from background. The statistical test results are presented in Appendix B, Table B-2. The results of the tests indicate site data are not different from background. The box plot for manganese is presented in Appendix B, Figure B-8. Manganese is not identified as a COPC.
- Nitrate was detected at three locations. Nitrate is naturally occurring, and the concentrations detected (1.32–6.77 mg/kg) likely reflect naturally occurring concentrations. Therefore, nitrate is not identified as a COPC.
- Perchlorate was detected at two locations with a maximum concentration of 0.00113 mg/kg. Perchlorate is identified as a COPC.
- Selenium was not detected above the soil BV (1.52 mg/kg), but had a detection limit (2.12 mg/kg) above the BV in one sample. The detection limit was above the maximum background concentration (1.7 mg/kg). Selenium is identified as a COPC in soil.
- Vanadium was detected above the soil BV (39.6 mg/kg) in one sample with a maximum concentration of 40.3 mg/kg. Statistical tests were performed to determine if the site sampling results for vanadium are different from background. The statistical test results are presented in Appendix B, Table B-2. The results of the tests indicate site data may be different from background. The box plot for vanadium is presented in Appendix B, Figure B-9. Vanadium is not identified as a COPC in soil.
- Zinc was detected above the soil BV (48.8 mg/kg) in one sample with a maximum concentration of 49.6 mg/kg. Statistical tests were performed to determine if the site sampling results for zinc are different from background. The statistical test results are presented in Appendix B, Table B-2. The results of the tests indicate site data are not different from background. The box plot for zinc is presented in Appendix B, Figure B-10. Zinc is not identified as a COPC in soil.

9.8.4.2 Organic Chemicals

Four soil and six fill samples were collected and analyzed for explosive compounds, SVOCs, and VOCs. Table 9.8-3 presents the organic chemicals detected. The sample locations and detected concentrations of organic chemicals are shown in Figure 9.8-3. The nature and extent of organic contamination are defined at SWMU 16-017(p)-99.

Acenaphthene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 4-isopropyltoluene, 2-methylnaphthalene, phenanthrene, and pyrene were detected in soil and are identified as COPCs.

9.8.4.3 Radionuclides

Four soil and six fill samples were collected and analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. There were no radionuclides detected or detected above BVs/FVs.

9.8.5 Spatial Distribution of COPCs

Ten samples were collected from two depths (0.0–0.5 and 5.5–6.0 ft bgs) at five locations (Figure 9.8-1). The extent of contamination at SWMU 16-017(p)-99 is evaluated in the following sections. The primary potential release mechanism for this SWMU is infiltration beneath the footprint of the building; thus, lateral migration is not a transport mechanism, and the lateral extent was not evaluated.

9.8.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-017(p)-99 is shown in Figure 9.8-2. The analytical results are presented in Table 9.8-2.

- Perchlorate was detected in samples at locations 16-609261 and 16-609262. These concentrations were below the EQL. Therefore, the extent of perchlorate is defined.
- Selenium was not detected above the soil BVs but had detection limits above the BVs. Therefore, the extent of selenium is defined.

9.8.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-017(p)-99 is shown in Figure 9.8-3. The analytical results are presented in Table 9.8-3.

- Benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 2-methylnaphthalene, phenanthrene, and pyrene were detected at location 16-609261. Concentrations decreased with depth and were below the EQLs. Therefore, the extent of these organic chemicals is defined.
- Acenaphthene and 4-isopropyltoluene were each detected in one surface sample at location 16-609264. Concentrations decreased with depth. Therefore, the extent of acenaphthene and 4-isopropyltoluene is defined.

9.8.5.3 Radionuclides

No radionuclides were detected or detected above BVs/FVs.

9.8.5.4 Summary of Extent

The extent is defined for all inorganic and organic chemicals. No radionuclides were detected or detected above BVs/FVs. Therefore, the extent of contamination at SWMU 16-017(p)-99 is defined.

9.8.6 Summary of Human Health Risk Assessment Results

Based on the results of the risk-screening assessments presented in Appendix H, there are no potential unacceptable risks at SWMU 16-017(p)-99 from COPCs for the industrial and residential scenarios. The total excess cancer risks for the industrial and residential scenarios are 1×10^{-7} and 4×10^{-7}, respectively, which are below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HIs are 0.00002 and 0.006, respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

9.8.7 Summary of Ecological Risk Assessment Results

Based on the results of the risk-screening assessments presented in Appendix H, no potential ecological risk was found for any receptor in SWMU 16-017(p)-99 following evaluations based on minimum ESLs and HI analyses.

9.9 SWMU 16-017(w)-99—Former Storage Magazine 16-073

9.9.1 Site Description and Operational History

SWMU 16-017(w)-99 is a former storage magazine (structure 16-073) that was located at V-Site in TA-16, southeast of the intersection of V-Site and Burning Ground Roads (Figure 9.9-1). The magazine measured 10 × 12 ft and was of wood-frame construction surrounded by an earthen berm on three sides. The magazine was removed during D&D activities in 1995. This SWMU was originally designated as SWMU 16-017, a group of several structures in central TA-16. In 1999, SWMU 16-017 was separated into 24 SWMUs, each of which consists of a single structure.

9.9.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-017(w)-99.

9.9.3 Field-Screening Results

A total of 13 samples, collected at six locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3) except for iron, rubidium, and thorium. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Iron was measured at 18,202 ppm, rubidium was measured at 92 ppm, and thorium was measured at 22.15 ppm in sample RE16-10-3603 at location 16-609442. Based on these results, three additional samples (RE16-10-3610, RE16-10-3611, and RE16-10-13936) were collected (Appendix C, section C-7.4.6).

9.9.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-017(w)-99 are shown in Figure 9.9-1. Table 9.9-1 summarizes the samples collected and analyses requested.

9.9.4.1 Inorganic Chemicals

Thirteen soil samples were collected and analyzed for inorganic chemicals. Each of the 13 samples was analyzed for TAL metals, anions, and perchlorate. Table 9.9-2 lists the inorganic chemicals above the

BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.9-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.9.4.2 Organic Chemicals

Thirteen soil samples were collected and analyzed for organic chemicals. Each of the 13 samples was analyzed for VOCs, SVOCs, and explosive compounds. Table 9.9-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.9-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.9.4.3 Radionuclides

Radionuclide analyses, in accordance with the approved work plan (LANL 2007, 102216), were not requested because radionuclides are unlikely based on site operations.

9.9.5 Spatial Distribution

Thirteen samples were collected from six sample locations (Figure 9.9-1). One surface sample (0.0–0.5 ft bgs) was collected at five of these locations, and one subsurface sample was collected at all six locations (one from 5.0–6.0 bgs and five from 5.5–6.0 ft bgs). Two additional subsurface samples (8.5–9.0 ft bgs) were collected at two of these locations. The extent of contamination at SWMU 16-017(w)-99 is evaluated in the following sections.

9.9.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-017(w)-99 is shown in Figure 9.9-2. Analytical results are presented in Table 9.9-2.

- Antimony and cadmium were not detected above BVs but had detection limits above BVs. Therefore, the extent of antimony and cadmium is defined.
- Bromide was detected at location 16-609446. Concentrations decreased with depth but were detected at one of the farthest locations downgradient. The vertical extent of bromide is defined, and the lateral extent is not defined.
- Calcium, chromium, and zinc were detected above the soil BVs at location 16-609445. The concentrations (6730, 20.5, and 50.2 mg/kg, respectively) were below their maximum background concentrations (14,000, 36.5, and 75.5 mg/kg, respectively). Therefore, the extent of calcium, chromium, and zinc is defined.
- Cobalt was detected above the soil BV at location 16-609442. Concentrations of cobalt decreased downgradient but increased with depth. Therefore, the lateral extent of cobalt is defined, but the vertical extent of cobalt is not defined.
- Fluoride was detected in all soil locations, and nitrate was detected at five locations. Both fluoride and nitrate are naturally occurring, and the concentrations detected (2.03–6.14 and 1.44–14.5 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Perchlorate was detected at locations 16-609444 and 16-609445. Concentrations increased with depth. Therefore, the lateral extent of perchlorate is defined, and the vertical extent is not defined.

9.9.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-017(w)-99 is shown in Figure 9.9-3. Analytical results are presented in Table 9.9-3.

- Benzo(a)anthracene and benzo(a)pyrene were detected at location 16-609441. Concentrations decreased with depth and were below EQLs. Therefore, the extent of benzo(a)anthracene and benzo(a)pyrene is defined.
- Benzo(b)fluoranthene was detected at locations 16-609441, 16-609442, and 16-609443. Concentrations were below the respective EQLs, decreased with depth, and decreased downgradient. Therefore, the extent of benzo(b)fluoranthene is defined.
- 2-Butanone was detected at location 16-609445. Concentrations increased with depth and were not detected downgradient. Therefore, the lateral extent of 2-butanone is defined, and the vertical extent is not defined.
- Fluoranthene was detected at locations 16-609441 and 16-609446. Concentrations decreased with depth and were below the EQL. Therefore, the extent of fluoranthene is defined.
- Methylene chloride was detected at location 16-609444, below the EQL. Therefore, the extent of methylene chloride is defined.
- Pyrene was detected at five locations. All concentrations were below the EQL. Therefore, the extent of pyrene is defined.

9.9.5.3 Radionuclides

In accordance with the approved work plan (LANL 2007, 102216), radionuclides were not analyzed for SWMU 16-017(w)-99.

9.9.5.4 Summary of Extent

The lateral extent of bromide is not defined. The vertical extent of 2-butanone, cobalt, and perchlorate are not defined. The extent for the remaining inorganic and organic chemicals is defined. Therefore, the overall extent of contamination is not defined for SWMU 16-017(w)-99.

9.9.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-017(w)-99.

9.9.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-017(w)-99.

9.10 SWMU 16-034(m)—Potential Soil Contamination Associated with Former Building 16-86

9.10.1 Site Description and Operational History

SWMU 16-034(m) is an area of potentially contaminated soil located at the eastern portion of V-Site at TA-16 (Figure 9.10-1). The potential soil contamination is associated with a former laboratory (former

building 16-86) built in 1945; the laboratory building was of wood-frame construction (including the floor) and measured 10 × 16 ft. The building housed temperature-controlled curing ovens. According to a former site worker, the building was used to dry plumbatol charges (Martin and Hickmott 1993, 087661). A second former site worker indicated that the building may also have been used as a rest house (Martin 1993, 052964.268). Use of the building ceased in 1959, and the building was removed by intentional burning in 1960.

9.10.2 Summary of Previous Investigations

In 1997, samples were collected from five locations and screened for HE and radiation, and one sample screened positive for HE. Two samples were submitted for laboratory analysis.

Table 9.10-1 presents the samples taken and analyses requested. Tables 9.10-2 and 9.10-3 present the decision-level data for SWMU 16-034(m). Copper, lead, silver, and zinc were detected above BVs. Benzoic acid and phenol were also detected; however, HE was not detected in either sample (LANL 1997, 056660.289, pp. 208–214).

9.10.3 Field-Screening Results

A total of 16 samples, collected at six locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Zinc was measured at 431 ppm in sample RE16-10-3001 and at 451 ppm in RE16-10-3011(FD) at location 16-609245. Strontium was measured at 196 ppm in sample RE16-10-3005 at location 16-609247. Based on these results, eight additional step-out samples (RE16-10-14304, RE16-10-14305, RE16-10-14306, RE16-10-14307, RE16-10-14308, RE16-10-14309, RE16-10-14310, and RE16-10-14311) were collected (Appendix C, section C-7.4.7).

9.10.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-034(m) are shown in Figure 9.10-1. Table 9.10-1 summarizes the samples collected and analyses requested for each sample.

9.10.4.1 Inorganic Chemicals

Eight soil, two fill, and eight tuff (Qbt 4) samples were collected and analyzed for inorganic chemicals. Sixteen samples were analyzed for TAL metals, anions, and perchlorate. Two samples were analyzed for TAL metals only. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.10-2. Table 9.10-2 lists the inorganic chemicals detected above BVs. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.10.4.2 Organic Chemicals

Eight soil, two fill, and eight tuff (Qbt 4) samples were collected and analyzed for organic chemicals. Sixteen samples were analyzed for VOCs, SVOCs, and explosive compounds, and two samples were analyzed for SVOCs and explosive compounds only. Table 9.10-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.10-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.10.4.3 Radionuclides

Based on previous site operations at SWMU 16-034(m), and in accordance with the approved work plan (LANL 2007, 102216), no analysis was done for radionuclides.

9.10.5 Spatial Distribution

Eighteen samples were collected from eight sample locations (Figure 9.10-1). Four locations were sampled at three depths (0.0–0.5, 5.5–6.0, and 8.5–9.0 ft bgs), two locations were sampled at two depths (0.0–0.5 and 5.5–6.0 ft bgs), and two locations were sampled at one depth each (0.0–1.0 ft bgs). SWMU 16-034(m) sits on level ground. The extent of contamination at SWMU 16-034(m) is evaluated in the following sections.

9.10.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-034(m) is shown in Figure 9.10-2; the analytical results are presented in Table 9.10-2. COPC identification was not performed for inorganic chemicals, because the extent is not defined at the site.

- Aluminum was detected above Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609247 and 16-611841. Concentrations increased to the southwest and with depth. Therefore, the extent of aluminum is not defined.
- Antimony was detected above the soil BV at locations 16-04037 and 16-04038. Antimony was not detected in the other samples collected deeper than 1.0 ft bgs at other locations. Therefore, the extent of antimony is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609247 and 16-611841. Concentrations increased with depth and decreased laterally. Therefore, the vertical extent of barium is not defined, and the lateral extent is defined.
- Cadmium was detected above the soil BV at location 16-609245. Cadmium was not detected deeper or in other samples. Therefore, the extent of cadmium is defined.
- Chloride was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609247 and 16-611841. Concentrations were below maximum background concentration (465 mg/kg). Therefore, the extent of chloride is defined.
- Chromium was detected above the soil BV at location 16-609245. Concentrations were below the maximum background concentration (36.5 ft mg/kg). Therefore, the extent of chromium is defined.
- Copper was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at six locations. Concentrations decreased with depth at all locations where a deeper sample was collected. Concentrations also decreased laterally. Therefore, the extent of copper is defined.

- Fluoride was detected all locations except 16-04037 and 16-04038. Fluoride is naturally occurring, and the concentrations detected (0.4–10.1 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at five locations. Concentrations decreased with depth at all locations where a deeper sample was collected. Concentrations of lead decreased laterally. Therefore, the extent of lead is defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609247. Concentrations were below the maximum background for concentration (7 mg/kg). Therefore, the extent of nickel is defined.
- Nitrate was detected at four locations. Nitrate is naturally occurring, and the concentrations detected (0.058–1.48 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of nitrate is defined.
- Perchlorate was detected at location 16-609247. Concentrations decreased with depth and were undetected at location 16-611841. Therefore, the extent of perchlorate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at four locations. Concentrations increased with depth and stayed roughly the same laterally. Therefore, the extent of selenium is not defined.
- Silver was detected above the soil BV at locations 16-04037 and 16-609245. Concentrations decreased with depth at location 16-609245 and decreased laterally. Therefore, the extent of silver is defined.
- Zinc was detected above the soil BV at six locations. Concentrations decreased with depth where deeper samples were collected and laterally. Therefore, the extent of zinc is defined.

9.10.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-034(m) is shown in Figure 9.10-3; the analytical results are presented in Table 9.10-3.

- Acenaphthene was detected at location 16-609247. Concentrations decreased with depth and were below the EQL. Therefore, the extent of acenaphthene is defined.
- Acetone was detected at locations 16-609247 and 16-611840. Concentrations decreased with depth at location 16-609247 and were below the EQL at location 16-611840. Therefore, the extent of acetone is defined.
- Benzoic acid was detected at location 16-04038 below the EQL. Therefore, the extent of benzoic acid is defined.
- 2-Butanone was detected at location 16-609247. The concentration decreased with depth and was below the EQL. Therefore, the extent of 2-butanone is defined.
- Di-n-butylphthalate was detected at location 16-609245. The concentration decreased with depth and was below the EQL. Therefore, the extent of di-n-butylphthalate is defined.
- Phenol was detected at location 16-04038. The concentration was below the EQL. Therefore, the extent of phenol is defined.
- 1,2,4-Trimethylbenzene was detected at location 16-611840. The concentrations decreased with depth, but they increased away from the southeast SWMU boundary. Therefore, the vertical extent of 1,2,4-trimeythylbenzene is defined, and the lateral extent is not defined.

9.10.5.3 Radionuclides

Based on site operations and in accordance with the approved work plan (LANL 2007, 102216), no analysis was done for radionuclides.

9.10.5.4 Summary of Extent

The vertical extent is not defined for aluminum, barium, and selenium. The lateral extent is not defined for aluminum, selenium, and 1,2,4-trimethylbenzene. There are no radionuclide COPCs. Therefore, the overall extent of contamination at SWMU 16-034(m) is not defined.

9.10.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-034(m).

9.10.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-034(m).

9.11 AOC 16-024(n)—Potential Soil Contamination Associated with Former HE Magazine 16-84

9.11.1 Site Description and Operational History

AOC 16-024(n) is an area of potentially contaminated soil located in the eastern portion of V-Site at TA-16 (Figure 9.11-1). The potential soil contamination is associated with a former HE magazine (structure 16-84). The magazine was a 16 × 16 × 9 ft structure of wood-frame construction. It was used from 1944 through the early 1950s to store packaged HE and finished HE products before processing, though no production-scale HE operations were conducted in the area. Use of the magazine ceased in 1959, and the building was removed by intentional burning in 1960.

9.11.2 Summary of Previous Investigations

No previous investigations have been conducted at AOC 16-024(n).

9.11.3 Field-Screening Results

A total of 10 samples, collected at five locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF; for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentration in screening sample RE16-10-3240 was 3 mg/kg. A step-out sample was inadvertently omitted. Fixed laboratory analysis of the sample did not detect RDX. All other samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal

detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

9.11.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for AOC 16-024(n) are shown in Figure 9.11-1. Table 9.11-1 summarizes the samples collected and analyses requested for AOC 16-024(n).

9.11.4.1 Inorganic Chemicals

Ten soil samples were collected and analyzed for inorganic chemicals. Each of these five samples was analyzed for TAL metals, anions, and perchlorate. Table 9.11-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.11-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.11.4.2 Organic Chemicals

Ten soil samples were collected and analyzed for organic chemicals. Each of these 10 samples was analyzed for SVOCs, explosive compounds, and VOCs. Table 9.11-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.11-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.11.4.3 Radionuclides

Based on previous site operations at AOC 16-024(n), and in accordance with the approved work plan (LANL 2007, 102216), no analysis was done for radionuclides.

9.11.5 Spatial Distribution

Ten samples were collected from five sample locations (Figure 9.11-1). Five surface samples (0.0–0.5 ft bgs) and five subsurface samples (5.5–6.0 ft bgs) were collected at the five sample locations. The extent of contamination at AOC 16-024(n) is evaluated in the following sections.

9.11.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC 16-024(n) is shown in Figure 9.11-2. Analytical results are presented in Table 9.11-2.

- Antimony was detected above the soil BV at location 16-609303. Concentrations decreased with depth. Therefore, the vertical extent is defined, and the lateral extent is not defined for antimony.
- Cadmium was detected above the soil BV at locations 16-609301 and 16-609302. Concentrations decreased with depth. The vertical extent is defined, and the lateral extent is not defined for cadmium.
- Copper was detected above the soil BV at locations 16-609304 and 16-609305. Concentrations increased to the northeast but decreased with depth. Copper concentrations increased to the north-northeast of the AOC boundary, but concentrations decreased with depth. Therefore, the lateral extent is not defined, but the vertical extent is defined for copper.

- Fluoride was detected at location 16-609302. Nitrate was detected at locations 16-609301 and 16-609305. Both nitrate and fluoride are naturally occurring, and the concentrations detected (1.74–7.14 and 3.89 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent for nitrate and fluoride is defined.
- Lead was detected above the soil BV at locations 16-609302, 16-609304, and 16-609305. Lead was highest in concentration at location 16-609302 in the center of the AOC and decreased laterally. Concentrations decreased with depth. The lateral and vertical extent of lead are defined.
- Perchlorate was detected at locations 16-609301 and 16-609305. The concentrations decreased with depth at location 16-609301 and are below the EQL at location 16-609305. Therefore, the extent is defined.
- Zinc was detected above the soil BV at locations 16-609301, 16-609302, 16-609304, and 16-609305. Concentrations decreased with depth. The lateral extent is not defined, and the vertical extent is defined for zinc.

9.11.5.2 Organic Chemicals

The distribution of organic chemicals at AOC16-024(n) is shown in Figure 9.11-3. Analytical results are presented in Table 9.11-3.

- Benzoic acid was detected at locations 16-609301, 16-609302, and 16-609303. Concentrations decreased with depth. Concentrations increased to above the EQL at the southern AOC boundary. Therefore, the vertical extent is defined, and the lateral extent is not defined for benzoic acid.
- 2-Butanone was detected at locations 16-609302 and 16-609305, below the EQL. Therefore, the extent of 2-butanone is defined.
- 4-Isopropyltoluene was detected at locations 16-609304 and 16-609305, below the EQL. This chemical was detected in surface samples (0.0–0.5 ft bgs) at locations 16-609302 and 16-609303, above the EQL. Concentrations decreased with depth at all locations. Concentrations are above the EQL at the southwest boundary of the AOC (location 16-609303). The lateral extent is not defined for 4-isopropyltoluene, but the vertical extent is defined.
- Methylene chloride was detected at locations 16-609301 and 16-609303, at concentrations below the EQL. Therefore, the extent is defined for methylene chloride.

9.11.5.3 Radionuclides

No analysis was done for radionuclides based on former site operations and in accordance with the approved work plan (LANL 2007, 102216).

9.11.5.4 Summary of Extent

The vertical extent is defined for all organic and inorganic chemicals. The lateral extent is defined for all organic chemicals except benzoic acid and 4-isopropyltoluene and for all inorganic chemicals except antimony, cadmium, copper, and zinc. Therefore, the overall extent of contamination at AOC 16-024(n) is not defined.

9.11.6 Summary of Human Health Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for AOC 16-024(n).

9.11.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for AOC 16-024(n).

9.12 SWMU 16-034(n)—Potential Soil Contamination Associated with Former Building 16-83

9.12.1 Site Description and Operational History

SWMU 16-034(n) is an area of potentially contaminated soil located in the eastern portion of V-Site at TA-16 (Figure 9.12-1). The potential soil contamination is associated with a former laboratory (building 16-83). Built in 1945, the laboratory building was of wood-frame construction (including the floor) and measured 16 × 16 ft. The building housed temperature-controlled curing ovens. According to a former site worker, the building was used to dry plumbatol charges. A second former site worker indicated the building may also have been used as a magazine (Martin 1993, 052964.268). Use of the building ceased in 1959, and the building was removed by intentional burning in 1960.

9.12.2 Summary of Previous Investigations

No documentation was located that indicated field-screening results for SWMU 16-034(n). Two surface soil samples were collected from two locations and submitted for laboratory analysis of TAL metals, HE, and SVOCs. Lead, mercury, and zinc were detected above BVs, and no organic chemicals were detected in either sample. Decision-level data are presented in this report.

9.12.3 Field-Screening Results

Eight samples, collected at four locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all 30 inorganic chemicals analyzed had concentrations less than 3 times the standard deviation above the mean for each inorganic chemical (Appendix C, section C-2.3). Gross-alpha/beta radiation, reported at <100 cpm, and gross-gamma radiation, reported at <20 µR/h, were below the minimum detectable activity level.

Based on these results, no additional step-out samples were required.

9.12.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-034(n) are shown in Figure 9.12-1. Table 9.12-1 summarizes the samples collected and analyses requested for each sample.

9.12.4.1 Inorganic Chemicals

Ten soil samples were collected and analyzed for inorganic chemicals. Eight samples were analyzed for TAL metals, anions, and perchlorate. Two samples were analyzed for TAL metals only. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.12-2. Table 9.12-2 lists the inorganic chemicals detected above BVs. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.12.4.2 Organic Chemicals

Ten soil samples were collected and analyzed for organic chemicals. Eight samples were analyzed for VOCs, SVOCs, and explosive compounds. Two samples were analyzed for SVOCs and explosive compounds only. Table 9.12-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.12-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.12.4.3 Radionuclides

Based on site operations at SWMU 16-034(n) and in accordance with the proposed sampling in the approved work plan (LANL 2007, 102216), no analysis was done for radionuclides.

9.12.5 Spatial Distribution

Ten samples were collected from six sample locations (Figure 9.12-1). One surface sample (0.0–0.5 ft bgs) and one subsurface sample (5.5–6.0 ft bgs) were collected at sample locations 16-609772 through 16-609775. One surface sample (0.0–1.0 ft bgs) was collected at locations 16-04029 and 16-04032. The extent of contamination at SWMU 16-034(n) is evaluated in the following sections.

9.12.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-034(n) is shown in Figure 9.12-2; the analytical results are presented in Table 9.12-2.

- Antimony was detected above the BV at locations 16-609772, 16-609773, and 16-609775. Concentrations increased with depth and increased to the northwest. Therefore, the extent of antimony is not defined.
- Cadmium was not detected above BV but had detection limits above BV. Therefore, the extent of cadmium is defined.
- Fluoride was detected at locations 16-609772, 16-609773, 16-609774, and 16-609775. Fluoride is naturally occurring, and the concentrations detected (1.13–6.82 mg/kg), likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Lead was detected above the soil BV at locations 16-04029, 16-04032, and 16-609773. Concentrations decreased with depth but increased to the northeast. Therefore, the vertical extent of lead is defined, and the lateral extent is not defined.
- Mercury was detected above the soil BV six locations. Concentrations decreased with depth but increased to the northeast. Therefore, the vertical extent of mercury is defined, and the lateral extent is not defined.

- Perchlorate was detected at locations 16-609772 and 16-609775. Concentrations increased with depth and were detected at the west SWMU boundary. Therefore, the extent of perchlorate is not defined.
- Sulfate was detected above the soil BV at locations 16-609773 and 16-609775. These concentrations were below the maximum background concentration. Therefore, the extent of sulfate is defined.
- Zinc was detected above the soil BV at locations 16-04029 and 16-609773. Concentrations decreased with depth but increased to the northeast. Therefore, the vertical extent of zinc is defined, and the lateral extent is not defined.

9.12.5.2 Organic Chemicals

The distribution of organic COPCs at SWMU 16-034(n) is shown in Figure 9.12-3; the analytical results are presented in Table 9.12-3.

- Anthracene, benzo(a)pyrene, and benzo(k)fluoranthene were detected at location 16-609773. Concentrations decreased with depth and were below the EQL. Therefore, the extent of these organic chemicals is defined.
- Acetone was detected at locations 16-609772, 16-609773 (in the samples from both depths), 16-609774, and 16-609775. Concentrations were below the EQL, and decreased with depth at location 16-609773. Concentrations increased with depth at all other locations. Concentrations increased to the northwest. Therefore, the extent of acetone is not defined.
- Benzo(b)fluoranthene, fluoranthene, phenanthrene, and pyrene were detected at location 16-609773. Concentrations decreased with depth, above the EQL, and increased to the northeast. Therefore, the vertical extent of these organic chemicals is defined, and the lateral extent is not defined.
- Benzo(a)anthracene and chrysene were detected at location 16-609773. Concentrations decreased with depth and were at or near the EQL. Therefore, the extent of these organic chemicals is defined.
- 4-Isopropyltoluene was detected at locations 16-609772, 16-609773, and 16-609775. Concentrations were above the EQL at location 16-609773 and decreased with depth. Concentrations were at or near the EQL at location 16-609775 and increased with depth. Concentrations increased toward the northeast SWMU boundary. Therefore, the extent is not defined.
- Toluene was detected at locations 16-609772 and 16-609773. Concentrations decreased with depth but increased toward the northeast SWMU boundary. Therefore, the vertical extent is defined, and the lateral extent is not defined for toluene.

9.12.5.3 Radionuclides

In accordance with the approved work plan (LANL 2007, 102216) and based on previous site operations at SWMU 16-034(n), no analysis was done for radionuclides.

9.12.5.4 Summary of Extent

The lateral extent is not defined for antimony, lead, mercury, perchlorate, and zinc. The vertical extent is defined for all inorganic chemicals except antimony and perchlorate. The lateral extent is not defined for acetone, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, 4-isopropyltoluene, and toluene. The vertical extent is defined for all organic chemicals except acetone and 4-isopropyltoluene. Therefore, the overall extent of contamination at SWMU 16-034(n) is not defined.

9.12.6 Summary of Human Health Risk Assessment Results

Because the extent of contamination is not defined, human health risk was not evaluated for SWMU 16-034(n).

9.12.7 Summary of Ecological Risk Assessment Results

Because the extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-034(n).

9.13 AOC 16-024(m)—Potential Soil Contamination Associated with Former HE Magazine 16-66

9.13.1 Site Description and Operational History

AOC 16-024(m) is an area of potentially contaminated soil located in the eastern portion of V-Site at TA-16, approximately 260 ft northwest of former building 16-061 (Figure 9.13-1). The potential soil contamination is associated with a former HE magazine (structure 16-66). Built in the mid-1940s, the magazine was a 6 × 6 × 7 ft structure of wood-frame construction with earthen berms on three sides and the top. It was used to store packaged HE and finished HE products before processing, though no production-scale HE operations were conducted in the area. Use of the magazine ceased in 1959, and the building was removed by intentional burning in 1960.

9.13.2 Summary of Previous Investigations

In 1997, samples were collected from four locations downgradient of AOC 16-024(m). One sample screened positive for HE and was submitted for laboratory analysis of metals, HE, and SVOCs.

Table 9-13-1 presents the samples taken at AOC 16-024(m) and the analyses requested. Tables 9.13-2 and 9.13-3 present the decision-level data for AOC 16-024(m). Cobalt was detected above the BV. Bis(2-ethylhexyl)phthalate and benzoic acid were also detected (LANL 1997, 056660.289, pp. 69–74).

9.13.3 Field-Screening Results

A total of 24 samples, collected at eight locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3) except for barium

and iron. Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Barium was measured at 792, 970, and 733 ppm in samples RE16-10-3019 (location 16-609250), RE16-10-3021 (location 16-609251), and RE16-10-3023 (location 16-609252), respectively. Iron was measured at 18,513, 21,548, 18,675, and 18,038 ppm in samples RE16-10-3019 (location 16-609250), RE16-10-3021 (location 16-609251), RE16-10-3023 (location 16-609252), and RE16-10-3025 (location 16-609253), respectively. Strontium was measured at 279, 307, and 234 ppm in samples RE16-10-3019 (location 16-609250), RE16-10-3021 (location 16-609251), and RE16-10-3023 (location 16-609252), respectively.

Based on these results, 16 additional step-out samples were collected: RE16-10-14280, RE16-10-14281, RE16-10-14282, RE16-10-14283, RE16-10-14284, RE16-10-14285, RE16-10-14286, RE16-10-14287, RE16-10-14288, RE16-10-14289, RE16-10-14290, RE16-10-14291, RE16-10-14292, RE16-10-14293, RE16-10-14294, and RE16-10-14319 (Appendix C, section C-7.4.8).

9.13.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for AOC 16-024(m) are shown in Figure 9.13-1. Table 9.13-1 summarizes the samples collected and analyses requested.

9.13.4.1 Inorganic Chemicals

Twelve tuff (Qbt 4), six fill, and seven soil samples were collected and analyzed for inorganic chemicals. The 25 samples were analyzed for TAL metals; in addition, all but one soil sample were also analyzed for anions and perchlorate. Table 9.13-2 lists the inorganic chemicals detected above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.13-2. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.13.4.2 Organic Chemicals

Twelve tuff (Qbt 4), six fill, and seven soil samples were collected and analyzed for organic chemicals. One soil sample was analyzed for SVOCs and explosive compounds, and the remaining samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 9.13-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.13-3. Because the extent of contamination is not defined for this site, COPCs have not been identified.

9.13.4.3 Radionuclides

Based on site operations, and in accordance with the approved work plan (LANL 2007, 102216), no analysis was done for radionuclides.

9.13.5 Spatial Distribution

Twenty-five samples were collected at nine sample locations (Figure 9.13-1). Eight surface samples were collected at 0.0–0.5 ft bgs, one surface sample was collected at 0.0–1.0 ft bgs, one subsurface sample was collected at 3.0–3.5 ft bgs, seven subsurface samples were collected at 5.5–6.0 ft bgs, and eight subsurface samples were collected at 8.5–9.0 ft bgs. The extent of contamination at AOC 16-024(m) is evaluated in the following sections.

9.13.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at AOC 16-024(m) is shown in Figure 9.13-2.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations decreased with depth at four locations, and the concentration was below the maximum background concentration (8370 mg/kg) at location 16-609251. Concentrations increased with depth at location 16-611836. Therefore, the extent of aluminum is not defined.
- Antimony was detected above the soil BV at locations 16-609252 and 16-609253. Concentrations decreased with depth and laterally at both locations. Therefore, the extent of antimony is defined.
- Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at seven locations. Concentrations decreased with depth at three locations and increased with depth at four locations. Barium concentrations increased laterally. Therefore, the extent of barium is not defined.
- Cadmium was not detected above BVs but had detection limits above BVs. Therefore, the extent of cadmium is defined.
- Calcium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations decreased with depth at four locations and increased with depth at two locations. The concentration at location 16-609251 is equivalent to the maximum background concentration (2370 mg/kg). Therefore, the extent of calcium is not defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations decreased with depth at four locations but increased laterally. The concentrations at locations 16-609251 and 16-611836 are below the maximum background concentration (13 mg/kg). Therefore, the vertical and lateral extent of chromium are not defined.
- Cobalt was detected above the soil BV at location 16-04041 and above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations decreased with depth at four locations, increased with depth at two locations, but decreased laterally. Therefore, the vertical extent of cobalt is not defined.
- Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations decreased with depth at four locations, increased with depth at two locations, and increased laterally. Therefore, the extent of copper is not defined.
- Fluoride was detected at all locations, and nitrate was detected at four locations. Fluoride and nitrate are naturally occurring, and the concentrations detected (1.56–22.2 and 0.093–1.34 mg/kg, respectively) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride and nitrate is defined.
- Iron was detected above the soil BV at location 16-611838 and above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-611836, 16-611837, and 16-611838. Concentrations decreased with depth at locations 16-611837 and 16-611838. The concentration at location 16-611836 was below the maximum background concentration (19,500 mg/kg). Therefore, the extent of iron is defined.
- Lead was detected above the soil BV at locations 16-609251 and 16-611838 and above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609250, 16-609251, 16-611836, 16-611838, and 16-611839. Concentrations decreased with depth at locations 16-609251, 16-611838, and 16-611839. Concentrations increased with depth at locations 16-609250 and 16-611836. Concentrations of lead increased to the west and south. Therefore, the extent of lead is not defined.

- Magnesium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at four locations. Concentrations decreased with depth at locations 16-611838 and 16-611839. The concentrations at locations 16-609251 and 16-611836 were below the maximum background concentration (2820 mg/kg). Therefore, the extent of magnesium is defined.
- Manganese was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609250. The concentration was below the maximum background concentration (752 mg/kg). Therefore, the extent of manganese is defined.
- Nickel was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at four locations. Concentrations decreased with depth at locations 16-611837, 16-611838, and 16-611839. Concentrations increased with depth at location 16-609250 and also to the west. Therefore, the extent of nickel is not defined.
- Perchlorate was detected at locations 16-609251, 16-611836, 16-611837, and 16-611838. Concentrations decreased with depth at locations 16-609251, 16-611836, and 16-611838. The concentration at location 16-611837 was below the EQL. Therefore, the extent of perchlorate is defined.
- Selenium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609253 and 16-611839. Concentrations increased with depth at both locations. Therefore, the extent of selenium is not defined.
- Thallium was detected above the soil BV at location 16-611836 and above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609250. The concentrations at location 16-611836 decreased with depth, but concentrations increased with depth at location 16-609250. Therefore, the extent of thallium is not defined.
- Vanadium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations decreased with depth at four locations, and the concentration was below the maximum background concentration (21 mg/kg) at location 16-611836. The concentration increased with depth at location 16-609251 and laterally. Therefore, the extent of vanadium is not defined.
- Zinc was detected above the soil BV at locations 16-609251 and 16-611838. Concentrations decreased with depth at both locations and laterally. Therefore, the extent of zinc is defined.

9.13.5.2 Organic Chemicals

The distribution of organic chemicals at AOC 16-024(m) is shown in Figure 9.13-3. Analytical results are presented in Table 9.13-3.

- Acenaphthene was detected at location 16-609252. Concentrations decreased downgradient and with depth. Therefore, the extent of acenaphthene is defined.
- Acetone was detected at location 16-611839 in the deepest sample. Therefore, the vertical extent of acetone is not defined. Benzoic acid and bis(2-ethylhexyl)phthalate were detected at location 16-04041 in the only sample collected at this location. These concentrations were below the respective EQLs. Benzoic acid and bis(2-ethylhexyl)phthalate were not detected in the other samples collected at this site, including all subsurface samples. Because concentrations decreased with depth and downgradient, the extent of benzoic acid and bis(2-ethylhexyl)phthalate is defined.

- Bromomethane was detected at location 16-609251 and downgradient at location 16-609250. Bromomethane was not detected in the farthest downgradient locations. Concentrations decreased with depth. Therefore, the extent of bromomethane is defined.
- 4-Isopropyltoluene was detected below the EQL at two locations. Concentrations decreased with depth at both locations. Therefore, the extent of 4-isopropyltoluene is defined.
- Methylene chloride was detected at locations 16-609252, 16-609253, 16-611837, and 16-611839. Concentrations increased with depth at locations 16-609253 and 16-611839 and were below the EQL at locations 16-609252 and 16-611837. Therefore, the vertical extent of methylene chloride is not defined. The lateral extent is defined.

9.13.5.3 Radionuclides

Radionuclide analyses were not analyzed for, based on site operations and the approved work plan (LANL 2007, 102216).

9.13.5.4 Summary of Extent

The vertical and lateral extent of aluminum, barium, calcium, chromium, copper, lead, nickel, selenium, thallium, and vanadium is not defined. The vertical extent of acetone, cobalt, and methylene chloride is not defined. Therefore, the overall extent of contamination at AOC 16-024(m) is not defined.

9.13.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for AOC 16-024(m).

9.13.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for AOC 16-024(m).

9.14 SWMU 16-017(v)-99—Former HE Processing Building 16-515

9.14.1 Site Description and Operational History

SWMU 16-017(v)-99 is former HE-processing building 16-515, which was located in the western portion of V-site at TA-16 (Figure 9.14-1). Built in 1944, building 16-515 was initially used as a warehouse, shop, and small office. In 1945, the building was converted to a laboratory, inspection room, and repair area for HE parts. By the 1950s to 1960s, building 16-515 had undergone another remodel to accommodate x-ray work, photo processing, and HE casting (LANL 1999, 063973, p. 5). This remodel included covering portions of the wall near the x-ray machine with lead shielding and reconstructing the floors in the inspection and repair rooms to include a 1% slope to allow drainage to lead-lined troughs constructed into the floors. HE wastes from the casting room and wash water from cleaning HE residue were directed into these troughs, which drained to a sump on the west side of building 16-515. HE residues were collected from the sump and burned at the TA-16 burning grounds. The sump discharged effluent to a secondary sump [SWMU 16-029(x)], which in turn discharged to an area southeast of V-Site and eventually formed the V-Site pond (LANL 2000, 066885). All operations at building 16-515 ceased by 1980 (LANL 1999, 063973, p. 6). Building 16-515 burned in the 2000 Cerro Grande fire.

9.14.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 16-017(v)-99.

9.14.3 Field-Screening Results

A total of four samples, collected at two locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

9.14.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for SWMU 16-017(v)-99 are shown in Figure 9.14-1. Table 9.14-1 summarizes the samples collected and analyses requested.

9.14.4.1 Inorganic Chemicals

Four (two fill and two tuff [Qbt 4]) samples were collected and analyzed for inorganic chemicals. The samples were analyzed for TAL metals, perchlorate, total cyanide, and anions. Table 9.14-2 lists the inorganic chemicals above BVs. Detected concentrations of inorganic chemicals above BVs are shown in Figure 9.14-2. Because the extent of contamination has not been defined, COPCs have not been identified.

9.14.4.2 Organic Chemicals

Four (two fill and two tuff [Qbt 4]) samples were collected and analyzed for organic chemicals. The samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 9.14-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown in Figure 9.14-3. Because the extent of contamination has not been defined, COPCs have not been identified.

9.14.4.3 Radionuclides

Four (two fill and two tuff [Qbt 4]) samples were collected and analyzed for radionuclides. The samples were analyzed for americium-241, isotopic plutonium, and isotopic uranium. No radionuclides were detected or detected above BVs/FVs.

9.14.5 Spatial Distribution

Four samples from two sample locations (Figure 9.14-1) were evaluated to determine the extent of contamination at SWMU 16-017(v)-99. Two surface samples were collected from 0.0 to 0.5 ft bgs, and

two subsurface samples were collected from 5.0 to 6.0 ft bgs. Two additional sample locations at the east end of the building footprint could not be sampled because of concerns for preserving the historic structure (Appendix C, section C-7.4.3). Extent discussions are based on the samples collected at the west end of the former building.

The extent of contamination at SWMU 16-017(v)-99 is evaluated in the following sections.

9.14.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at SWMU 16-017(v)-99 is shown in Figure 9.14-2. Analytical results are presented in Table 9.14-2.

- Arsenic, chromium, and thallium were detected above the Qbt 2, Qbt 3, and Qbt 4 BVs at location 16-609436. Concentrations were below the maximum background concentrations (5, 13, and 1.7 mg/kg respectively) Therefore, the extent of arsenic, chromium, and thallium is defined.
- Aluminum, barium, calcium, magnesium, and nickel were detected at location 16-609436 above Qbt 2, Qbt 3, and Qbt 4 BVs. Concentrations increased with depth. Therefore, the extent of aluminum, barium, calcium, magnesium, and nickel is not defined.
- Antimony, copper, and lead were detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at locations 16-609436 and 16-609437. Concentrations decreased with depth at both locations. Therefore, the extent of antimony, copper, and lead is defined.
- Fluoride was detected in four samples at locations 16-609436 and 16-609437. Fluoride is a naturally occurring element, and the concentrations detected (1.07–13.2 mg/kg) likely reflect naturally occurring concentrations. Therefore, the extent of fluoride is defined.
- Silver was detected above the soil BV at location 16-609437. Concentrations decreased with depth. Therefore, the extent is defined for silver.
- Cadmium and selenium were not detected above BVs but had elevated detection limits above BVs. Therefore, the extent of cadmium and selenium is defined.
- Sulfate was detected above BVs at location 16-609437. Concentrations decreased with depth. Therefore, the extent of sulfate is defined.
- Zinc was detected above the soil BV at locations 16-609436 and 16-609437. Concentrations decreased with depth at both locations. Therefore, the extent of zinc is defined.

9.14.5.2 Organic Chemicals

The distribution of organic chemicals at SWMU 16-017(v)-99 is shown in Figure 9.14-3. The analytical results are presented in Table 9.14-3.

- Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and tetrachloroethene were detected at location 16-609436. Concentrations decreased with depth. Therefore, the extent of these organic chemicals is defined.
- 4-Isopropyltoluene was detected at location 16-609437. The concentration decreased with depth and was also below the EQL. Therefore, the extent of 4-isopropyltoluene is defined.

- Methylene chloride was detected at locations 16-609436 and 16-609437, below the EQL. Therefore, the extent of methylene chloride is defined.

9.14.5.3 Radionuclides

Radionuclides were not detected or not detected above the BVs/FVs.

9.14.5.4 Summary of Extent

The extent of aluminum, barium, calcium, magnesium, and nickel is not defined. The east end of the former building remains unsampled. Therefore, the overall extent of contamination at SWMU 16-017(v)-99 is not defined.

9.14.6 Summary of Human Health Risk Assessment Results

Because the overall extent of contamination is not defined, human health risk was not evaluated for SWMU 16-017(v)-99.

9.14.7 Summary of Ecological Risk Assessment Results

Because the overall extent of contamination is not defined, ecological risk was not evaluated for SWMU 16-017(v)-99.

9.15 Courtyard Periphery Area

The V-Site Courtyard Area is of historical significance because of its association with the Manhattan Project. In this area, the Trinity test device was assembled and tests of Fat Man and Little Boy weapon components were conducted. The NHPA requires historic building management at the Laboratory. Compliance with the NHPA is regulated by the NMHPD.

Six S-Site Aggregate SWMUs [16-006(h), 16-013, 16-017(q)-99, 16-017(r)-99, 16-017(s)-99, and 16-017(t)-99] are located within the V-Site Courtyard Area. Historic preservation restrictions prohibit the Laboratory from sampling within this historically protected area, thereby preventing the determination of the nature and extent of contamination for each of the six sites that lie within the V-Site Courtyard Area. NMED has conditionally approved the Laboratory's proposal to move sampling to the periphery of the V-Site Courtyard (NMED 2009, 108102). By sampling at the periphery, the Laboratory will be able to determine whether any contaminants are migrating off-site. Therefore, for the purposes of the S-Site Aggregate investigation, SWMUs 16-006(h), 16-013, 16-017(q)-99,16-017(r)-99, 16-017(s)-99, and 16-017(t)-99 have been assembled into a grouping designated as the Courtyard Periphery Area.

Because of the historic nature of the Courtyard Area, the Laboratory occasionally conducts tours for the public to view the area. To ensure that the public is protected during site visits, the area was evaluated for potential human health risk using the recreational scenario to represent site visitors (Appendix H). Despite extent not being defined, the risk-screening assessment was conducted for information purposes and not for compliance with the Consent Order.

The Courtyard Periphery Area includes the six sites described below and the relatively level drainage area north of SWMU 16-013 and west of K-Site Road.

9.15.1 Site Description and Operational History

9.15.1.1 SWMU 16-006(h)–Pit

SWMU 16-006(h) is a 6 × 6 × 6 pit (structure 16-526) located at V-Site in TA-16 against the berm retaining wall of building 16-517 (Figure 9.15-1). Built in 1945, the pit housed a condensate pump for the TA-16 steam-heating distribution system. Condensate from steam radiators was routed to the pump pit to be returned to the source boiler. The condensate pump served buildings 16-515, 16-516, 16-519 and 16-520 (LANL 1997, 055512, p. 7). The 1990 SWMU report (LANL 1990, 007512) incorrectly listed structure 16-526 as a septic system. Field verification correctly identified the structure as a pit that housed a steam-heating distribution pump (LANL 1994, 039440).

9.15.1.2 SWMU 16-013–Decommissioned Storage Area

SWMU 16-013 is a decommissioned storage area that was located in the V-Site Courtyard at TA-16 (Figure 9.15-1). The courtyard was open at the north end and surrounded on three sides by buildings or covered structures. Buildings 16-516 and 16-517 composed the west side of the courtyard; former building 16-518 (a covered structure with no walls), the east side; and former buildings 16-519, 16-520, and the south portion of former building 16-518, the south side. The storage area occupied the entire V-Site Courtyard, which is approximately 90 × 90 ft and paved with asphalt. The area was used to store drums containing spent HE-contaminated hydraulic oil. Spent solvents, barium nitrate, empty containers (formerly holding radioactive material), and empty drums (formerly containing lithium hydride) were stored in this area (DOE 1987, 008663). The beginning date of operation for this storage area is not known. The area ceased being used for storage in 1989. Evidence of leaks was observed during a 1987 field visit.

9.15.1.3 SWMU 16-017(q)-99–Storage Building 16-517

SWMU 16-017(q)-99 is building 16-517, located at V-Site in TA-16 (Figure 9.15-1). Constructed in 1944, building 16-517 was originally used as a laboratory and later for equipment storage. The building may also have been used as a storage magazine (LANL 1994, 039440, pp. 5-503, 6-23). Building 16-517 is one of the few V-Site buildings that did not burn in the Cerro Grande fire (LANL 2000, 066885). This building was originally designated as SWMU 16-017, a group of several structures in central TA-16. In 1999, SWMU 16-017 was separated into 24 SWMUs, each of which consists of a single structure.

9.15.1.4 SWMU 16-017(r)-99–Former Building 16-519

SWMU 16-017(r)-99 is former building 16-519, located at V-Site in TA-16 (Figure 9.15-1). Constructed in 1945, building 16-519 was initially used for varnishing and assembling Fat Man mockups. Later uses included storage and photo processing (LANL 1994, 039440, pp. 5-503, 6-32). Building 16-519 burned in the 2000 Cerro Grande fire. This building was originally designated as SWMU 16-017, a group of several structures in central TA-16. In 1999, SWMU 16-017 was separated into 24 SWMUs, each of which consists of a single structure.

9.15.1.5 SWMU 16-017(s)-99–Former Building 16-520

SWMU 16-017(s)-99 is former building 16-520, located at V-Site in TA-16 (Figure 9.15-1). Constructed in 1945, building 16-520 was initially used for varnishing and assembling Fat Man mockups. Later uses included storage and photo processing (LANL 1994, 039440, pp. 5-503, 6-32). Building 16-520 burned in the 2000 Cerro Grande fire. This building was originally designated as SWMU 16-017, a group of several

structures in central TA-16. In 1999, SWMU 16-017 was separated into 24 SWMUs, each of which consists of a single structure.

9.15.1.6 SWMU 16-017(t)-99–High Bay Building 16-516

SWMU 16-017(t)-99 is the historic High Bay (building 16-516) located at V-Site in TA-16 (Figure 9.15-1). Building 16-516 originally housed a laboratory used to fit test the Trinity Device. Later uses included pioneer work in plastic explosives and storage of equipment (LANL 1994, 039440, pp. 5-503, 6-32). The building has been undergoing restoration since shortly after the time of the 2000 Cerro Grande Fire. Building 16-516 was originally designated as SWMU 16-017, a group of several structures in central TA-16. In 1999, SWMU 16-017 was separated into 24 SWMUs, each of which consists of a single structure.

9.15.2 Summary of Previous Investigations

No previous investigations have been conducted at SWMUs 16-017(r)-99, 16-017(s)-99, 17-017(t)-99, and 16-017(q)-99 or in the Drainage North of the Courtyard.

In 1997, two locations were sampled beyond the northeast corner of SWMU 16-013. Table 9.15-1 presents the samples taken and the analyses requested for the Courtyard Periphery. Tables 9.15-2 and 9.15-3 present the decision-level data for the Courtyard Periphery samples. Copper, barium, lead, uranium, and zinc were detected above BVs at location 16-03008. Arsenic, barium, lead, copper and zinc were detected above BVs at location 16-03009. Di-n-butyl phthalate was also detected from location 16-03009. Barium, copper, and lead were detected above BVs in samples from locations 16-03005 and 16-03007. Decision-level data are presented in Tables 9.15-2 and 9.15-3.

Three samples were collected south of SWMU 16-006(h) and northwest of AOC C-16-068. Metals were detected above BVs in all three samples (LANL 1999, 063973).

9.15.3 Field-Screening Results

Seventy-five samples, collected at 30 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. ARS performed screening for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments.

The RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Review of the XRF results indicates that all process-related inorganic chemicals analyzed had concentrations that were less than the established criteria (Appendix C, section C-2.3). Gross alpha and beta were reported at less than the minimal detectable activity of 100 cpm, and gross gamma was reported at less than the minimal detectable activity of 20 µR/h.

Based on these results, no additional step-out samples were required.

9.15.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for the Courtyard Periphery Area are shown in Figure 9.15-1. Table 9.15-1 summarizes the samples collected and analyses requested for each sample. Decision-level data collected at the Courtyard Periphery Area consists of 56 samples (21 tuff [Qbt 4], 1 sediment, 23 soil, and 11 fill)

collected at 30 locations. The Courtyard Periphery Area is being treated differently than SWMUs and AOCs (i.e., in the reasonably foreseeable future land use for the area is recreational and the likely receptors reasonably expected to be present are short-term visitors to the site and tour guides). Therefore, this site was evaluated for risk even though the nature and extent of contamination are not defined.

9.15.4.1 Inorganic Chemicals

Twenty-one tuff (Qbt 4), 1 sediment, 23 soil, and 11 fill samples were collected and analyzed for inorganic chemicals. Of these 56 samples, 56 were analyzed for TAL metals, 54 for anions and perchlorate, 42 for boron, and 2 for uranium. Detected concentrations of inorganic chemicals above BVs and those detected without BVs are shown on Plate 17. Table 9.15-2 lists the inorganic chemicals detected above BVs and those detected without BVs.

The nature and extent of contamination are not defined for this site. However, because risk has been evaluated for the recreational scenario and ecological receptors, COPCs have been identified. The inorganic chemicals identified as COPCs in soil at the Courtyard Periphery Area are aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, iron, lead, perchlorate, selenium, silver, thallium, and zinc.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (7340 mg/kg) in two samples, with a maximum concentration of 9730 mg/kg. Statistical tests were performed to determine if the site sampling results for aluminum are different from background. The statistical test results are presented in Appendix B, Table B-3. The results of the tests indicate that site data may be different from background. The box plot for aluminum is presented in Appendix B, Figure B-11. Aluminum is identified as a COPC in tuff.
- Antimony was not detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs (0.83 and 0.5 mg/kg), but had detection limits (0.77–1.66 mg/kg) above the BVs in several samples. The detection limits were either slightly above or below the maximum soil background concentration (1 mg/kg). Because the detection limits are similar to the maximum background concentration, antimony is not identified as a COPC in soil but is identified as a COPC in tuff.
- Arsenic was detected above the sediment and Qbt 2, Qbt 3, and Qbt 4 BVs (3.98 and 2.79 mg/kg, respectively) in one sample each with a maximum concentration of 31.6 mg/kg. Because there were less than 10 sediment samples, statistical tests could not be performed. The concentration was above the maximum sediment background concentration. The maximum detected concentration was substantially above background. Arsenic is identified as a COPC in sediment and tuff.
- Barium was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs (295 and 46 mg/kg) in 1 soil sample and 11 tuff samples with a maximum concentration of 885 mg/kg. Because the concentrations are substantially above the BVs, barium is identified as a COPC in soil and tuff.
- Boron was detected in one tuff sample. Boron is naturally occurring and the concentration detected (1.597 mg/kg) likely reflects naturally occurring concentrations. Therefore, boron is not identified as a COPC.
- Cadmium was detected above the soil BV (0.4 mg/kg) in two samples and had detection limits (0.418–0.716 mg/kg) above the BV in several soil samples. Because there were too many nondetects, statistical tests could not be performed. Concentrations were below the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC in soil.

- Calcium was detected above the soil and QBT 2, QBT 3, AND QBT 4 BVs (6120 and 2220 mg/kg, respectively) in one sample each with a maximum concentration of 6890 mg/kg. Statistical tests were performed to determine if the site sampling results for calcium are different from background. The statistical test results are presented in Appendix B, Table B-3. The results of the tests indicate that site data are not different from background for soil but may be different from background for tuff. The box plot for calcium in soil is presented in Appendix B, Figure B-12. Calcium is identified as a COPC in tuff.
- Chloride was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs (231 and 94.6 mg/kg) in one soil sample and one tuff sample, with a maximum concentration of 308 mg/kg. Concentrations are similar to the maximum soil background concentration (303 mg/kg) and below the maximum tuff background concentration (465 mg/kg). Chloride is not identified as a COPC in soil and tuff.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (7.14 mg/kg) in five samples with a maximum concentration of 10.2 mg/kg. Statistical tests were performed to determine if the site sampling results for chromium are different from background. The statistical test results are presented in Appendix B, Table B-3. The results of the tests indicate that site data may be different from background. The box plot for chromium is presented in Appendix B, Figure B-13. Chromium is identified as a COPC in tuff.
- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (3.14 mg/kg) in four samples with a maximum concentration of 4.23 mg/kg. Cobalt is identified as a COPC.
- Copper was detected above the soil, sediment, and Qbt 2, Qbt 3, and Qbt 4 BVs (14.7, 11.2, and 4.66 mg/kg) in 11 soil, 1 sediment, and 6 tuff samples with a maximum concentration of 347 mg/kg. Because the concentrations are substantially above the soil and sediment BVs, copper is identified as a COPC.
- Cyanide was detected above soil BV (0.5 mg/kg) in one sample with a maximum concentration of 0.534 mg/kg. Cyanide is identified as a COPC.
- Fluoride was detected at 28 locations. Fluoride is naturally occurring and the concentrations detected (0.638–10.8 mg/kg) likely reflect naturally occurring concentrations, Therefore, fluoride is not identified as a COPC.
- Iron was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs (21,500 and 14,500 mg/kg) in one tuff and two soil samples with a maximum concentration of 43,000 mg/kg. The maximum concentration is substantially above the soil BV. Statistical tests were performed to determine if the site sampling results for iron in tuff are different from background. The statistical test results are presented in Appendix B, Table B-3. The results of the tests indicate that site data are different from background. The box plots for iron are presented in Appendix B, Figures B-14 and B-15. Iron is identified as a COPC.
- Lead was detected above soil, sediment, and Qbt 2, Qbt 3, and Qbt 4 BVs (22.3, 19.7, and 11.2 mg/kg) in 13 soil, 1 sediment, and 3 tuff samples with a maximum concentration of 85.6 mg/kg. Statistical tests were performed to determine if the site sampling results for lead are different from background. The statistical test results are presented in Appendix B, Table B-3. The results of the tests indicate that site data are different from background. The box plots for lead are presented in Appendix B, Figures B-16 and B-17. Lead is identified as a COPC.
- Nitrate was detected at one location. Nitrate is naturally occurring and the concentration detected (2.93 mg/kg) likely reflects naturally occurring concentrations. Therefore, nitrate is not identified as a COPC.

- Perchlorate was detected at three locations with a maximum concentration of 0.000866 mg/kg. Perchlorate is identified as a COPC.
- Selenium was detected above the sediment BV (0.3 mg/kg) in one sample and had detection limits (0.938–1.39 mg/kg) above the Qbt 2, Qbt 3, and Qbt 4 BV (0.3 mg/kg) in several samples. Selenium is identified as a COPC.
- Silver was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs (1.0 mg/kg) in two soil and three tuff samples with a maximum concentration of 113 mg/kg. Because the maximum concentration is substantially above the soil BV, silver is identified as a COPC.
- Sulfate was detected in one Qbt 2, Qbt 3, and Qbt 4 sample with a maximum concentration of 547 mg/kg. The maximum concentration was below the maximum background concentration (1430 mg/kg). Sulfate is not identified as a COPC.
- Thallium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV (1.1 mg/kg) in one sample with a maximum concentration of 2.8 mg/kg. Thallium also had detection limits above the soil and sediment BVs (0.73 mg/kg) in one sample each. Because the maximum concentration is substantially above the tuff BV, thallium is identified as a COPC.
- Uranium was detected above the soil BV (1.82 mg/kg) in one sample with a maximum concentration of 3.21 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration was below the maximum background concentration (3.6 mg/kg). The box plot for uranium is presented in Appendix B, Figure B-18. Uranium is not identified as a COPC.
- Zinc was detected above the soil and sediment BVs (48.8 and 60.2 mg/kg) in one sediment and seven soil samples with a maximum concentration of 393 mg/kg. Because there were less than 10 sediment samples, statistical tests could not be performed. Because the maximum concentration is substantially above the soil BV, zinc is identified as a COPC.

9.15.4.2 Organic Chemicals

Twenty-one tuff (Qbt 4), 1 sediment, 23 soil, and 11 fill samples were collected and analyzed for organic chemicals. Of these 56 samples, 54 were analyzed for VOCs and 56 were analyzed for SVOCs and explosive compounds. Table 9.15-3 lists the organic chemicals detected. Detected concentrations of organic chemicals are shown on Plate 18. The nature and extent of contamination are not defined for this site. However, because risk has been evaluated for the recreational scenario and ecological receptors, COPCs have been identified.

The following organic chemicals were detected in soil/fill and tuff and are identified as COPCs: acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, di-n-butylphthalate, dibenz(a,h)anthracene, dibenzofuran,1,1-dichloroethene, diphenylamine, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, methylene chloride, 2-methylnaphthalene, naphthalene, pentachlorophenol, phenanthrene, pyrene, RDX, and toluene.

9.15.4.3 Radionuclides

Twenty-one tuff (Qbt 4), 1 sediment, 23 soil, and 11 fill samples were collected and analyzed for radionuclides. Each of these 56 samples was analyzed for gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, and americium-241. No radionuclides were detected above BVs/FVs at the Courtyard Periphery Area.

9.15.5 Spatial Distribution

The Courtyard Area within V-Site is of historical importance. Because restrictions related to historical preservation were imposed during the sampling, the SWMUs and AOCs that constitute the area could not be sampled directly to adequately characterize the nature or extent of contamination. The Courtyard Periphery Area sampling data was compiled to evaluate the potential for off-site migration of contamination from the V-Site Courtyard, exposure of visitors at the historic area, and exposure of ecological receptors in the surrounding area.

Fifty-six samples were collected from 30 sample locations (Figure 9.15-1). One surface sample (0.0–0.5 ft bgs) and one subsurface sample (5.5–6.0 ft bgs) were collected at each sample location. The extent of contamination at the Courtyard Periphery Area is evaluated in the following sections.

9.15.5.1 Inorganic Chemicals

The distribution of inorganic chemicals at the Courtyard Periphery Area is shown on Plate 17; the analytical results are presented in Table 9.15-2. The lateral extent is not defined for most sample locations.

- Aluminum was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at six locations. Concentrations were below the maximum background concentrations (8370 mg/kg) at locations 16-609496, 16-611437, 16-611440, 16-609266, 16-609288, and 16-609297, and concentrations increased with depth. Therefore, the extent of aluminum is not defined.
- Antimony was undetected above the BV but had detection limits above the BV; therefore, the extent of antimony is defined.
- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609496. Concentrations increased with depth at location 16-609496. Arsenic was detected above the sediment BV at location 16-03009. It was not detected above the BV at depth at locations 16-609285 and 16-609290 (less than approximately 10 ft away). Therefore, the extent of arsenic is not defined.
- Barium was detected above the soil BV at location 16-609297. Barium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at 10 other locations. Concentrations increased with depth at most locations. Therefore, the extent of barium is not defined.
- Calcium was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at one location for each. Concentrations decreased with depth at location 16-609497. The concentration increased with depth at location 16-611437. Therefore, the extent of calcium is not defined.
- Chromium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at five locations. The concentrations were below the maximum background concentration (13 mg/kg). Therefore, the extent of chromium is defined.
- Cobalt was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609255, 16-609266, 16-609287, and 16-609288. Concentrations increased with depth. Therefore, the extent of cobalt is not defined.
- Copper was detected above the soil BV at 11 locations. Concentrations decreased with depth. Copper was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at five locations. Concentrations were below or slightly above the maximum background concentration (6.2 mg/kg). Copper was detected above the sediment BV at location 16-03009. Copper was not detected above the BV at

depth at nearby locations 16-609290 and 16-609255 (within approximately 10 ft). Therefore, the extent of copper is not defined.

- Total cyanide was detected above the soil BV at location 16-609266. Concentrations decreased with depth. Therefore, the extent of total cyanide is defined.
- Iron was detected above the soil BV at locations 16-609290 and 16-609434. Concentrations decreased with depth. Therefore, the vertical extent of iron is defined.
- Lead was detected above the soil BV at 13 locations. Concentrations decreased with depth at most locations or decreased with depth at nearby locations. Concentrations increased with depth at location 16-609496. Therefore, the extent of lead is not defined.
- Perchlorate was detected at locations 16-609255, 16-609297, and 16-609433. Concentrations decreased with depth at locations 16-609255 and 16-609297. These concentrations are below the perchlorate EQL. Therefore, the extent of perchlorate is defined.
- Selenium was detected above the sediment BV at location 16-03009. Selenium was not detected above the BV at depth at nearby locations. Therefore, the extent of selenium is defined.
- Silver was detected above the soil BV at locations 16-609256 and 16-609289. Concentrations decreased with depth at both locations. Silver was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at locations 16-609266 and 16-611437. Concentrations increased with depth at locations 16-609266 and 16-611437. Therefore, the extent of silver is not defined.
- Thallium was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at location 16-609496. Concentrations decreased with depth. Therefore, the extent of thallium is not defined.
- Zinc was detected above the soil BV at several locations. Concentrations decreased with depth at each location or at nearby locations. Zinc was detected above the sediment BV at location 16-03009. Zinc was not detected above the BV at depth or at nearby locations 16-609285 and 16-609290. Therefore, the extent of zinc is defined.

9.15.5.2 Organic Chemicals

The distribution of organic chemicals at the Courtyard Periphery Area is shown on Plate 18. The analytical results are presented in Table 9.15-3. The lateral extent is not defined for most sample locations.

- Benzo(k)fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and naphthalene were detected at one to five locations. Concentrations decreased at all locations except location 16-609289. Therefore, the extent of these organic chemicals is not defined.
- Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, and pyrene were detected at 4 to 13 locations. Concentrations decreased with depth at all locations except locations 16-609289 and 16-609296. Concentrations were below the EQLs at location 16-609296 for acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and phenanthrene, but concentrations increased with depth for fluoranthene and pyrene. The concentration of benzo(b)fluoranthene at location 16-611440 was below the EQL. Therefore, the vertical extent of these organic chemicals is not defined.
- Acetone was detected at eight locations. Concentrations increased with depth at locations 16-609266 and 16-611437. Concentrations at the other six locations were below the EQL. Therefore, the vertical extent of acetone is not defined.

- Dibenzofuran and diphenylamine were detected at location 16-609289. Concentrations increased with depth. Therefore, the extent of dibenzofuran and diphenylamine is not defined.
- 1,1-Dichloroethene was detected at locations 16-609284, 16-609287, and 16-609300. Concentrations decreased with depth. Therefore, the vertical extent of 1,1-dichlroethene is defined.
- Di-n-butylphthalate was detected at location 16-03009. Di-n-butylphthalate was not detected in deeper samples collected from nearby locations 16-609285 and 16-609290 (within approximately 10 ft). Therefore, the vertical extent of di-n-butylphthalate is defined.
- Bis(2-ethylhexyl)phthalate was detected at 21 locations. Concentrations decreased with depth at 19 locations. Concentrations were below the EQL at locations 16-609432 and 16-609434. Therefore, the vertical extent of bis(2-ethylhexyl)phthalate is defined.
- HMX was detected at locations 16-60281 and 16-609498. The concentration decreased with depth at location 16-609498 and was below the EQL at location 16-609281. Therefore, the vertical extent of HMX is defined.
- 4-Isopropyltoluene was detected at six locations. Concentrations increased with depth at locations 16-609255 and 16-609266. The concentrations at the other four locations were below the EQL. Therefore, the vertical extent of 4-isopropyltoluene is not defined.
- Methylene chloride was detected at seven locations. The concentrations were below the EQL at each location. Therefore, the vertical extent of methylene chloride is defined.
- Pentachlorophenol was detected at location 16-609286. The concentration decreased with depth. Therefore, the vertical extent of pentachlorophenol is defined.
- RDX was detected at locations 16-609281, 16-609283, and 16-609498. The concentration decreased with depth at location 16-609498. Concentrations increased with depth at locations 16-609281 and 16-609283. Therefore, the vertical extent of RDX is not defined.
- Toluene was detected at locations 16-609255, 16-609266, and 16-609281. The concentration decreased with depth at location 16-609255, was below the EQL at location 16-609281, and increased with depth at location 16-609266. Therefore, the vertical extent of toluene is not defined.

9.15.5.3 Radionuclides

No radionuclides were detected above BVs/FVs at the Courtyard Periphery Area.

9.15.5.4 Summary of Extent

The extent is not defined for aluminum, arsenic, barium, calcium, cobalt, copper, lead, silver, thallium benzo(k)fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, pyrene, dibenzofuran, diphenylamine, acetone, 4-isopropyltoluene, RDX, and toluene. Therefore, the overall extent of contamination at the Courtyard Periphery Area is not defined.

9.15.6 Summary of Human Health Risk Assessment Results

Based on the results of the risk-screening assessments presented in Appendix H, there are no unacceptable risks from COPCs for the recreational scenario. The total excess cancer risk for the recreational scenario is 1×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

9.15.7 Summary of Ecological Risk Assessment Results

Based on results of the risk-screening assessment presented in Appendix H, no potential risk was found for any receptor following evaluations based on minimum ESLs, HI analyses, potential effects to populations (individuals for T&E species), and LOAEL analyses.

9.16 SWMU 16-006(g)—Former Septic System

9.16.1 Site Description and Operational History

SWMU 16-006(g) is a former septic system that was located at TA-16 approximately 50 ft south of building 16-515 (Figure 9-15.1). The septic system consisted of a septic tank (16-527) and its associated drainline. The system received effluent from sinks and toilets in a restroom located at the southeast section of building 16-515, an HE processing building (ENG C-6031). The drainline discharged into a manhole (structure 16-795). The septic tank, drainline, and manhole ceased use in 1970 when the manhole was removed. The drainline was removed in 1997, and the septic tank was removed in 1998 (IT Corporation 1999, 087145, pp. 25−27). The former location of the septic system is in the near vicinity of an historic earthen berm identified as an historic preservation area.

9.16.2 Summary of Previous Investigations

In 1997, nine samples were collected from joints and breaks in the drainline at SWMU 16-006(g). Following sample screening, elevated levels of HE, silver, barium, chromium, and copper were detected. Three samples were submitted for laboratory analysis. No inorganic chemicals were detected above BVs, and uranium was detected at elevated levels. Two additional samples were collected from beneath the former septic tank location and submitted for analysis in 1999. Methylene chloride, HMX, RDX, PCE, trichloroethylene (TCE), and acetone were detected (IT Corporation 1999, 087145, pp. 25−27).

9.16.3 Investigation Status

Sampling at SWMU 16-006(g) was cancelled because of historic preservation restrictions, which prohibit the Laboratory from sampling within a historically protected area. After sampling had begun at V-Site, the Laboratory's Cultural Resources monitor observed that drilling equipment posed the potential for adverse effects to unsupported earthen berms—both directly from the use of the drill rig itself and indirectly from the vibrations caused by operating the drill rig. Therefore, the Cultural Resources monitor prohibited sampling at this SWMU.

9.17 SWMU 16-031(c)—Former Drainline

9.17.1 Site Description and Operational History

SWMU 16-031(c) is a former drainline at V-Site in TA-16 (Plate 5). This drainline received sanitary and industrial effluent from former HE processing building 16-515 and discharged the effluent into a sump

[SWMU 160929(x)] located approximately 90 ft south of former building 16-515. The drainline and 1 yd^3 of soil were removed in 1997 (IT Corporation 1999, 087145, pp. 98−120). The former location of this drainline is located in the near vicinity of a historic earthen berm identified as a historic preservation area.

9.17.2 Summary of Previous Investigations

Thirteen samples were collected from 0.0–0.5 ft below the location of the former drainline [SWMU 16-031(c)]. Field-screening results indicated HE contamination at one location (16-03043). Three additional samples were submitted for laboratory analysis because of field-screening results, and 1 yd^3 of soil was remediated following analysis. Two samples were collected postexcavation, confirming remediation goals had been met (IT Corporation 1999, 087145, pp. 120–125).

9.17.3 Investigation Status

Sampling at SWMU 16-031(c) was cancelled because of historic preservation restrictions, which prohibit the Laboratory from sampling within a historically protected area, After sampling had begun at V-Site, the Laboratory's Cultural Resources monitor observed that drilling equipment posed the potential for adverse effects to unsupported earthen berms—both directly from the use of the drill rig itself and indirectly from the vibrations caused by operating the drill rig. Therefore, the Cultural Resources monitor prohibited sampling at this SWMU.

10.0 EXTENDED DRAINAGES

The Extended Drainages consist of the drainage channels adjacent to the sites under investigation as well as the main ephemeral stream channel running into Water and Martin Spring canyons. The Extended Drainages are not a SWMU or AOC but are included in this investigation to assess the potential for off-site migration of contamination from the SWMUs/AOCs under investigation (Plate 1).

10.1 Summary of Tuff, Soil, and Sediment Sampling

In the current 2009–2010 sampling, 161 soil, 2 fill, 1 sediment, and 25 tuff (Qbt 4) samples were collected in the Extended Drainages and analyzed for inorganic chemicals (TAL metals, perchlorate, anions, and cyanide), organic chemicals (VOCs, SVOCs, and explosive compounds), and radionuclides (americium-241, isotopic uranium, and isotopic plutonium). These data are used to evaluate off-site transport from the SWMUs and AOCs in the S-Site Aggregate Area. Section 10.2 presents the evaluation of Fishladder Canyon Drainages in the area north of P-Site and running to the east. Section 10.3 evaluates the transport within Martin Spring Canyon Drainages from P-Site and 300s Line eastward to the east boundary of TA-11.

10.2 Fishladder Canyon Drainages

10.2.1 Site Description

The Fishladder Canyon Drainages receive runoff from the former Fishladder air stripper [SWMU 13-001(o)] and from the P-Site Subaggregate Area, specifically from the bullseye grid (SWMU 13-001). Fishladder Canyon flows east and is a tributary to Cañon de Valle just southeast of TA-15 (Plate 1).

10.2.2 Field-Screening Results

A total of 10 samples, collected at 6 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments. RDX concentrations for all samples were less than the action level of 2 ppm, which is equal to 2 times the limit of detection (0.8 ppm), as defined in the approved work plan (LANL 2007, 102216). Field-screening review of XRF results for the Fishladder Canyon Drainages was performed differently from the other subaggregate areas because of the number of potential release sources of contaminants.

Review of the XRF results was performed using bar graphs to evaluate a list of analytes of interest that were selected based on historical site operations. The list of analytes consisted of antimony, arsenic, barium, cadmium, cesium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, strontium, and thorium. Review of the XRF results indicated that all inorganic chemicals analyzed had concentrations less than 3 times the standard deviation above the mean for each inorganic chemical (Appendix C, section C-2.3). Gross-alpha/beta radiation, reported at <100 cpm, and gross-gamma radiation, reported at <20 µR/h, were below the minimum detectable activity level.

Based on these results, no additional step-out samples were required.

10.2.3 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled for the Fishladder Canyon Drainages are shown in Figure 10.2-1. Table 10.2-1 summarizes the samples collected and analyses requested. Contaminants evaluated included those detected above BVs and the residential SSLs for inorganic chemicals and radionuclides, those above residential SSLs for organic chemicals, and/or process-related chemicals. Process-related chemicals were retained because of the nature of explosive-related historical activities conducted at the subaggregate areas.

10.2.3.1 Inorganic Chemicals

Ten soil samples were collected during the 2009–2010 investigation and analyzed for inorganic chemicals. All samples were analyzed for TAL metals, cyanide, anions, and perchlorate. Eighteen soil samples collected in 1995, 2005, and 2008 were analyzed for TAL metals. In addition, seven soil samples collected in 2005 were analyzed for anions, and four soil samples were analyzed for perchlorate.

Sixteen tuff samples were collected in 2005 and were analyzed for TAL metals, anions, and perchlorate. In addition, five tuff samples were collected in 2008 and were analyzed for TAL metals only.

Inorganic chemicals evaluated based on the criteria presented in section 10.2.3 included arsenic, barium, chromium, cobalt, lead, mercury, nickel, and perchlorate.

Table 10.2-2 summarizes the inorganic chemicals detected at the Fishladder Canyon Drainages. Detected concentrations of inorganic chemicals are shown on Plate 19.

10.2.3.2 Organic Chemicals

Ten soil samples were collected during the 2009–2010 investigation and analyzed for explosive compounds. Previous sampling included seven samples collected in 1995 and analyzed for SVOCs and

explosive compounds; four samples collected in 2005 and analyzed for HE, SVOCs, and VOCs; and six samples collected in 2008 and analyzed for explosive compounds, and/or SVOCs, and/or VOCs.

Sixteen tuff samples were collected in 2005 and were analyzed for explosive compounds. Fourteen samples were also analyzed for SVOCs and VOCs. Five tuff samples were collected in 2008 and were analyzed for SVOCs only.

Organic chemicals evaluated based on the criteria presented in section 10.2.4 included HMX, RDX, TATB, 2,4,6-trinitrotoluene, and benzo(a)pyrene.

Table 10.2-3 summarizes the organic chemicals detected at the Fishladder Canyon Drainages. Detected concentrations of organic chemicals are shown on Plate 20.

10.2.3.3 Radionuclides

Ten soil samples were collected during the 2009–2010 investigation and analyzed for americium-241, isotopic plutonium, and isotopic uranium. Previous sampling included seven samples collected in 2008 and analyzed for isotopic uranium.

Five tuff samples were collected in 2008 and were analyzed for isotopic uranium.

Based on the criteria presented in section 10.2.4, no radionuclides were evaluated.

Radionuclides detected or detected above BVs/FVs are shown in Figure 10.2-2. Table 10.2-4 summarizes the radionuclides detected at the Fishladder Canyon Drainages.

10.2.4 Spatial Distribution

The Fishladder Canyon Drainages consist of the drainage channels adjacent to sites under investigation as well as the main ephemeral stream channel running in Fishladder Canyon. The Fishladder Canyon Drainages do not compose a SWMU or AOC but are included in this investigation to assess the potential for off-site migration of contamination from the SWMUs/AOCs under investigation.

The samples collected and analyses requested in the Fishladder Canyon Drainages are summarized in Table 10.2-1. The inorganic and organic chemical distributions in soil and tuff (Qbt 4) in the Fishladder Canyon Drainages are summarized in the following sections. The investigation conducted in 2009 included collecting samples at five locations downgradient of the P-Site Subaggregate. Samples were generally collected in drainage channels along transects at six locations (one on each stream bank and one along the center line of the channel) at two depths at each location (0.0–0.5 and 1.0–1.5 ft bgs), for a total of 10 samples. In addition, a total of 39 samples were previously collected from 20 locations along the Fishladder Canyon Drainages from 1995 to 2008. The Fishladder Canyon Drainages were sampled to evaluate whether contaminants are migrating off-site from the SWMUs and AOCs included in this investigation. The potential for off-site migration was evaluated using the distribution of concentrations in soil and tuff (Qbt 4) along the drainage from west to east. This discussion focuses on inorganic and organic chemicals that either exceeded the NMED residential SSLs and/or were process-related.

10.2.4.1 Inorganic Chemicals

The distribution of inorganic chemicals in the Fishladder Canyon Drainages is shown on Plate 19. The analytical results are presented in Table 10.2-2. The majority of the inorganic chemical concentrations

were detected downgradient of the Fishladder air stripper and east of the P-Site Subaggregate. Concentrations displayed a decrease further downstream.

Arsenic was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at 10 locations and over the residential SSL at eight locations. The maximum arsenic concentration (65.6 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient from this location (at locations 16-02023 and 16-603403) did not reveal arsenic above BVs. Arsenic was detected at 18.1 mg/kg at location 16-603409, which is approximately 32 ft south of location 16-02024. Arsenic was detected at 18.1 mg/kg at location 16-01542, which is the furthest downgradient location sampled.

- Barium was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at 11 locations; concentrations did not exceed the residential SSL. The maximum barium concentration (370 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient from this location (at locations16-02023 and 16-603403) did not reveal barium above BVs. Barium was detected at 115 mg/kg at location 16-24906 and at 122 mg/kg at location 16-603407, which are approximately 25–35 ft south of location 16-02024. Barium was detected at 336 mg/kg at location 16-01542, which is the furthest downgradient location sampled. The two highest barium concentrations (370 and 336 mg/kg) were below the maximum background concentration for soil (410 mg/kg).
- Chromium was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at 10 locations; concentrations did not exceed the residential SSL. The maximum chromium concentration (167 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient of this location (at locations 16-02023 and 16-603403) did not reveal chromium above BVs. Chromium was detected at 8.92 mg/kg at location 16-24906 and at 12.9 mg/kg at location 16-603407, which are approximately 25–35 ft south of location 16-02024. These concentrations were below the maximum background concentration for Qbt 2, Qbt 3, and Qbt 4 (13 mg/kg). Chromium was detected at 68.3 mg/kg at location 16-01542, which is the furthest downgradient location sampled.
- Cobalt was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at seven locations; concentrations exceeded the residential SSL at two locations. The maximum cobalt concentration (275 mg/kg) was detected at location 16-23569, which is approximately halfway downstream below P-Site in the main drainage. Samples collected slightly upgradient of P-Site did not reveal cobalt above BVs. Cobalt was not detected above BVs at location 16-01542, which is the furthest downgradient location sampled and approximately 120 ft downstream from location 16-23569.
- Lead was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at seven locations; concentrations did not exceed the residential SSL. The maximum lead concentration (103 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient from this location (at locations 16-02023 and 16-603403) did not reveal lead above BVs. Lead was detected at 13.8 mg/kg at location 16-24906, which is approximately 35 ft south of location 16-02024. This concentration is below the maximum tuff background concentration (15.5 mg/kg). Lead was detected at 33.7 mg/kg at location 16-01542, which is the furthest downgradient location sampled.
- Mercury was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at four locations; concentrations did not exceed the residential SSL. The maximum mercury concentration (0.83 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient from this location (at locations 16-02023 and 16-603403) did not reveal mercury above BVs. Samples from locations south of location

16-02024 (16-24906, 16-603409, 16-603407, 16-603408, and 16-603406) also did not have mercury detected above BVs. Mercury was detected at 0.2 mg/kg at location 16-01542, which is the furthest downgradient location sampled.

- Nickel was detected above the soil and/or Qbt 2, Qbt 3, and Qbt 4 BVs at three locations; concentrations did not exceed the residential SSL. The maximum nickel concentration (11 mg/kg) was detected at location 16-603407, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient of this location (at locations 16-02023 and 16-603403) did not reveal nickel above BVs. Nickel was not detected above BVs at location 16-01542, which is the furthest downgradient location sampled.
- Perchlorate was detected at three locations. The maximum perchlorate concentration (0.00149 mg/kg) was detected at location 16-608453, which is approximately 85 ft west of the furthest downstream location. The other two locations where perchlorate was detected (locations 16-23692 and 16-608499) are approximately 75 ft downstream from location 16-02024. Perchlorate was not detected at location 16-01542, which is the furthest downgradient location sampled.

10.2.4.2 Organic Chemicals

The distribution of organic chemicals in the Fishladder Canyon Drainages is shown on Plate 20. The analytical results are presented in Table 10.2-3. The majority of the organic chemical concentrations were detected downgradient of the Fishladder air stripper and east of the P-Site Subaggregate. Concentrations generally displayed a decrease further downstream.

- Benzo(a)pyrene was detected at six locations and was detected above the residential SSL at two locations. The maximum benzo(a)pyrene concentration (1.4 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient of this location (at locations 16-02023 and 16-603403) also revealed benzo(a)pyrene at lower concentrations (0.053 and 0.0862 mg/kg). Samples from locations south of location 16-02024 (16-24906, 16-603409, 16-603407, 16-603408, and 16-603403) did not reveal benzo(a)pyrene. Benzo(a)pyrene was not detected at location 16-01542, which is the furthest downgradient location sampled.
- HMX was detected at 11 locations and was not detected above the residential SSL. The maximum HMX concentration (2.28 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient of this location (at locations 16-02023 and 16-603409) did not reveal HMX. Samples from locations south of location 16-02024 (16-24906, 16-603409, 16-603407, 16-603408, and 16-603403) also did not reveal HMX. HMX was detected at 0.839 mg/kg at location 16-01542, which is the furthest downgradient location sampled.
- RDX was detected at 10 locations and was not detected above the residential SSL. The maximum HMX concentration (3.92 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient of this location (at locations 16-02023 and 16-603409) did not reveal RDX. Samples from locations south of location 16-02024 (16-24906, 16-603409, 16-603407, 16-603408, and 16-603403) also did not reveal RDX. RDX was not detected at location 16-01542, which is the furthest downgradient location sampled, but RDX was detected at 0.882 mg/kg at location 16-23655, which is adjacent to location 16-01542.

- TATB was detected at seven locations, but there is no residential SSL. The maximum TATB concentration (26 mg/kg) was detected at location 16-608451, which is approximately 90 ft west of the furthest downstream location. Samples from locations slightly upgradient of P-Site and locations south of location 16-02024 (including location 16-02024) did not reveal TATB. However, lower concentrations were detected at locations 16-23651 and 16-23653, which are less than 15 ft downstream of location 16-02024. TATB was not detected at location 16-01542, which is the furthest downgradient location sampled, but TATB was detected at 0.936 mg/kg at location 16-23655, which is adjacent to location 16-01542.
- 2,4,6-Trinitrotoluene was detected at one location and was not detected above the residential SSL. The maximum 2,4,6-trinitrotoluene concentration (0.356 mg/kg) was detected at location 16-02024, which is an upgradient location below P-Site in the main drainage. Samples collected slightly upgradient of this location (at locations 16-02023 and 16-603403) did not reveal 2,4,6-trinitrotoluene. Samples from locations south of location 16-02024 (16-24906, 16-603409, 16-603407, 16-603408, and 16-603403) also did not reveal 2,4,6-trinitrotoluene. 2,4,6-Trinitrotoluene was not detected at location 16-01542, which is the furthest downgradient location sampled.

10.2.4.3 Summary of Extent at the Extended Drainages (Fishladder Canyon Subarea)

Several inorganic chemicals and organic chemicals were detected or detected above BVs in drainages leading from P-Site and in the main stream channel of Fishladder Canyon. Some of these contaminants, particularly arsenic, barium, chromium, cobalt, lead, mercury, benzo(a)pyrene, HMX, RDX, TATB, and 2,4,6-trinitrotoluene, appear to be in part or entirely coming from P-Site into Fishladder Canyon. This is based on the maximum concentrations being detected at location 16-02024, which is directly below P-Site and either lower concentrations or no concentrations being detected in slightly upgradient locations. In all cases in Fishladder Canyon, concentrations decreased downstream from the maximum concentrations.

10.2.5 Summary of Human Health Risk Assessment Results

The purpose of the sampling in the Fishladder Canyon Drainages was to determine whether there is migration into the adjacent canyon areas; therefore, human health risk was not evaluated.

10.2.6 Summary of Ecological Risk Assessment Results

The purpose of the sampling in the Fishladder Canyon Drainages was to determine whether there is migration into the adjacent canyon areas; therefore, ecological risk was not evaluated.

10.3 Martin Spring Canyon Drainages

10.3.1 Site Description and Operational History

The Martin Spring Canyon Drainages include the drainages downgradient of P-Site and 300s Line SWMUs and AOCs, draining east through K-Site. Martin Spring Canyon is a tributary to, and merges with, Water Canyon east of TA-37 and due south of TA-15.

10.3.2 Summary of Previous Investigations

No samples were previously collected from the Martin Spring Canyon Drainages.

10.3.3 Field-Screening Results

One hundred seventy-five samples, collected at 97 locations, were field screened on-site for organic vapors using a PID equipped with an 11.7-eV bulb. Screening was performed by ARS for inorganic chemicals using XRF, for explosives (RDX) using immunoassay test kits, and for gross-alpha/beta and -gamma radiation using handheld instruments. RDX was detected at 179.8 ppm in sample RE16-10-404 at location 16-611212 and at 8.4 ppm in sample RE16-10-416 at location 16-611218. Based on these results, six step-out samples (RE16-10-11734, RE16-10-11735, RE16-10-11736, RE16-10-11737, RE16-10-11738, and RE16-10-11739) were collected from locations 16-611328, 16-611329, and 16-311330 (Appendix C, section C-7.5).

Gross-alpha/beta radiation, reported at <100 cpm, and gross-gamma radiation, reported at <20 µR/h, were below the minimum detectable activity level.

Review of the XRF results identified a list of analytes of interest selected based on historical site operations. The list of analytes consisted of antimony, arsenic, barium, cadmium, cesium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, and strontium. After a review of all of the samples, arsenic, lead, mercury, selenium, and silver were more elevated, primarily at the outfall associated with the P-Site WWTP. Therefore, based on the review, eight step-out samples (RE16-10-12061, RE16-10-12062, RE16-10-12063, RE16-10-12064, RE16-10-12065, RE16-10-12066, RE16-10-12069, and RE16-10-12070) were collected at locations 16-611401, 16-611402, 16-611403, and 16-611404 (Appendix C, section C-7.5).

10.3.4 Soil, Tuff, and Sediment Sampling Analytical Results and COPC Identification

The locations sampled in the Martin Spring Canyon Drainages are shown on Plates 21–24. Table 10.3-1 summarizes the samples collected and the analyses requested. Contaminants evaluated included those detected above BVs and the residential SSLs for inorganic chemicals and radionuclides, and those above residential SSLs for organic chemicals and/or process-related chemicals. Process-related chemicals were retained because of the nature of explosive-related historical activities conducted at the subaggregates.

10.3.4.1 Inorganic Chemicals

One hundred sixty soil and three fill samples were collected and analyzed for TAL metals, cyanide, anions, and perchlorate. Twenty-five tuff samples were collected and analyzed for TAL metals, cyanide, anions, and perchlorate. One sediment sample was collected and analyzed for TAL metals, cyanide, anions, and perchlorate. Table 10.3-1 presents a summary of the samples and requested analyses, while Table 10.3-2 presents a summary of inorganic chemicals above BVs. Detected concentrations of inorganic chemicals are shown on Plates 25−28.

10.3.4.2 Organic Chemicals

One hundred sixty soil and three fill samples were collected and analyzed for VOCs, SVOCs, and explosive compounds. Twenty-five tuff samples were collected and analyzed for VOCs, SVOCs, and explosive compounds. One sediment sample was collected and analyzed for VOCs, SVOCs, and explosive compounds. Table 10.3-1 presents a summary of the samples and requested analyses, while Table 10.3-3 presents a summary of organic chemicals detected. Detected concentrations of organic chemicals are shown on Plates 29−32.

Organic chemicals evaluated based on the criteria presented in section 10.3.4 included 4-amino-2,6-dinitrotoluene, HMX, RDX, TATB, and 2,4,6-trinitrotoluene.

10.3.4.3 Radionuclides

One hundred fifty-eight soil and three fill samples were collected and analyzed for americium-241, isotopic plutonium, and isotopic uranium. Twenty-five tuff samples were collected and analyzed for americium-241, isotopic plutonium, and isotopic uranium. One sediment sample was collected and analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 10.3-1 presents a summary of the samples and requested analyses. Table 10.3-4 presents the results of the radiological analyses. Based on the criteria in section 10.3.4, no radionuclides require evaluation.

10.3.5 Spatial Distribution

The Martin Spring Canyon Drainages consist of the drainage channels adjacent to the sites under investigation as well as the main ephemeral stream channel running into Water and Martin Spring canyons. The Martin Spring Canyon Drainages do not compose a SWMU or AOC but are included in this investigation to assess the potential for off-site migration of contamination from the SWMUs/AOCs under investigation.

The samples collected and analyses requested in the Martin Spring Canyon Drainages are summarized in Table 10.3-1. The inorganic chemical and organic chemical distributions in soil, fill, tuff (Qbt 4), and sediment in the Martin Spring Canyon Drainages are summarized in the following sections. Samples were collected at 105 locations downgradient of the P-Site, 300s Line, and K-Site subaggregates. Samples were generally collected in drainage channels along transects at three locations (one on each stream bank and one along the center line of the channel) and two depths at each location (0.0–0.5 and 1.0–1.5 ft bgs), for a total of 189 samples. The Martin Spring Canyon Drainages were sampled to evaluate whether contaminants are migrating off-site from the SWMUs and AOCs.

10.3.5.1 Inorganic Chemicals

The distribution of inorganic chemicals in the Martin Spring Canyon Drainages is presented on Plates 25–28. The analytical results are presented in Table 10.3-2. The majority of inorganic chemical concentrations were detected downgradient of the P-Site and K-Site subaggregates. Concentrations displayed a decrease further downstream of these subaggregates.

- Arsenic was detected above the Qbt 2, Qbt 3, and Qbt 4 BV at two locations and above the residential SSL at one location. The maximum arsenic concentration (4.89 mg/kg) was at location 16-608477, which is below the P-Site WWTP and receives runoff from this area. The other concentration was detected further down the drainage below P-Site. Arsenic was not detected above BVs in Martin Spring Canyon or below K-Site.
- Barium was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at 32 locations and was not above the residential SSL. Barium was detected above the BV at 616 mg/kg below the 300s Line Drainage and decreased downgradient but then increased between P-Site and K-Site to the maximum barium concentration (928 mg/kg) at location 16-608559. Concentrations subsequently decreased below K-Site to below background.
- Chromium was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at 20 locations and was not above the residential SSL. Most concentrations were below the maximum background concentrations for soil and Qbt 2, Qbt 3, and Qbt 4 (36.5 and 13 mg/kg, respectively); only six

concentrations were above the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration but only by less than 4 mg/kg. Concentrations decreased down Martin Spring Canyon, and chromium was not detected above BVs below K-Site.

- Lead was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at 25 locations and was not above the residential SSL. Most concentrations were below the maximum background concentrations for soil and Qbt 2, Qbt 3, and Qbt 4 (28 and 15.5 mg/kg, respectively); only nine concentrations were above the soil maximum background concentration, and two concentrations were above the Qbt 2, Qbt 3, and Qbt 4 maximum background concentration. The maximum lead concentration (74.7 mg/kg) was detected at location 16-611403, which is below the P-Site WWTP and receives runoff from this area. Concentrations decreased down Martin Spring Canyon, and lead was not detected above BVs below K-Site.
- Mercury was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at 27 locations and was not above the residential SSL. The maximum mercury concentrations (6.64 and 5.54 mg/kg) were detected at locations 16-611401 and 16-60878, respectively, which are downgradient of the WWTP structures at P-Site. Concentrations decreased down Martin Spring Canyon, and mercury was not detected above BVs below K-Site.
- Nickel was detected above the soil and Qbt 2, Qbt 3, and Qbt 4 BVs at five locations and was not above the residential SSL. All concentrations above BVs were detected in the drainages below P-Site. The maximum nickel concentration (18.4 mg/kg) was detected at location 16-608523, which is downgradient from the HE sump, drainlines, and outfall supporting the former firing site and landfill at P-Site. Concentrations decreased down the drainage, and nickel was not detected above BVs in Martin Spring Canyon and below K-Site.
- Perchlorate was detected at 19 locations and was not above the residential SSL. Seventeen locations were between P-Site and K-Site, with the maximum perchlorate concentration (0.00251 mg/kg) at location 16-611403. Concentrations decreased downstream, and perchlorate was detected at 0.0000798 mg/kg at location 16-611218, which is one of the furthest downstream locations.

10.3.5.2 Organic Chemicals

The distribution of organic chemicals in the Martin Spring Canyon Drainages is presented on Plates 29–32. The analytical results are presented in Table 10.3-3. The majority of the inorganic chemical concentrations were detected near the K-Site Subaggregate. Concentrations decreased further downstream of the subaggregates.

- 4-Amino-2,6-dinitrotoluene was detected at three locations and was not detected above the residential SSL. All concentrations were below the EQL, and two concentrations were at locations below the 300s Line Subaggregate. The third location was further down Martin Spring Canyon between P-Site and K-Site. Concentrations decreased downstream in Martin Spring Canyon, and 4-amino-2,6-dinitrotoluene was not detected below K-Site.
- HMX was detected at 13 locations and was not detected above the residential SSL. All concentrations were below and downgradient of K-Site. The maximum concentrations were detected in a small drainage east of K-Site that receives runoff from the HE catch basin outfalls and in an area east of the former drop tower complex. Concentrations decreased downstream in Martin Spring Canyon, and HMX was detected at 8.01 mg/kg at location 16-611218, which is one of the furthest downstream locations sampled.

- RDX was detected at four locations and was not detected above the residential SSL. Location 16-608551 was upgradient of the K-Site Subaggregate, and the other three locations were in a small drainage east of K-Site that receives runoff from the HE catch basin outfalls and in an area east of the former drop tower complex. Concentrations decreased downstream in Martin Spring Canyon, and RDX was not detected at location 16-611218, which is one of the furthest downstream locations sampled.
- TATB was detected at six locations and has no residential SSL. TATB was detected at three locations downgradient of WWTP structures at P-Site and at three locations in a small drainage east of K-Site that receives runoff from the HE catch basin outfalls, east of the former drop tower complex. TATB was not detected in Martin Spring Canyon, and concentrations decreased downstream.
- 2,4,6-Trinitrotoluene was detected at 13 locations and was not detected above the residential SSL. 2,4,6-Trinitrotoluene was detected downgradient of the 300s Line Subaggregate and between the P-Site drainage and K-Site. It was not detected downgradient of P-Site in the P-Site Subaggregate drainage or below K-Site.

10.3.5.3 Summary of Extent

Inorganic chemicals appear to originate primarily from the P-Site Subaggregate and to a lesser extent from the 300s Line Subaggregate (barium). Concentrations decreased down Martin Spring Canyon, and inorganic chemicals were not detected above BVs or were detected at lower concentrations (perchlorate) below K-Site. Organic chemicals were primarily detected below the K-Site Subaggregate and particularly in the small drainage east of K-Site that receives runoff from the HE catch basin outfalls and in an area east of the former drop tower complex. 4-Amino-2,6-dinitrotoluene and 2,4,6-trinitrotoluene appear to originate at the 300s Line Subaggregate. Concentrations for all organic chemicals decreased down Martin Spring Canyon and were either not detected or detected at lower concentrations below K-Site. The vast majority of the other organic chemicals detected in the drainages and Martin Spring Canyon are polycyclic aromatic hydrocarbons. These appear to come from all of the subaggregates and are likely related to asphalt paving and roofs and are not related to process activities at the sites.

10.3.6 Summary of Human Health Risk Assessment Results

The purpose of the sampling in the Martin Spring Canyon Drainages was to determine whether there is migration into the adjacent canyon areas. Therefore, human health risk was not evaluated for Martin Spring Canyon Drainages.

10.3.7 Summary of Ecological Risk Assessment Results

The purpose of the sampling in the Martin Spring Canyon Drainages was to determine whether there is migration into the adjacent canyon areas. Therefore, ecological risk was not evaluated for Martin Spring Canyon Drainages.

11.0 CONCLUSIONS

11.1 Nature and Extent of Contamination

The nature and extent of contamination have been defined for six sites previously investigated or investigated during the 2009–2010 S-Site Aggregate Area investigation. Three sites were not sampled

and will be proposed for NFA. The nature and extent of contamination have not been defined for the remaining 59 sites addressed in this investigation report. Summaries of the nature and extent of contamination and remaining characterization requirements for the K-Site Subaggregate Area, P-Site Subaggregate Area, 300s Line Subaggregate Area, V-Site Subaggregate Area, and the Extended Drainages are presented below.

11.1.1 K-Site Subaggregate Area

The nature and extent of contamination have not been defined for all 11 sites in the K-Site Subaggregate Area. Additional sampling is needed to define the extent of contamination for one or more inorganic chemicals, organic chemicals, or radionuclides at the following sites:

- AOC C-11-002—lateral extent of methylene chloride
- SWMU 11-005(a)—lateral extent of americium-241 and plutonium-239/240; vertical extent of RDX
- SWMU 11-005(b)—lateral and vertical extent of HMX; vertical extent of aluminum, cobalt, barium, chromium, and copper
- SWMU 11-006(a)—lateral and vertical extent of calcium and HMX; lateral extent of cadmium, copper, lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and TATB
- SWMU 11-006(b)—lateral and vertical extent of antimony, iron, lead, and vanadium; lateral extent of uranium-234 and uranium-238; vertical extent of aluminum, barium, beryllium, bromide, calcium, chromium, cobalt, copper, nickel, perchlorate, HMX, RDX, and TATB
- SWMU 11-006(c)—lateral and vertical extent of and plutonium-239/240; lateral extent of RDX; vertical extent of chromium, copper, acenaphthene, and HMX
- SWMU 11-006(d)—lateral extent of total cyanide, uranium-234, and uranium-238; vertical extent of barium, acetone, benzoic acid, HMX, and TATB
- SWMU 11-005(c)—vertical extent of copper, aluminum, barium, chromium, HMX, and uranium-235/236
- SWMU 11-011(a)—vertical extent of aluminum, barium, calcium, nickel, chromium , copper, uranium-234, and uranium-238
- SWMU 11-011(b)—lateral and vertical extent of toluene; vertical extent of chromium, copper, acetone, and 4-isopropyltoluene
- SWMU 11-011(d)—lateral and vertical extent of chromium, nickel and selenium; lateral extent of copper, uranium-234, uranium-238, and uranium-235/236.

11.1.2 P-Site Subaggregate Area

The nature and extent have been defined for the following sites in the P-Site Subaggregate Area:

- SWMU 16-004(a), Imhoff Tank
- SWMU 16-004(e), Filter Screen.

In addition, three sites (AOC C-16-049, AOC C-16-062, and AOC C-16-063) were determined in the approved work plan to qualify for NFA and were not sampled (LANL 2007, 102216).

The nature and extent of contamination have not been defined for 17 sites in the P-Site Subaggregate Area. Additional sampling is needed to define the extent of contamination for one or more inorganic chemicals, organic chemicals, or radionuclides at the following sites:

- SWMU 16-025(d2)—vertical extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and cesium-137
- SWMU 16-031(h)—lateral and vertical extent of aluminum, antimony, barium, and selenium; lateral extent of mercury and TATB
- AOC 16-024(a)—lateral and vertical extent of aluminum, barium, calcium, copper, nickel, and cobalt; lateral extent of vanadium, cesium-137, and plutonium-239/240; vertical extent of bromide, sulfate, and perchlorate
- AOC 16-024(u)—lateral and vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene; lateral extent of acenaphthene, anthracene, dibenz(a,h)anthracene, dibenzofuran, fluorene, 2-methylnaphthalene, and naphthalene
- AOC C-16-050—lateral and vertical extent of selenium; lateral extent of calcium and perchlorate
- AOC C-16-060—lateral extent of acenaphthene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, anthracene, naphthalene, benzo(a)anthracene, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pyrene, benzoic acid, dibenzofuran, fluoranthene, phenanthrene, pyrene, fluorene, and 2-methylnaphthalene
- SWMUs 13-001, 13-004, 16-035, 16-036—lateral and vertical extent of chromium; lateral extent of barium; vertical extent of aluminum, antimony, arsenic, calcium, copper, lead, mercury, perchlorate, zinc, acenaphthene, acetone, fluoranthene, phenanthrene, pyrene, and indeno(1,2,3-cd)pyrene
- SWMU 13-002—lateral and vertical extent of chromium; lateral extent of mercury and trichloroethene; vertical extent of barium
- SWMU 16-029(h)—lateral and vertical extent of chromium; lateral extent of lead and americium-241; vertical extent of aluminum, antimony, arsenic, barium, copper, iron, nickel, acetone, 2-butanone, and cesium-137
- AOC 16-003(p)—lateral and vertical extent of acetone and 2-butanone; lateral extent of nickel; vertical extent of barium, cobalt, HMX, and RDX
- SWMU 16-004(b)—extent of uranium-235/236
- SWMU 16-004(c)—extent of uranium-235/236
- SWMU 16-004(d)—extent of barium and calcium
- SWMU 16-004(f)—extent of chromium

11.1.3 300s Line Subaggregate Area

The nature and extent have been defined for the following sites in the 300s Line Subaggregate Area:

- SWMU 16-026(b), Outfall
- SWMU 16-029(d), Sumps.

The nature and extent of contamination have not been defined for 12 sites in the 300s Line Subaggregate Area, the Shared Drainages, and the Liquid Waste Trunk Line. Additional sampling is needed to define the extent of contamination for one or more inorganic chemicals, organic chemicals, or radionuclides at the following sites:

- SWMU 16-026(z)—lateral and vertical extent of anthracene and phenanthrene; lateral extent of benzo(b)fluoranthene, fluoranthene, pyrene, fluorene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene; vertical extent of barium, cobalt, and naphthalene
- SWMU 16-001(e)—vertical extent of barium, mercury, and acetone
- SWMU 16-003(d)—lateral and vertical extent of selenium and thallium; lateral extent of acetone
- SWMU 16-003(e)—vertical extent of cobalt, copper, nickel, zinc, HMX, and RDX
- SWMU 16-003(f)—vertical extent of arsenic, chromium, cobalt, lead, thallium, acenaphthene, fluorene, anthracene, benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, pyrene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, indeno(1,2,3-cd)pyrene, naphthalene, and RDX
- SWMU 16-003(g)—vertical extent of barium, calcium, cobalt, lead, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, fluoranthene, phenanthrene, pyrene, fluorene, and indeno(1,2,3-cd)pyrene
- SWMU 16-026(c)—lateral and vertical extent of barium; lateral extent of selenium and benzoic acid; vertical extent of chromium
- SWMU 16-026(d)— lateral extent of copper, mercury, and cesium-137; vertical extent of barium, chromium, selenium, benzo(a)anthracene, chrysene, diethylphthalate, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and RDX
- SWMU 16-026(e)—vertical extent of barium, silver, HMX, and plutonium-239/240
- SWMU 16-029(a)—lateral and vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, diethylphthalate, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene; lateral extent of acenaphthene, anthracene, and fluoranthene; vertical extent of chromium and acetone
- SWMU 16-029(b)— extent of calcium, selenium, acetone, benzo(a)anthracene, phenanthrene, pyrene, benzo(b)fluoranthene, chrysene, and fluoranthene
- SWMU 16-029(c)—extent of selenium
- Shared Drainages—lateral and vertical extent of arsenic, barium, and vanadium, and 2-methylphenol; vertical extent of aluminum, calcium, cobalt, chromium, copper, iron, lead, mercury, nickel, zinc, acenaphthene, 2-amino-4,6-dinitrotoluene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, dibenzofuran, fluoranthene, fluorene, , HMX, indeno(1,2,3-cd)pyrene, 4-methylphenol, phenanthrene, pyrene, RDX, tetryl, and 2,4,6-trinitrotoluene
- Liquid Waste Trunk Line—lateral and vertical extent of aluminum; lateral extent of cobalt; vertical extent of barium, calcium, chloride, chromium, selenium, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, benzo(g,h,i)perylene, fluoranthene, phenanthrene, pyrene, acenaphthene, fluorene,

indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, bis-2-ethylhexylphthalate, plutonium-238, and uranium-235/236.

11.1.4 V-Site Subaggregate Area

The nature and extent of contamination have been defined for the following sites in the V-Site Subaggregate Area:

- SWMU 16-029(g2), Pit
- SWMU 16-017(p)-99, Former Storage Magazine 16-61.

The nature and extent of contamination have not been defined for 19 sites in the V-Site Subaggregate Area. Additional sampling is needed to define the extent of contamination for one or more inorganic chemicals, organic chemicals, or radionuclides at the following sites:

- AOC C-16-068—extent of acetone; vertical extent of bis(2-ethylhexyl)phthalate
- AOC C-16-074—lateral and vertical extent of barium and lead; lateral extent of chromium, copper, nickel, and acetone; vertical extent of cobalt
- SWMU 16-029(x)—lateral and vertical extent of acetone; vertical extent of barium, boron, bromide, chromium, manganese, nickel, selenium, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, bis(2-chloroethyl)ether, 2,4-dinitrotoluene, HMX, fluoranthene, pyrene, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, RDX, 1,3,5-trimethylbenzene, 2,4,6-trinitrotoluene, and plutonium-238
- SWMU 16-029(w)—lateral and vertical extent of selenium; vertical extent of aluminum, arsenic, barium, calcium, cobalt, copper, lead, magnesium, nickel, vanadium, zinc, and acetone
- SWMU 16-025(x)— vertical extent of antimony, barium, bromide, lead, and uranium
- SWMU 16-017(w)-99—lateral extent of bromide; vertical extent of cobalt, perchlorate, and 2-butanone
- SWMU 16-034(m)—lateral and vertical extent of aluminum and selenium; lateral extent of 1,2,4-trimeythylbenzene; vertical extent of barium
- AOC 16-024(n)—lateral extent of antimony, cadmium, copper, zinc, benzoic acid, and 4-isopropyltoluene
- SWMU 16-034(n)—lateral and vertical extent of antimony, perchlorate, acetone, and 4-isopropyltoluene; lateral extent of lead, mercury, zinc, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, and toluene
- AOC 16-024(m)—lateral and vertical extent of aluminum, barium, calcium, chromium, copper, lead, nickel, selenium, thallium, and vanadium; vertical extent of cobalt, acetone, and methylene chloride
- SWMU 16-017(v)-99—vertical extent of aluminum, barium, calcium, magnesium, and nickel
- Courtyard Periphery Area [SWMUs 16-017(r)-99, 16-017(s)-99, 16-017(t)-99, 16-013, 16-017(q)-99, and 16-006(h), and Drainage North of Courtyard]—lateral and vertical extent of aluminum, arsenic, barium, boron, calcium, cobalt, copper, lead, silver, thallium, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene,

fluorene, 2-methylnaphthalene, naphthalene, dibenzofuran, benzo(g,h,i)perylene, chrysene, diphenylamine, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, acetone, bis(2-ethylhexyl)phthalate, 4-isopropyltoluene, RDX, and toluene

- SWMU 16-006(g) and SWMU 16-031(c) were not sampled because of historic preservation constraints; therefore, extent is not defined.

11.1.5 Extended Drainages

The nature and extent of contamination have been defined for the following sites in the Extended Drainages:

- Fishladder Canyon Drainages—arsenic, barium, chromium, cobalt, lead, mercury, HMX, RDX, TATB, benzo(a)pyrene, and 2,4,6-trinitrotoluene appear to be coming from the P-Site Subaggregate Area into the Fishladder Canyon; the detected concentrations decreased downstream in Fishladder Canyon.
- Martin Spring Canyon—inorganic chemicals appear to originate primarily from the P-Site Subaggregate Area and to a lesser extent from the 300s Line Subaggregate Area for barium, with concentrations decreasing down Martin Spring Canyon. Organic chemicals were primarily derived from the K-Site Subaggregate Area, east of the drop tower complex. Concentrations decreased down Martin Spring Canyon and were either not detected or detected at lower concentrations below K-Site.

11.2 Summary of Risk-Screening Assessments

Six sites for which the nature and extent of contamination are defined [SWMUs 16-004(a), 16-004(e), 16-026(b), 16-029(d), 16-029(g2), and 16-017(p)-99] were evaluated for human health and ecological screening:

- Human health risk-screening assessments were performed for all six of these sites
- Ecological risk-screening assessments were performed for all six of these sites.

11.2.1 Human Health Risk Screening Assessment

The human health risk-screening assessments presented in Appendix H indicated potential unacceptable risks from benzo(a)pyrene at SWMU 16-026(b) under the industrial and residential scenarios (2×10^{-5} and 4×10^{-5}, respectively). SWMU 16-017(p)-99 did not pose a potential unacceptable risk under the industrial and residential scenarios. SWMUs 16-004(e), 16-029(d), and 16-029(g2) did not pose potential unacceptable risks under the residential scenario. These sites were not evaluated under the industrial scenario because no samples were collected from 0−1 ft bgs. In addition, the Courtyard Periphery Area did not pose a potential unacceptable risk under the recreational scenario. Table H-6.1-1 presents a summary of the human health risk-screening-assessment results.

11.2.2 Ecological Risk Screening Assessment

Potential ecological risk was evaluated using minimum ESLs, HI analyses, comparisons to background, potential effects to populations (individuals for T&E species), and LOAEL analyses. These lines of evidence support the conclusion that there is no potential ecological risk for any receptor at the S-Site Aggregate Area sites evaluated. SWMUs 16-004(a), 16-029(d), and 16-029(g2) were not evaluated for

potential ecological risk because no complete pathways to receptors are present (all samples were collected below 5 ft bgs).

12.0 RECOMMENDATIONS

The determination of site status is based on the results of the risk-screening assessments and the nature and extent evaluation. Depending upon the decision scenario used, the sites are recommended as corrective actions complete either with or without controls or for additional action. The residential scenario is the only scenario under which corrective action complete without controls is applicable; that is, no additional corrective actions or conditions are necessary. The other decision scenarios (industrial and recreational) result in corrective action complete with controls; that is, some type of institutional controls must be in place to ensure that the land use remains consistent with site cleanup levels. The current and reasonably foreseeable future land use for the S-Site Aggregate Area is industrial.

12.1 Additional Field Characterization Activities

The extent of contamination has not been defined for 40 sites investigated in the S-Site Aggregate Area. Additional sampling is needed to define the extent of contamination for one or more inorganic chemicals, organic chemicals, or radionuclides at the following sites:

- AOC C-11-002, SWMUs 11-005(a), 11-005(b), 11-006(a), 11-006(b), 11-006(c), 11-006(d), 11-005(c), 11-011(a), 11-011(b), and 11-011(d) at K-Site Subaggregate
- AOCs 16-024(a), 16-024(u), C-16-050, C-16-060, and 16-003(p), and SWMUs 16-025(d2), 16-031(h), 13-001, 13-004, 16-035, 16-036, 13-002, 16-029(h), 16-004(b), 16-004(c), 16-004(d), 16-004(f) at P-Site Subaggregate
- SWMUs 16-026(z), 16-001(e), 16-003(d), 16-003(e), 16-003(f), 16-003(g), 16-026(c), 16-026(d), 16-026(e), 16-029(a), 16-029(b), and 16-029(c), and the Liquid Waste Trunk Line and the Shared Drainages at the 300s Line Subaggregate
- AOCs C-16-068, C-16-074, 16-024(m), 16-024(n), and SWMUs 16-025(x), 16-029(x), 16-029(w), 16-017(w)-99, 16-034(m), 16-034(n), 16-017(v)-99, 16-006(g), 16-031(c), and the Courtyard SWMUs 16-017(r)-99, 16-017(s)-99, 16-017(t)-99, 16-013, 16-017(q)-99, and 16-006(h) at V-Site Subaggregate.

A Phase II investigation work plan will be developed specifying sampling locations, numbers of samples, and analytical suites required to define the extent of contamination for those sites. Upon completion of the proposed Phase II sampling, the data will be used to confirm the extent of contamination has been defined and to complete human health and ecological risk-screening assessments for all remaining sites. The results will be presented in a Phase II investigation report for the S-Site Aggregate Area.

12.2 Recommendations for Corrective Actions Complete

SWMU 16-026(b), Outfall, has been found to pose potential carcinogenic risk to human health under the industrial and residential scenarios. Remediation activities at this site are warranted.

Five sites for which the nature and extent of contamination are defined do not pose a potential unacceptable risk or dose under the industrial and/or residential scenarios. At these sites, the Laboratory recommends no further investigation or remediation activities are warranted. These sites have been found

to pose no potential unacceptable risks to human health under the residential scenario and are appropriate for corrective actions complete without controls. They include the following:

- SWMU 16-004(a), Imhoff Tank
- SWMU 16-004(e), Filter Screen
- SWMU 16-029(d), Sumps
- SWMU 16-029(g2), Pit
- SWMU 16-017(p)-99 Former Storage Magazine 16-61.

The Courtyard Periphery Area does not pose a potential unacceptable risk under the recreational scenario. At this site, further investigation or remediation activities are not warranted except for the investigation activities at the individual sites that compose this area.

Two additional sites were proposed for no investigation in the approved work plan (LANL 2007, 102216) and are appropriate for corrective action complete without controls because there is no history or evidence of releases of hazardous constituents (Blackwell 1983, 005823; LANL 2007, 097685). Seven surrounding SWMUs not included in the P-Site Subaggregate Area were approved for NFA Table 1.1-1 (EPA 2005, 088464). These sites are

- AOC C-16-062, Manhole
- AOC C-16-063, Manhole.

12.3 Recommendations for Delayed Characterization

In order to maintain the integrity of the historic V-Site structures, the sampling needs for the unsampled SWMUs 16-017(r)-99, 16-017(s)-99, 16-017(t)-99, 16-013, 16-017(q)-99, and 16-006(h) should be presented to the NMHPD. In coordination with the NMHPD, determination should be made as to if and how sampling can be performed without adversely impacting the historic site.

12.4 Schedule for Recommended Activities

A Phase II investigation work plan will be developed and submitted to NMED 6 months after this investigation report is approved. The Phase II work plan will provide details and a schedule for implementing sampling activities and submitting a Phase II investigation report.

13.0 REFERENCES AND MAP DATA SOURCES

13.1 References

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to

review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

Barr, M.J., June 25, 1992. "Rest House Evaluation and Operations at TA-16 and TA-11," Los Alamos National Laboratory memorandum (WX-3-92-538) to W.B. Martin from M.J. Barr, Los Alamos, New Mexico. (Barr 1992, 052964.4)

Baytos, J.F., June 2, 1970. "Analysis of Soil Samples for Residual Explosives from Drainage Ditches at the Sump Effluent Outlets at Group GMX-3 Operating Buildings," Los Alamos Scientific Laboratory memorandum to E. Wilder from J.F. Baytos, Los Alamos, New Mexico. (Baytos 1970, 058911)

Baytos, J.F., December 30, 1975. "Analysis of Soil Samples for Residual Explosives from Drainage Ditches at Sump Effluent Outlets," Los Alamos Scientific Laboratory memorandum to H.E. Ballance from J.F. Baytos, Los Alamos, New Mexico. (Baytos 1975, 034568)

Baytos, J.F., August 7, 1985. "Analysis of Soil Samples for Residual Explosives from Drainage Ditches at Sump Effluent Outlets (for July 18, 1984)," Los Alamos National Laboratory memorandum to A.P. Torres (WX-3) from J.F. Baytos, Los Alamos, New Mexico. (Baytos 1985, 058910)

Baytos, J.F., October 8, 1986. "Analysis of Soil for Residual Explosives from Core Samples Taken at Pond at TA-16-92," Los Alamos Scientific Laboratory memorandum to J.L. Parkinson (WX-3) from J.F. Baytos (M-1), Los Alamos, New Mexico. (Baytos 1986, 005834)

Birdsall, K., March 29, 2007. "S-Site Tour," North Wind memorandum to file from K. Birdsall, Los Alamos, New Mexico. (Birdsall 2007, 097416)

Blackwell, C.D., November 17, 1983. "Structures Removed from TA-16," Los Alamos National Laboratory memorandum (HSE8-83-794) to A.J. Ahlquist (HSE-8) from C.D. Blackwell (HSE-1), Los Alamos, New Mexico. (Blackwell 1983, 005823)

Broxton, D., R. Warren, P. Longmire, R. Gilkeson, S. Johnson, D. Rogers, W. Stone, B. Newman, M. Everett, D. Vaniman, S. McLin, J. Skalski, and D. Larssen, March 2002. "Characterization Well R-25 Completion Report," Los Alamos National Laboratory report LA-13909-MS, Los Alamos, New Mexico. (Broxton et al. 2002, 072640)

Collins, K.A., A.M. Simmons, B.A. Robinson, and C.I. Nylander (Eds.), December 2005. "Los Alamos National Laboratory's Hydrogeologic Studies of the Pajarito Plateau: A Synthesis of Hydrogeologic Workplan Activities (1998–2004)," Los Alamos National Laboratory report LA-14263-MS, Los Alamos, New Mexico. (Collins et al. 2005, 092028)

Cordell, L., 1979. "Gravimetric Expression of Graben Faulting in Santa Fe Country and the Española Basin, New Mexico," New Mexico Geological Society Guidebook: 30th Field Conference, Santa Fe, New Mexico, pp. 59-64. (Cordell 1979, 076049)

DOE (U.S. Department of Energy), October 1987. "Phase I: Installation Assessment, Los Alamos National Laboratory," draft, Volume 1 of 2, Comprehensive Environmental Assessment and Response Program, Environment and Health Division, Environmental Programs Branch, Albuquerque Operations Office, Albuquerque, New Mexico. (DOE 1987, 008663)

DOE (U.S. Department of Energy), November 1989. "Los Alamos National Laboratory Sampling and Analysis Data Document," Draft, technical report EGG-ES-8204, Vol. I, report prepared by DOE Environmental Survey and Idaho National Engineering Laboratory, Washington, D.C. (DOE 1989, 015364)

DOE (U.S. Department of Energy), June 13, 2000. "Procedure for the Release of Residual Radioactive Material from Real Property," U.S. Department of Energy memorandum to D. Glenn, I.R. Triay, M. Zamorski, E. Sellers, D. Gurule, and D. Bergman-Tabbert from C.L. Soden, Albuquerque, New Mexico. (DOE 2000, 067489)

EPA (U.S. Environmental Protection Agency), January 21, 2005. "EPA's Prior Decisions on SWMU/AOC Sites at Los Alamos National Laboratory (LANL)," U.S. Environmental Protection Agency letter to J. Bearzi (NMED-HRMB) from L.F. King (EPA Federal Facilities Section Chief), Dallas, Texas. (EPA 2005, 088464)

EPA (U.S. Environmental Protection Agency), December 2007. "EPA Region 6 Human Health Medium-Specific Screening Levels," U.S. EPA Region 6, Dallas, Texas. (EPA 2007, 099314)

Gehan, E.A., June 1965. "A Generalized Wilcoxon Test for Comparing Arbitrarily Singly-Censored Samples," *Biometrika,* Vol. 52, No. 1 and 2, pp. 203–223. (Gehan 1965, 055611)

Gilbert, R.O., and J.C. Simpson, November 1990. "Statistical Sampling and Analysis Issues and Needs for Testing Attainment of Background-Based Cleanup Standards at Superfund Sites," Proceedings of The Workshop on Superfund Hazardous Waste: Statistical Issues in Characterizing a Site: Protocols, Tools, and Research Needs, U.S. Environmental Protection Agency, Arlington, Virginia. (Gilbert and Simpson 1990, 055612)

Gilbert, R.O., and J.C. Simpson, December 1992. "Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 3: Reference-Based Standards for Soils and Solid Media," document prepared for the U.S. Environmental Protection Agency, Pacific Northwest Laboratory, Richland, Washington. (Gilbert and Simpson 1992, 054952)

IT Corporation (International Technology Corporation), July 1999. "Field Summary Report for the VCM at PRSs: 16-005(d), 16-006(g, h), 16-013, 16-017, 16-025(x), 16-026(q), 16-029(g2, h2, w, x), 16-031(c, d), 16-034(p), C-16-065, C-16-068, and C-16-074," report prepared for Los Alamos National Laboratory, Los Alamos, New Mexico. (IT Corporation 1999, 087145)

Kistiakowsky, G.B., August 1944. "New Field Facilities Construction," Los Alamos Scientific Laboratory memorandum to W.S. Parsons from G.B. Kistiakowsky, Los Alamos, New Mexico. (Kistiakowsky 1944, 004680)

Kleinfelder, May 7, 2004. "Final Well CdV-16-1(i) Completion Report," report prepared for Los Alamos National Laboratory, Project No. 37151/9.12, Albuquerque, New Mexico. (Kleinfelder 2004, 087844)

Kleinfelder, May 18, 2004. "Final Borehole CdV-16-3(i) Status Report," report prepared for Los Alamos National Laboratory, Project No. 37151/11.12, Albuquerque, New Mexico. (Kleinfelder 2004, 087845)

Kleinfelder, November 2005. "Final Completion Report, Characterization Well CdV-16-2(i)r," report prepared for Los Alamos National Laboratory, Project No. 49436, Albuquerque, New Mexico. (Kleinfelder 2005, 093665)

LANL (Los Alamos National Laboratory), August 1989. "Release Site Database, Task 13, TA-11, 13, 16, 24, and 25," Preliminary Draft, Vol. I and II, prepared by Roy F. Weston, Inc., for Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1989, 068685)

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. II of IV (TA-10 through TA-25), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007512)

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. IV of IV (TA-51 through TA-74), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007514)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1082," Los Alamos National Laboratory document LA-UR-93-1196, Los Alamos, New Mexico. (LANL 1993, 020948)

LANL (Los Alamos National Laboratory), July 1994. "RFI Work Plan for Operable Unit 1082, Addendum I," Los Alamos National Laboratory document LA-UR-94-1580, Los Alamos, New Mexico. (LANL 1994, 039440)

LANL (Los Alamos National Laboratory), July 1995. "RFI Work Plan for Operable Unit 1082, Addendum 2," Los Alamos National Laboratory document LA-UR-95-1038, Los Alamos, New Mexico. (LANL 1995, 057225)

LANL (Los Alamos National Laboratory), September 1996. "RFI Report for Potential Release Sites in TA-16: 16-003(k), 16-021(c)," Los Alamos National Laboratory document LA-UR-96-3191, Los Alamos, New Mexico. (LANL 1996, 055077)

LANL (Los Alamos National Laboratory), March 1997. "Voluntary Corrective Action Plan for Potential Release Sites at TA-16: 16-005(d), 16-006(g,h), 16-013, 16-017, 16-025(x), 16-026(q), 16-029(g2,h2,w,x), 16-031(c,d), 16-034(p), C-16-065, C-16-068, C-16-074," Los Alamos National Laboratory document LA-UR-97-640, Los Alamos, New Mexico. (LANL 1997, 055512)

LANL (Los Alamos National Laboratory), March 20, 1997. "Voluntary Corrective Measures Plan for Potential Release Sites at TA-16: 16-005(d), 16-006(g,h), 16-013, 16-017, 16-025(x), 16-026(q), 16-029(g2,h2,w,x), 16-031(c,d), 16-034(p), C-16-065, C-16-068, C-16-074," Los Alamos National Laboratory document LA-UR-97-640, Los Alamos, New Mexico. (LANL 1997, 055653)

LANL (Los Alamos National Laboratory), September 1997. "Voluntary Corrective Measures Completion Report for Potential Release Sites 16-013, 16-025(x), 16-031(d), C-16-065, C-16-068," Los Alamos National Laboratory document LA-UR-97-3677, Los Alamos, New Mexico. (LANL 1997, 056569)

LANL (Los Alamos National Laboratory), September 1997. "RFI Report for Potential Release Sites at TA-16: 16-024(c,d,f,g,k,m,o,p–s), 16-025(b2,d,g,h,j,k,m–o,y), 16-034(c–f,l,m), C-16-005, C-16-017," Los Alamos National Laboratory document LA-UR-97-3770, Los Alamos, New Mexico. (LANL 1997, 056660.289)

LANL (Los Alamos National Laboratory), June 1998. "Addendum to the Voluntary Corrective Measures Plan for Potential Release Sites 16-005(d), 16-006(g,h), 16-017[Bldg.27], 16-026(q), 16-029(g2,w,x), 16-031(c), C-16-074," Los Alamos National Laboratory document LA-UR-98-2780, Los Alamos, New Mexico. (LANL 1998, 063069)

LANL (Los Alamos National Laboratory), September 1998. "RFI Report for Potential Release Site 16-021(c)," Los Alamos National Laboratory document LA-UR-98-4101, Los Alamos, New Mexico. (LANL 1998, 059891)

LANL (Los Alamos National Laboratory), September 1998. "Replacement Chapter 6 for RFI Work Plan 1082, Addendum 2," enclosure to Los Alamos National Laboratory letter (EM/ER:98-317) to T. Taylor (DOE) from J. Canepa (LANL), Los Alamos, New Mexico. (LANL 1998, 059685)

LANL (Los Alamos National Laboratory), September 22, 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 059730)

LANL (Los Alamos National Laboratory), July 1999. "Voluntary Corrective Measures Completion Report for Potential Release Sites 16-006(g), Drum Storage Area Aggregate–[16-029(g2) and C-16-074], 16-005(d), 16-034(p)," Los Alamos National Laboratory document LA-UR-99-3001, Los Alamos, New Mexico. (LANL 1999, 063973)

LANL (Los Alamos National Laboratory), June 15, 2000. "Response to Request for Supplemental Information VCM Report for Potential Release Sites 16-006(g), Drum Storage Area Aggregate [16-029(g2) and C-16-074], 16-005(d), and 16-034(p)," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2000, 066885)

LANL (Los Alamos National Laboratory), May 2002. "Progress Report for Plume-Chasing and Characterization Well Cañon de Valle R-15-3 (CdV-R-15-3)," corrected version, May 2002, Los Alamos National Laboratory document LA-UR-00-4527, Los Alamos, New Mexico. (LANL 2002, 073211)

LANL (Los Alamos National Laboratory), September 2003. "Phase III RFI Report for Solid Waste Management Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-03-5248, Los Alamos, New Mexico. (LANL 2003, 077965)

LANL (Los Alamos National Laboratory), March 2004. "Investigation Work Plan for the TA-16-340 Complex, Solid Waste Management Units 13-003(a)-99, 16-003(n)-99, 16-003(o), 16-026(j2), and 16-029(f) at Technical Area 16," Los Alamos National Laboratory document LA-UR-04-1466, Los Alamos, New Mexico. (LANL 2004, 087345)

LANL (Los Alamos National Laboratory), May 2005. "Derivation and Use of Radionuclide Screening Action Levels, Revision 1," Los Alamos National Laboratory document LA-UR-05-1849, Los Alamos, New Mexico. (LANL 2005, 088493)

LANL (Los Alamos National Laboratory), August 2005. "Material Disposal Area P Site Closure Certification Report, Revision 1," Los Alamos National Laboratory document LA-UR-05-6536, Los Alamos, New Mexico. (LANL 2005, 092251)

LANL (Los Alamos National Laboratory), October 2005. "Solid Waste Management Unit (SWMU) Assessment Report for SWMU 03-003(c)" and "Solid Waste Management Unit (SWMU) Assessment Report for SWMU 60-002," 70% Drafts, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2005, 100704)

LANL (Los Alamos National Laboratory), September 2006. "Investigation Work Plan for Cañon de Valle Aggregate Area," Los Alamos National Laboratory document LA-UR-06-4960, Los Alamos, New Mexico. (LANL 2006, 091698)

LANL (Los Alamos National Laboratory), July 2006. "Interim Facility-Wide Groundwater Monitoring Plan, Revision 1.1," Los Alamos National Laboratory document LA-UR-06-4975, Los Alamos, New Mexico. (LANL 2006, 094043)

LANL (Los Alamos National Laboratory), September 2006. "South Canyons Investigation Work Plan," Los Alamos National Laboratory document LA-UR-06-5979, Los Alamos, New Mexico. (LANL 2006, 093713)

LANL (Los Alamos National Laboratory), September 2007. "Historical Investigation Report for S-Site Aggregate Area," Los Alamos National Laboratory document LA-UR-07-5620, Los Alamos, New Mexico. (LANL 2007, 097685)

LANL (Los Alamos National Laboratory), December 2007. "Investigation Work Plan for S-Site Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-07-8366, Los Alamos, New Mexico. (LANL 2007, 102216)

LANL (Los Alamos National Laboratory), March 2008. "Historical Investigation Report for Upper Sandia Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-08-1851, Los Alamos, New Mexico. (LANL 2008, 100693)

LANL (Los Alamos National Laboratory), October 2008. "Ecorisk Database (Release 2.3)," on CD, LA-UR-08-6673, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2008, 103352)

LANL (Los Alamos National Laboratory), December 2009. "Radionuclide Screening Action Levels (SALs) from RESRAD, Version 6.5," Los Alamos National Laboratory document LA-UR-09-8111, Los Alamos, New Mexico. (LANL 2009, 107655)

LANL (Los Alamos National Laboratory), December 2009. "Ecorisk Database (Release 2.4)," on CD, LA-UR-09-7834, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2009, 107524)

LANL (Los Alamos National Laboratory), February 2010. "Technical Approach for Calculating Recreational Soil Screening Levels for Chemicals, Revision 1," Los Alamos National Laboratory document LA-UR-09-07510, Los Alamos, New Mexico. (LANL 2010, 108613)

LANL (Los Alamos National Laboratory), March 2010. "Periodic Monitoring Report for Water Canyon/Cañon de Valle Watershed, October 2–October 28, 2009," Los Alamos National Laboratory document LA-UR-10-0941, Los Alamos, New Mexico. (LANL 2010, 108758)

LASL (Los Alamos Scientific Laboratory), April 22, 1944. "Bldg. No. (P-1) 16-475 - Plumbing & Details, Zia Project 'P' Site Construction," Engineering Drawing ENG-C-1643, sheet number 3 of 7, Los Alamos, New Mexico. (LASL 1944, 097497)

LASL (Los Alamos Scientific Laboratory), September 11, 1947. "A Technical Maintenance Group Report on General Background Data Concerning the Los Alamos Scientific Laboratory Required for Planning Purposes," Los Alamos Scientific Laboratory report LAB-A-5, Los Alamos, New Mexico. (LASL 1947, 005581)

LASL (Los Alamos Scientific Laboratory), September 18, 1979. [Laboratory Analyses Request for Explosive Content in Solution from Building TA-16-302 Sump Water], Los Alamos Scientific Laboratory, Los Alamos, New Mexico. (LASL 1979, 057081)

Madsen, A., August 21, 2007. "K-Site Drop Tower Sumps and Catch Basin Status," North Wind memorandum to file from A. Madsen, Los Alamos, New Mexico. (Madsen 2007, 098271)

Martin, B., November 17, 1993. "Early S-Site History, Lee Hilton Interview," Los Alamos National Laboratory memorandum (CST-6-ER/BM-93-060) to OU 1082 File from B. Martin (CST-6), Los Alamos, New Mexico. (Martin 1993, 052964.268)

Martin, B., and D. Hickmott, May 6, 1993. "Early S-Site History. Melvin Brooks Interview," Los Alamos National Laboratory memorandum (CLS-ER/BM-93:022) to OU 1082 Files (CLS-DO) from B. Martin and D. Hickmott, Los Alamos, New Mexico. (Martin and Hickmott 1993, 087661)

Millard, W.P., and S.J. Deverel, December 1988. "Nonparametric Statistical Methods for Comparing Two Sites Based on Data with Multiple Nondetect Limits," *Water Resources Research,* Vol. 24, No. 12, pp. 2087–2098. (Millard and Deverel 1988, 054953)

Morgan, G.L., May 2, 1994. "Investigation of Material Used in Underground Chambers at TA-33," Los Alamos National Laboratory memorandum (P-15-94-U-141) to D. Hoard (CST-1) from G.L. Morgan (P-15), Los Alamos, New Mexico. (Morgan 1994, 054782.75)

NMED (New Mexico Environment Department), December 23, 1998. "Approval: Class III Permit Modification to Remove Ninety-nine (99) Solid Waste Management Units from the Department of Energy/Los Alamos National Laboratory RCRA Permit NM 0890010515," New Mexico Environment Department letter to T. Taylor (DOE-LAAO) and J.C. Browne (LANL Director) from E. Kelley (NMED-HRMB), Santa Fe, New Mexico. (NMED 1998, 063042)

NMED (New Mexico Environment Department), June 2006. "Technical Background Document for Development of Soil Screening Levels, Revision 4.0, Volume 1, Tier 1: Soil Screening Guidance Technical Background Document," New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2006, 092513)

NMED (New Mexico Environment Department), January 23, 2008. "Approval of Los Alamos National Laboratory Proposal for No Further Action," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2008, 100116)

NMED (New Mexico Environment Department), December 2009. "Technical Background Document for Development of Soil Screening Levels, Revision 5.0," with revised Table A-1, New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2009, 108070)

NMED (New Mexico Environment Department), December 9, 2009. "Notice of Approval for Deviations from the Approved Investigation Work Plan for the S-Site Aggregate Area," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 108102)

Paige, K.S., July 5, 1994. "Discussion with Pete Velarde Regarding Removal of Underground Storage Tank," Los Alamos National Laboratory memorandum (CST-ER-KSP-020) to CST-ER File from K.S. Paige, Los Alamos, New Mexico. (Paige 1994, 052964.607)

Parratt, L.G., February 19, 1945. "Monthly Progress Report of Group G-2: 15 January to 15 February," Los Alamos Scientific Laboratory memorandum to R.F. Bacher from L.G. Parratt, Los Alamos, New Mexico. (Parratt 1945, 028308)

13.2 Map Data Sources

Data sources used in original figures and/or plates created for this report are described below and identified by legend title.

Legend Item	Data Source
2-ft elevation contour	Hypsography, 2 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
10-ft elevation contour	Hypsography, 10-ft Contour Interval; LANL, ENV Environmental Remediation and Surveillance Program; 1991. Hypsography, 20-ft Contour Interval; LANL, ENV Environmental Remediation and Surveillance Program; 1991.
100-ft elevation contour	Hypsography, 100-ft Contour Interval; LANL, ENV Environmental Remediation and Surveillance Program; 1991.
Canyon reach (planned)	Los Alamos National Laboratory, September 2006. "South Canyons Investigation Work Plan," Los Alamos National Laboratory document LA-UR-06-5979, Los Alamos, New Mexico.
Communication line	Communication Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 08 August 2002; as published 02 July 2010.

Legend Item	Data Source
Electric line	Primary Electric Grid; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.
Fence	Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.
Former drainline	Former Structures of the Los Alamos Site, Line Feature Representation; Los Alamos National Laboratory, Environment and Remediation Support Services Division, EP2010-0170; 1:2,500 Scale Data; 09 April 2010.
Former structure or building	Former Structures of the Los Alamos Site; Los Alamos National Laboratory, Waste and Environmental Services Division, 2010-0A; 1:2,500 Scale Data; 09 April 2010. Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 12 December 2001.
Gas line	Primary Gas Distribution Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.
LANL boundary Laboratory boundary	LANL Areas Used and Occupied; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 04 December 2008.
Major drainage	WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
Monitoring well, regional Monitoring well, alluvial	Los Alamos National Laboratory, Waste and Environmental Services Division; Water Quality database pull, April 27, 2010.
NPDES-permitted outfall, active (approx. location) NPDES-permitted outfall, inactive (approx. location)	WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003. WQH Inactive Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003. Outfalls; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; Unknown publication date. Location identification on 2008 orthophotography by 2009–2010 S-Site Investigation Field Staff. (Orthophotography, 2008 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, February 2009.)
Paved road	Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.
Primary paved road Secondary paved road	Road Centerlines for the County of Los Alamos; County of Los Alamos, Information Services; as published 04 March 2009.
S-Site Aggregate Area S-Site Aggregate Area boundary	Aggregate Areas; LANL, ENV Environmental Remediation & Surveillance Program, ER2005-0496; 1:2,500 Scale Data; 22 September 2005.
Sampling location Sampling location, 2009–2010 Sampling location, historic 2009–2010 sampling location	ER Project Locations; Los Alamos National Laboratory, ESH&Q Waste and Environmental Services Division, EP2010-0B; 1:2,500 Scale Data; 17 June 2010.
Sewer line	Sewer Line System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.

Legend Item	Data Source
Spring	Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
Storm drain	Storm Drain Line Distribution System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.
Structure or building	Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.
Surface-water sampling station	Watershed Monitoring - Environmental Surveillance at Los Alamos during 2008 – On-Site and Perimeter Monitoring Locations, Edition 2009-0A; Los Alamos National Laboratory, Waste and Environmental Services Division, Water Stewardship Program, Corrective Actions Program, Environmental Protection Division, Ecology and Air Quality Group, and Water Quality and RCRA Group; September 2009.
SWMU or AOC Subject SWMU or AOC Other SWMU or AOC Subject area Liquid Waste Trunk Line	Potential Release Sites; Los Alamos National Laboratory, ESH&Q Waste & Environmental Services Division, Environmental Data and Analysis Group, EP2010-0A; 1:2,500 Scale Data; 17 June 2010.
TA boundary Technical Area boundary	Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 04 December 2008.
Unpaved road	Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.
V-Site Courtyard Area V-Site Courtyard Periphery	Original graphic elements presented for the Investigation Report for S-Site Aggregate Area.
Water line	Water Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 02 July 2010.

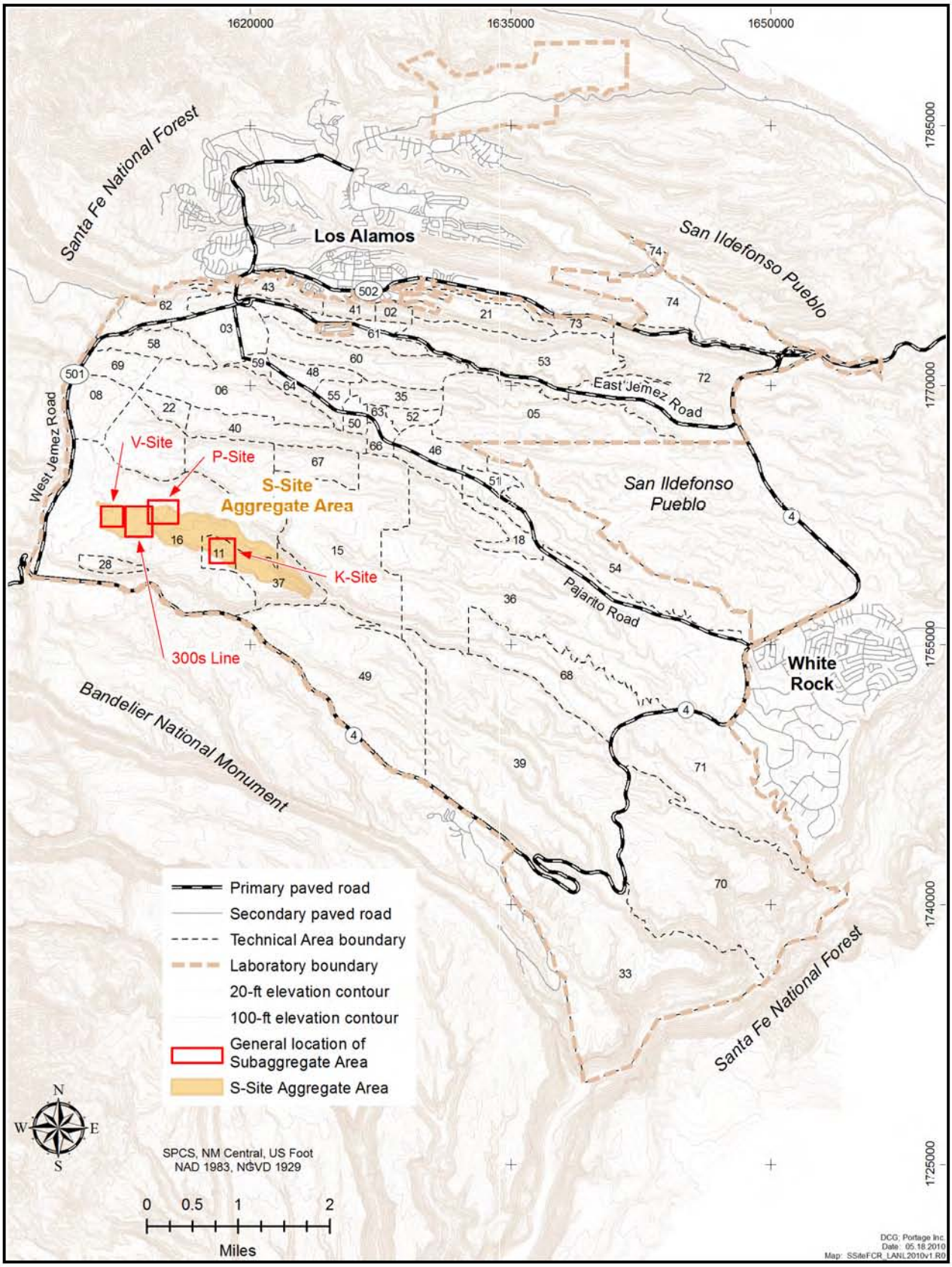


Figure 1.1-1 Location of the S-Site Aggregate Area

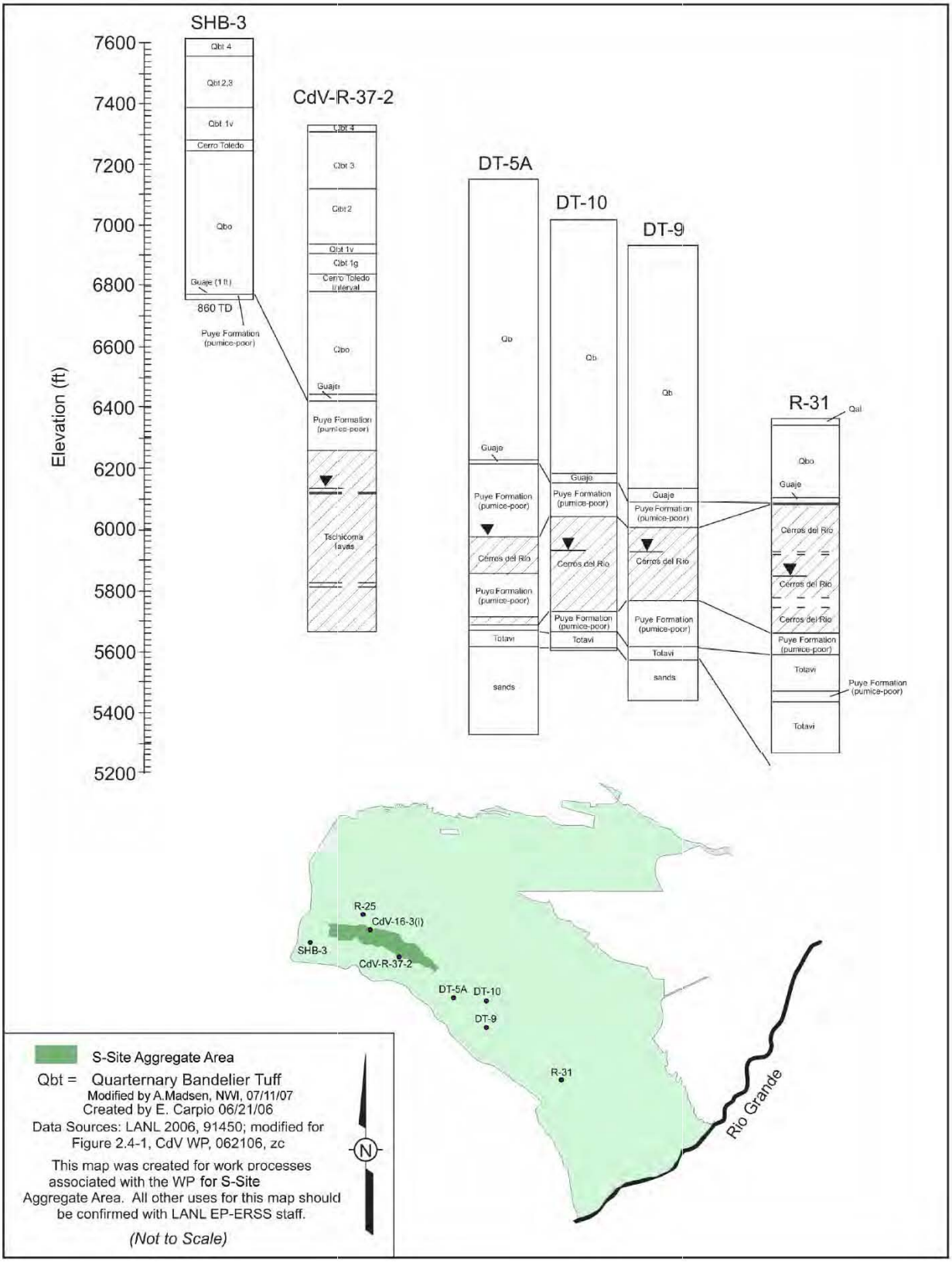


Figure 2-4.1 Stratigraphy and geologic correlations at selected borings (west-northwest to east-southeast)

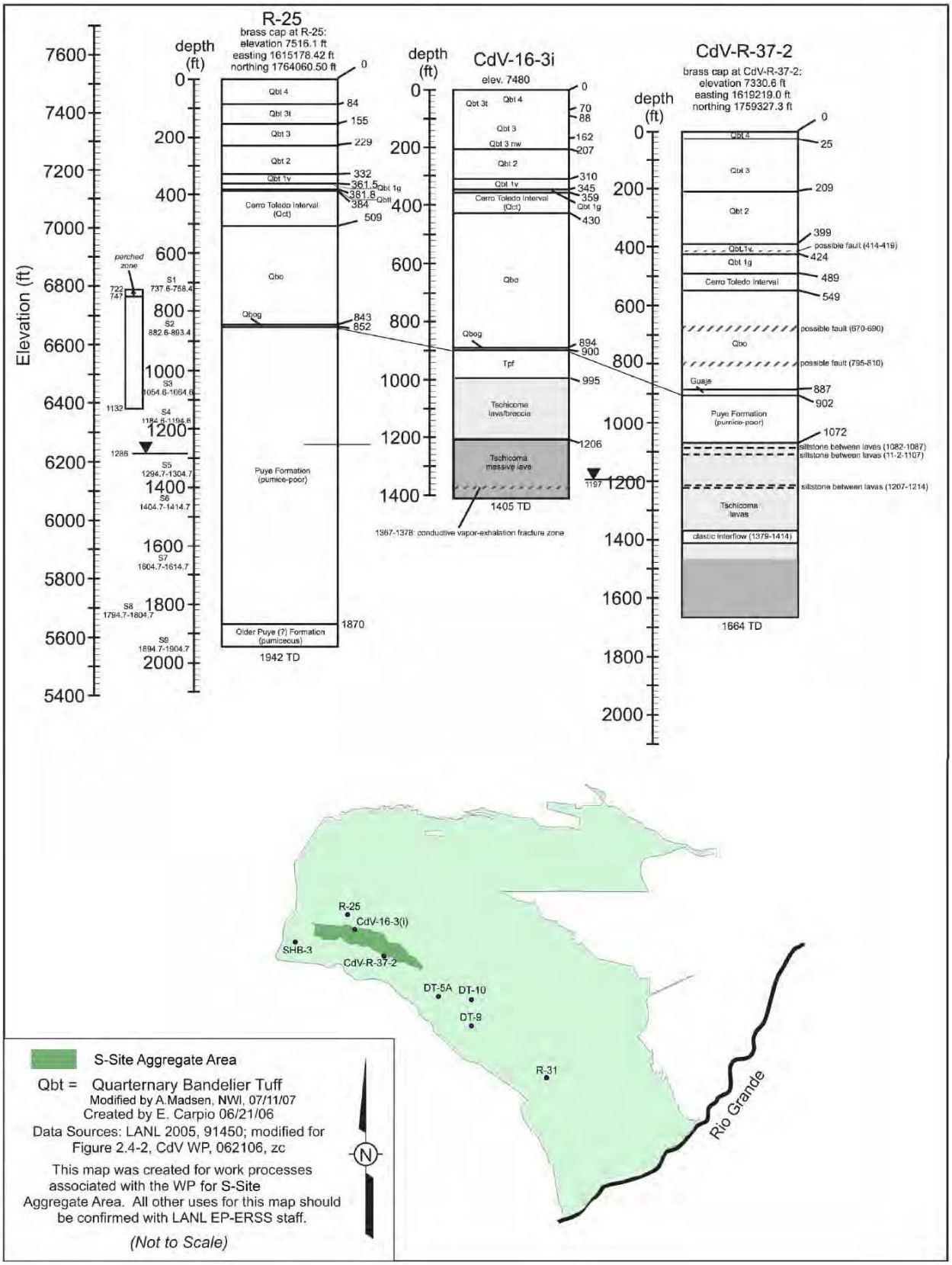


Figure 2-4.2 Stratigraphy and geologic correlations at selected borings (north to south)

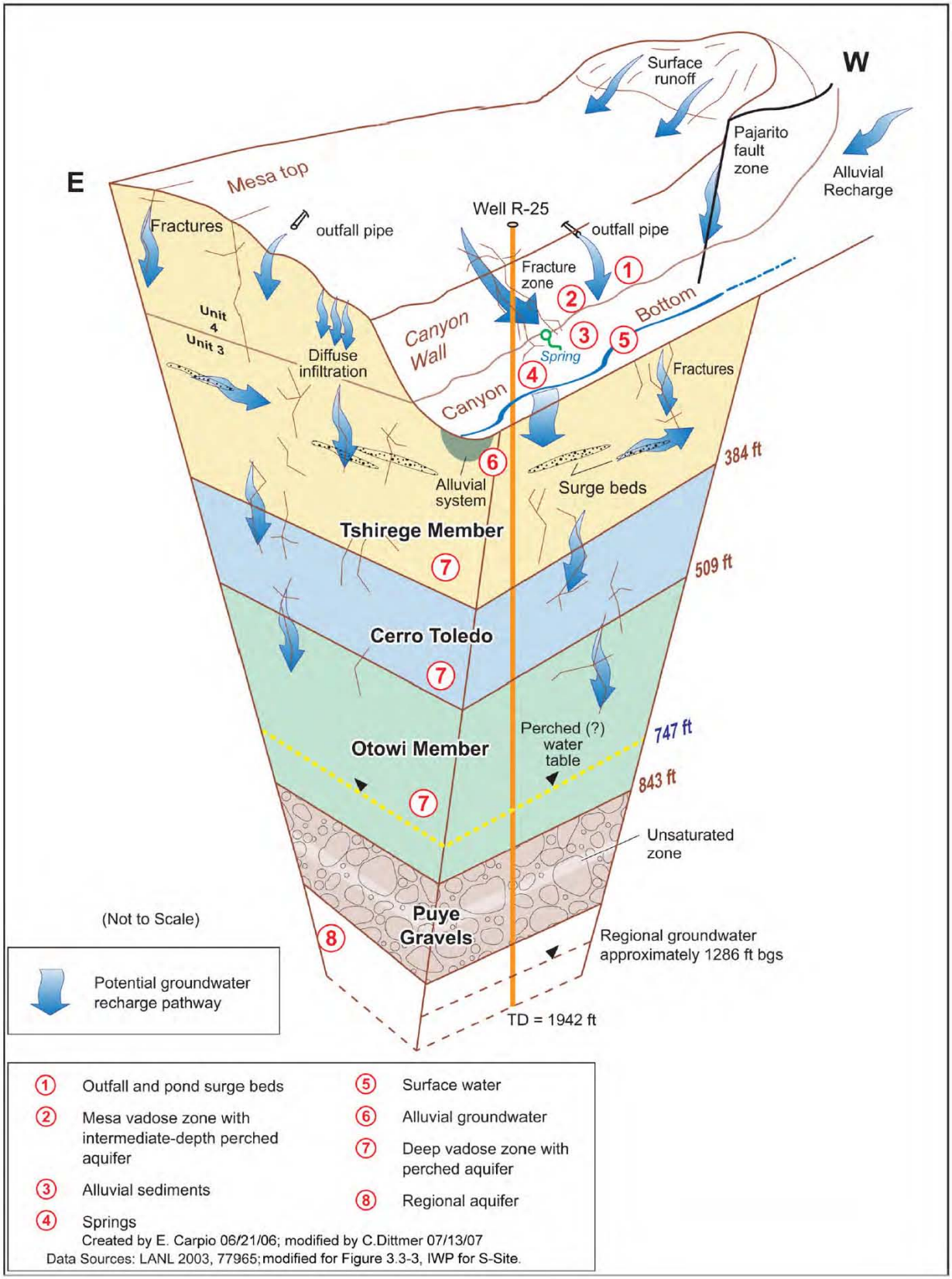
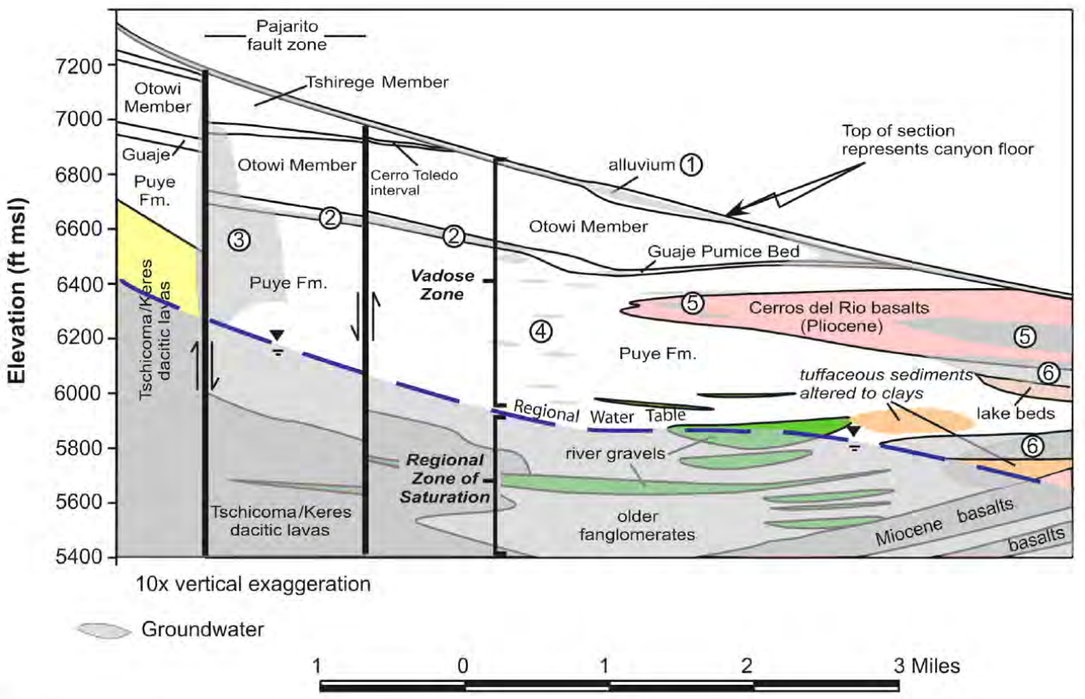


Figure 2-4.3 Hydrogeologic conceptual model for the S-Site Aggregate Area



① Canyon-floor alluvial groundwater - most commonly found in large, wet watersheds with significant snow and storm runoff or in smaller watersheds that receive liquid effluent from wastewater treatment plants. Saturated thickness and downcanyon extent varies seasonally.

② Perched groundwater is associated with the Guaje Pumice Bed in Los Alamos Canyon. This perched water body has a lateral extent of up to 3.7 mi. Guaje Pumice Bed has a high moisture content but is not fully saturated in most other locations.

③ Cañon de Valle area in the southwest part of LANL. This is the largest perched zone identified on the plateau. A deep-sounding surface-based magnetotelluric survey suggests that this perched zone is discontinuous laterally, occurring as vertical, pipelike groundwater bodies. One interpretation of this zone is that it represents groundwater mound(s) formed in response to local recharge beneath a wet canyon floor. Recharge may be enhanced across the Pajarito fault zone where shallow, densely welded tuffs rocks are highly fractured.

④ Small zones of perched water formed above stratigraphic traps in Puye fanglomerate. These perched zones tend to be more numerous beneath large wet canyons and less frequent beneath dry mesa tops.

⑤ Perched groundwater associated with Cerro del Rio basalt. Saturation occurs in fractured basalt flows and in interflow breccias and sediments.

⑥ Perched zones form in response to local geologic conditions on the eastern side of the plateau. These include perch zones within clay-altered tuffaceous sediments and above lake deposits.

Source: LANL 2005, 92028; modified for Figure 3.3-4, IWP for S-Site.

Figure 2-4.4 Generalized east-west hydrostratigraphic cross-section through the Pajarito Plateau

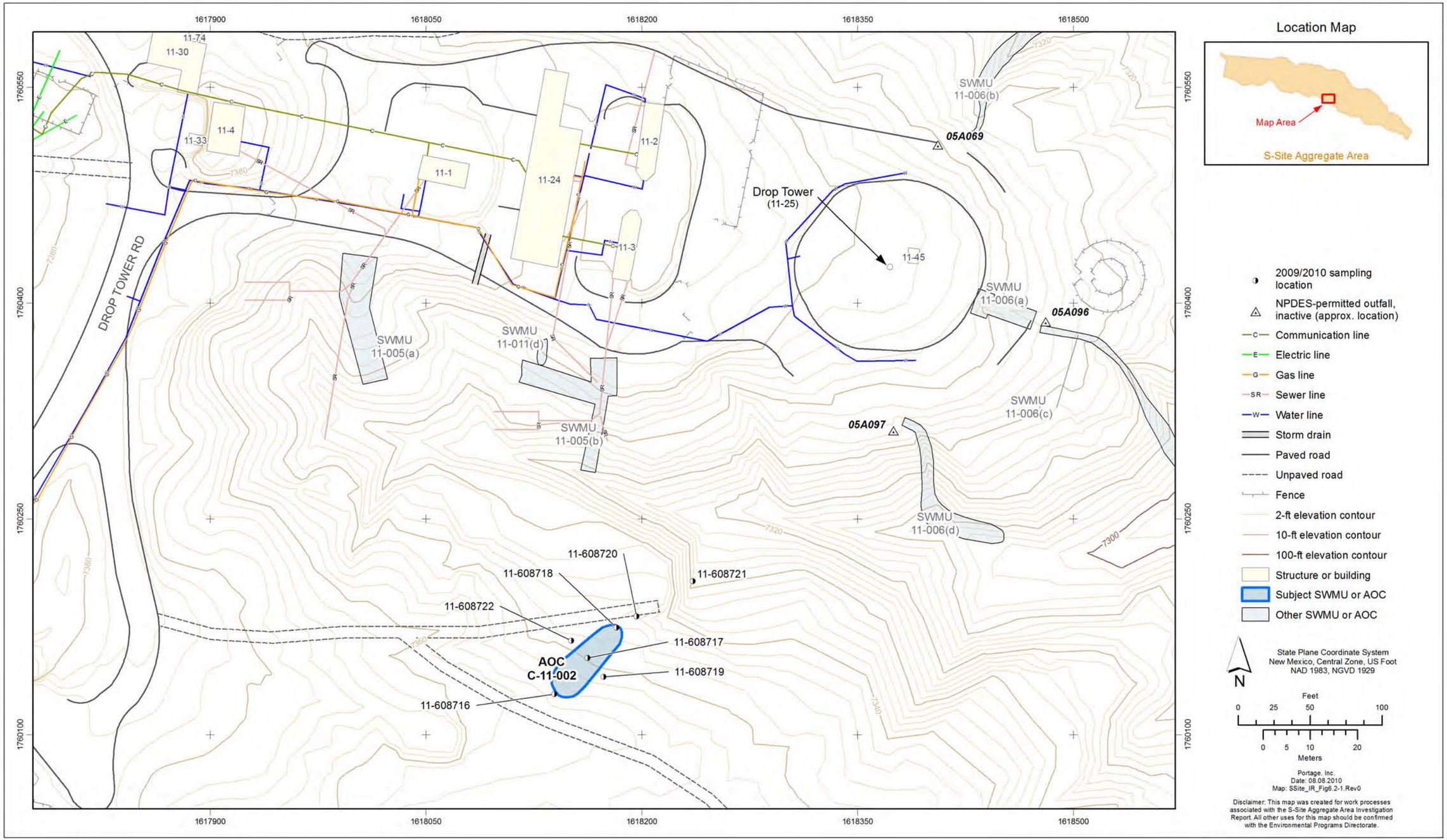


Figure 6.2-1 Locations sampled for AOC C-11-002

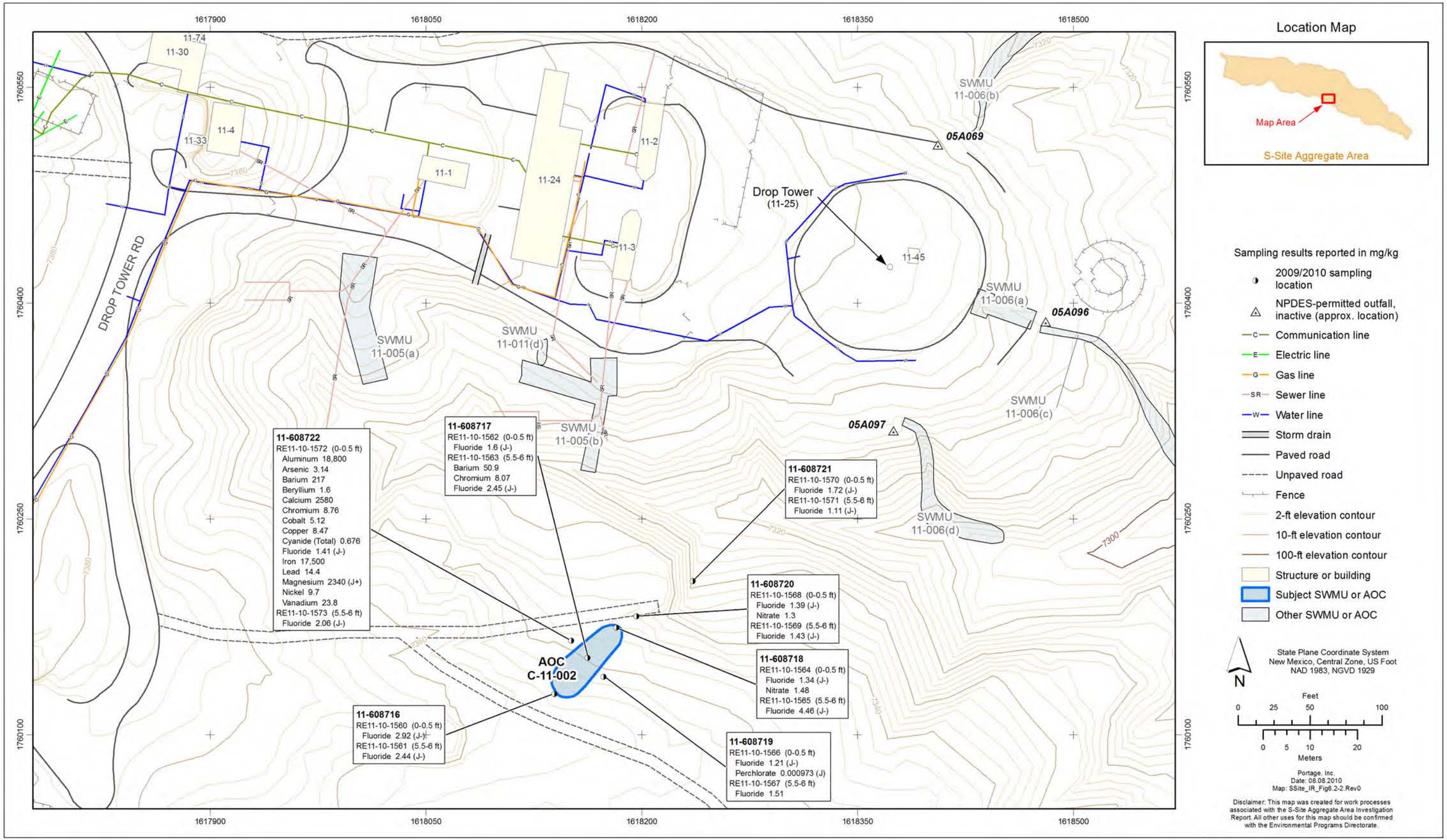


Figure 6.2-2 Inorganic chemicals detected above BVs at AOC C-11-002

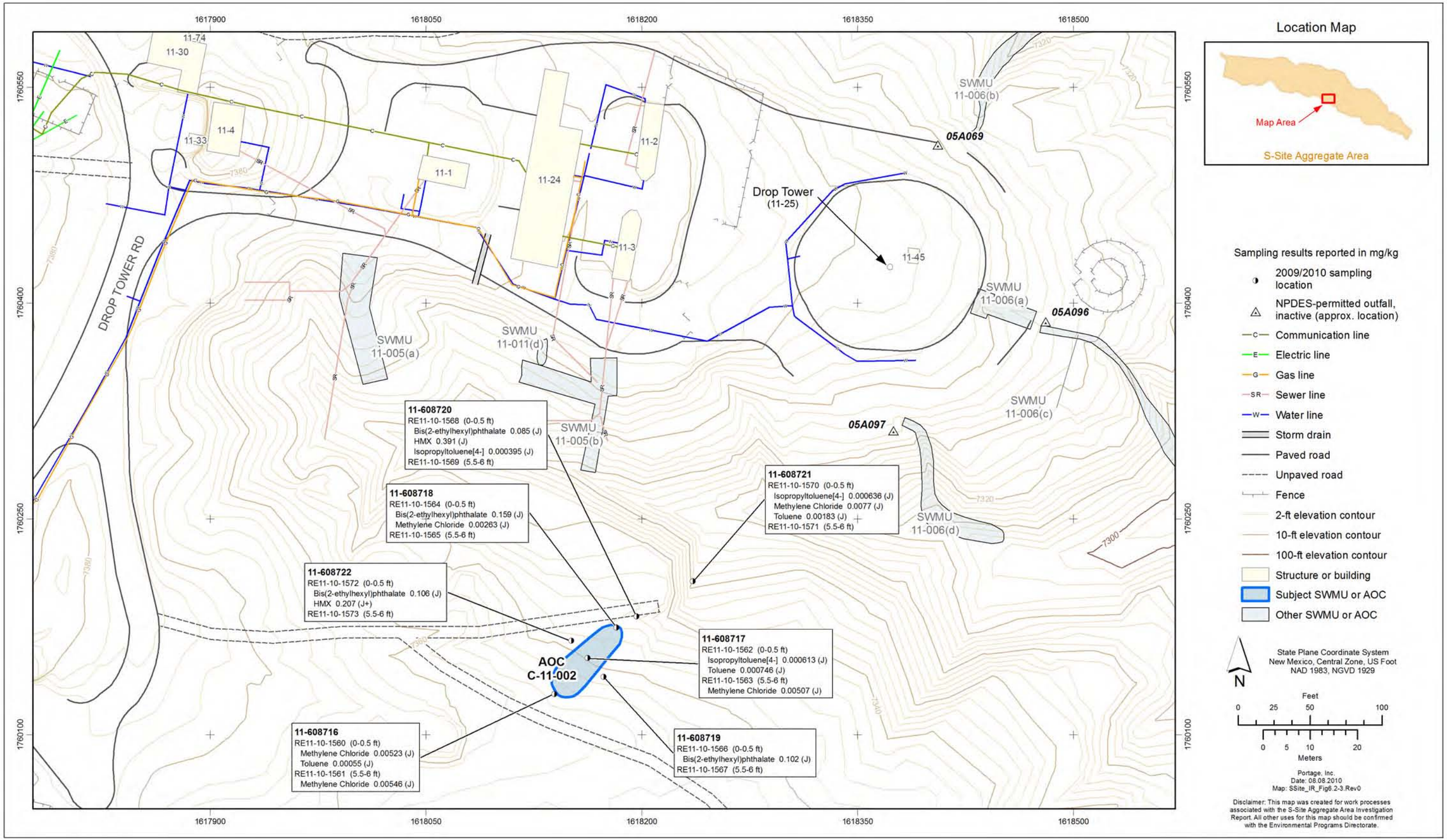


Figure 6.2-3 Organic chemicals detected in samples at AOC C-11-002

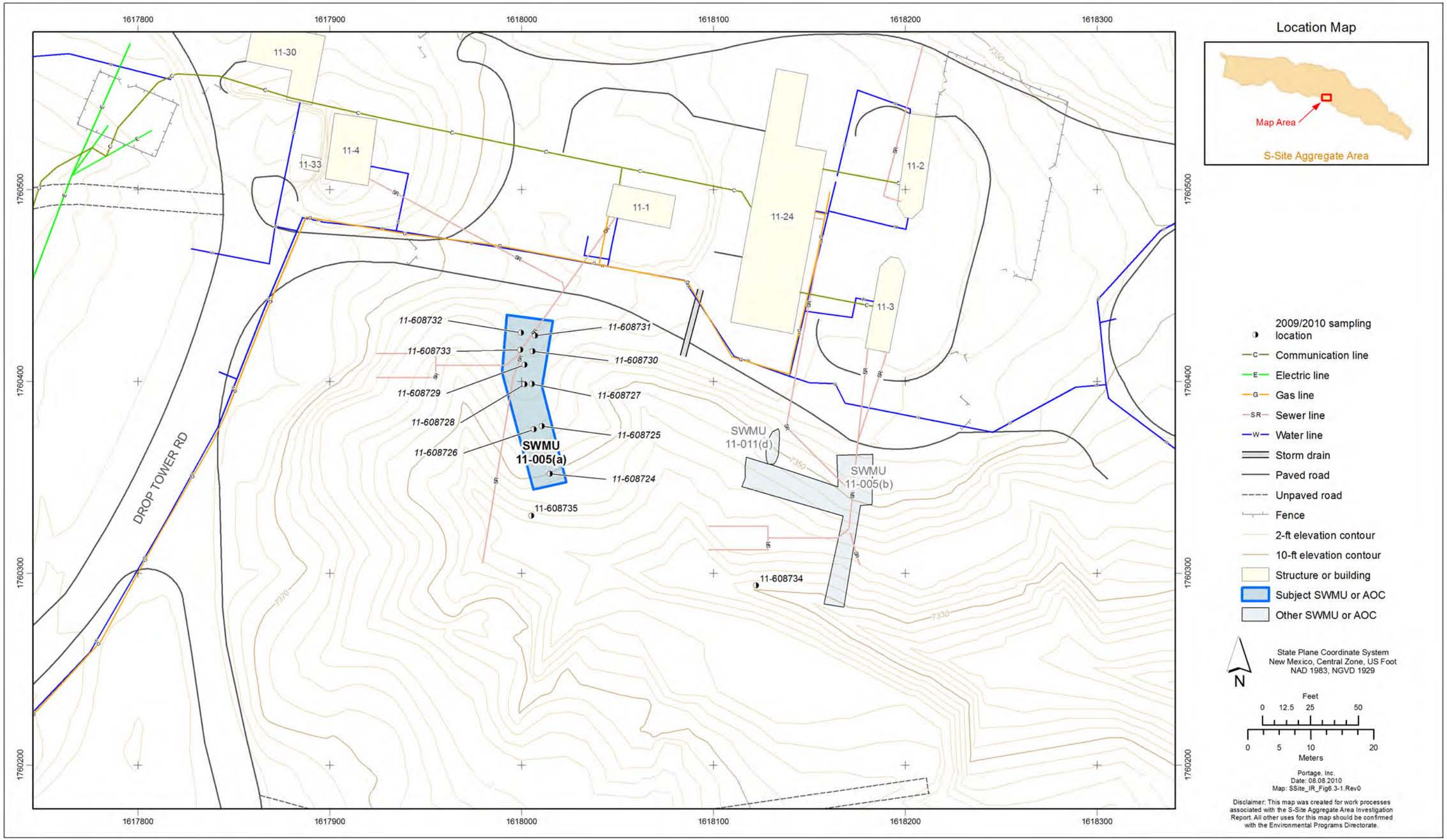


Figure 6.3-1 Locations sampled for SWMU 11-005(a)

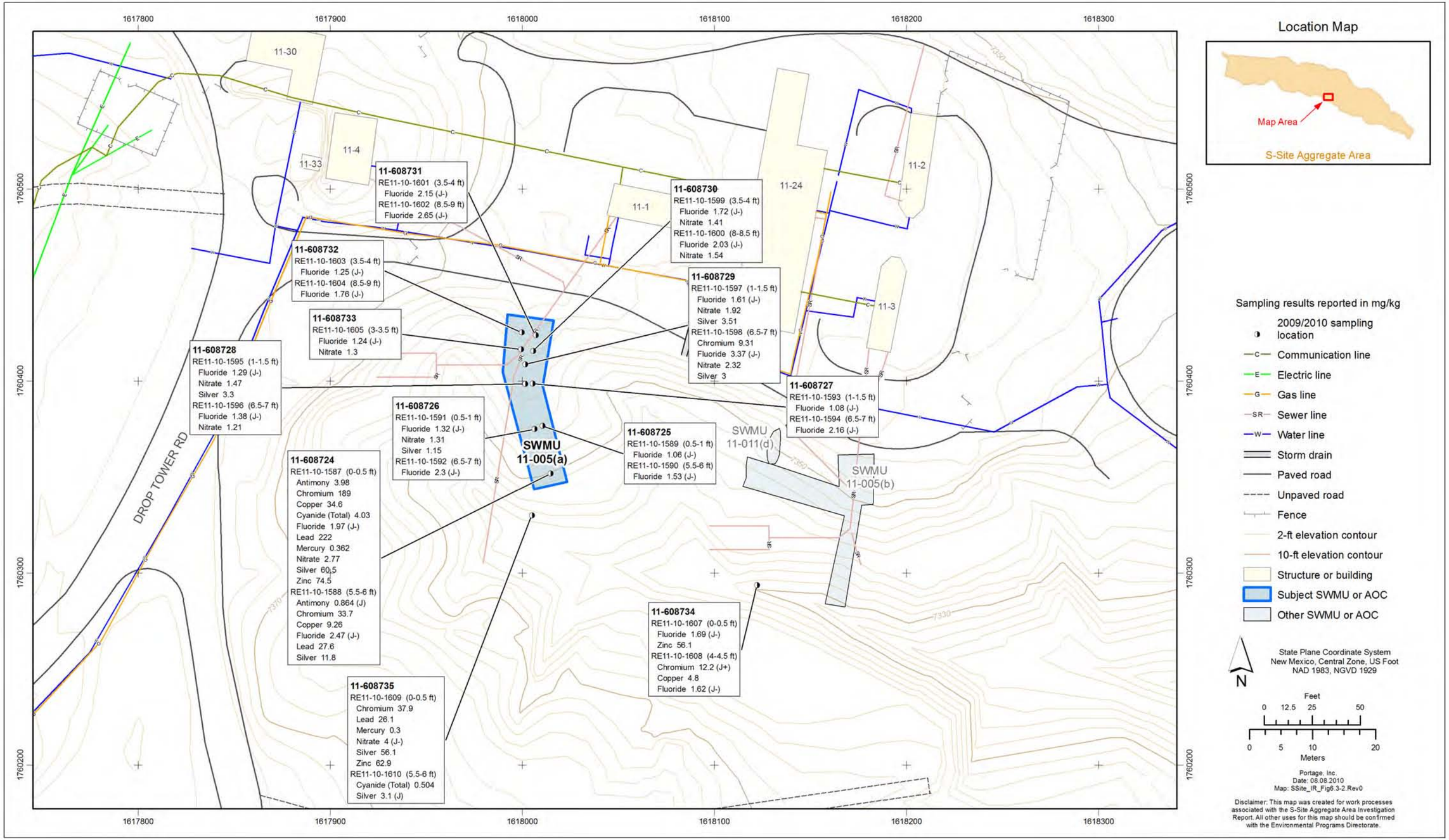


Figure 6.3-2 Inorganic chemicals detected above BVs at SWMU 11-005(a)

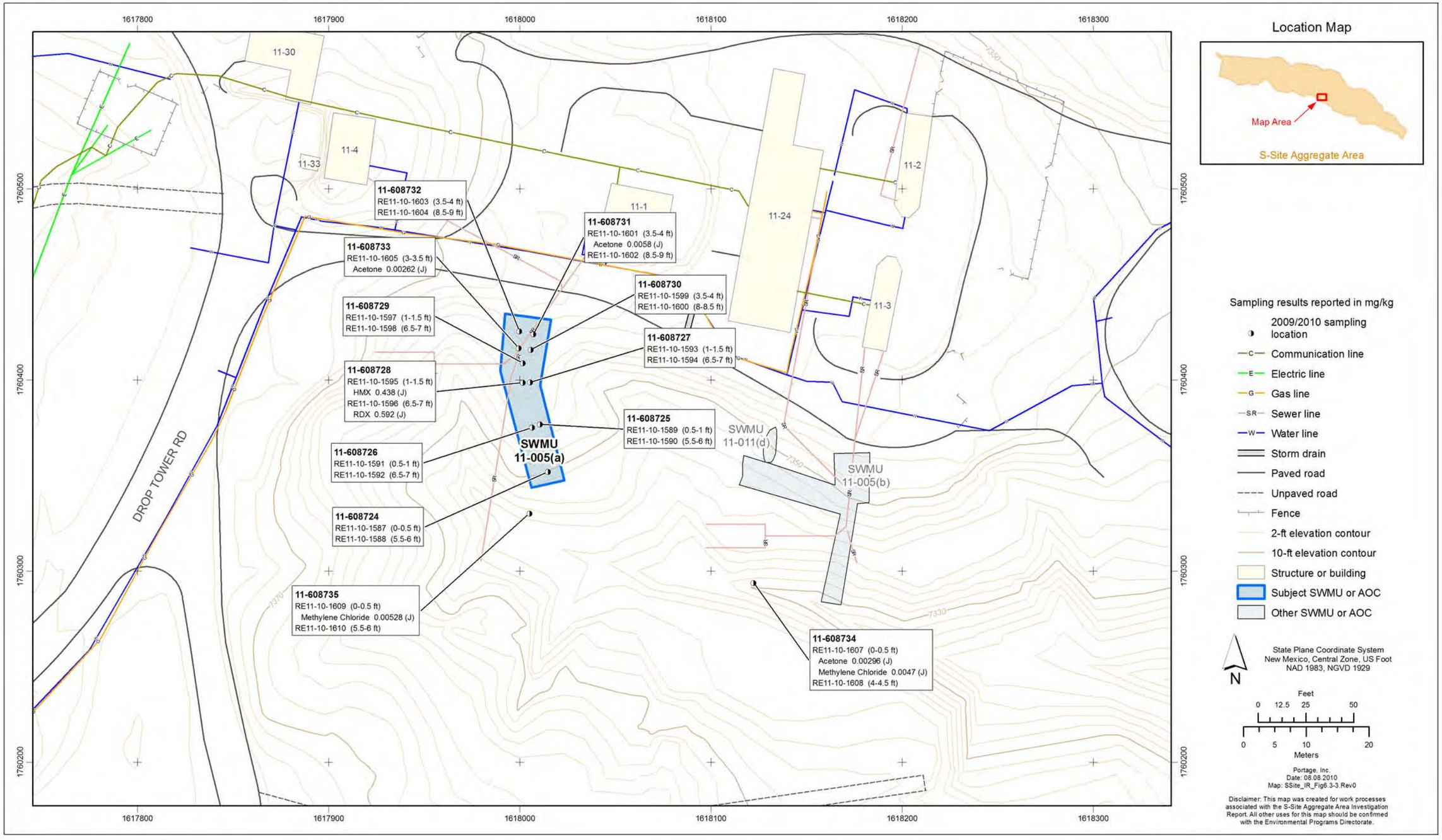


Figure 6.3-3 Organic chemicals detected in samples at SWMU 11-005(a)

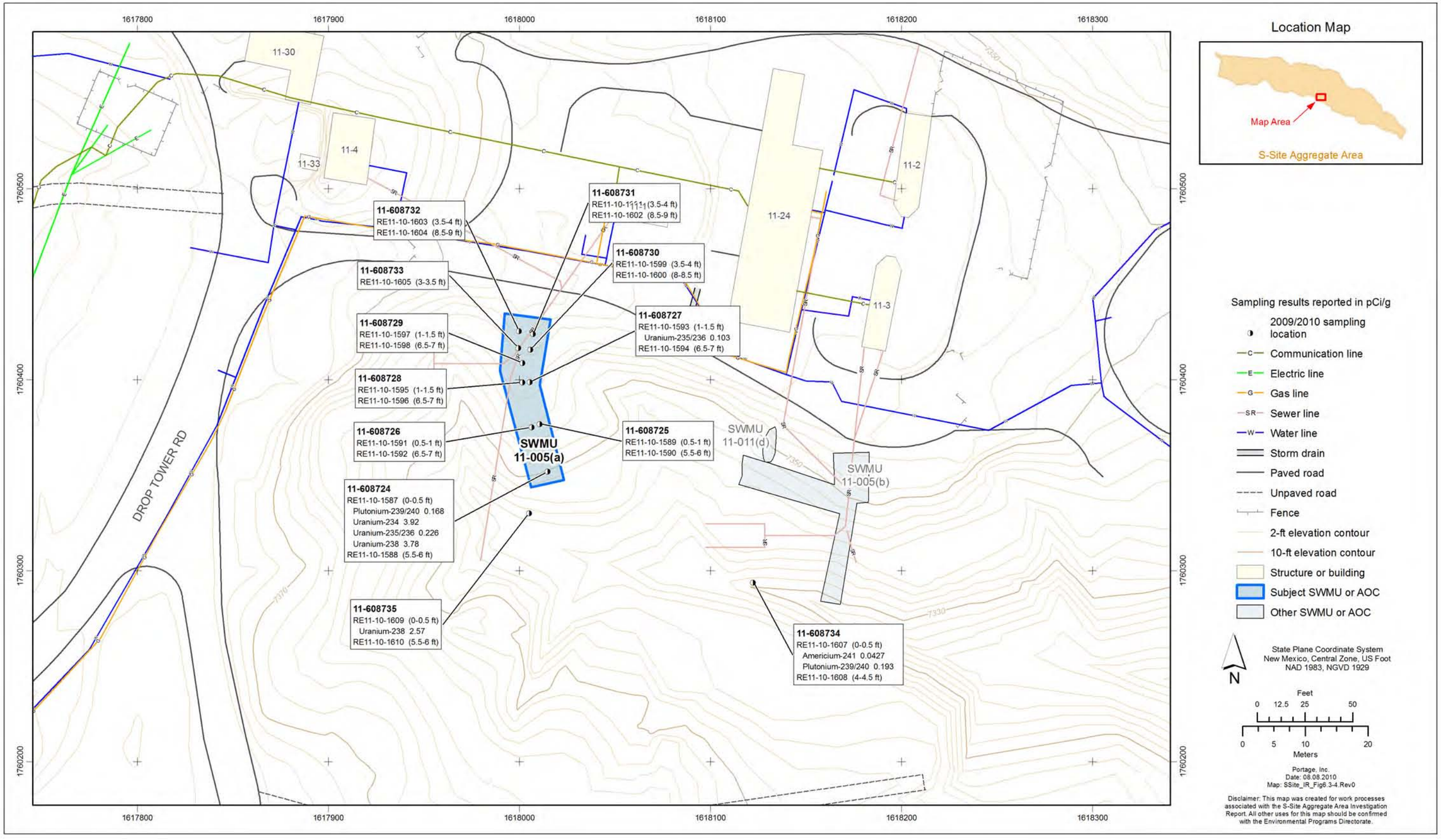


Figure 6.3-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-005(a)

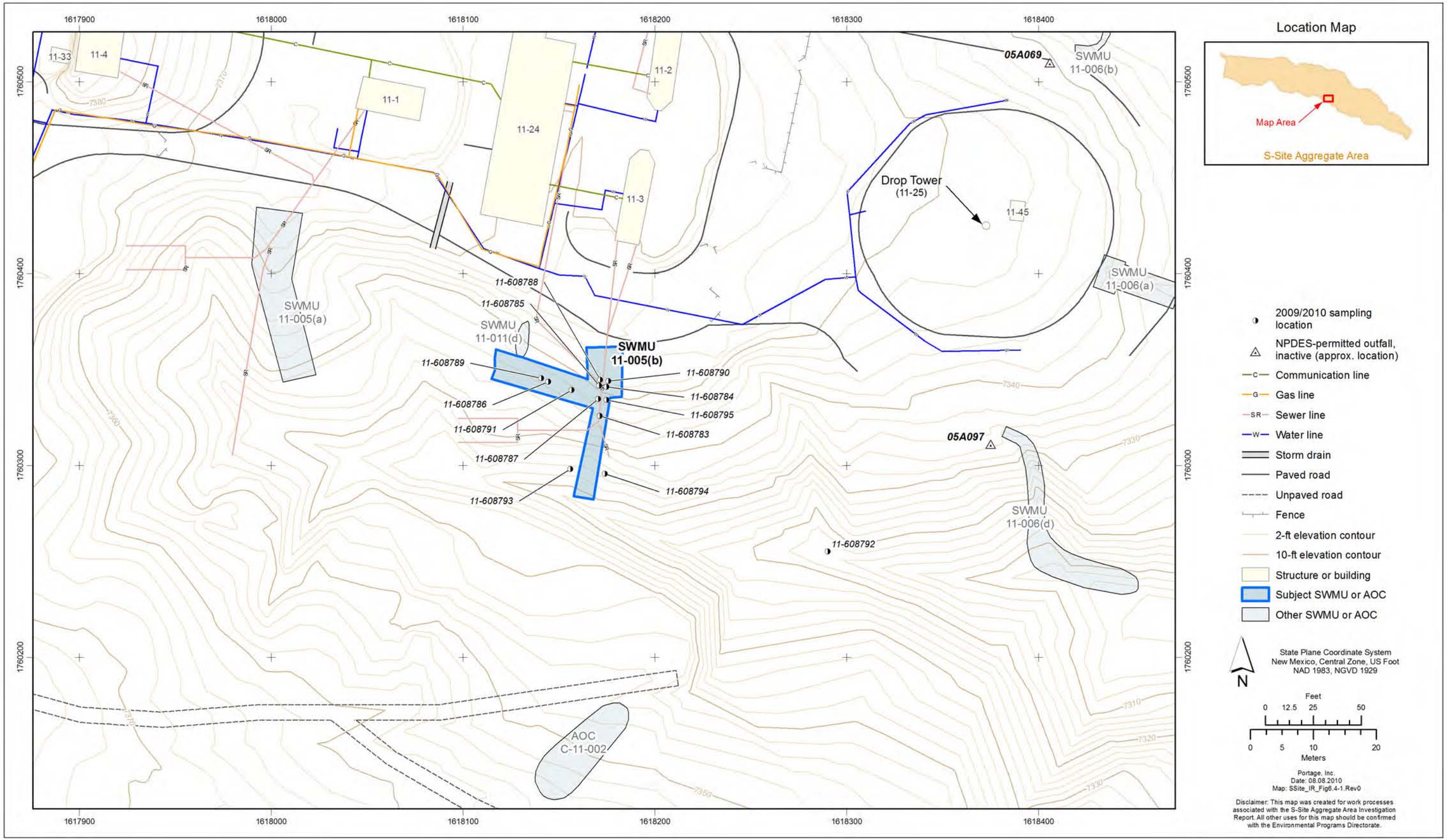


Figure 6.4-1 Locations sampled for SWMU 11-005(b)

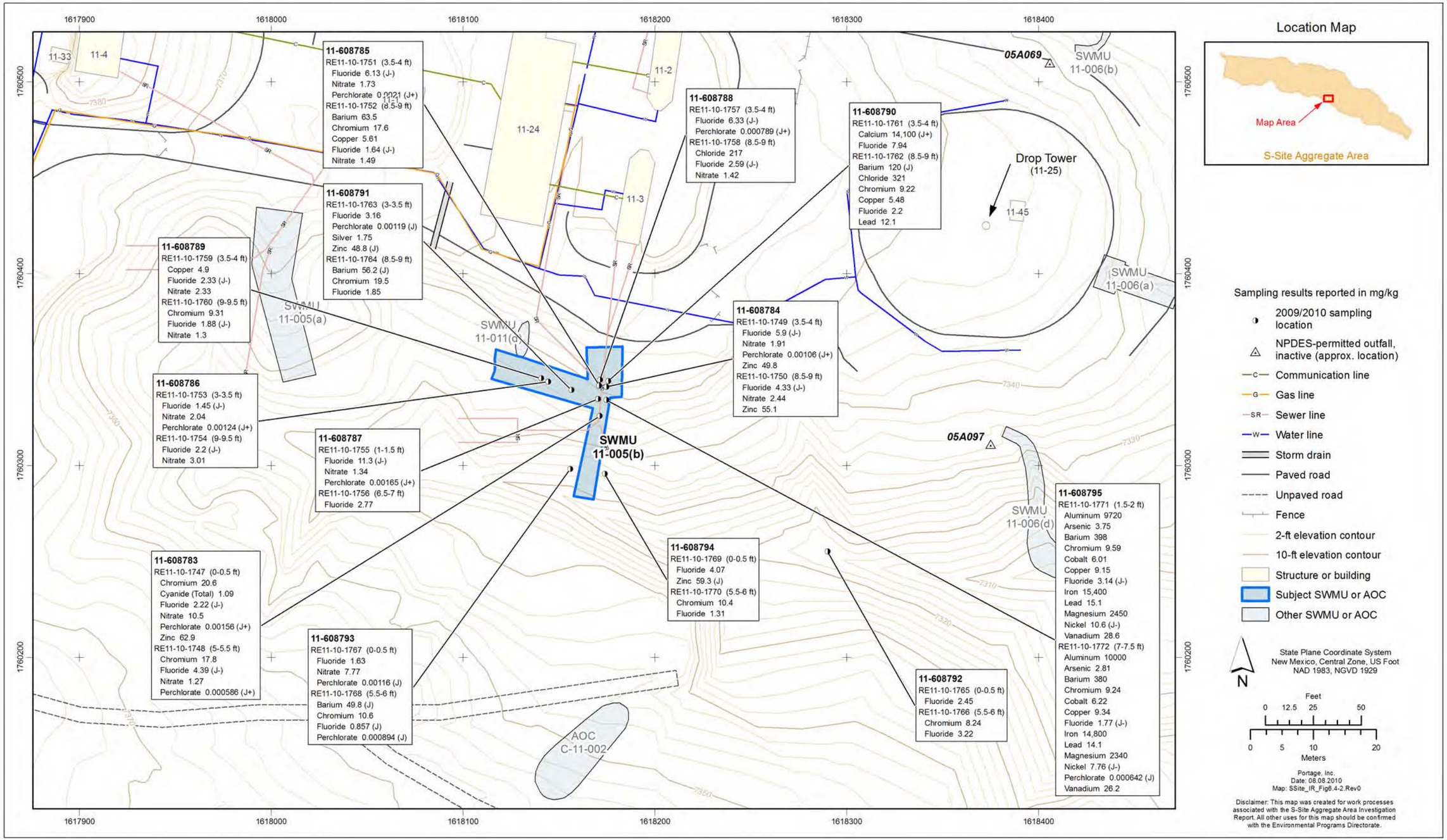


Figure 6.4-2 Inorganic chemicals detected above BVs at SWMU 11-005(b)

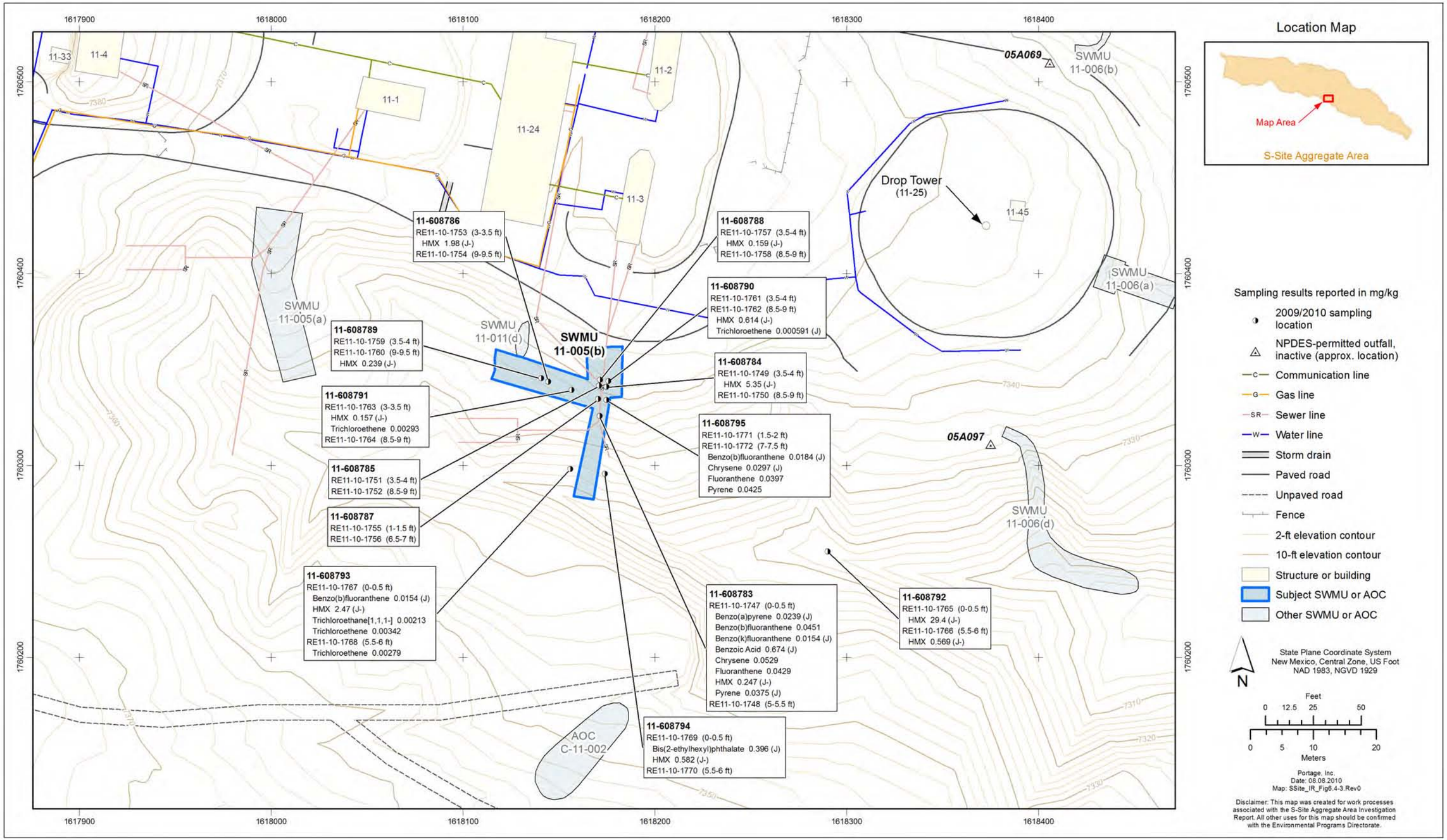


Figure 6.4-3 Organic chemicals detected in samples at SWMU 11-005(b)

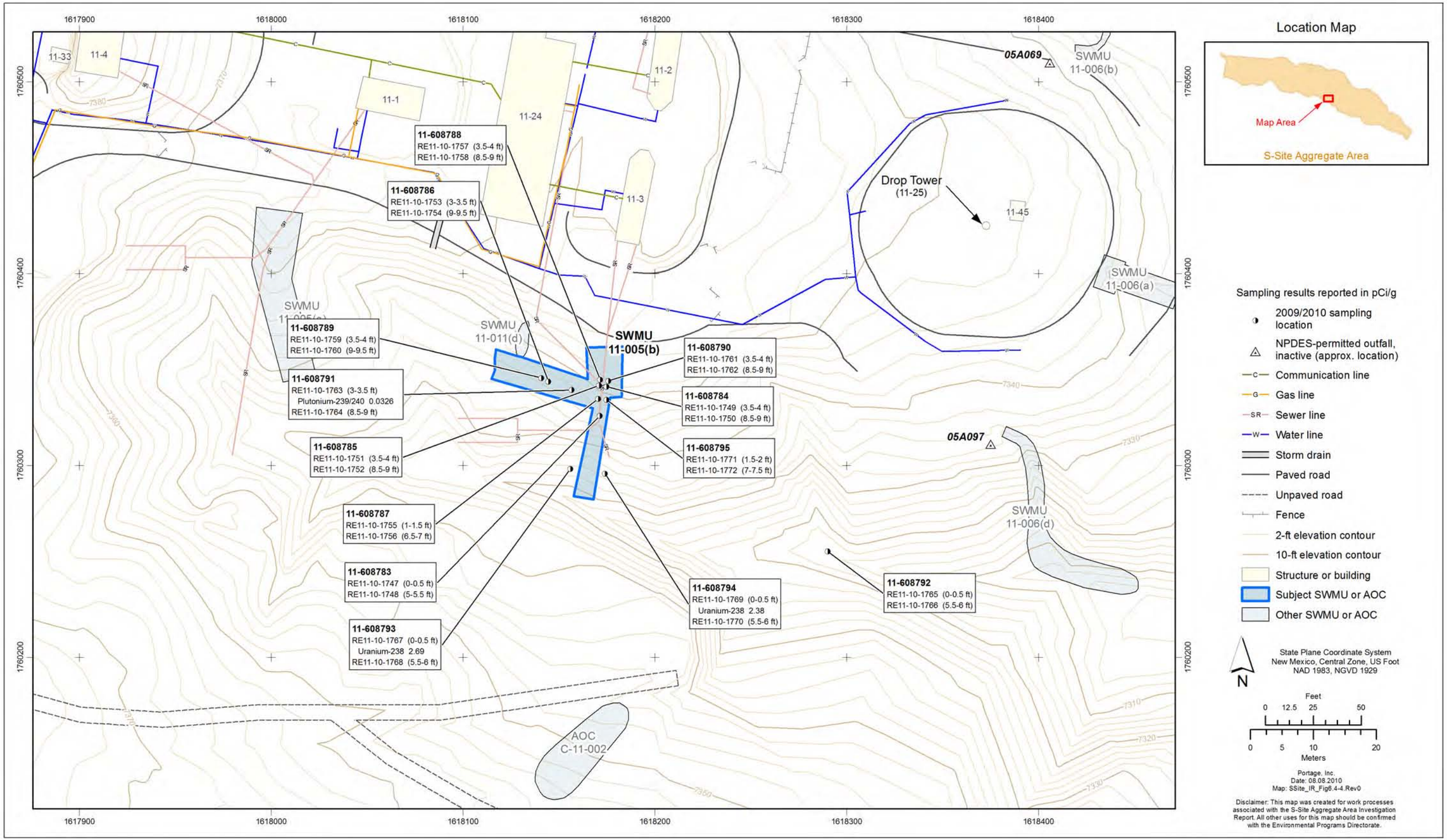


Figure 6.4-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-005(b)

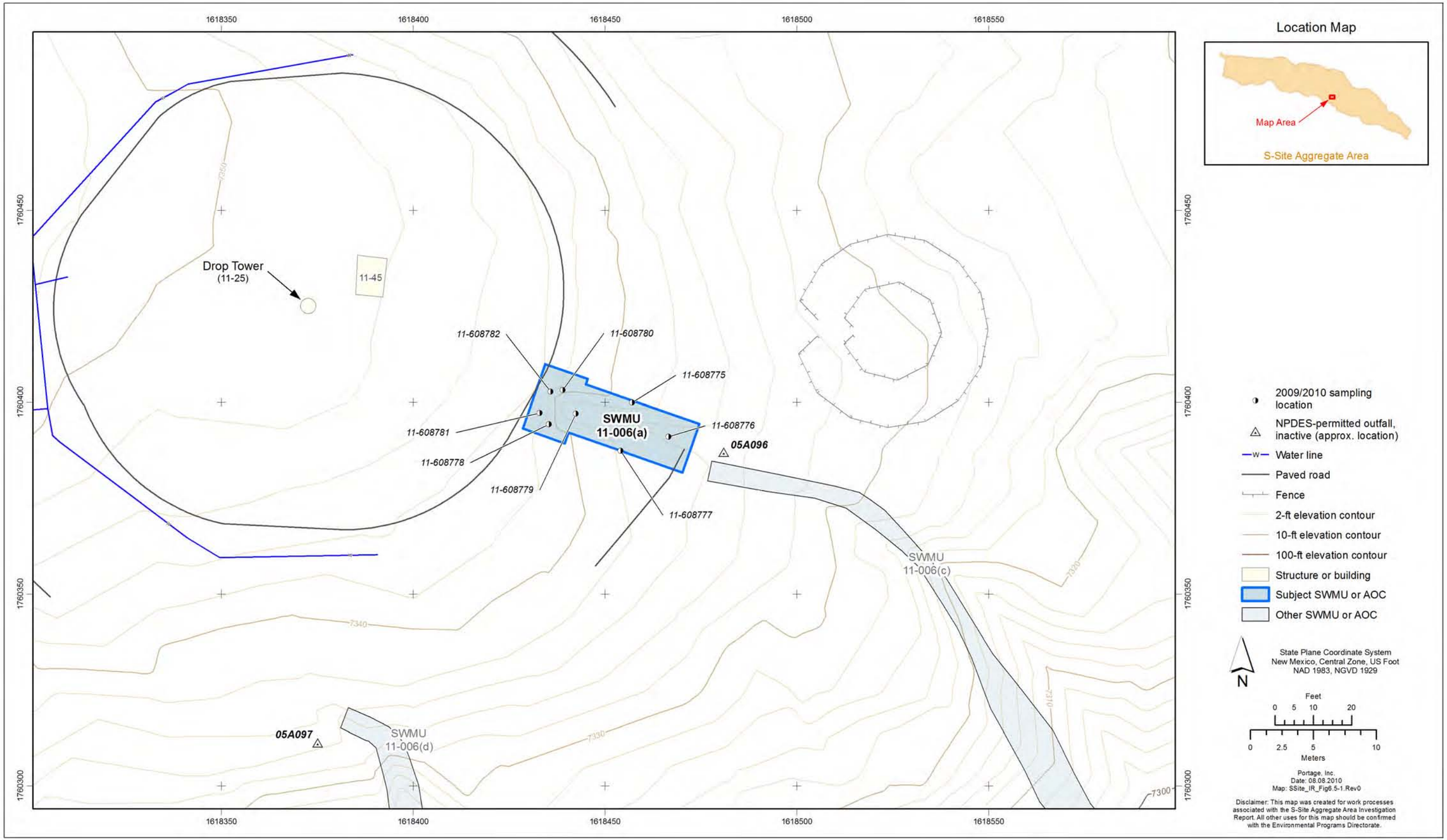


Figure 6.5-1 Locations sampled for SWMU 11-006(a)

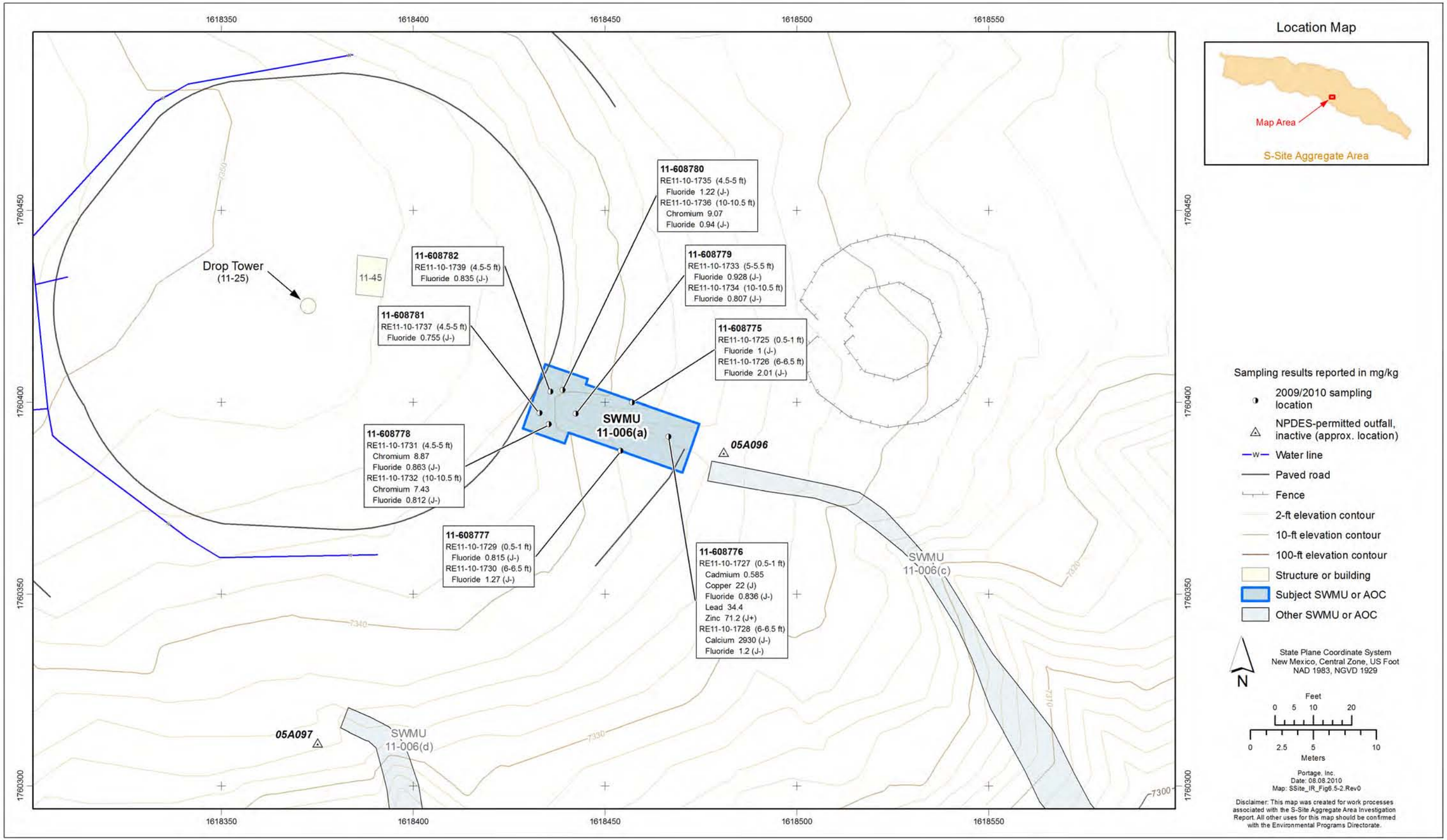


Figure 6.5-2 Inorganic chemicals detected above BVs at SWMU 11-006(a)

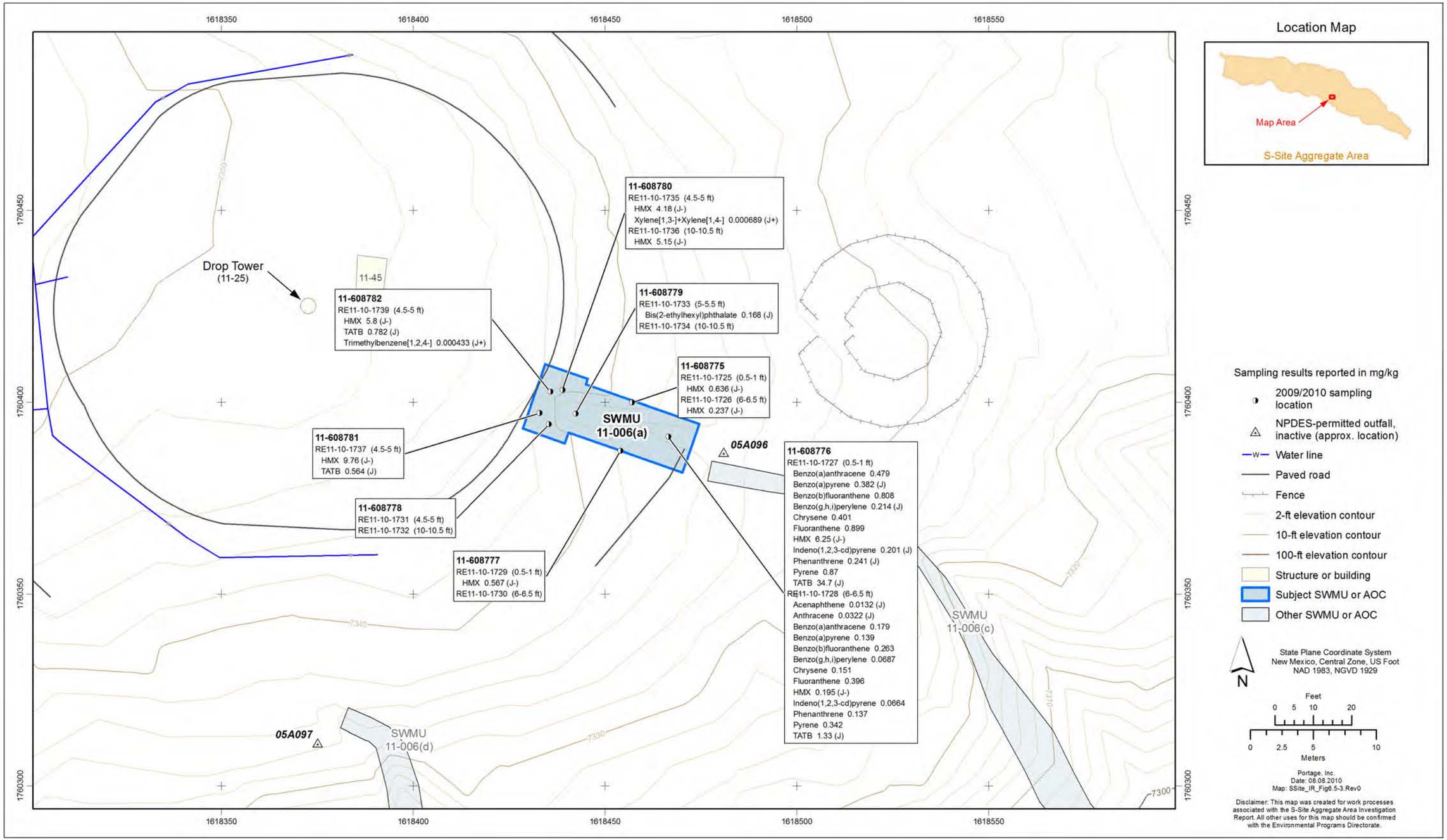


Figure 6.5-3 Organic chemicals detected in samples at SWMU 11-006(a)

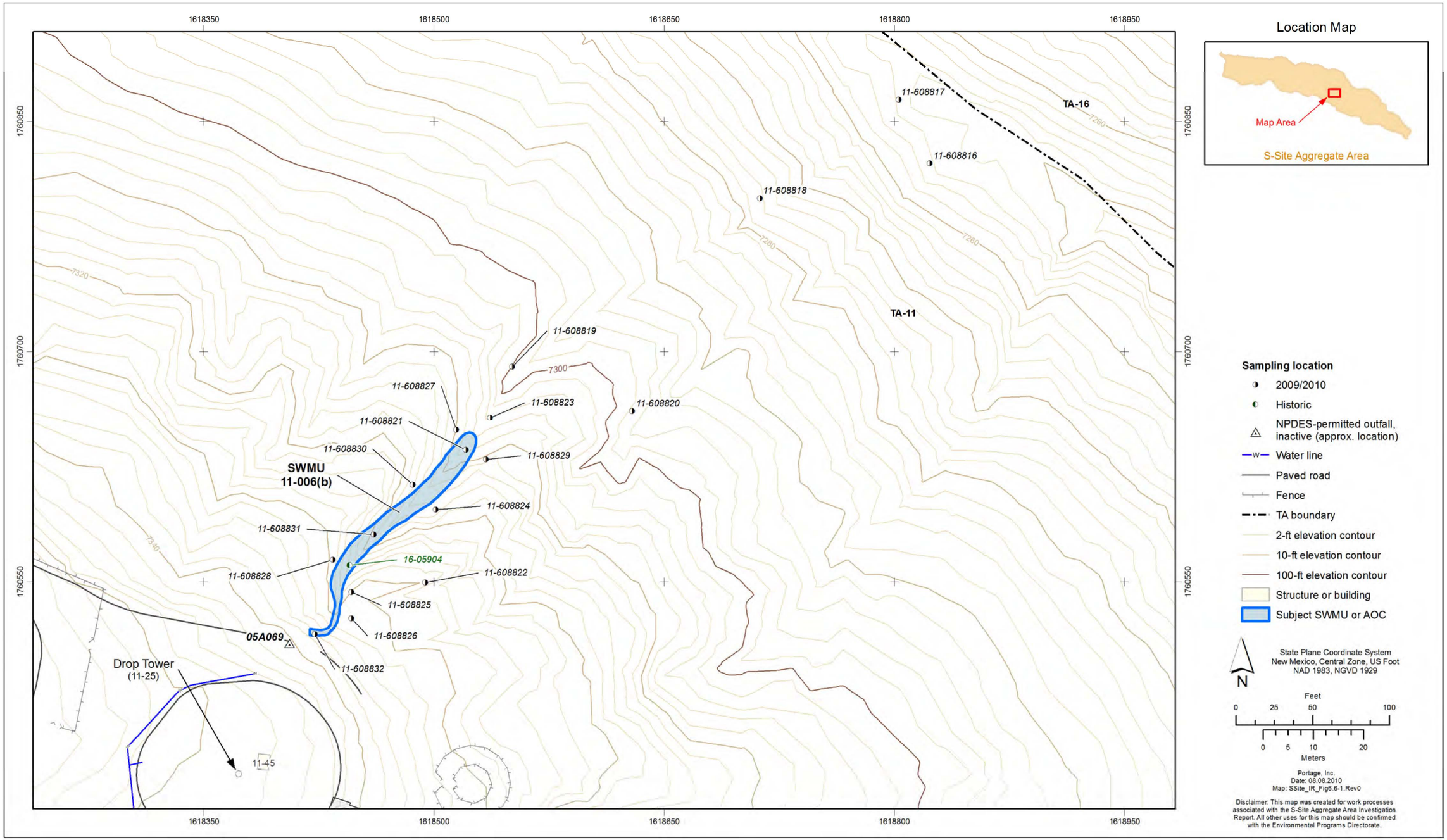


Figure 6.6-1 Locations sampled for SWMU 11-006(b)

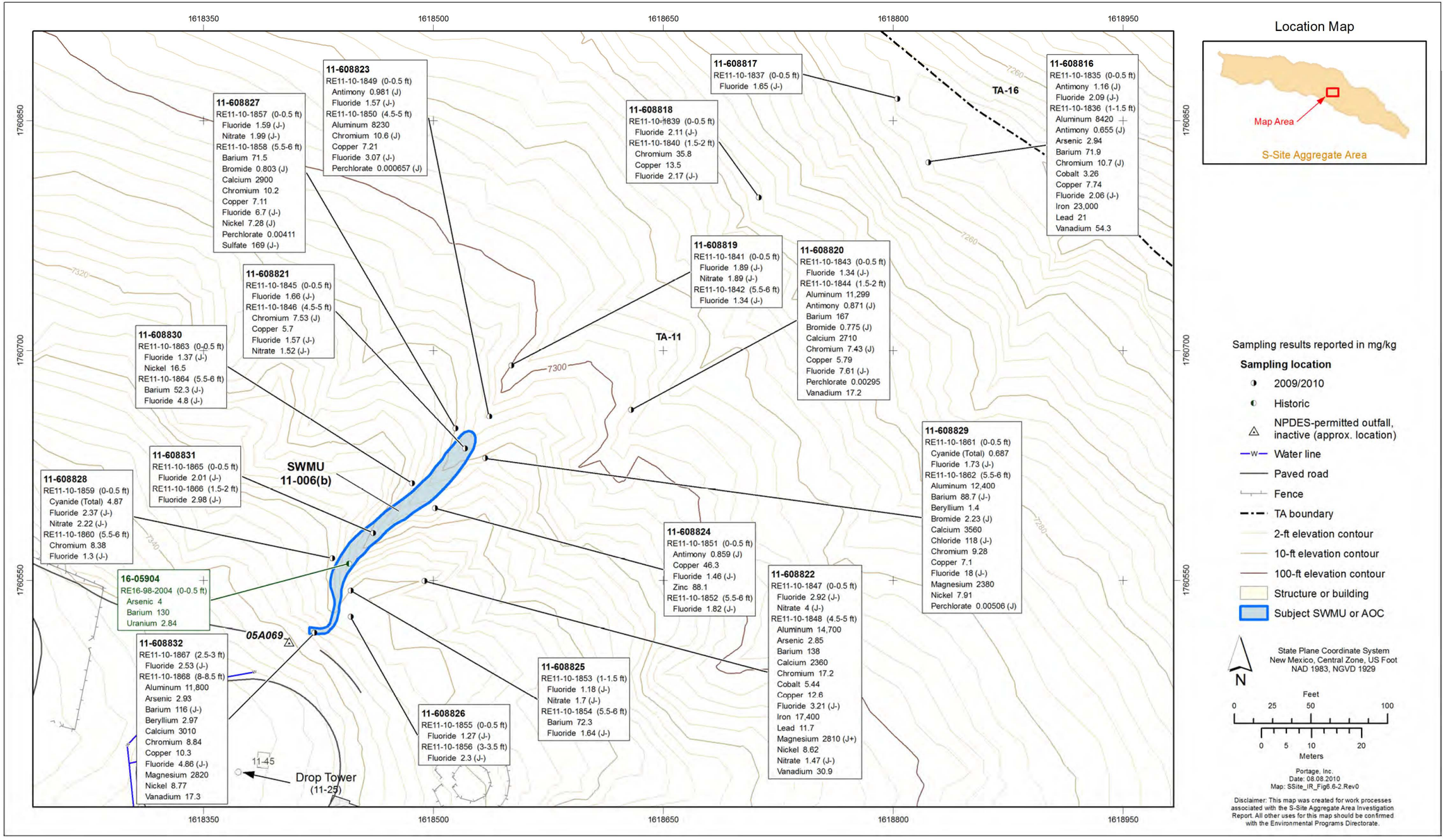


Figure 6.6-2 Inorganic chemicals detected above BVs at SWMU 11-006(b)

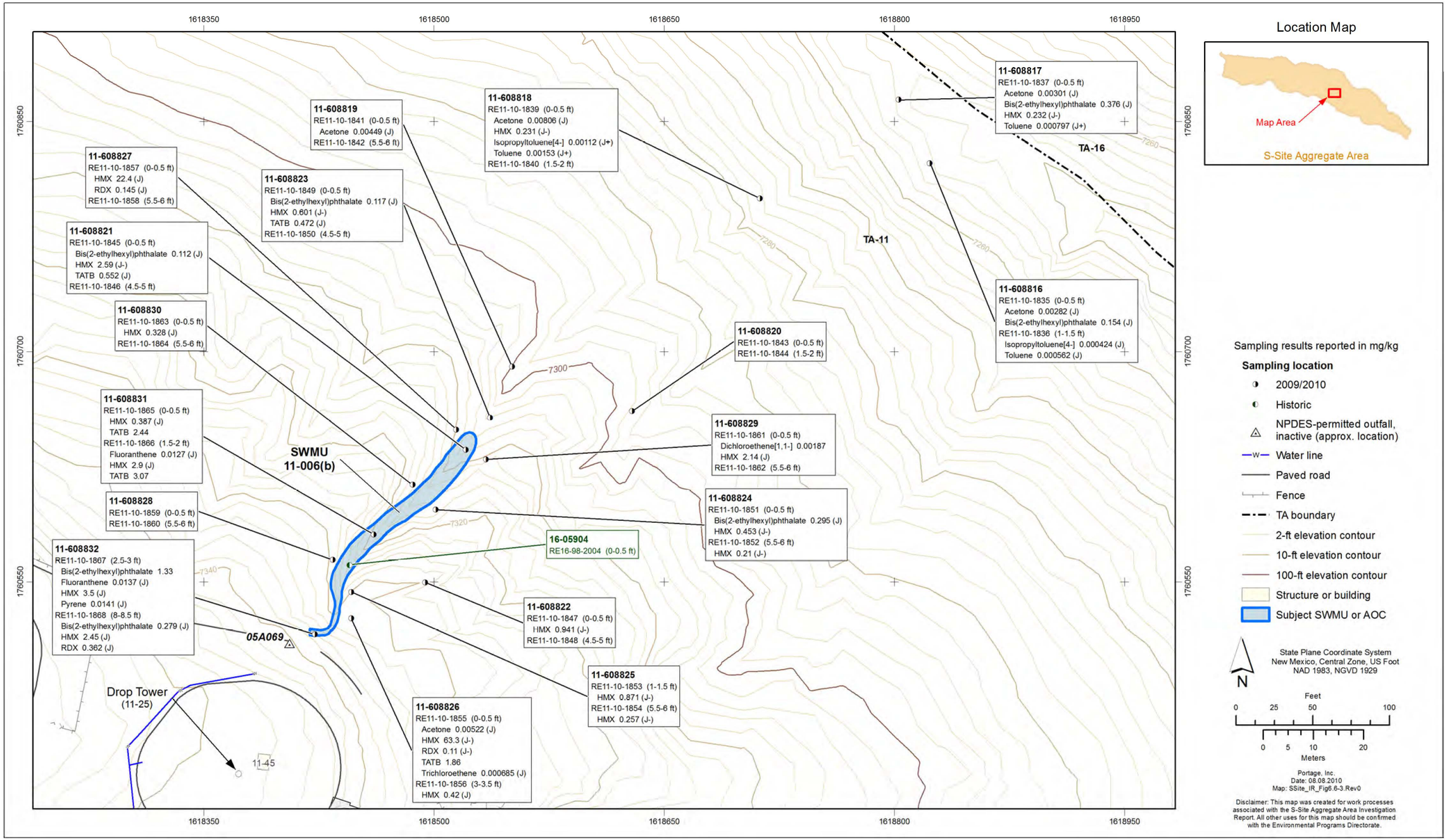


Figure 6.6-3 Organic chemicals detected in samples at SWMU 11-006(b)

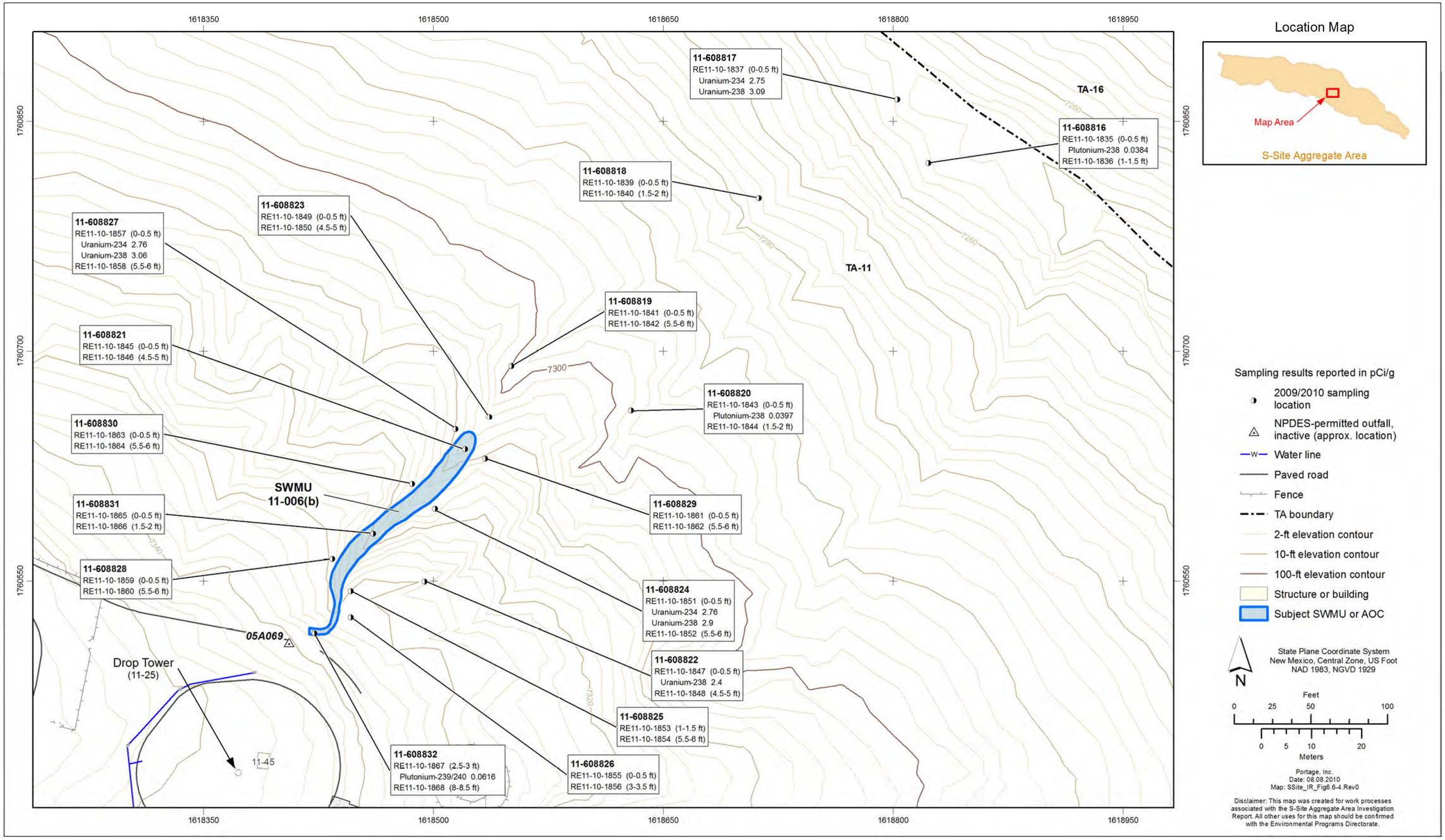


Figure 6.6-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-006(b)

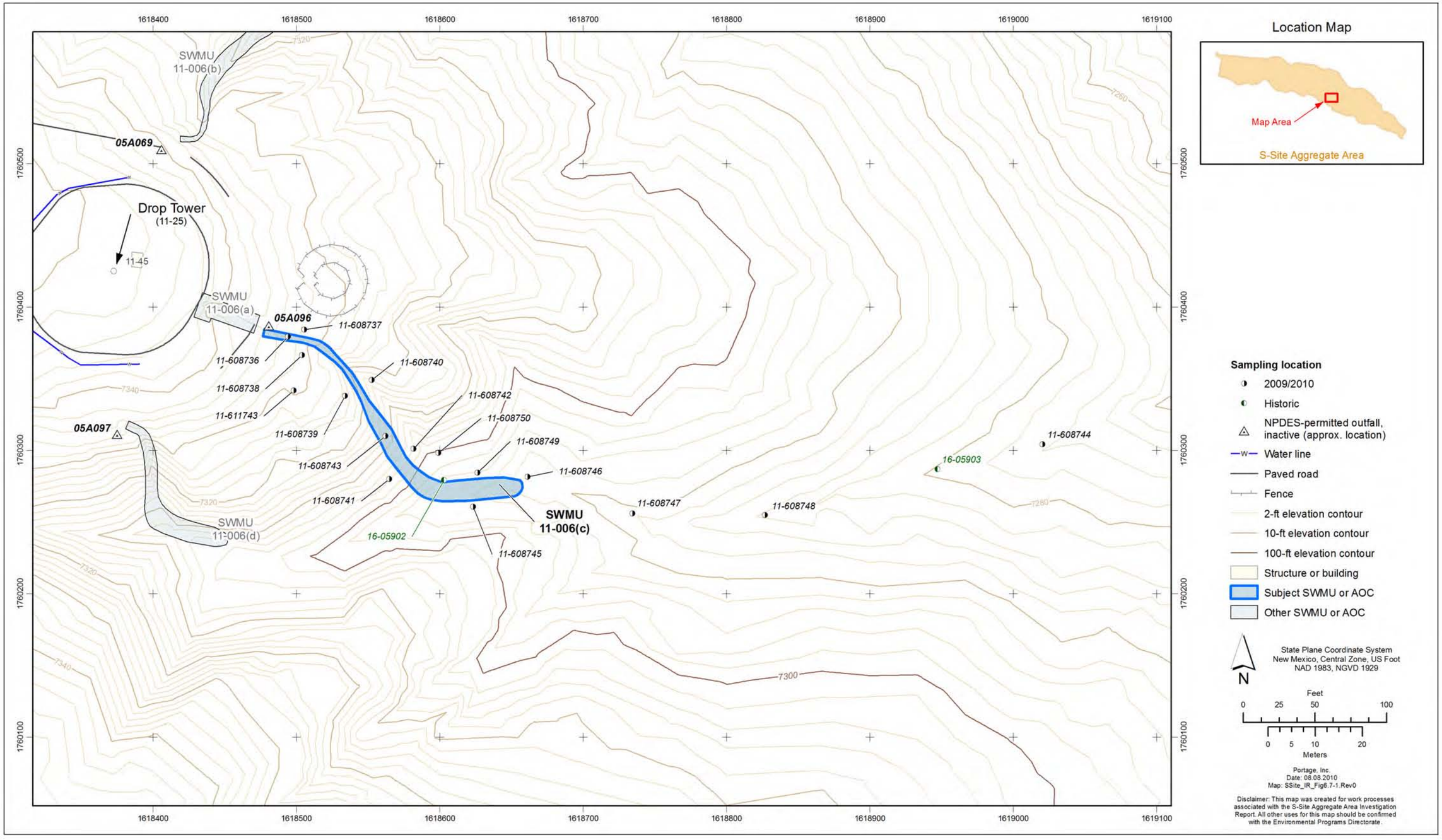


Figure 6.7-1 Locations sampled for SWMU 11-006(c)

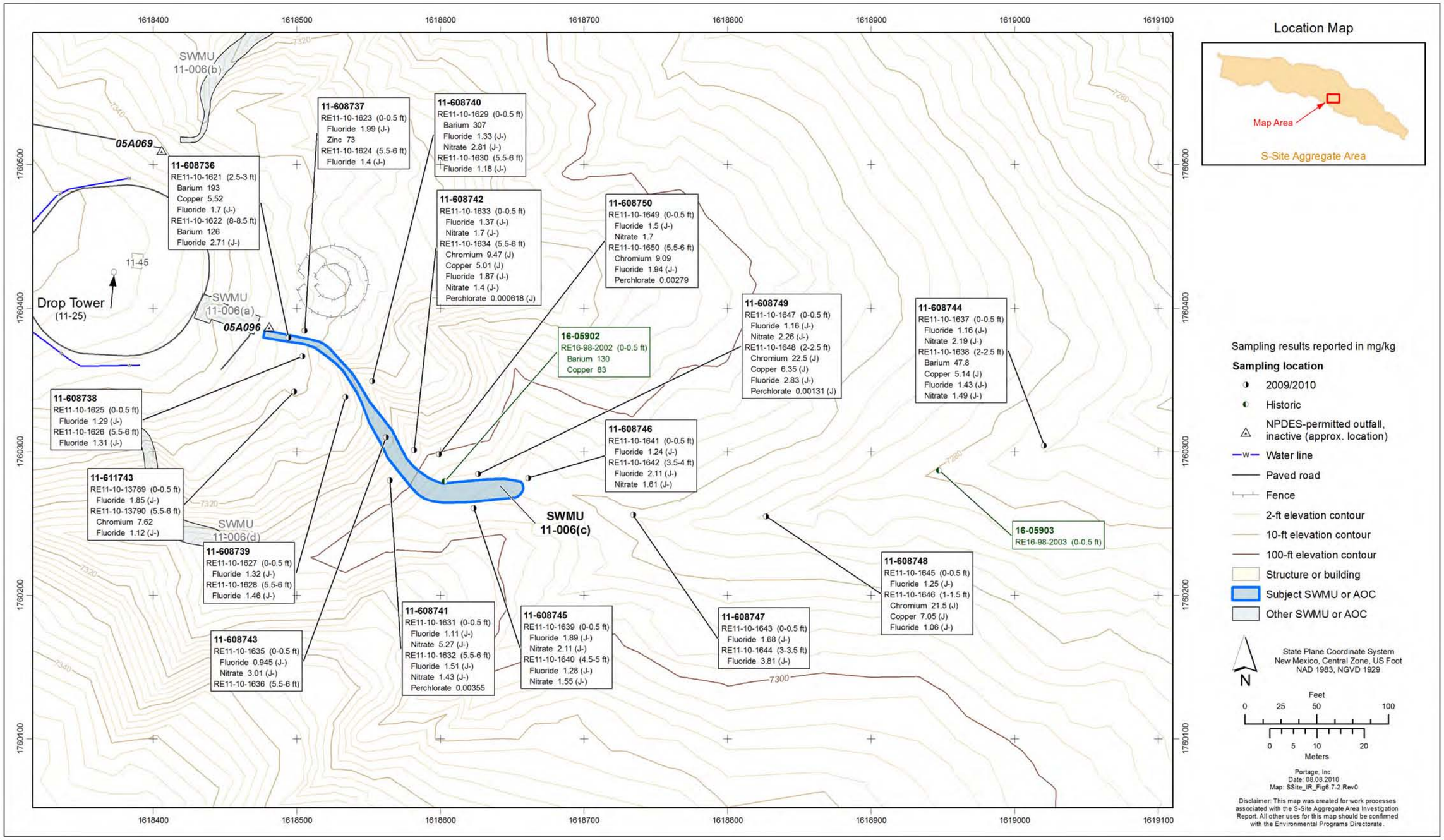


Figure 6.7-2 Inorganic chemicals detected above BVs or detected without BVs at SWMU 11-006(c)

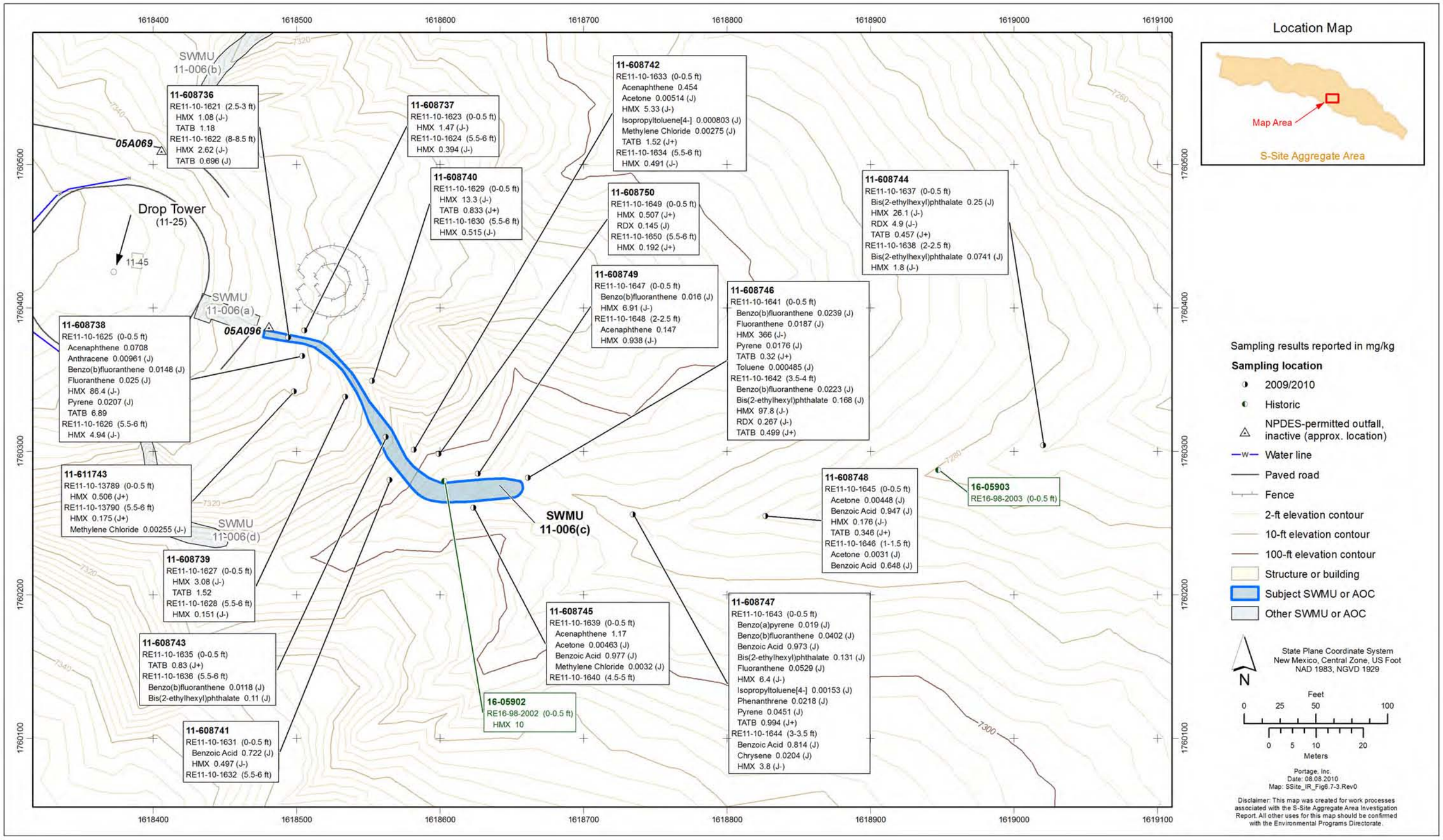


Figure 6.7-3 Organic chemicals detected in samples at SWMU 11-006(c)

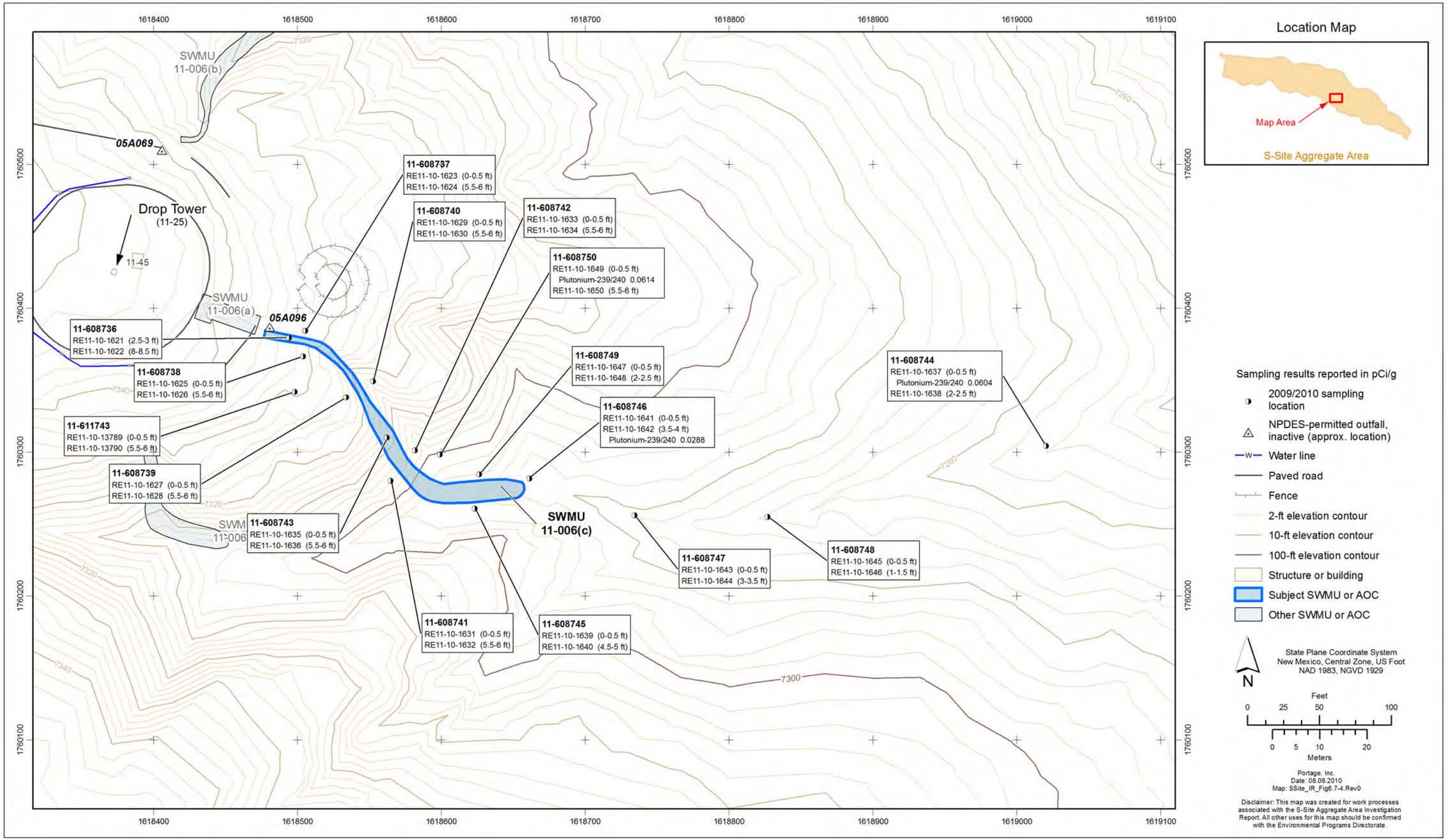


Figure 6.7-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-006(c)

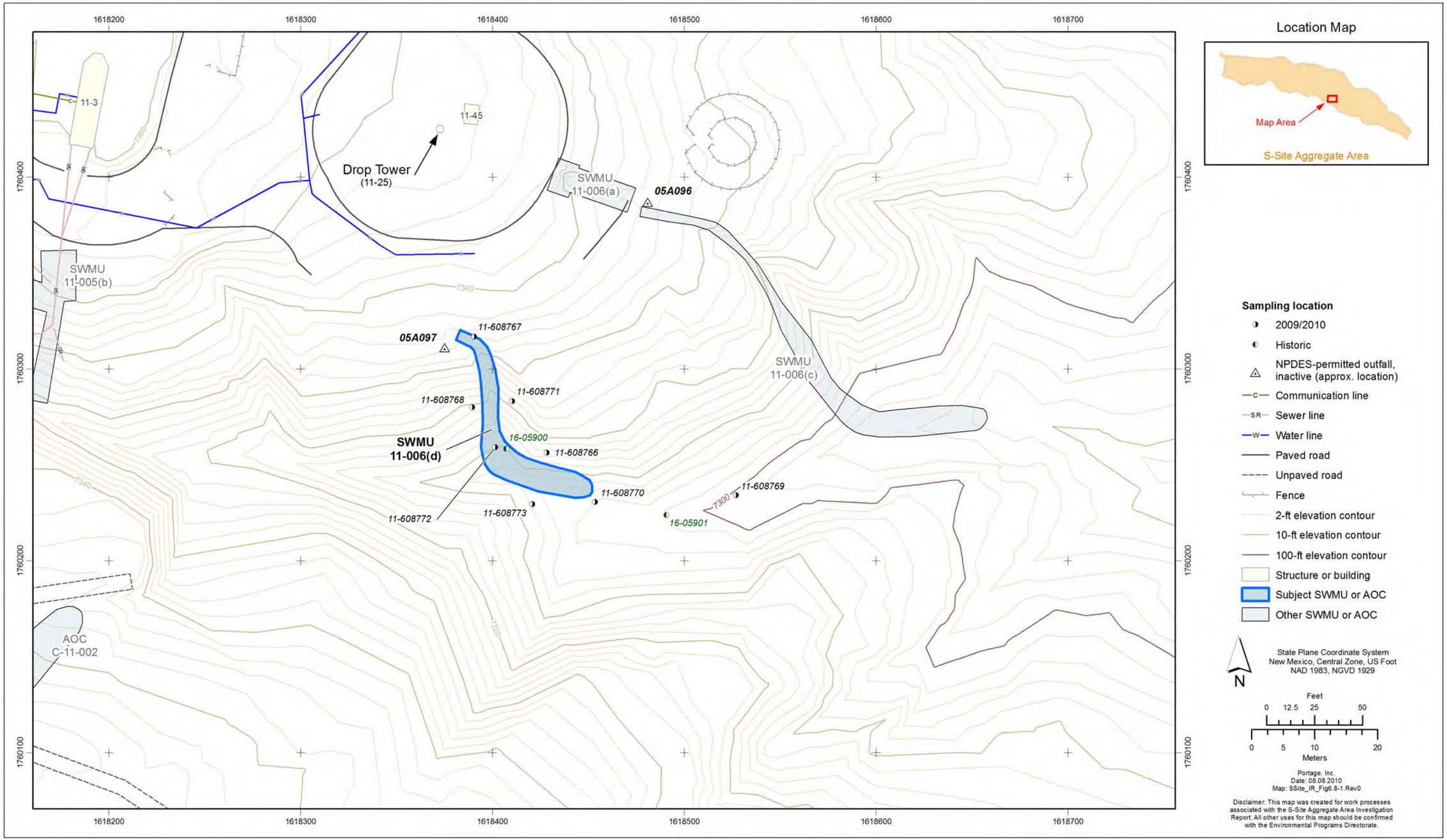


Figure 6.8-1 Locations sampled for SWMU 11-006(d)

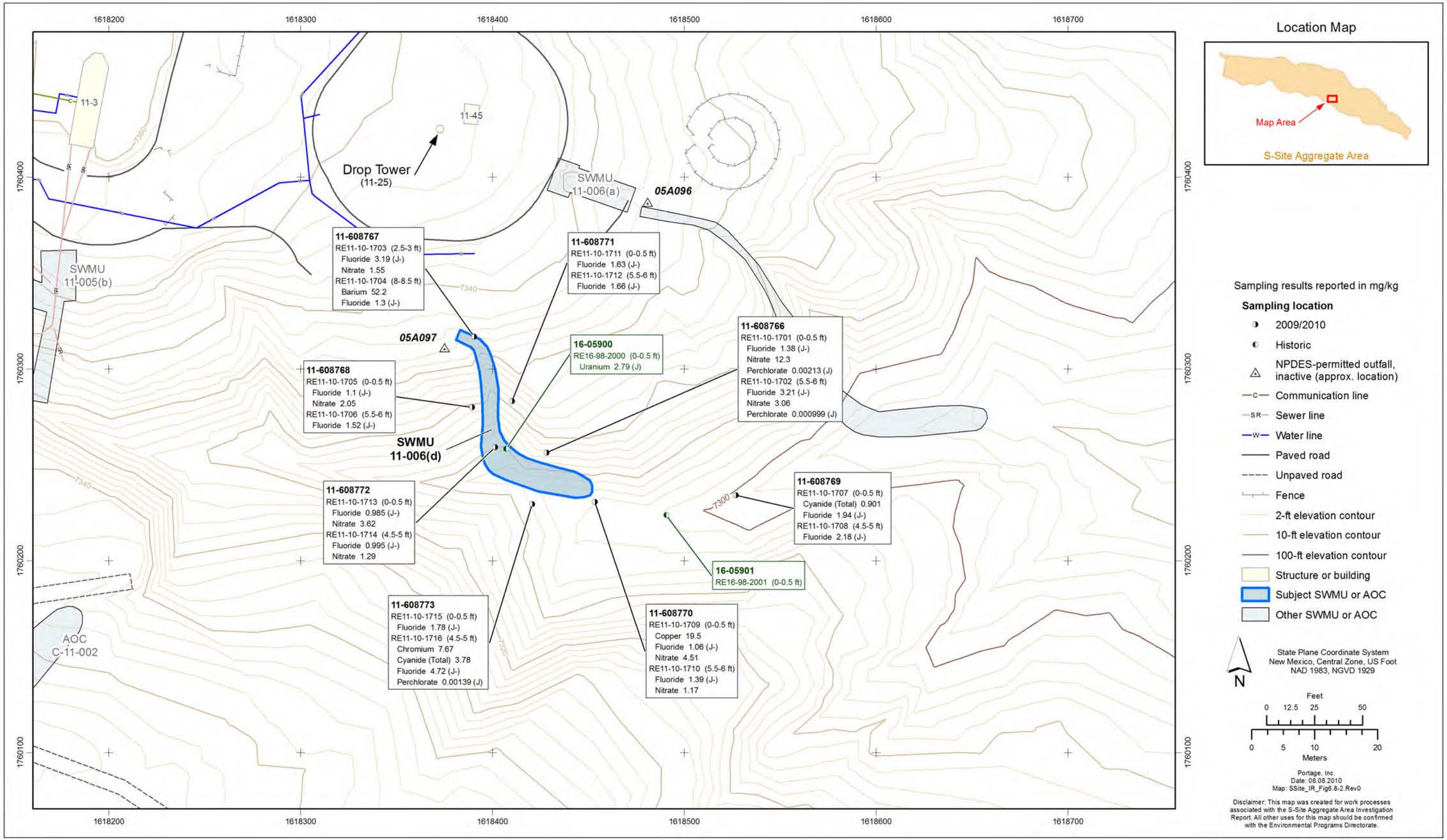


Figure 6.8-2 Inorganic chemicals detected above BVs at SWMU 11-006(d)

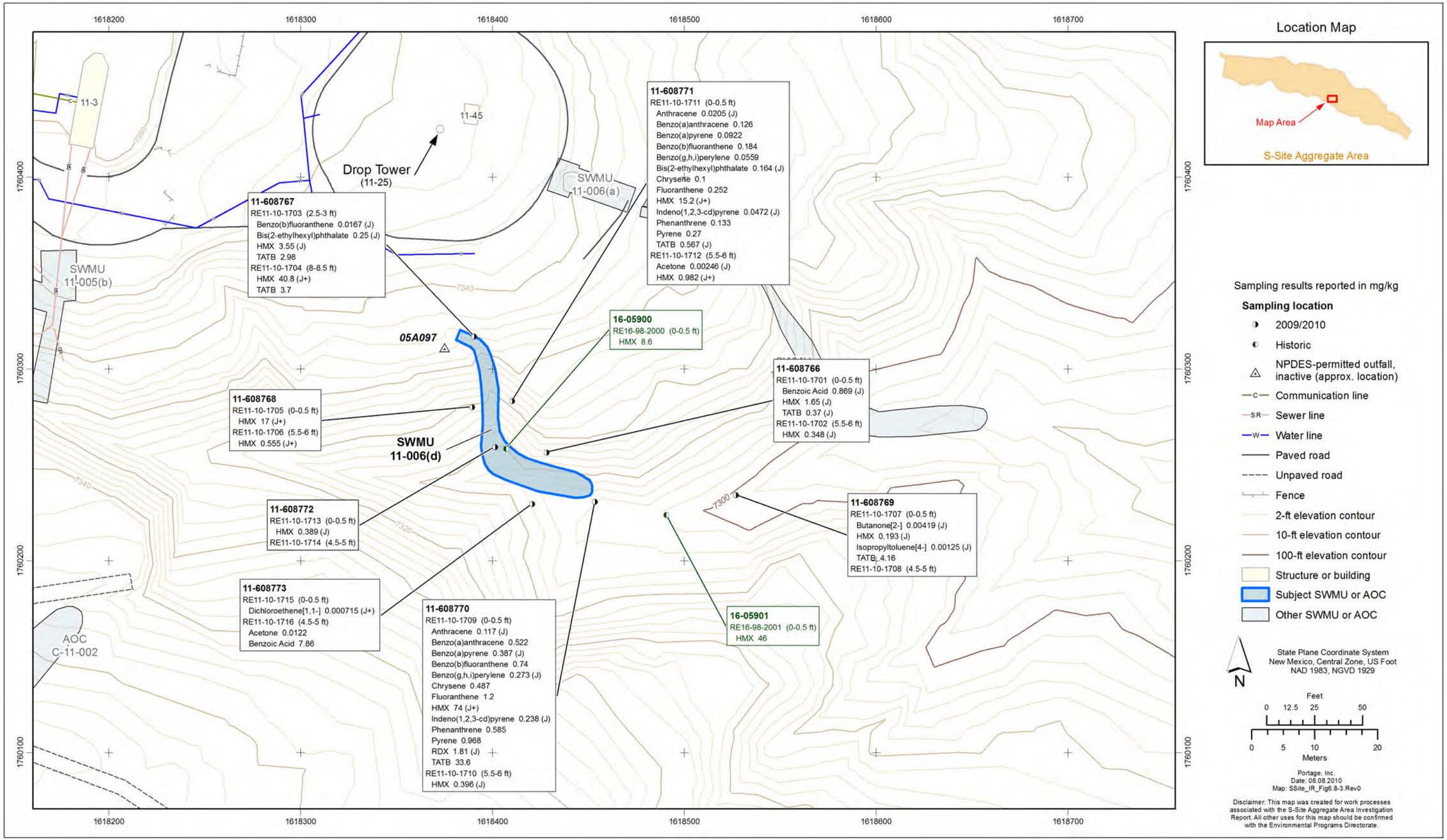


Figure 6.8-3 Organic chemicals detected in samples at SWMU 11-006(d)

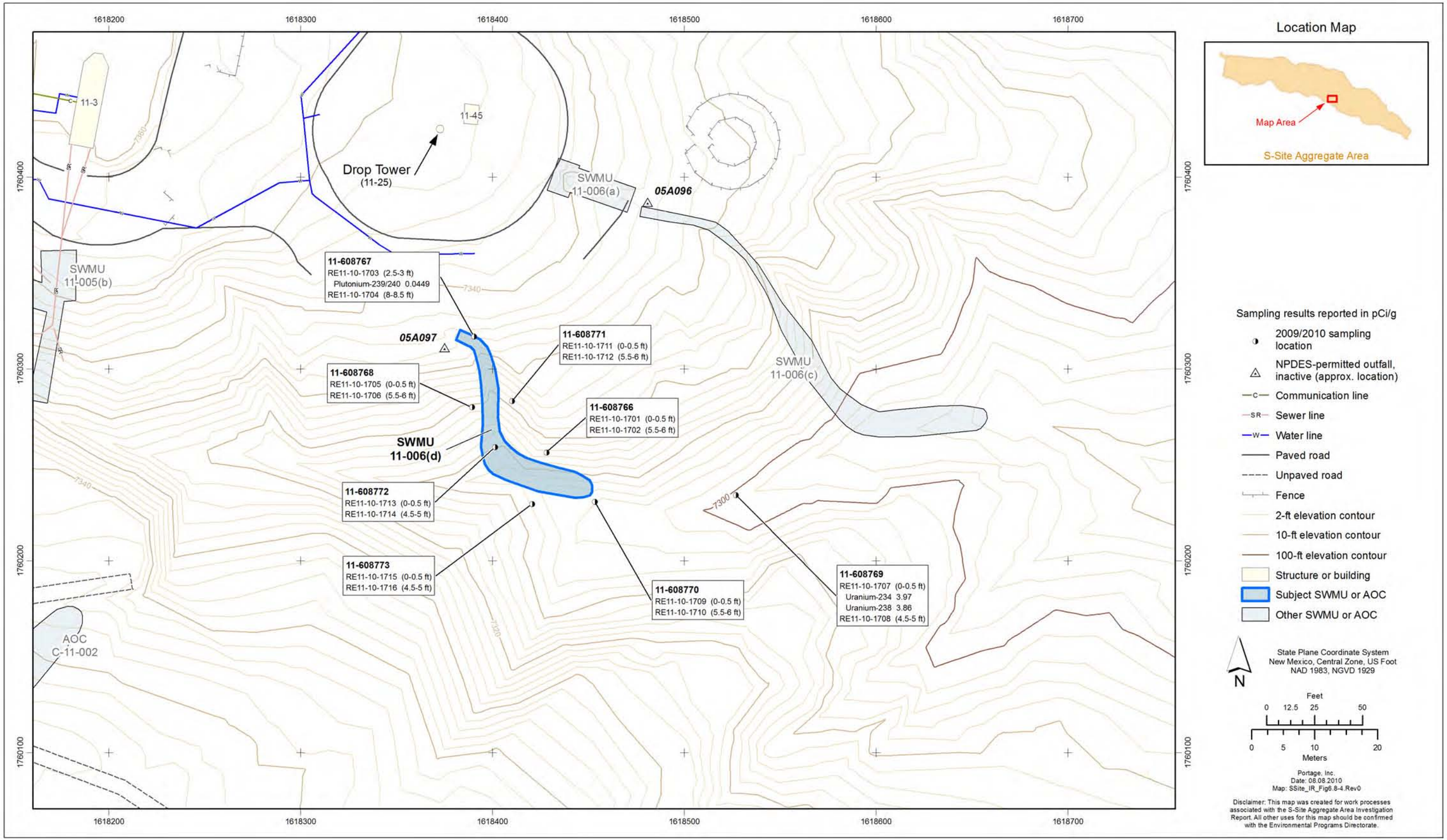


Figure 6.8-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-006(d)

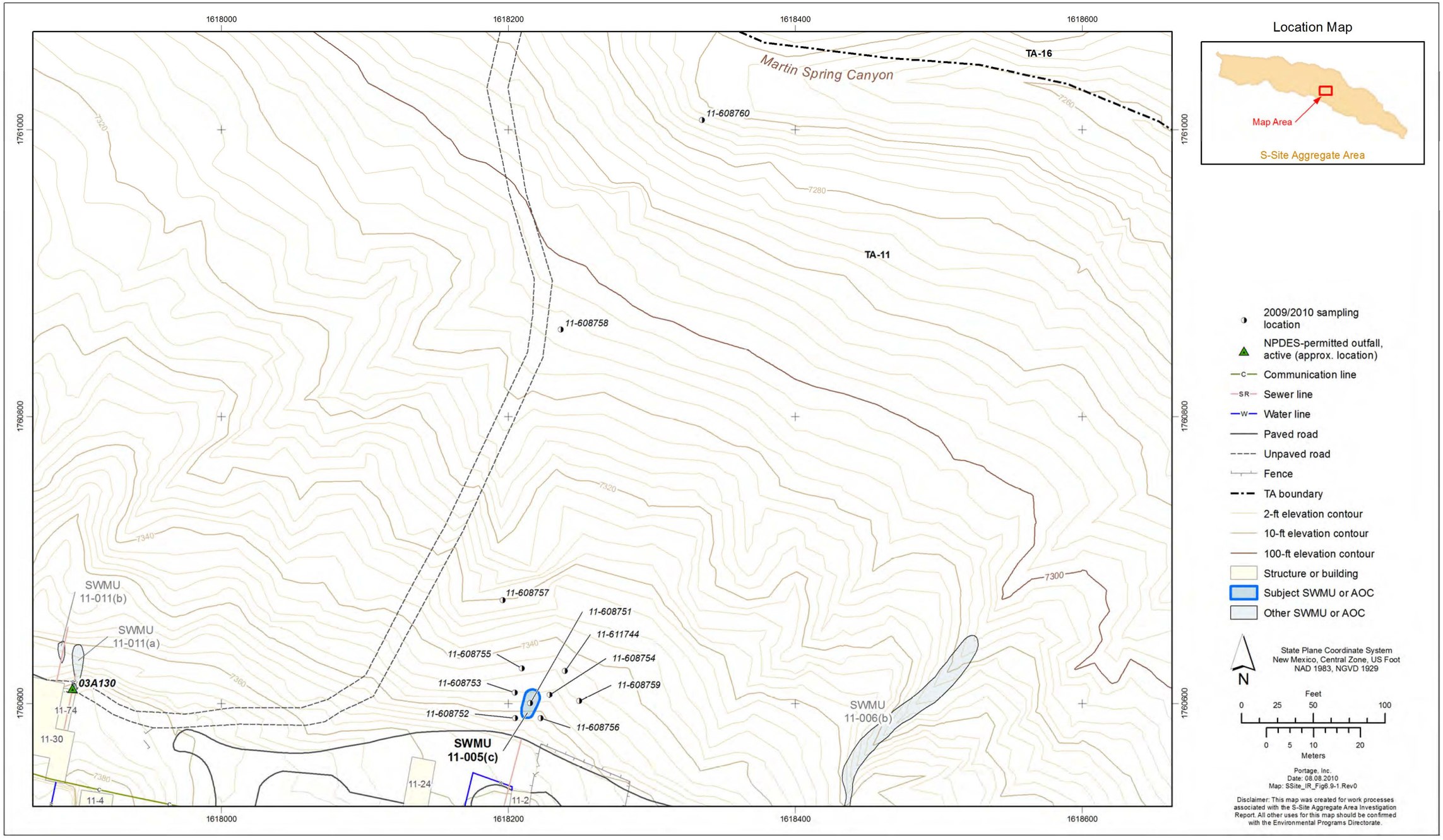


Figure 6.9-1 Locations sampled for SWMU 11-005(c)

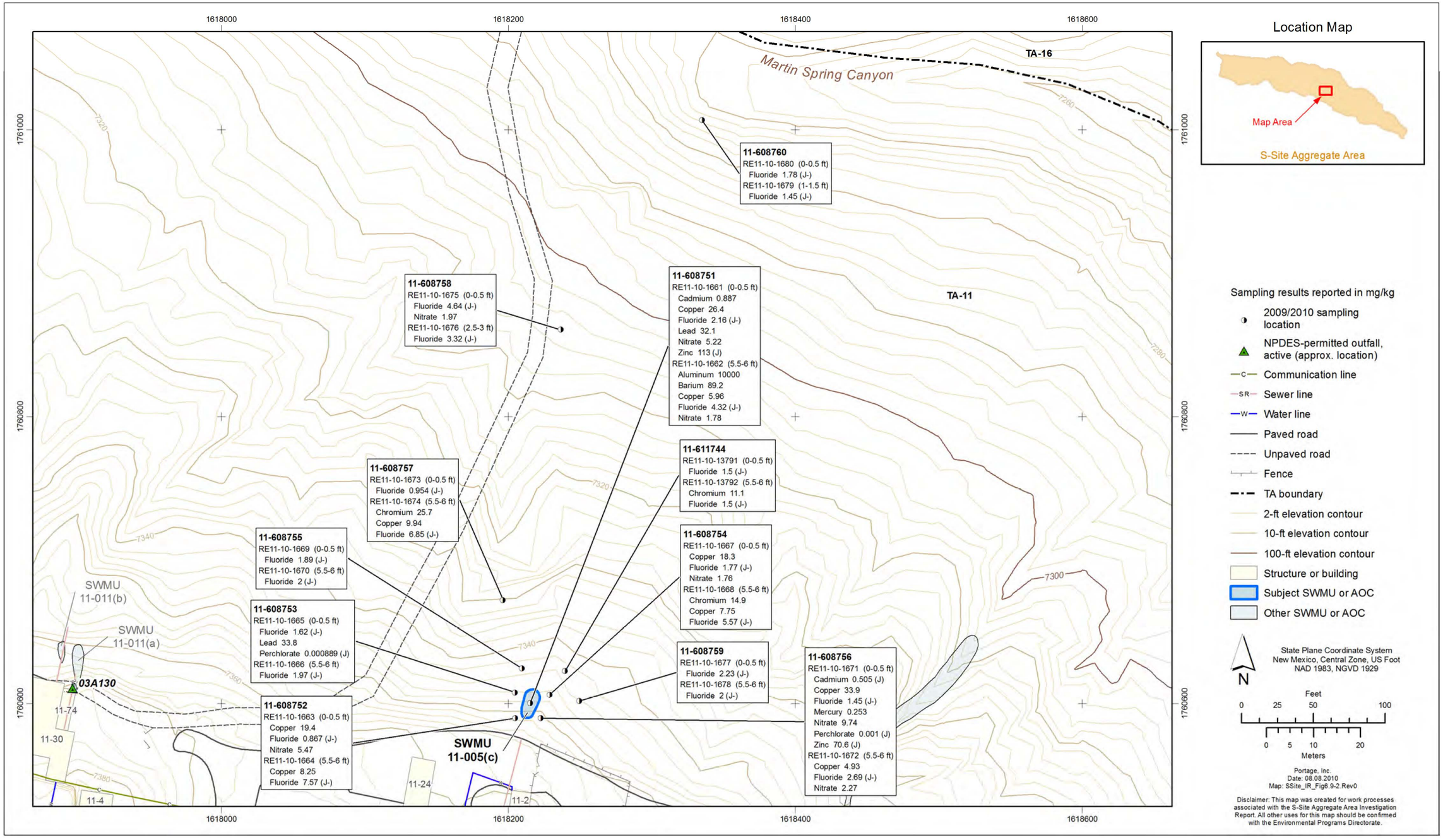


Figure 6.9-2 Inorganic chemicals detected above BVs at SWMU 11-005(c)

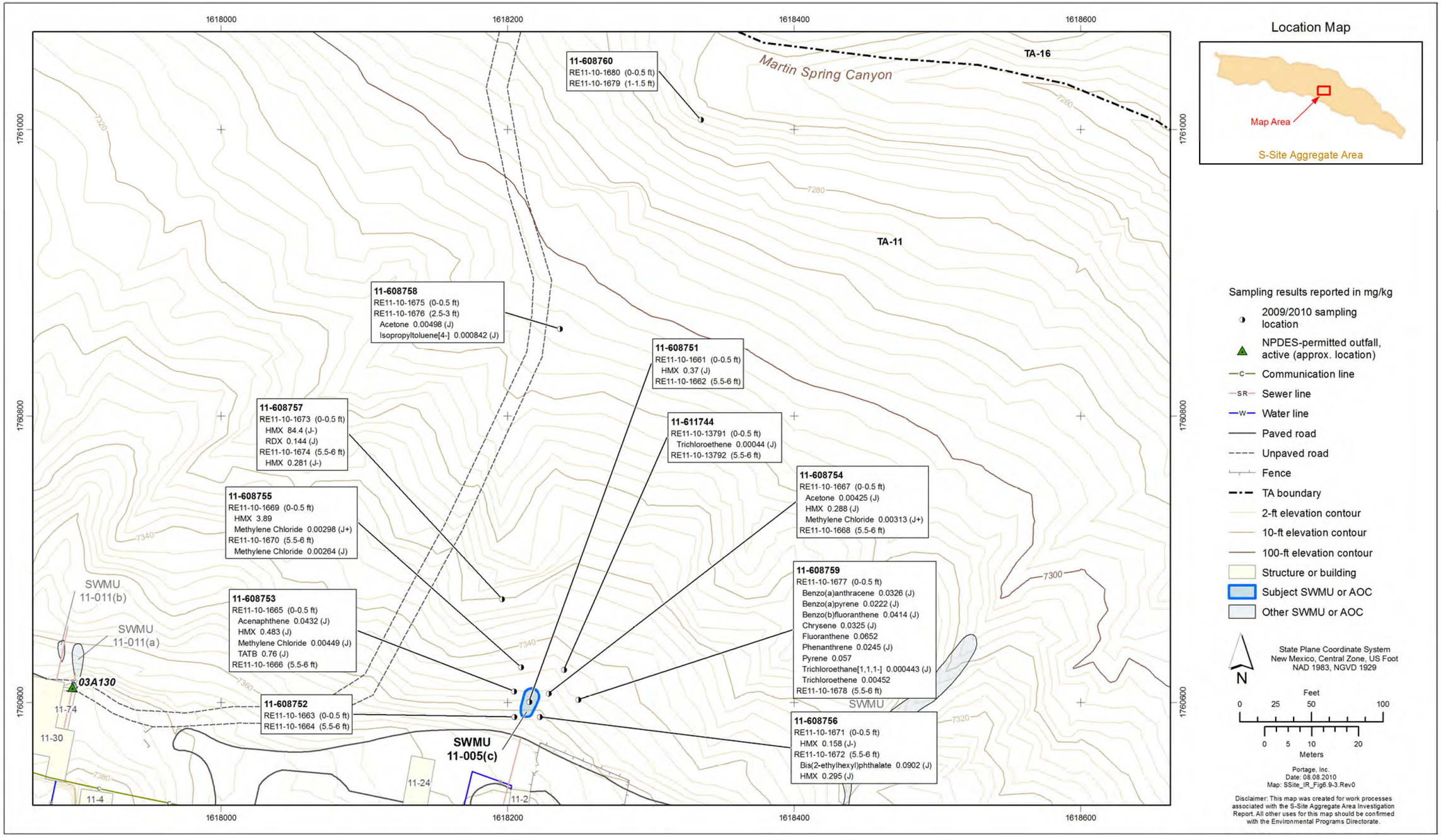


Figure 6.9-3 Organic chemicals detected in samples at SWMU 11-005(c)

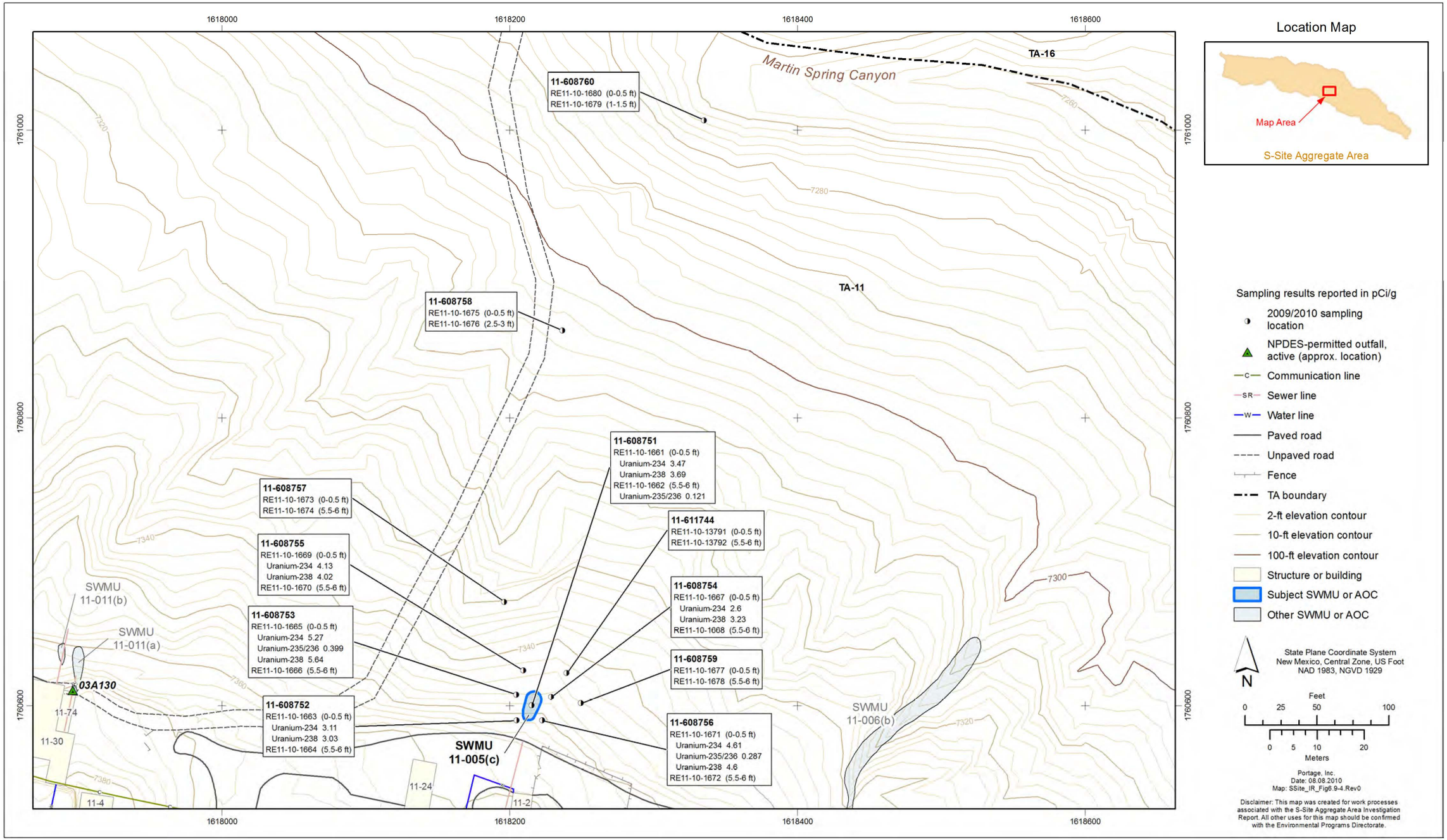


Figure 6.9-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-005(c)

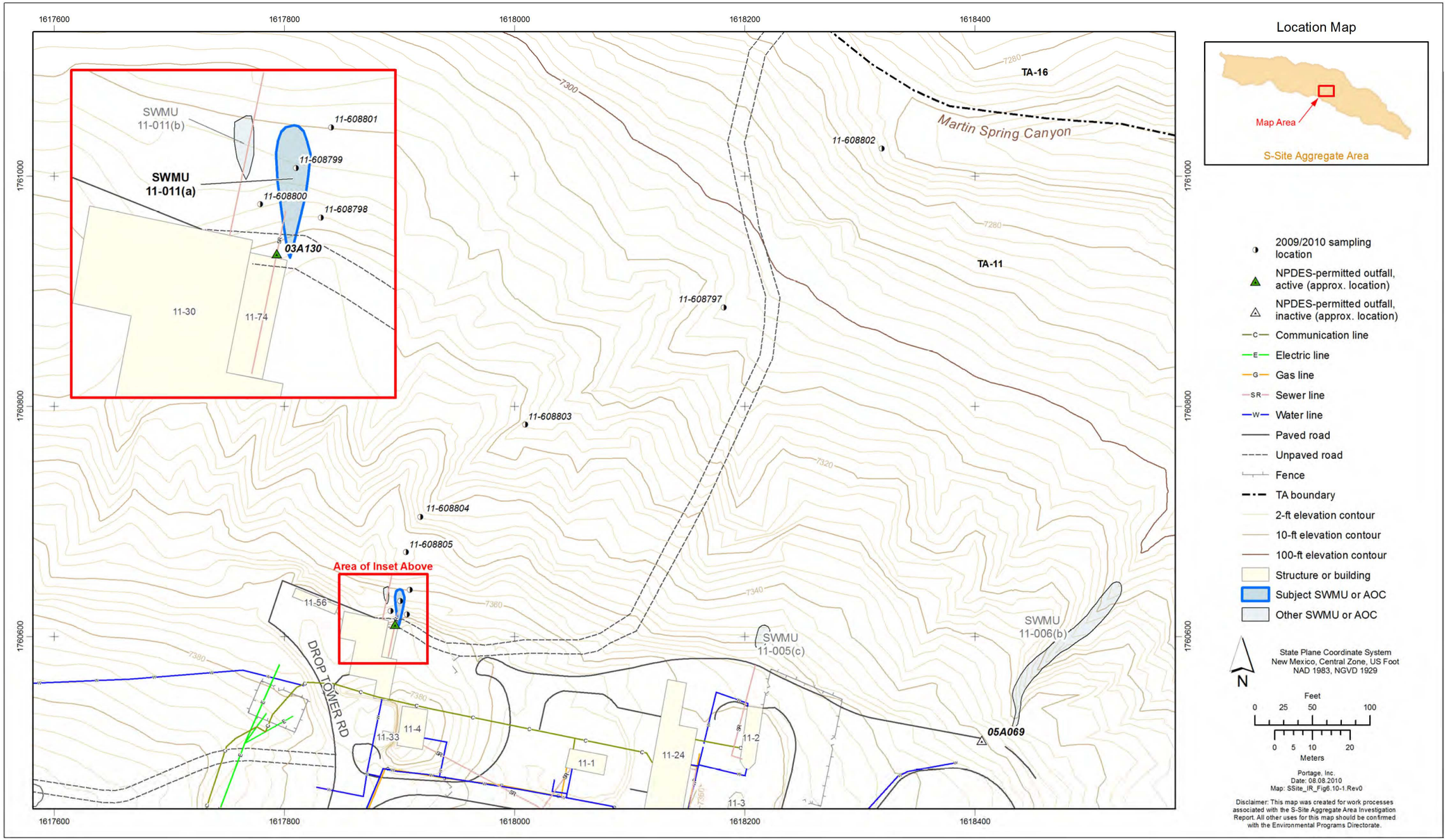


Figure 6.10-1 Locations sampled for SWMU 11-011(a)

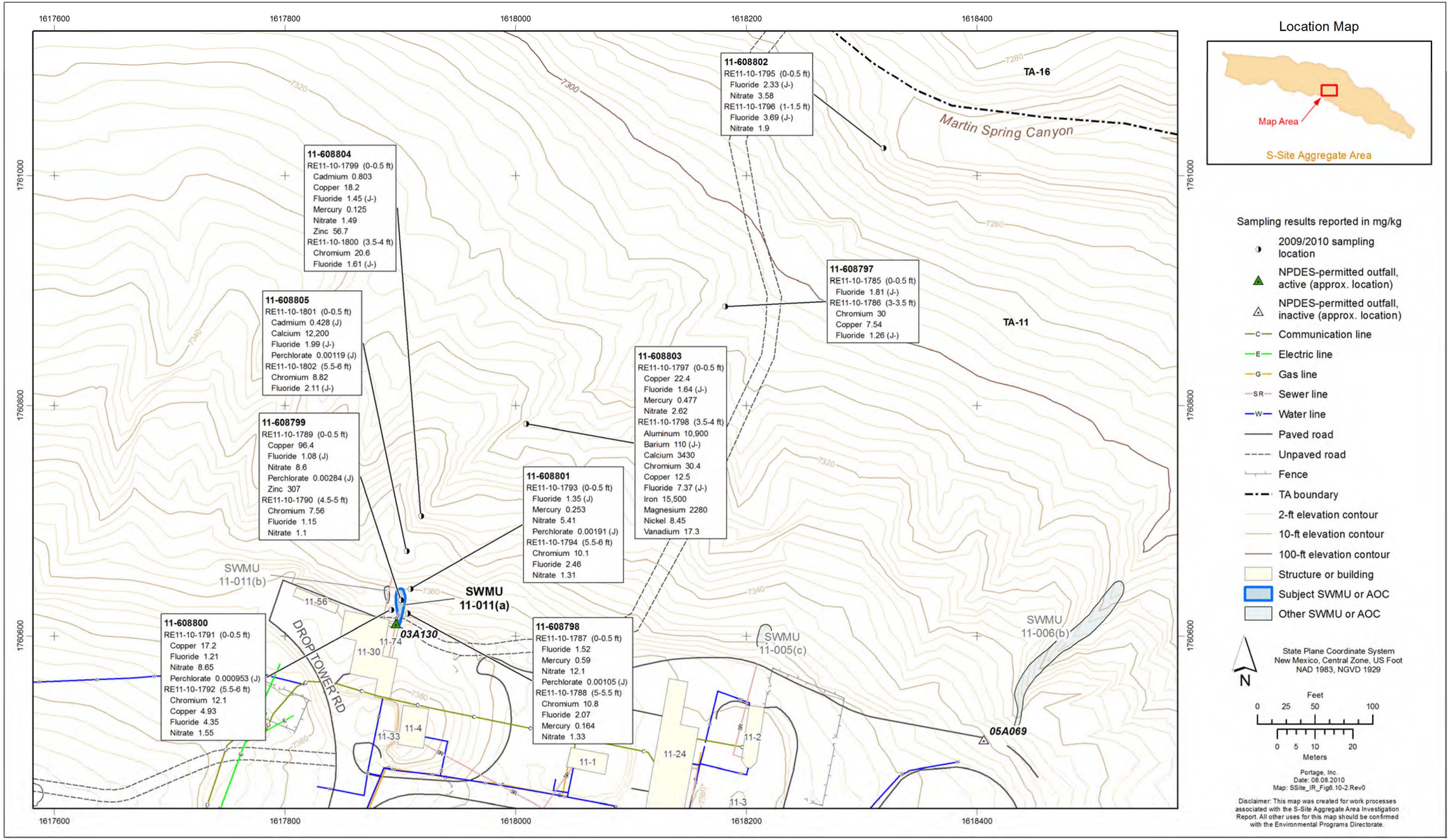


Figure 6.10-2 Inorganic chemicals detected above BVs at SWMU 11-011(a)

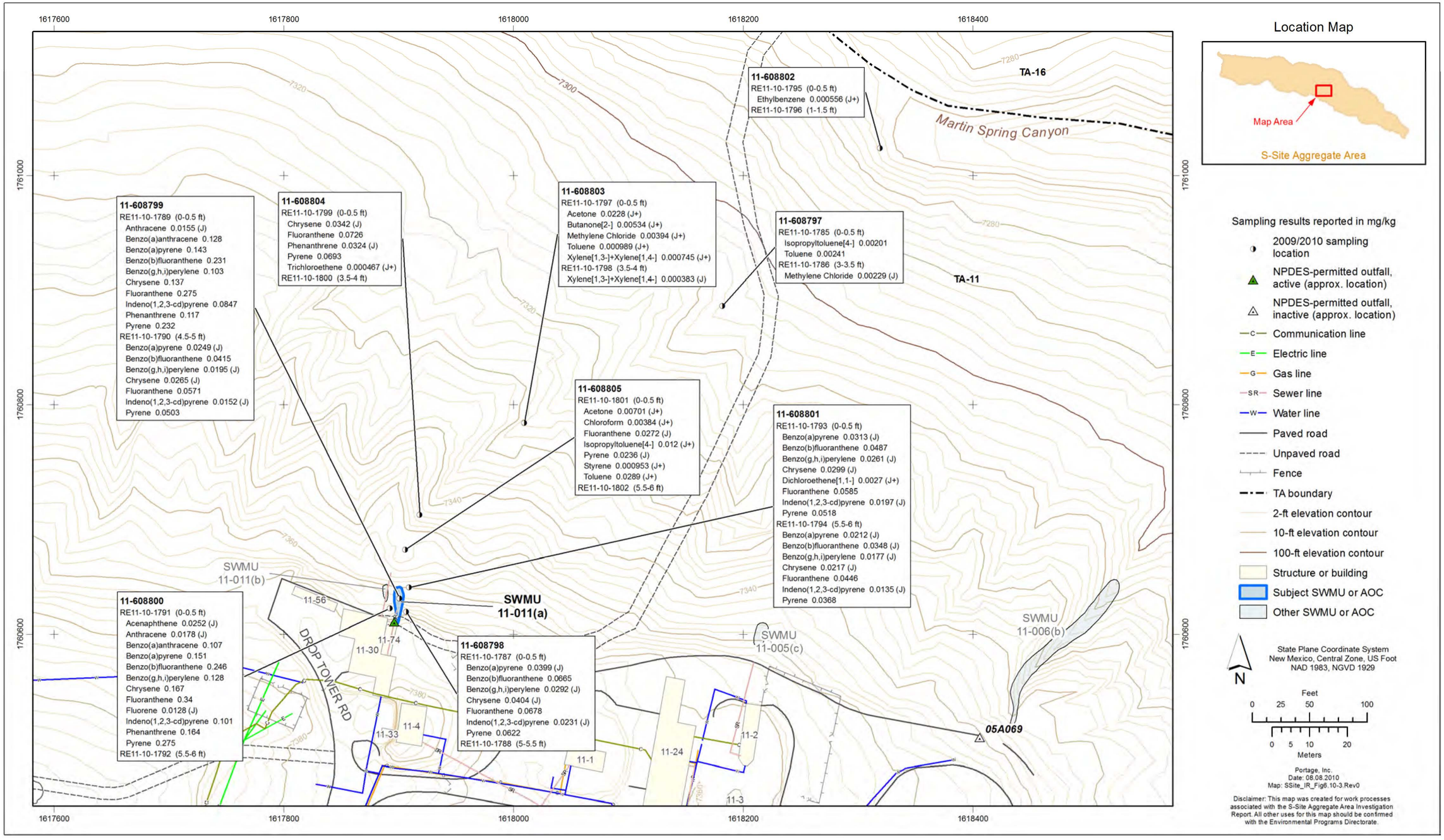


Figure 6.10-3 Organic chemicals detected in samples at SWMU 11-011(a)

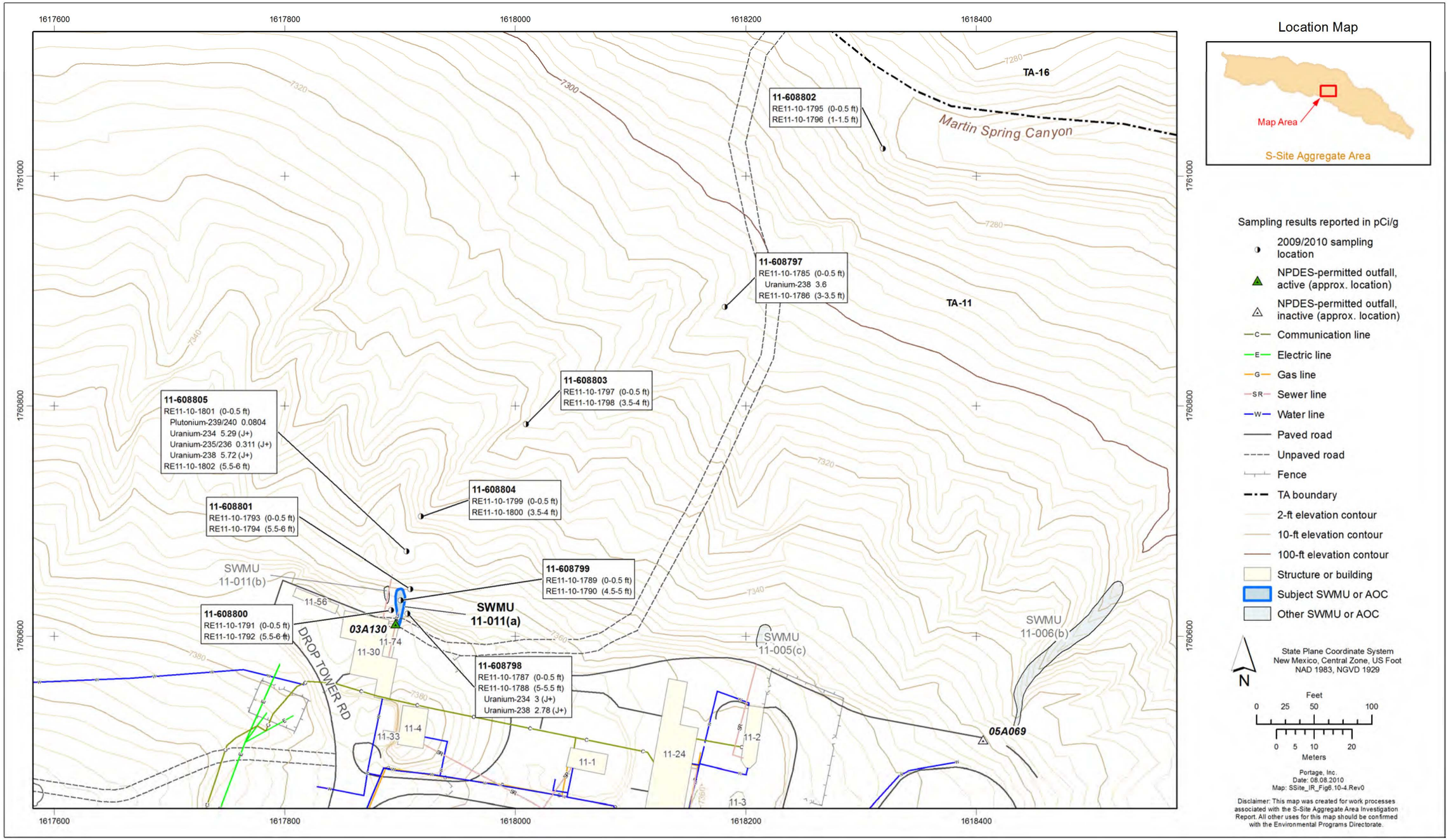


Figure 6.10-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-011(a)

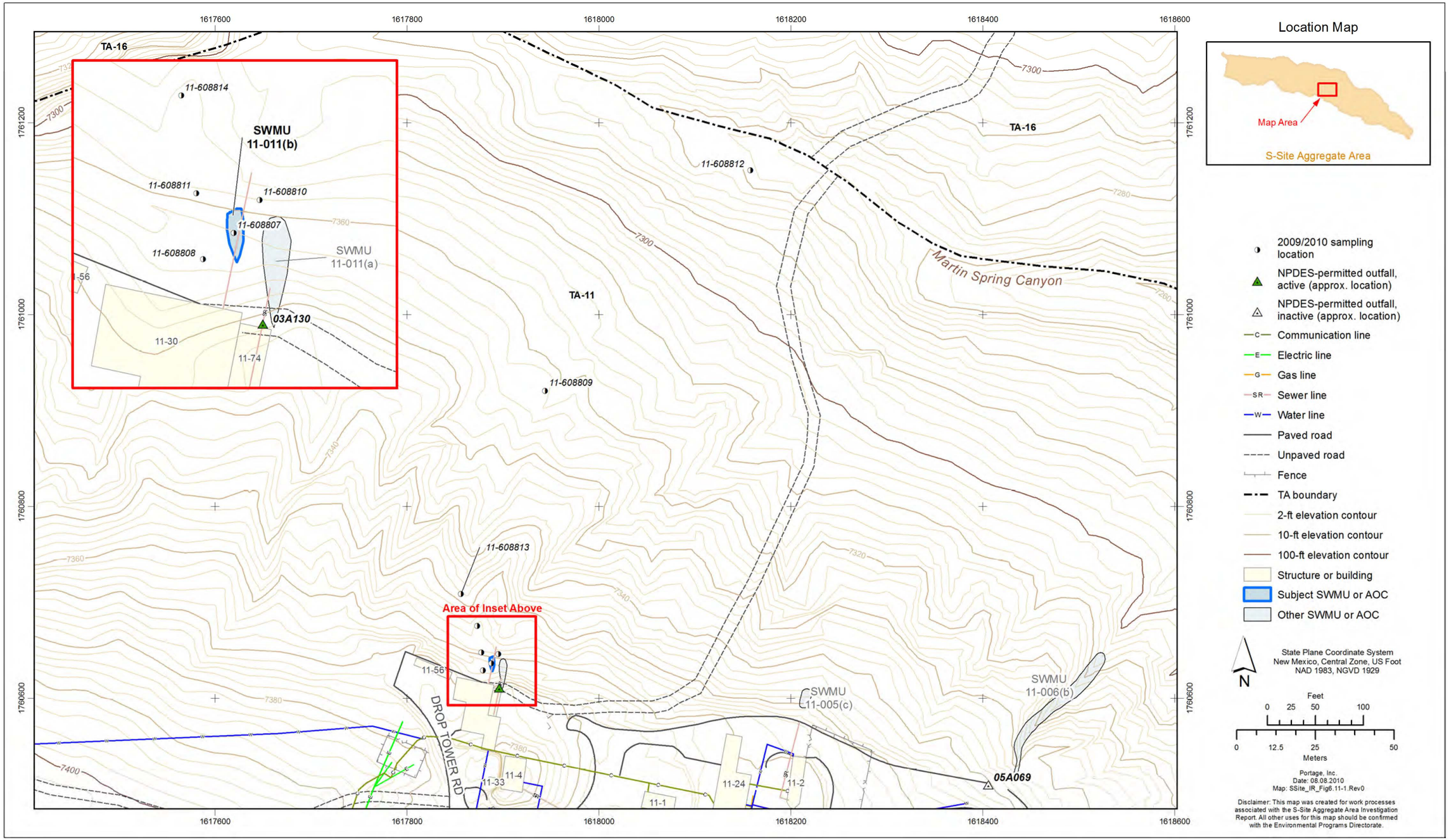


Figure 6.11-1 Locations sampled for SWMU 11-011(b)

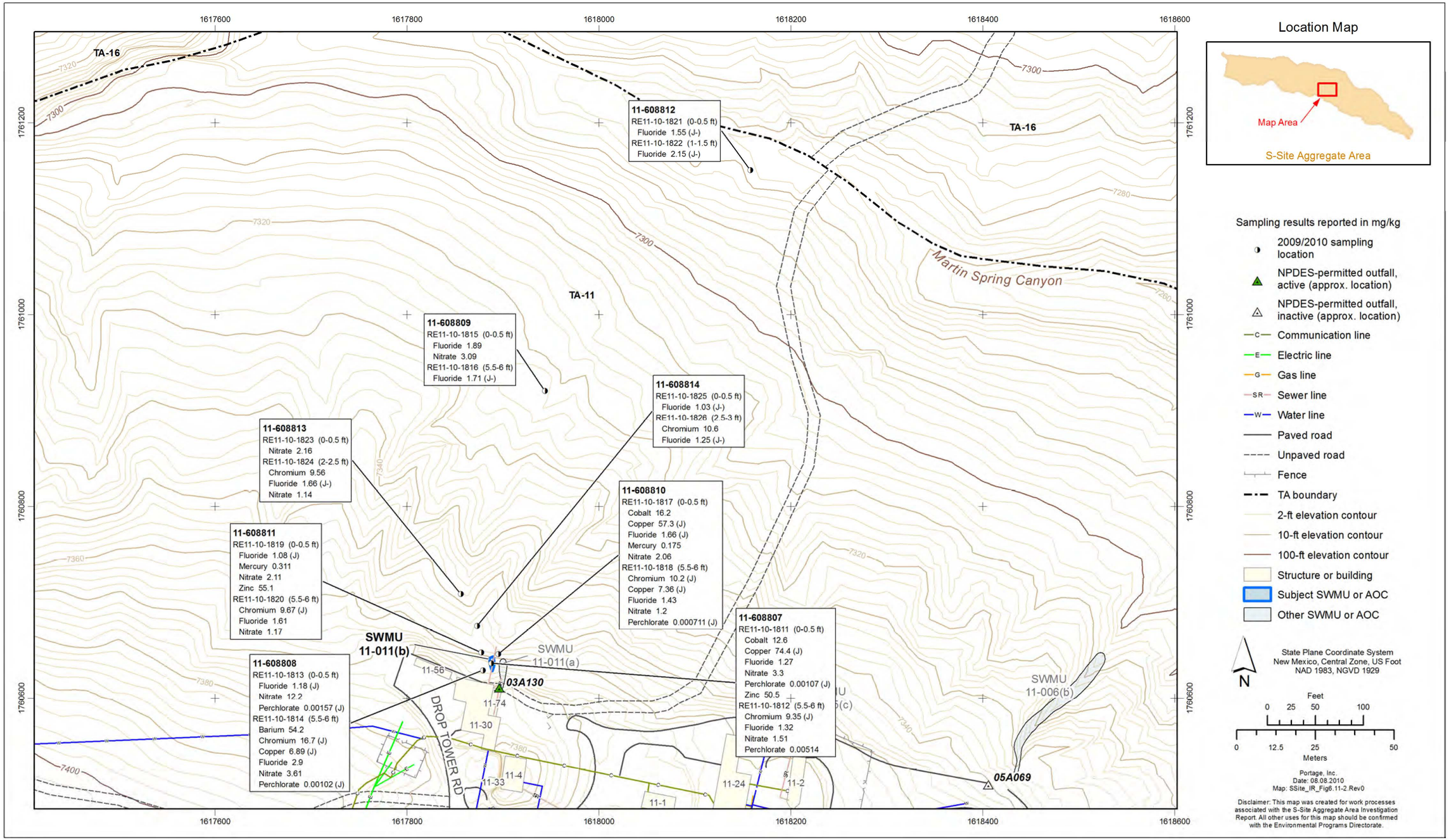


Figure 6.11-2 Inorganic chemicals detected above BVs at SWMU 11-011(b)

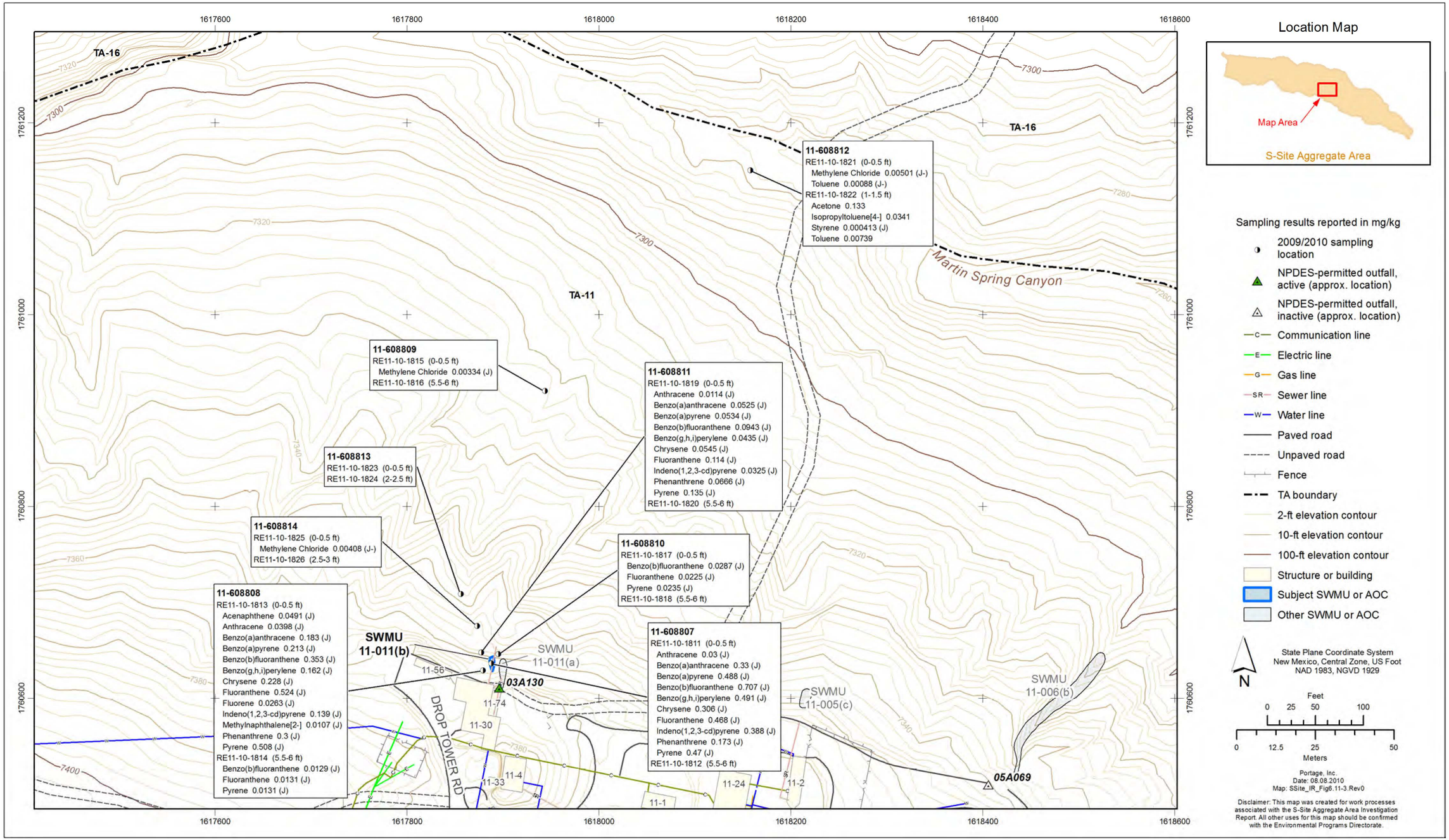


Figure 6.11-3 Organic chemicals detected in samples at SWMU 11-011(b)

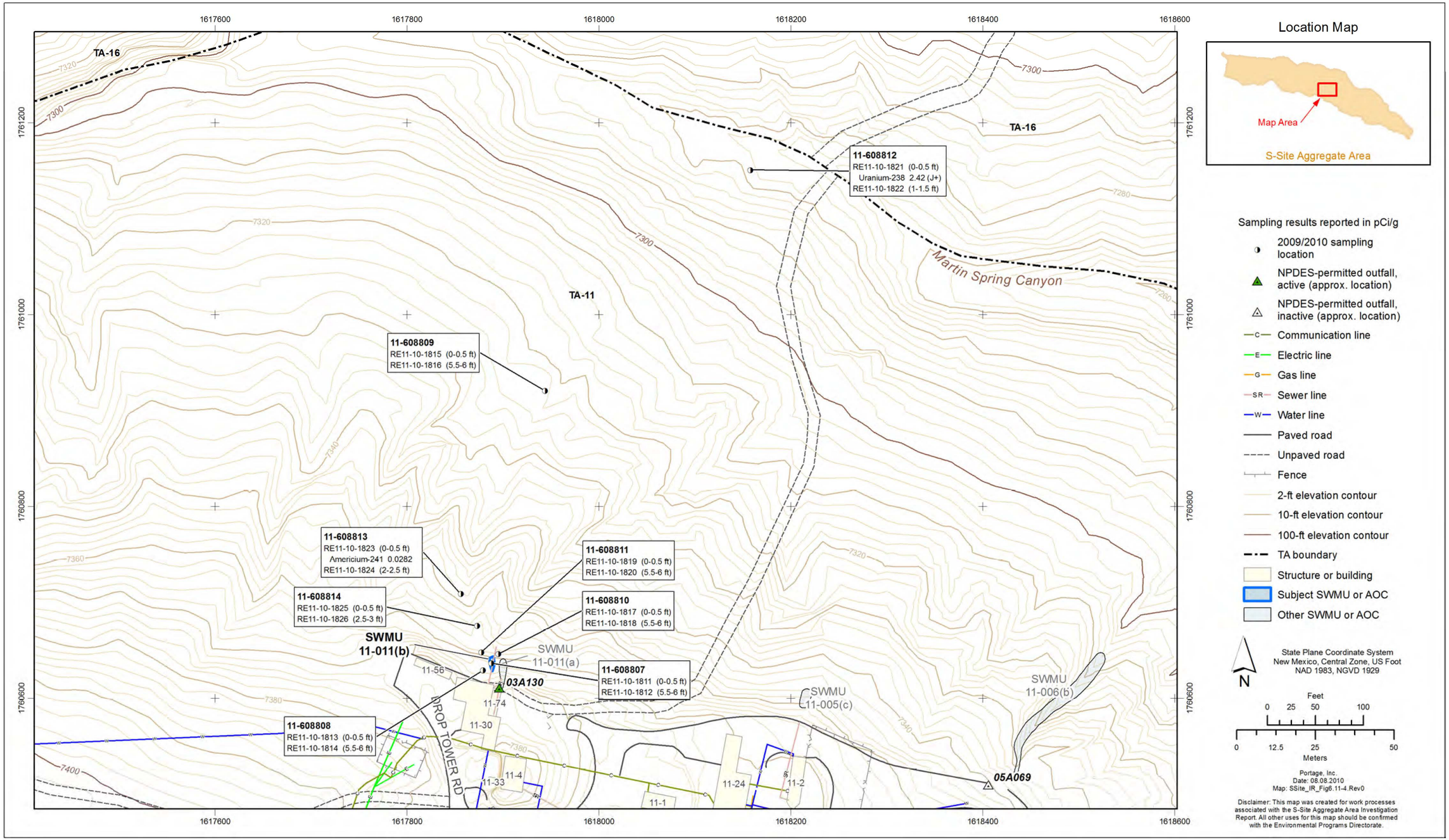


Figure 6.11-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-011(b)

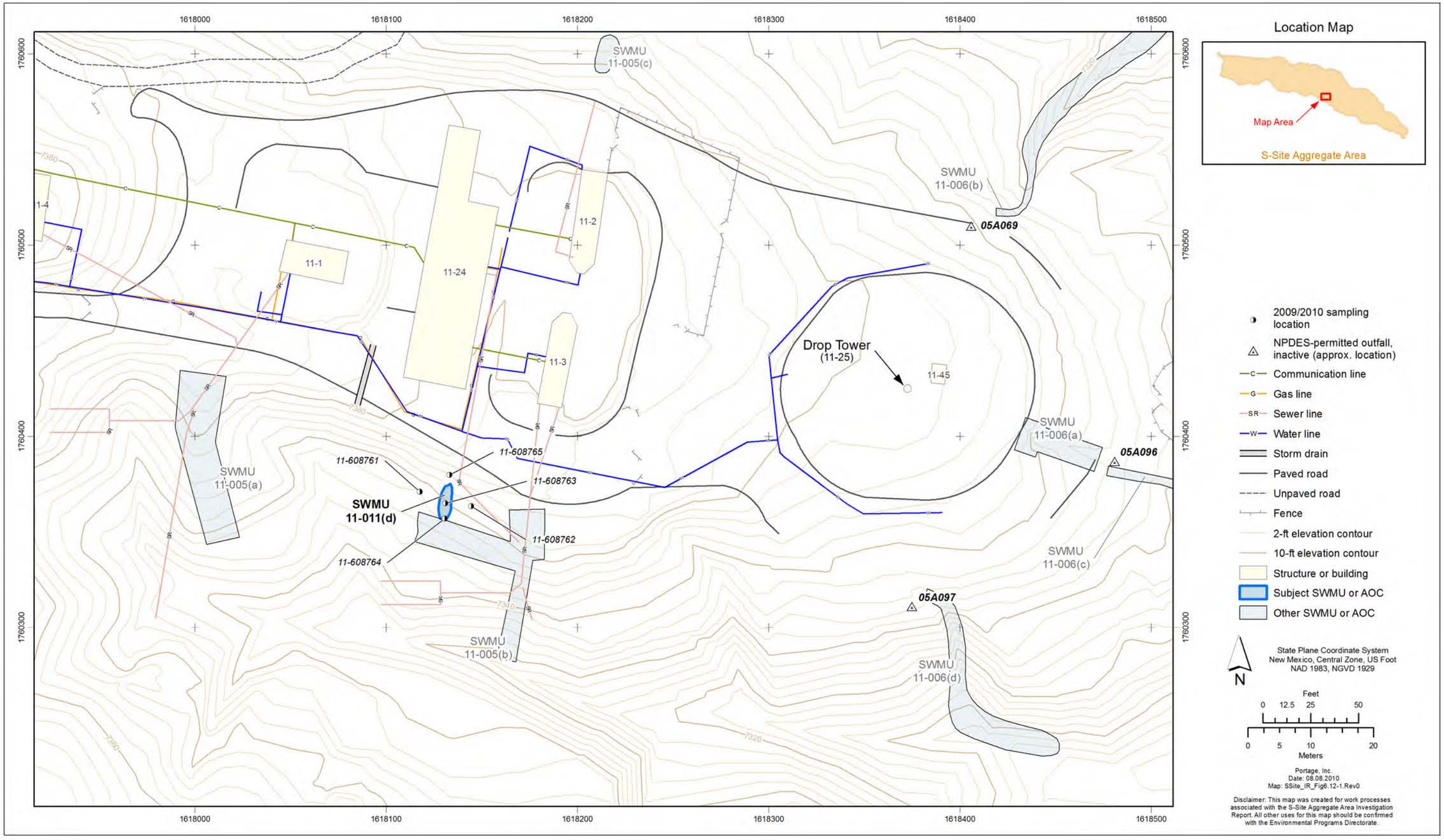


Figure 6.12-1 Locations sampled for SWMU 11-011(d)

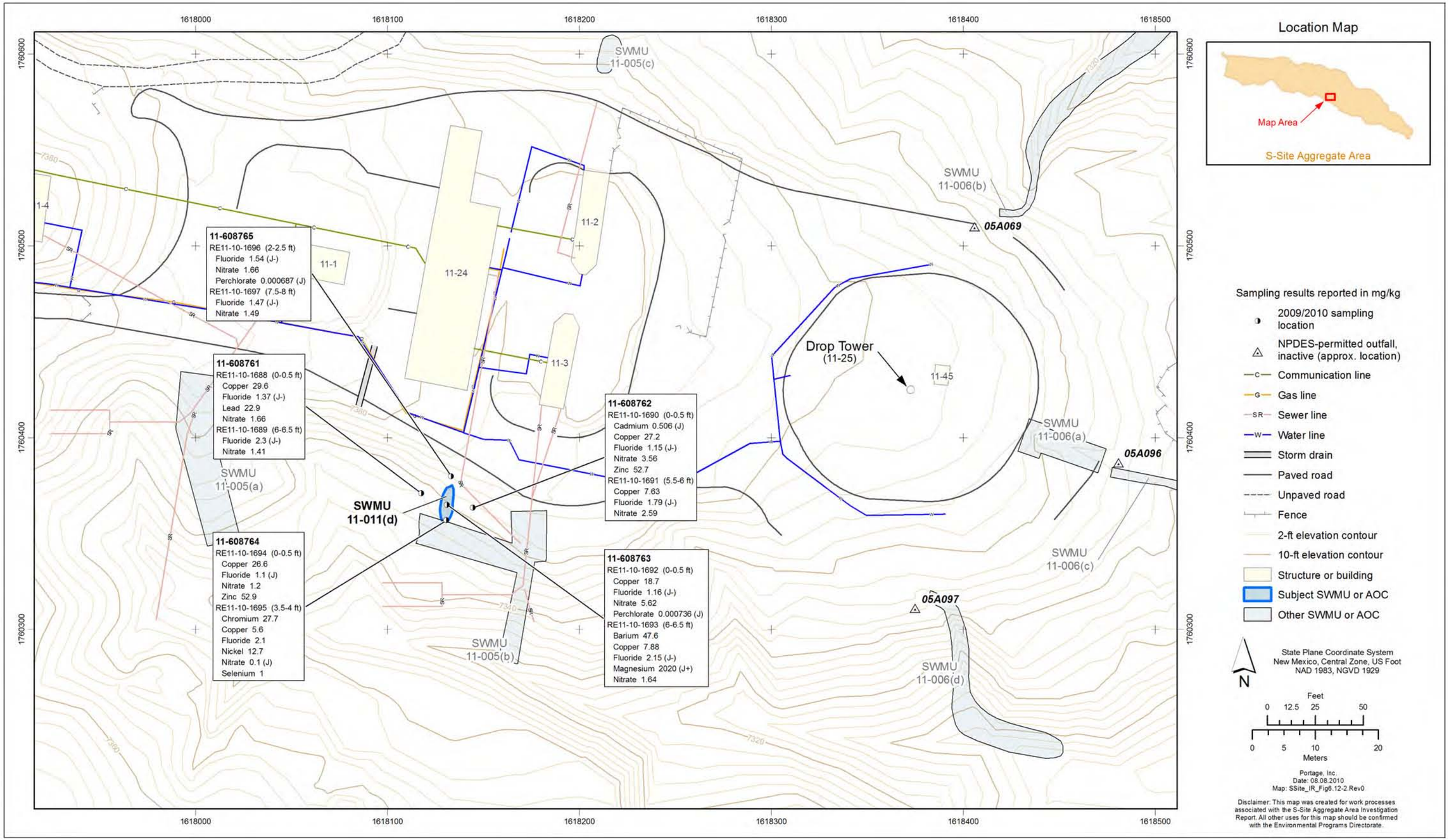


Figure 6.12-2 Inorganic chemicals detected above BVs at SWMU 11-011(d)

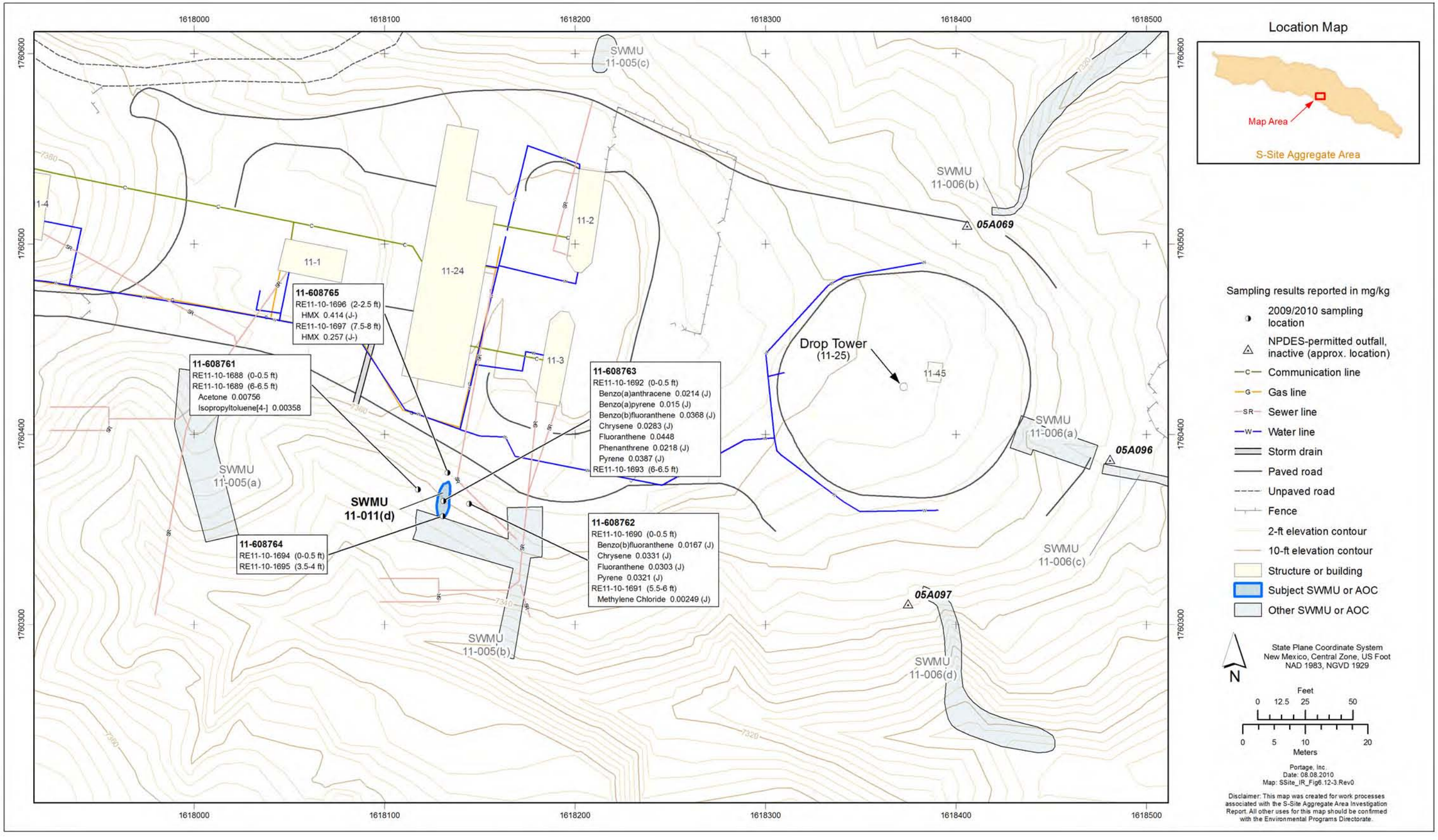


Figure 6.12-3 Organic chemicals detected in samples at SWMU 11-011(d)

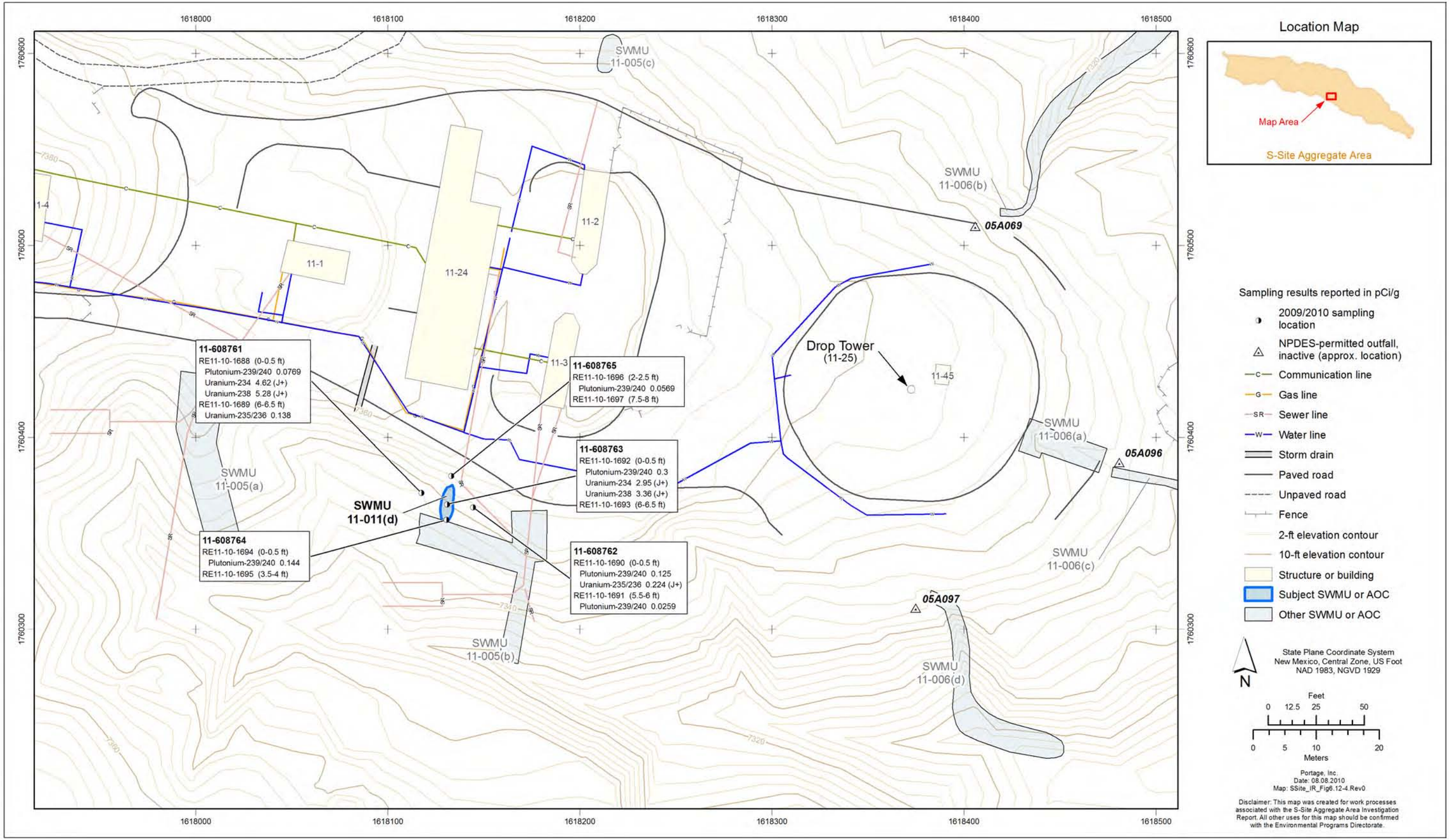


Figure 6.12-4 Radionuclides detected or detected above BVs/FVs at SWMU 11-011(d)

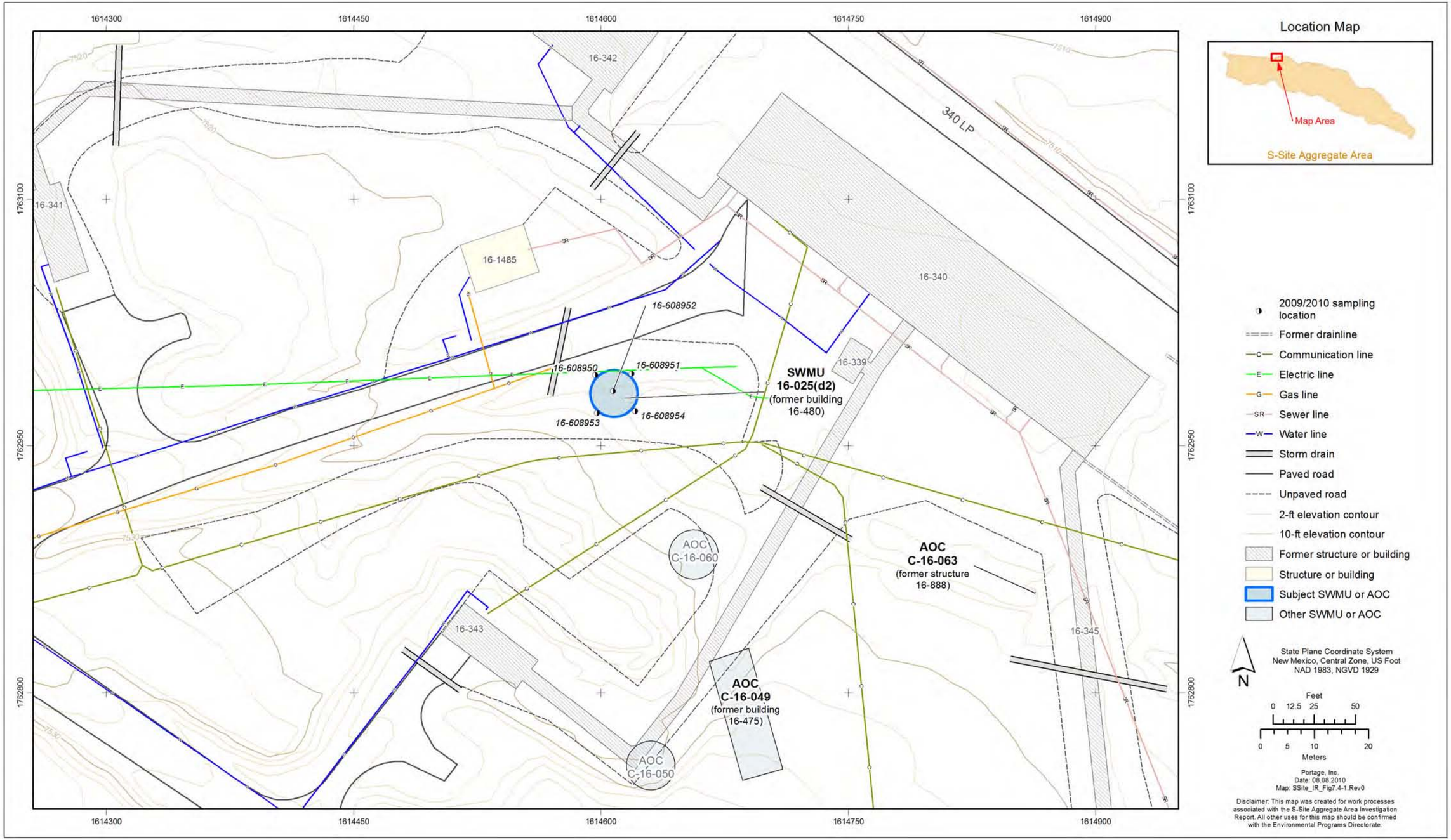


Figure 7.4-1 Locations sampled for SWMU 16-025(d2)

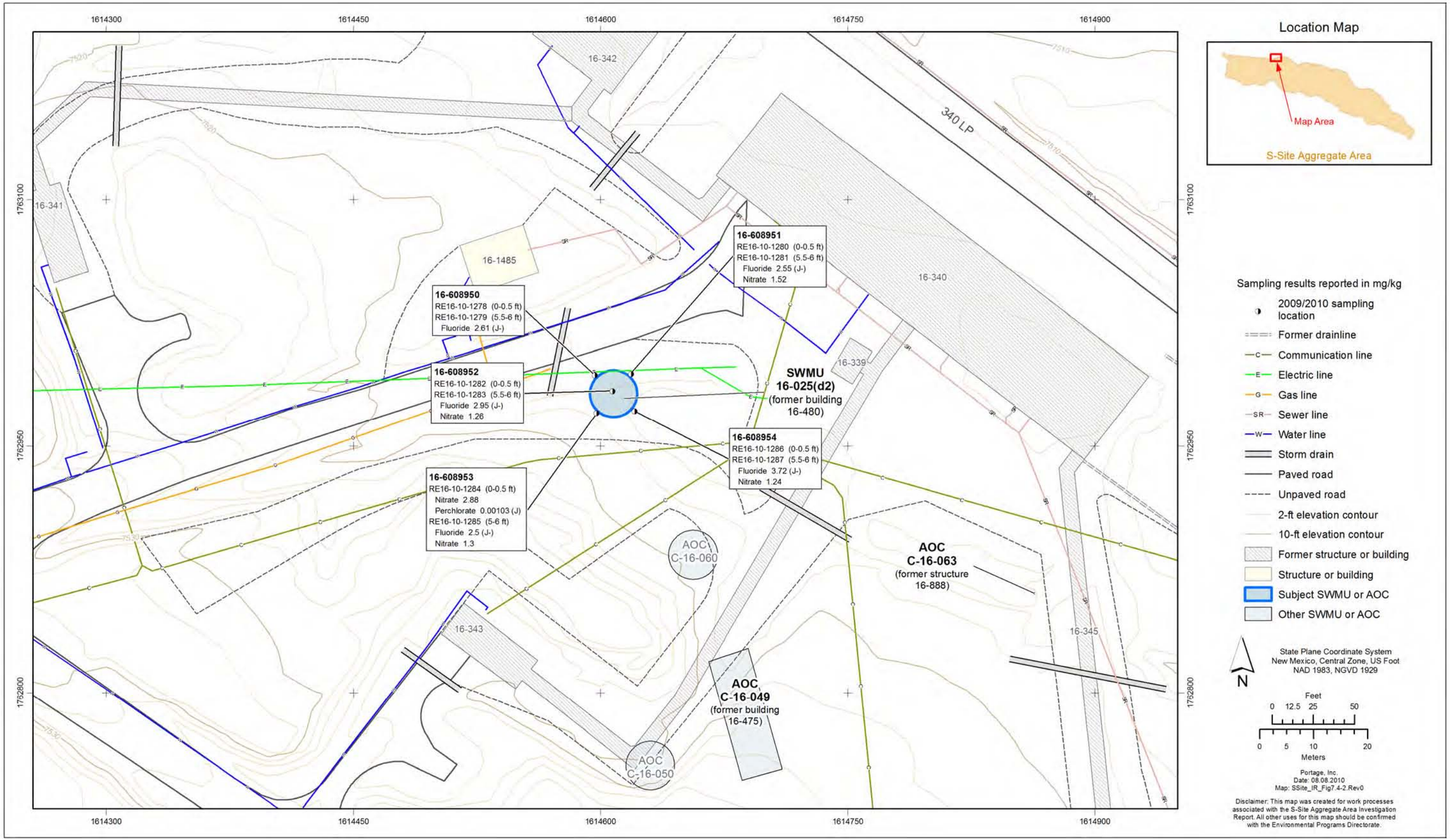


Figure 7.4-2 Inorganic chemicals detected above BVs at SWMU 16-025(d2)

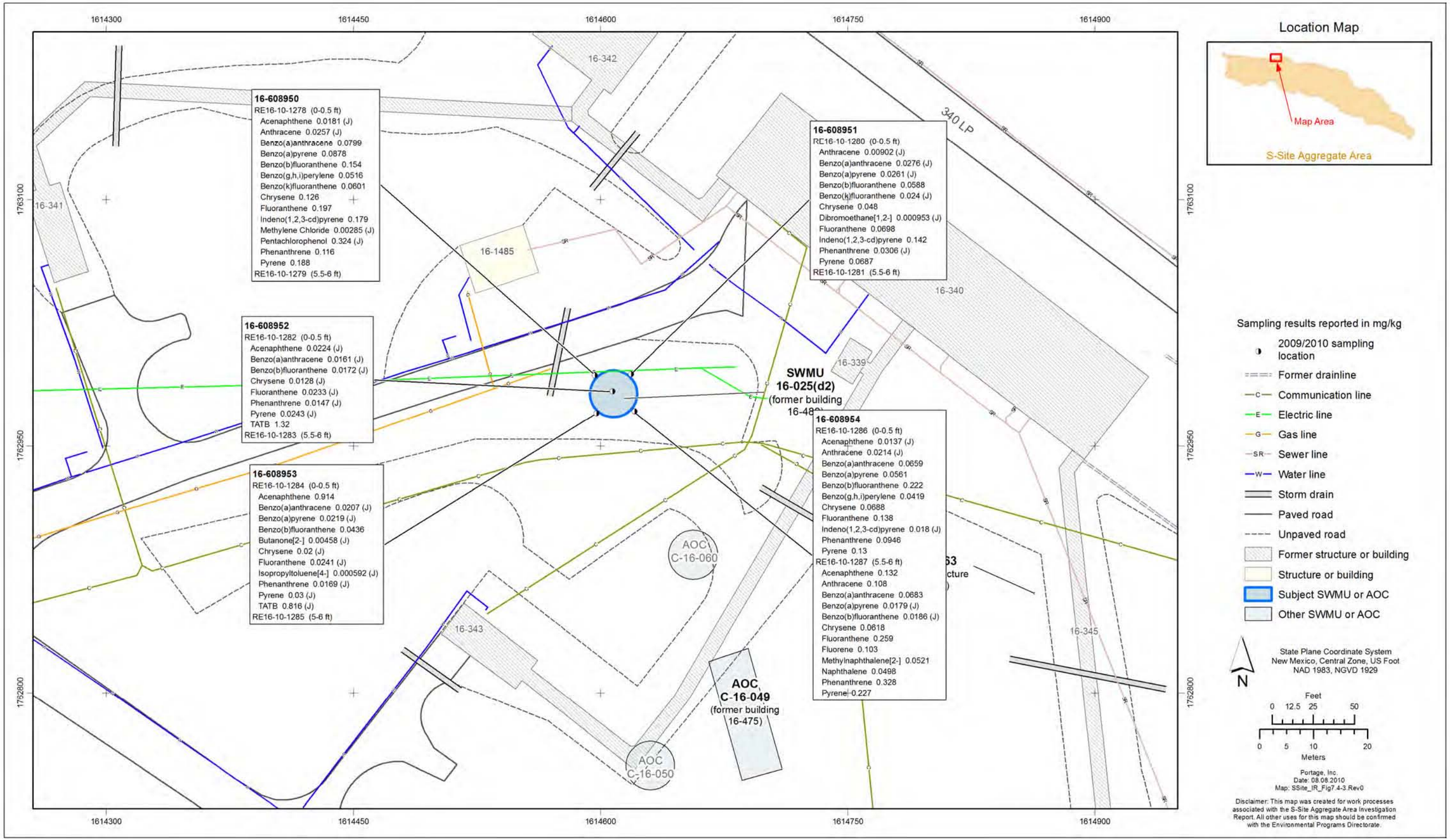


Figure 7.4-3 Organic chemicals detected in samples at SWMU 16-025(d2)

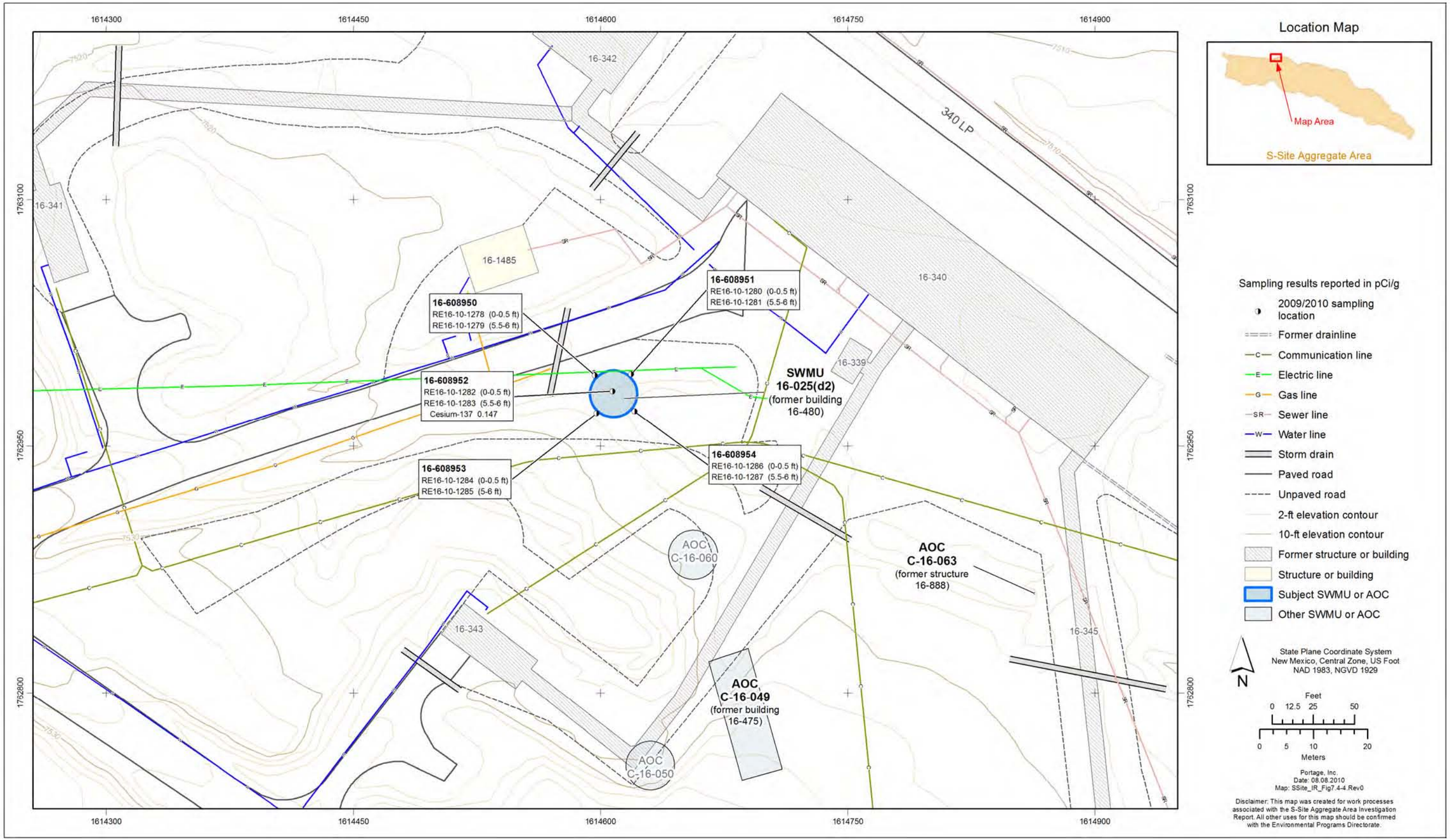


Figure 7.4-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-025(d2)

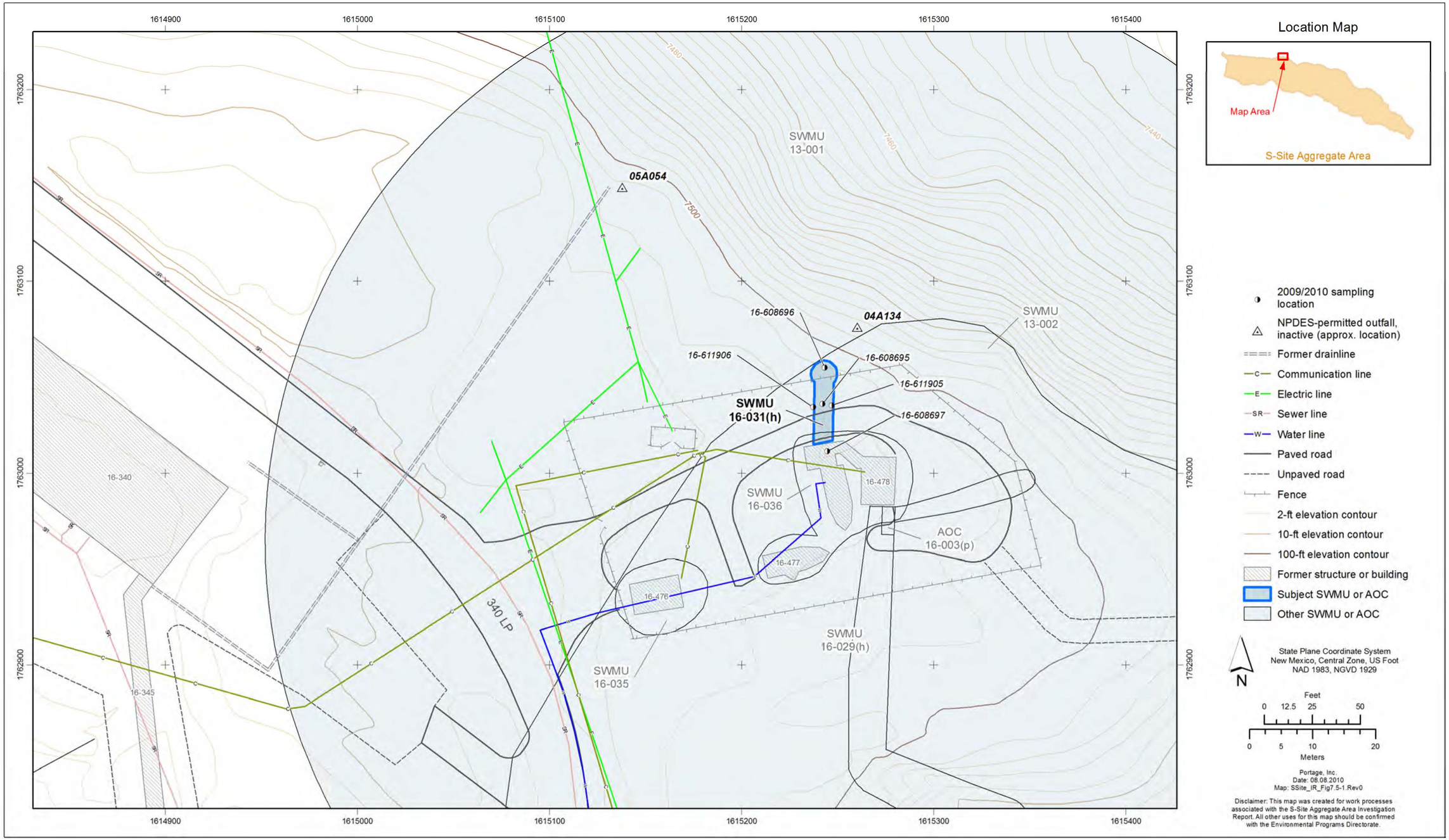


Figure 7.5-1 Locations sampled for SWMU 16-031(h)

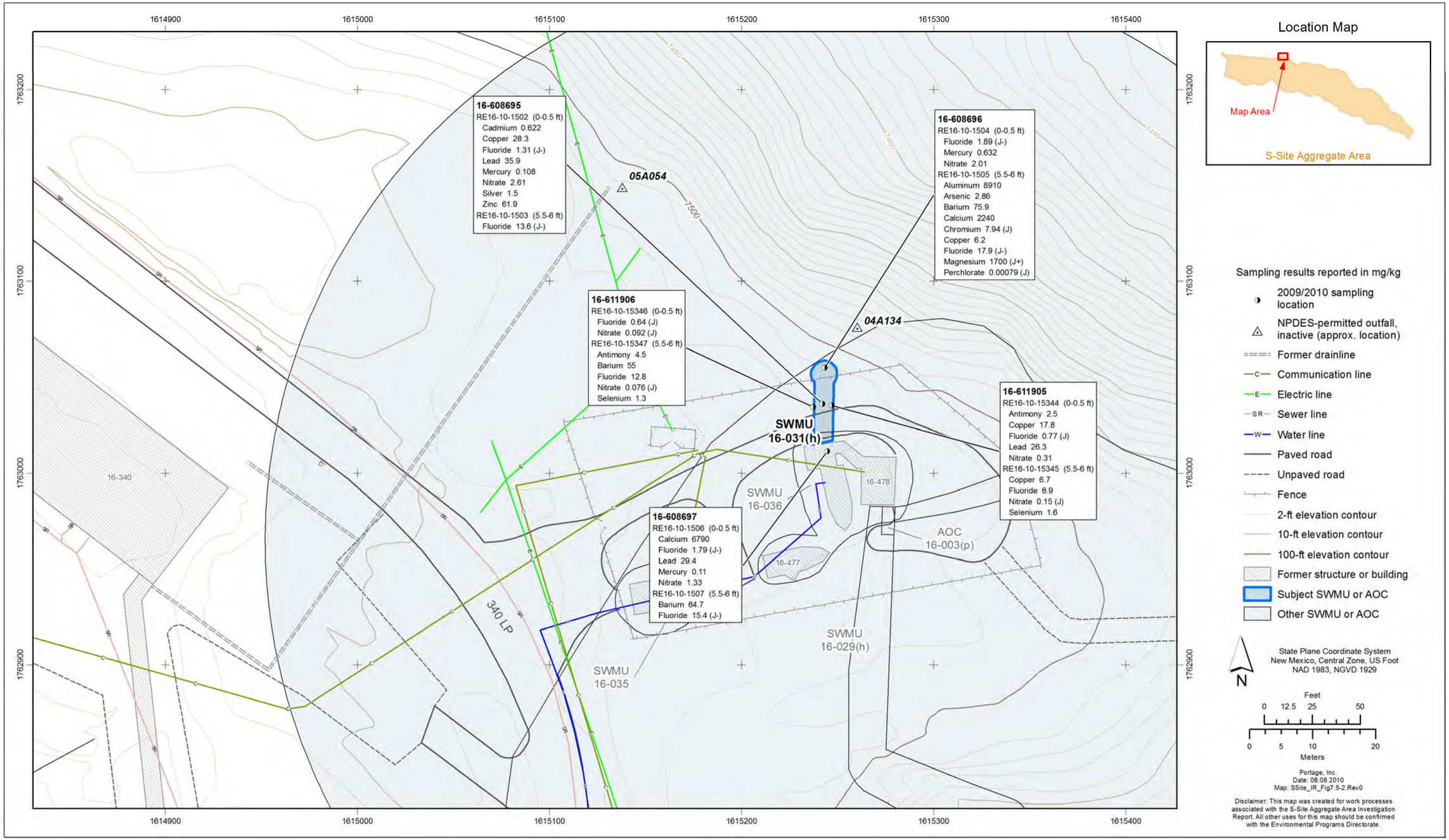


Figure 7.5-2 Inorganic chemicals detected above BVs at SWMU 16-031(h)

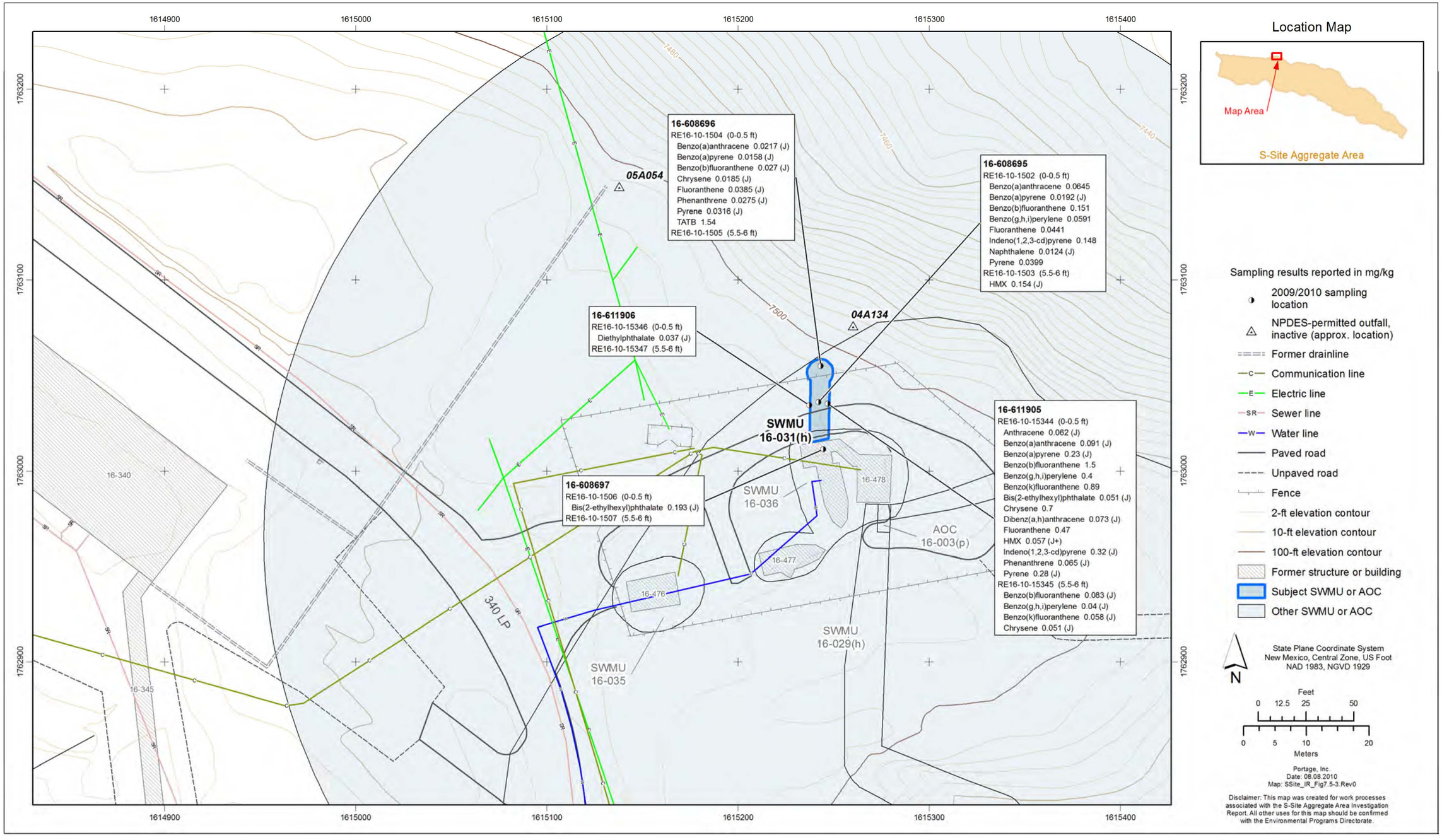


Figure 7.5-3 Organic chemicals detected in samples at SWMU 16-031(h)

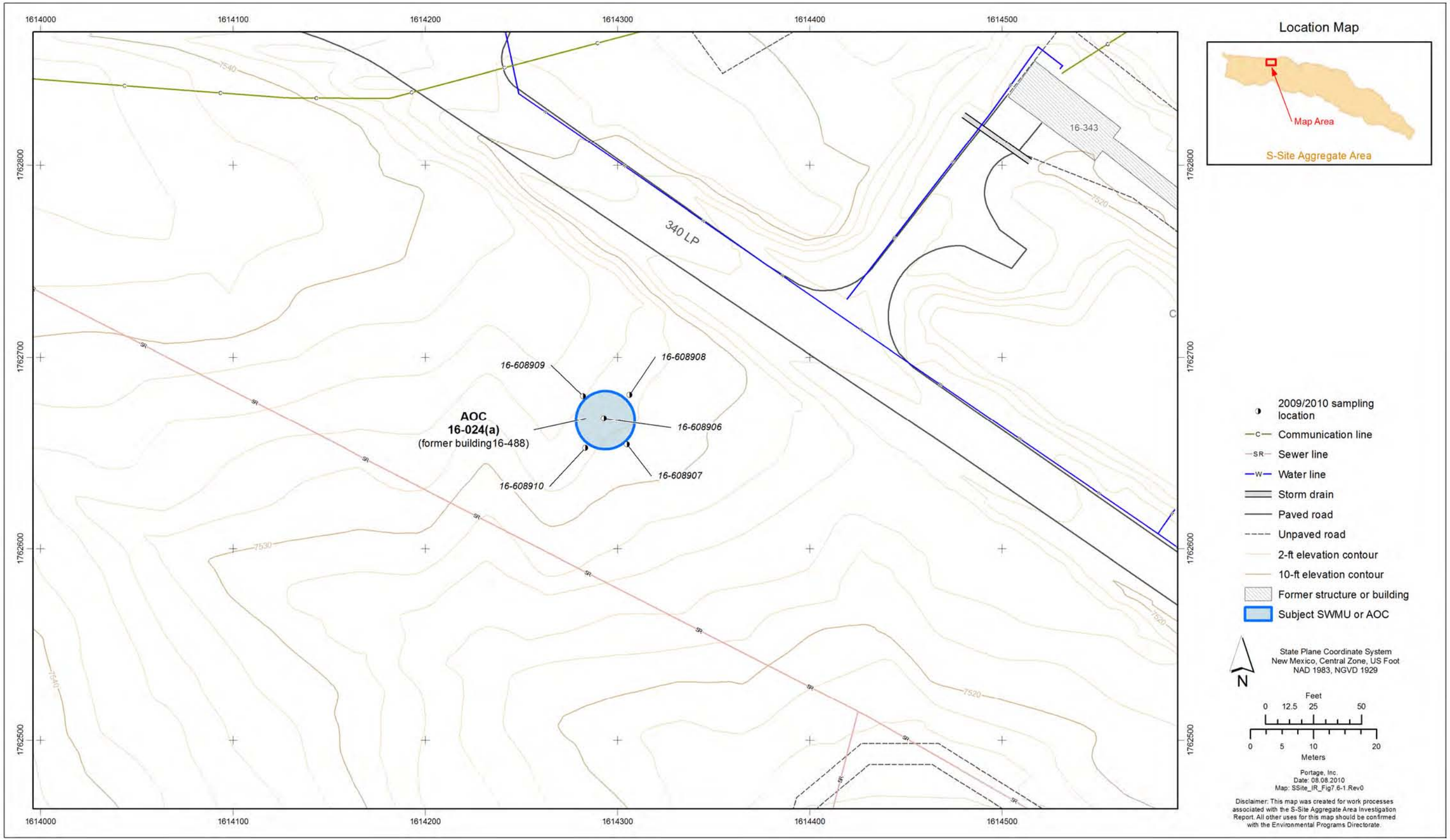


Figure 7.6-1 Locations sampled for AOC 16-024(a)

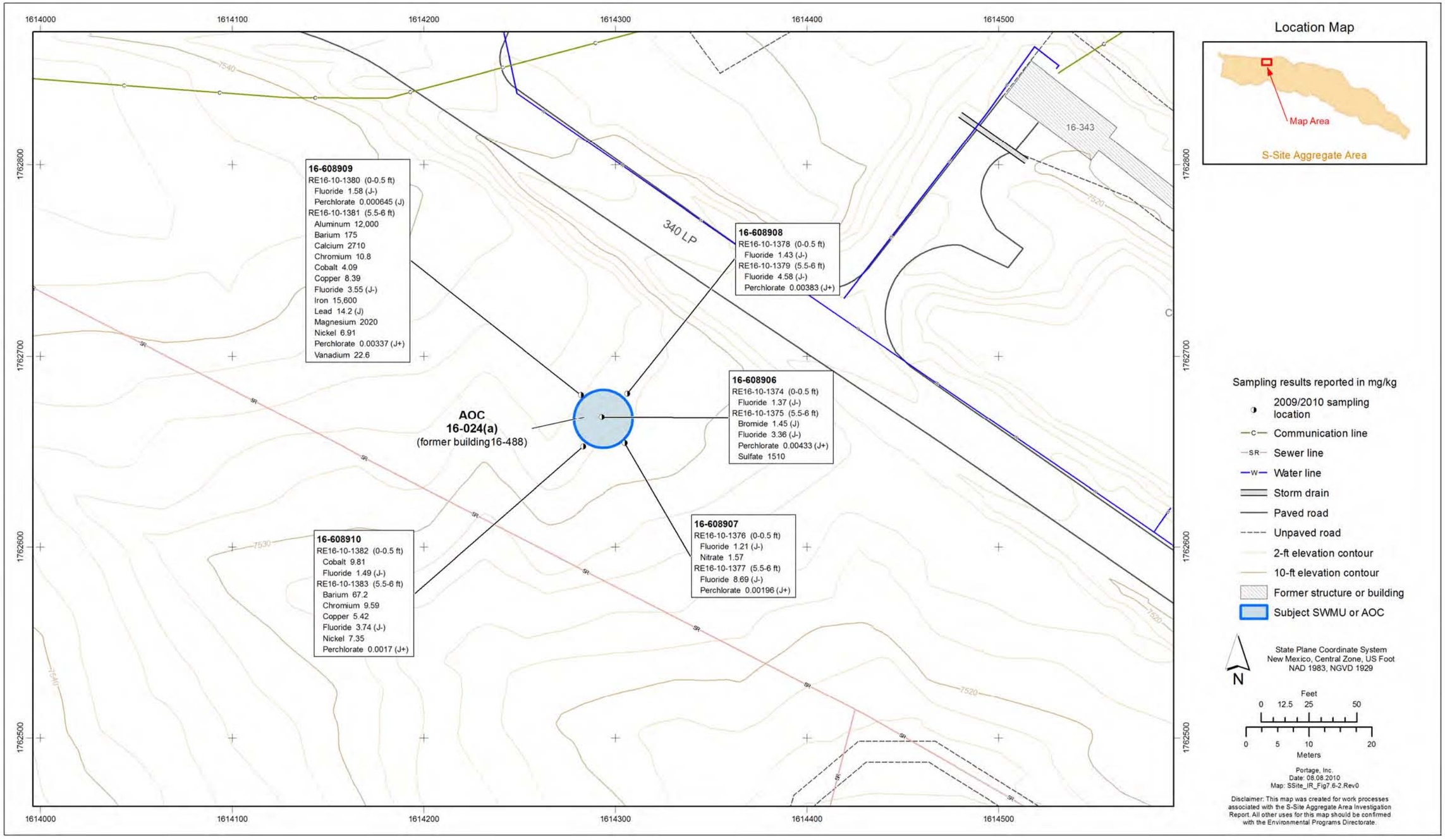


Figure 7.6-2 Inorganic chemicals detected above BVs at AOC 16-024(a)

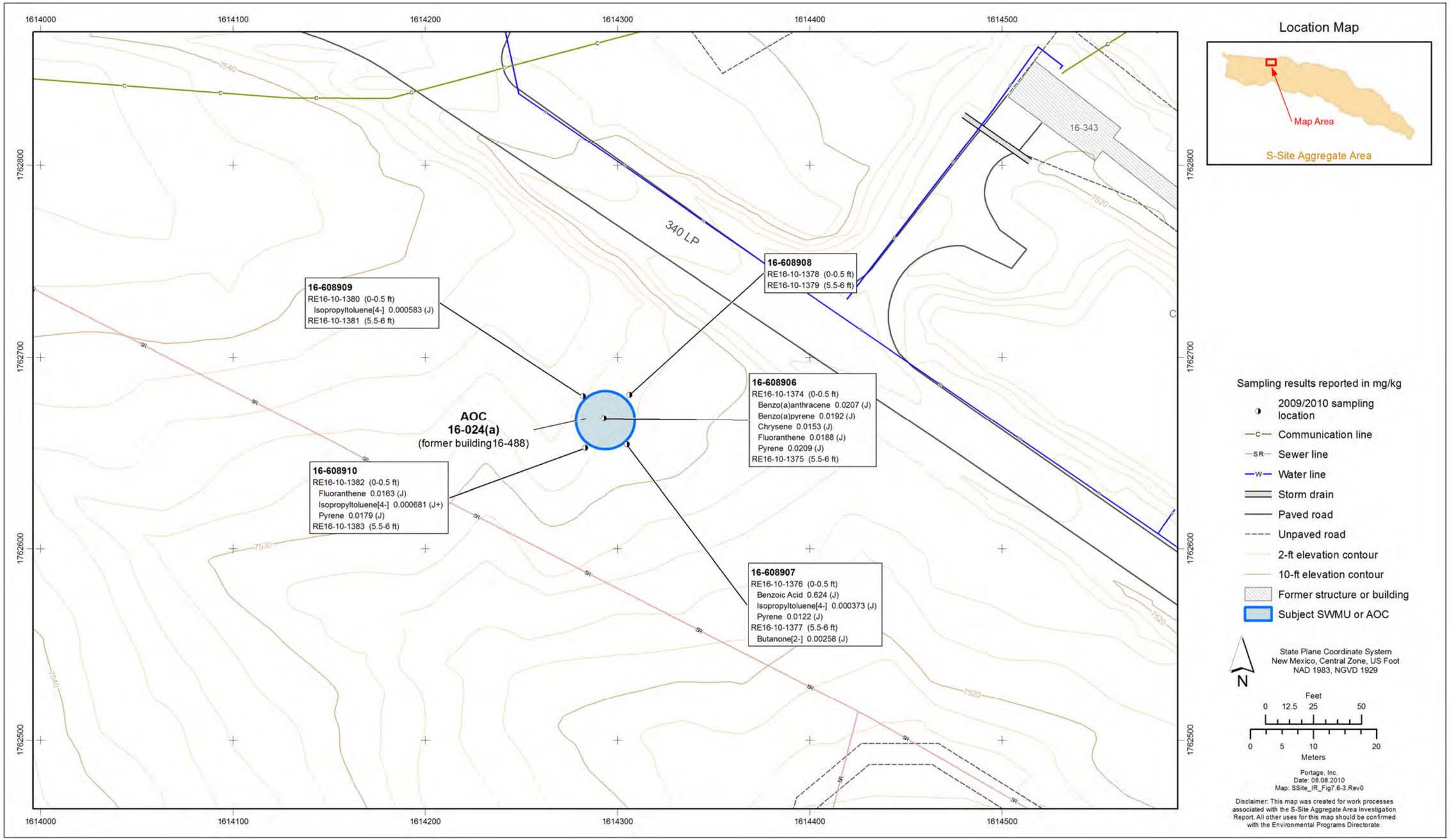


Figure 7.6-3 Organic chemicals detected in samples at AOC 16-024(a)

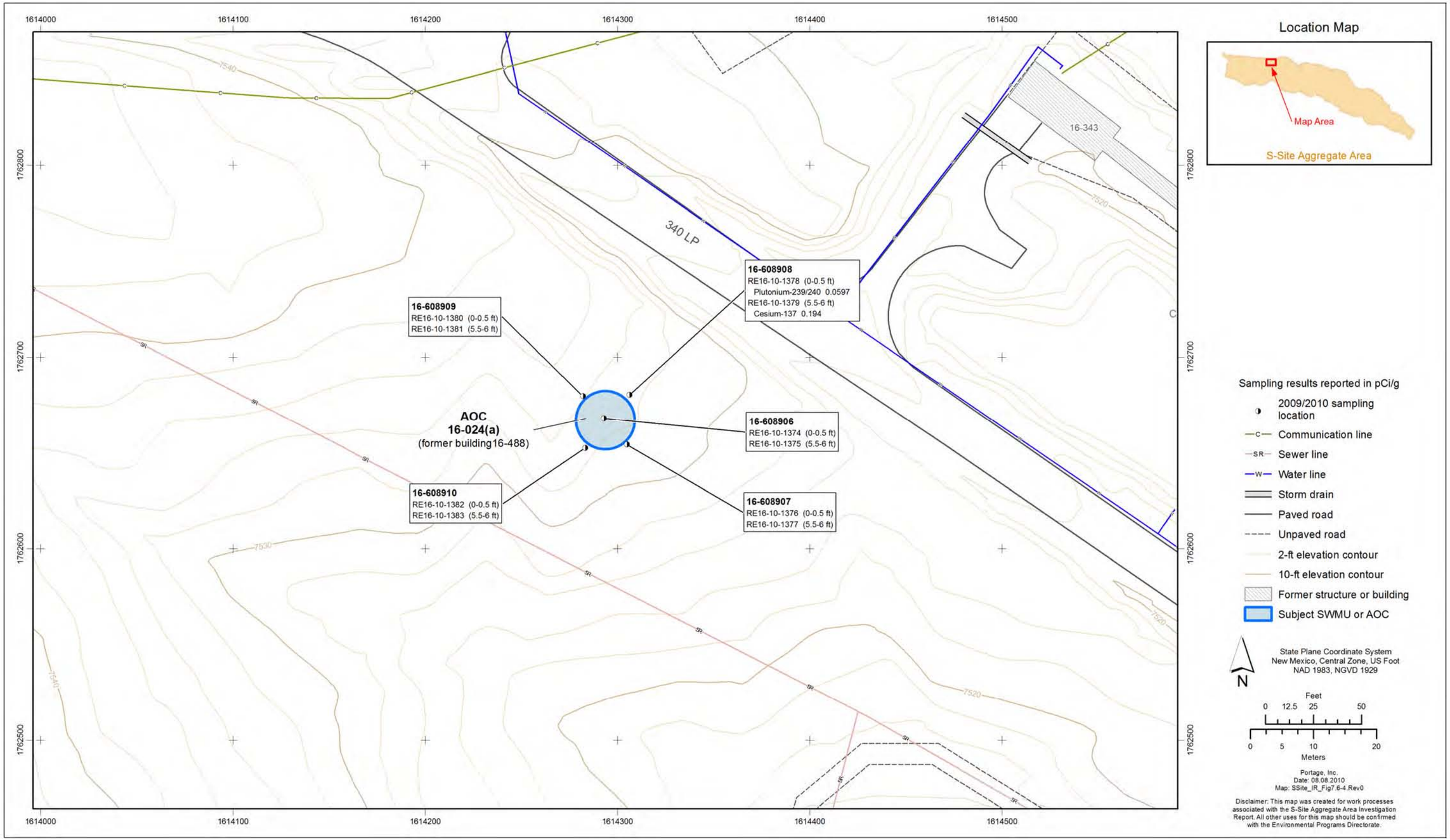


Figure 7.6-4 Radionuclides detected or detected above BVs/FVs at AOC 16-024(a)

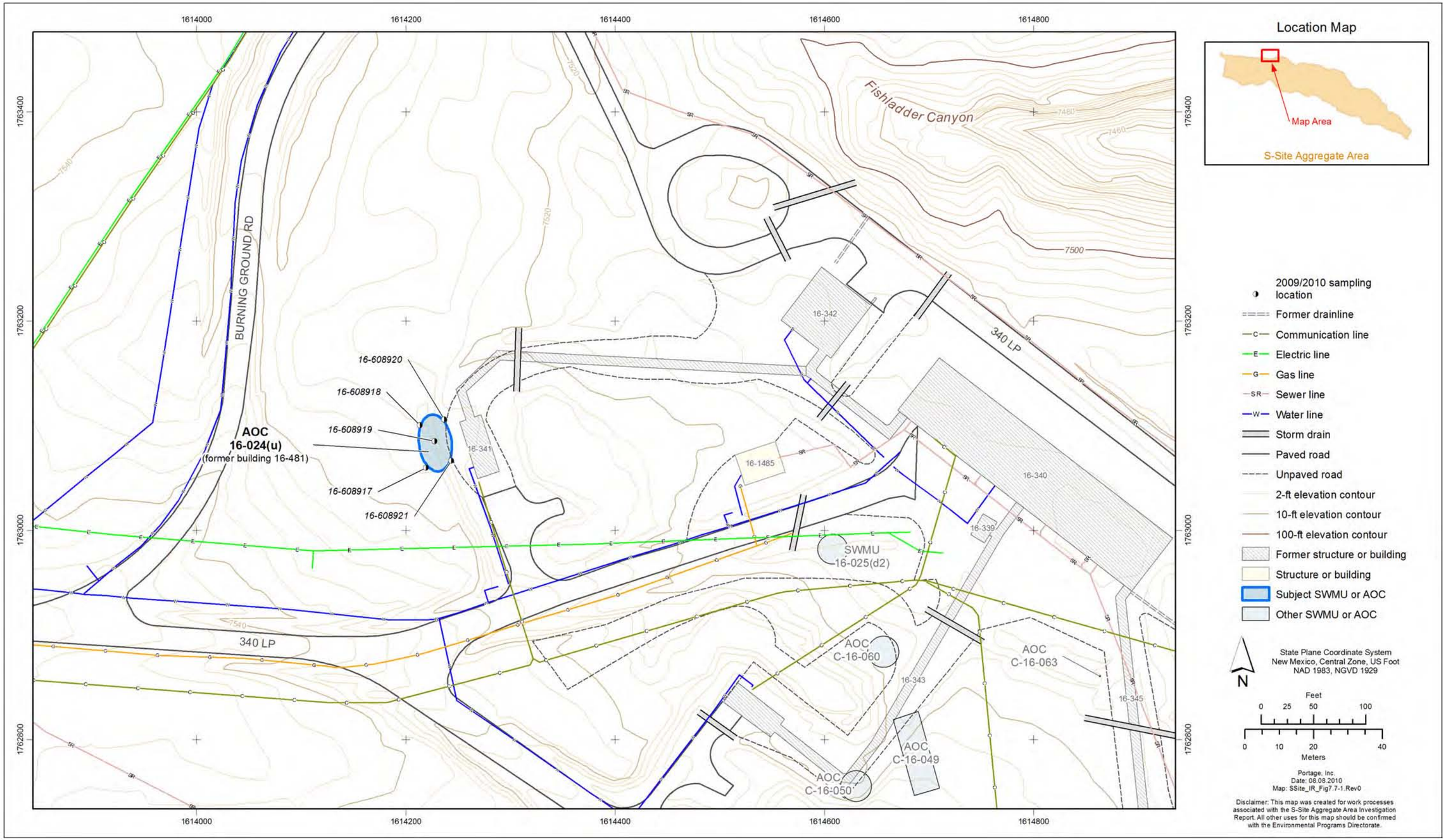


Figure 7.7-1 Locations sampled for AOC 16-024(u)

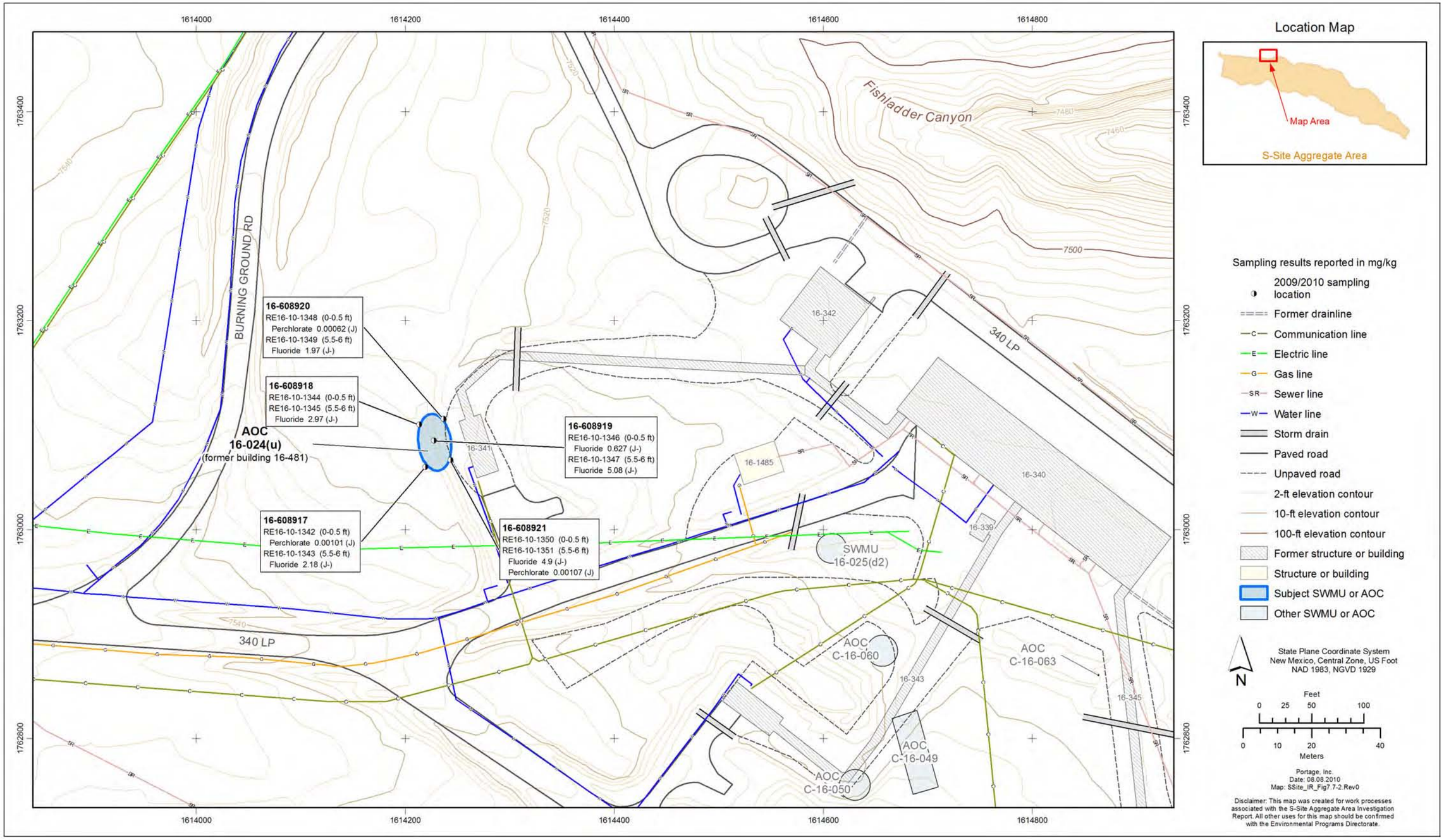


Figure 7.7-2 Inorganic chemicals detected above BVs at AOC 16-024(u)

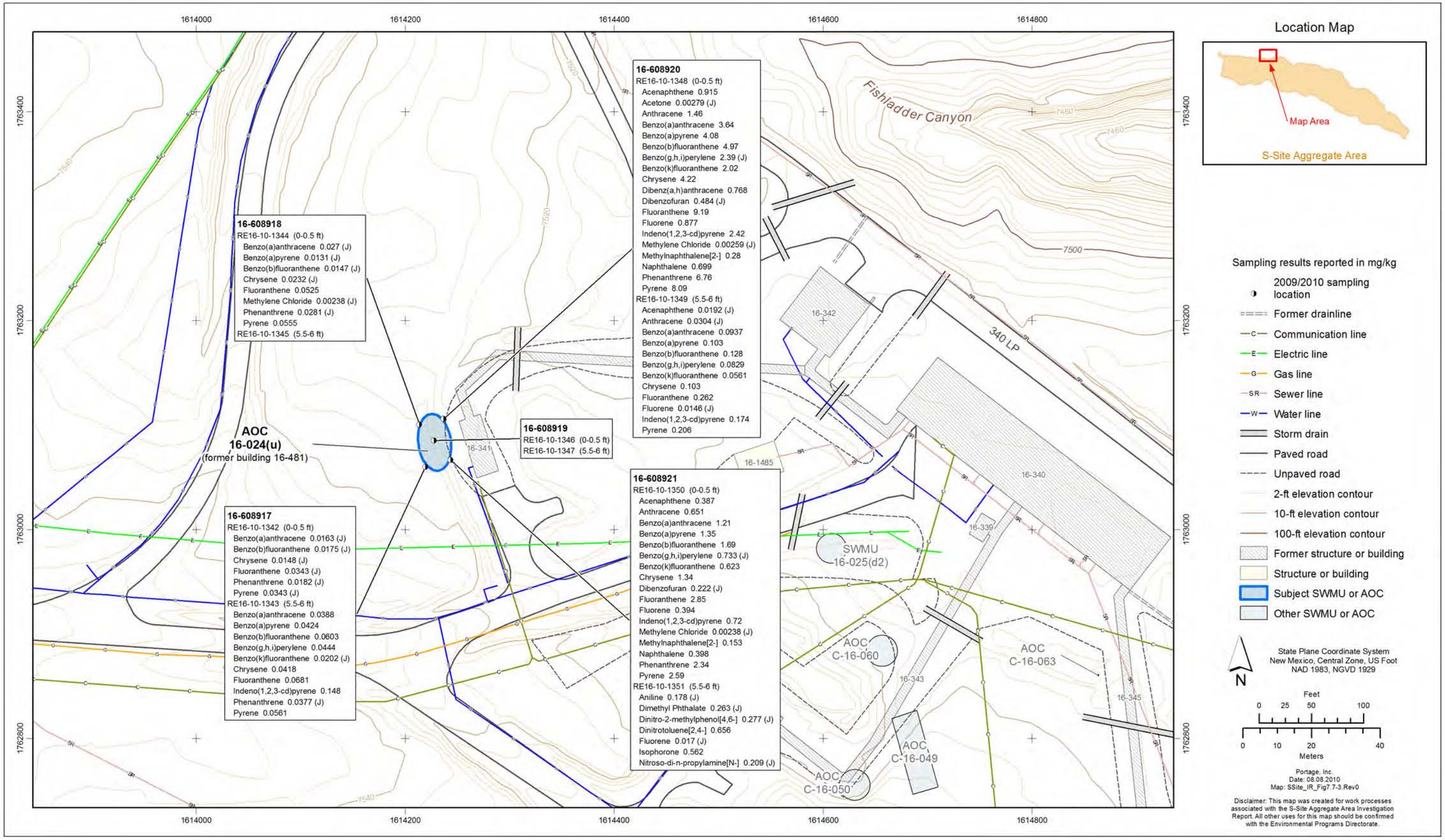


Figure 7.7-3 Organic chemicals detected in samples at AOC 16-024(u)

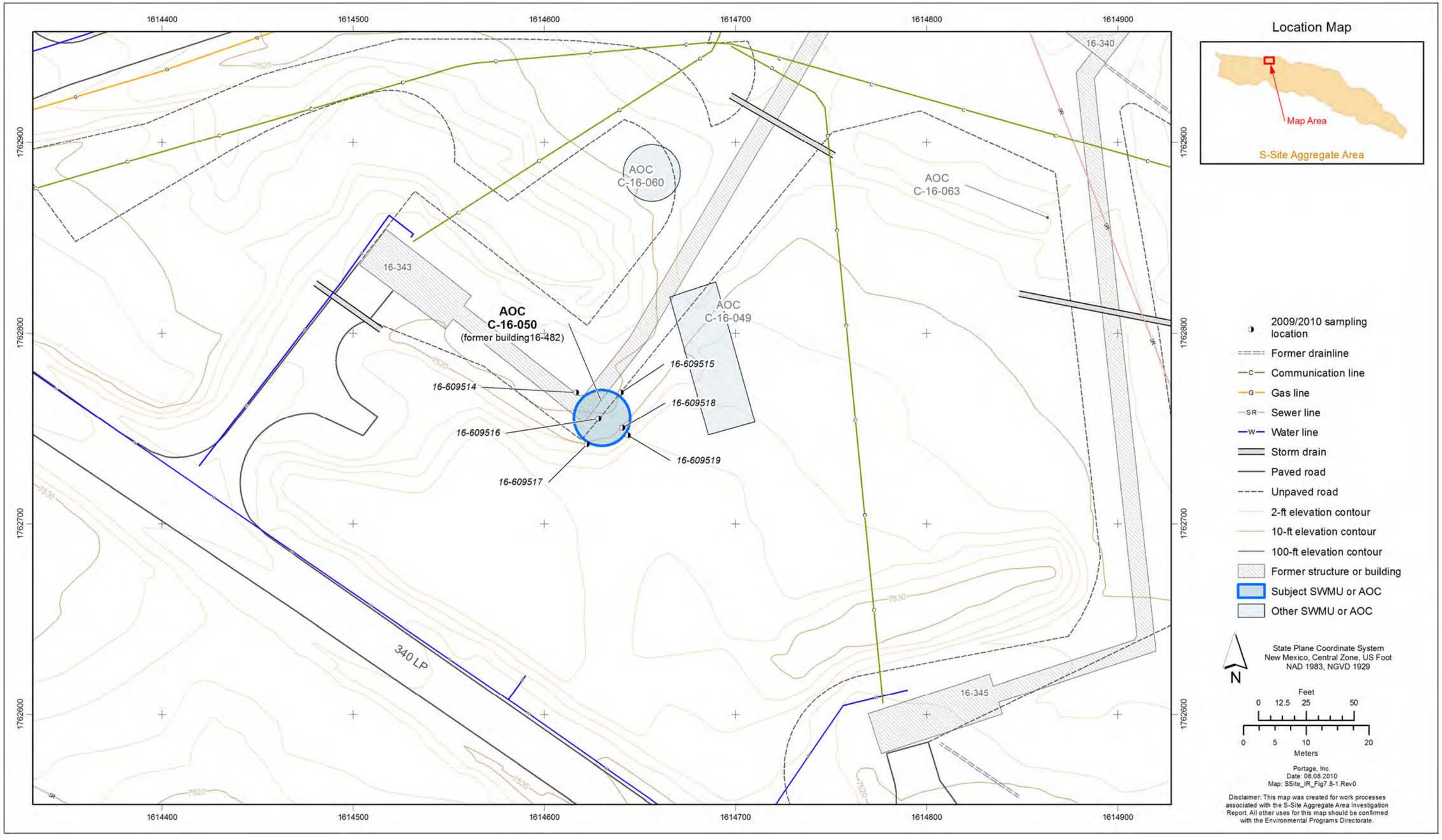


Figure 7.8-1 Locations sampled for AOC C-16-050

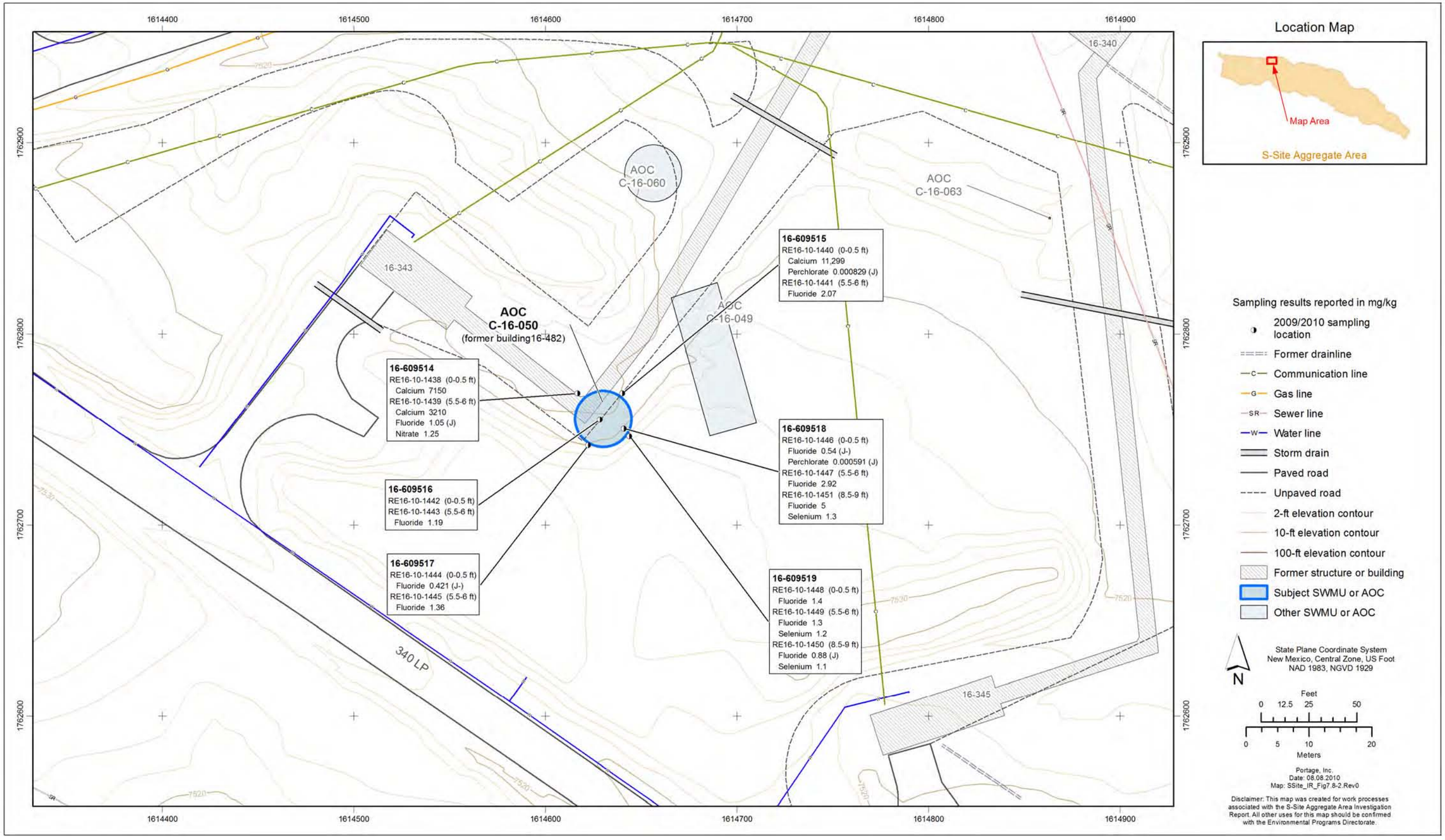


Figure 7.8-2 Inorganic chemicals detected above BVs at AOC C-16-050

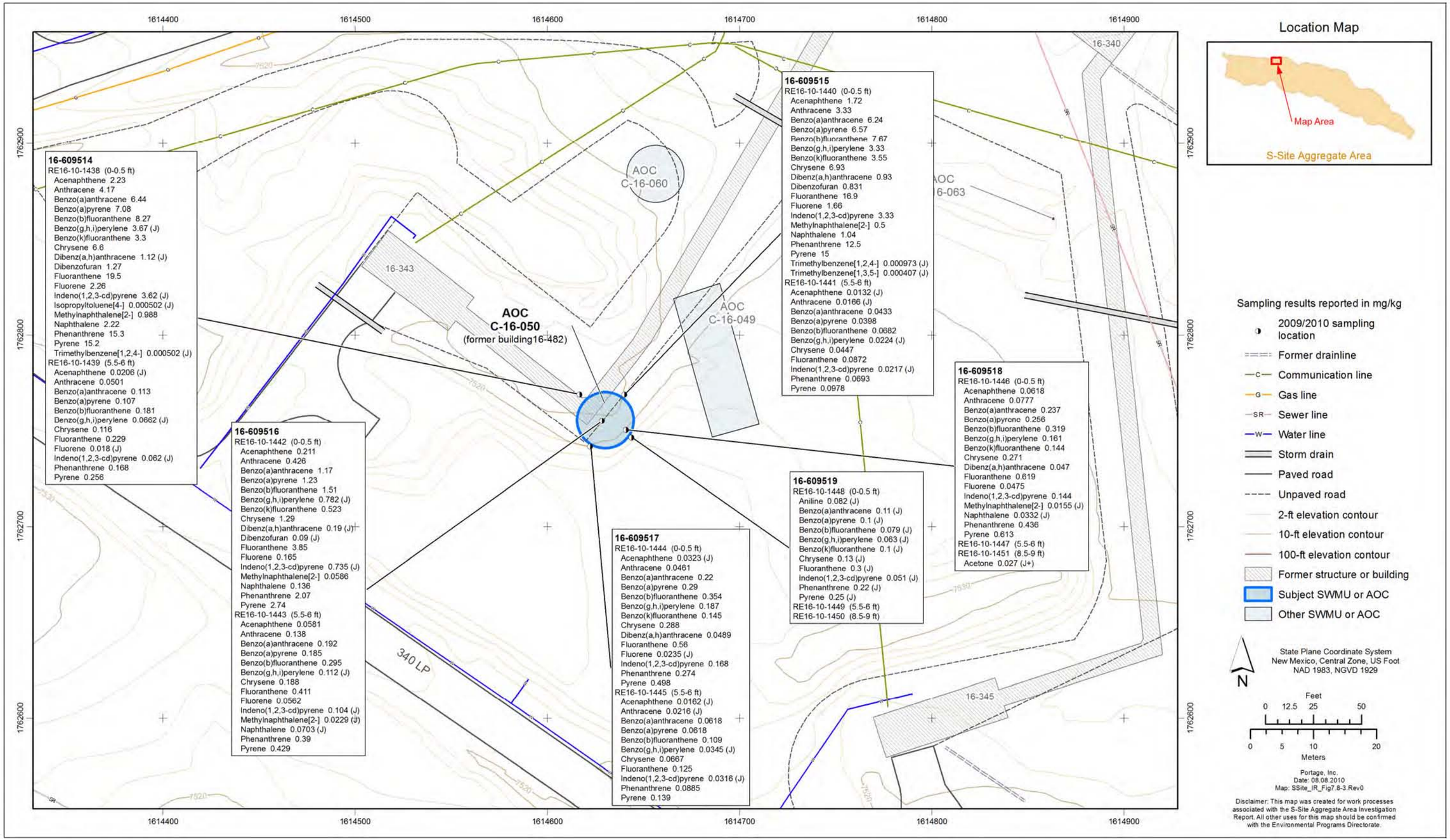


Figure 7.8-3 Organic chemicals detected in samples at AOC C-16-050

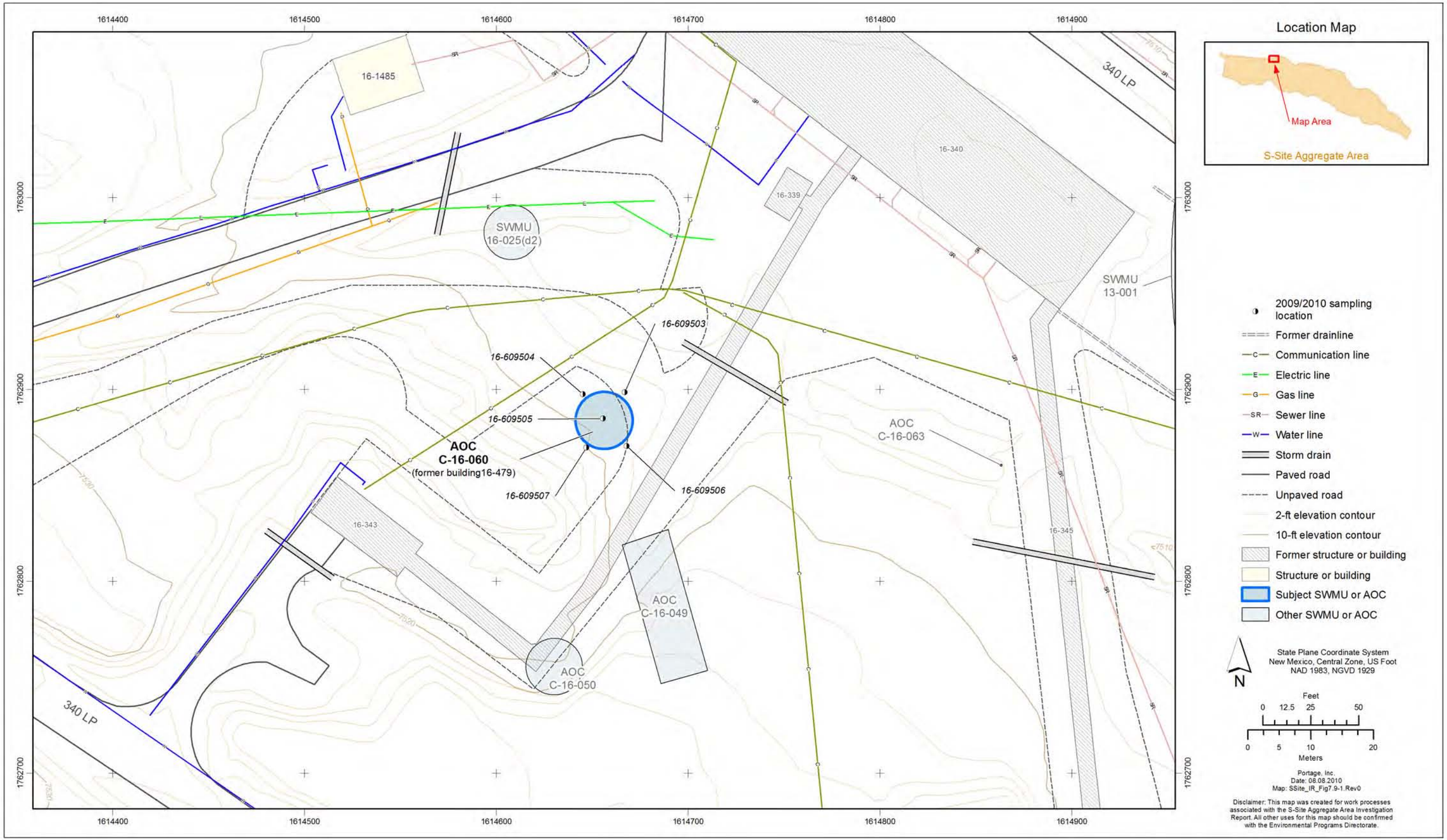


Figure 7.9-1 Locations sampled for AOC C-16-060

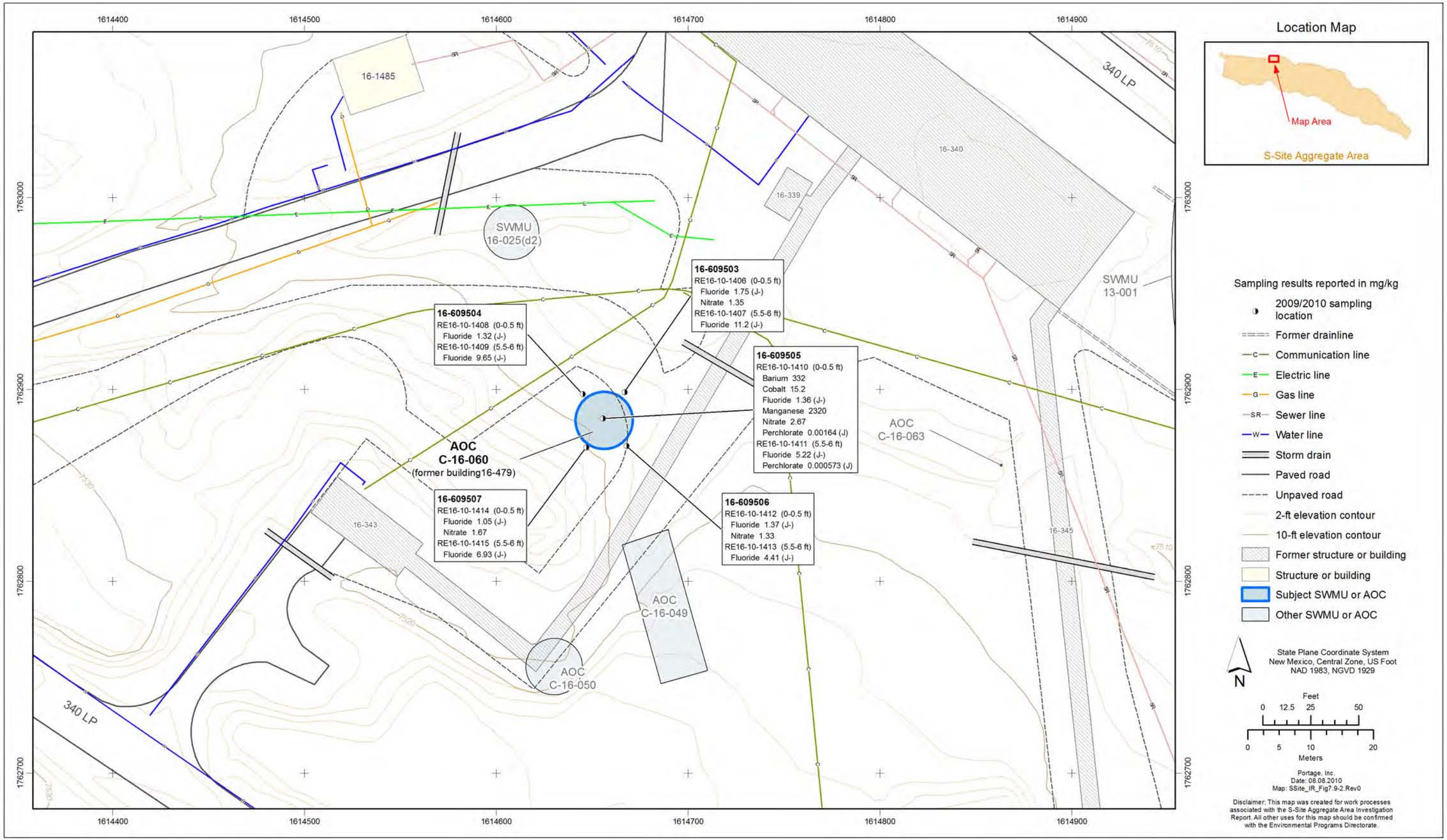


Figure 7.9-2 Inorganic chemicals detected above BVs at AOC C-16-060

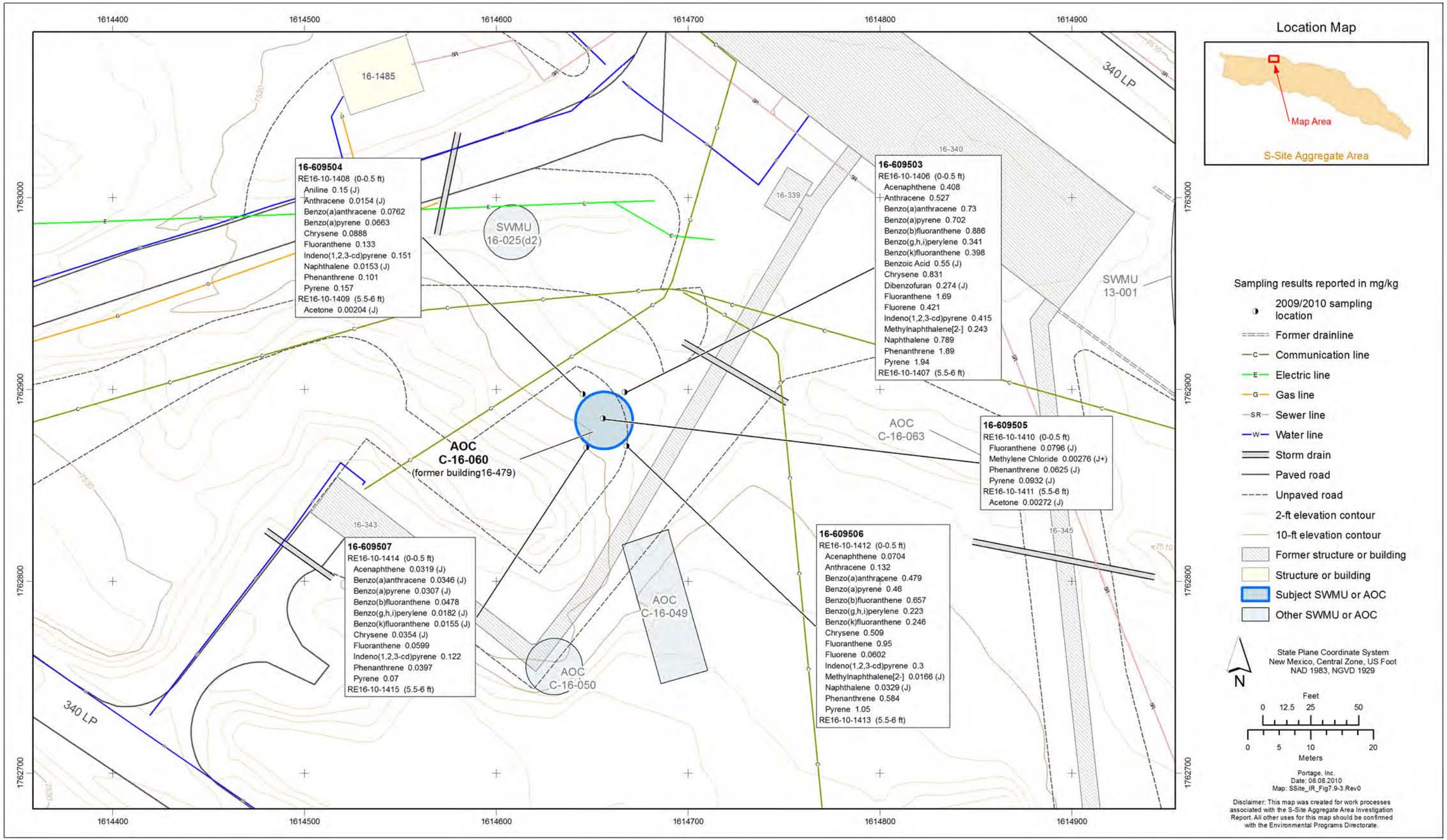


Figure 7.9-3 Organic chemicals detected in samples at AOC C-16-060

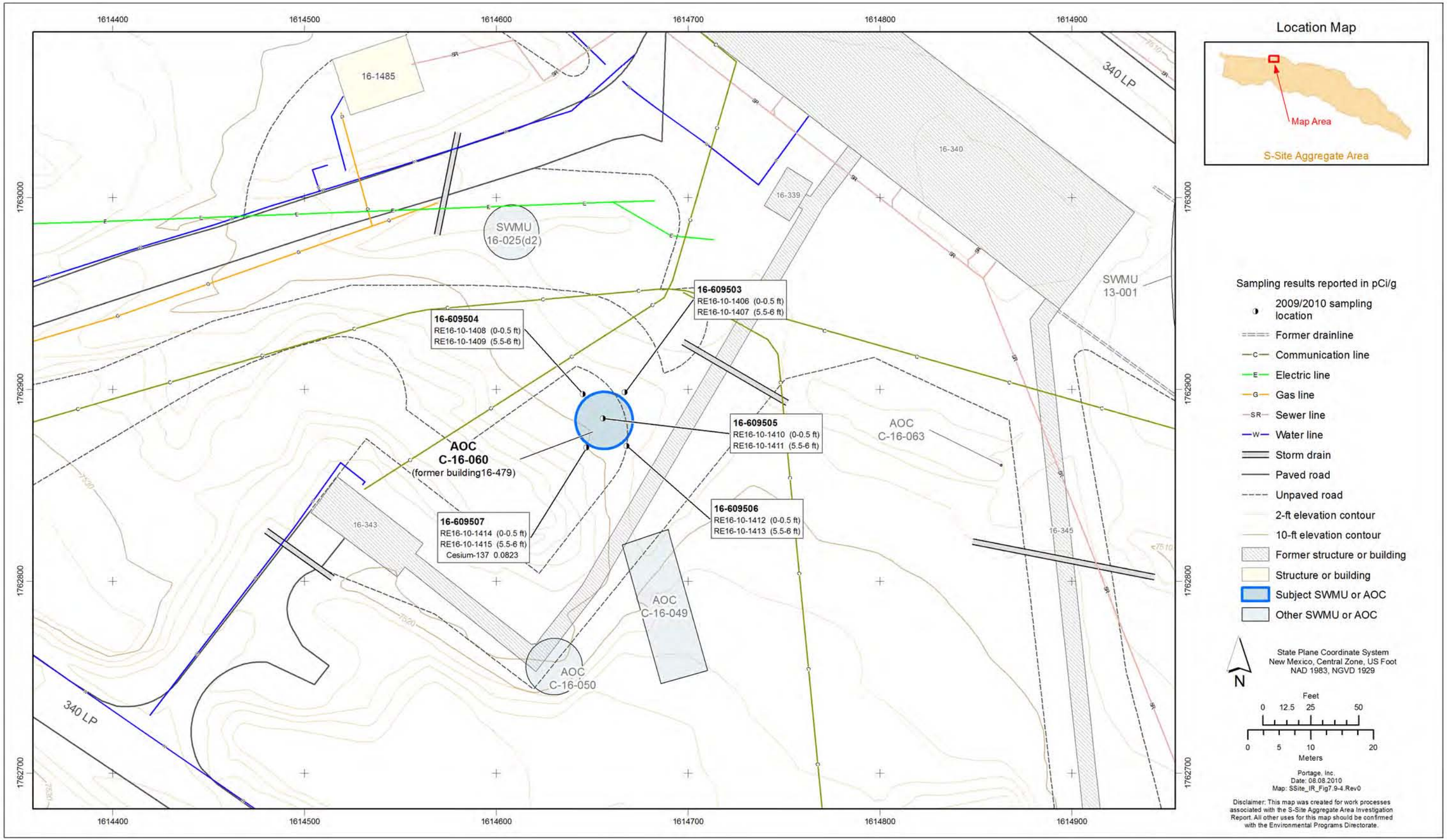


Figure 7.9-4 Radionuclides detected or detected above BVs/FVs at AOC C-16-060

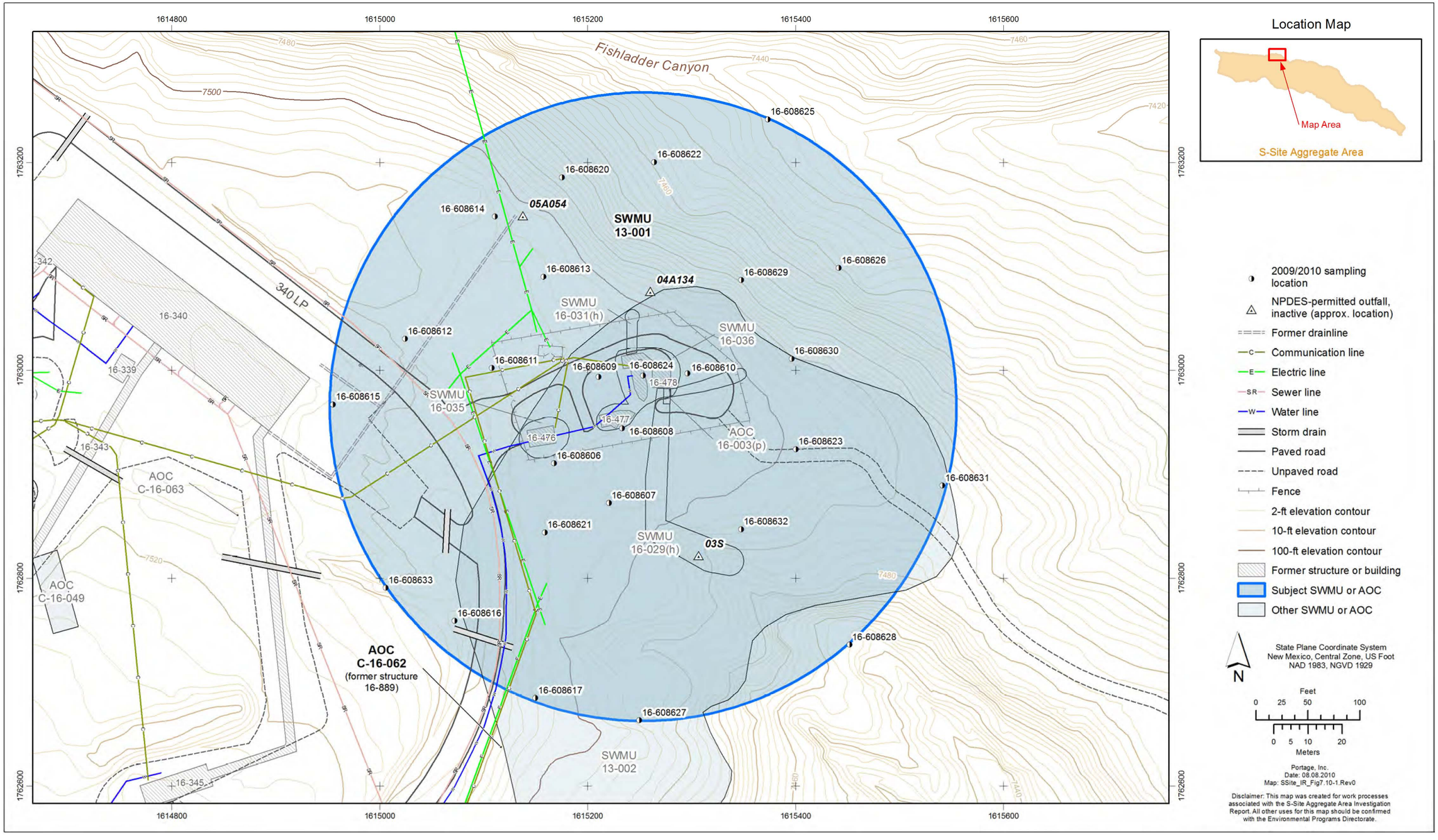


Figure 7.10-1 Locations sampled for SWMU 13-001

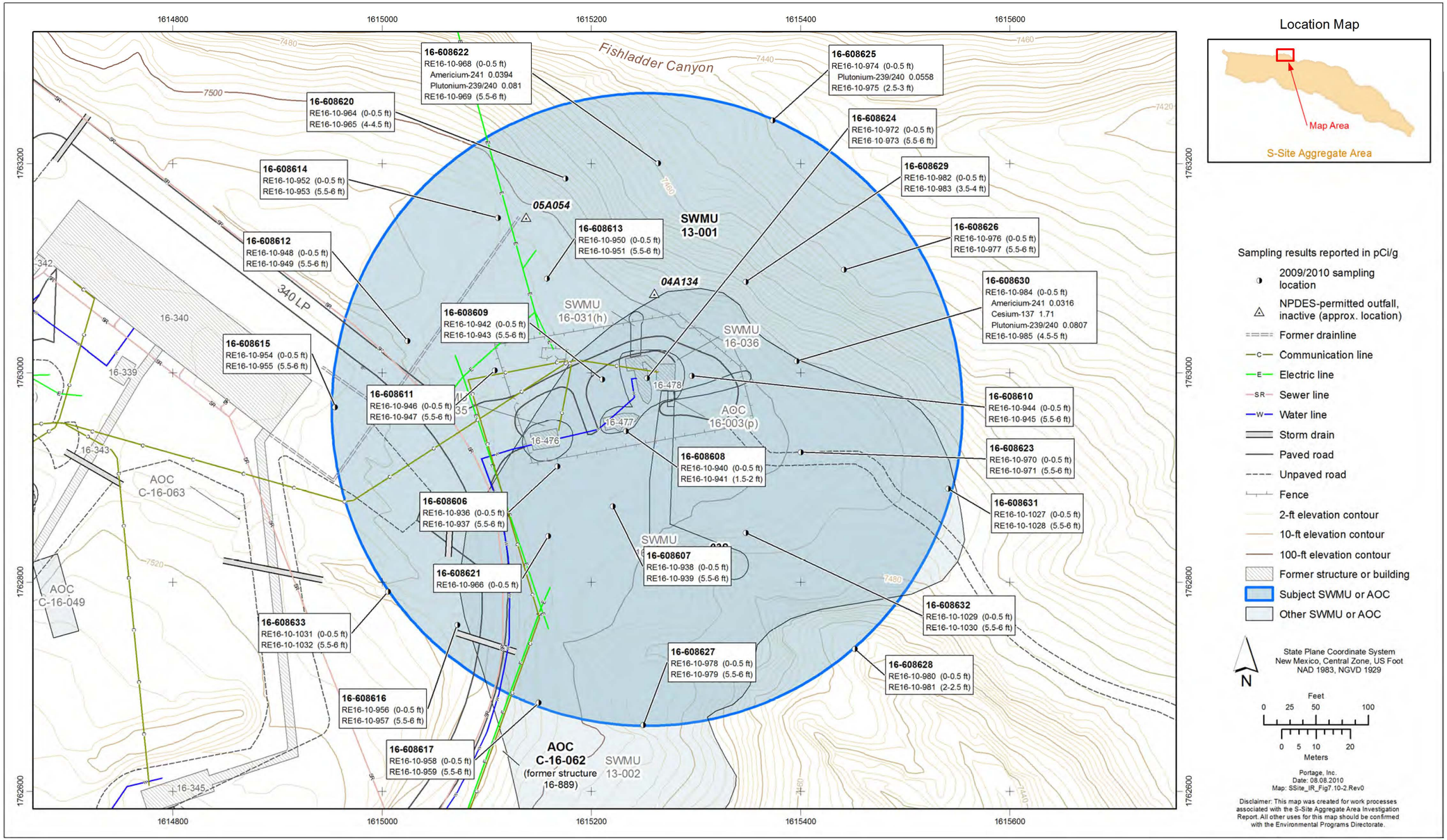


Figure 7.10-2 Radionuclides detected or detected above BVs/FVs at SWMU 13-001

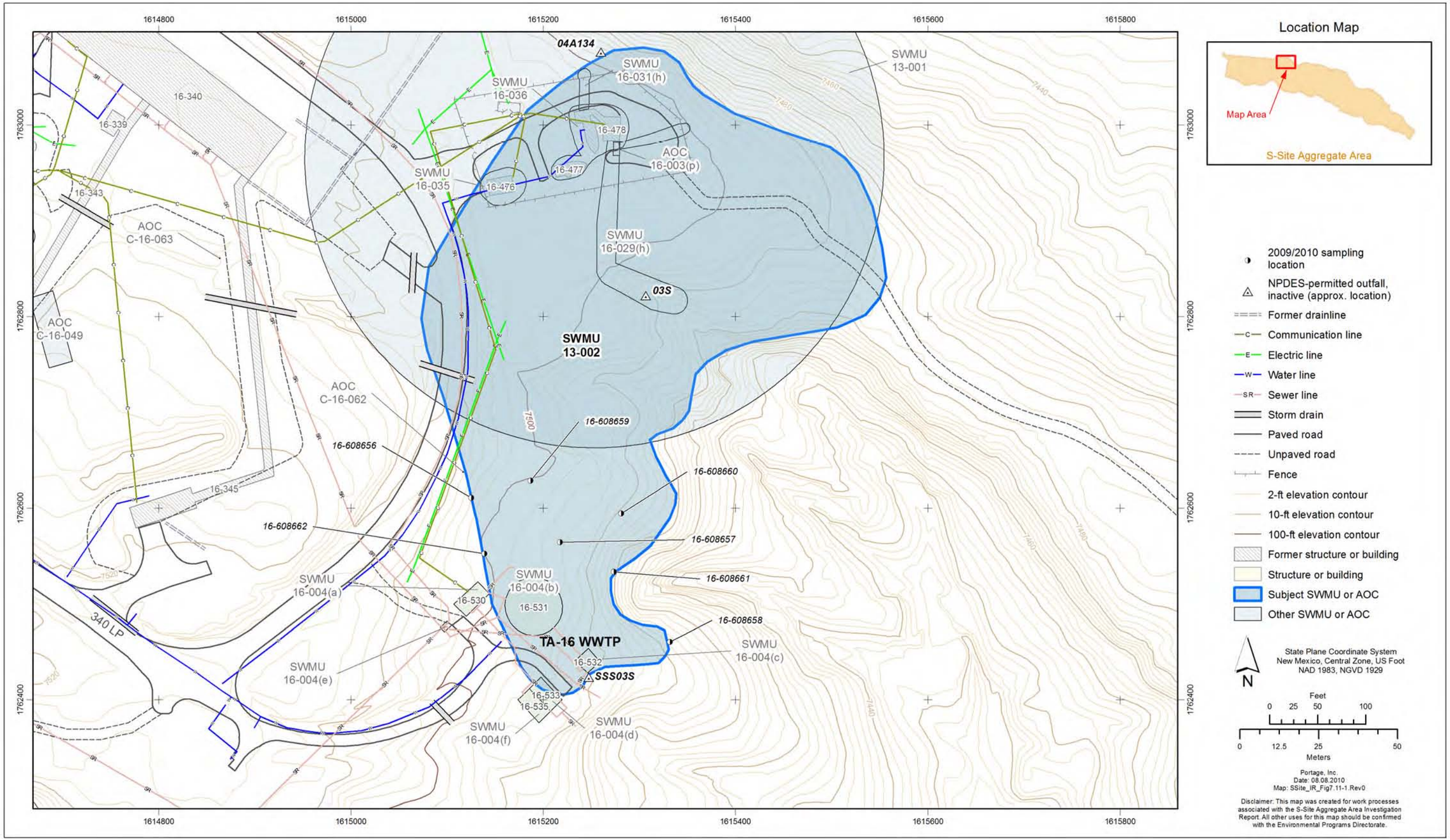


Figure 7.11-1 Locations sampled for SWMU 13-002

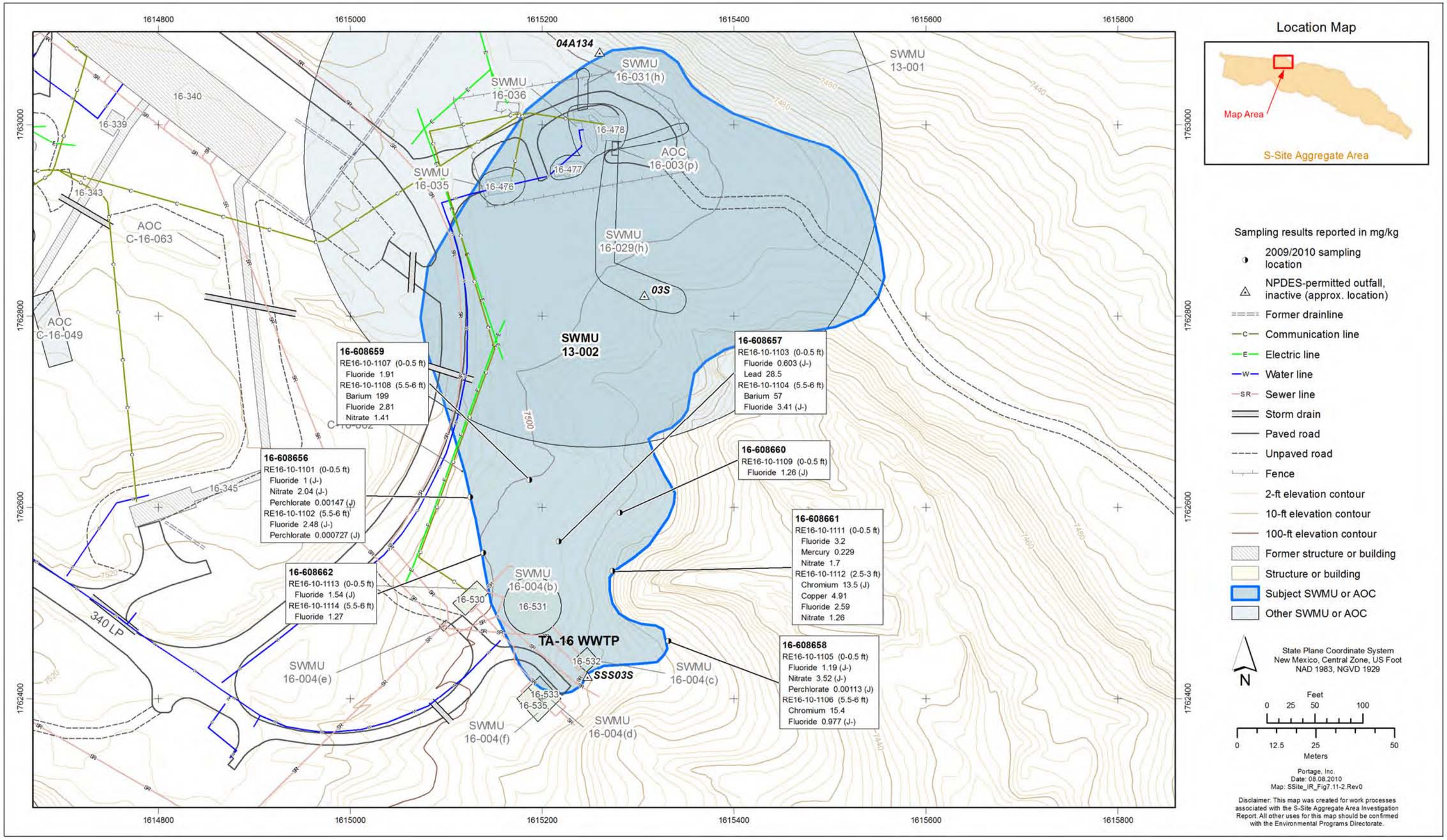


Figure 7.11-2 Inorganic chemicals detected above BVs at SWMU 13-002

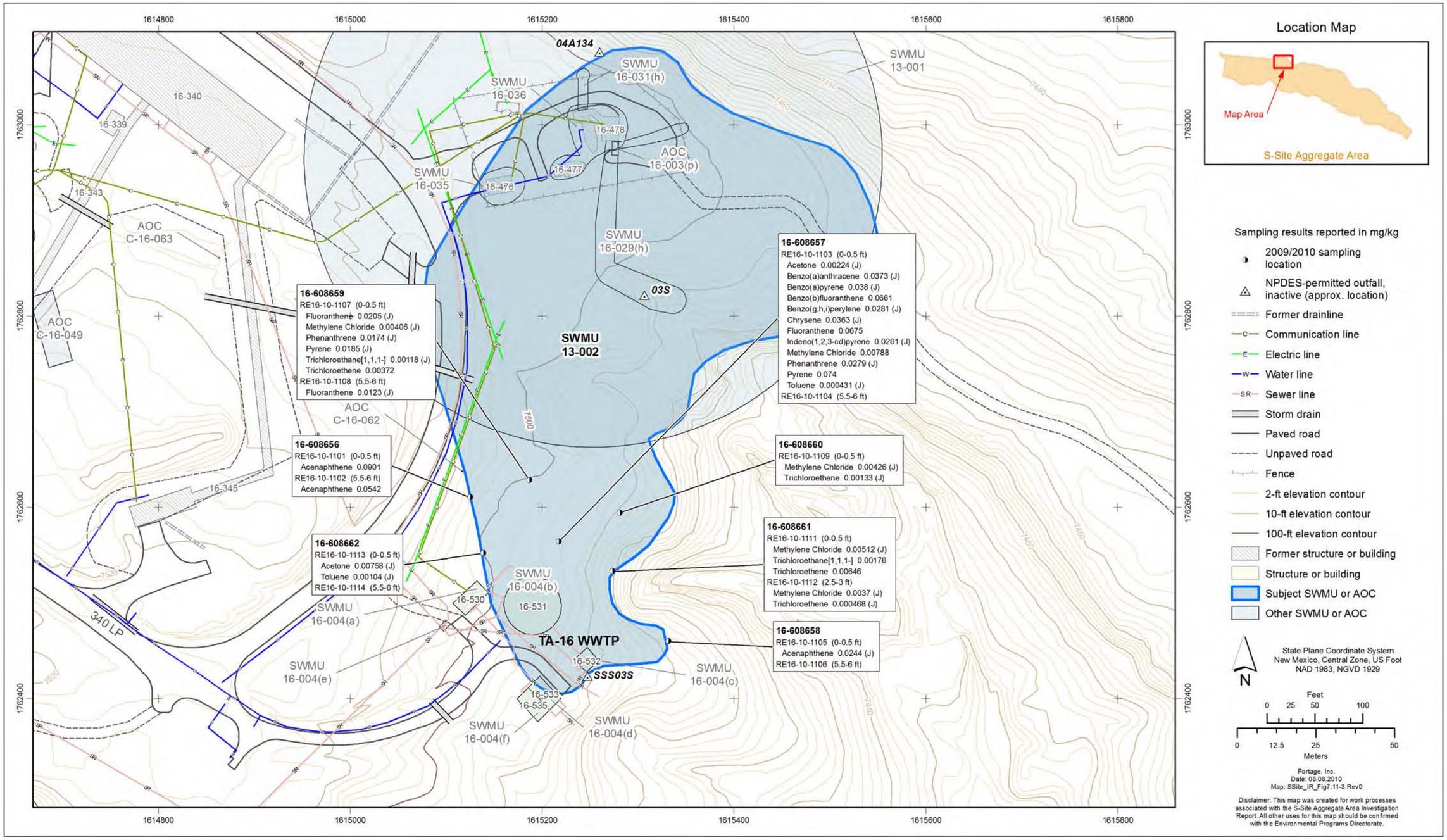


Figure 7.11-3 Organic chemicals detected in samples at SWMU 13-002

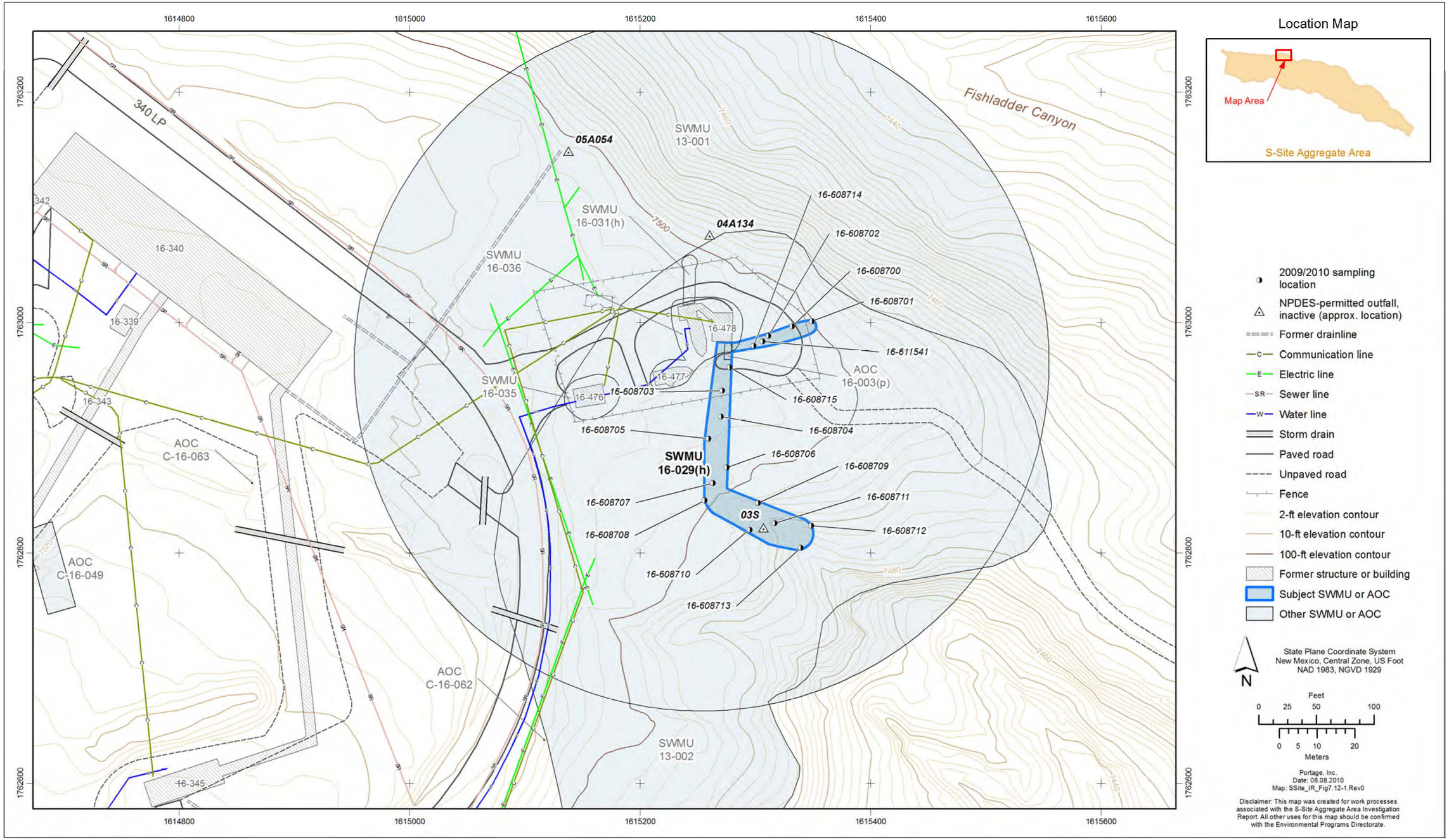


Figure 7.12-1 Locations sampled for SWMU 16-029(h)

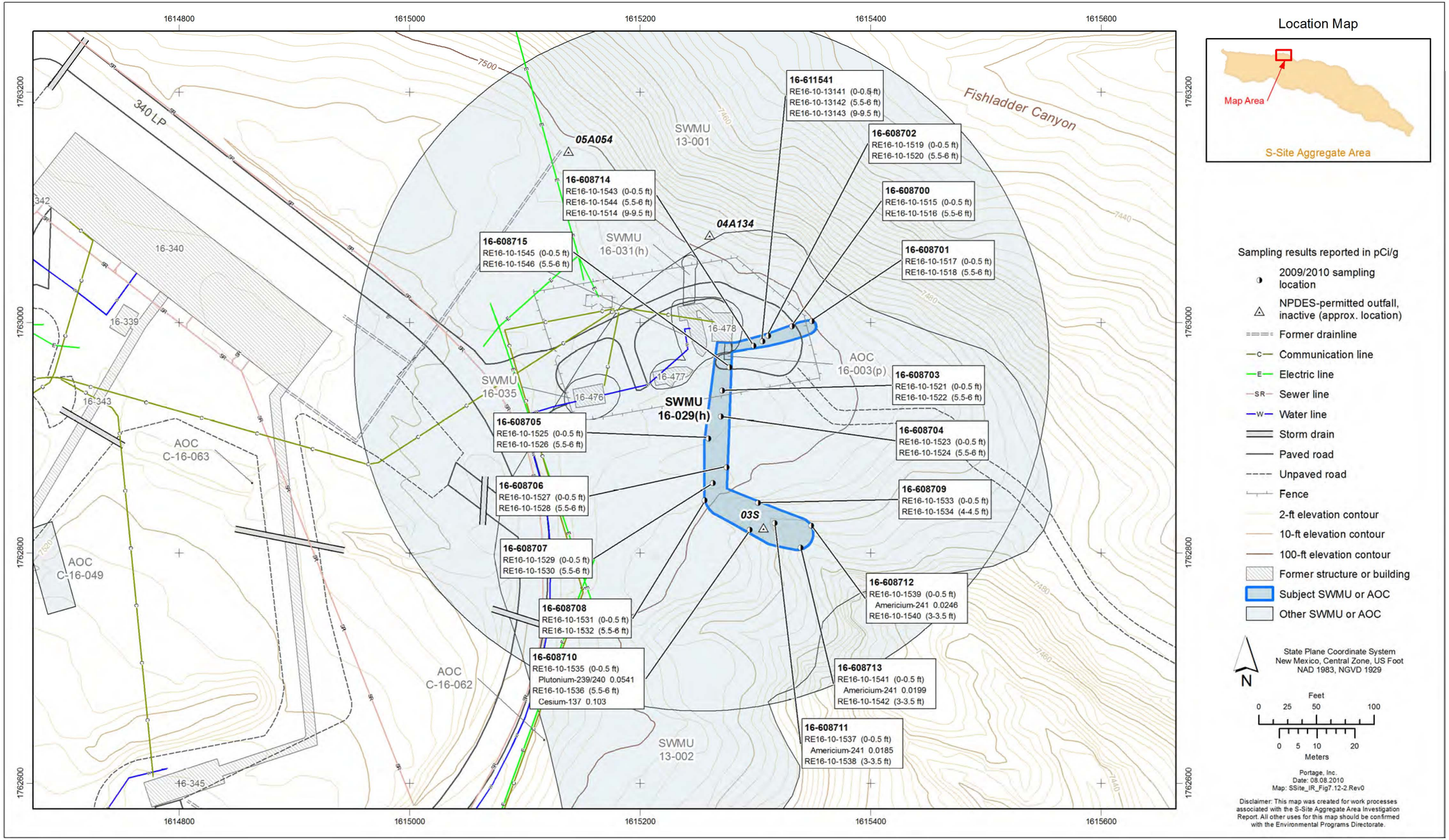


Figure 7.12-2 Radionuclides detected or detected above BVs/FVs at SWMU 16-029(h)

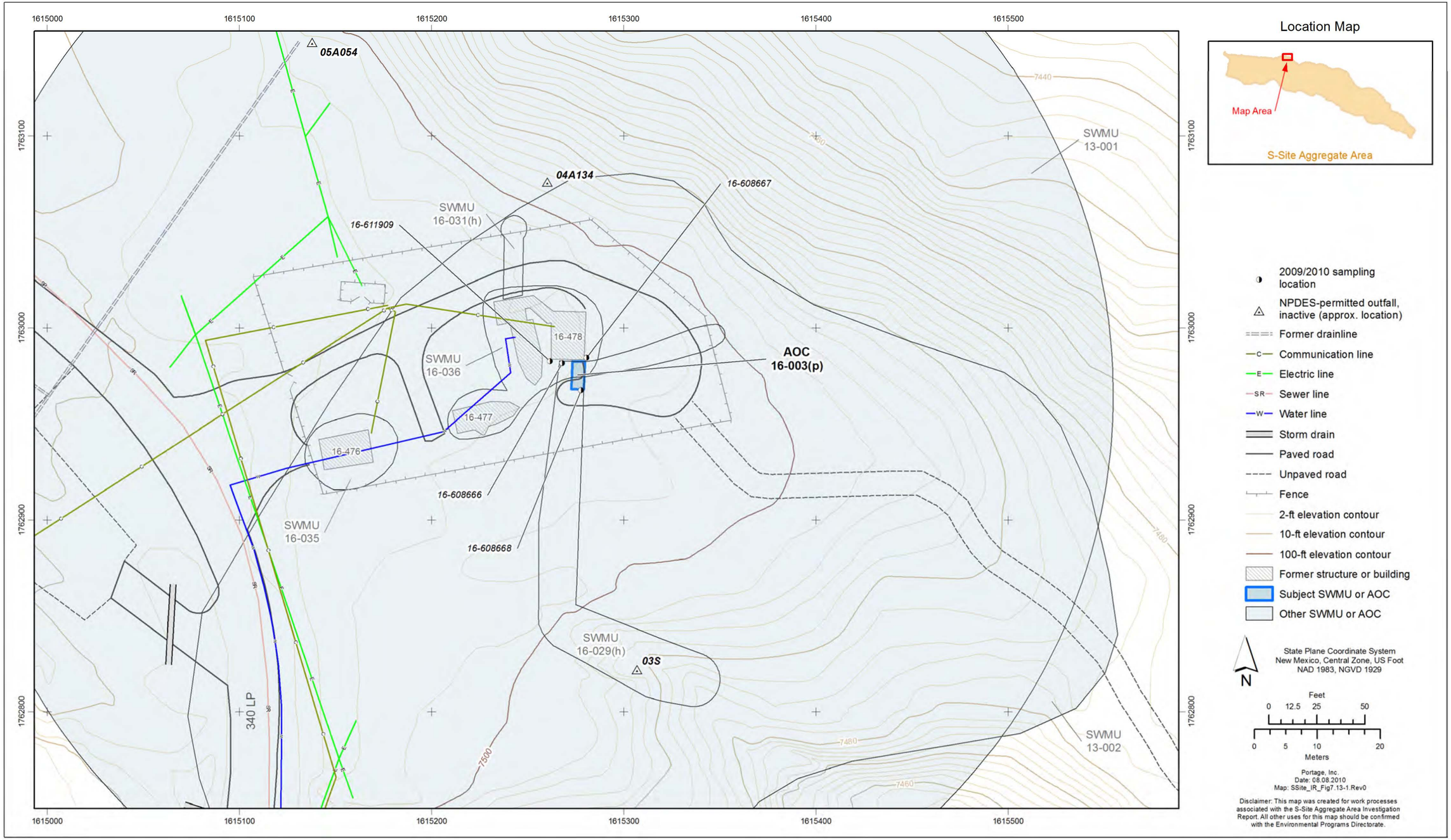


Figure 7.13-1 Locations sampled for AOC 16-003(p)

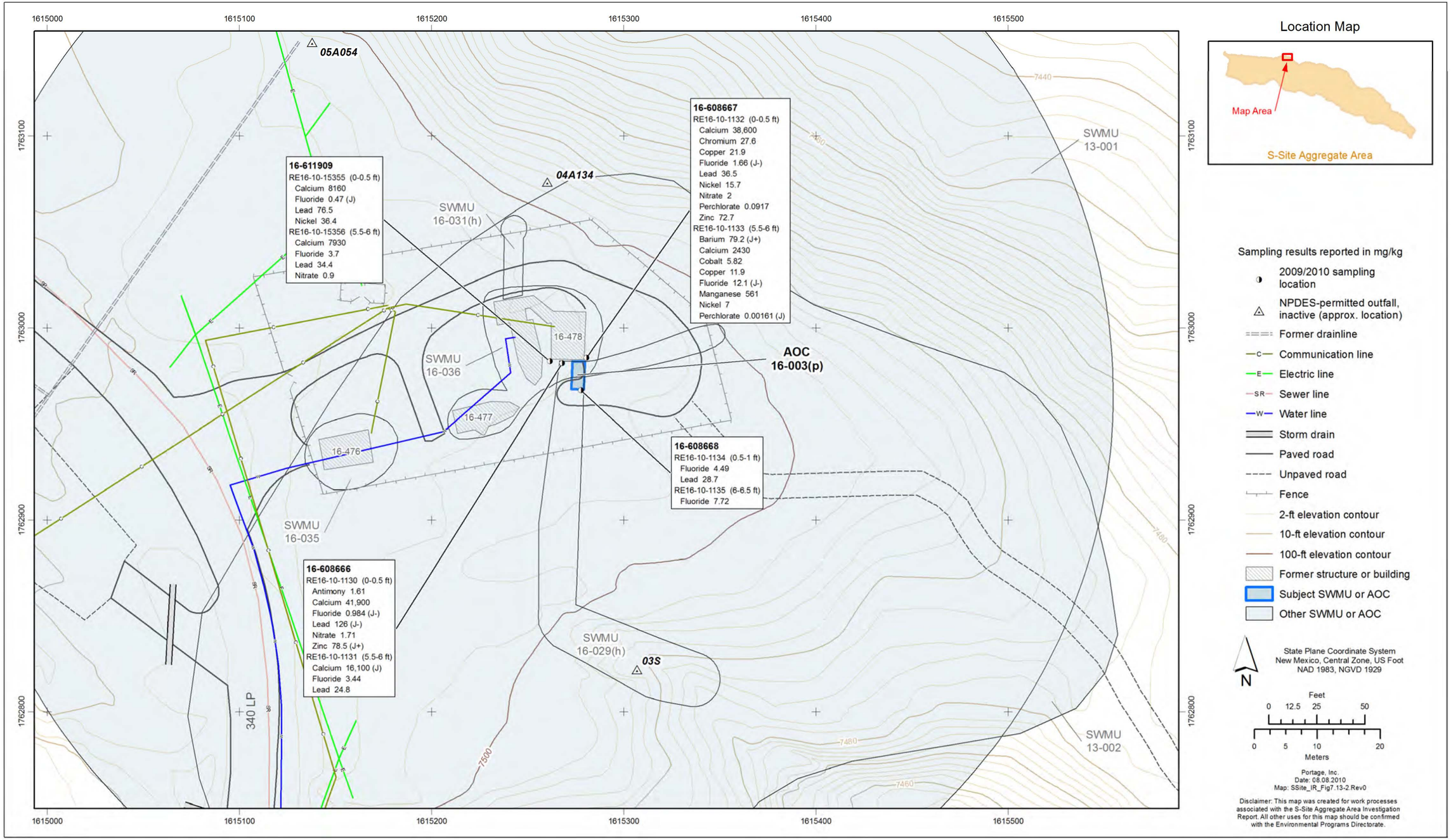


Figure 7.13-2 Inorganic chemicals detected above BVs at AOC 16-003(p)

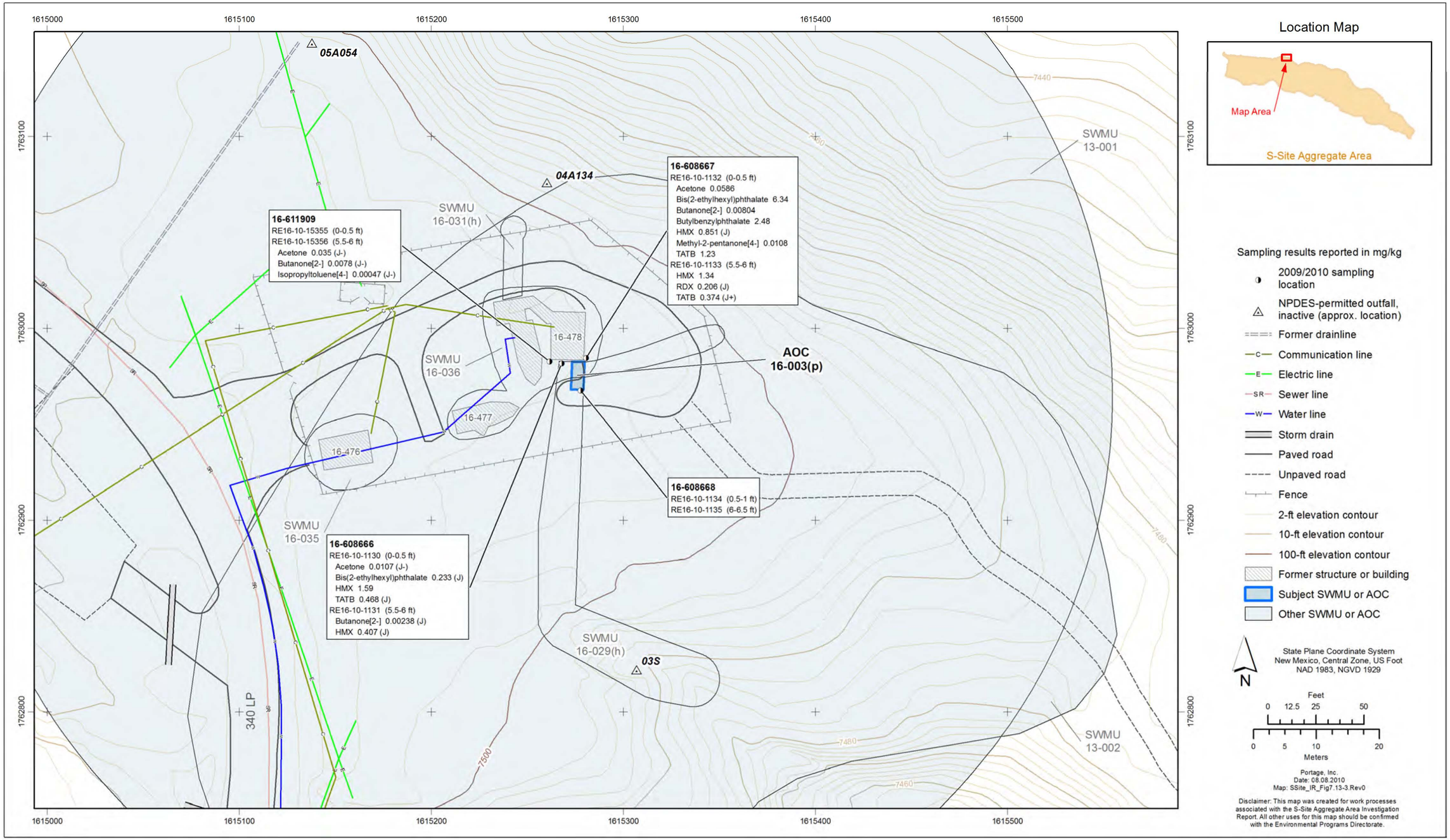


Figure 7.13-3 Organic chemicals detected in samples at AOC 16-003(p)

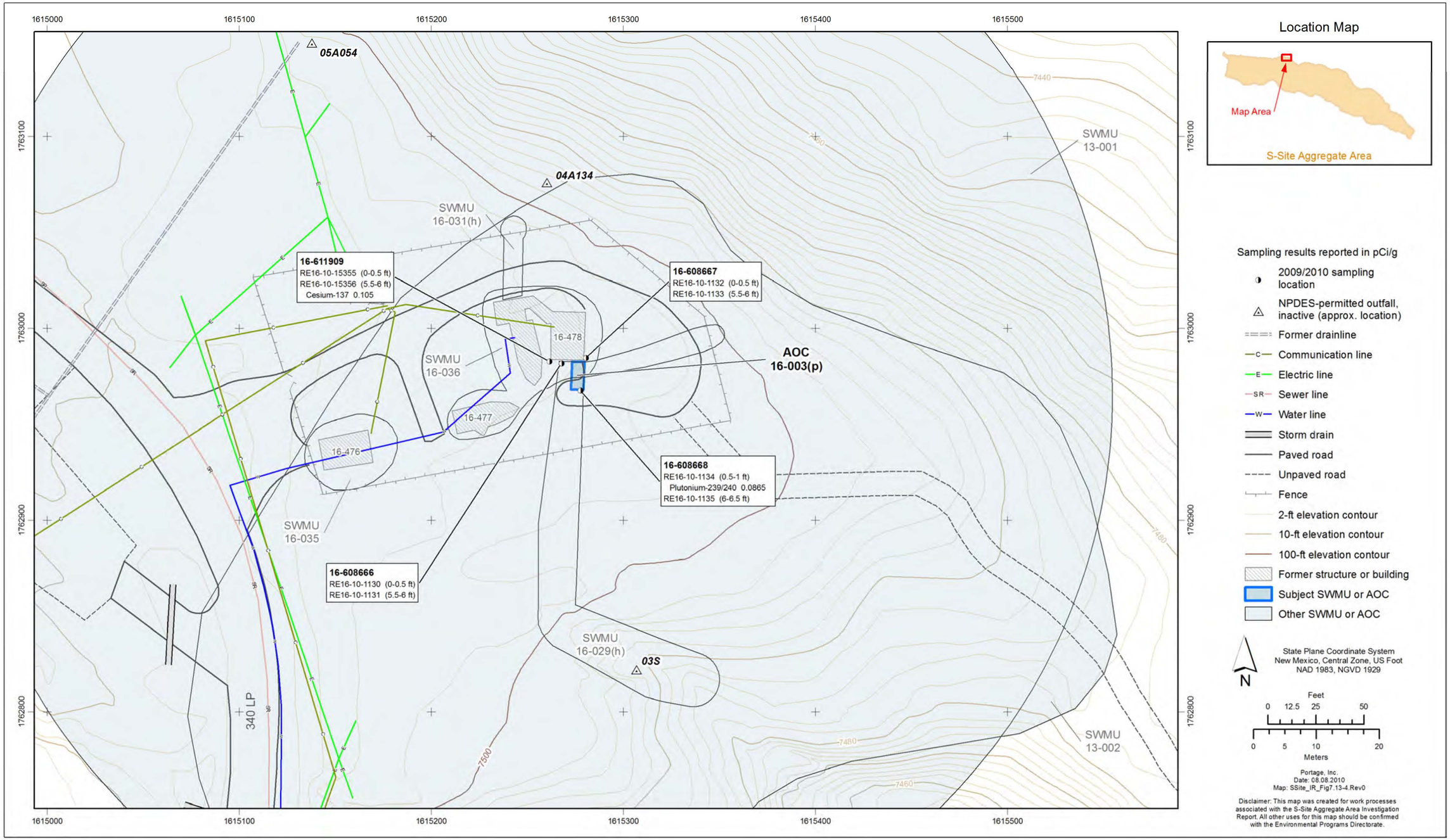


Figure 7.13-4 Radionuclides detected or detected above BVs/FVs at AOC 16-003(p)

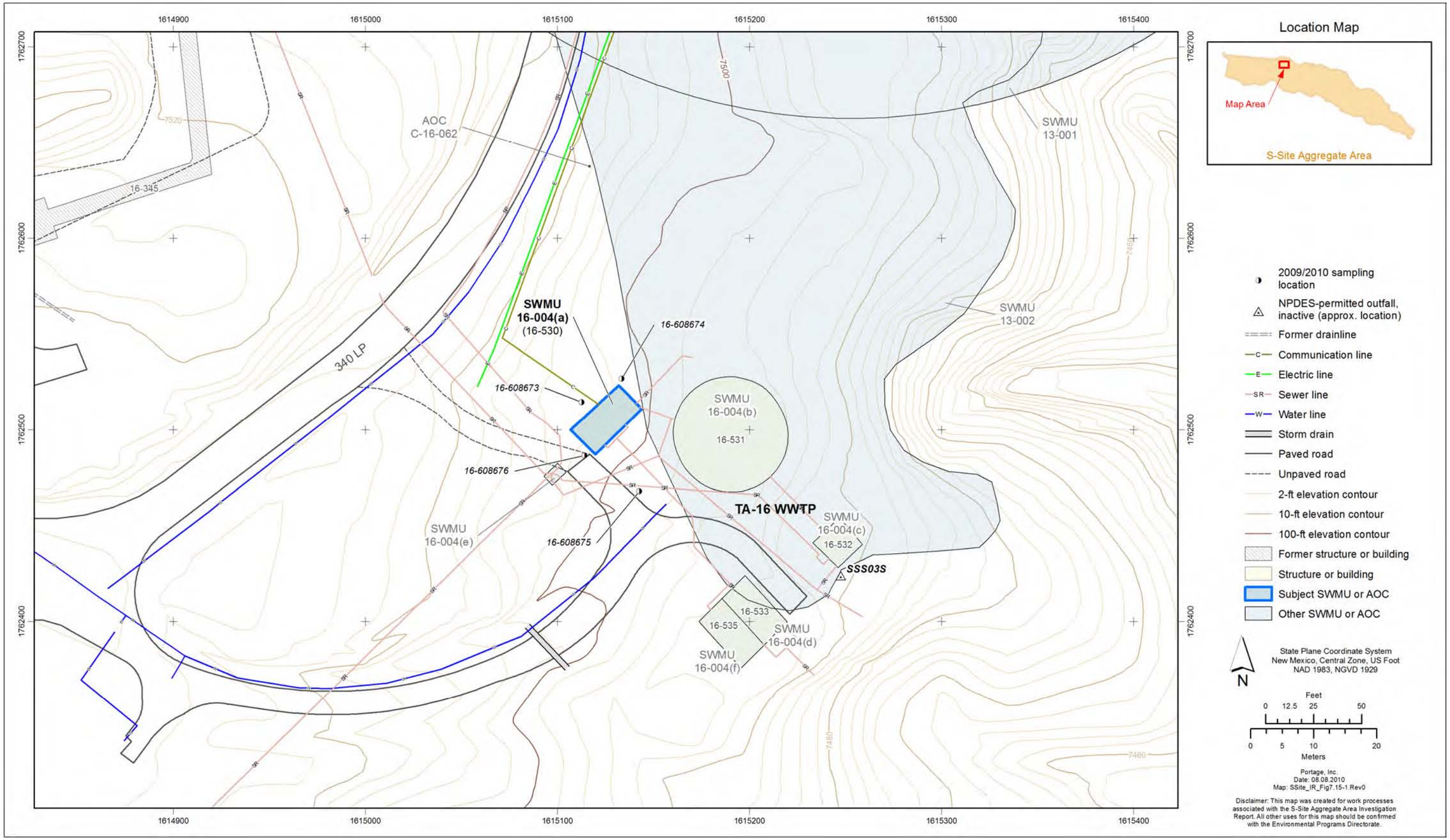


Figure 7.15-1 Locations sampled for SWMU 16-004(a)

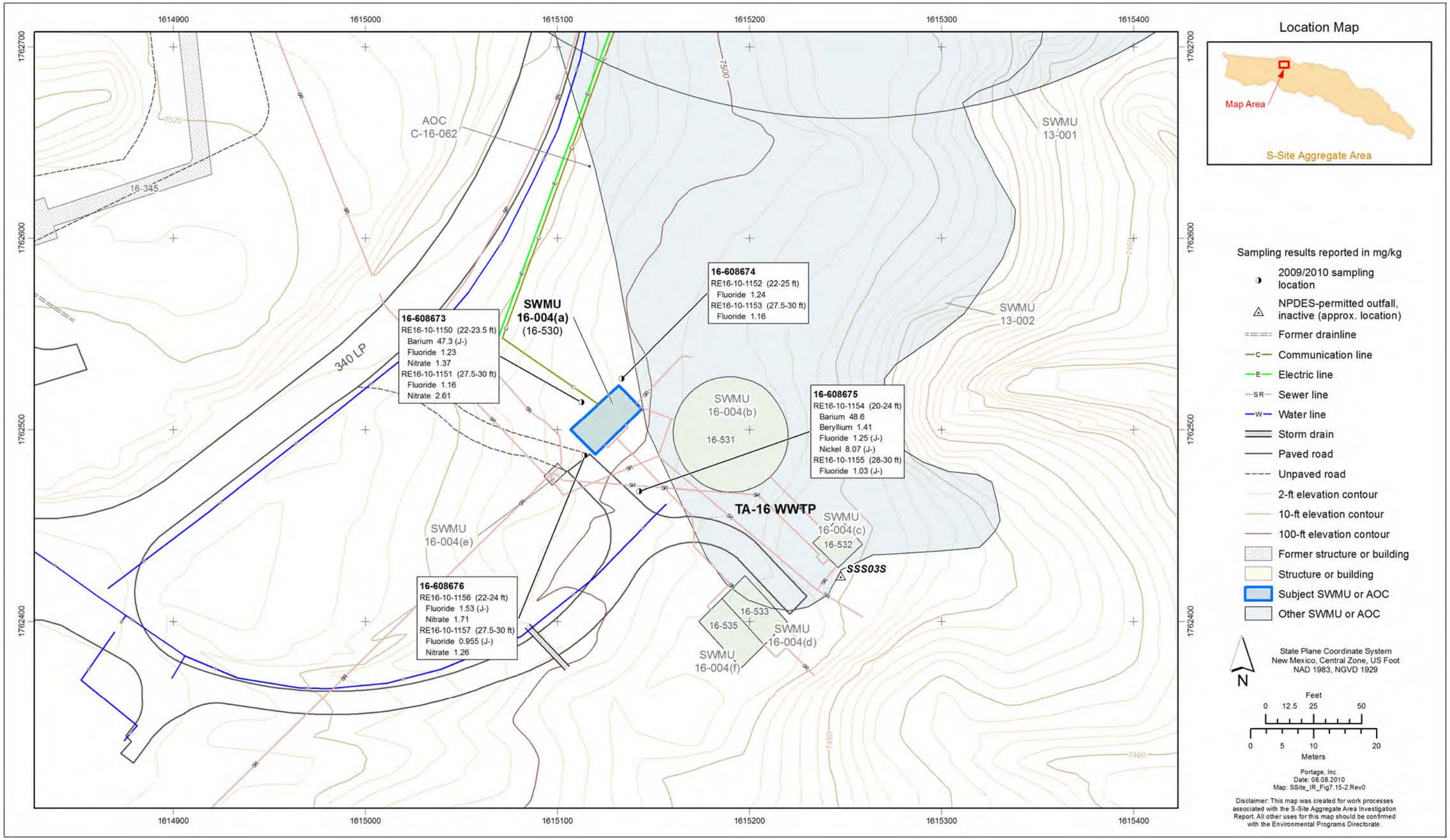


Figure 7.15-2 Inorganic chemicals detected above BVs at SWMU 16-004(a)

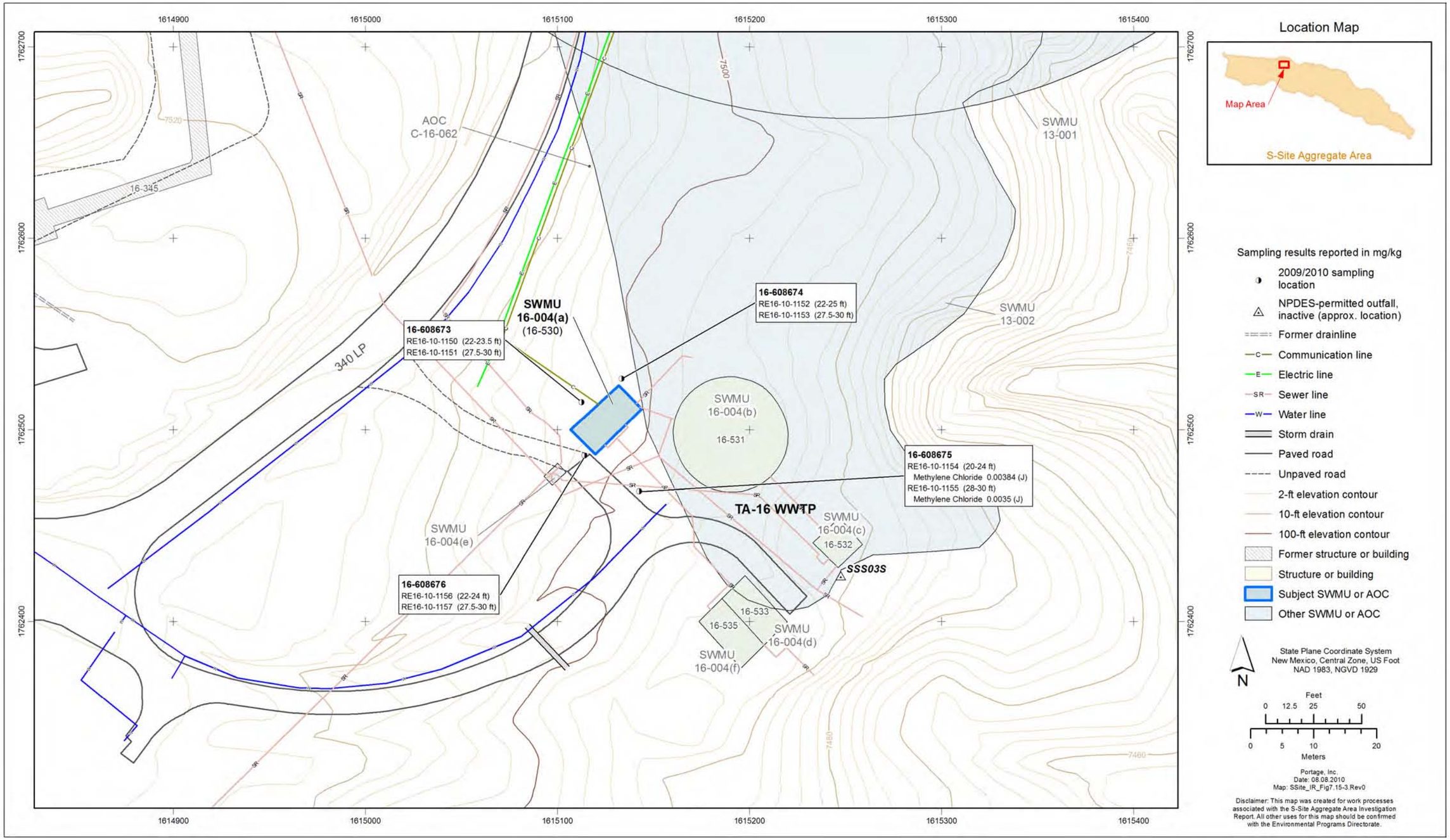


Figure 7.15-3 Organic chemicals detected in samples at SWMU 16-004(a)

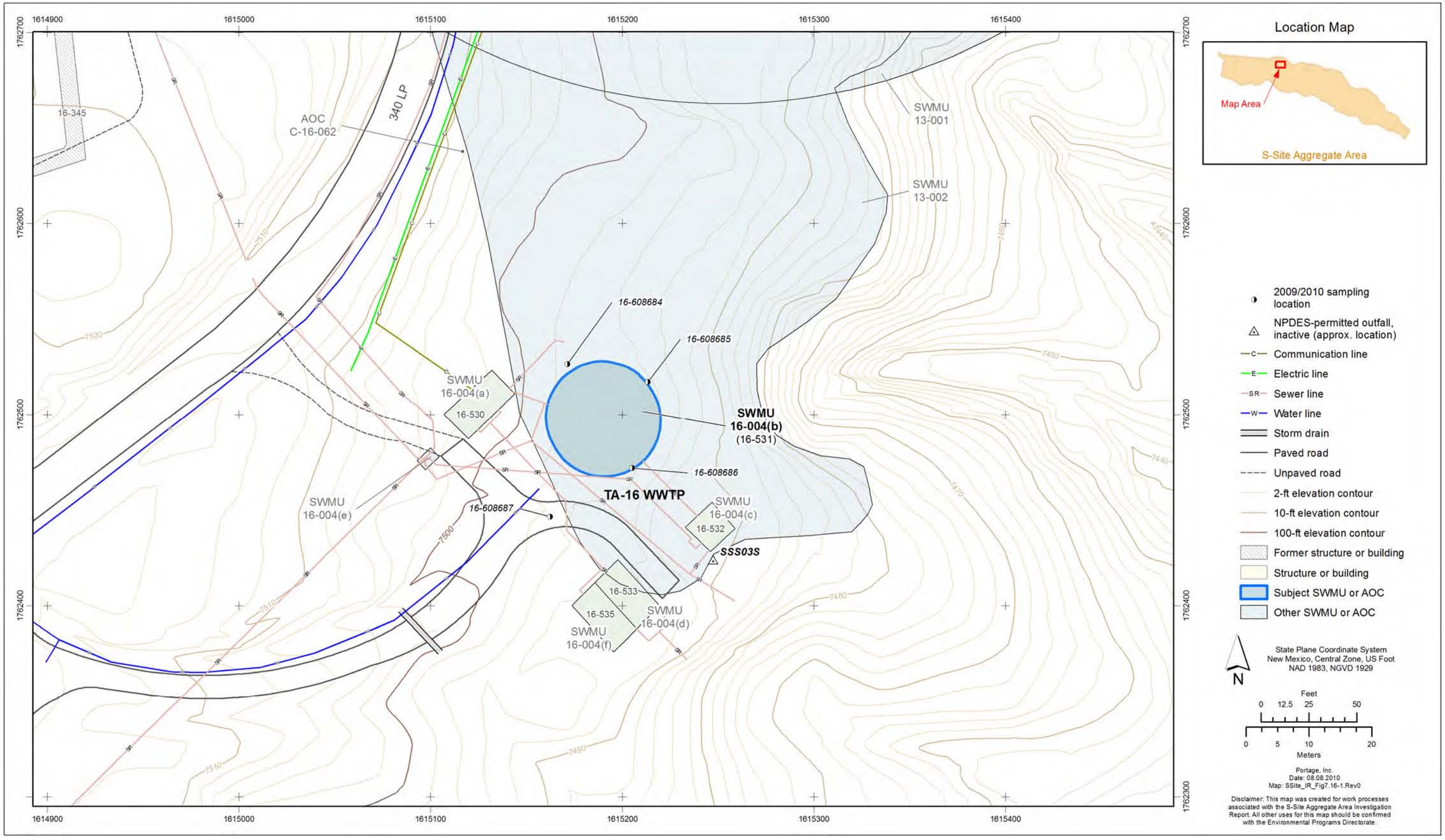


Figure 7.16-1 Locations sampled for SWMU 16-004(b)

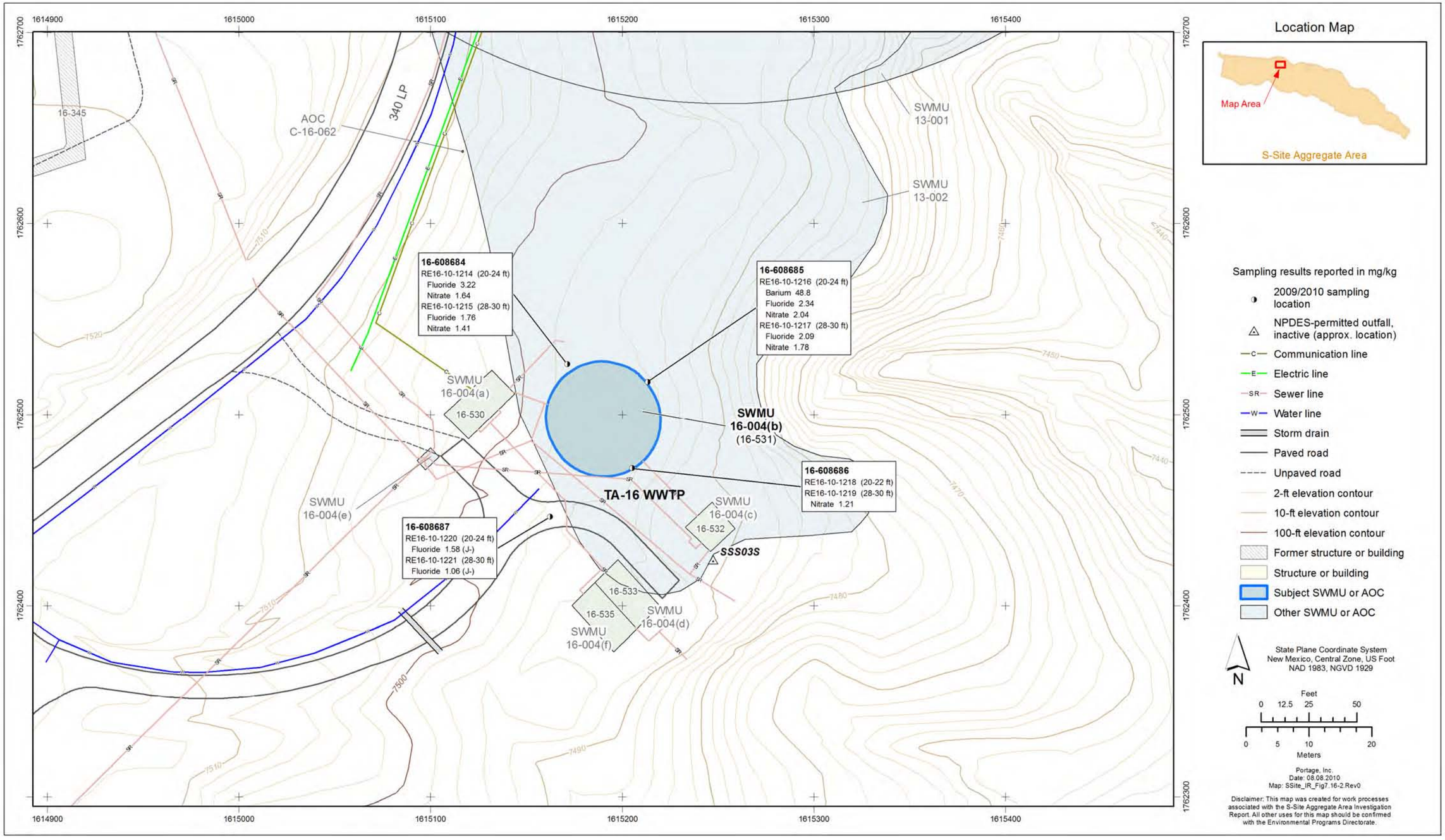


Figure 7.16-2 Inorganic chemicals detected above BVs at SWMU 16-004(b)

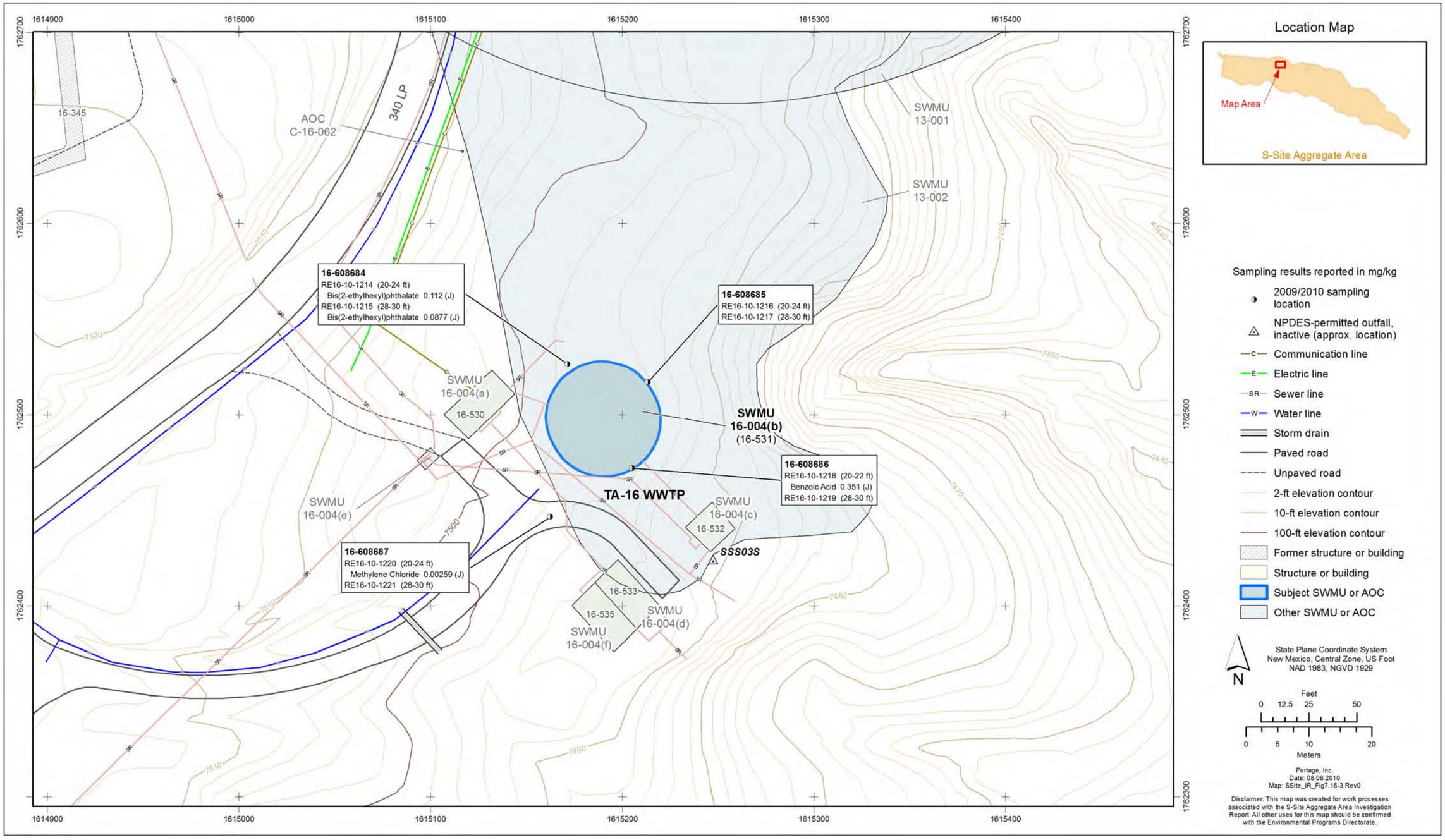


Figure 7.16-3 Organic chemicals detected in samples at SWMU 16-004(b)

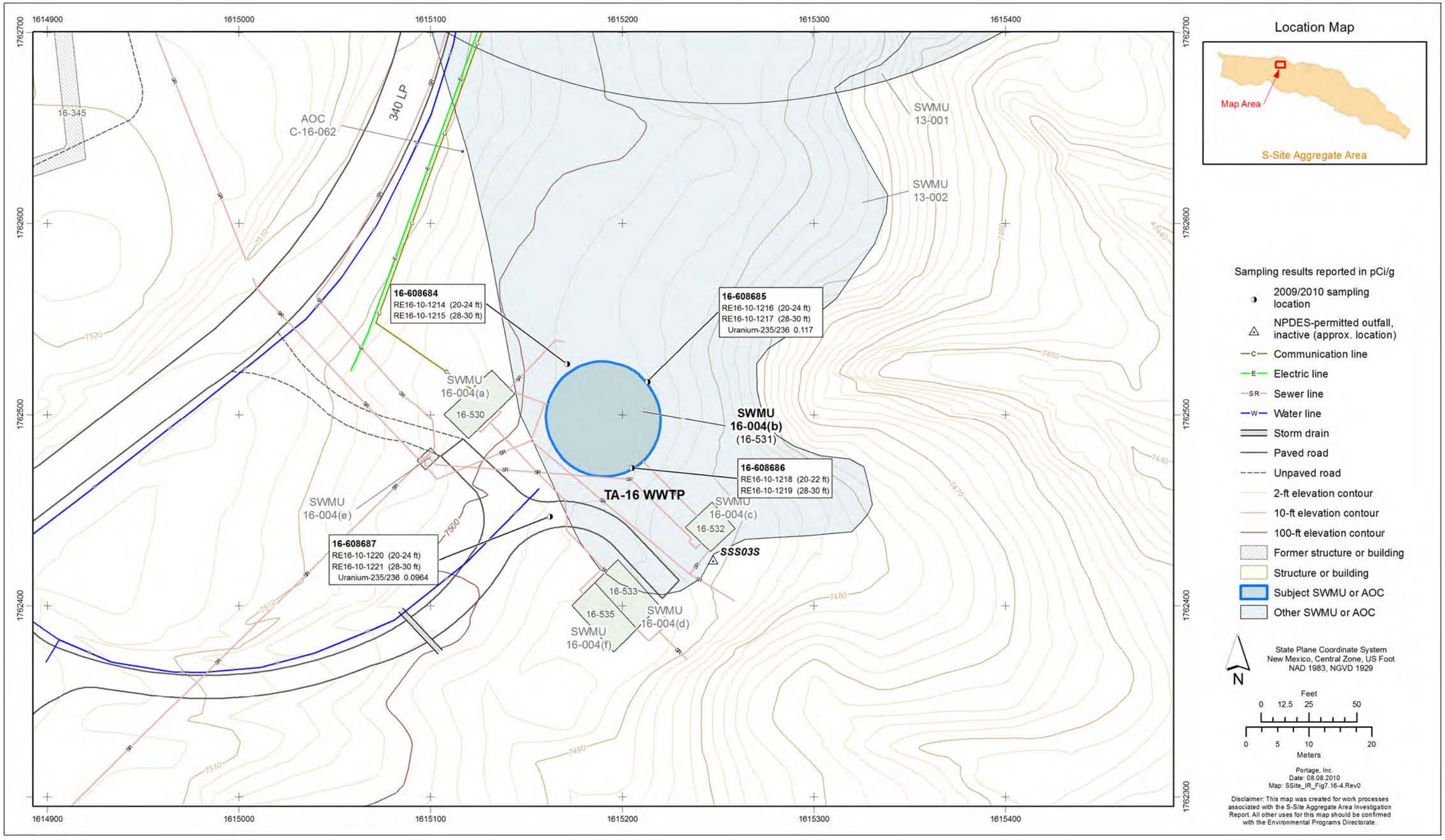


Figure 7.16-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-004(b)

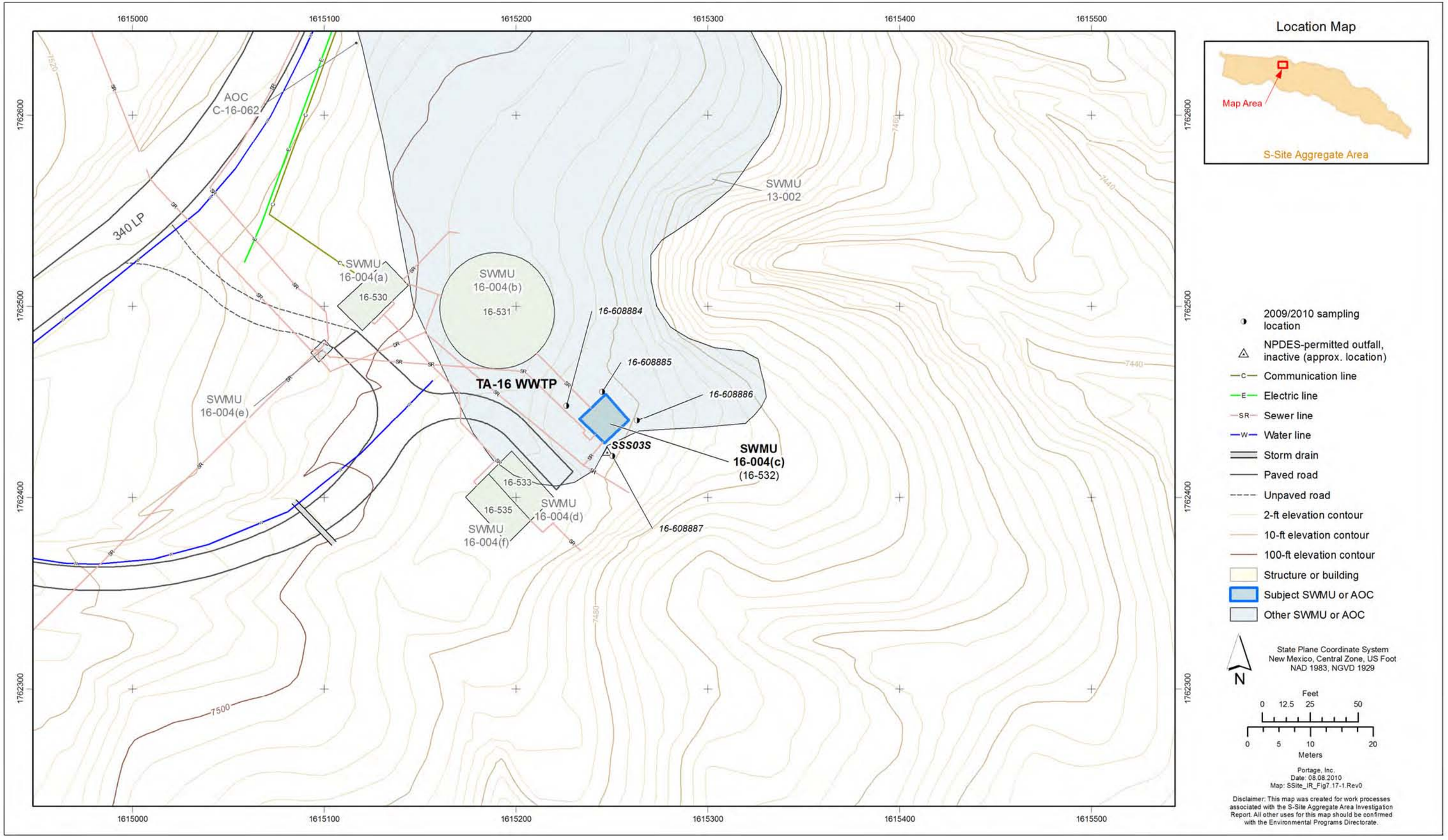


Figure 7.17-1 Locations sampled for SWMU 16-004(c)

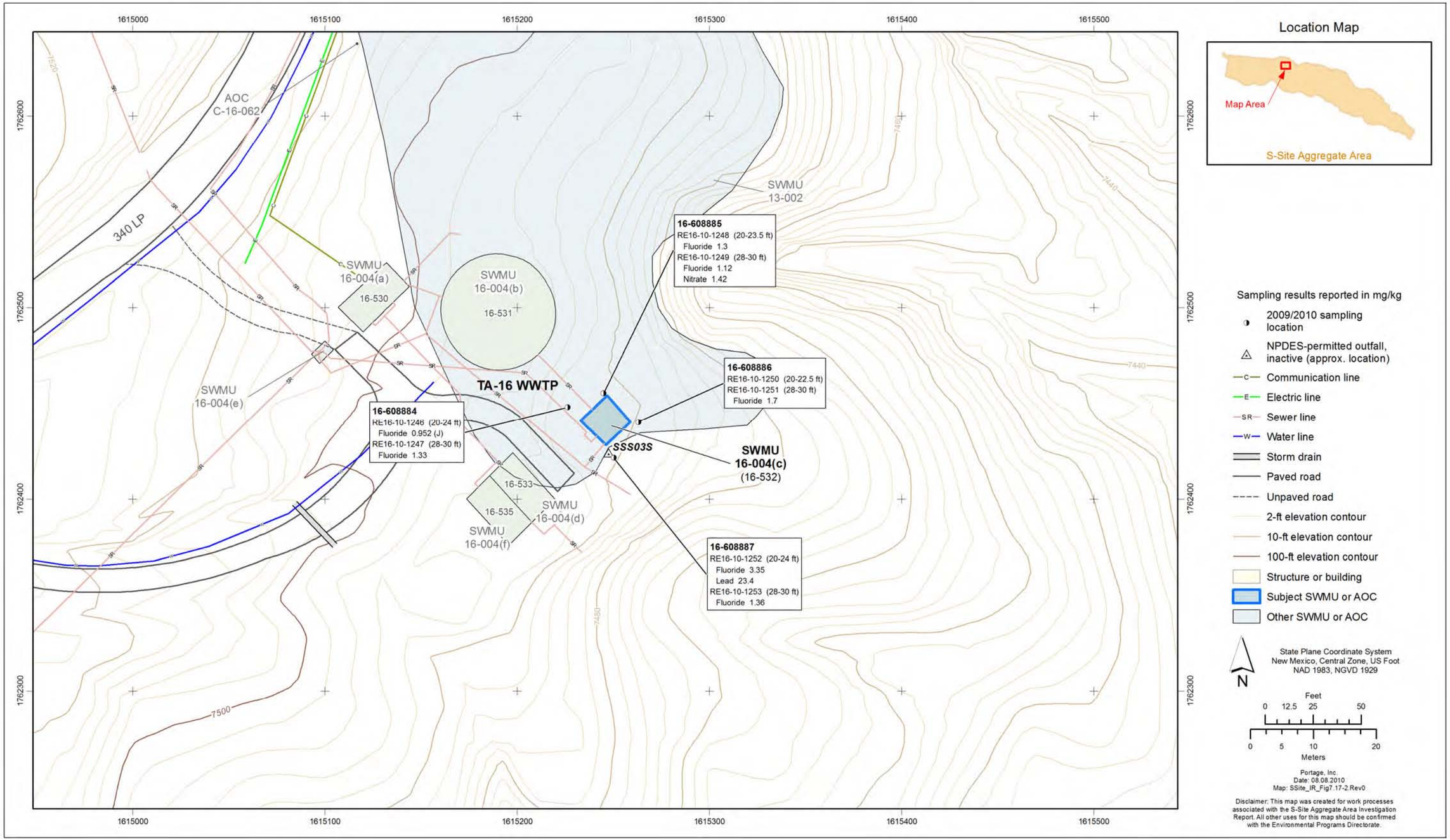


Figure 7.17-2 Inorganic chemicals detected above BVs at SWMU 16-004(c)

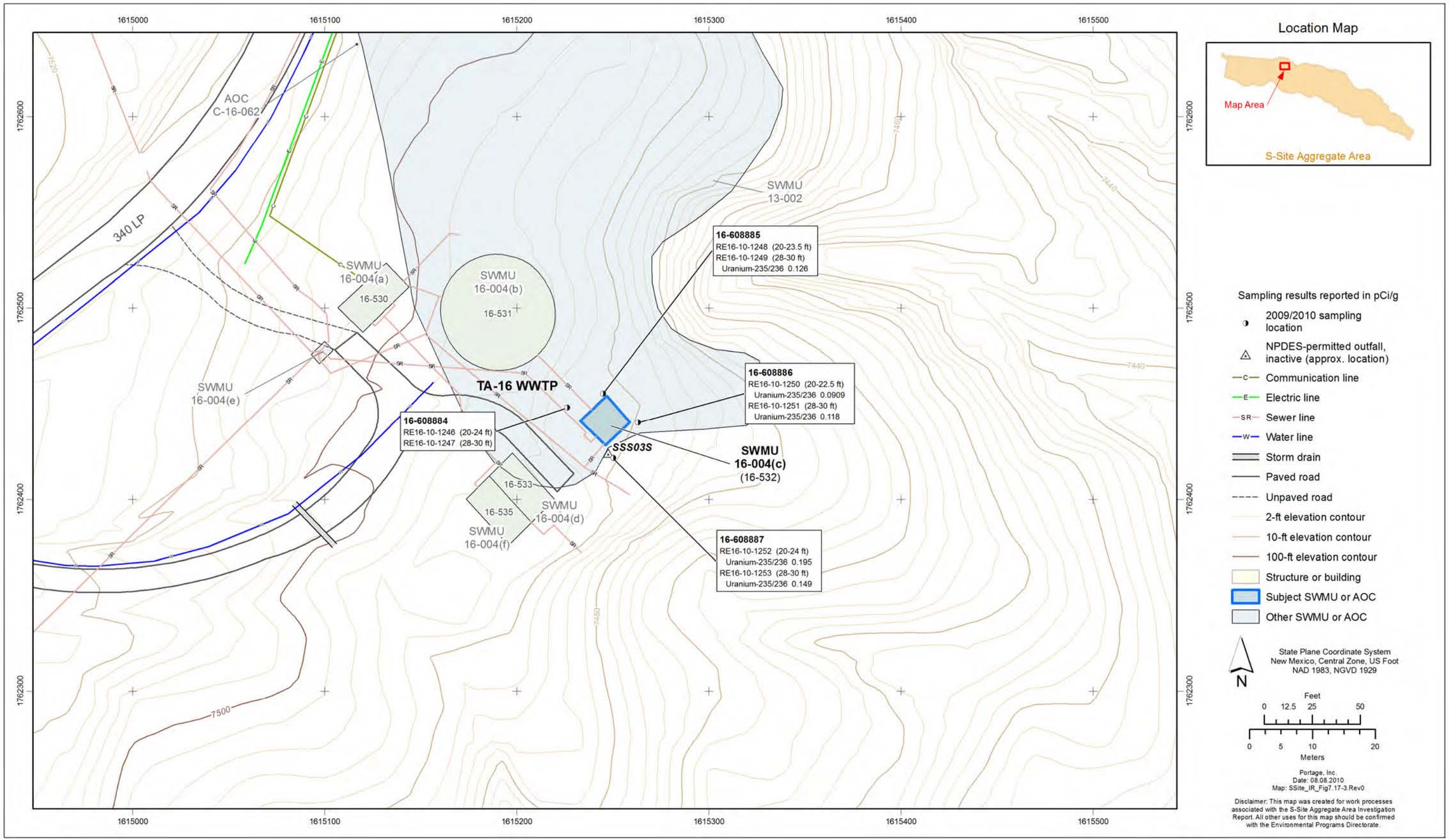


Figure 7.17-3 Radionuclides detected or detected above BVs/FVs at SWMU 16-004(c)

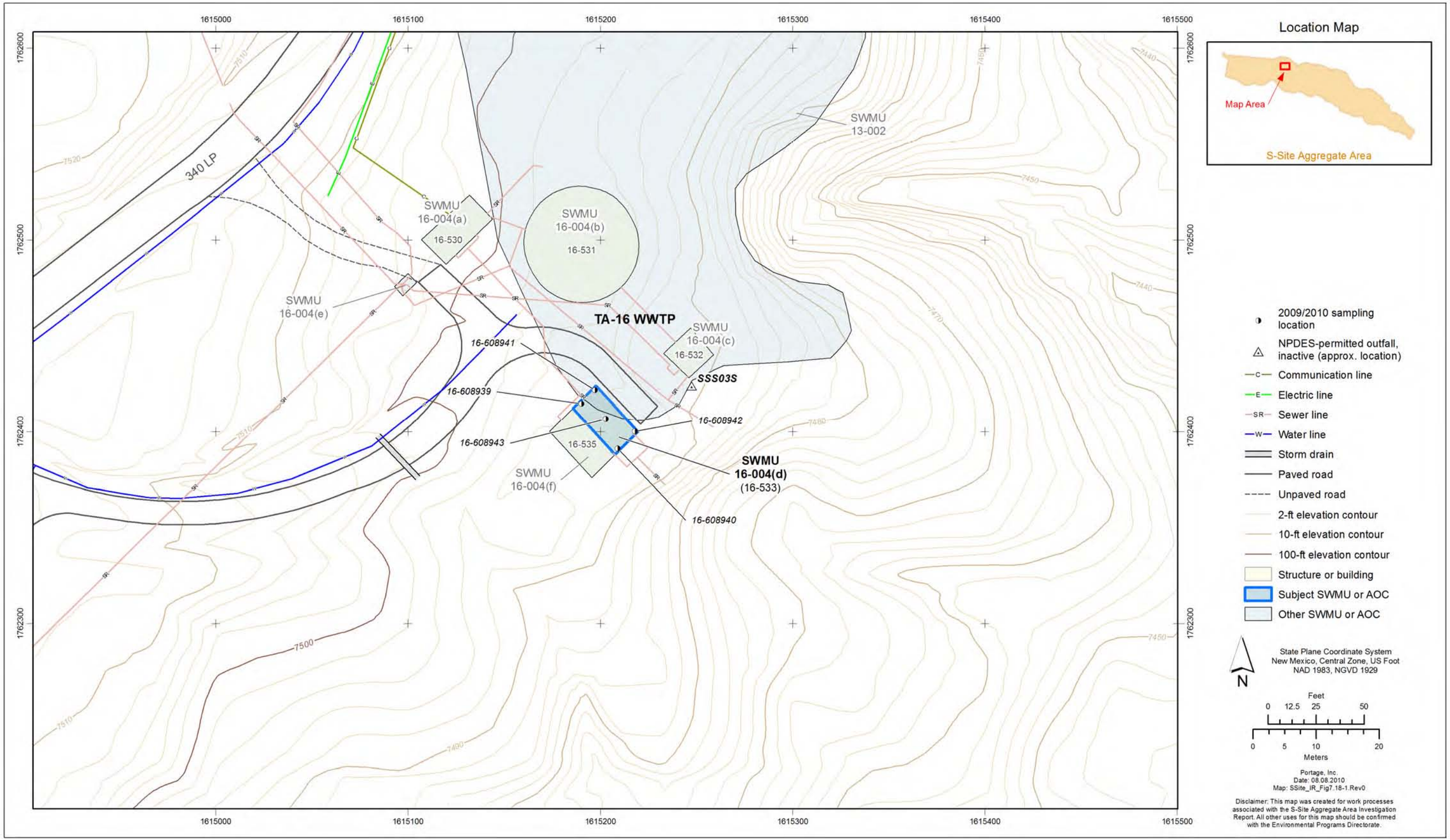


Figure 7.18-1 Locations sampled for SWMU 16-004(d)

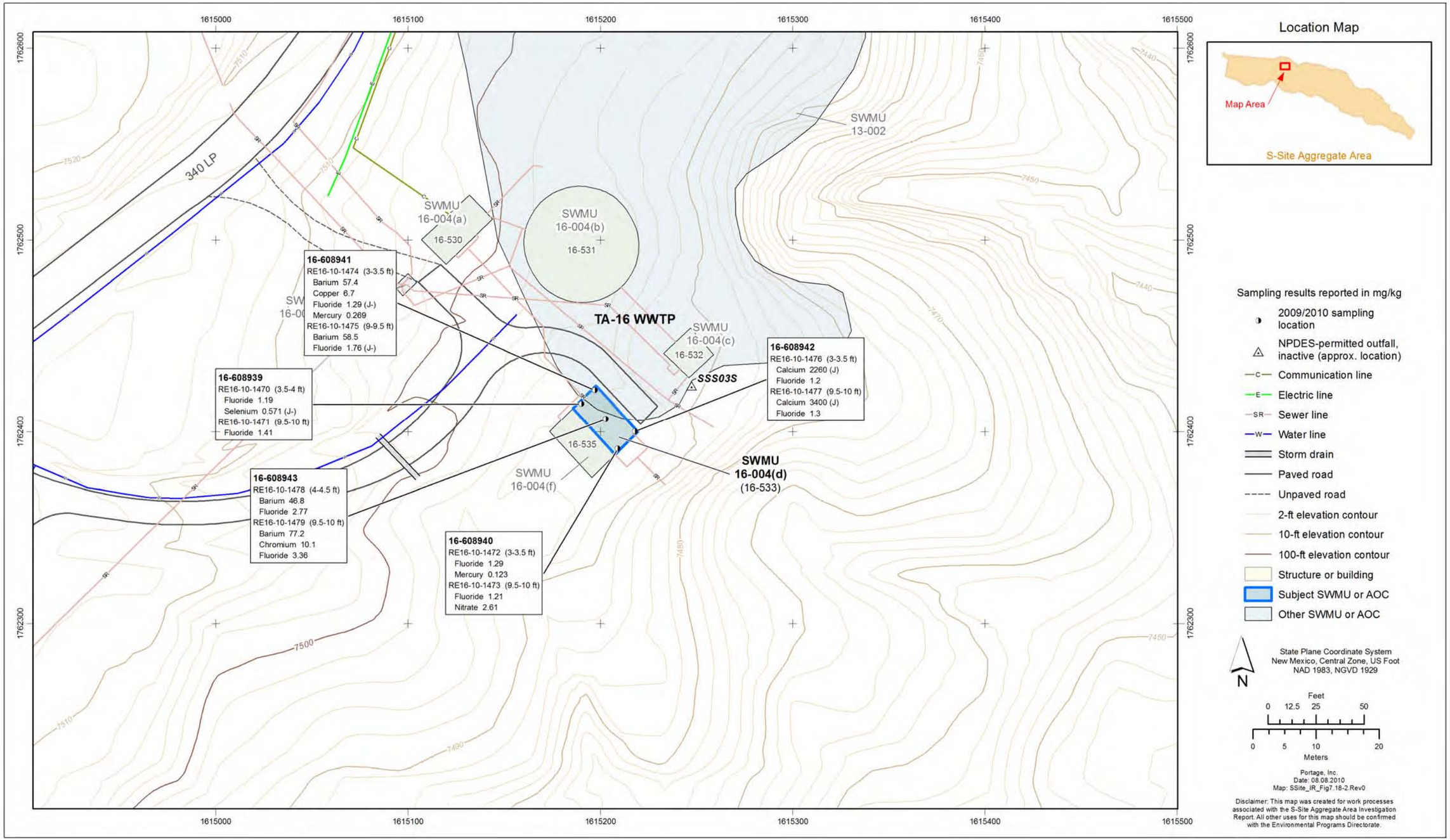


Figure 7.18-2 Inorganic chemicals detected above BVs at SWMU 16-004(d)

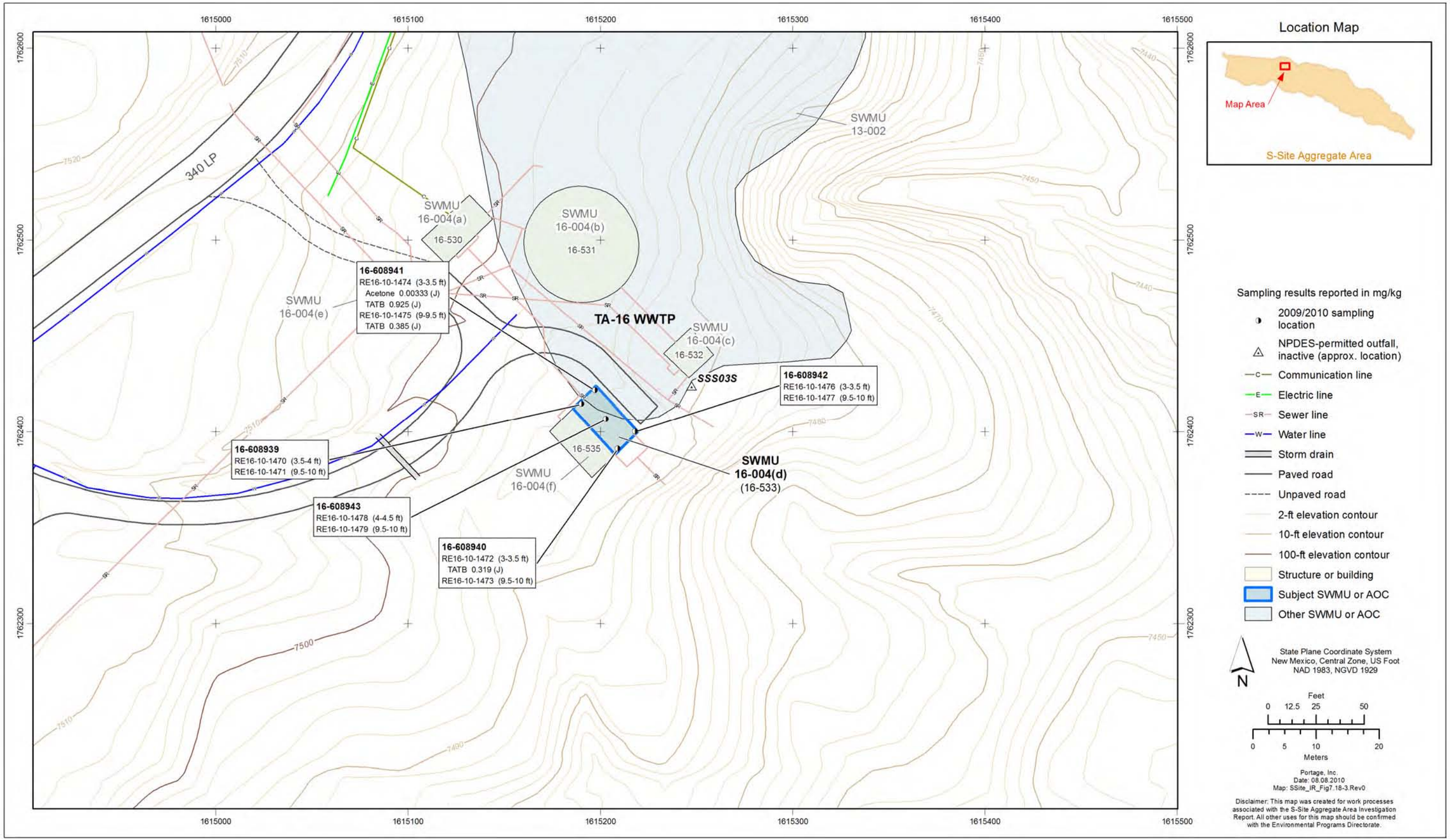


Figure 7.18-3 Organic chemicals detected in samples at SWMU 16-004(d)

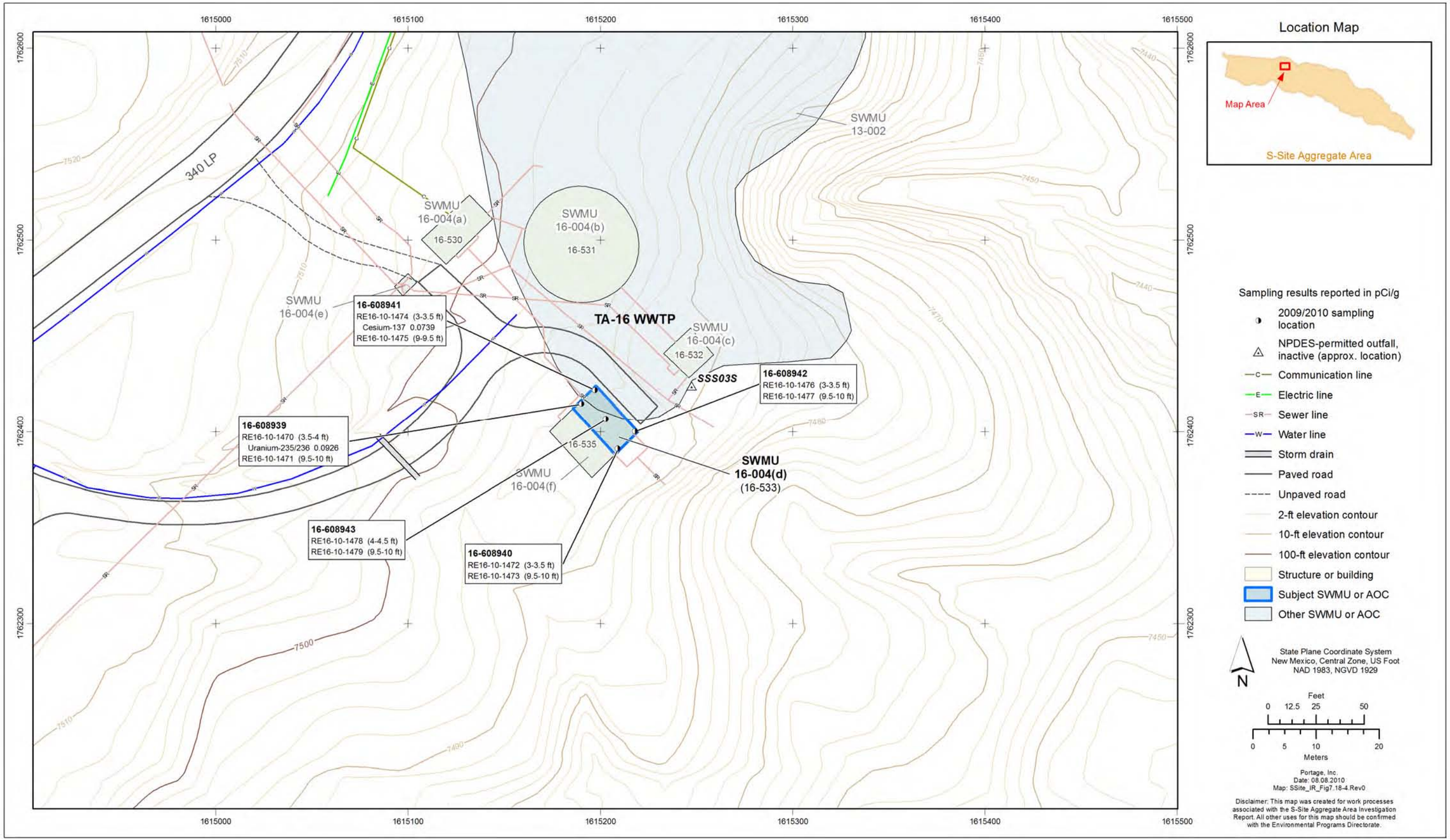


Figure 7.18-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-004(d)

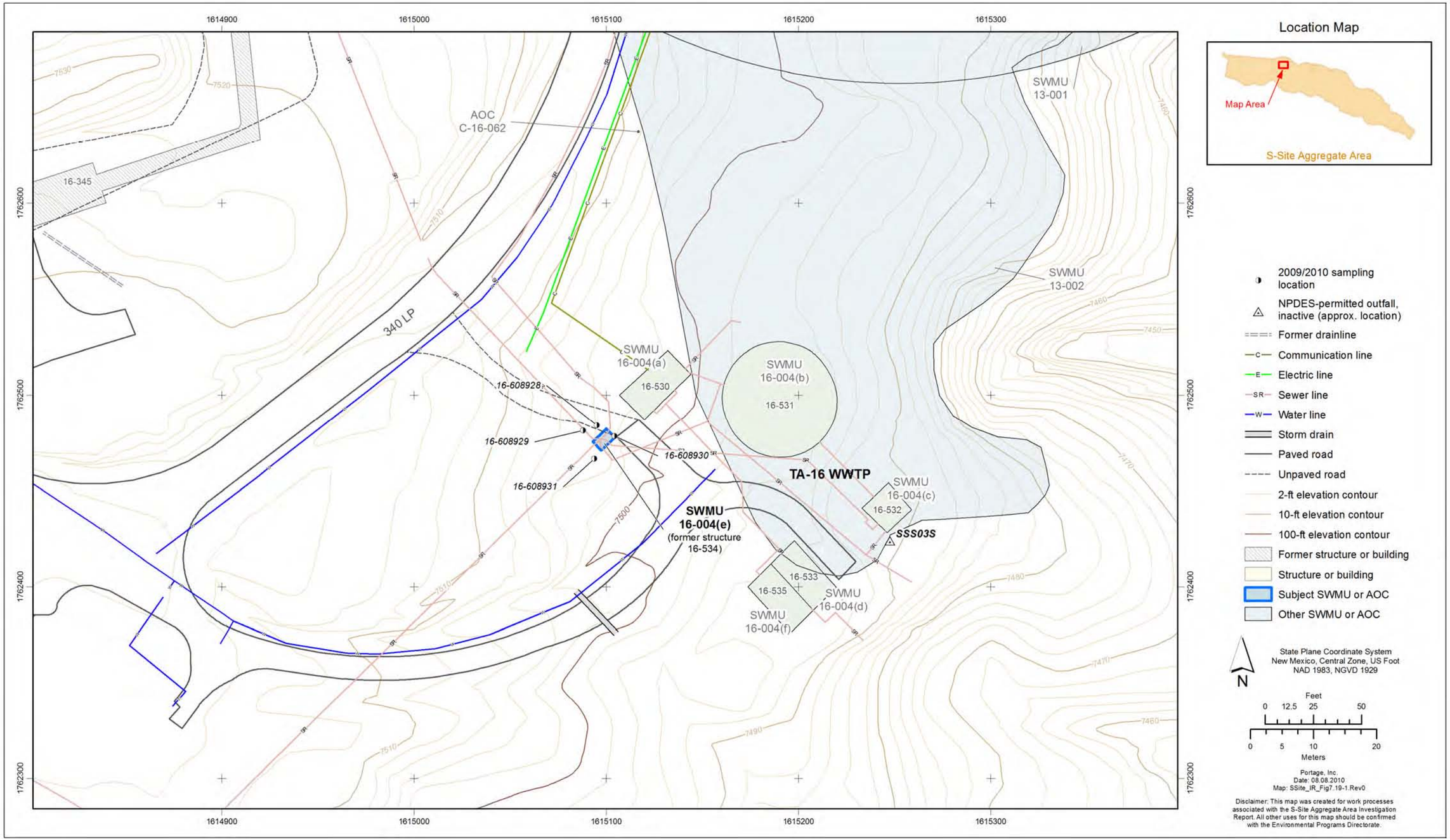


Figure 7.19-1 Locations sampled for SWMU 16-004(e)

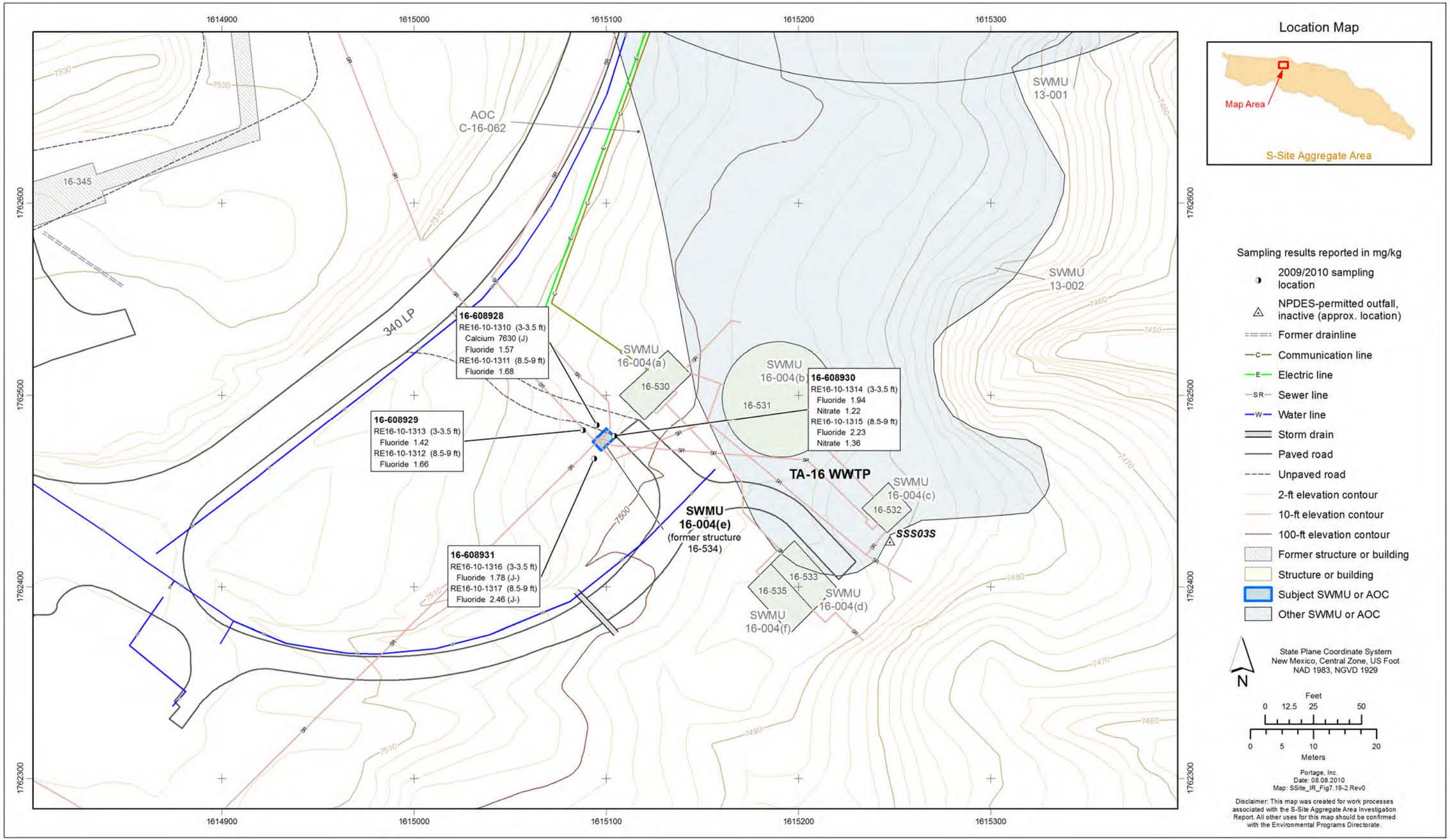


Figure 7.19-2 Inorganic chemicals detected above BVs at SWMU 16-004(e)

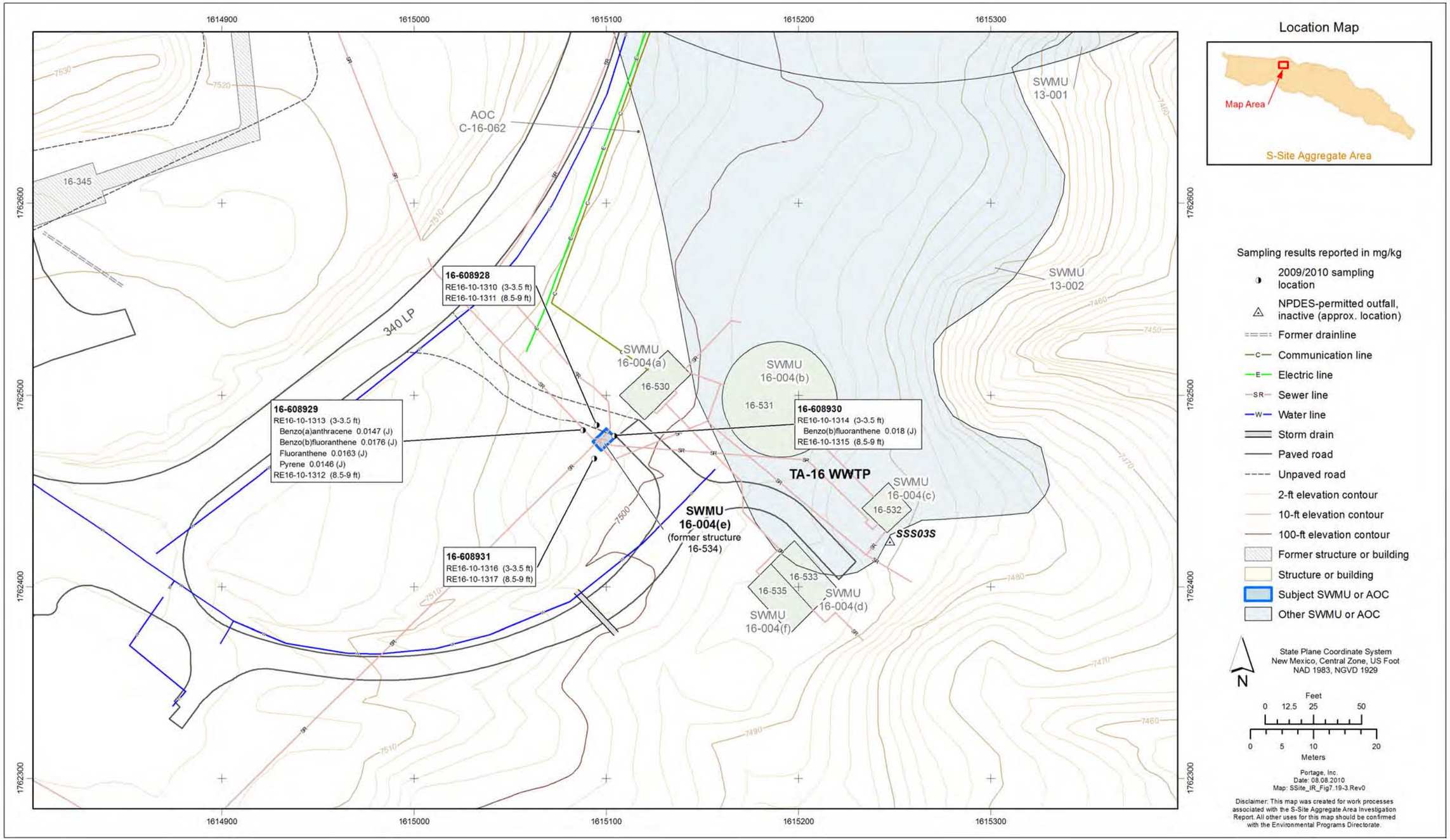


Figure 7.19-3 Organic chemicals detected in samples at SWMU 16-004(e)

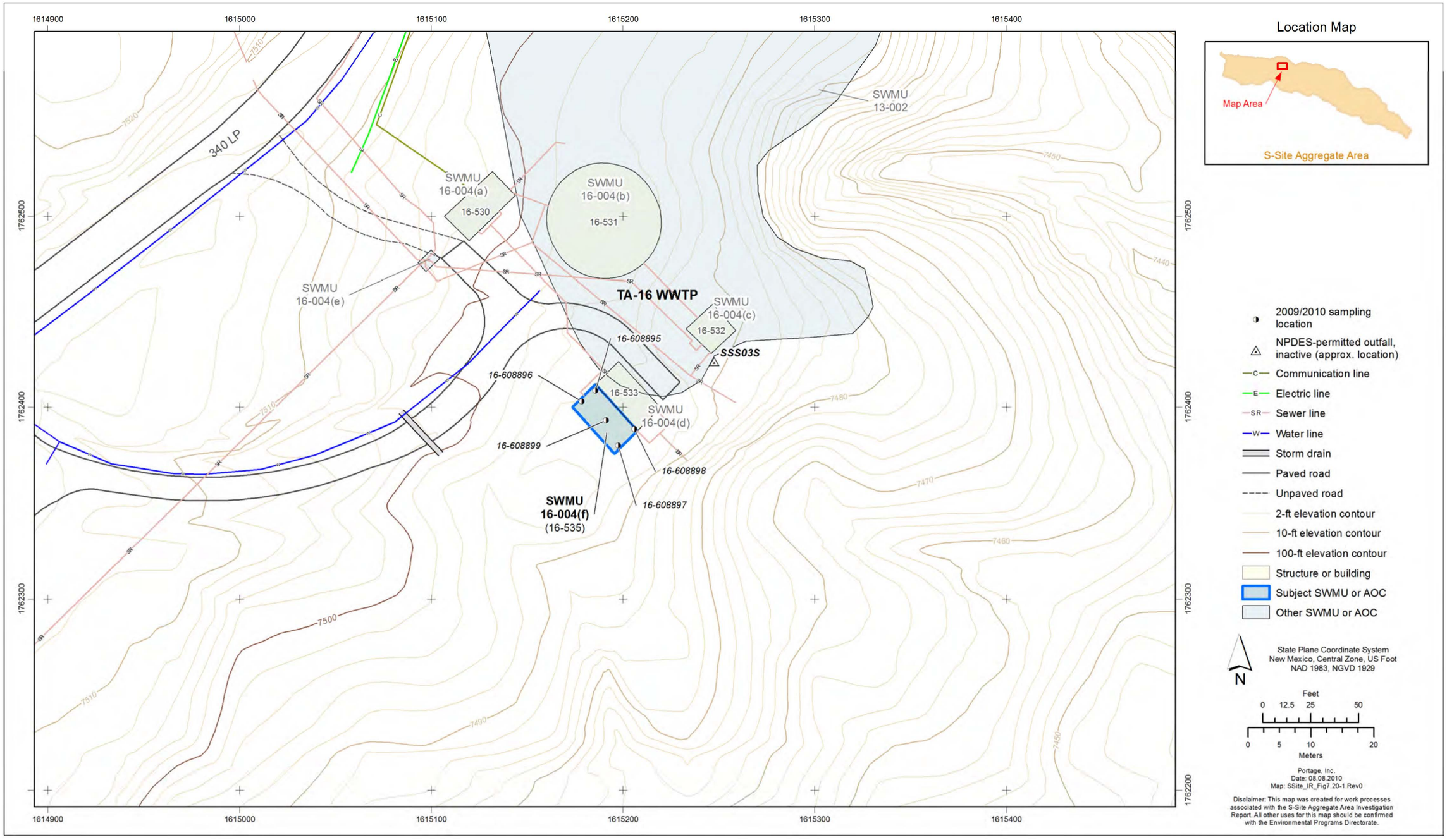


Figure 7.20-1 Locations sampled for SWMU 16-004(f)

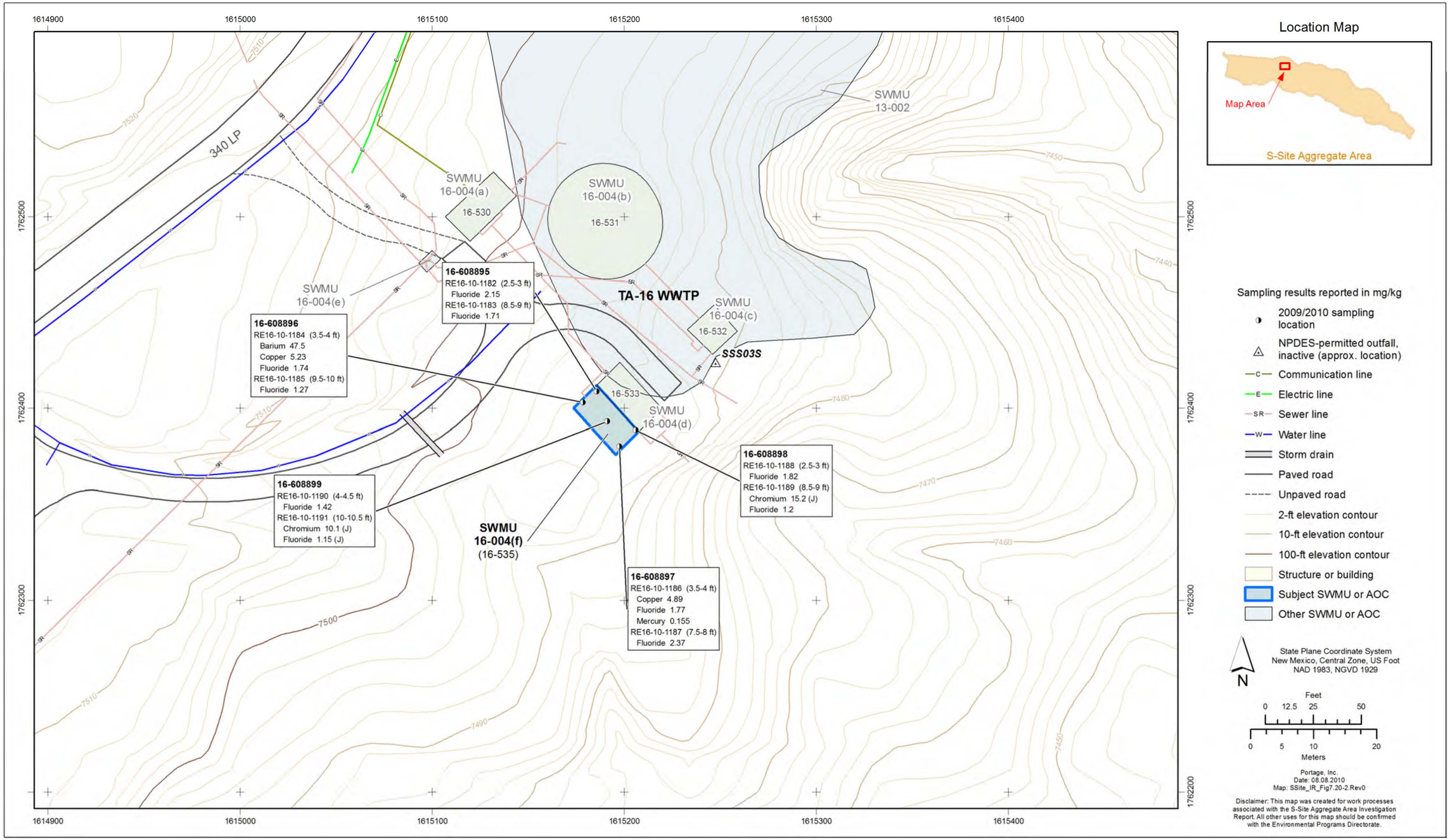


Figure 7.20-2 Inorganic chemicals detected above BVs at SWMU 16-004(f)

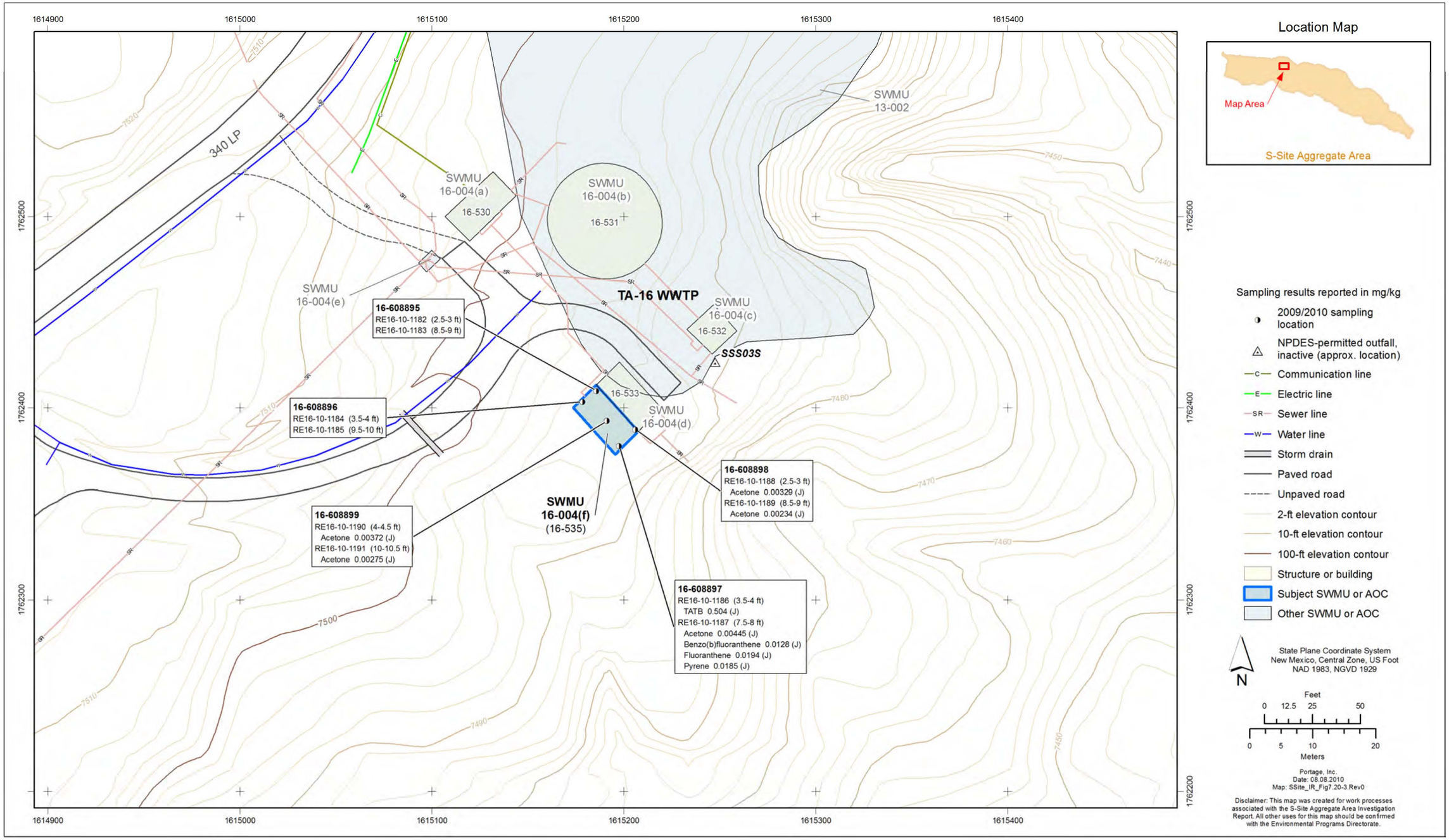


Figure 7.20-3 Organic chemicals detected in samples at SWMU 16-004(f)

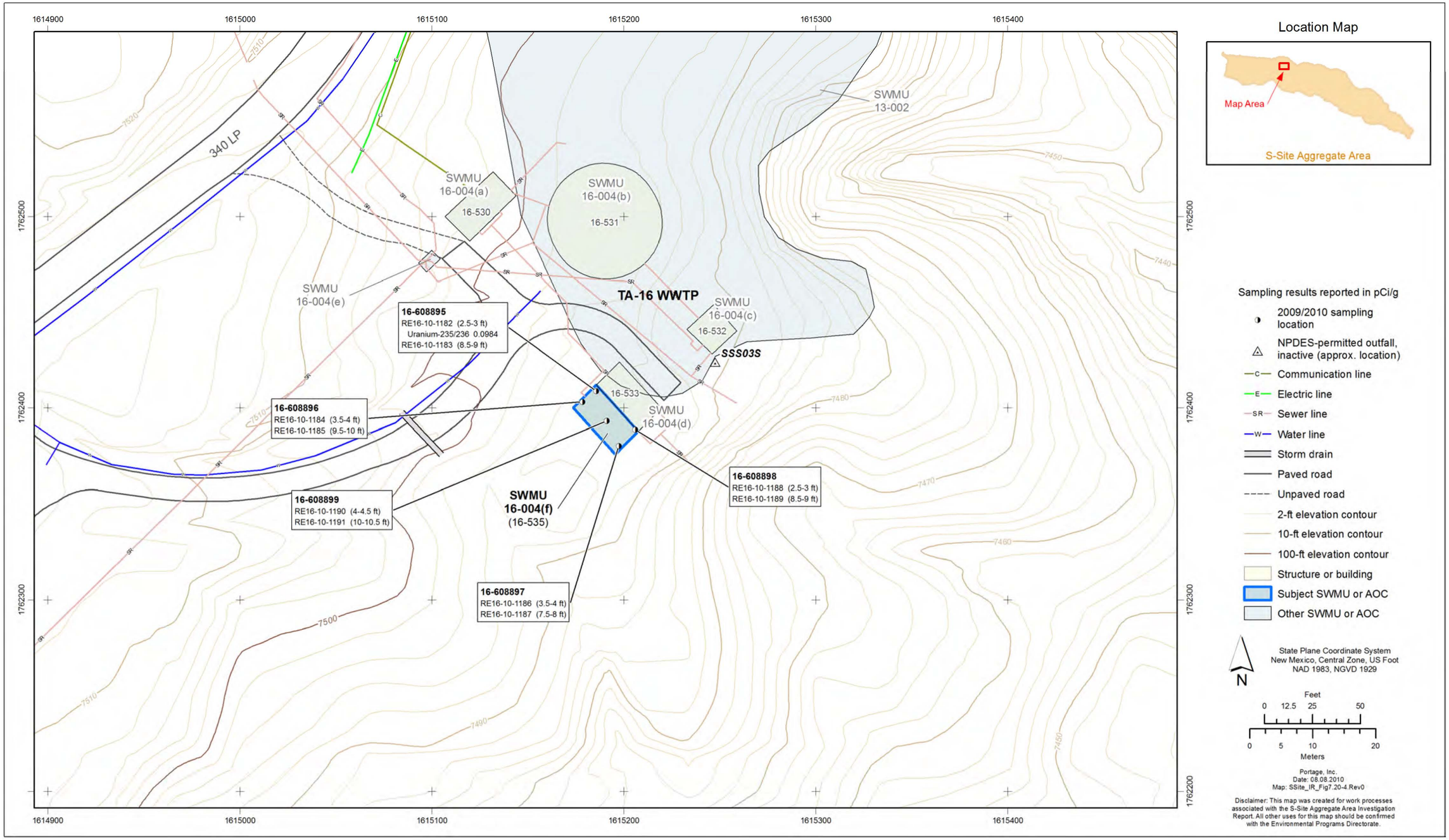


Figure 7.20-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-004(f)

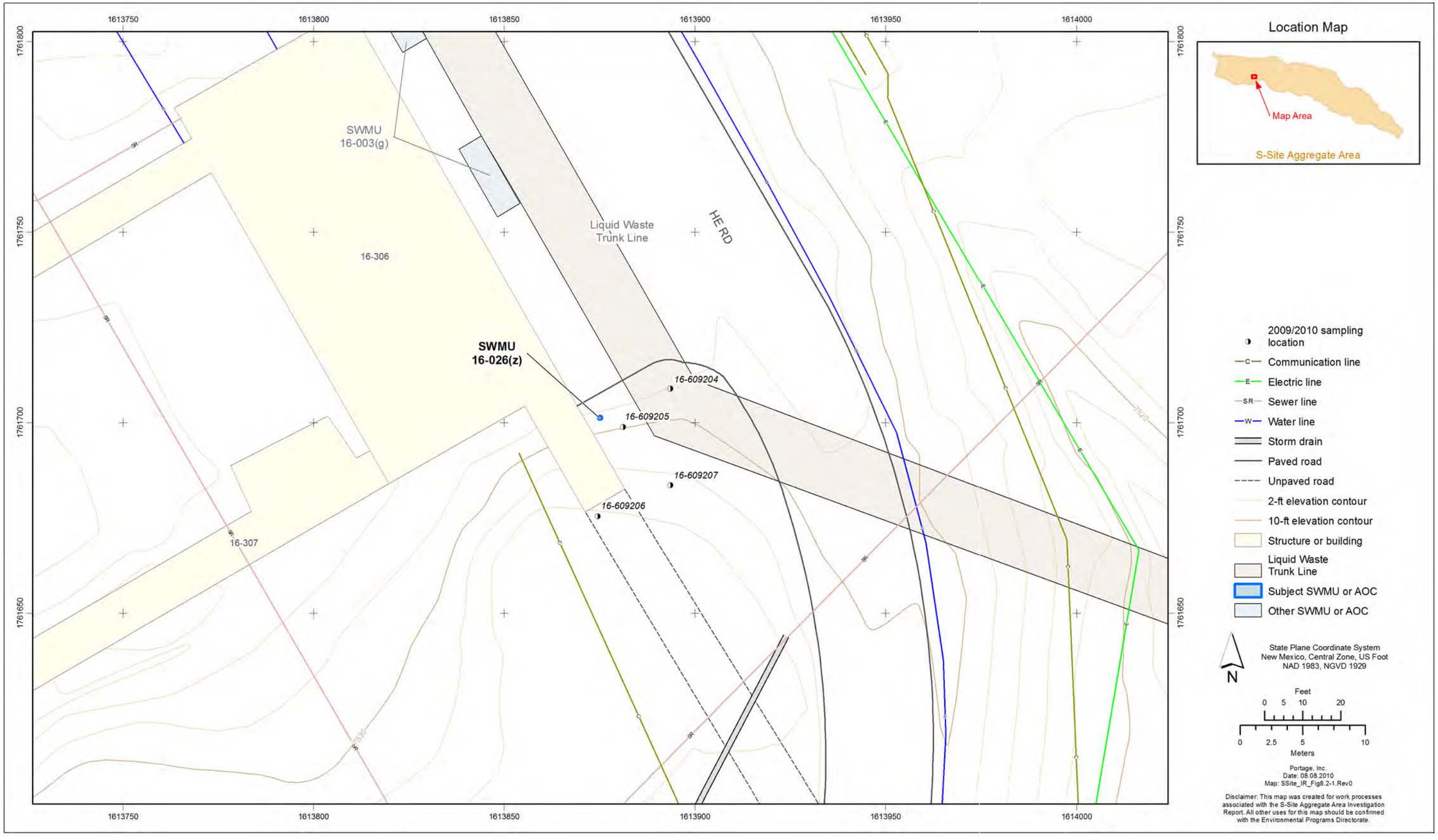


Figure 8.2-1 Locations sampled for SWMU 16-026(z)

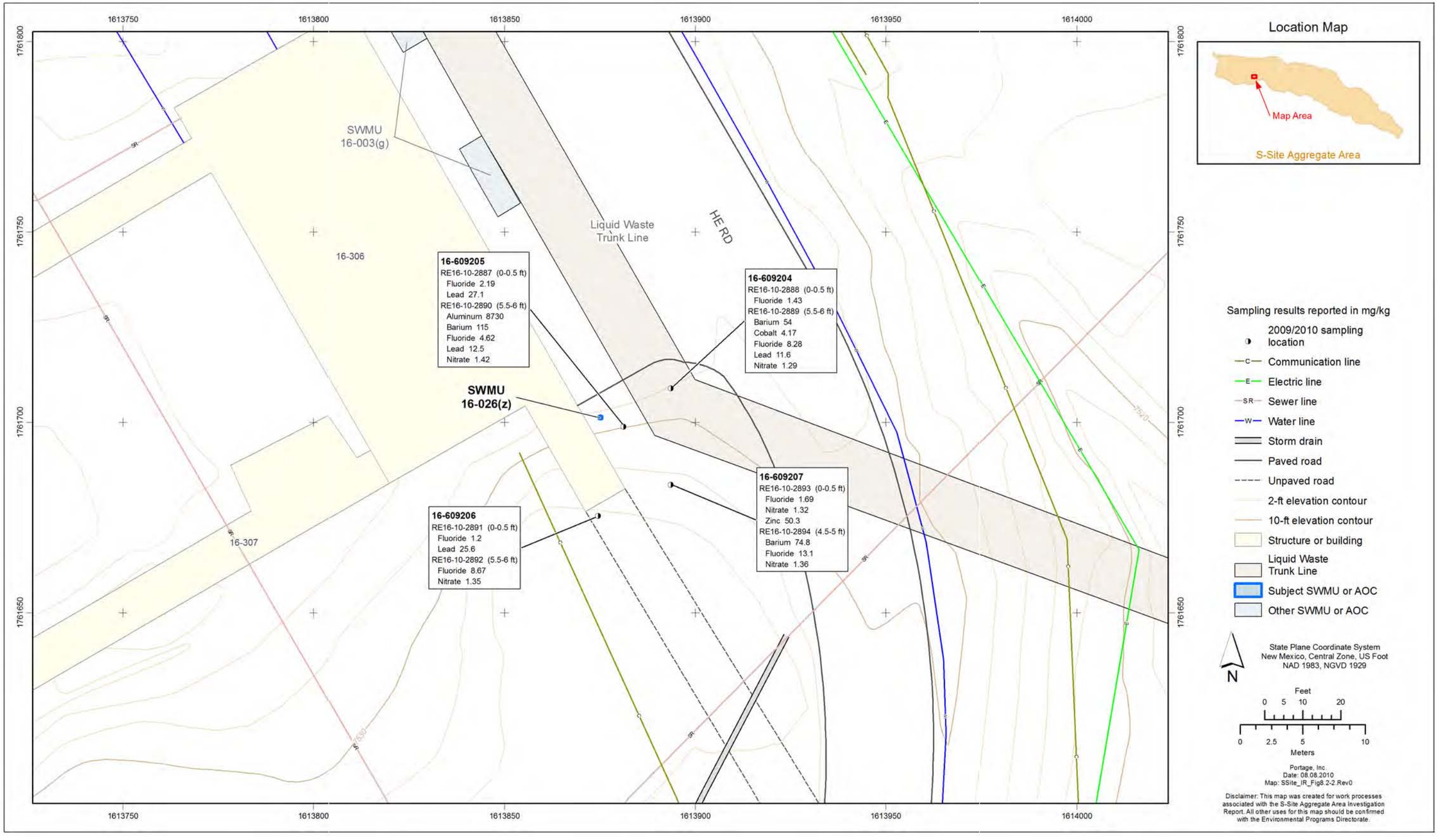


Figure 8.2-2 Inorganic chemicals detected above BVs at SWMU 16-026(z)

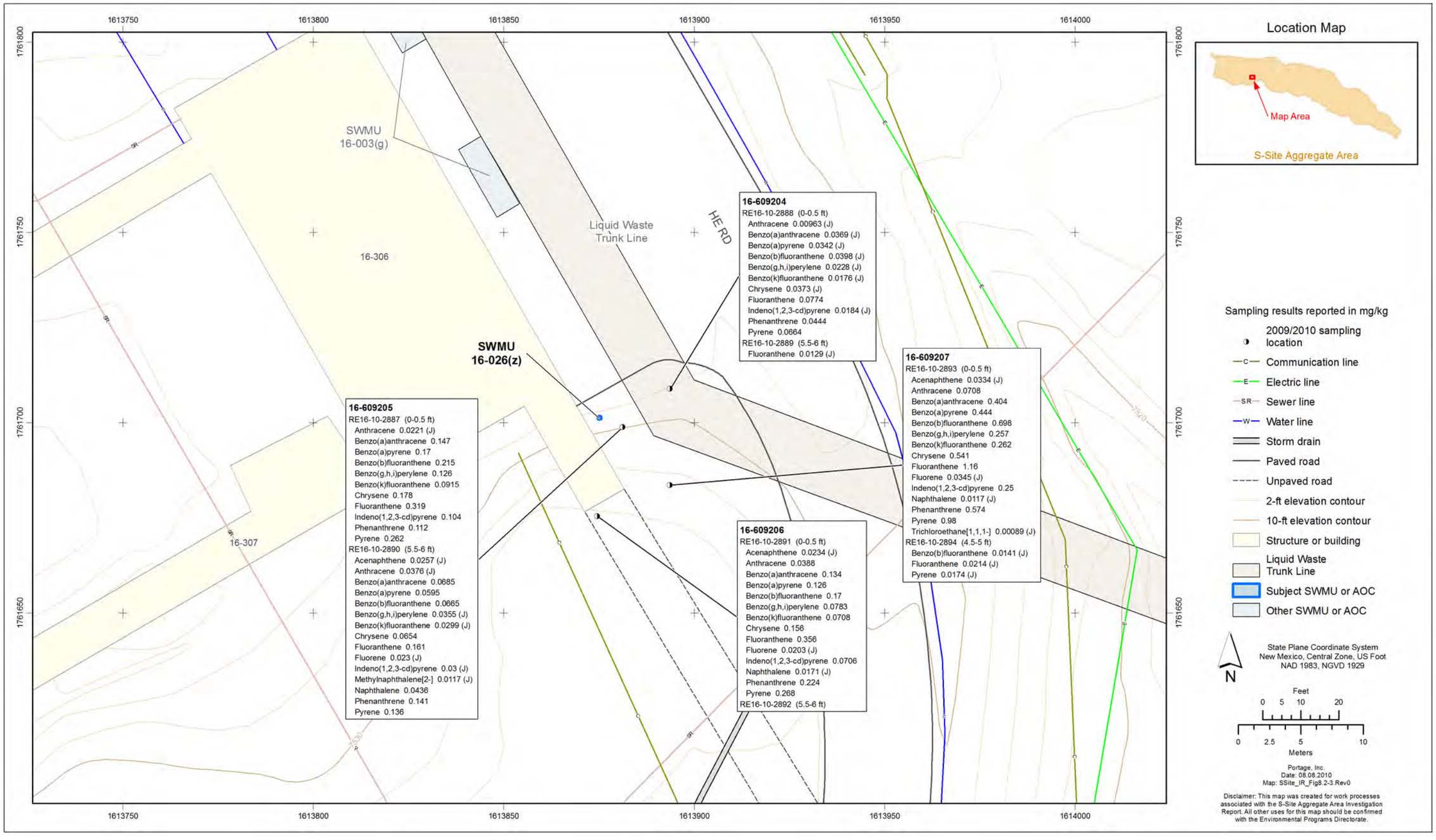


Figure 8.2-3 Organic chemicals detected in samples at SWMU 16-026(z)

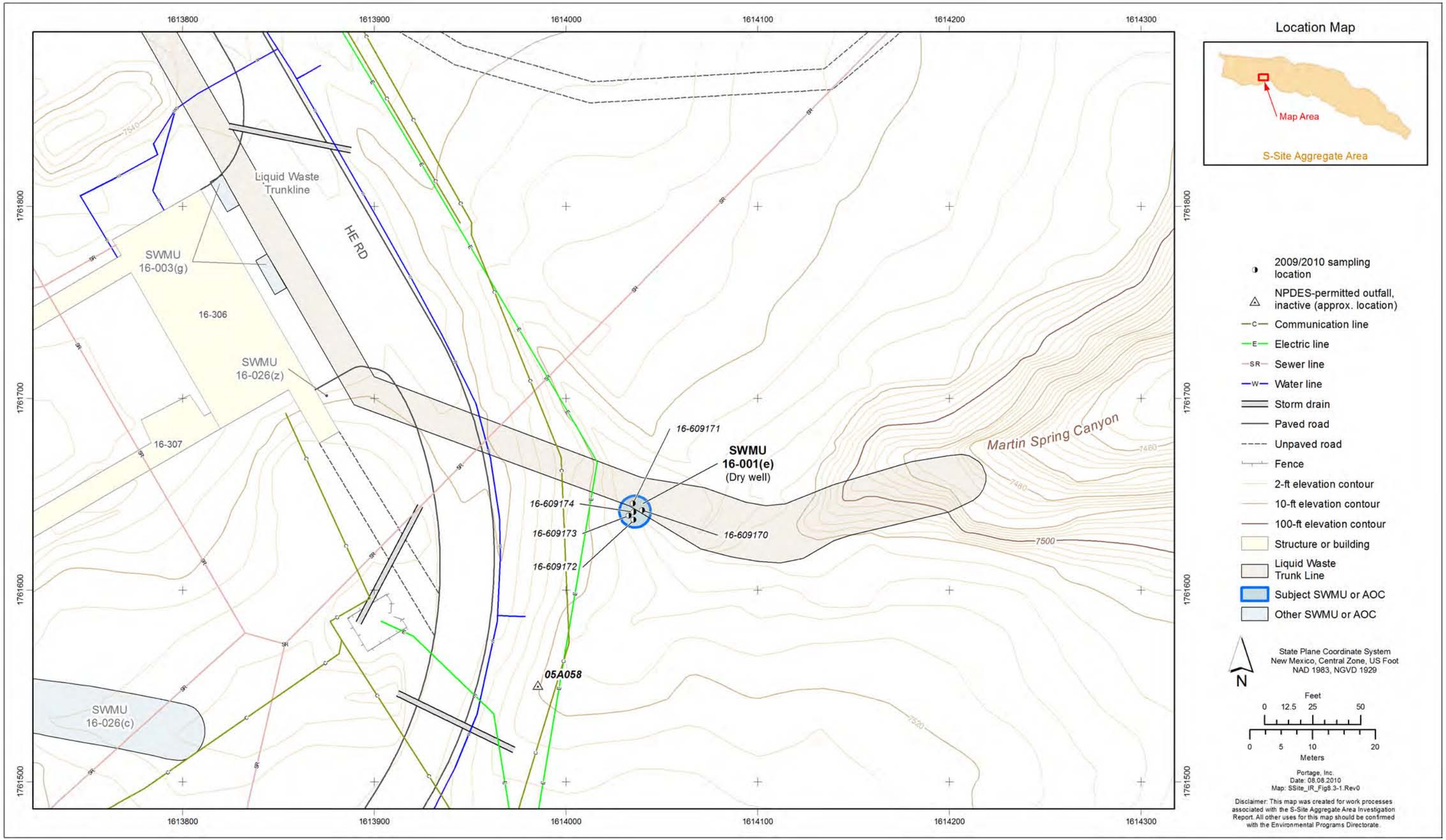


Figure 8.3-1 Locations sampled for SWMU 16-001(e)

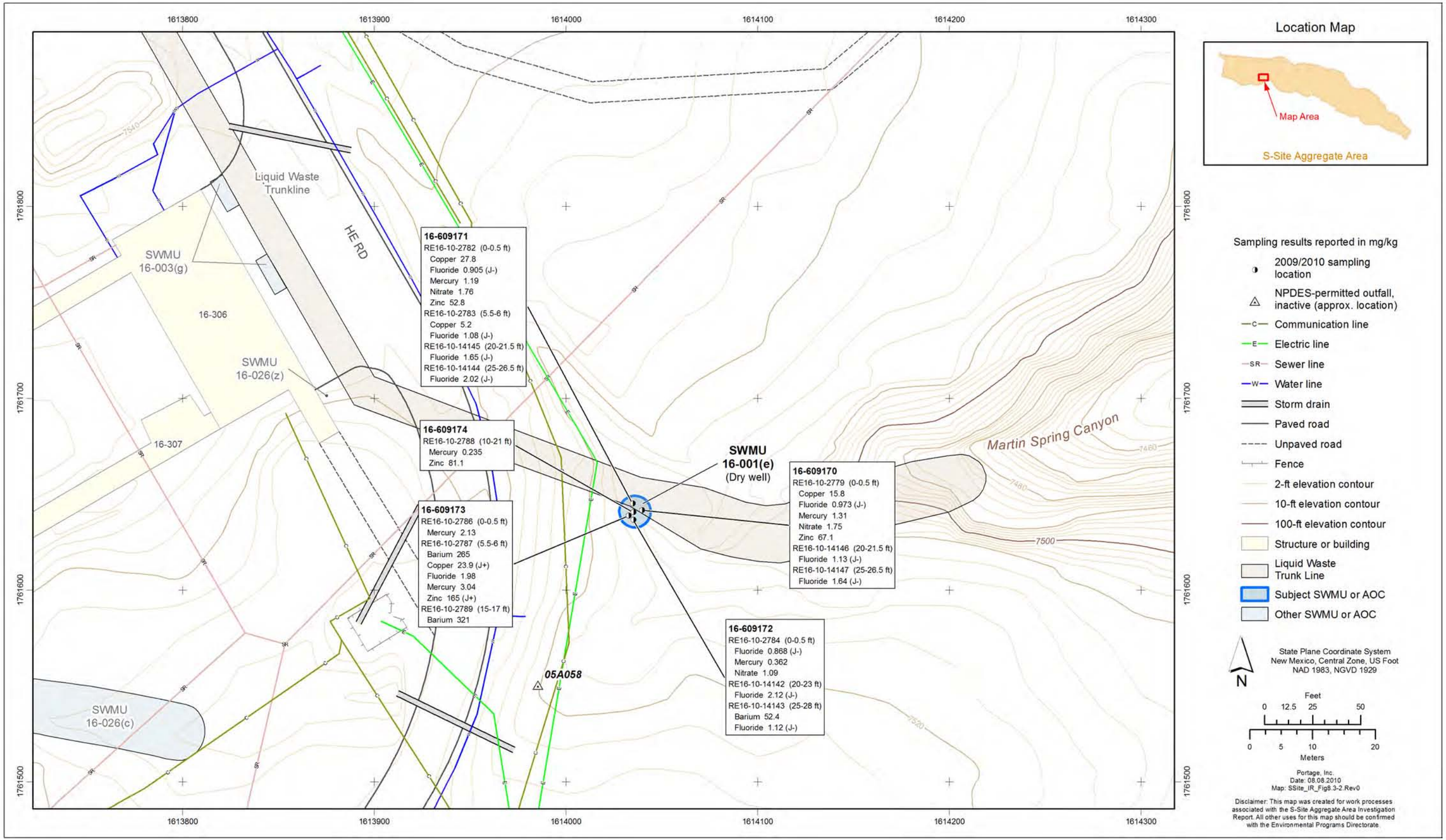


Figure 8.3-2 Inorganic chemicals detected above BVs at SWMU 16-001(e)

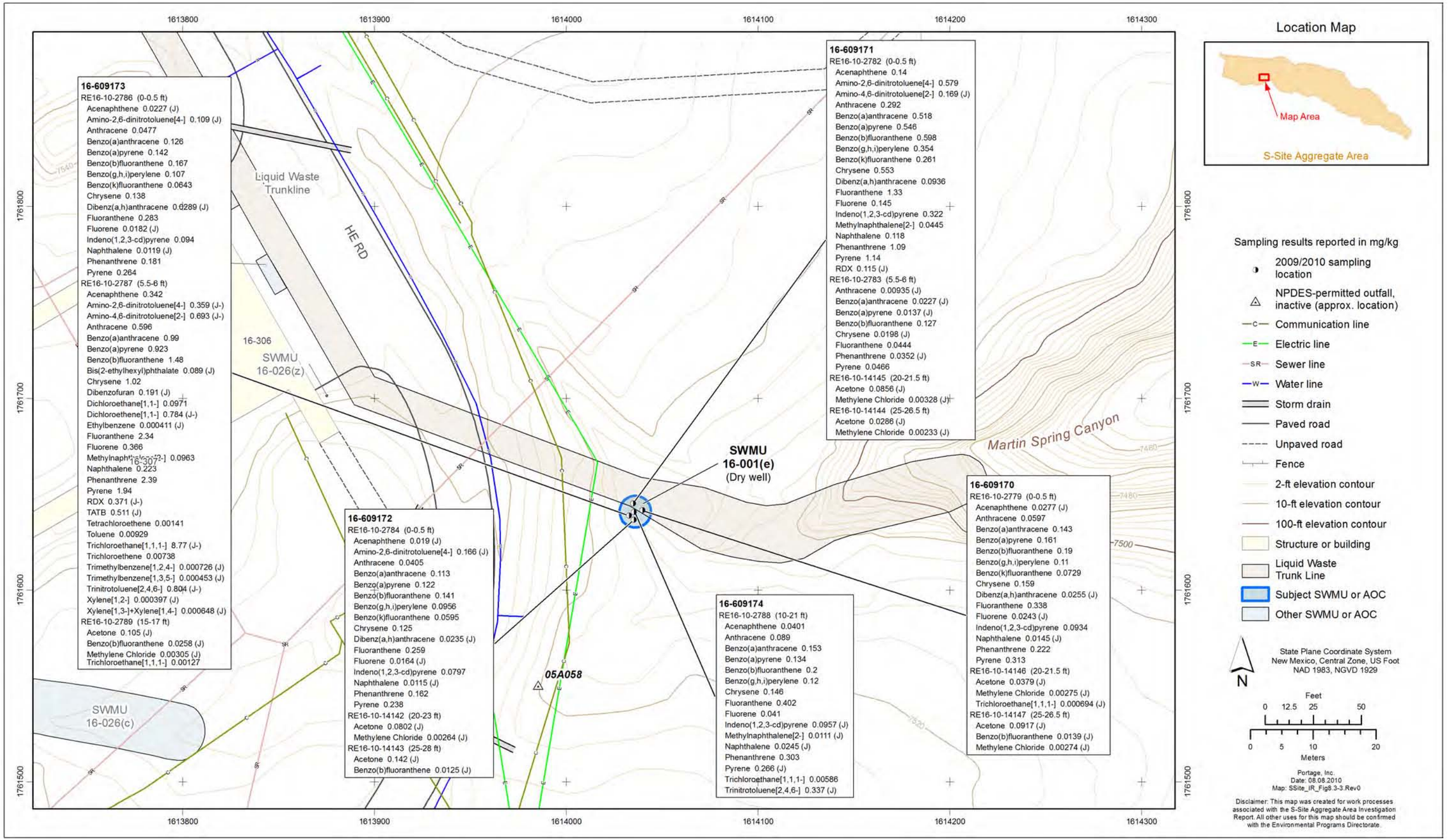


Figure 8.3-3 Organic chemicals detected in samples at SWMU 16-001(e)

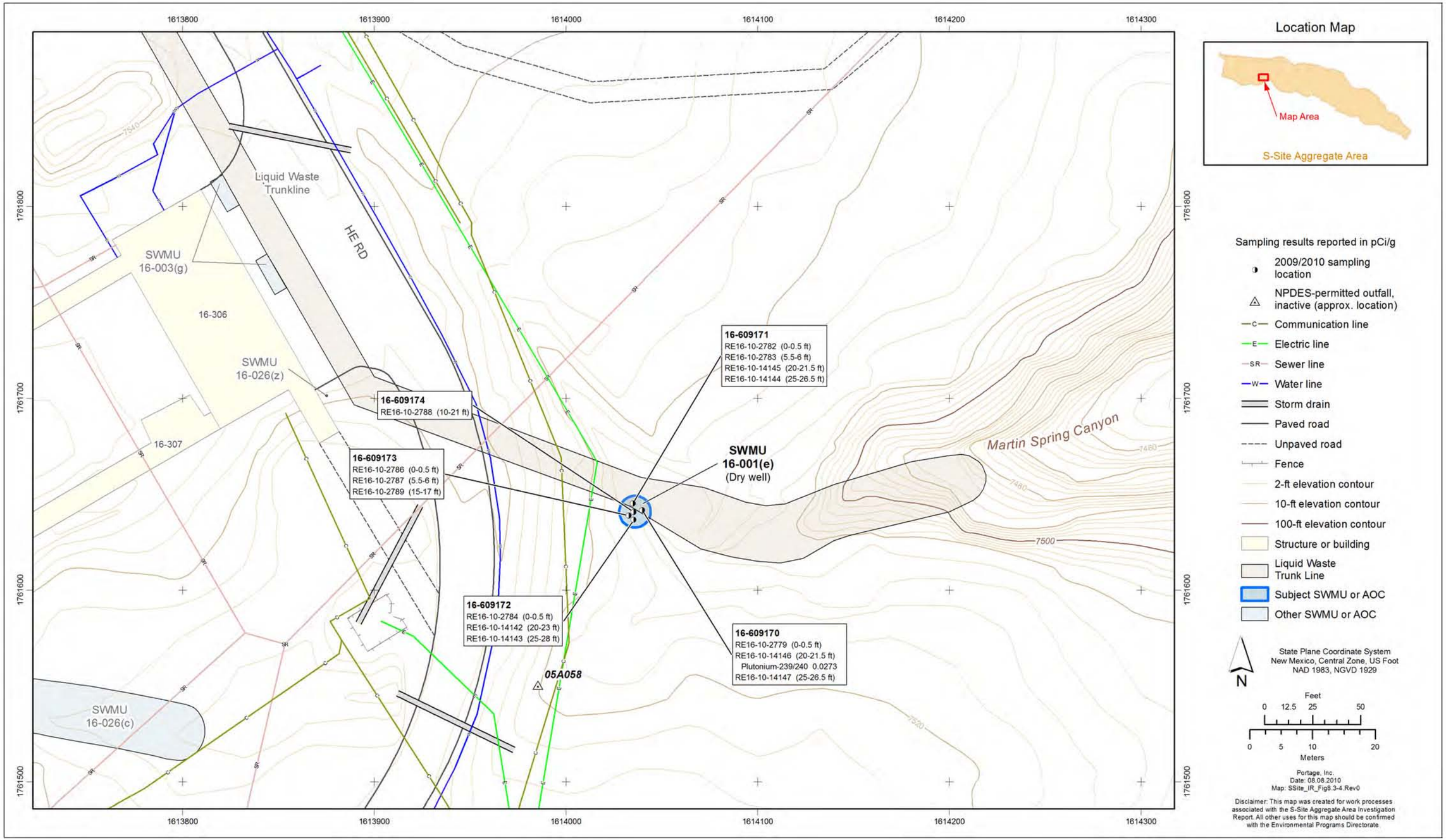


Figure 8.3-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-001(e)

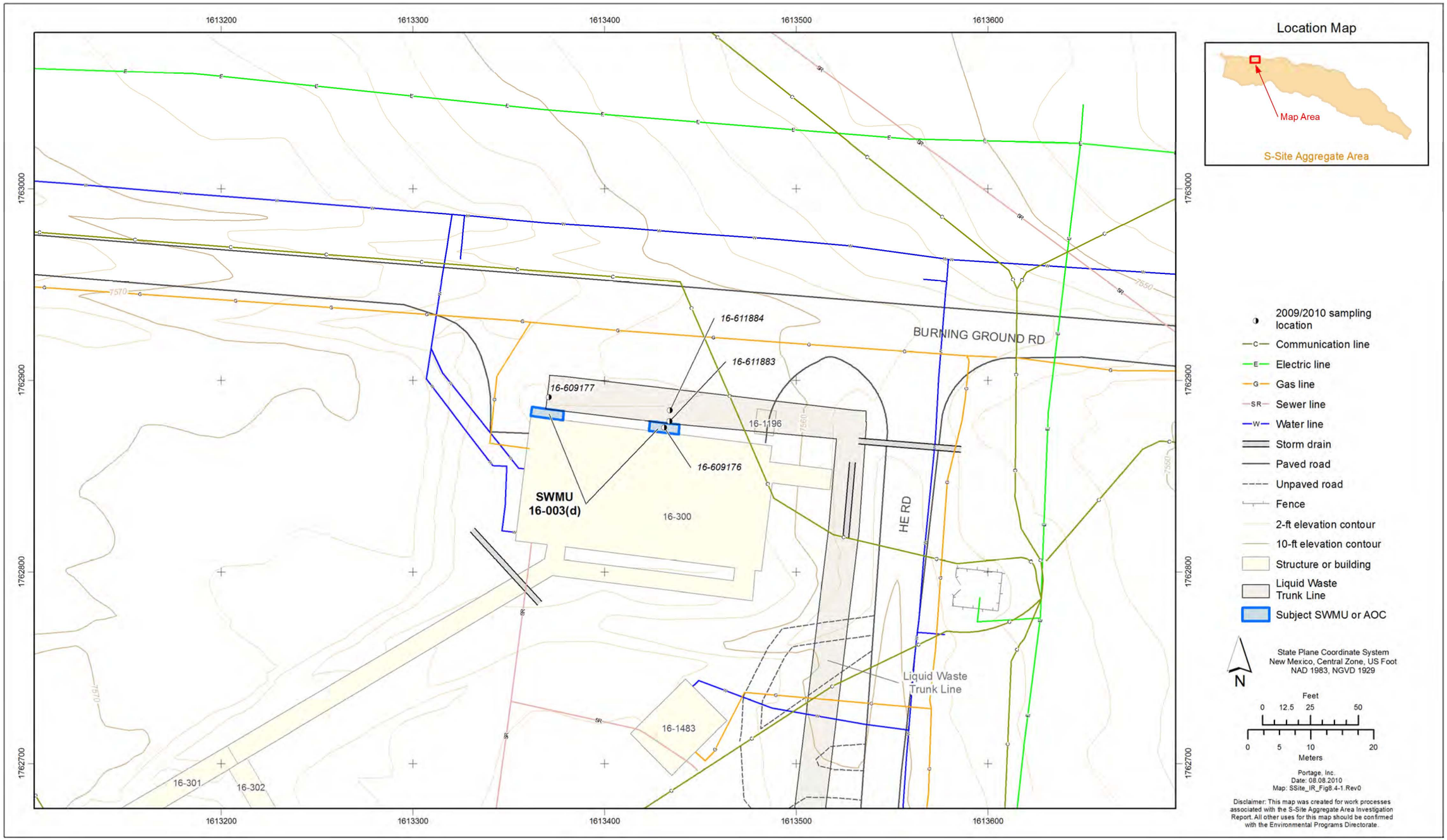


Figure 8.4-1 Locations sampled for SWMU 16-003(d)

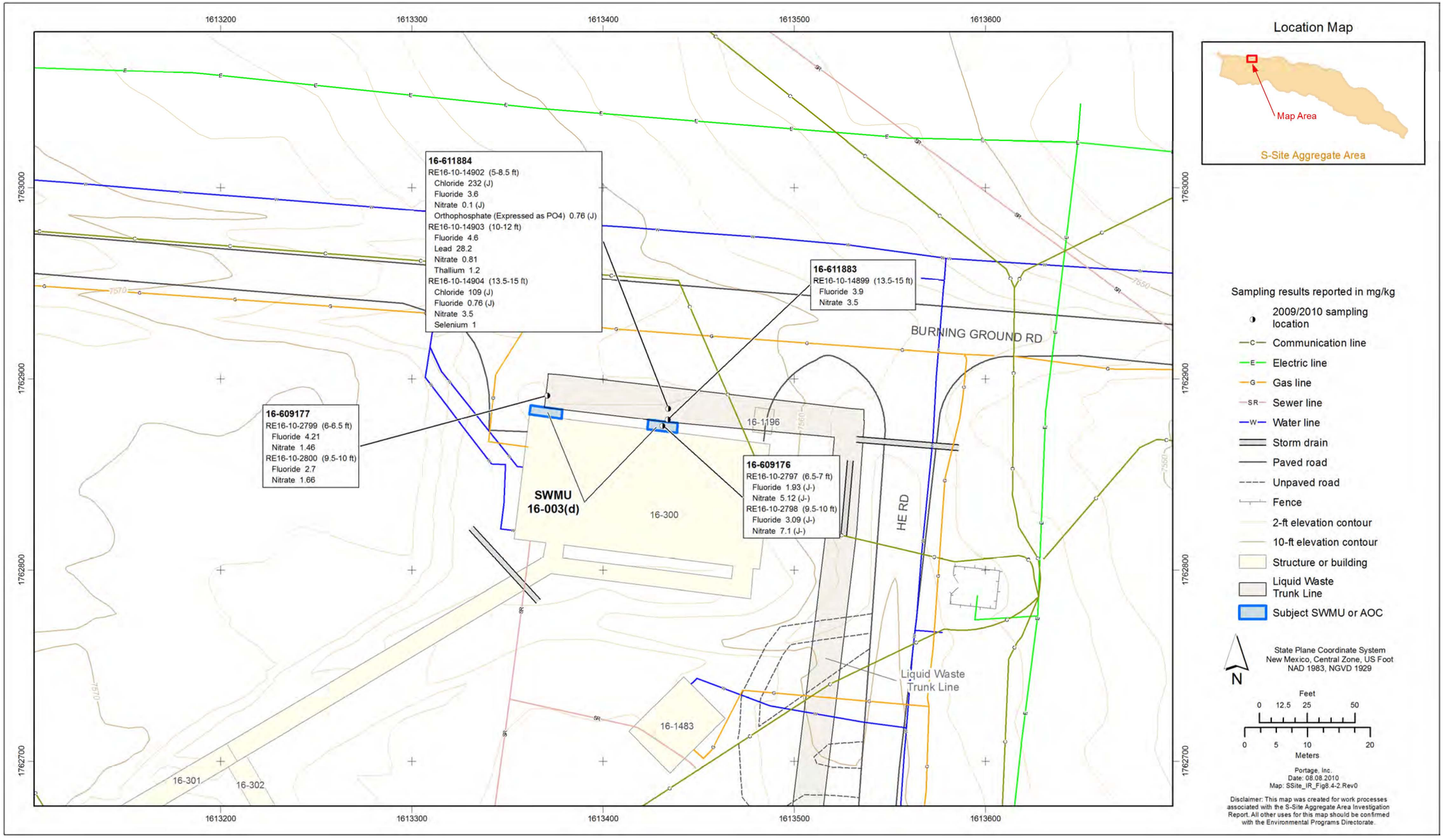


Figure 8.4-2 Inorganic chemicals detected above BVs at SWMU 16-003(d)

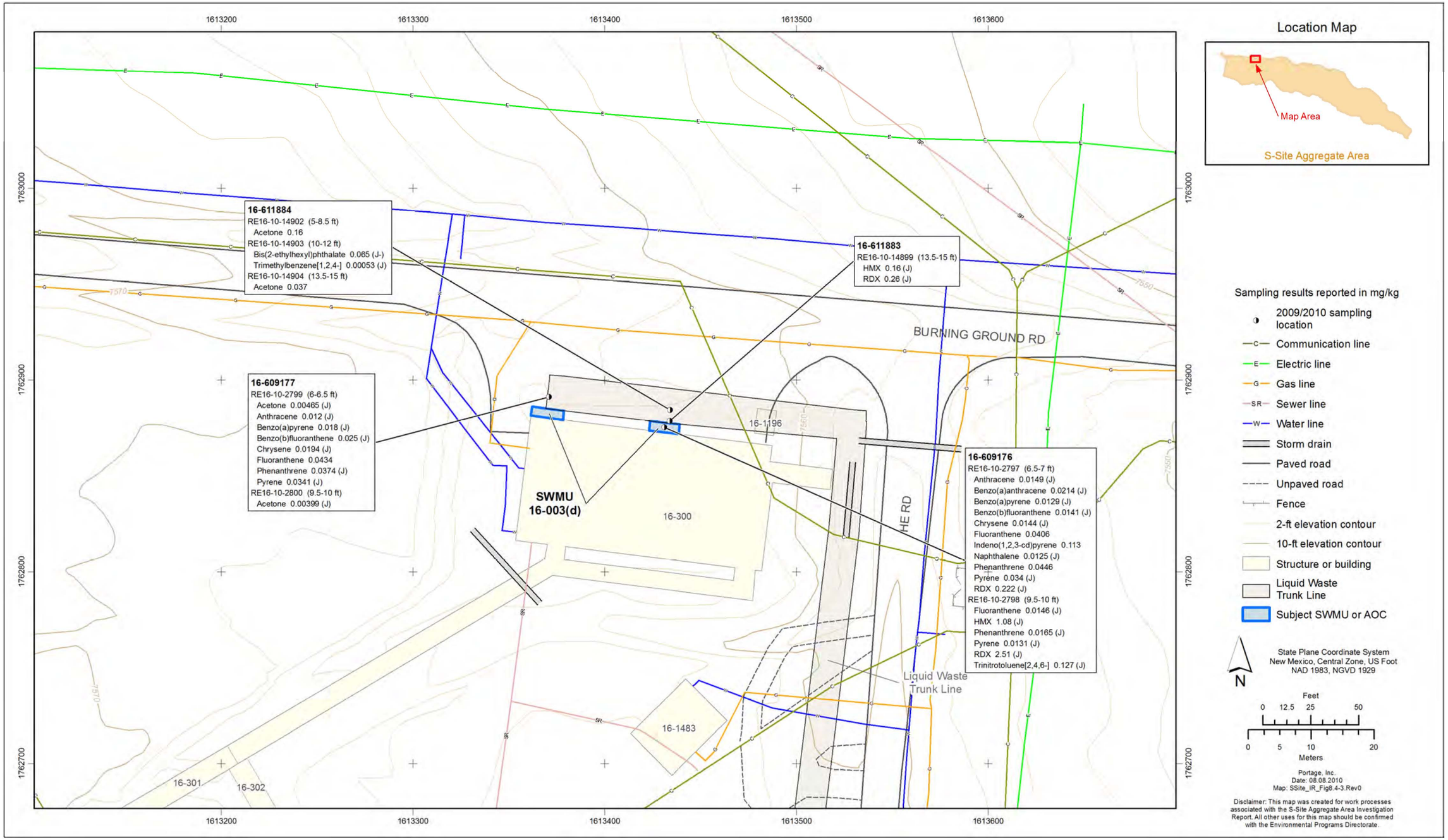


Figure 8.4-3 Organic chemicals detected in samples at SWMU 16-003(d)

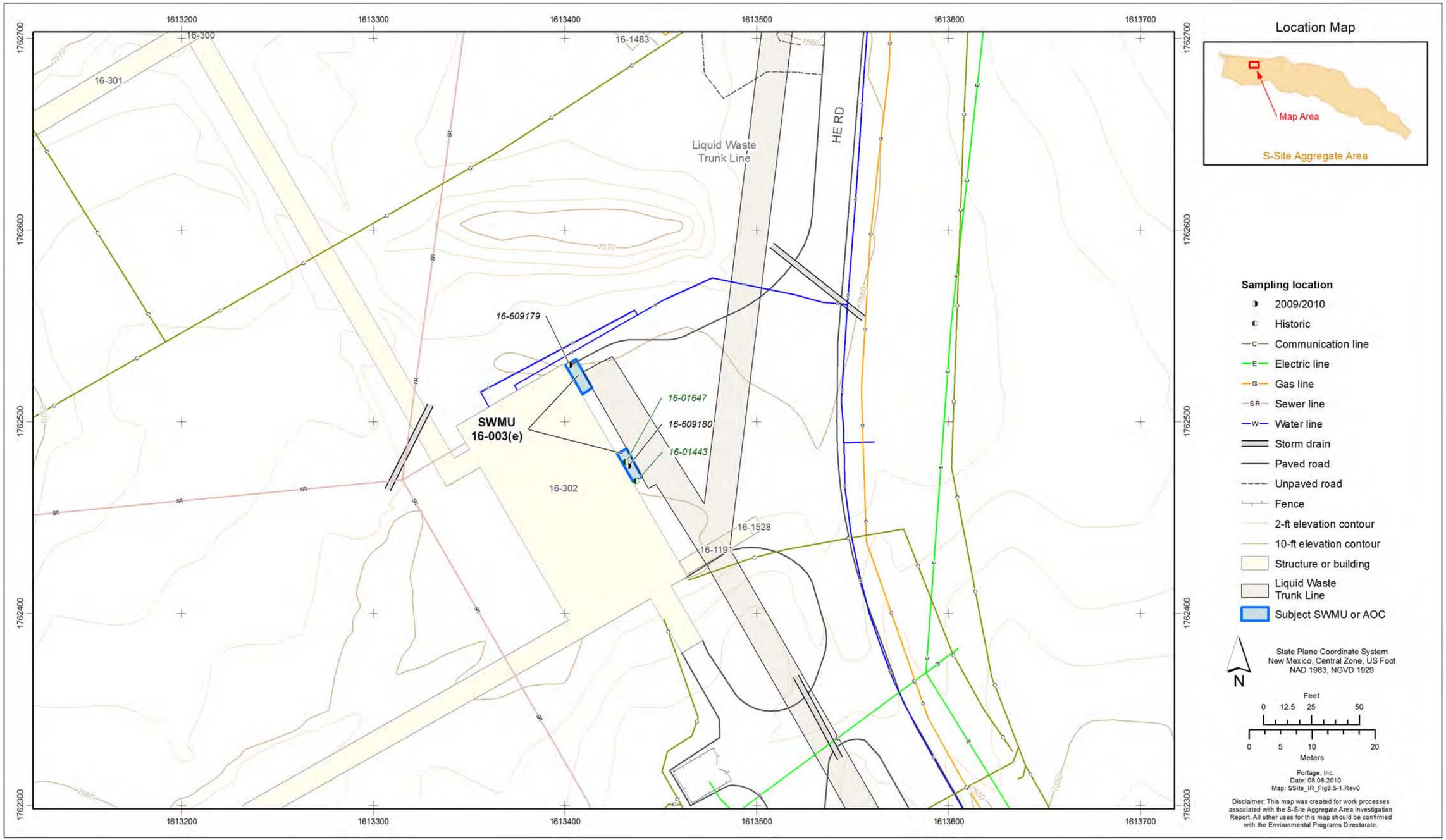


Figure 8.5-1 Locations sampled for SWMU 16-003(e)

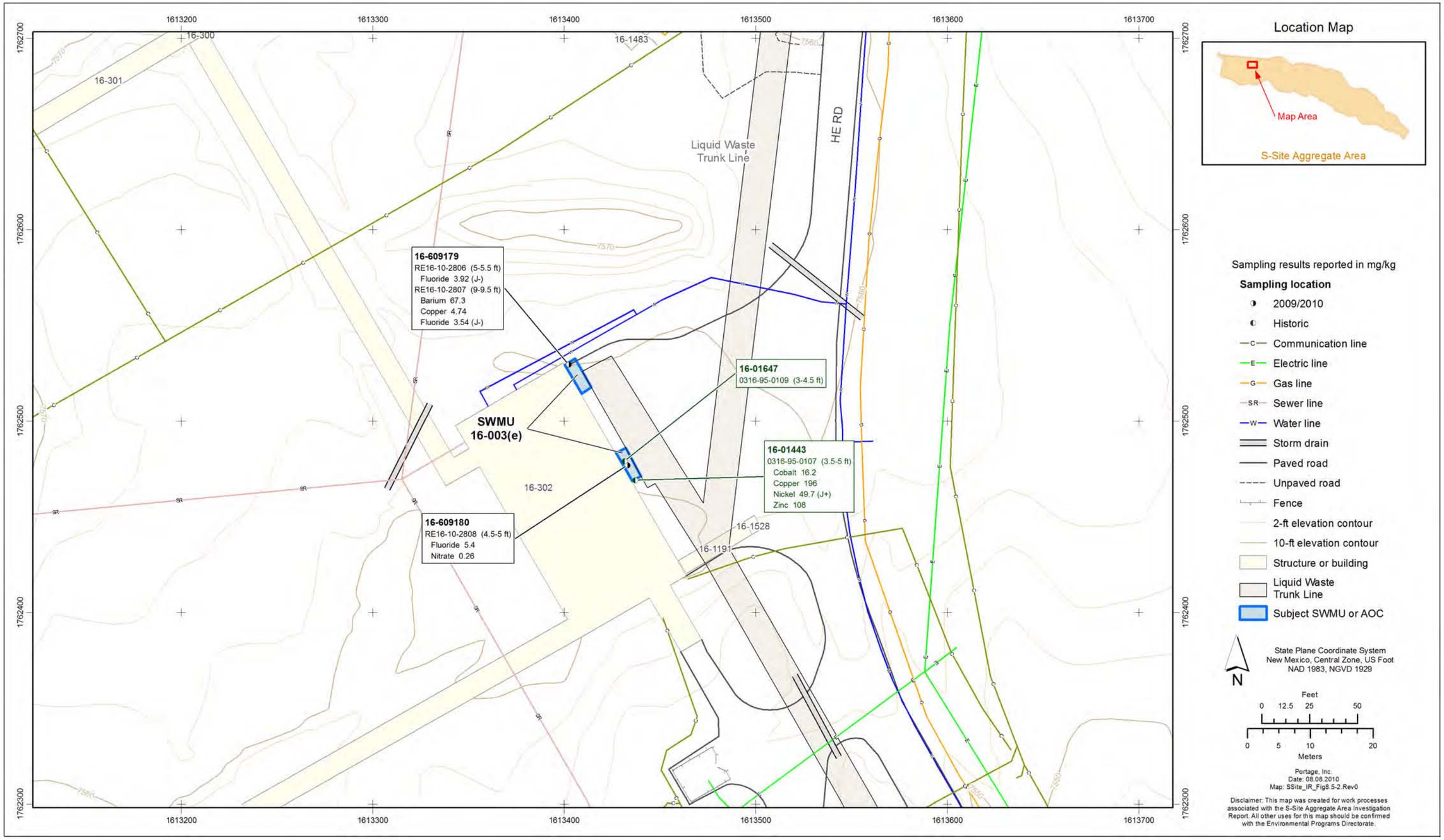


Figure 8.5-2 Inorganic chemicals detected above BVs at SWMU 16-003(e)

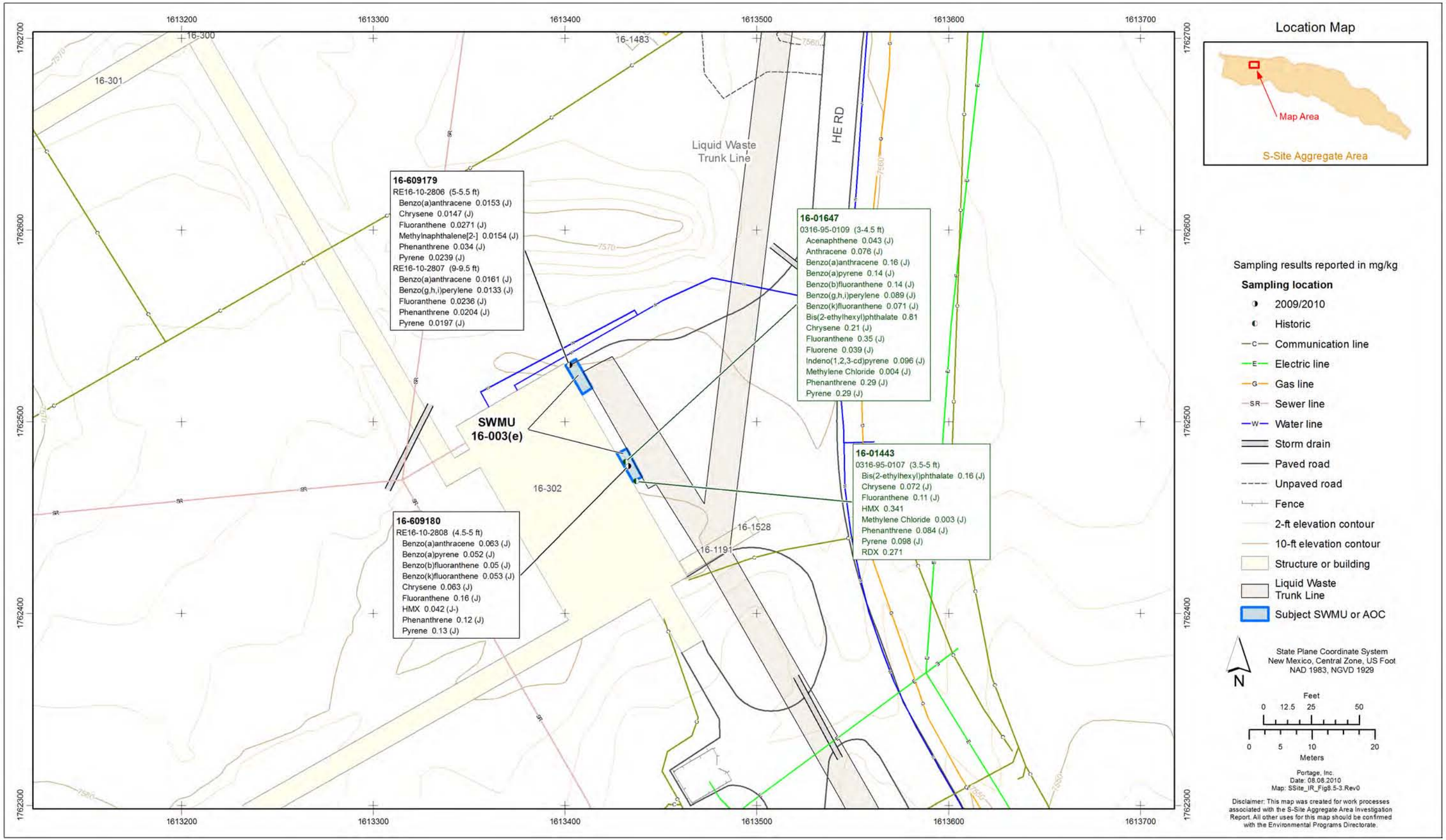


Figure 8.5-3 Organic chemicals detected in samples at SWMU 16-003(e)



Figure 8.6-1 Locations sampled for SWMU 16-003(f)

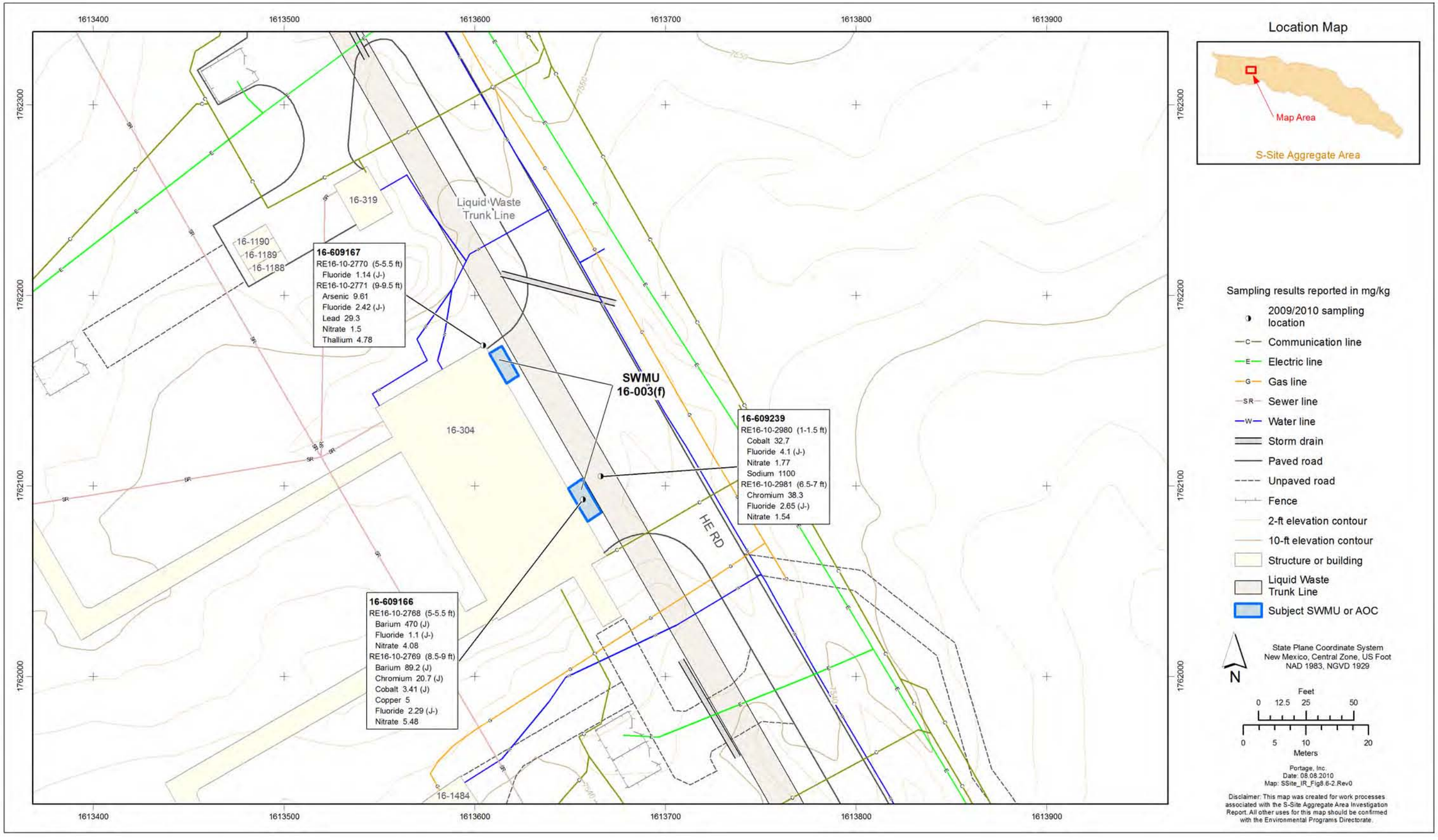


Figure 8.6-2 Inorganic chemicals detected above BVs at SWMU 16-003(f)

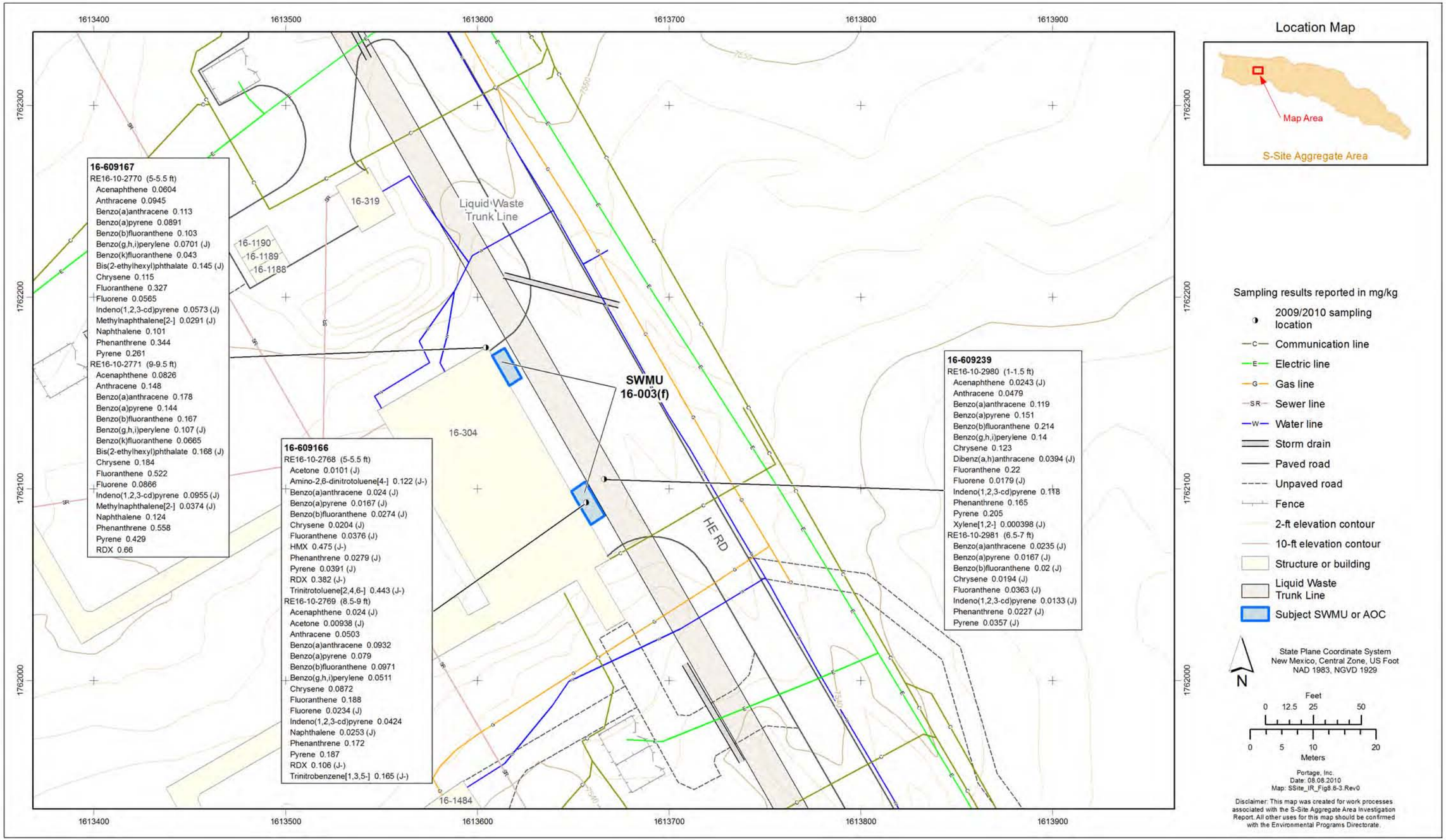


Figure 8.6-3 Organic chemicals detected in samples at SWMU 16-003(f)

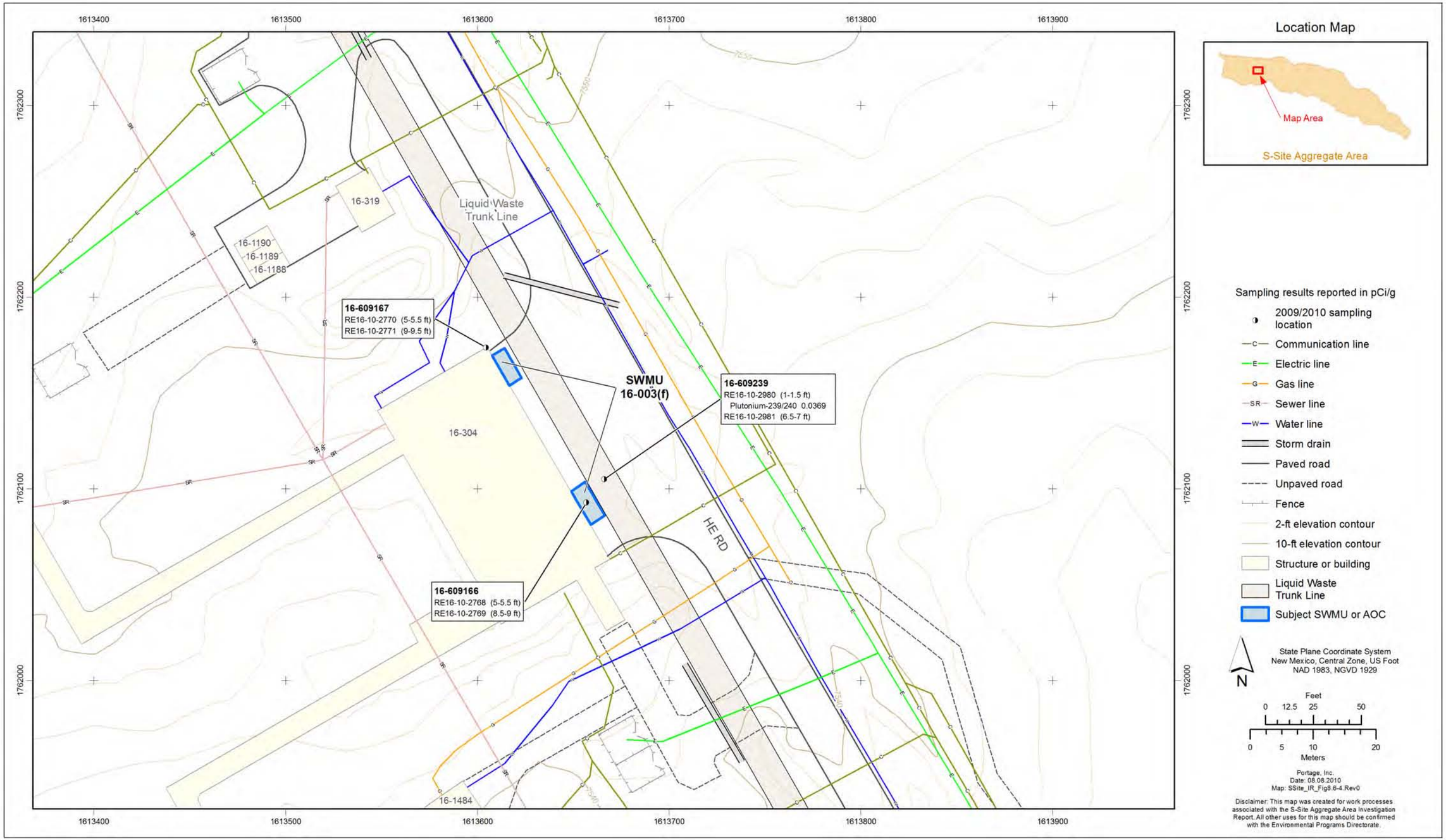


Figure 8.6-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-003(f)

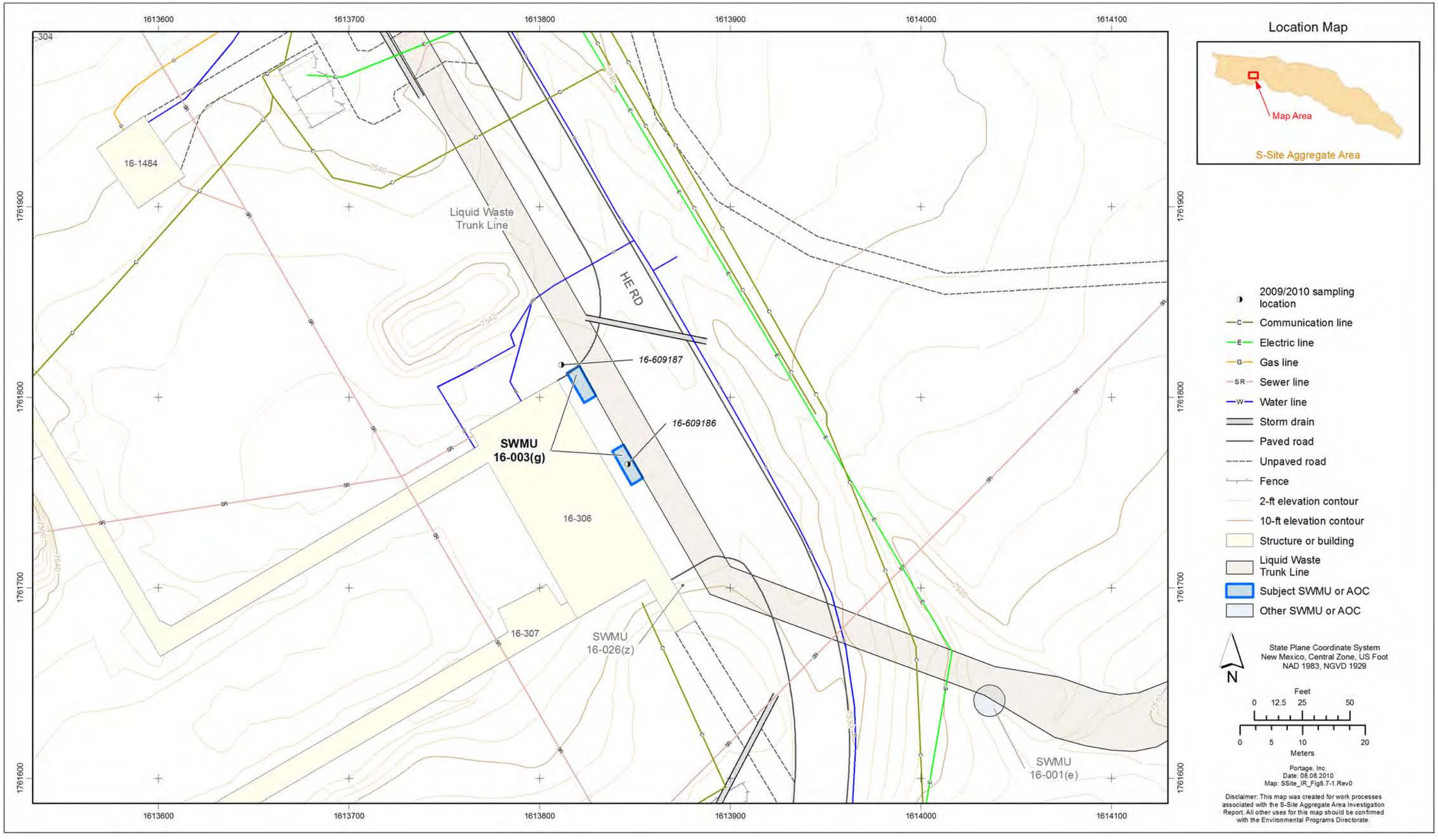


Figure 8.7-1 Locations sampled for SWMU 16-003(g)

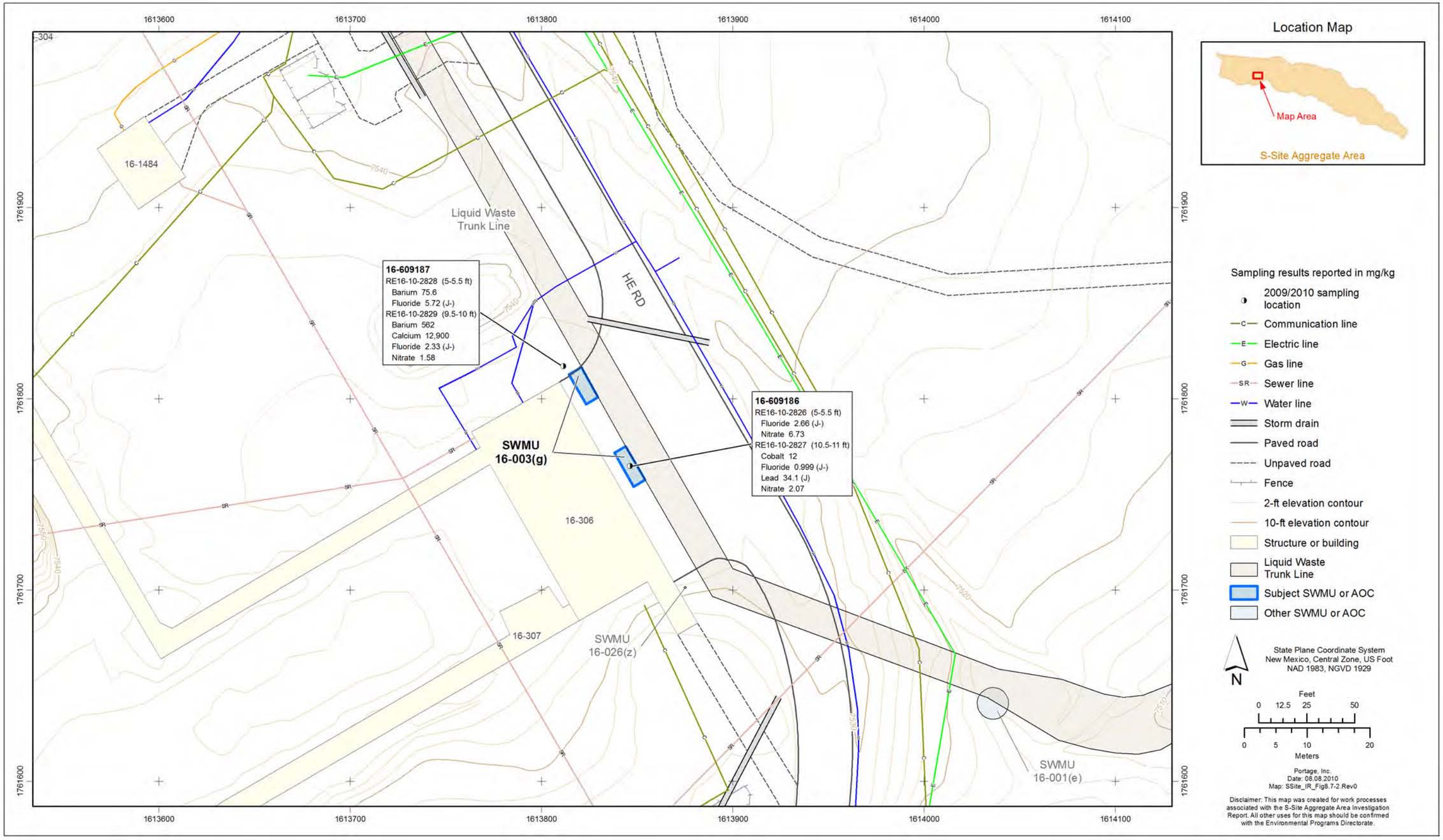


Figure 8.7-2 Inorganic chemicals detected above BVs at SWMU 16-003(g)

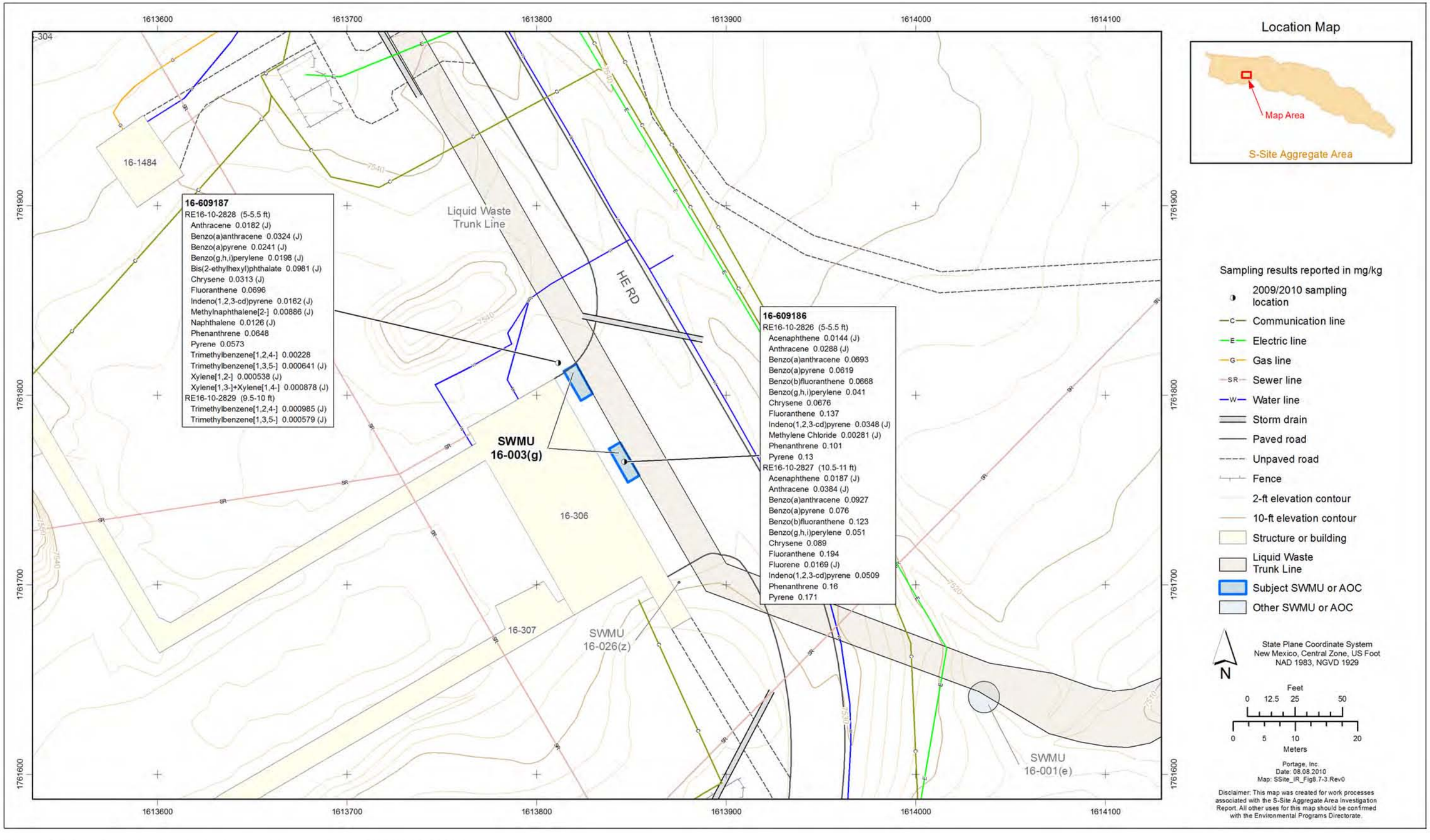


Figure 8.7-3 Organic chemicals detected in samples at SWMU 16-003(g)

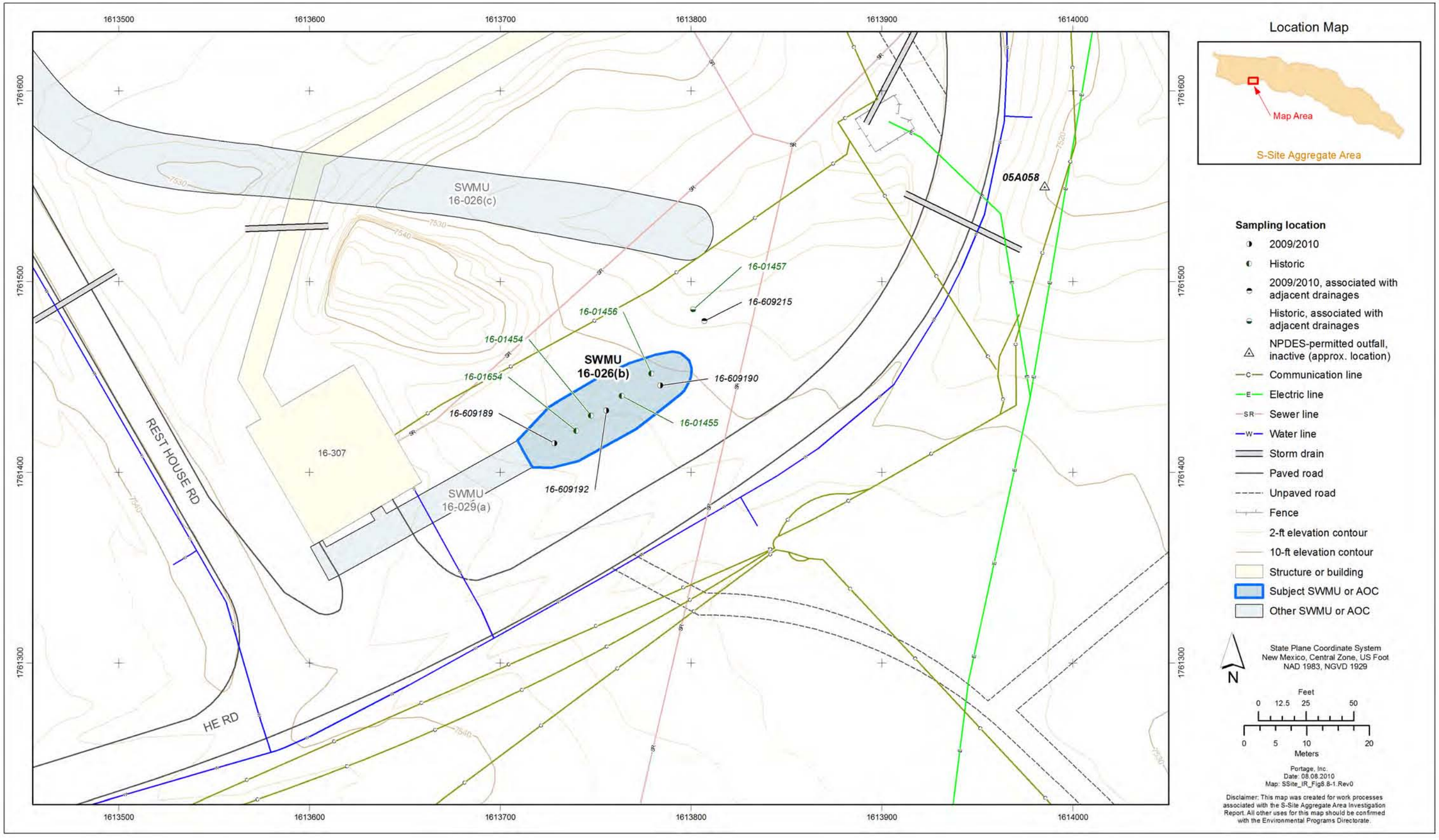


Figure 8.8-1 Locations sampled for SWMU 16-026(b)

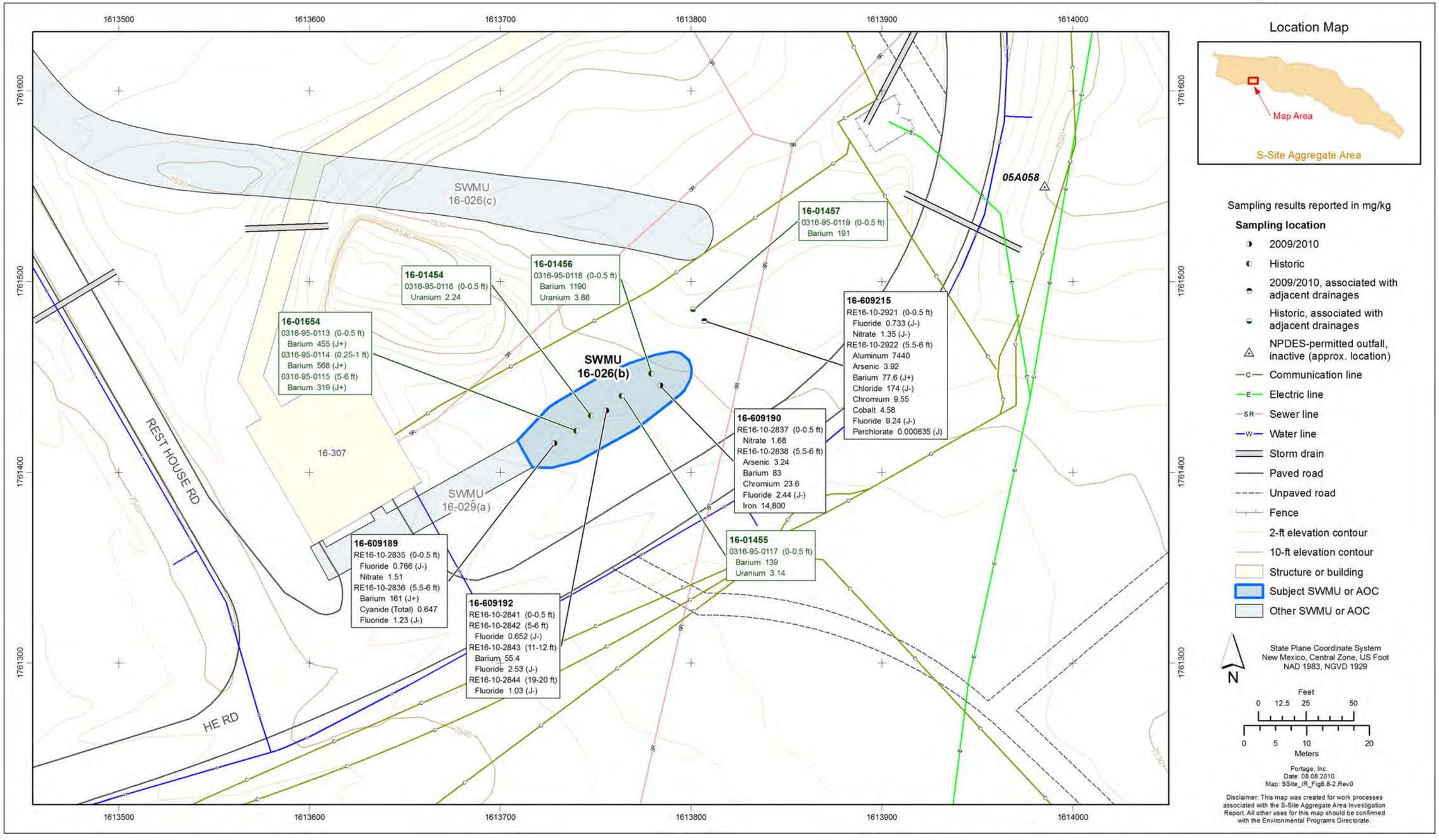


Figure 8.8-2 Inorganic chemicals detected above BVs at SWMU 16-026(b)

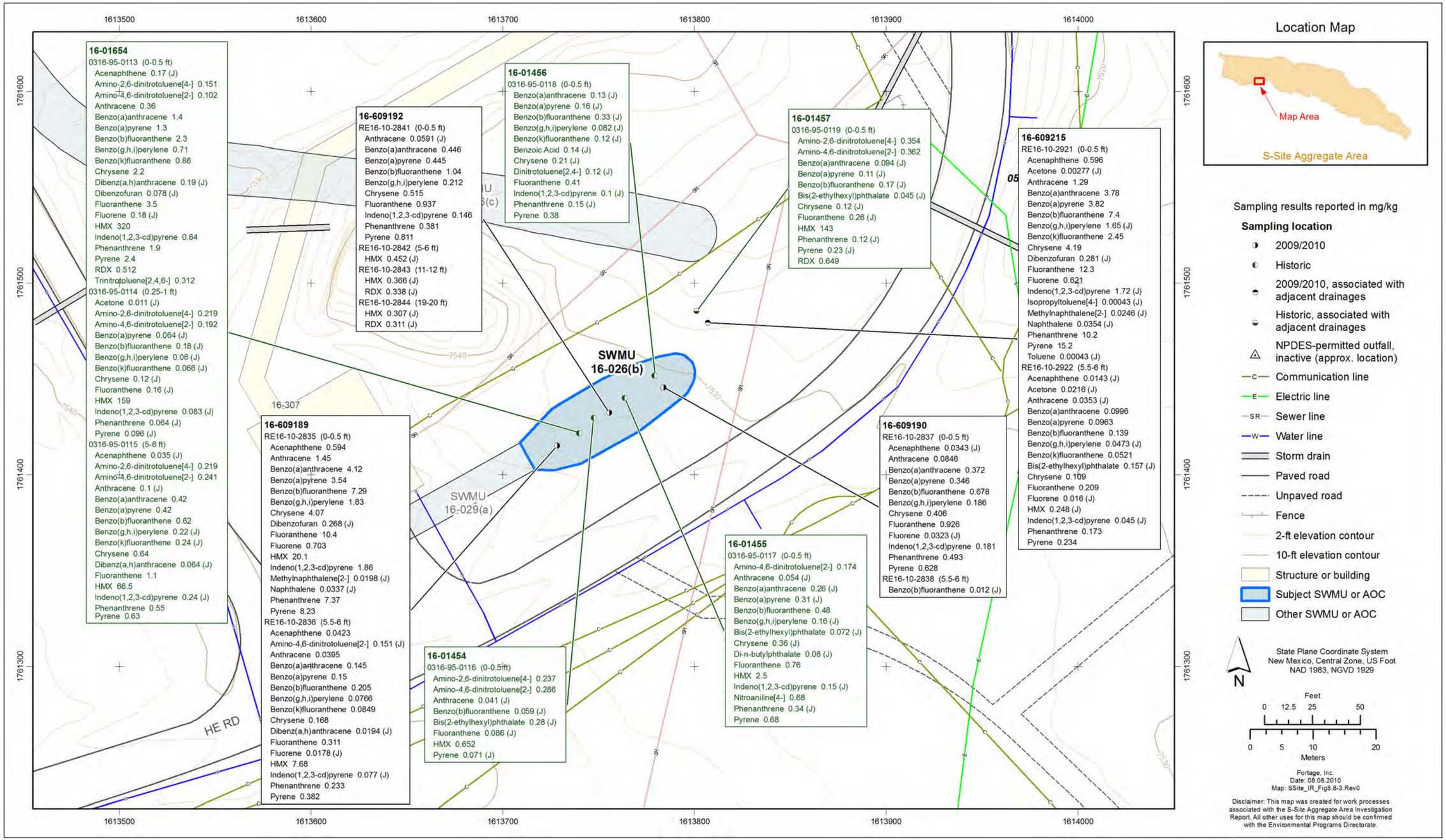


Figure 8.8-3 Organic chemicals detected in samples at SWMU 16-026(b)

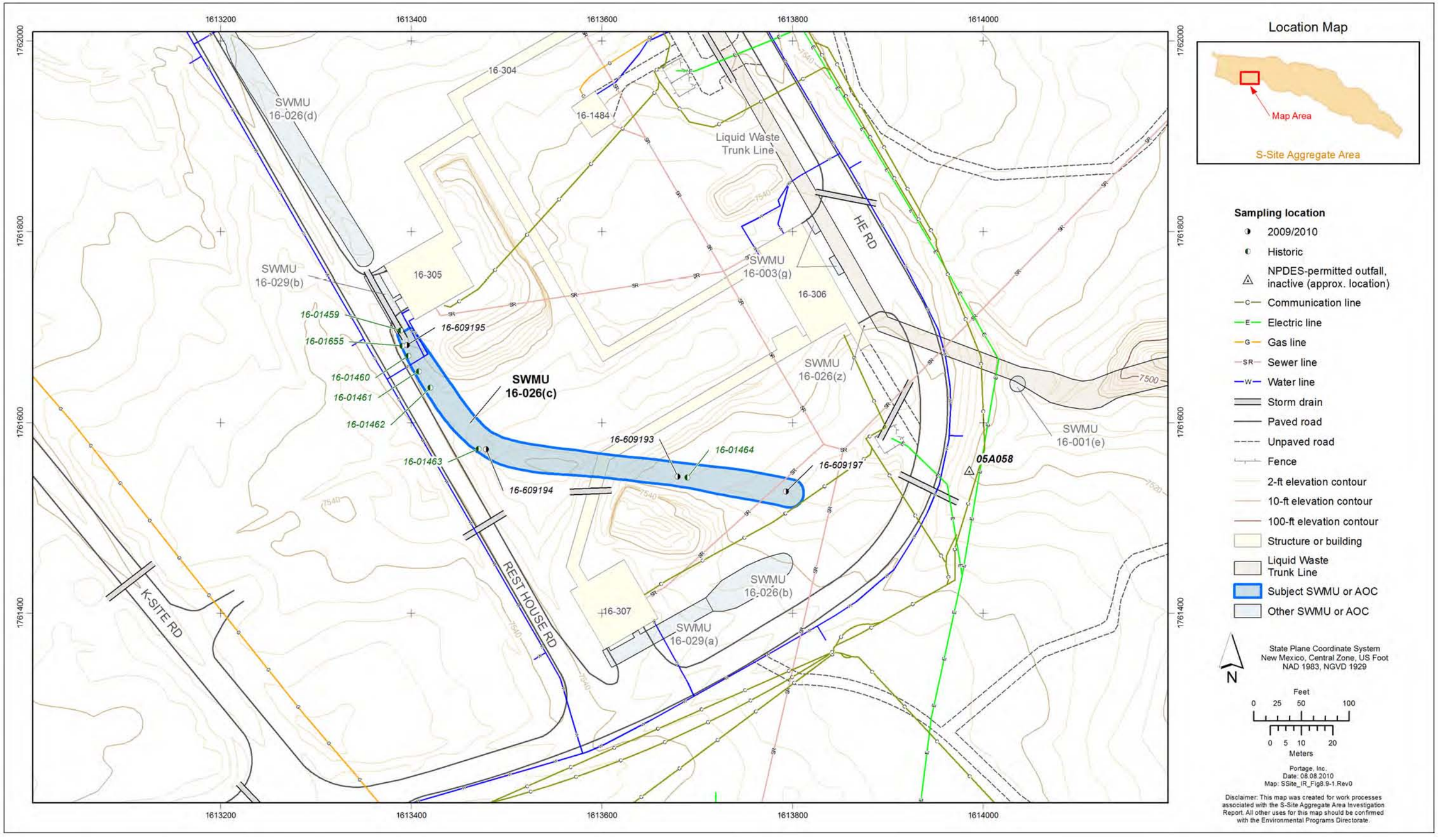


Figure 8.9-1 Locations sampled for SWMU 16-026(c)

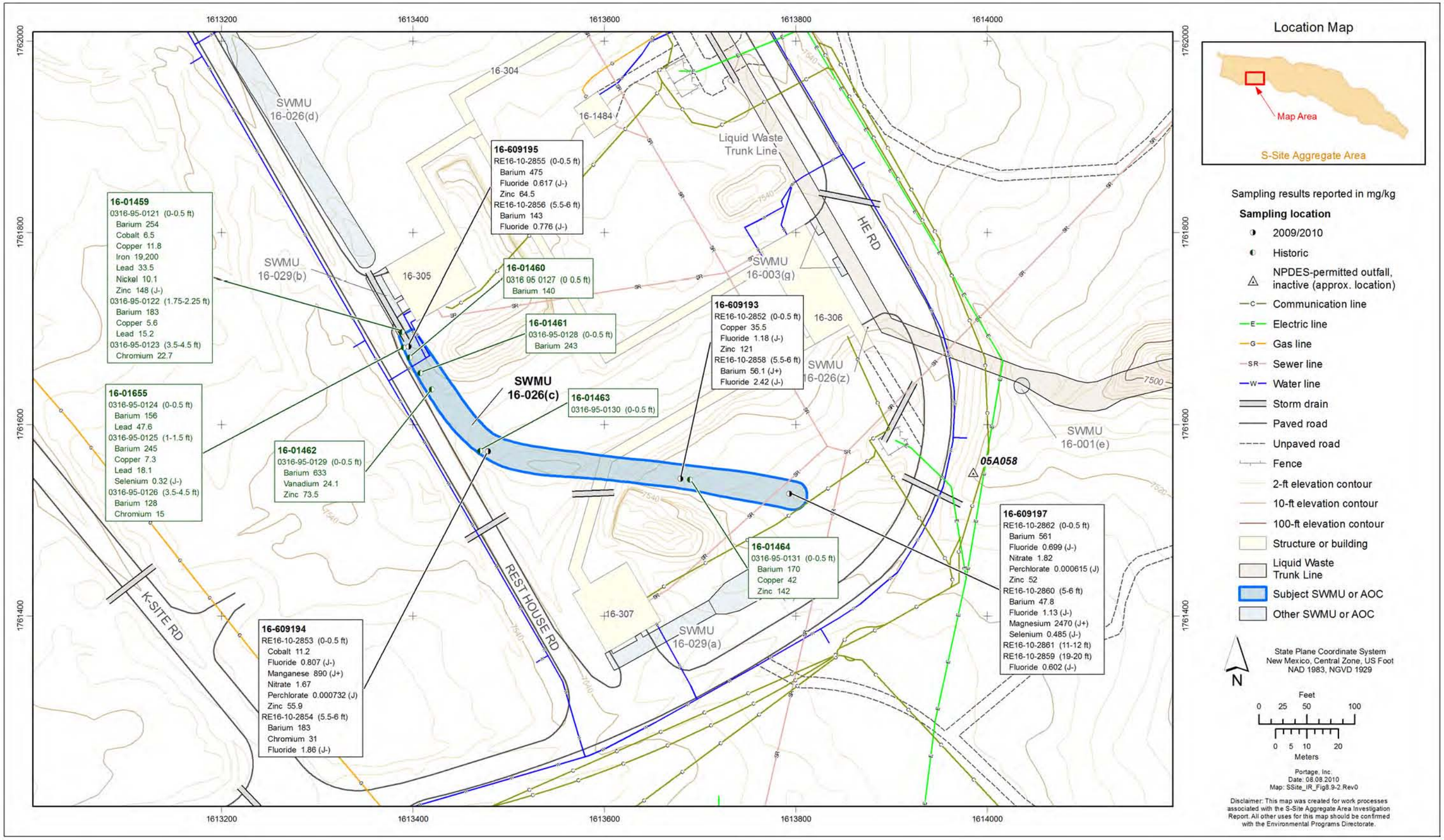


Figure 8.9-2 Inorganic chemicals detected above BVs at SWMU 16-026(c)

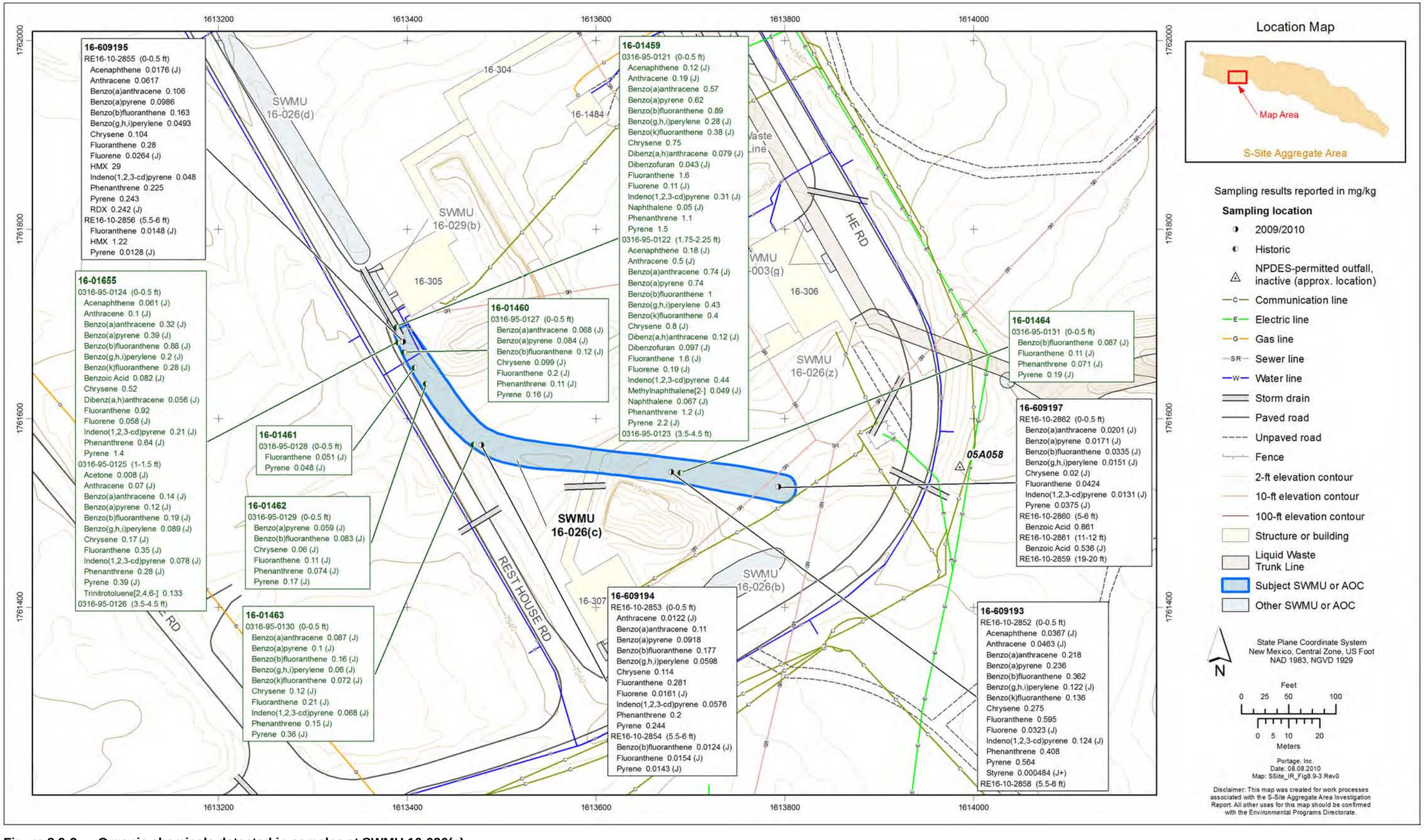


Figure 8.9-3 Organic chemicals detected in samples at SWMU 16-026(c)

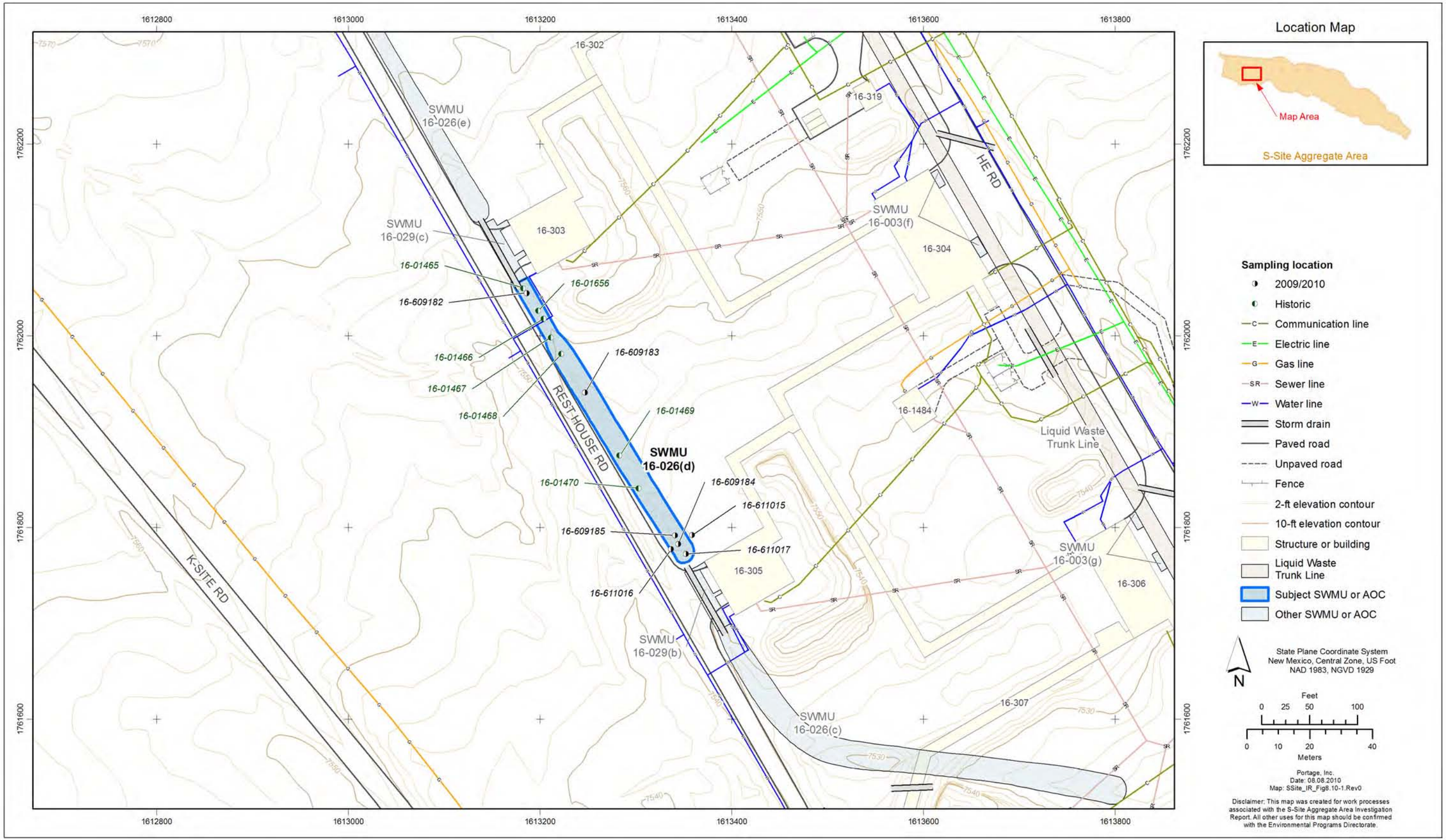


Figure 8.10-1 Locations sampled for SWMU 16-026(d)

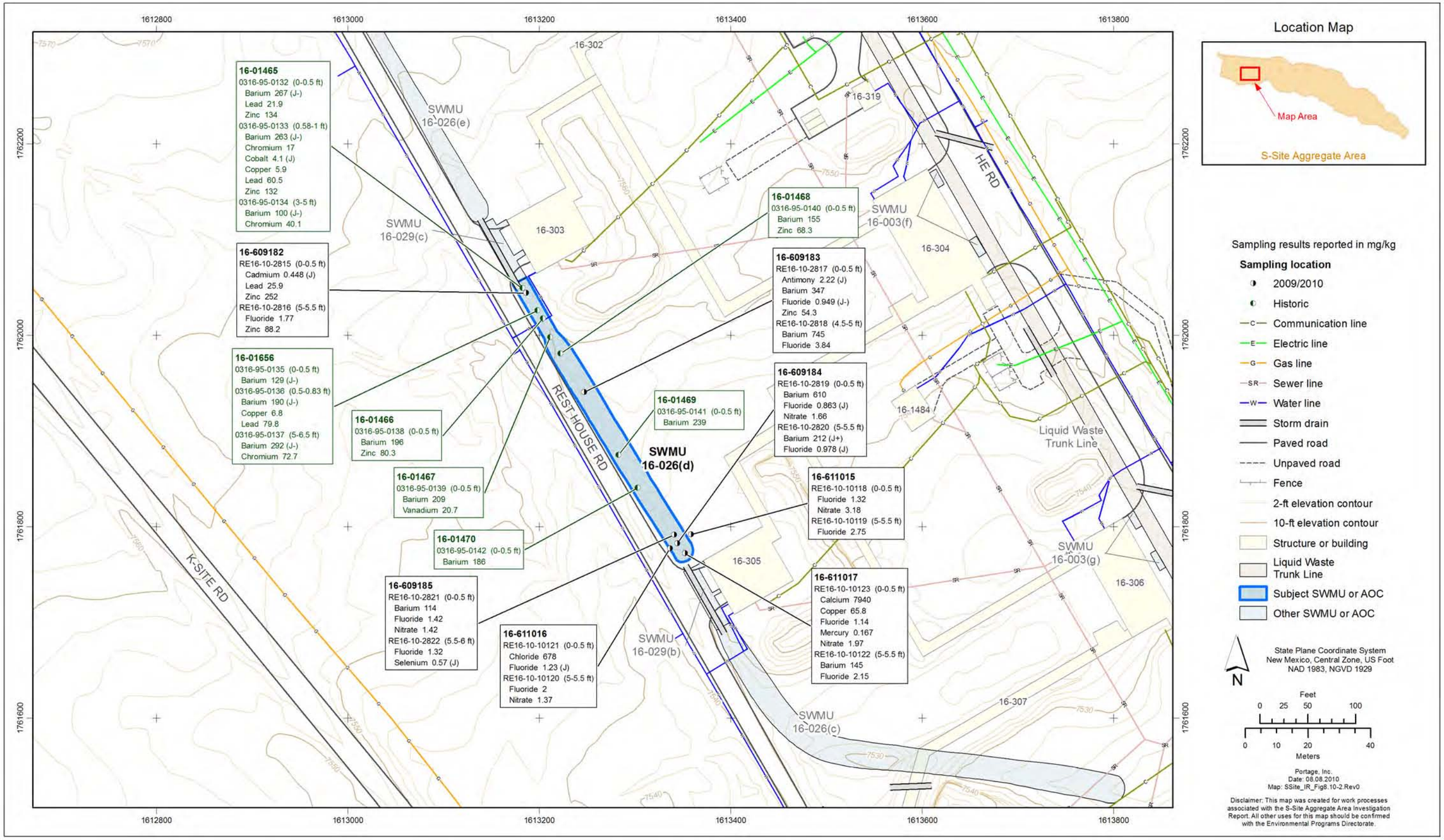


Figure 8.10-2 Inorganic chemicals detected above BVs at SWMU 16-026(d)

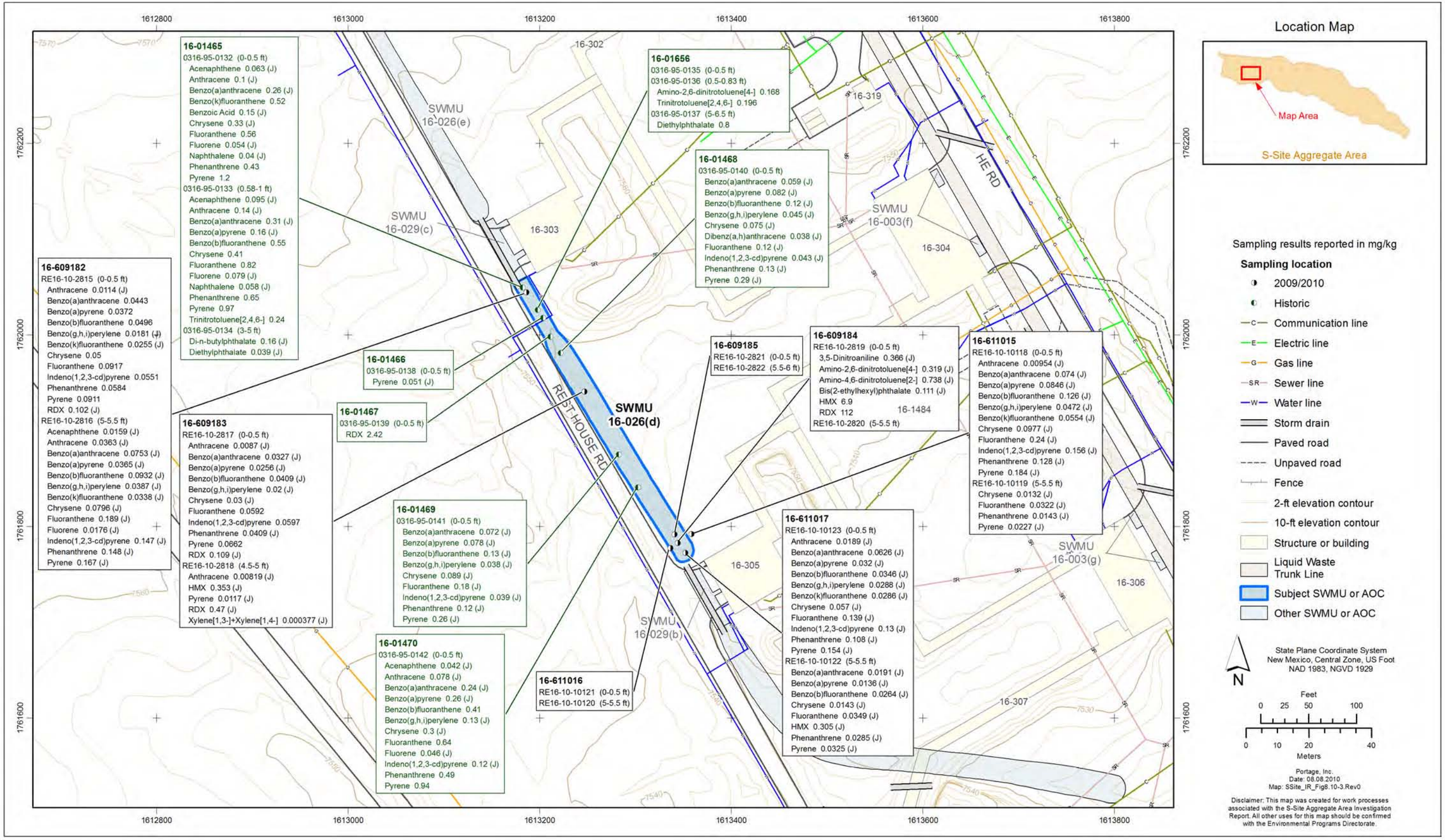


Figure 8.10-3 Organic chemicals detected in samples at SWMU 16-026(d)

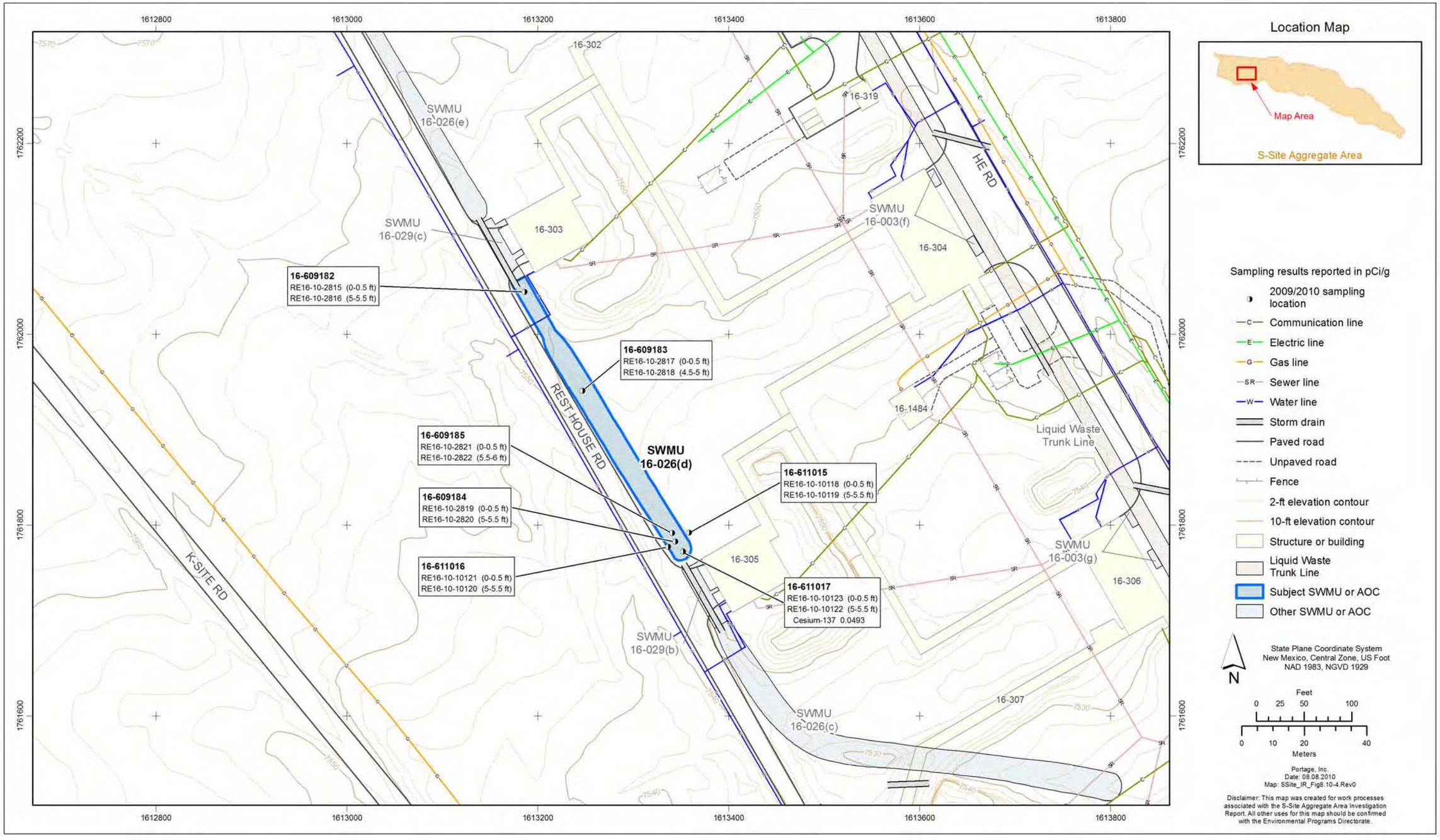


Figure 8.10-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-026(d)

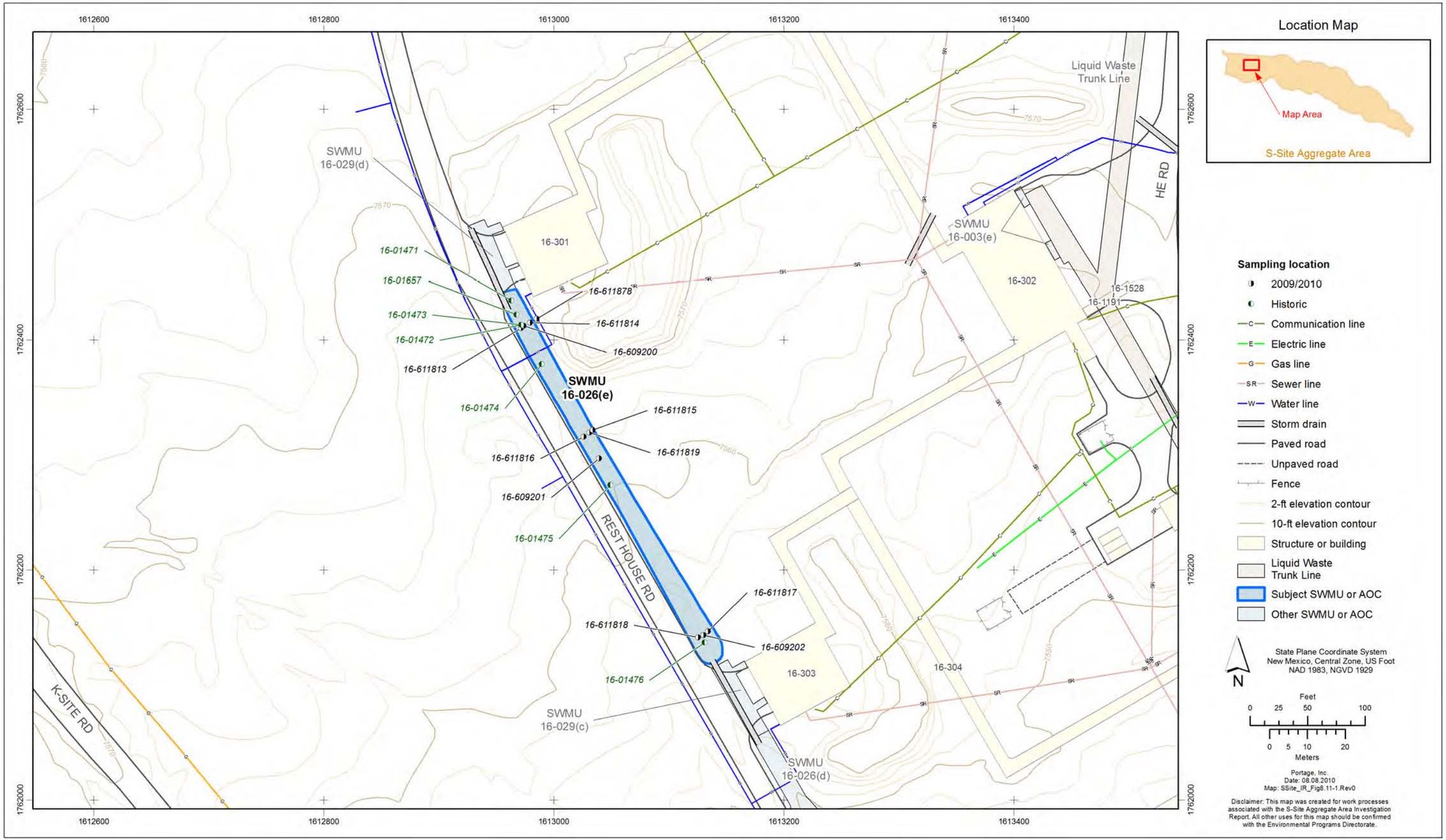


Figure 8.11-1 Locations sampled for SWMU 16-026(e)

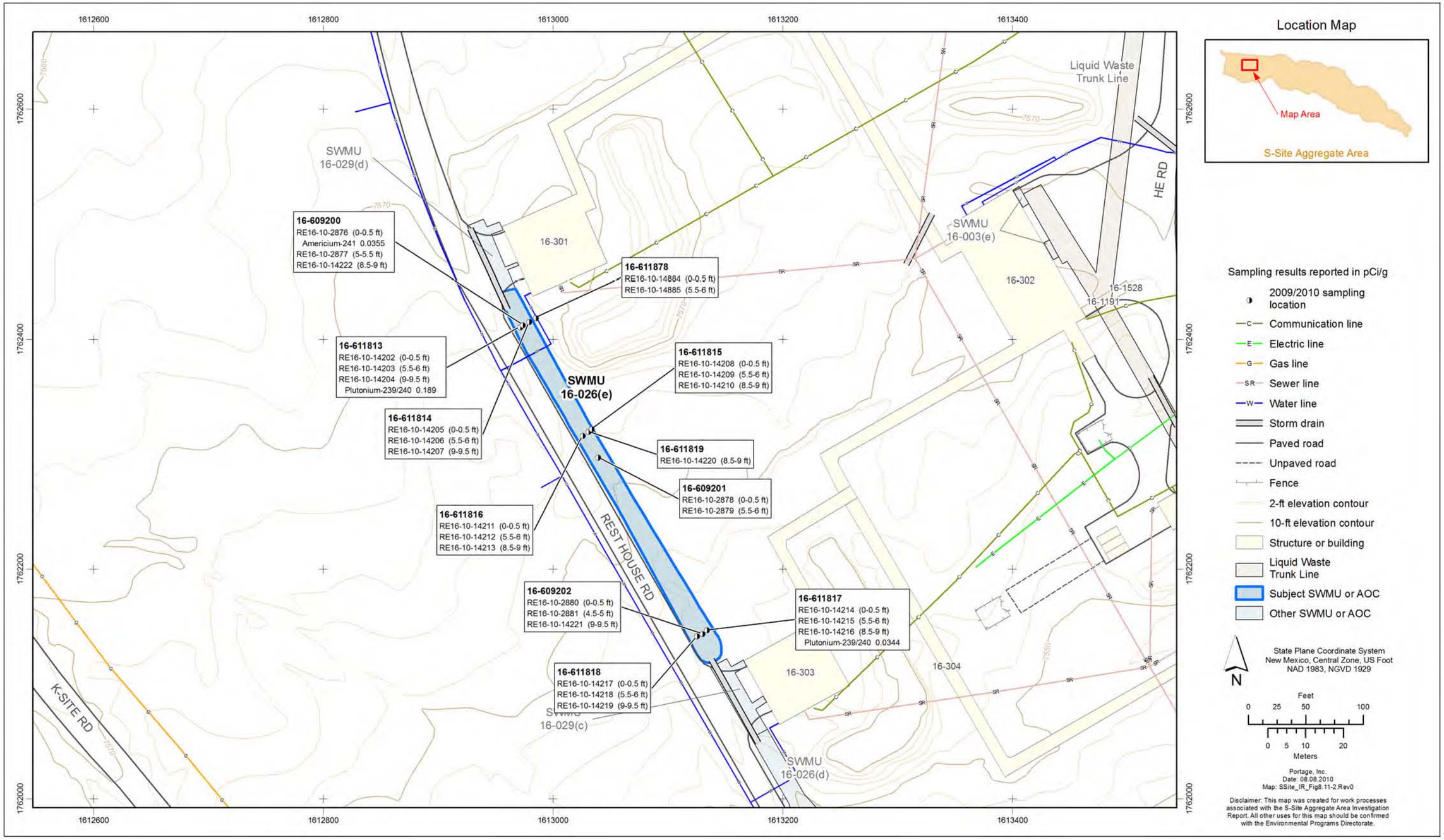


Figure 8.11-2 Radionuclides detected or detected above BVs/FVs at SWMU 16-026(e)



Figure 8.12-1 Locations sampled for SWMU 16-029(a)

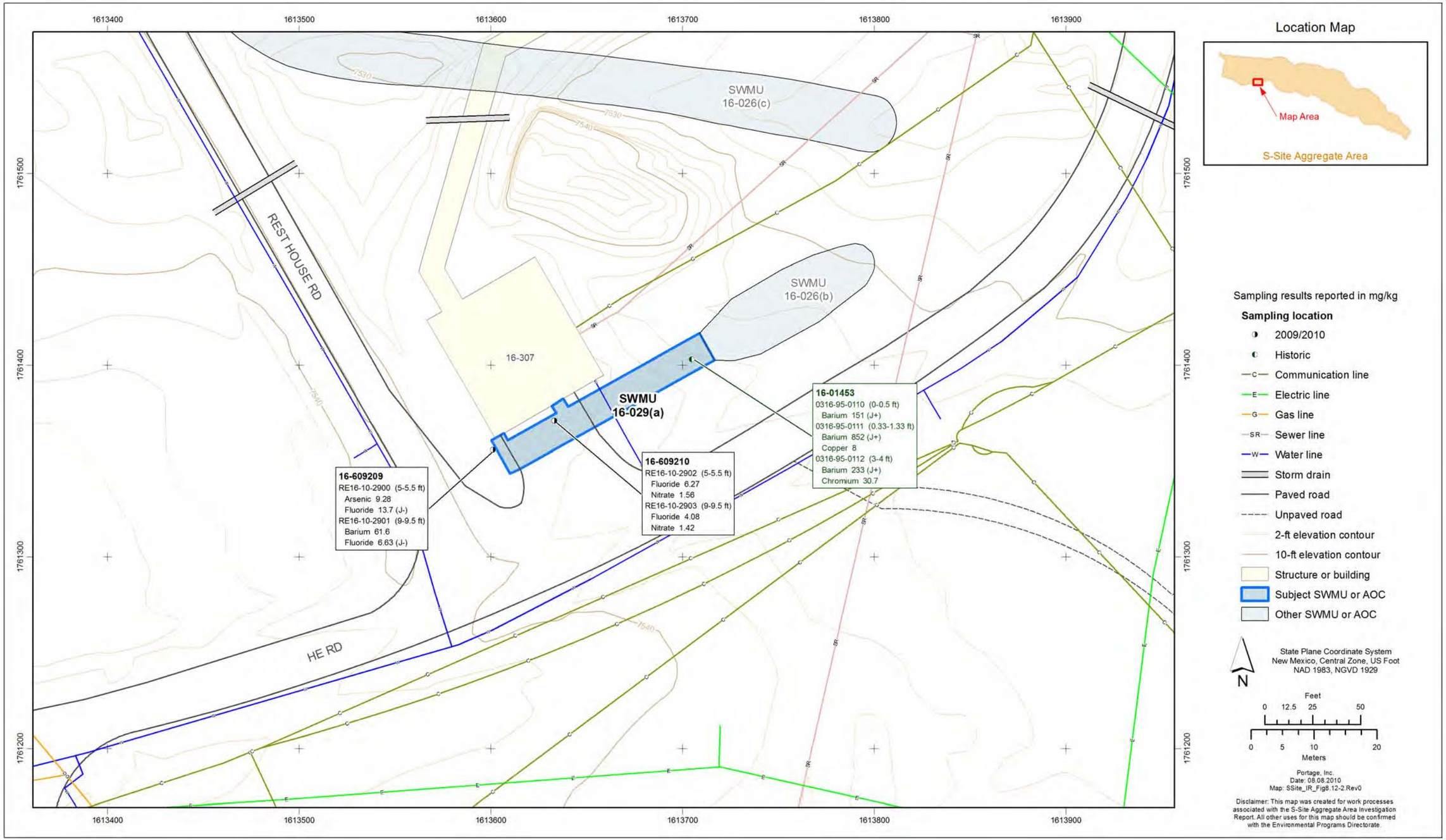


Figure 8.12-2 Inorganic chemicals detected above BVs at SWMU 16-029(a)

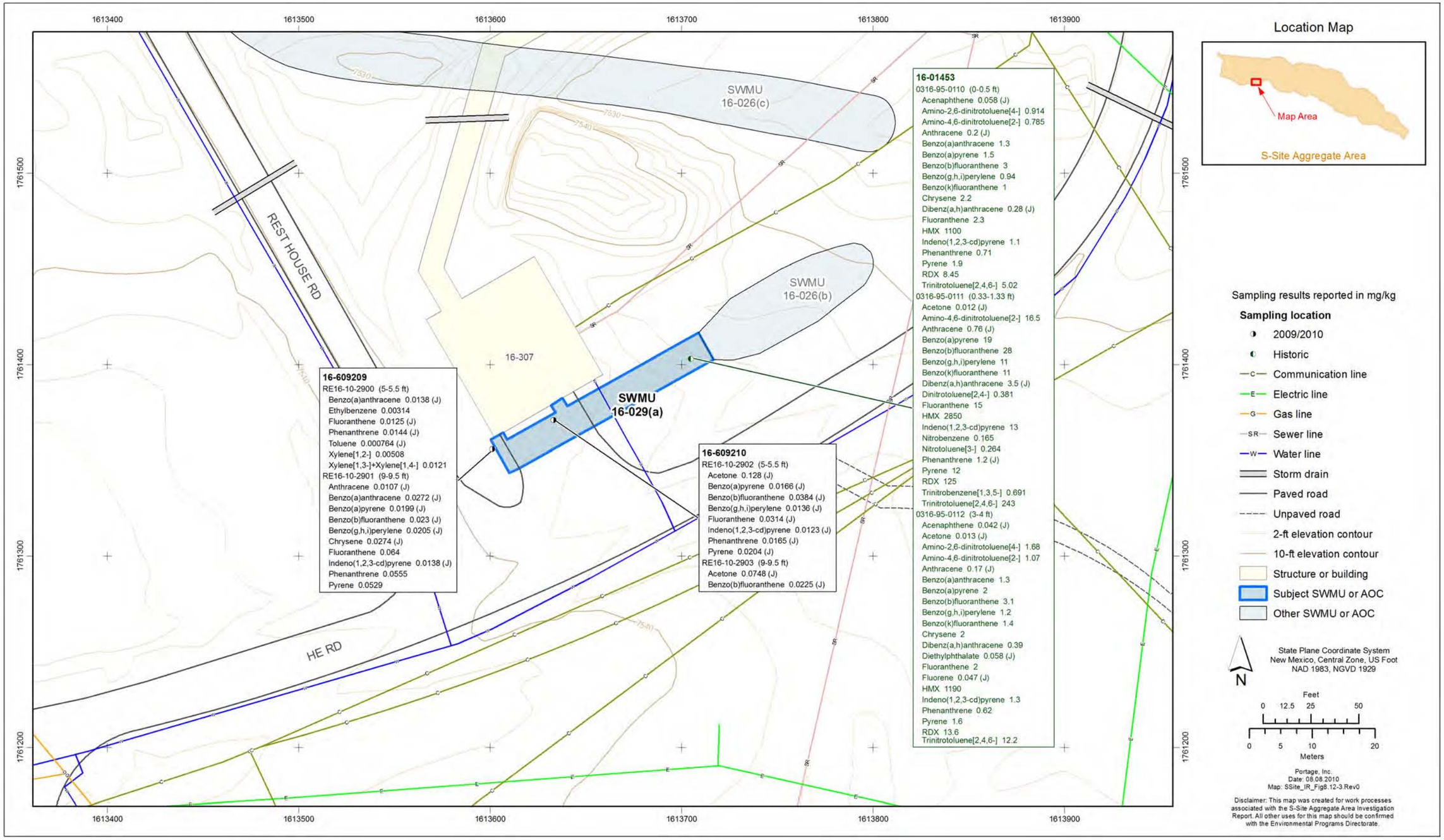


Figure 8.12-3 Organic chemicals detected in samples at SWMU 16-029(a)

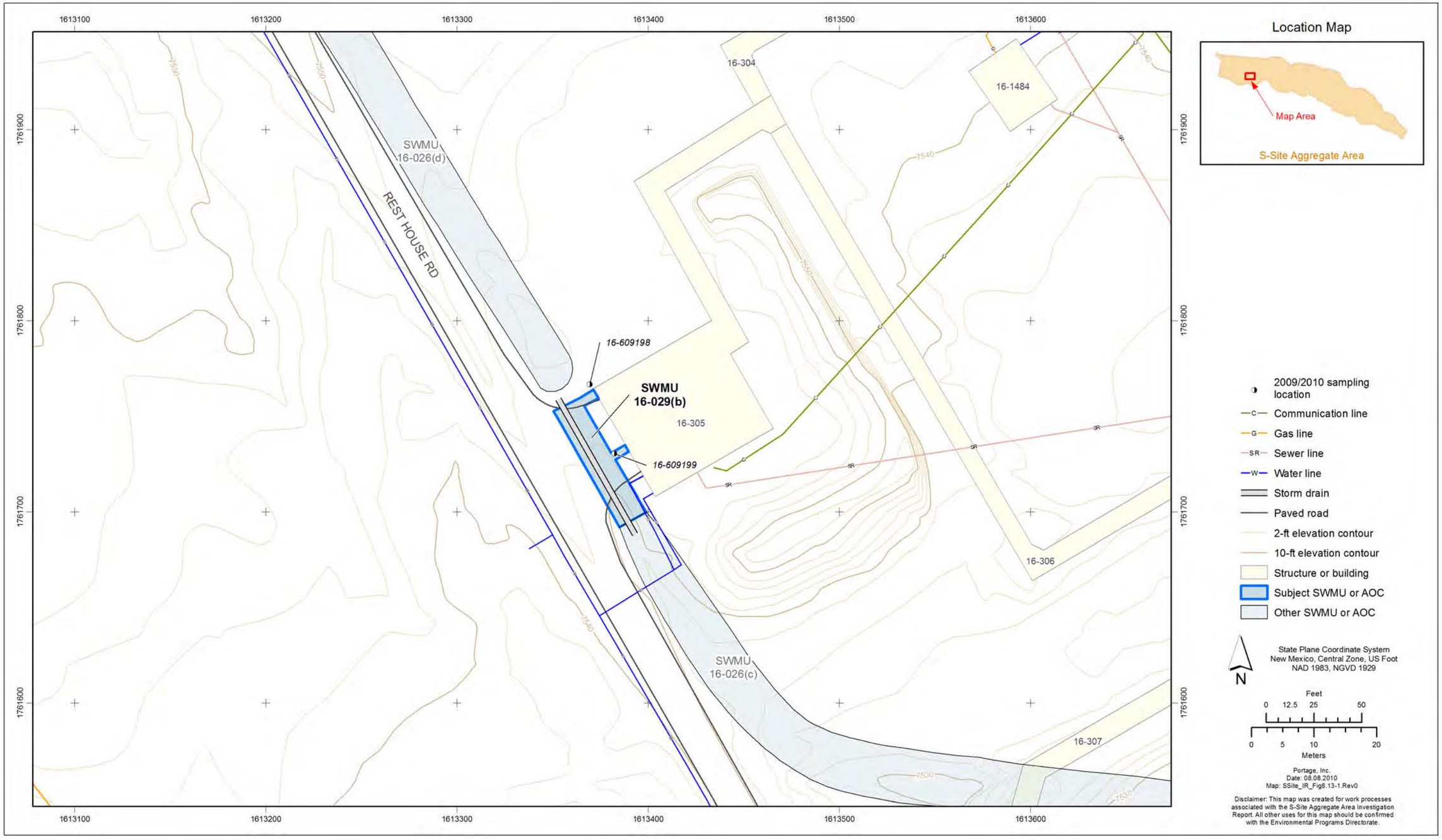


Figure 8.13-1 Locations sampled for SWMU 16-029(b)

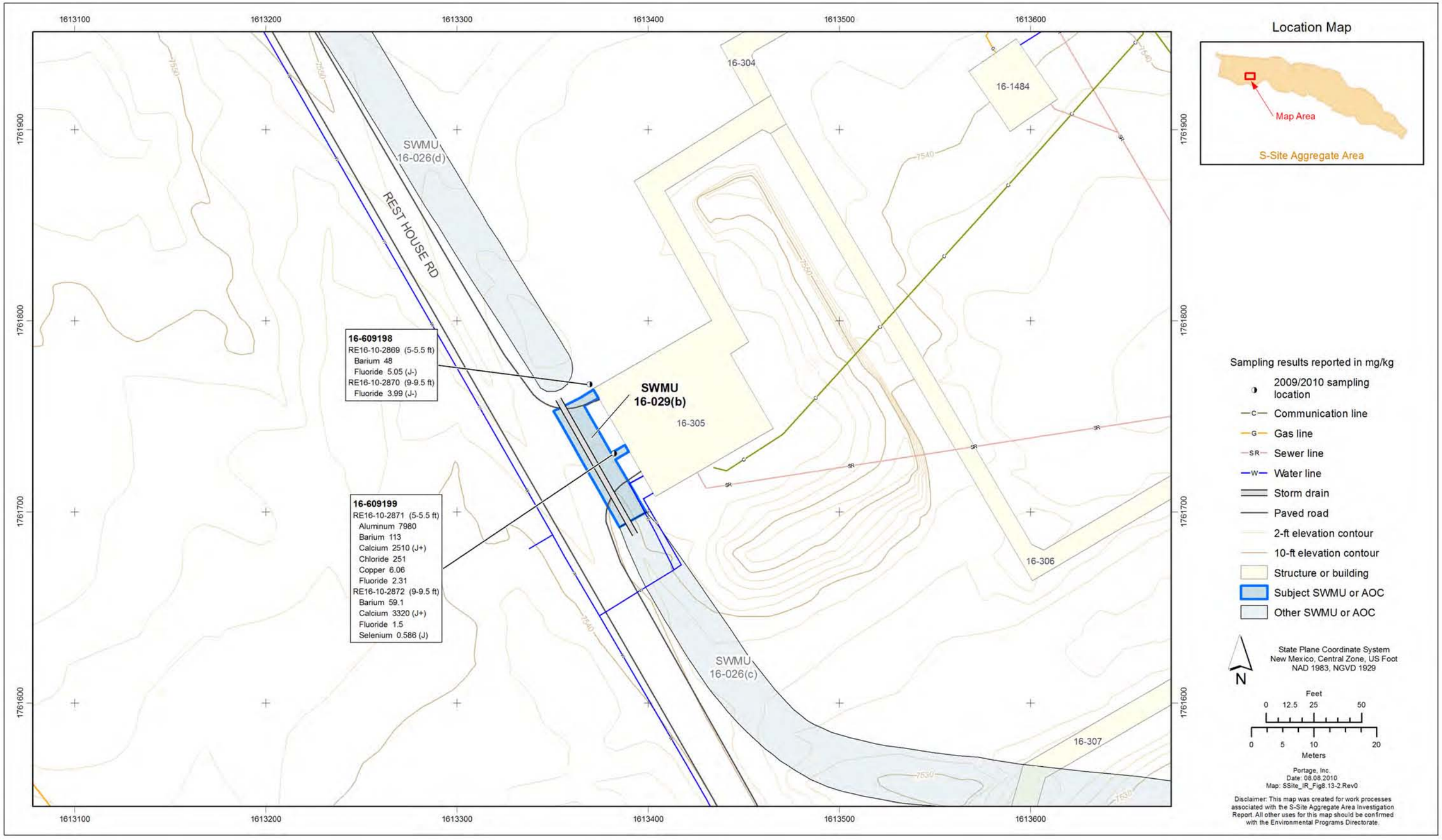


Figure 8.13-2 Inorganic chemicals detected above BVs at SWMU 16-029(b)

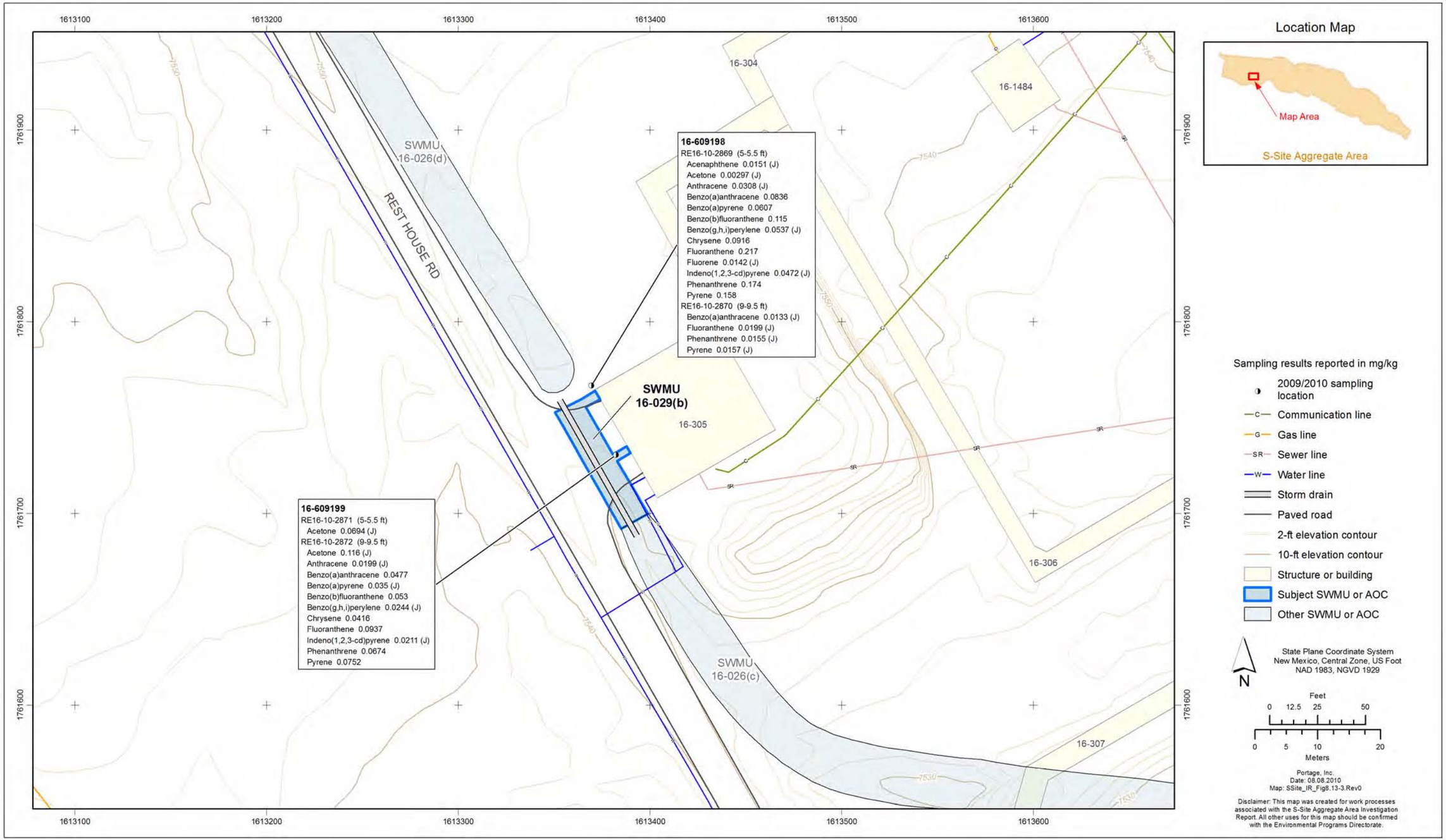


Figure 8.13-3 Organic chemicals detected in samples at SWMU 16-029(b)

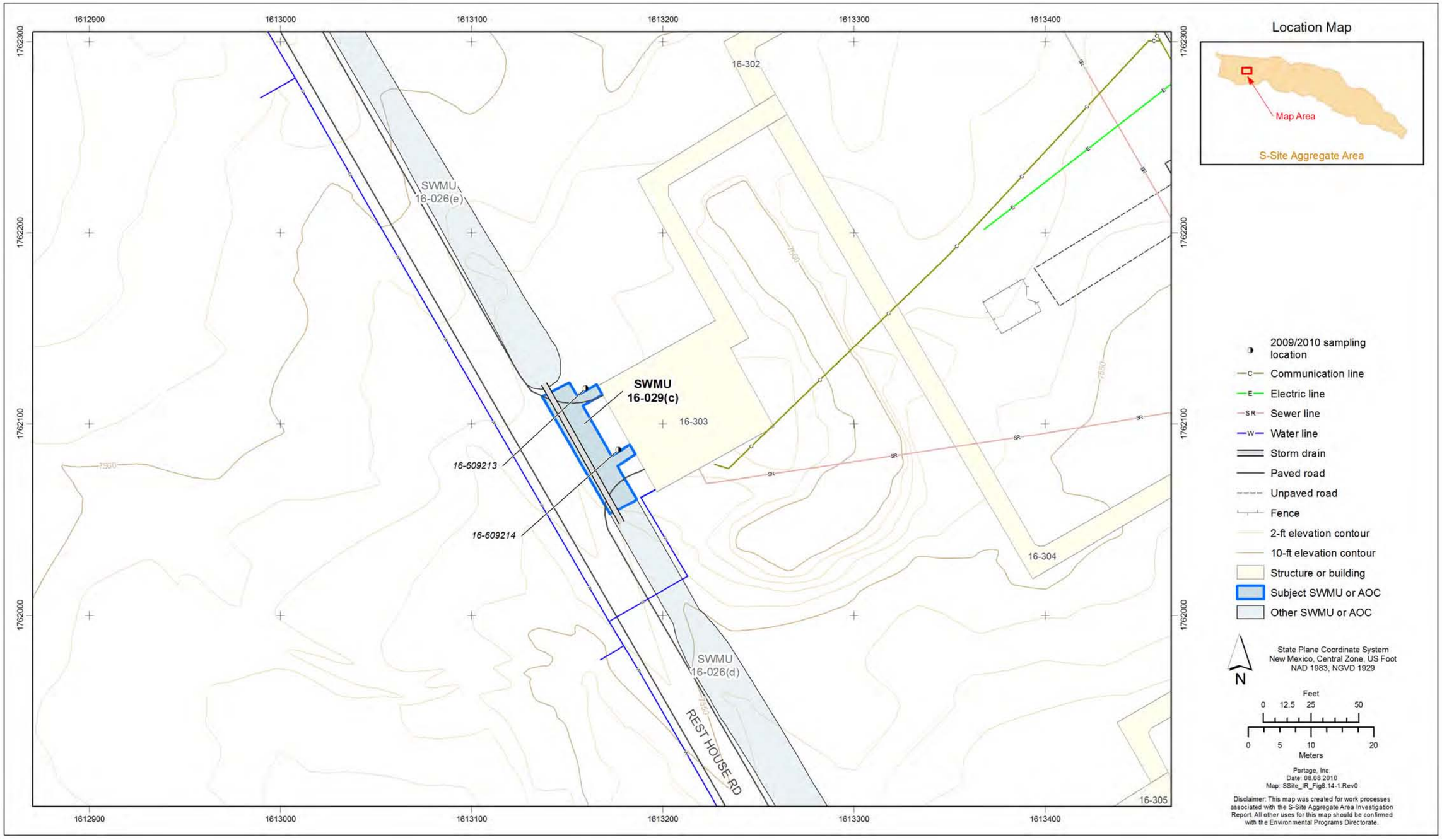


Figure 8.14-1 Locations sampled for SWMU 16-029(c)

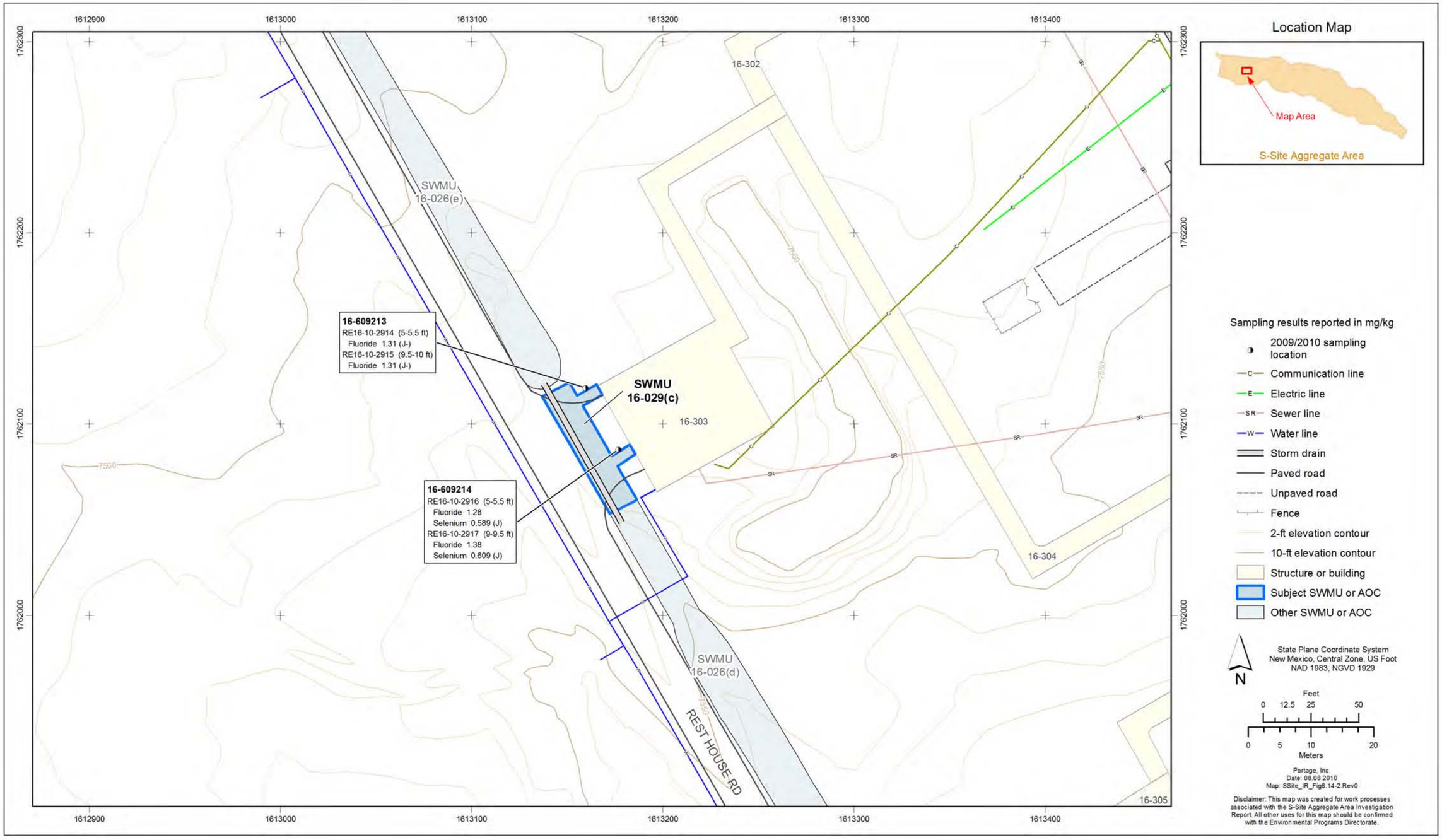


Figure 8.14-2 Inorganic chemicals detected above BVs at SWMU 16-029(c)

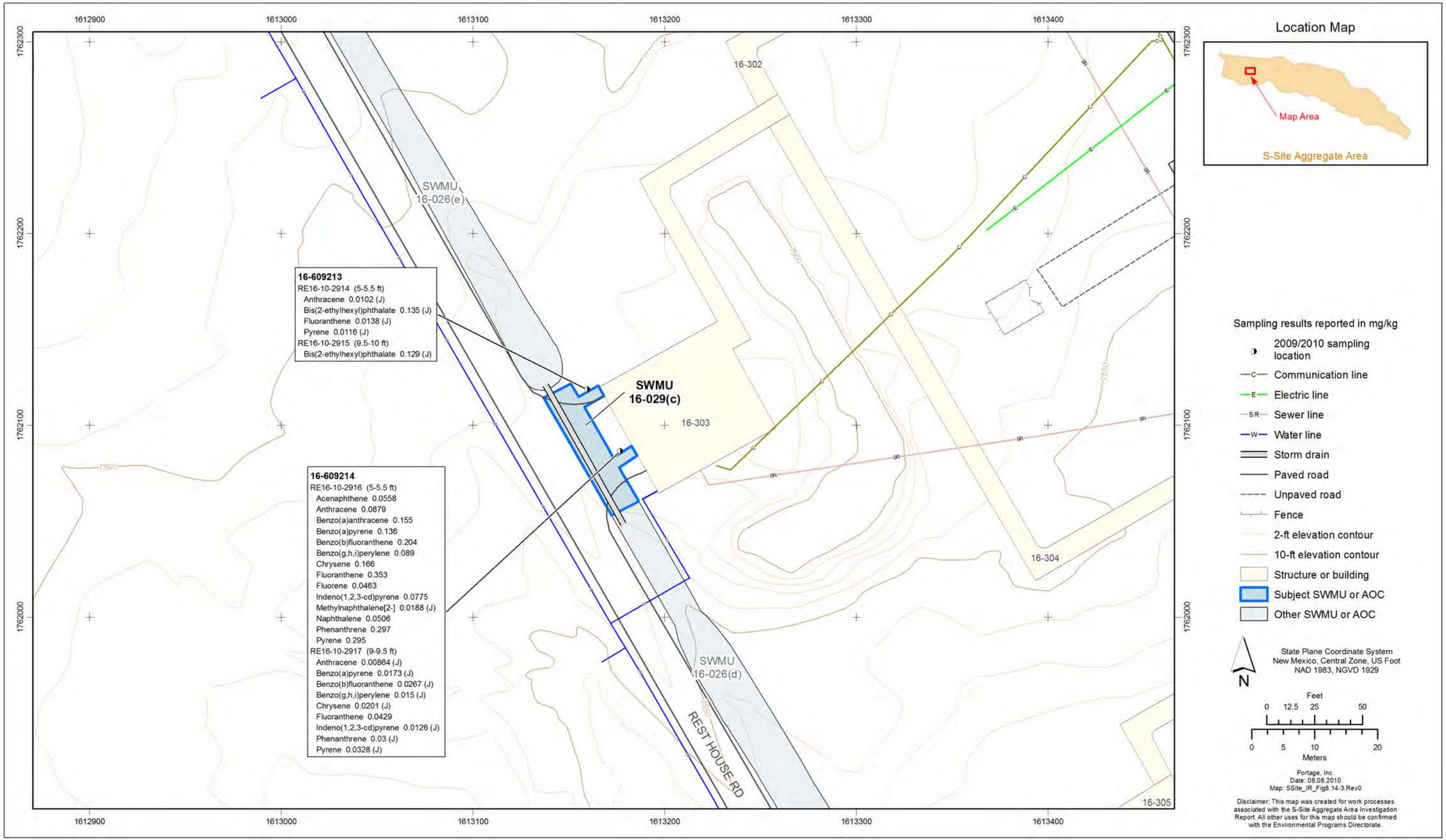


Figure 8.14-3 Organic chemicals detected in samples at SWMU 16-029(c)



Figure 8.15-1 Locations sampled for SWMU 16-029(d)

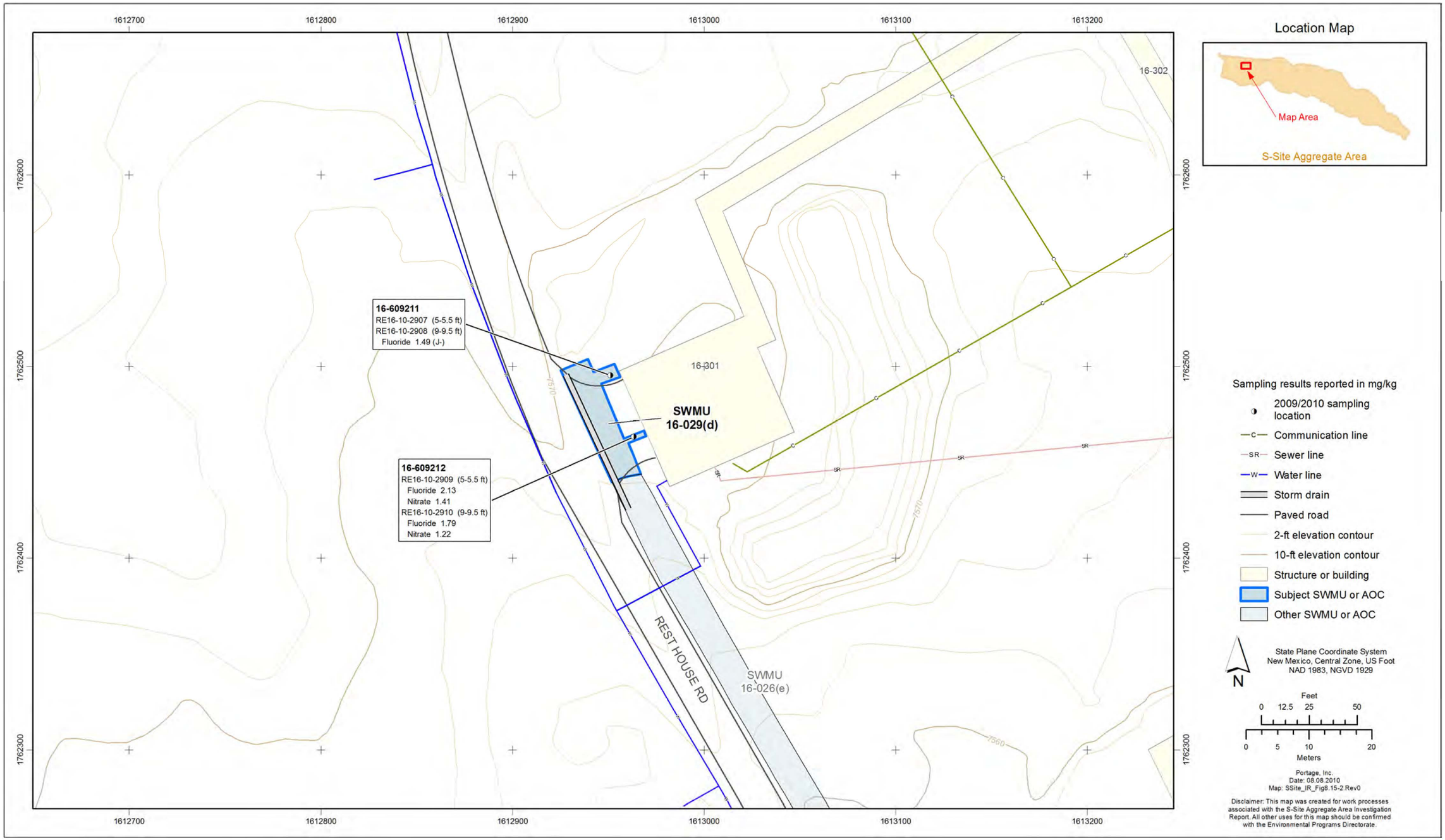


Figure 8.15-2 Inorganic chemicals detected above BVs at SWMU 16-029(d)

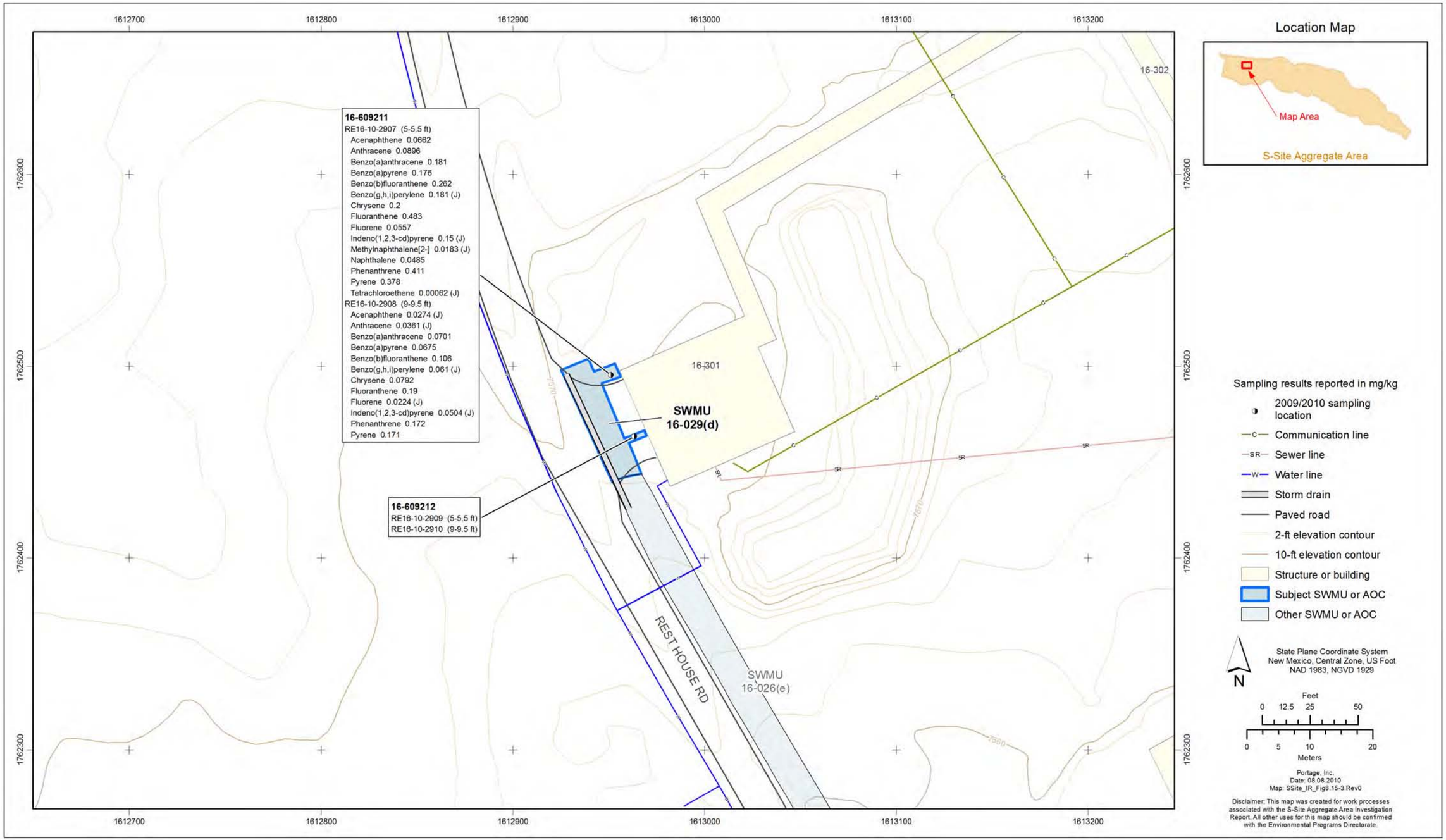


Figure 8.15-3 Organic chemicals detected in samples at SWMU 16-029(d)

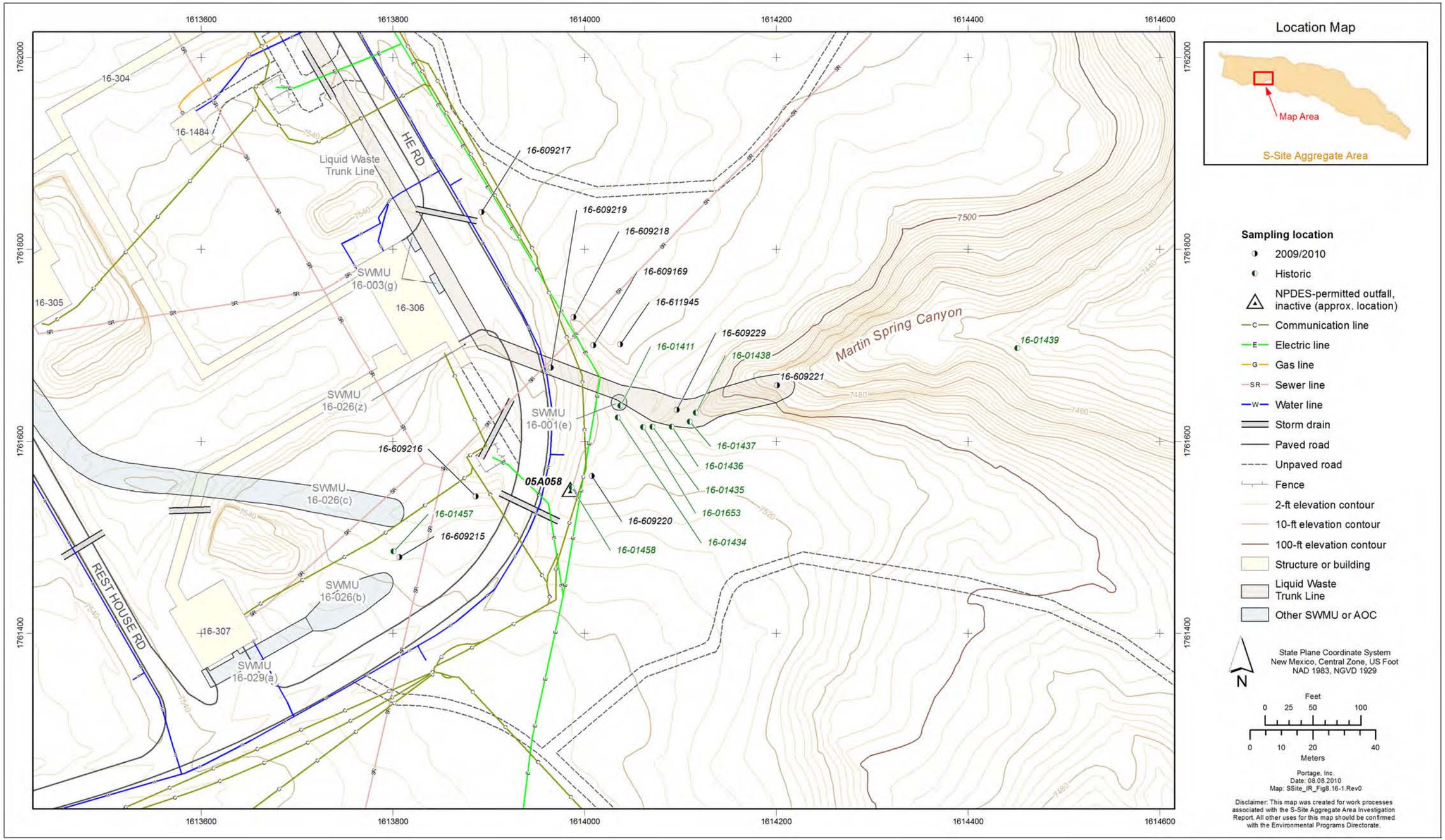


Figure 8.16-1 Locations sampled for the Shared Drainages

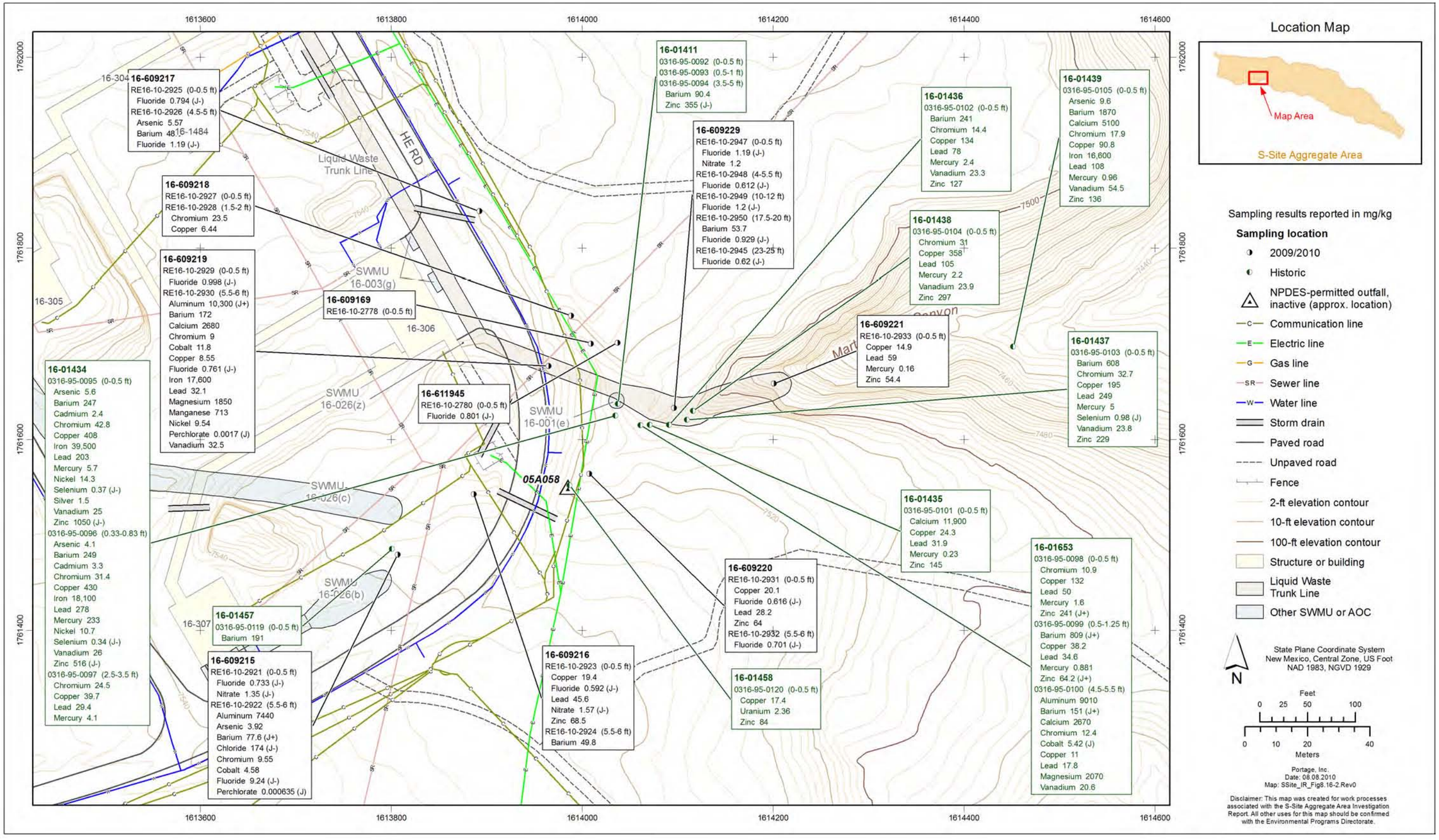


Figure 8.16-2 Inorganic chemicals detected above BVs at the Shared Drainages

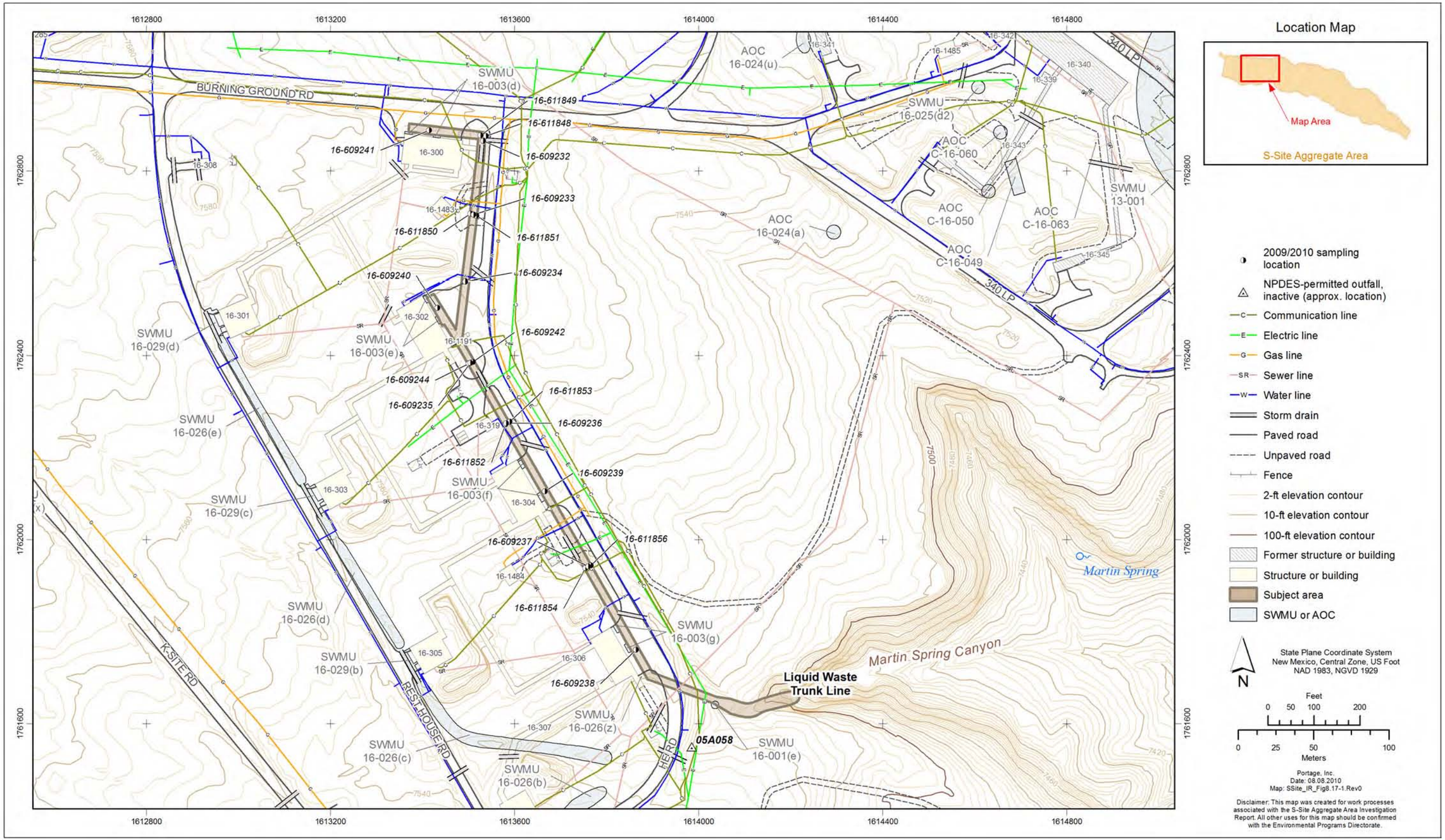


Figure 8.17-1 Locations sampled for the Liquid Waste Trunk Line

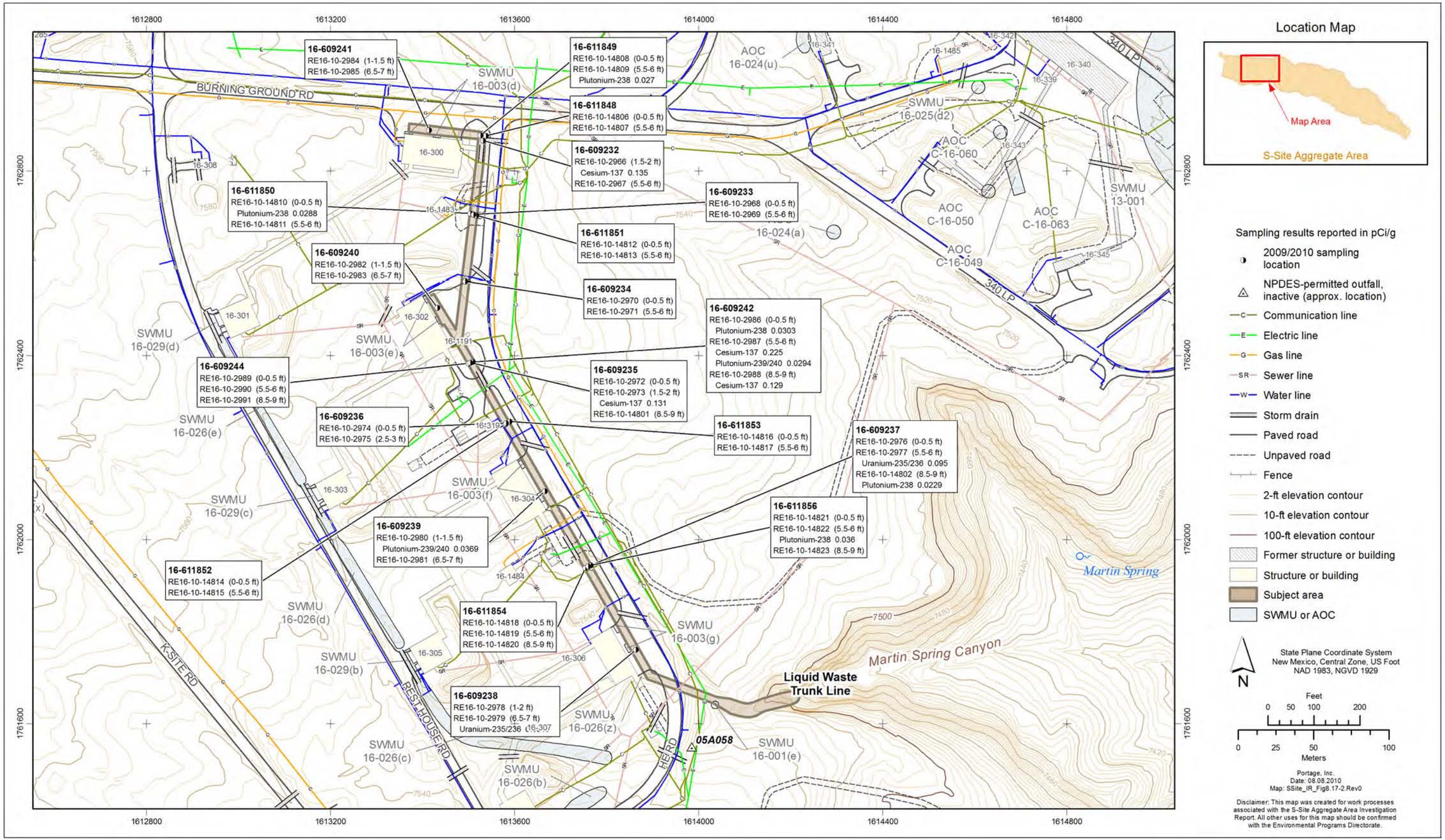


Figure 8.17-2 Radionuclides detected or detected above BVs/FVs at the Liquid Waste Trunk Line

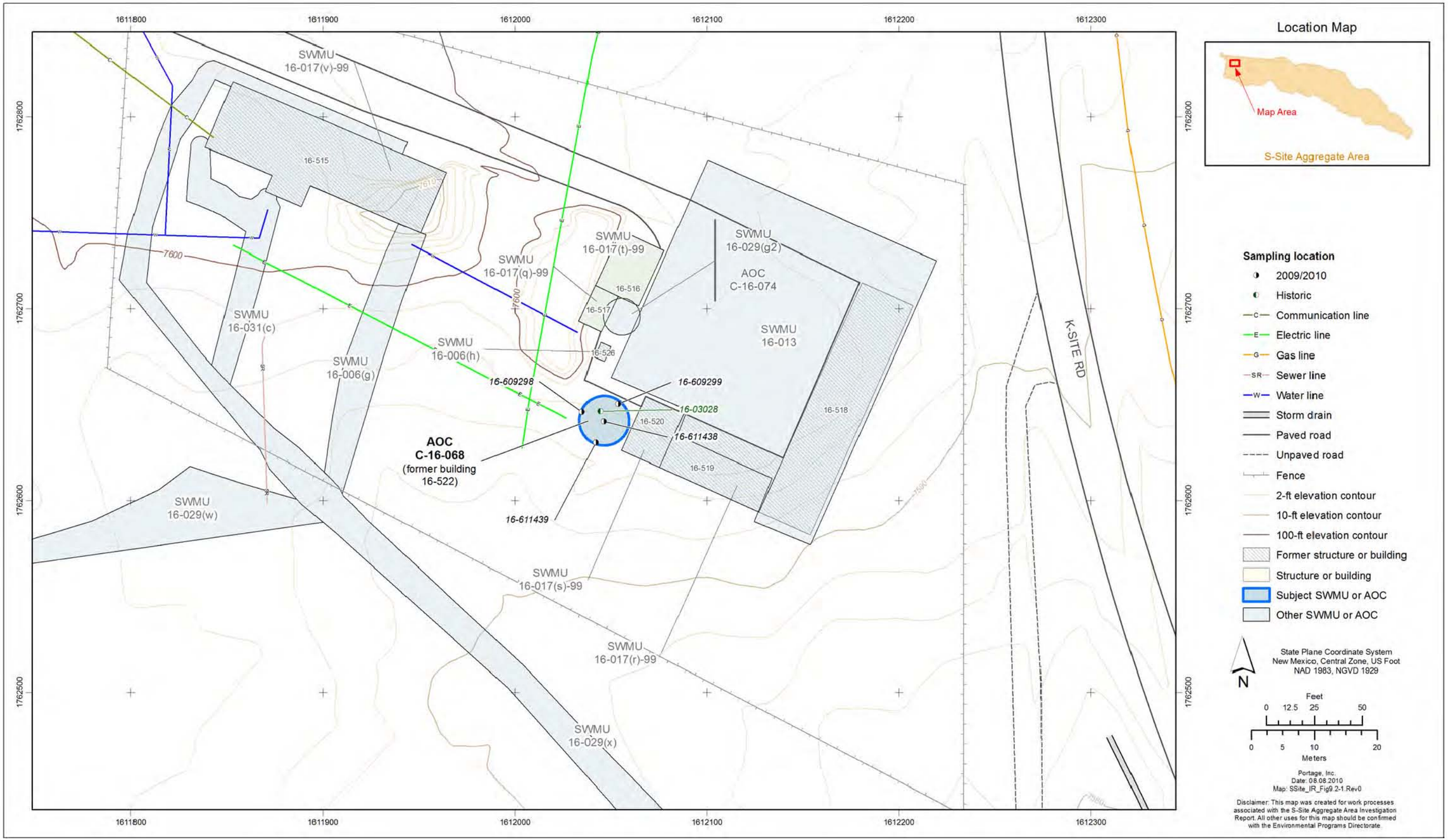


Figure 9.2-1 Locations sampled for AOC C-16-068

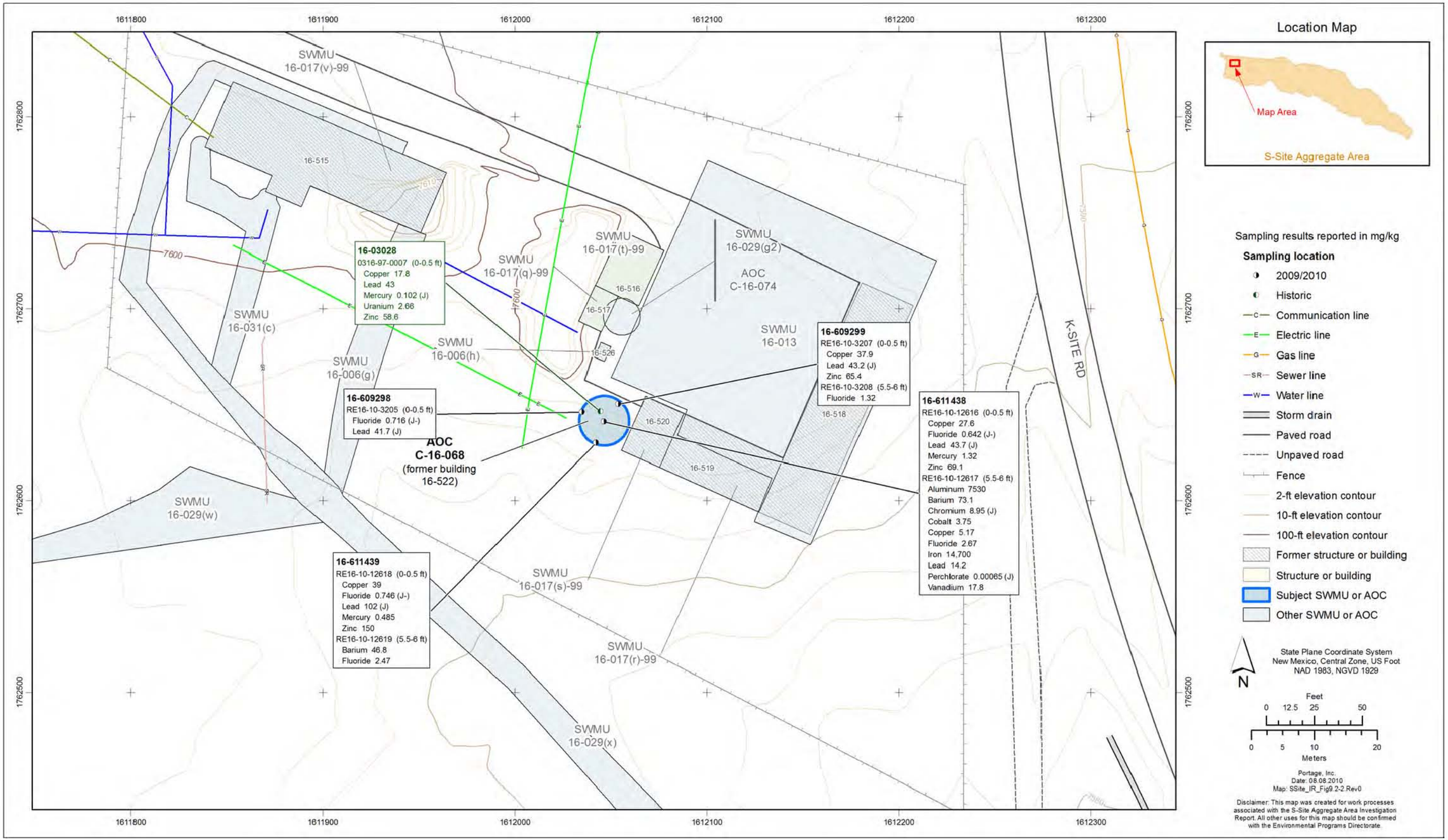


Figure 9.2-2 Inorganic chemicals detected above BVs at AOC C-16-068

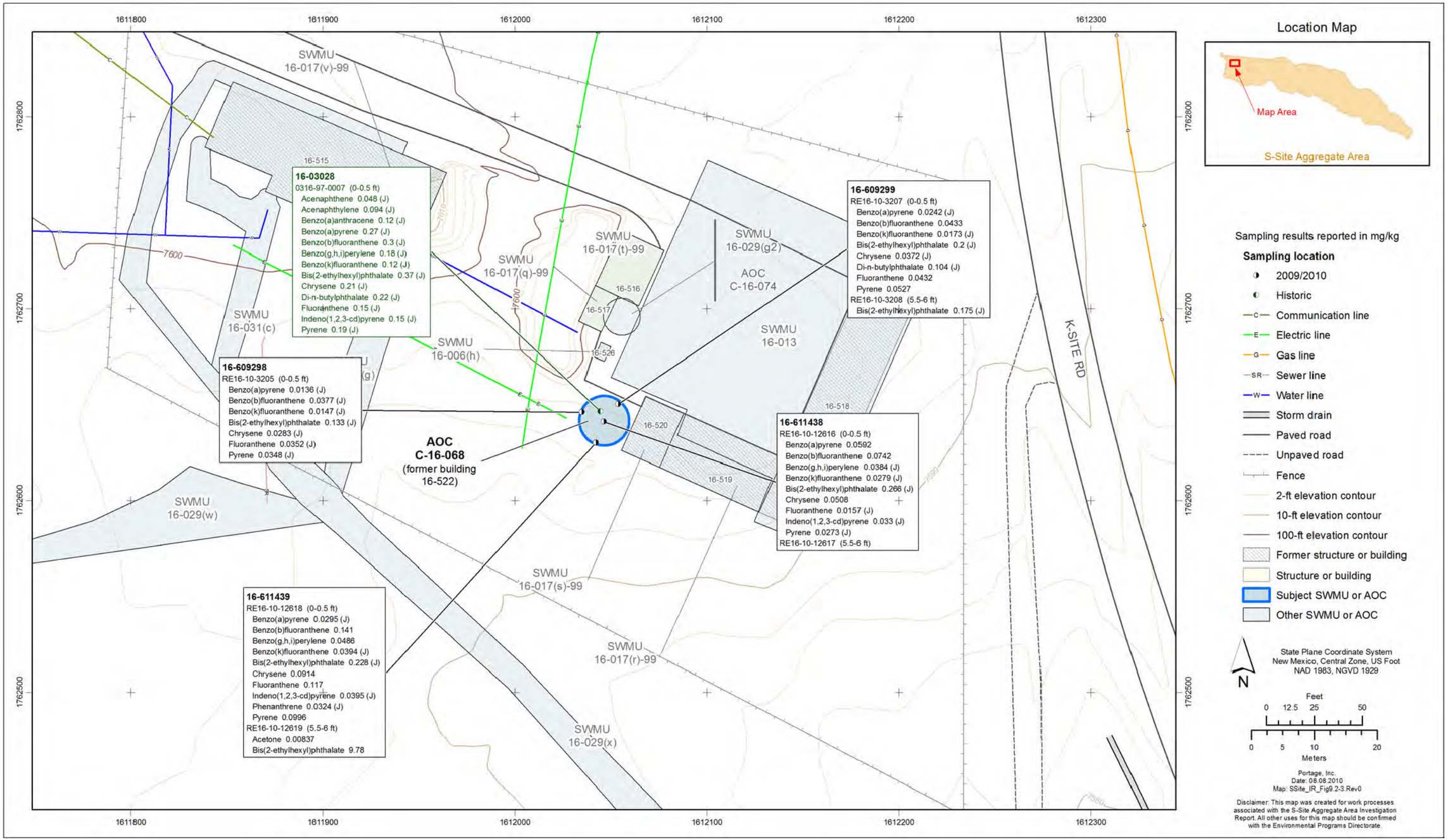


Figure 9.2-3 Organic chemicals detected in samples at AOC C-16-068

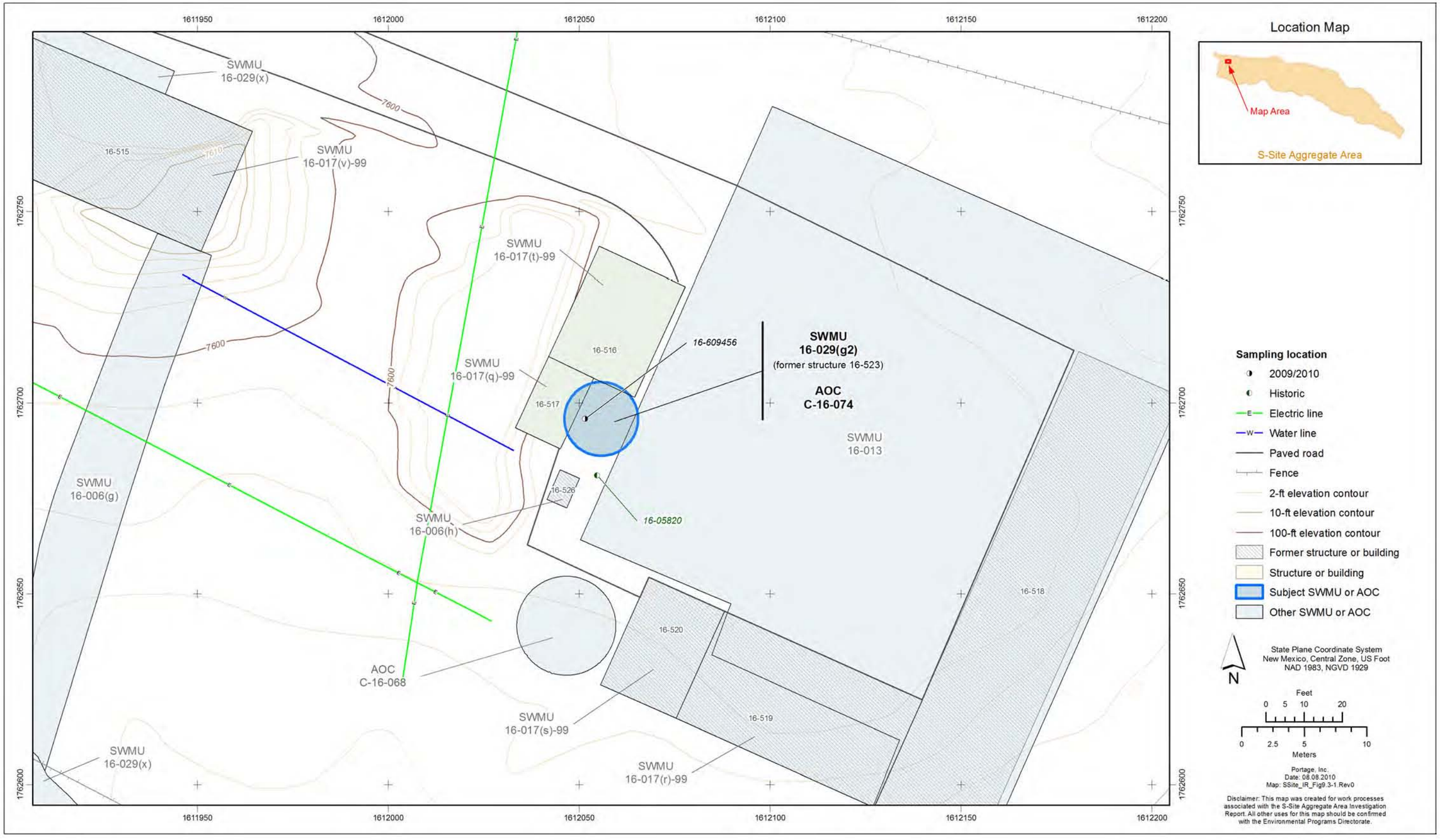


Figure 9.3-1 Locations sampled for SWMU 16-029(g2) and AOC C-16-074

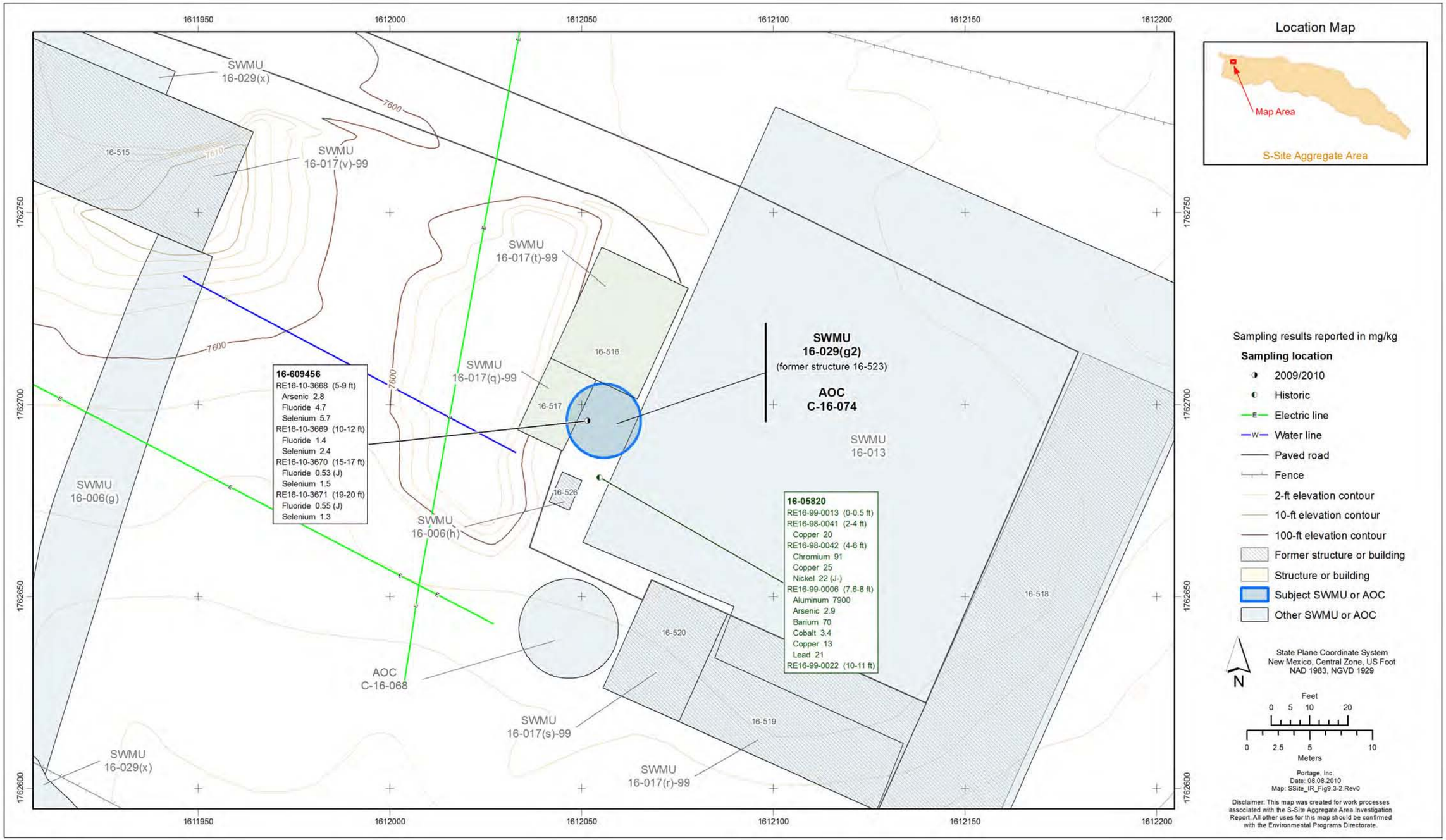


Figure 9.3-2 Inorganic chemicals detected above BVs at SWMU 16-029(g2) and AOC C-16-074

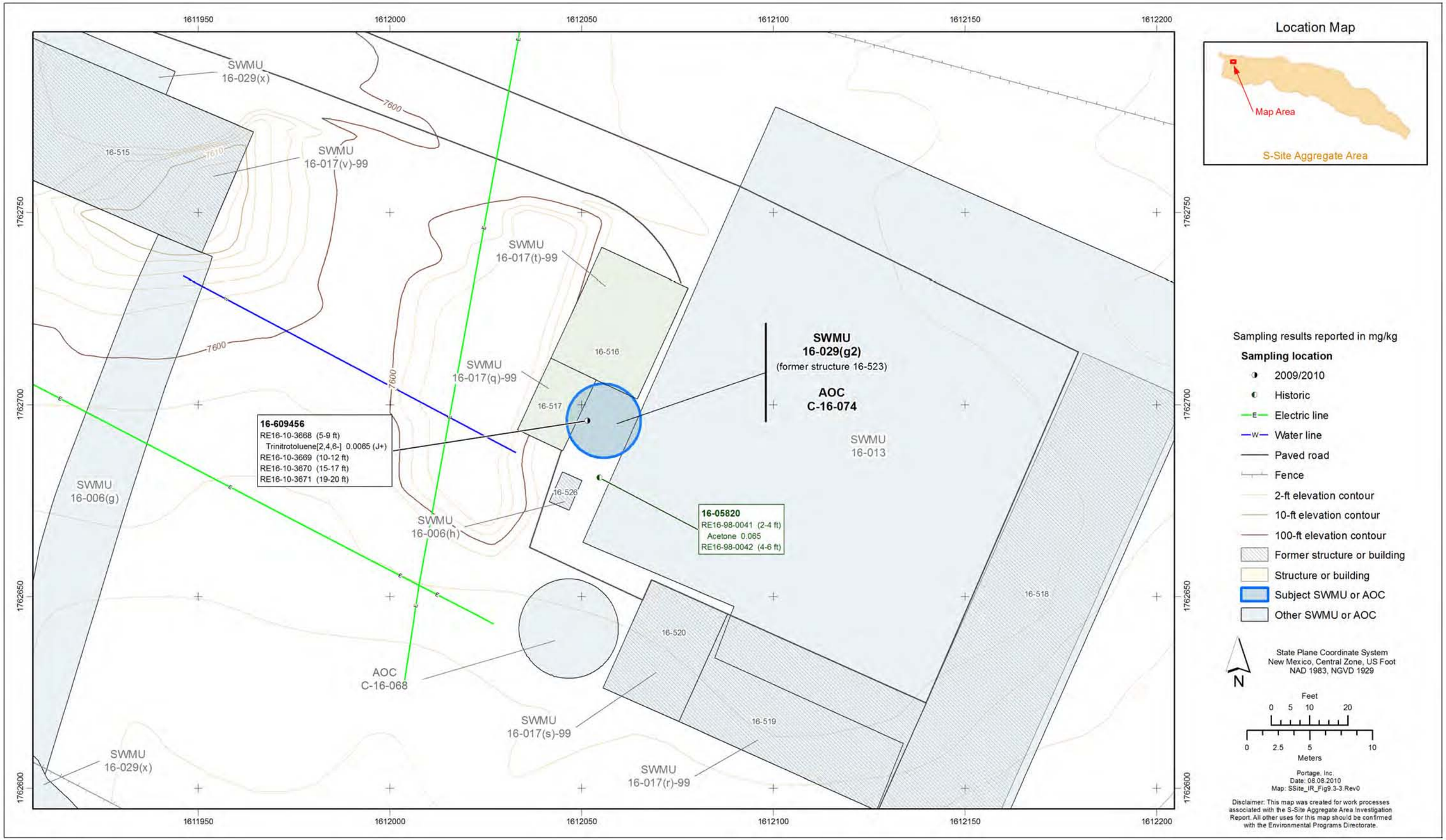


Figure 9.3-3 Organic chemicals detected in samples at SWMU 16-029(g2) and AOC C-16-074

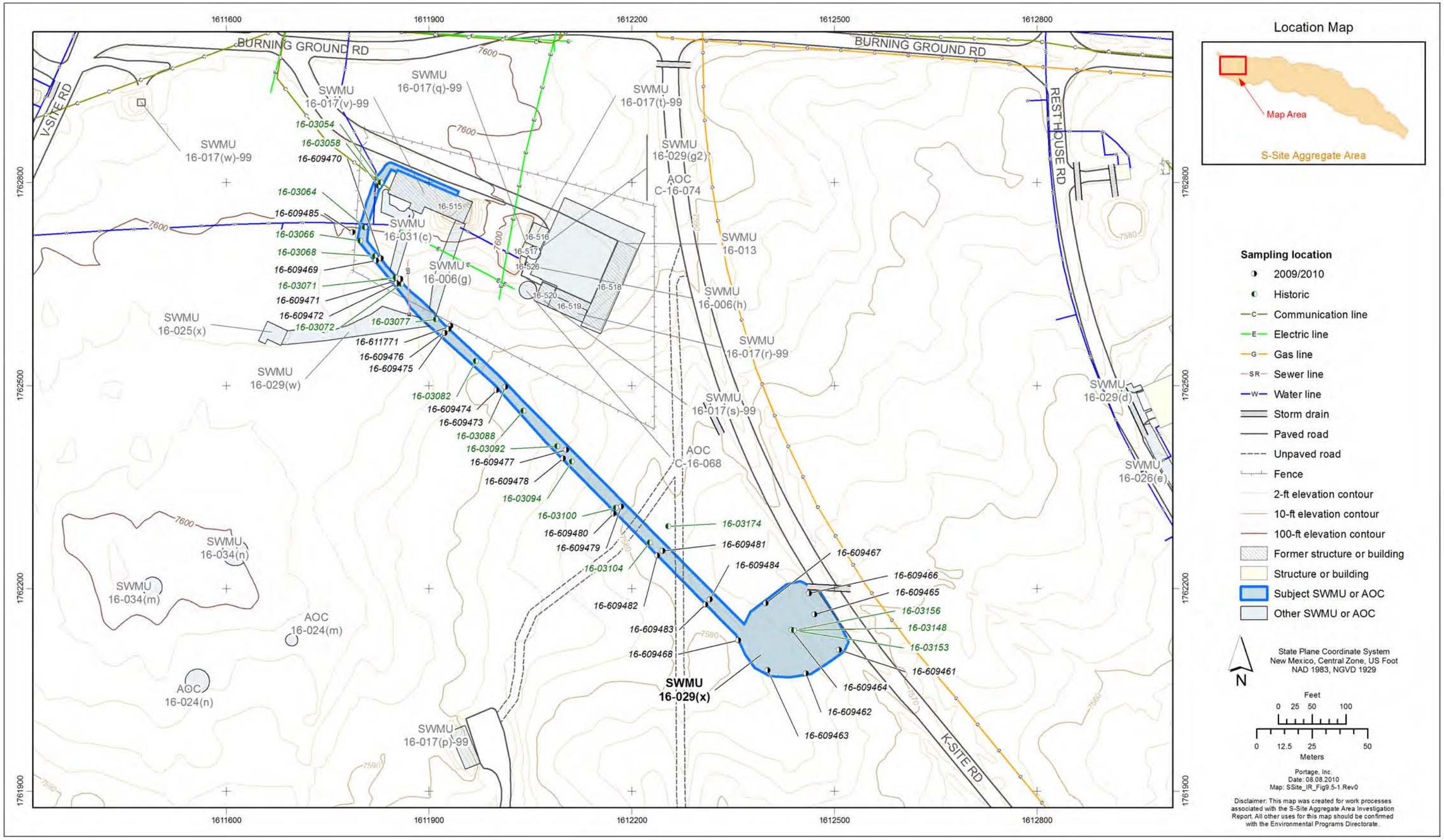


Figure 9.5-1 Locations sampled for SWMU 16-029(x)

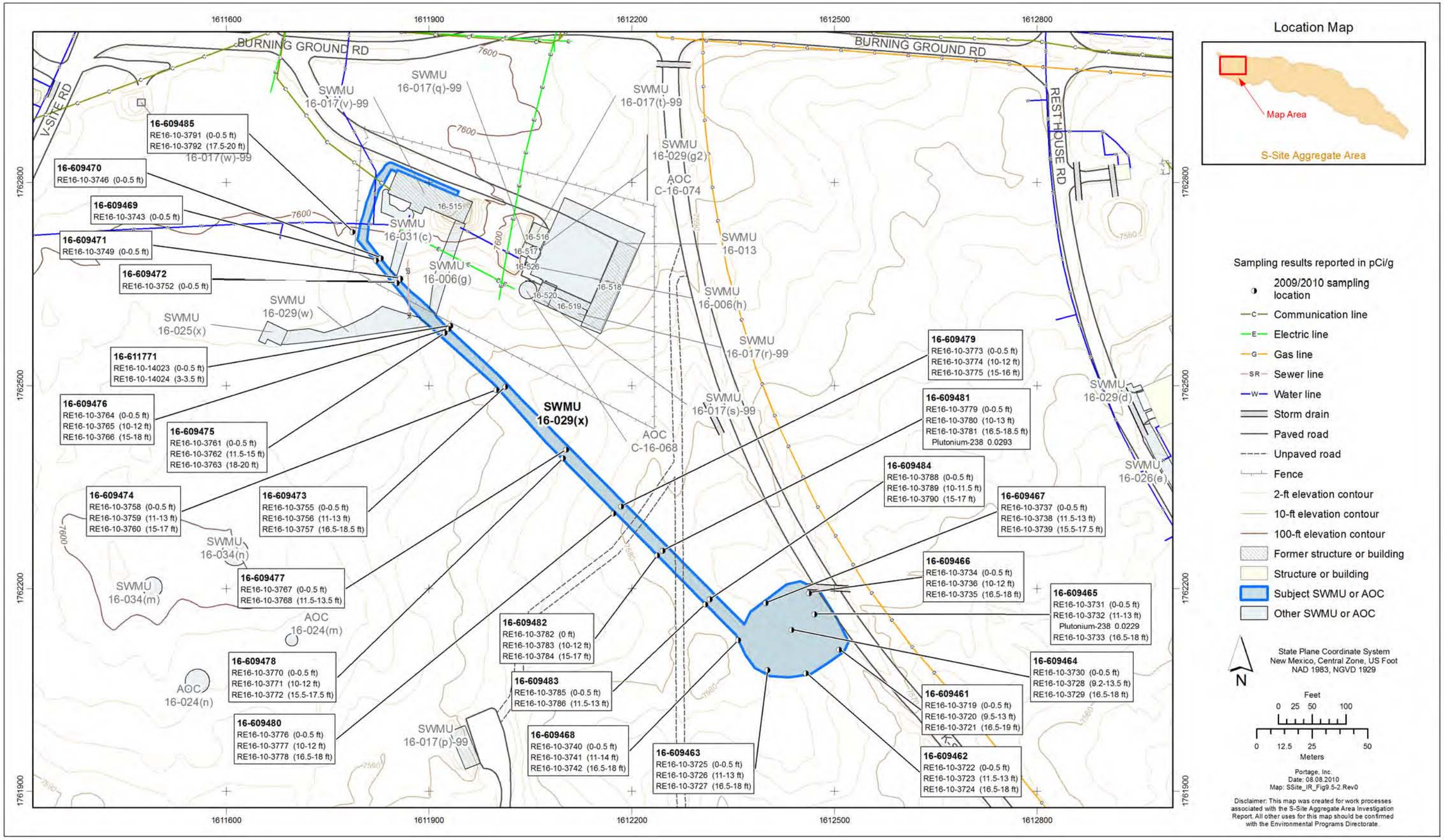


Figure 9.5-2 Radionuclides detected or detected above BVs/FVs at SWMU 16-029(x)

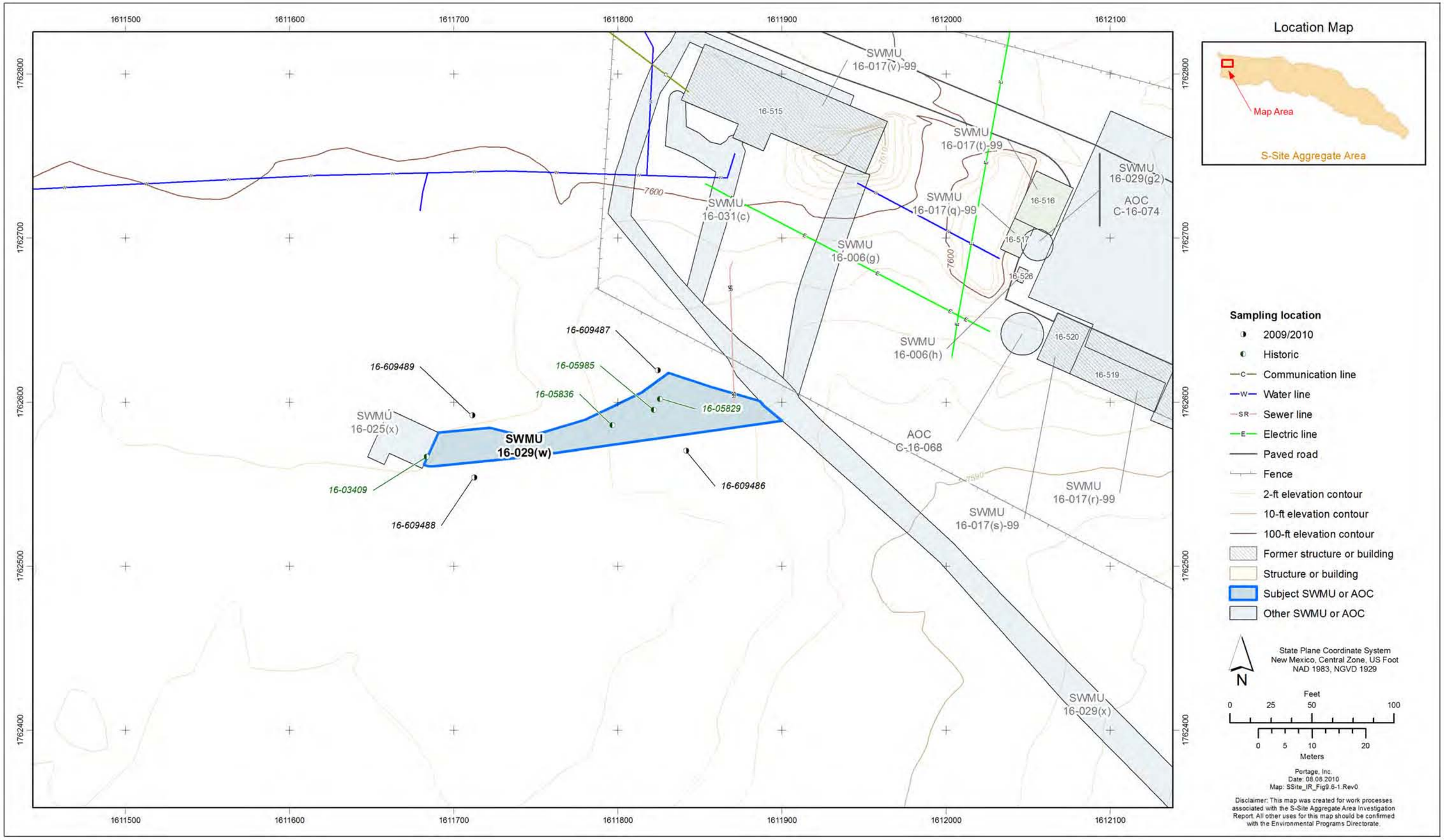


Figure 9.6-1 Locations sampled for SWMU 16-029(w)

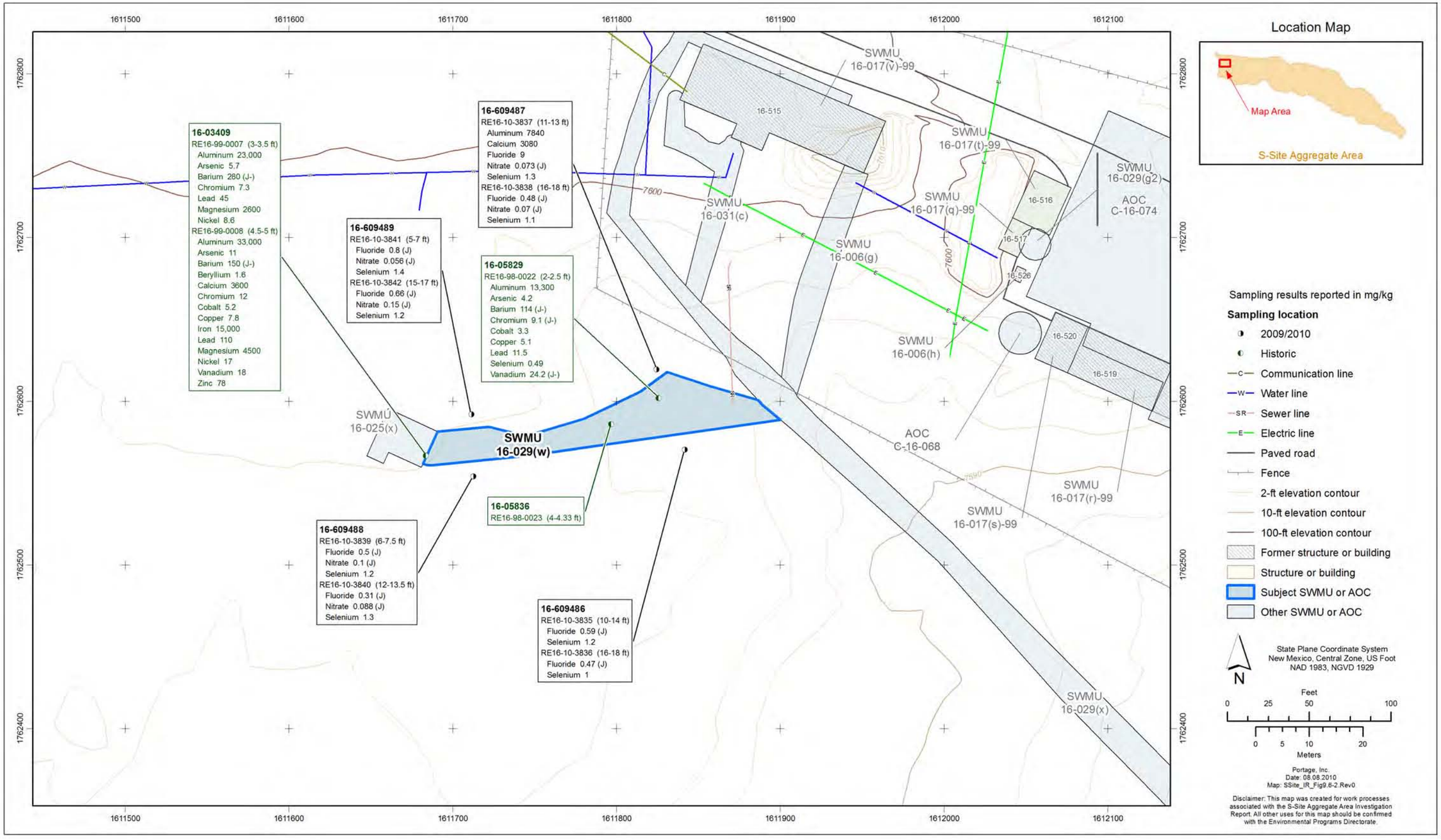


Figure 9.6-2 Inorganic chemicals detected above BVs at SWMU 16-029(w)

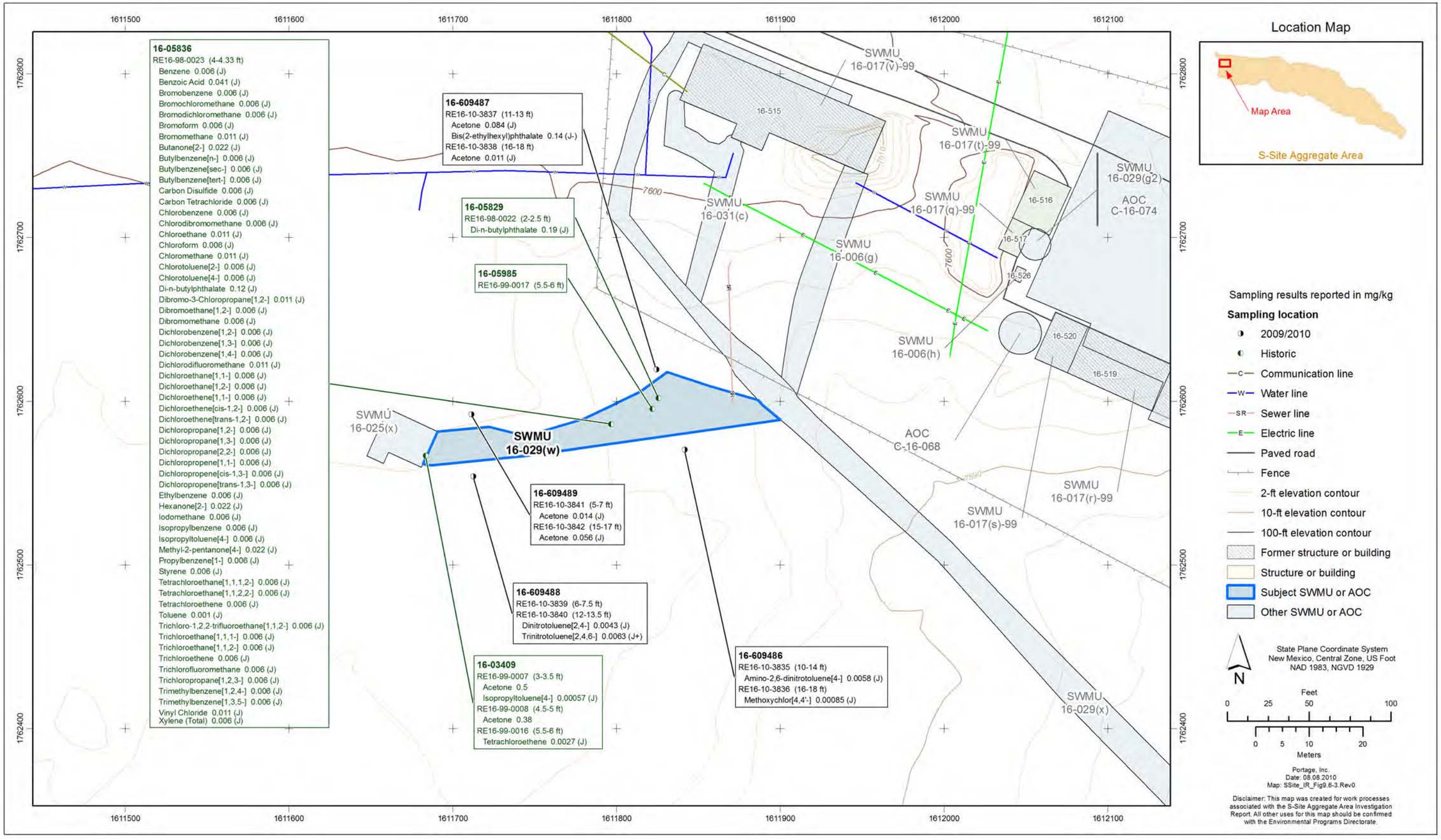


Figure 9.6-3 Organic chemicals detected in samples at SWMU 16-029(w)

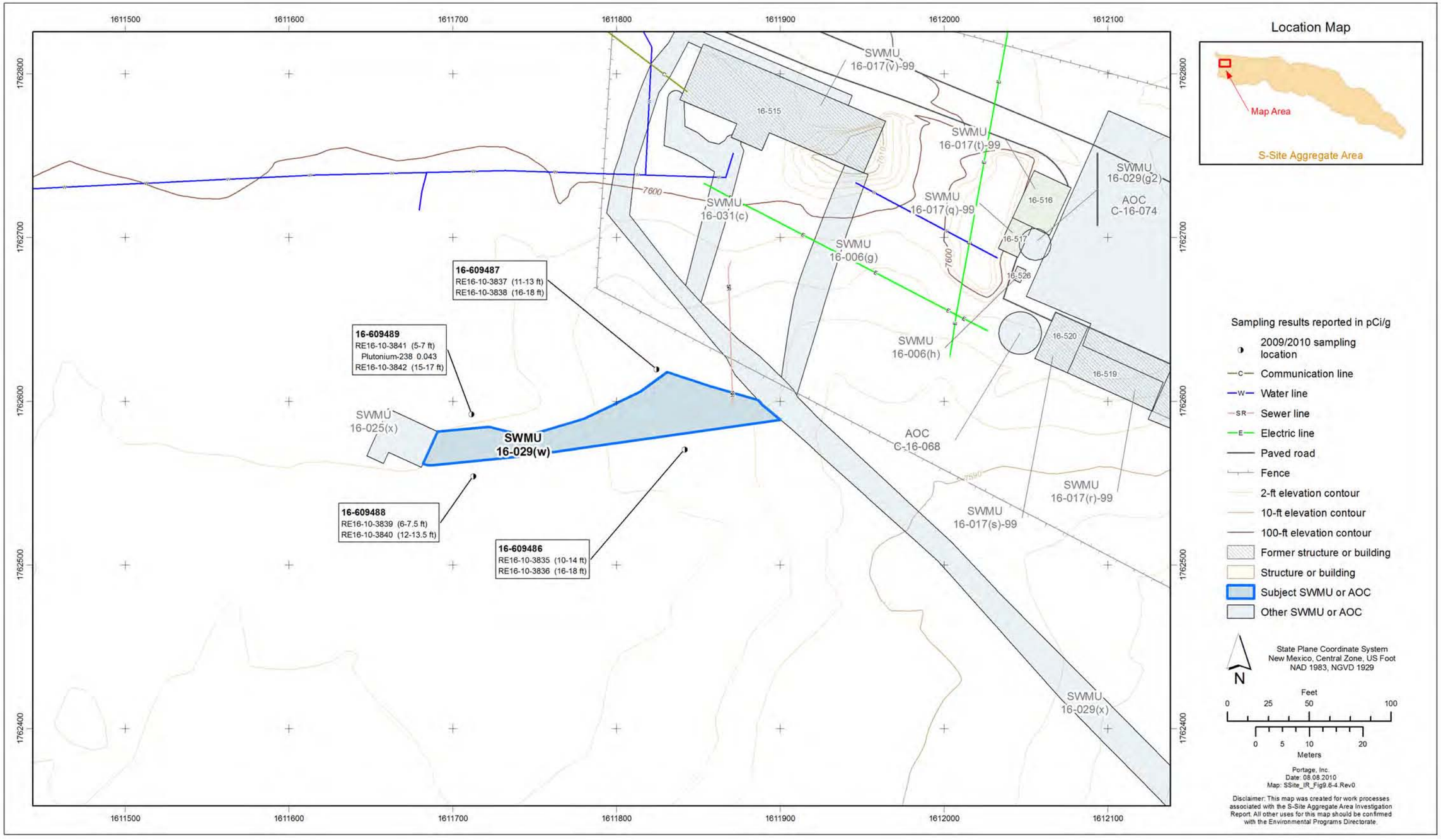


Figure 9.6-4 Radionuclides detected or detected above BVs/FVs at SWMU 16-029(w)

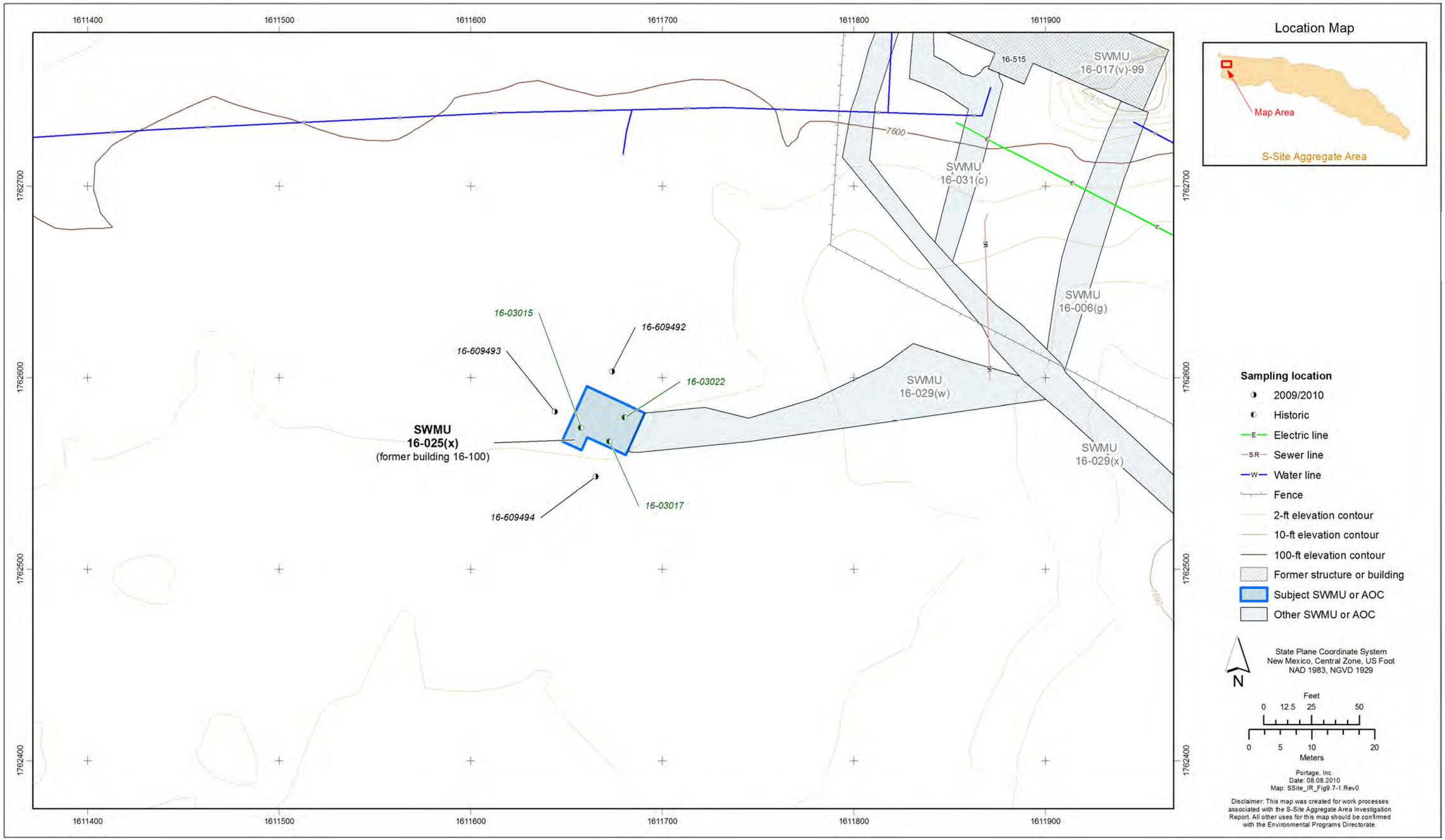


Figure 9.7-1 Locations sampled for SWMU 16-025(x)

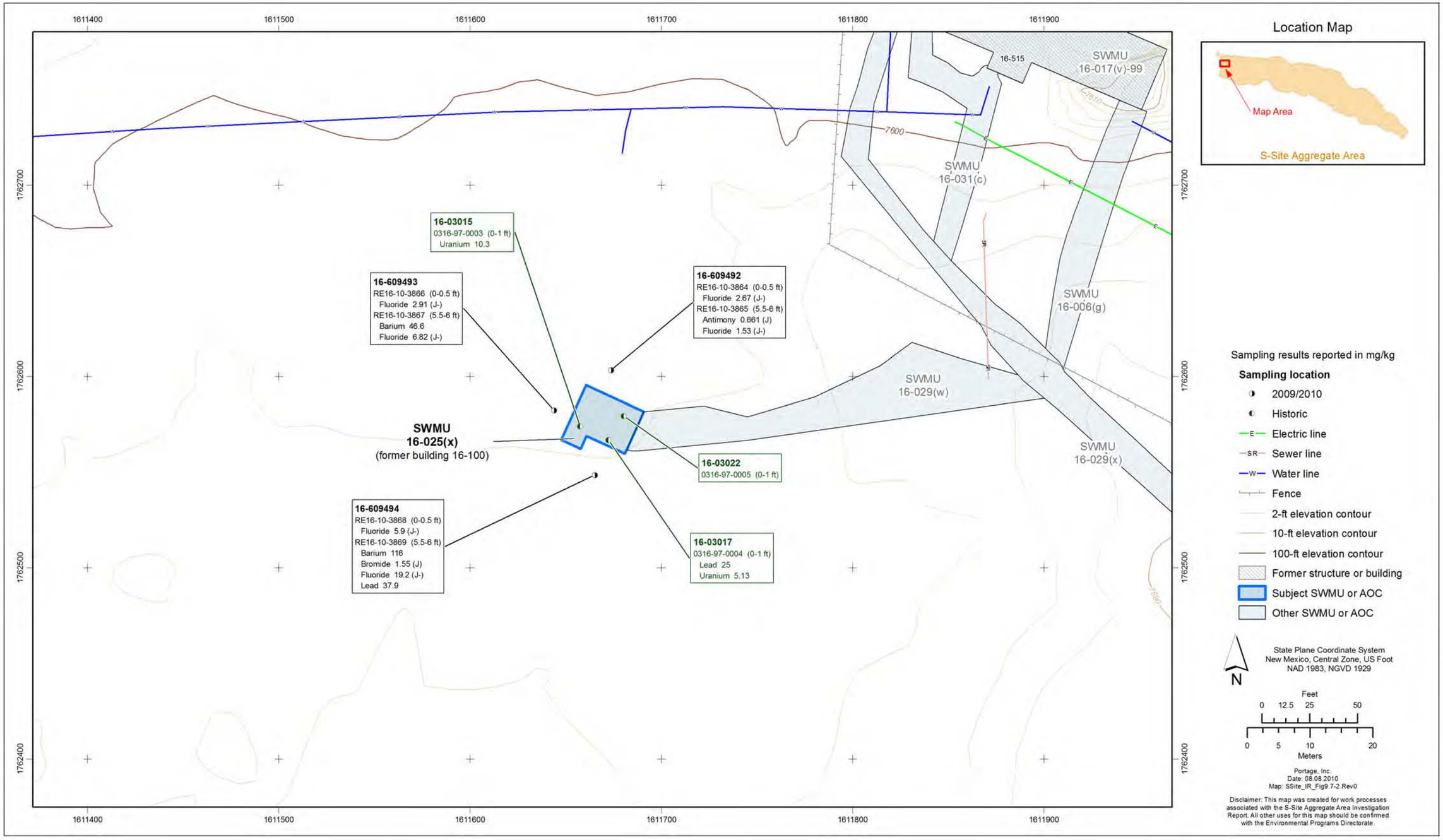


Figure 9.7-2 Inorganic chemicals detected above BVs at SWMU 16-025(x)

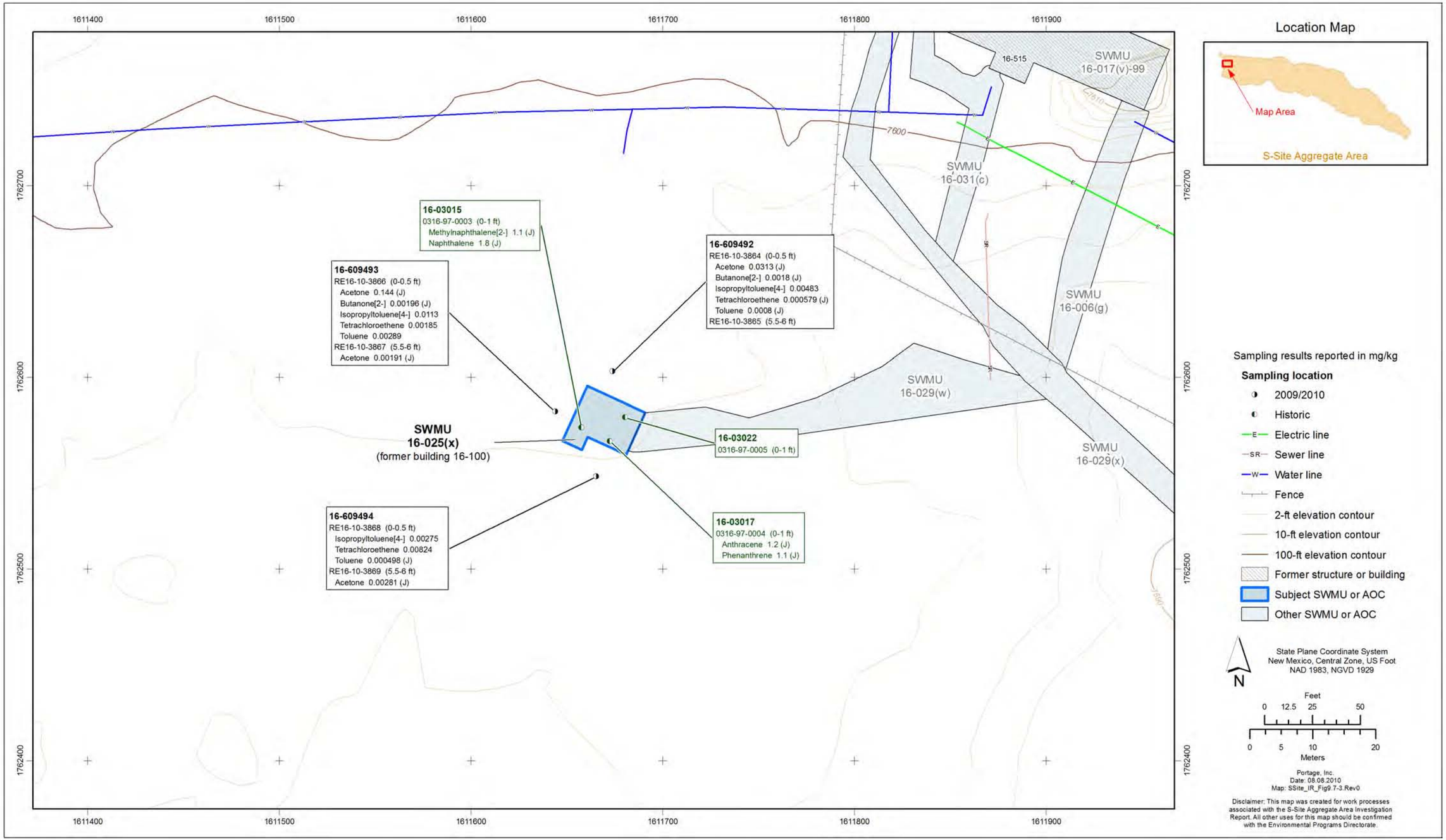


Figure 9.7-3 Organic chemicals detected in samples at SWMU 16-025(x)



Figure 9.8-1 Locations sampled for SWMU 16-017(p)-99

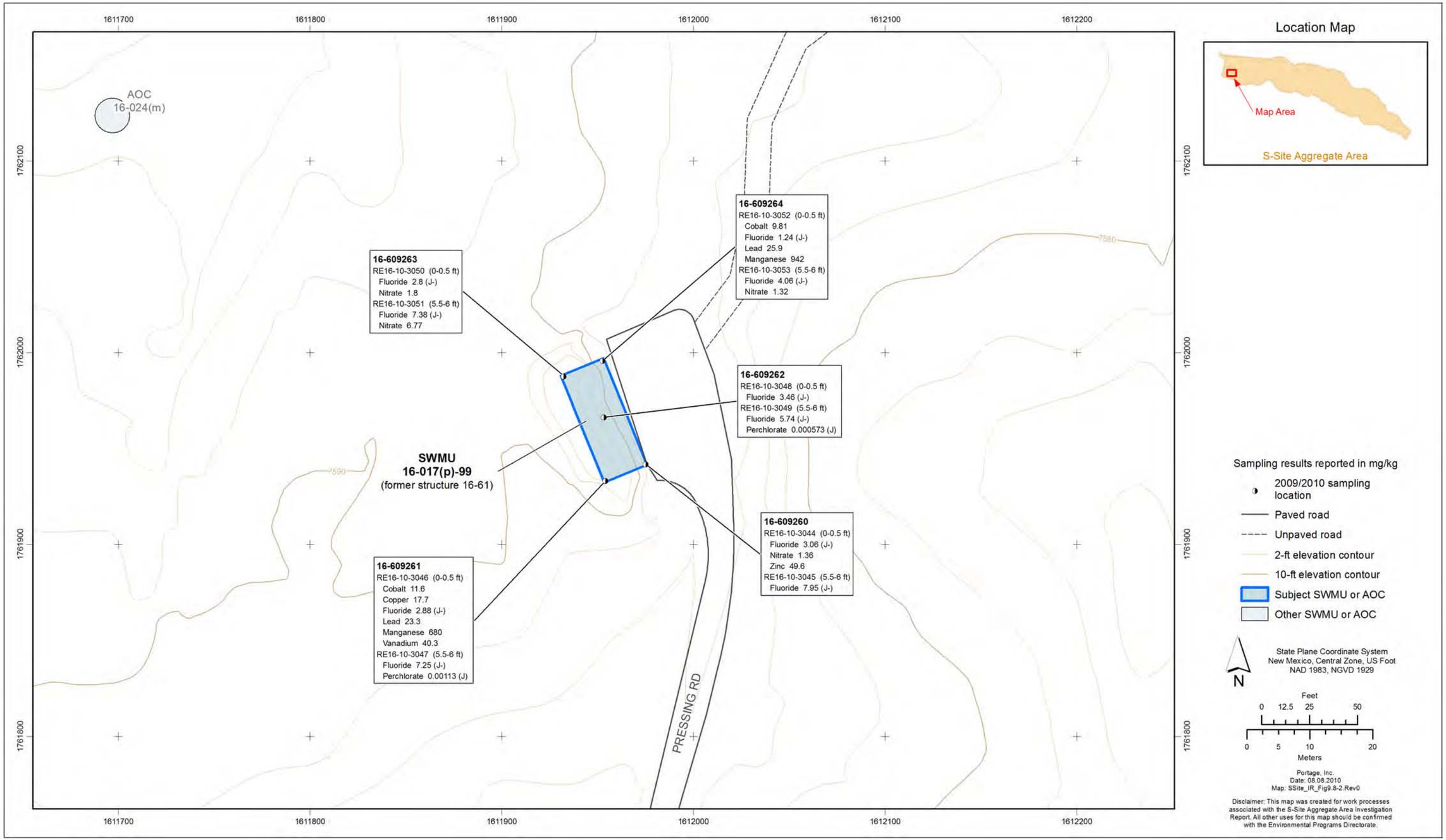


Figure 9.8-2 Inorganic chemicals detected above BVs at SWMU 16-017(p)-99

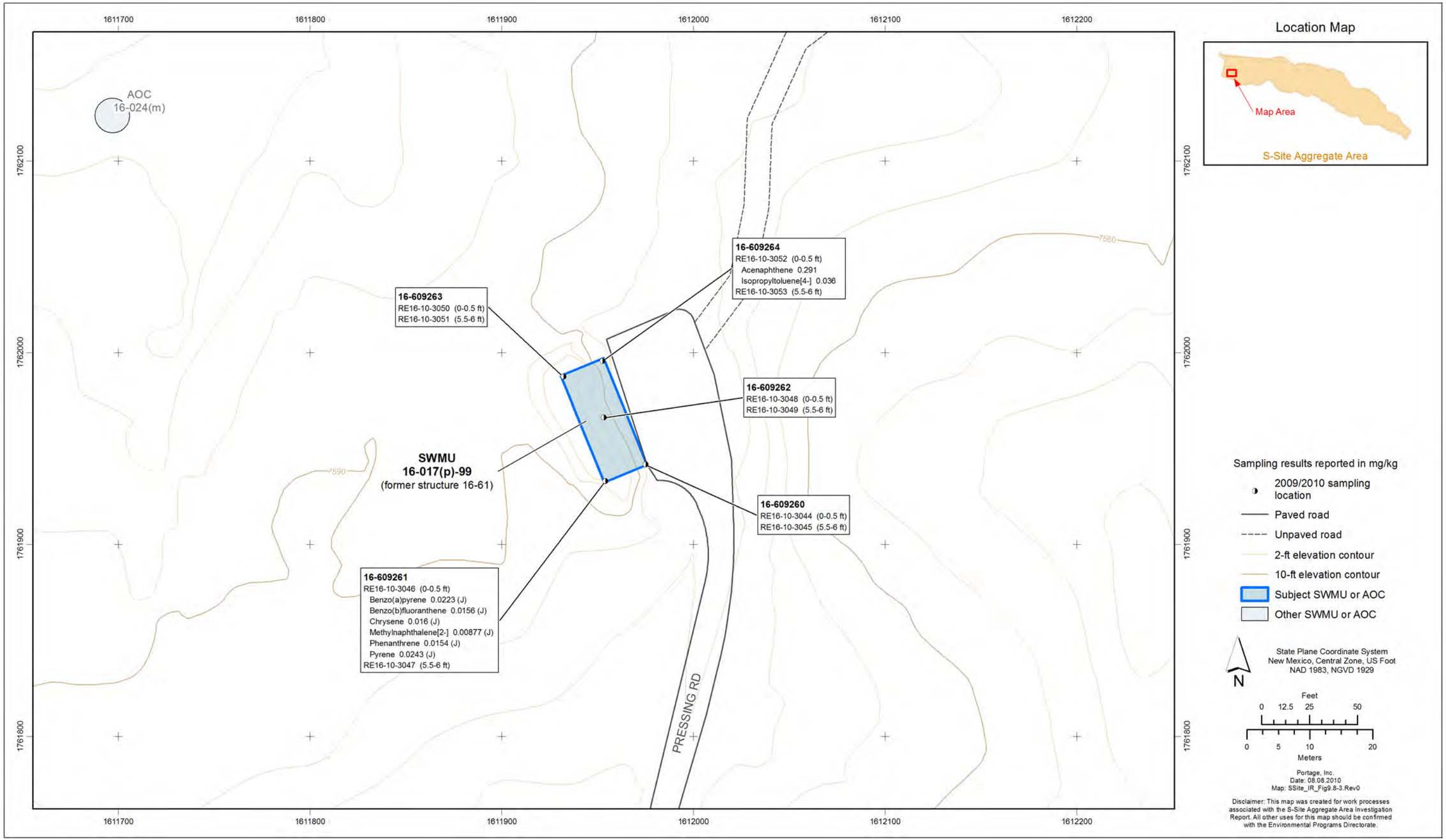


Figure 9.8-3 Organic chemicals detected in samples at SWMU 16-017(p)-99

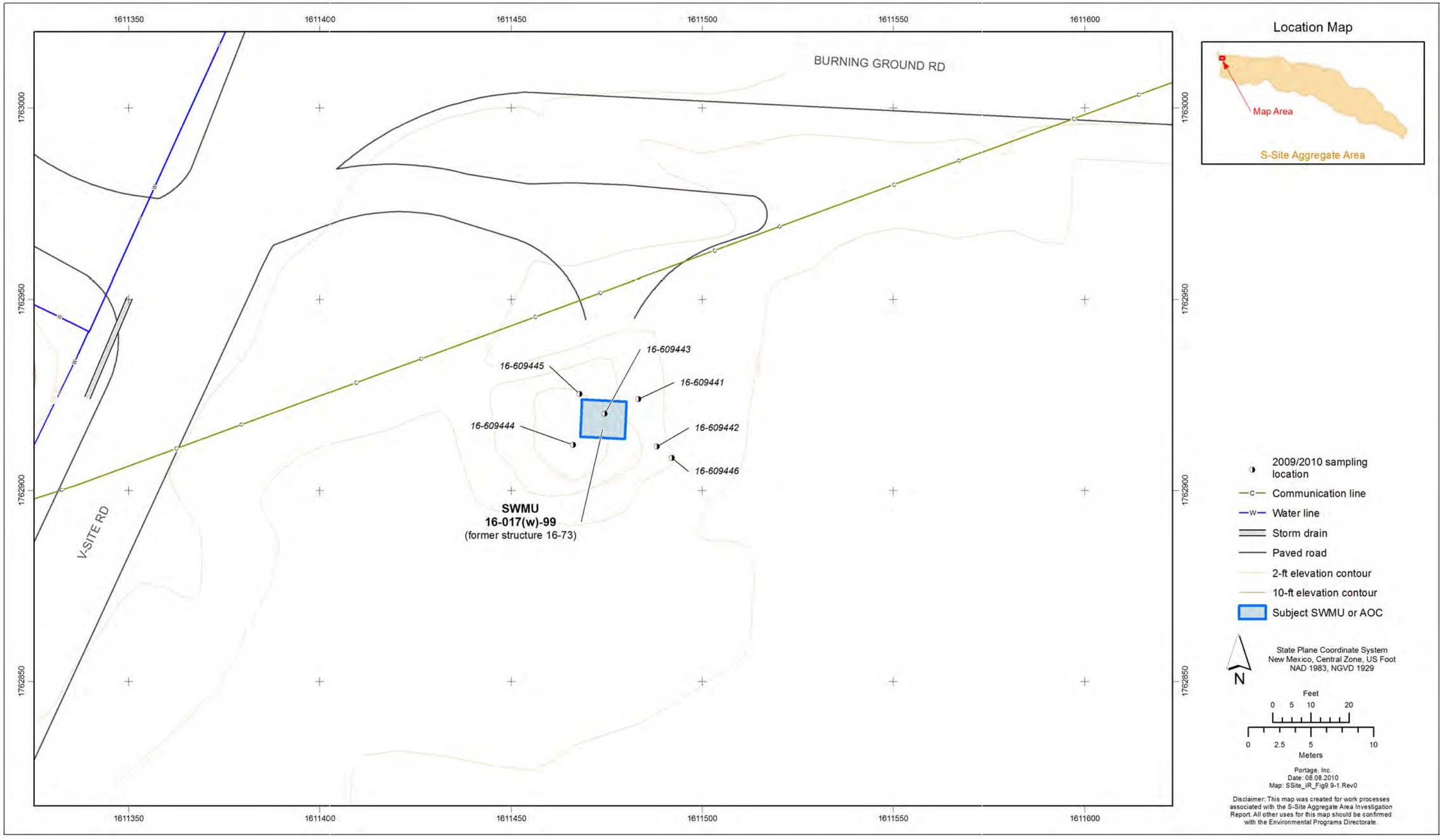


Figure 9.9-1 Locations sampled for SWMU 16-017(w)-99

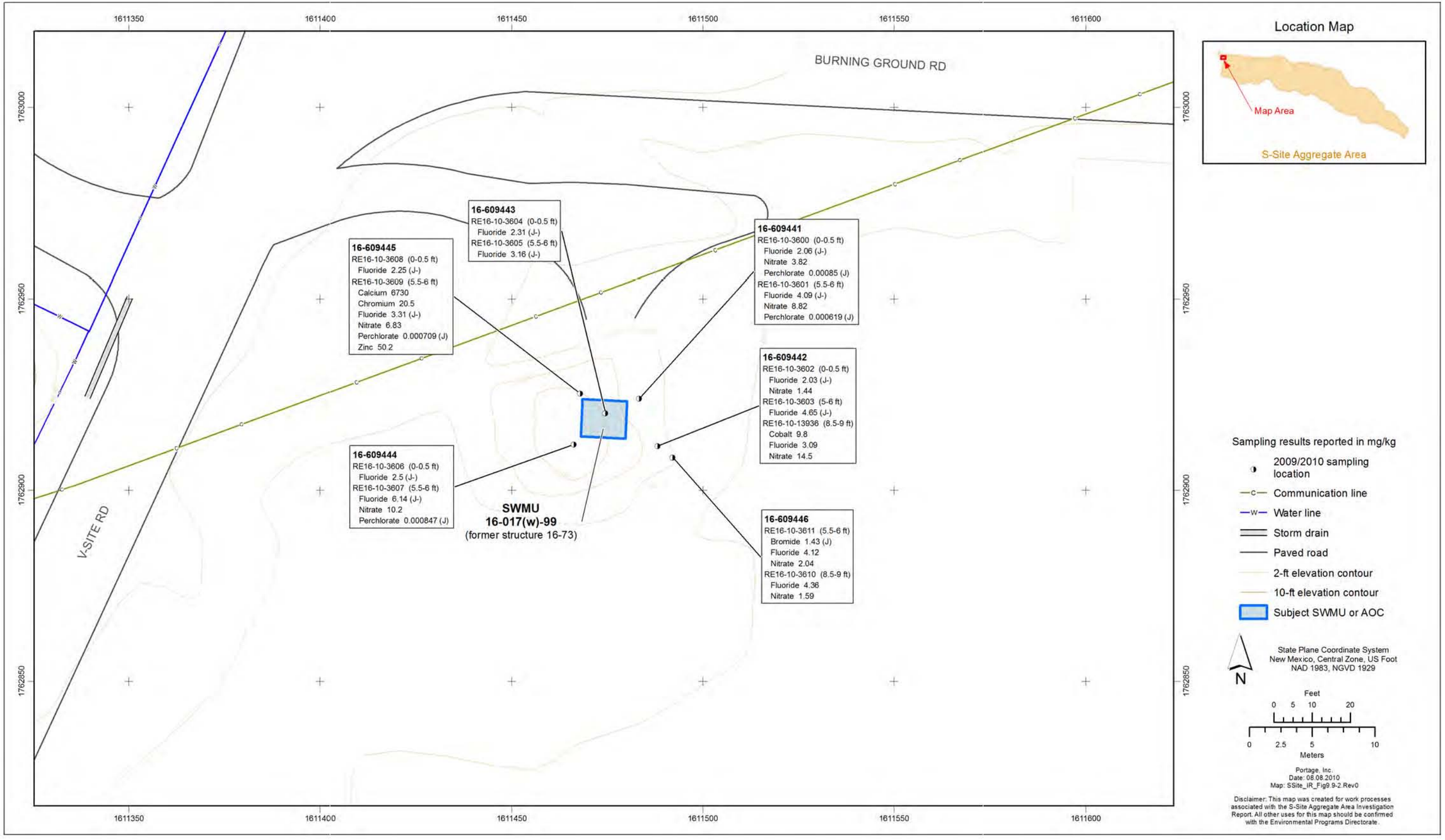


Figure 9.9-2 Inorganic chemicals detected above BVs at SWMU 16-017(w)-99

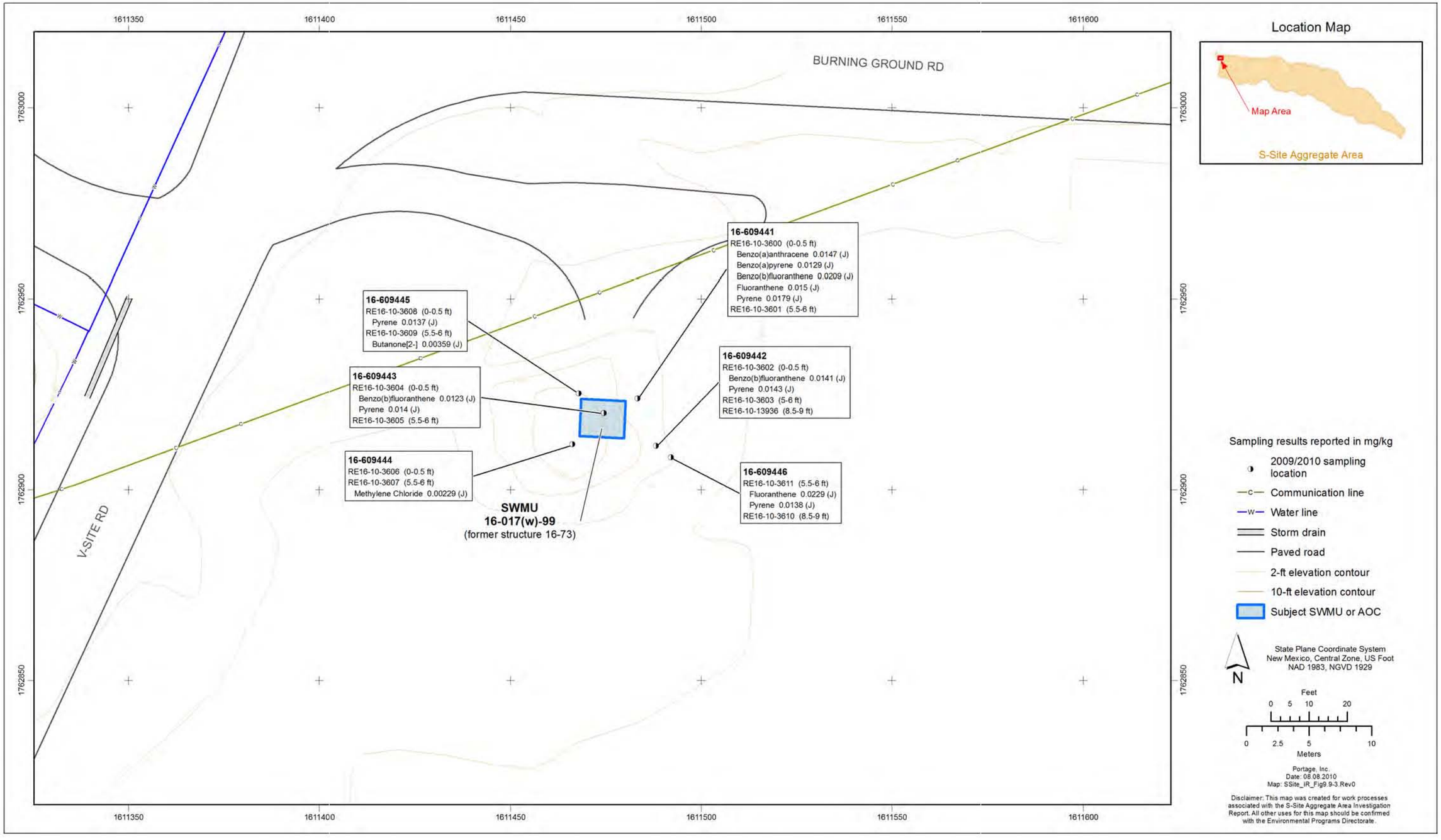


Figure 9.9-3 Organic chemicals detected in samples at SWMU 16-017(w)-99

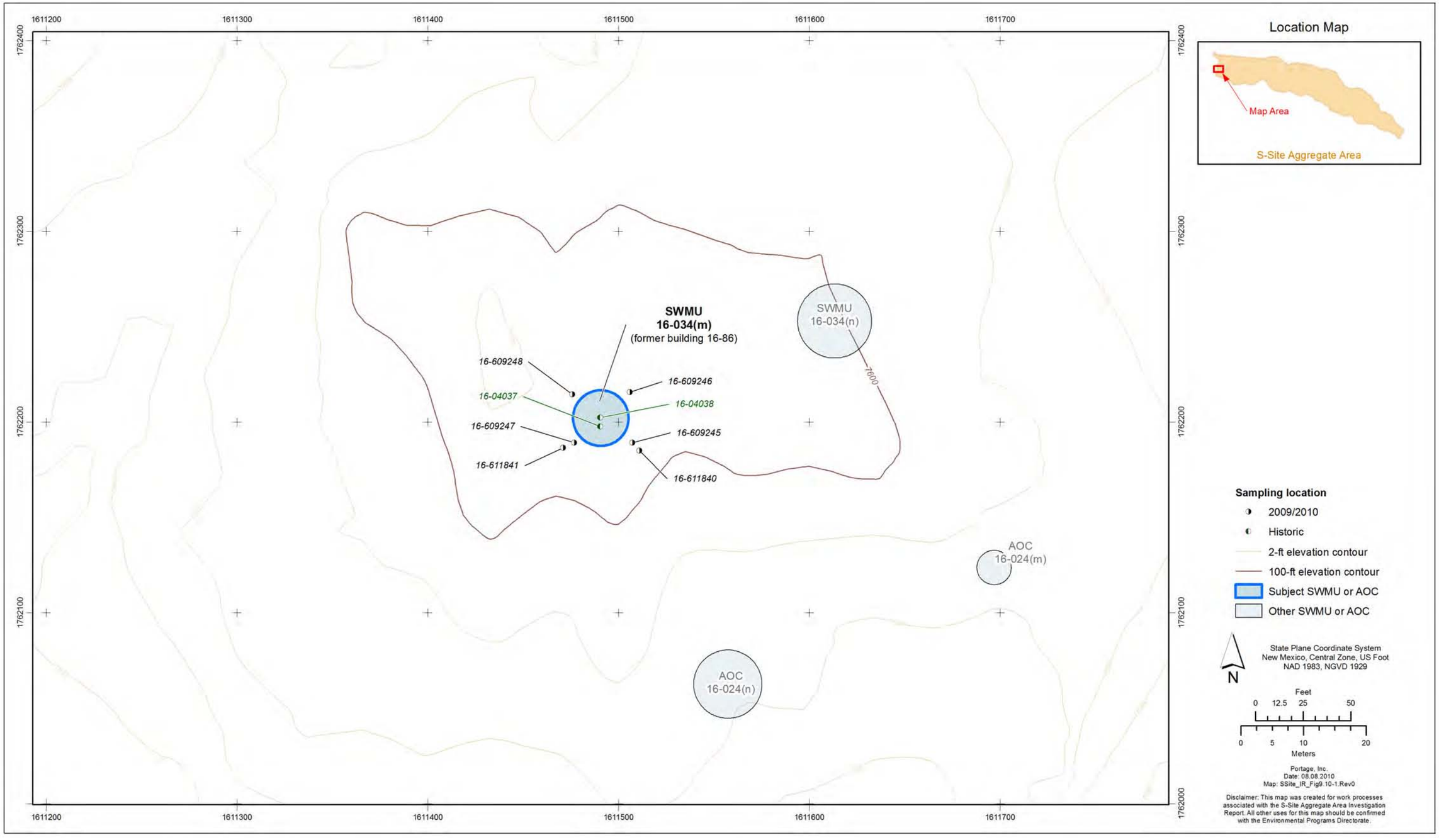


Figure 9.10-1 Locations sampled for SWMU 16-034(m)

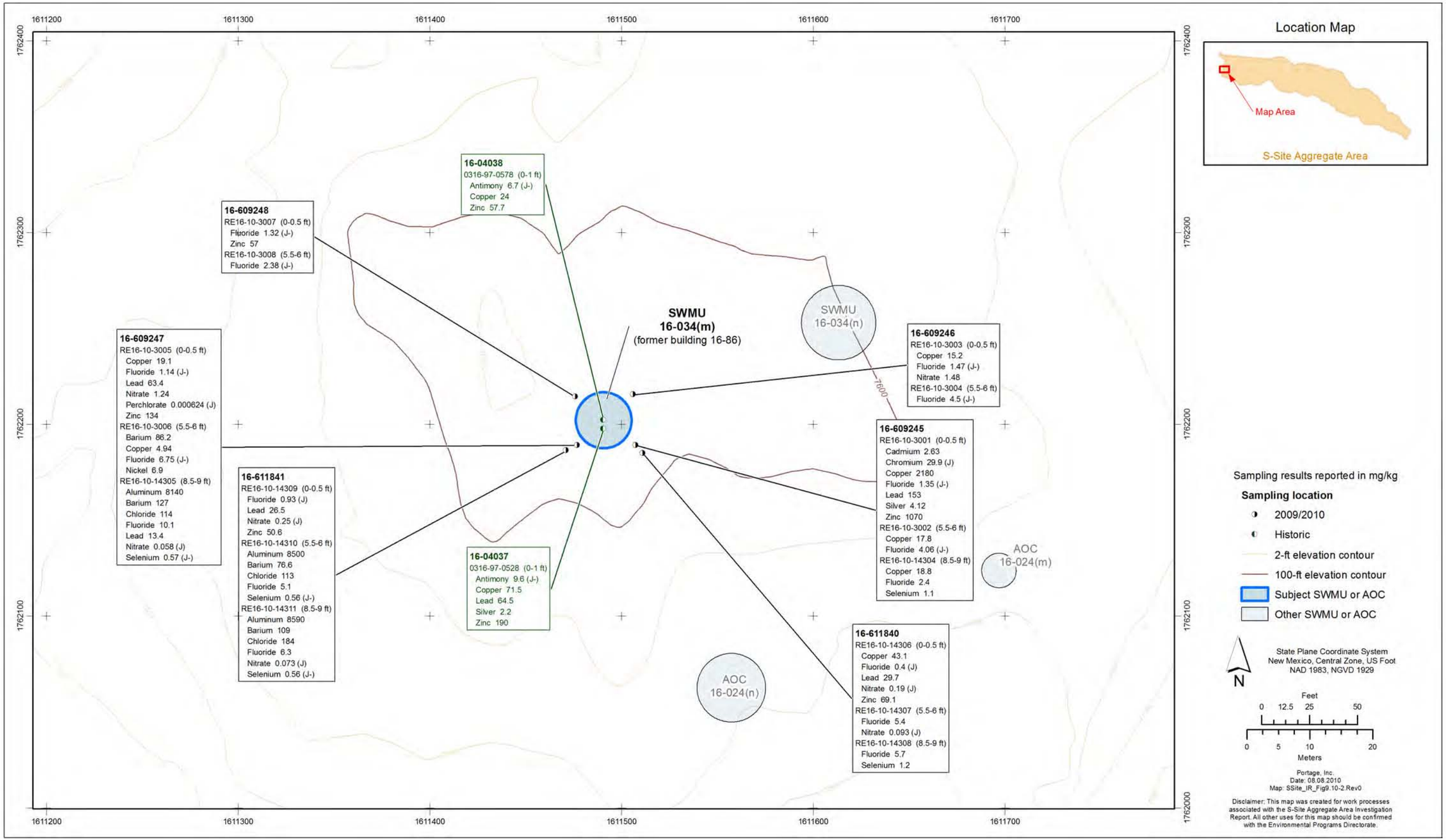


Figure 9.10-2 Inorganic chemicals detected above BVs at SWMU 16-034(m)

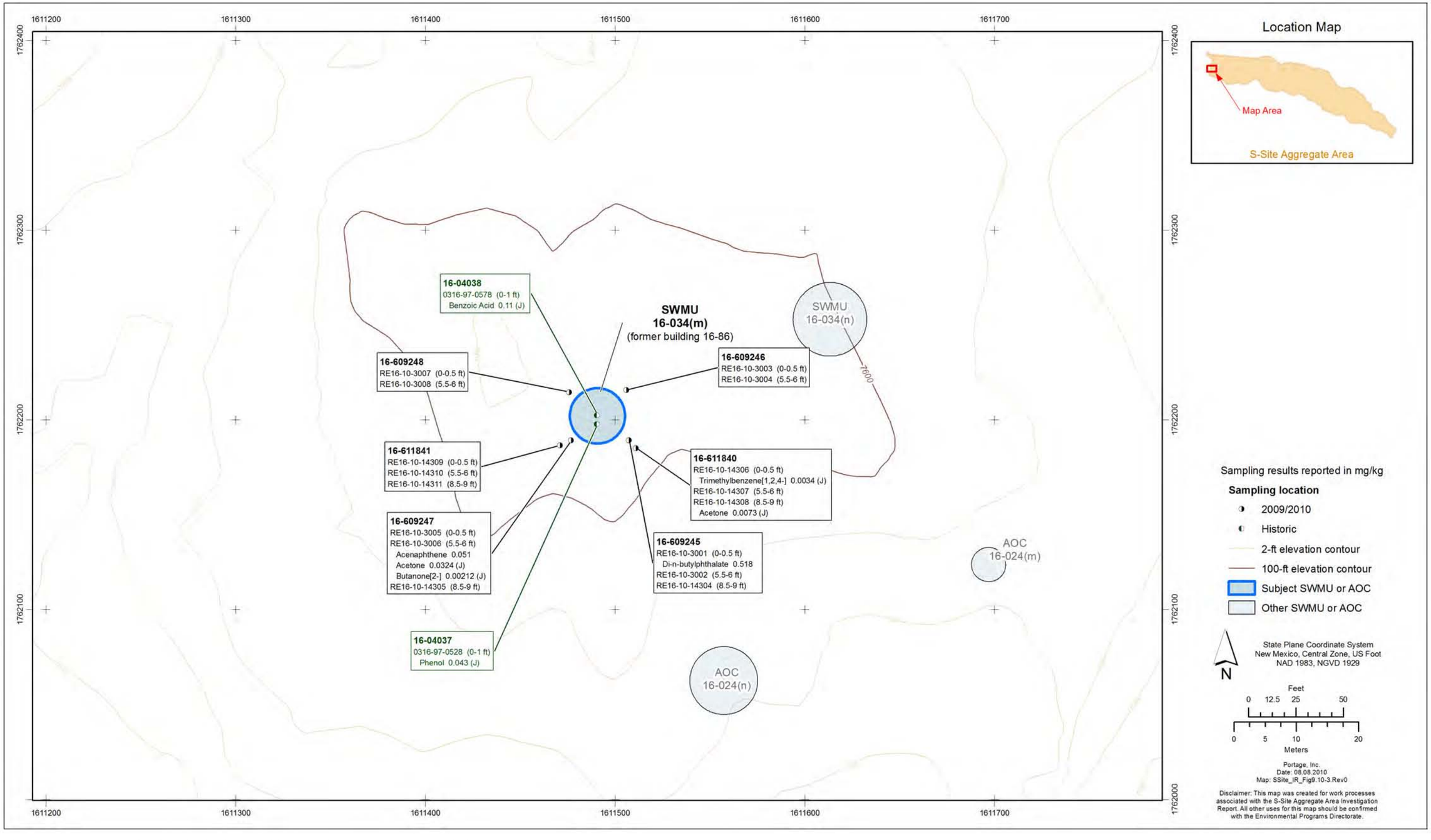


Figure 9.10-3 Organic chemicals detected in samples at SWMU 16-034(m)

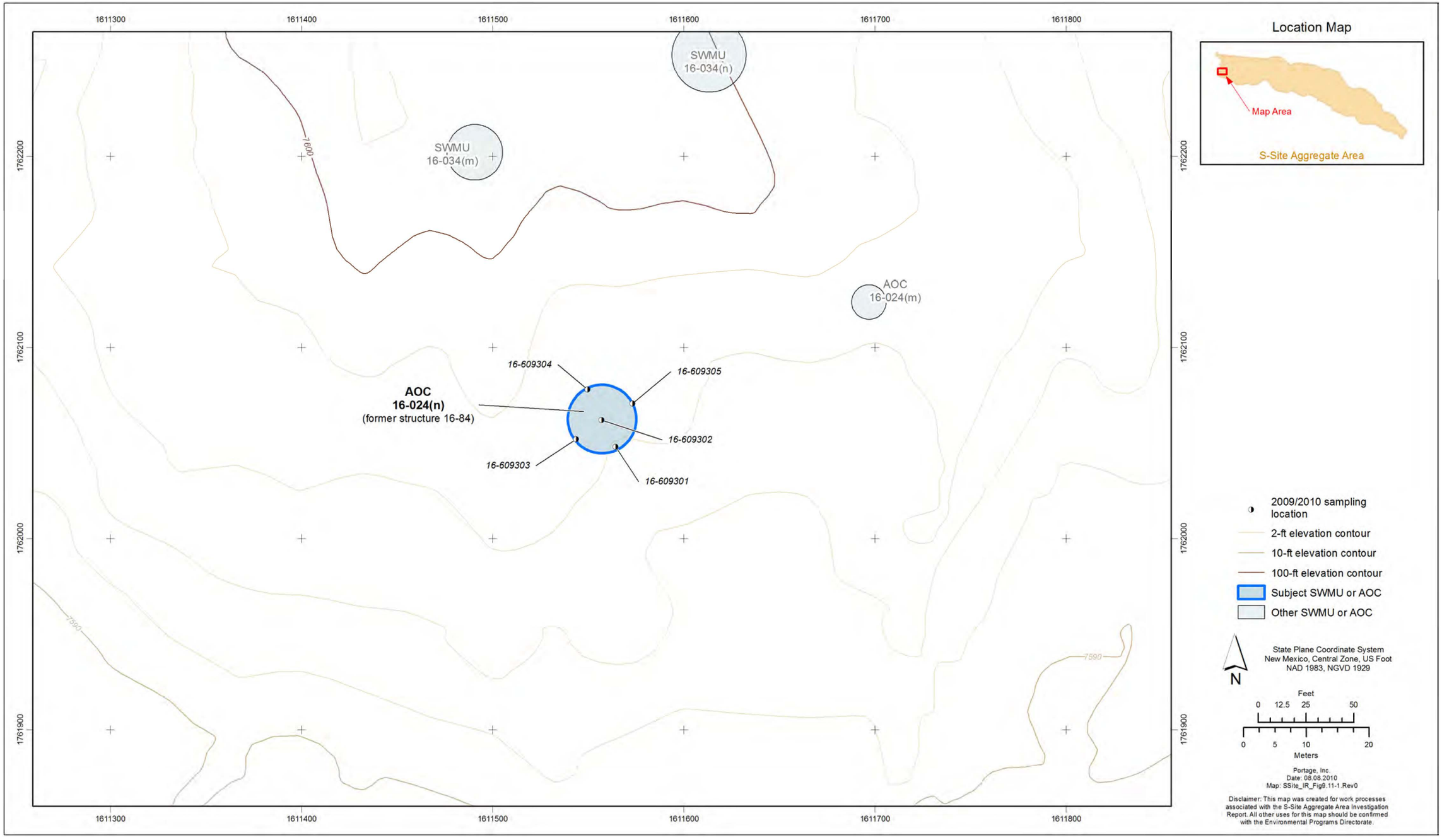


Figure 9.11-1 Locations sampled for AOC 16-024(n)

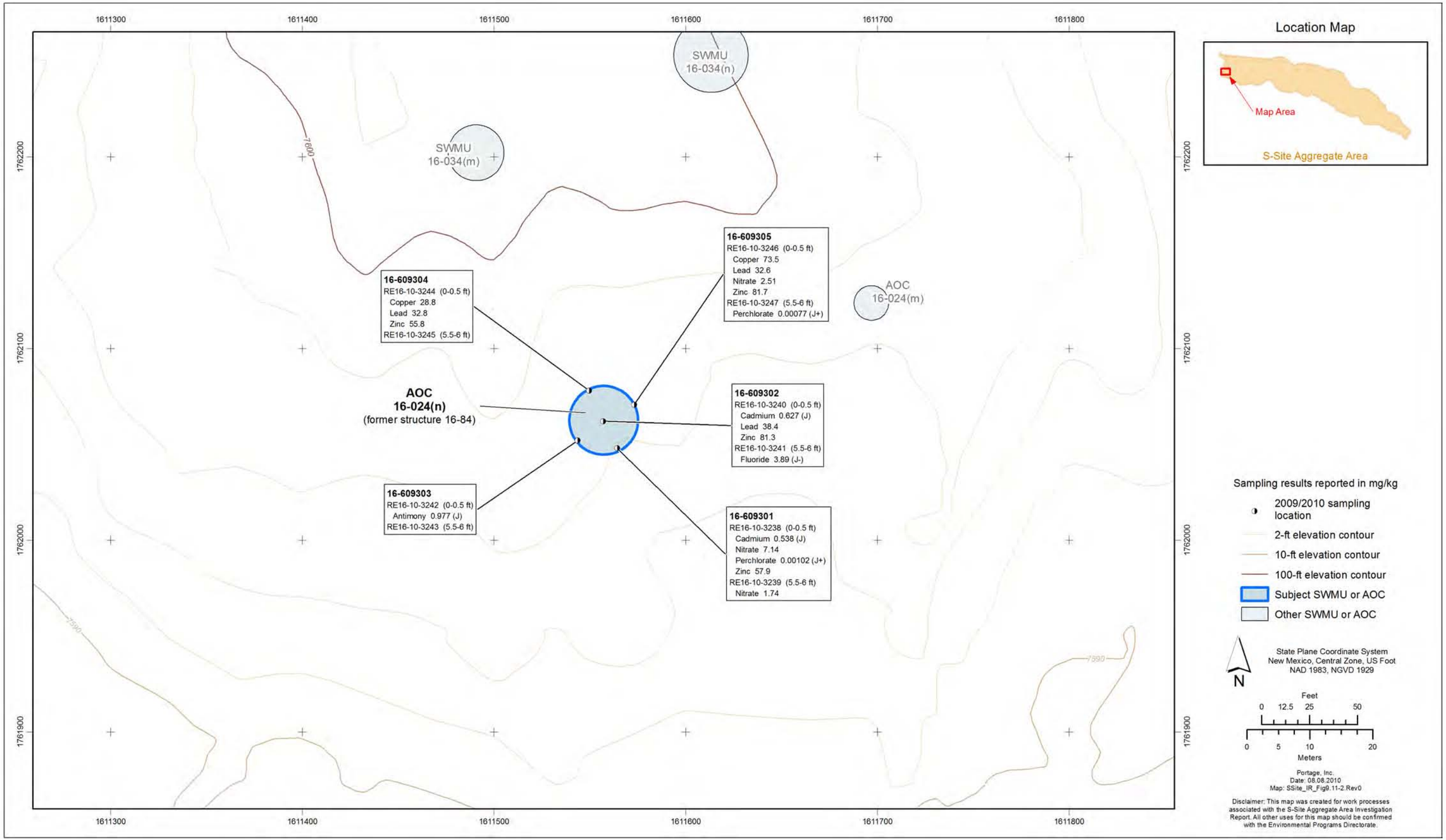


Figure 9.11-2 Inorganic chemicals detected above BVs at AOC 16-024(n)

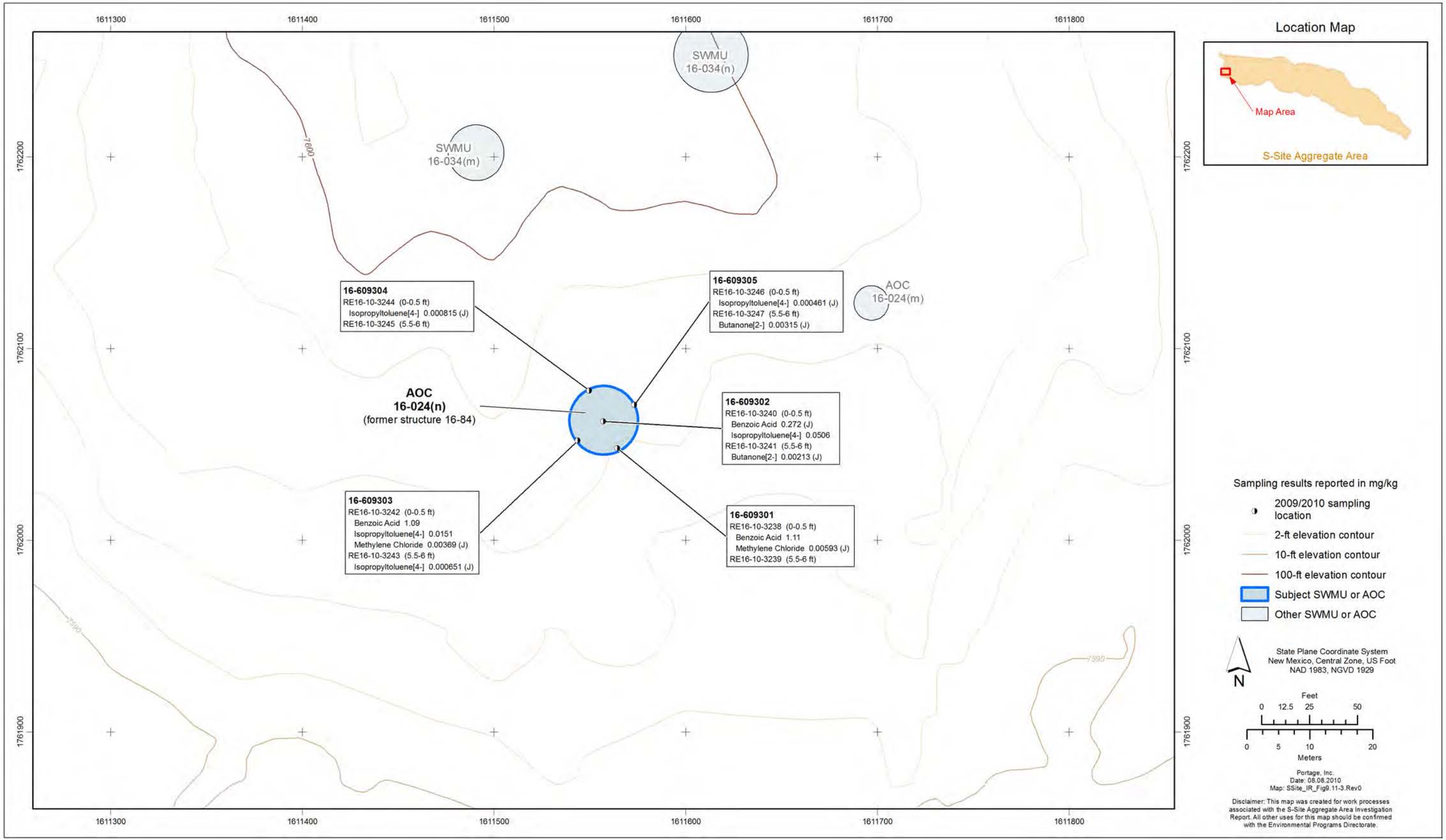


Figure 9.11-3 Organic chemicals detected in samples at AOC 16-024(n)

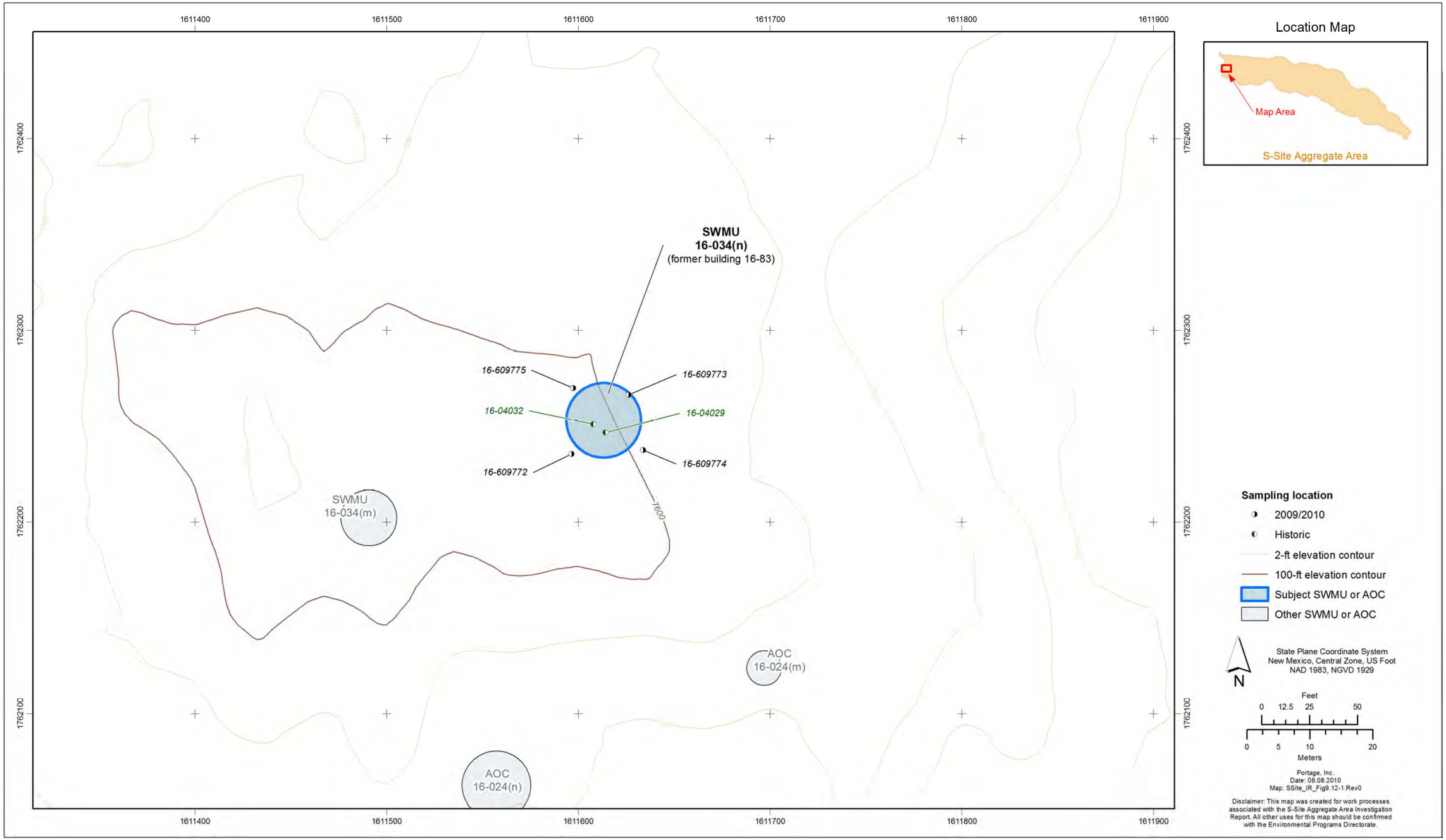


Figure 9.12-1 Locations sampled for SWMU 16-034(n)

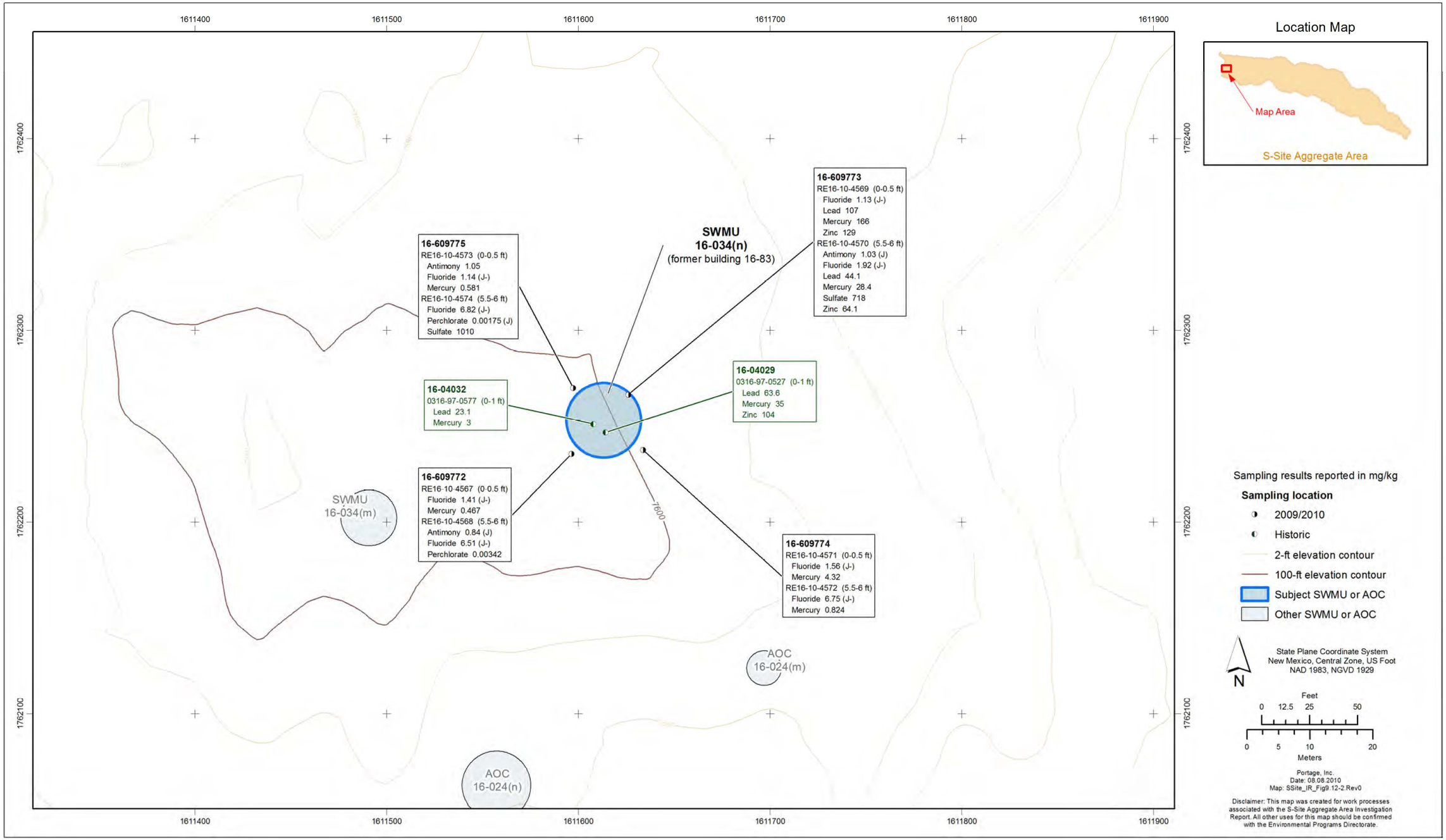


Figure 9.12-2 Inorganic chemicals detected above BVs at SWMU 16-034(n)

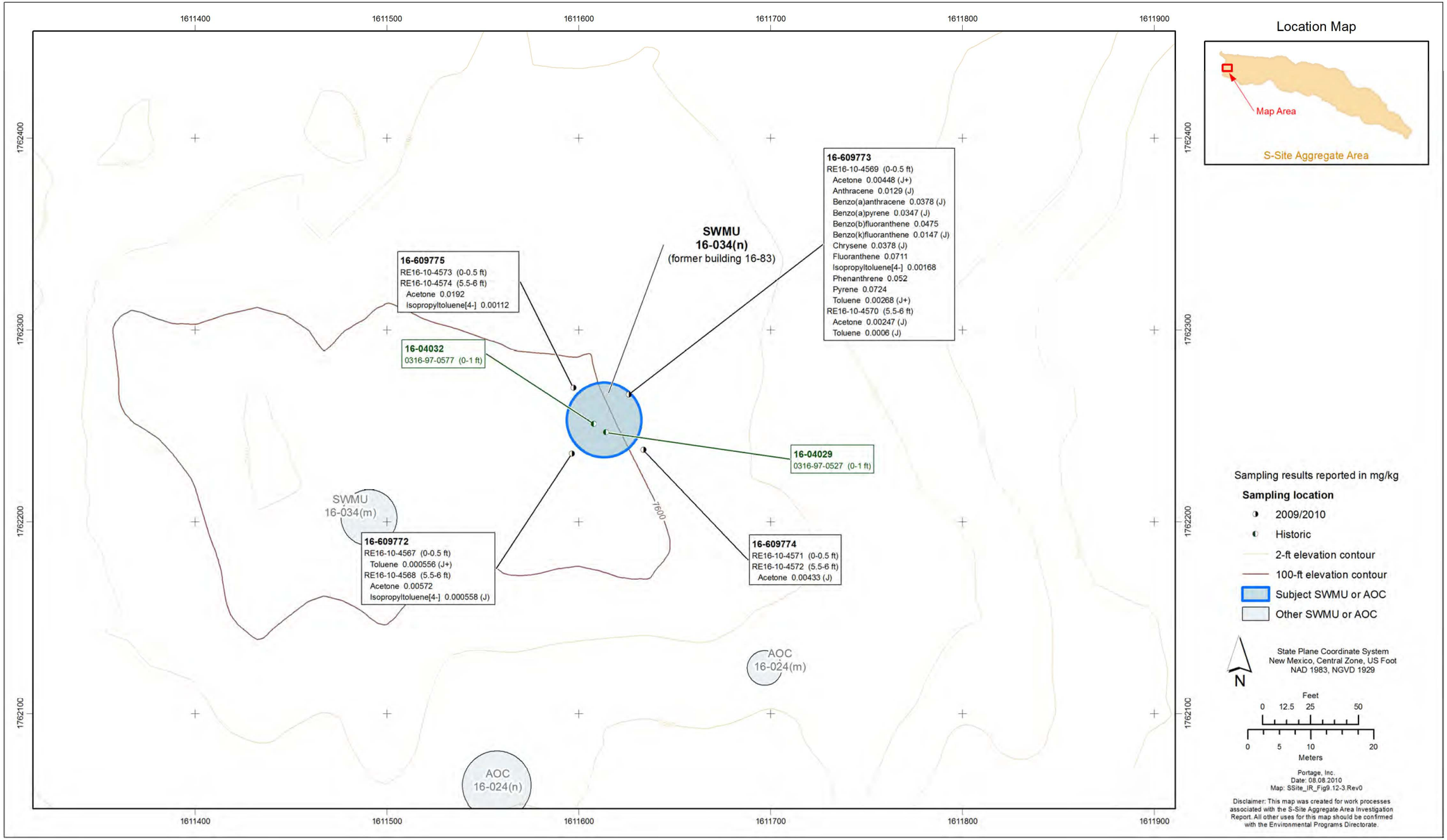


Figure 9.12-3 Organic chemicals detected in samples at SWMU 16-034(n)

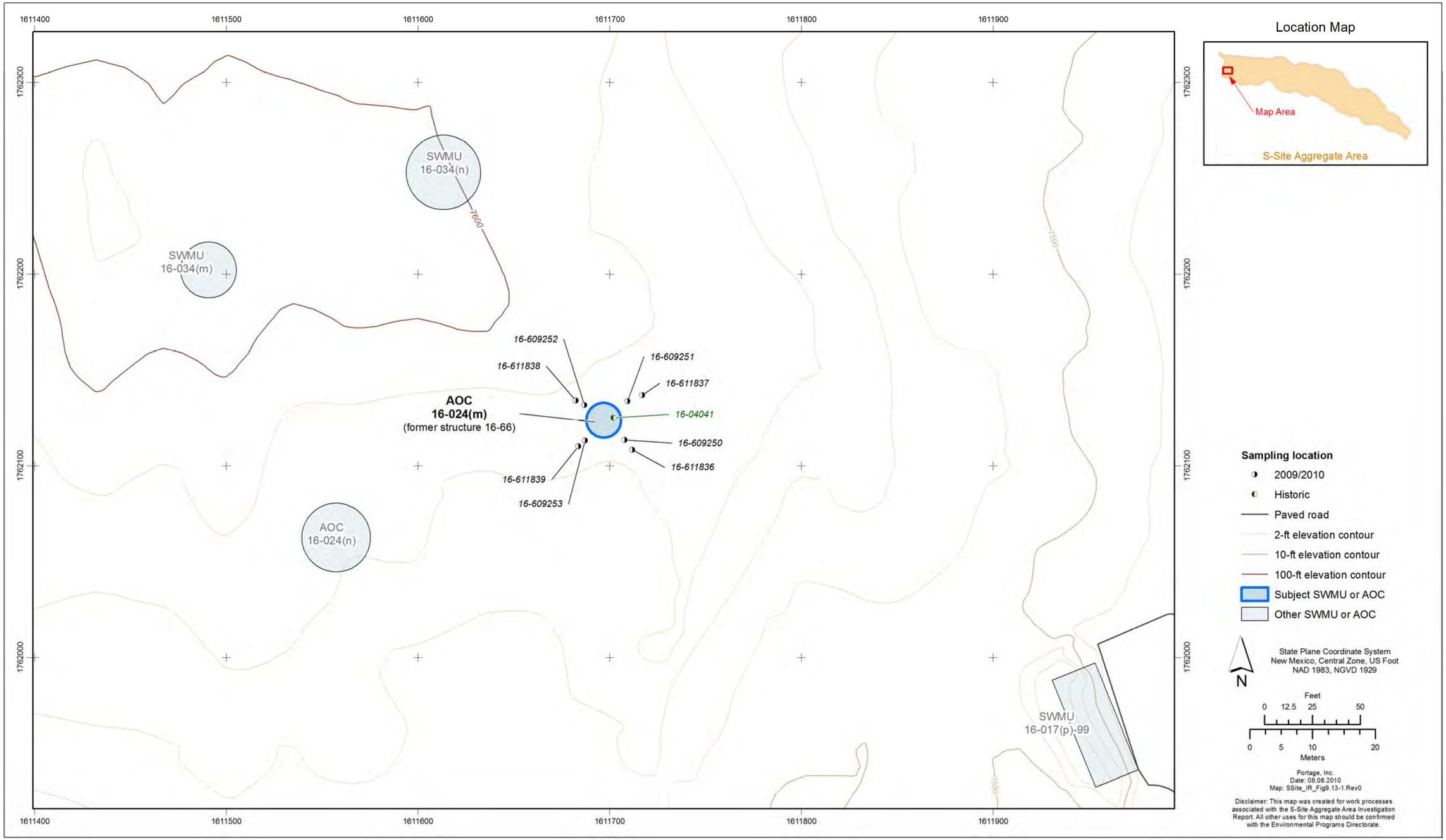


Figure 9.13-1 Locations sampled for AOC 16-024(m)

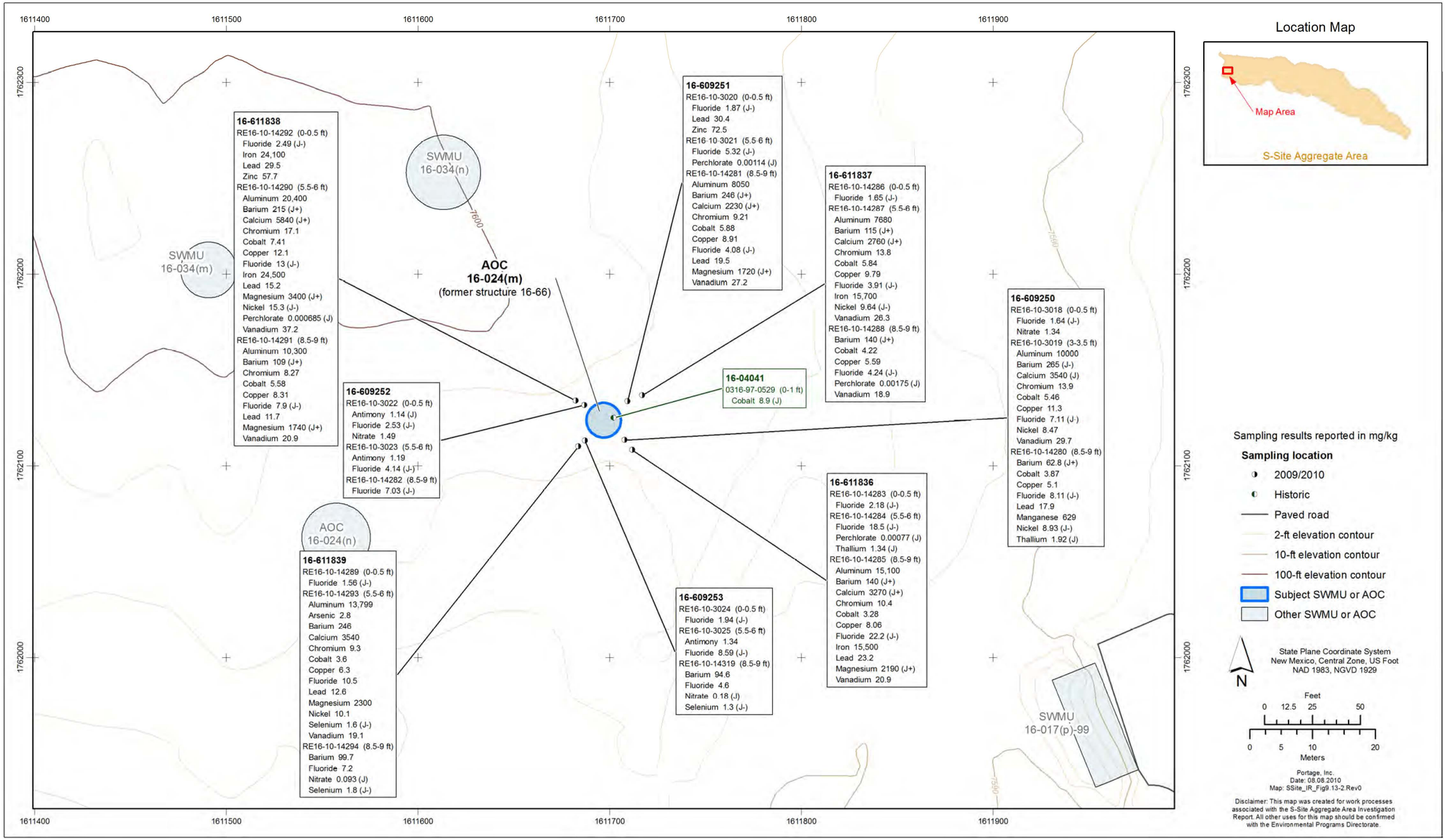


Figure 9.13-2 Inorganic chemicals detected above BVs at AOC 16-024(m)

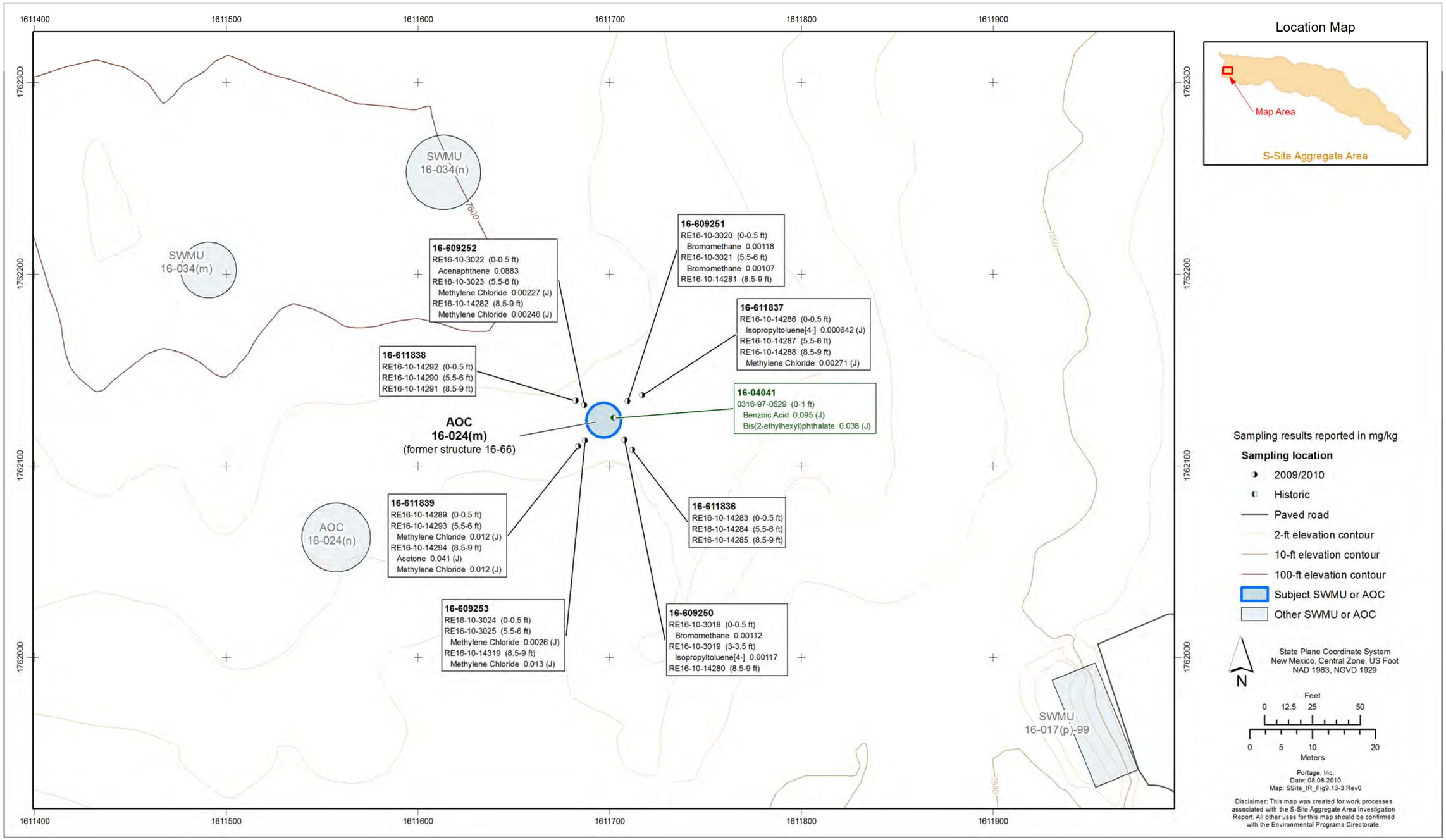


Figure 9.13-3 Organic chemicals detected in samples at AOC 16-024(m)

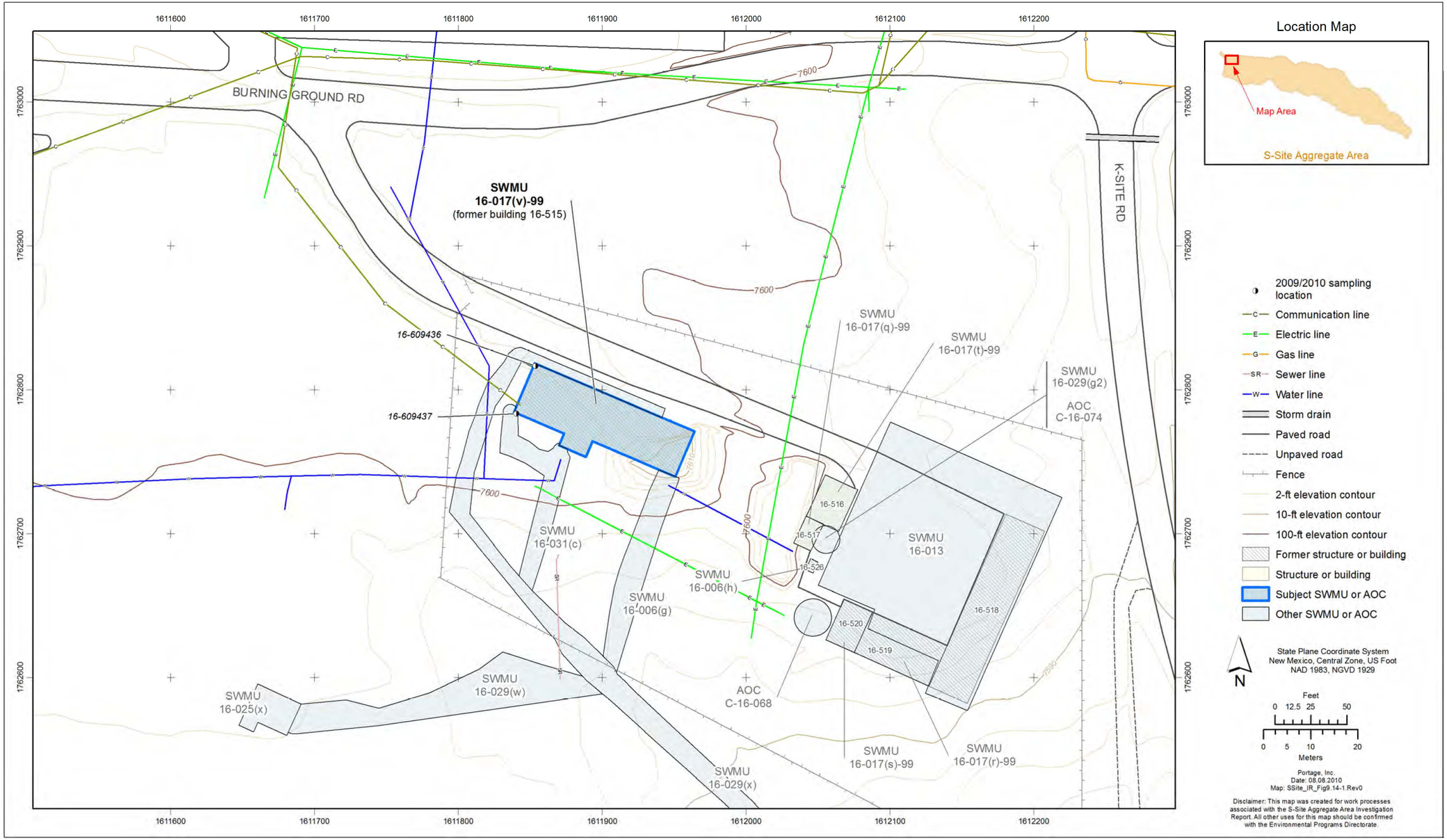


Figure 9.14-1 Locations sampled for SWMU 16-017(v)-99

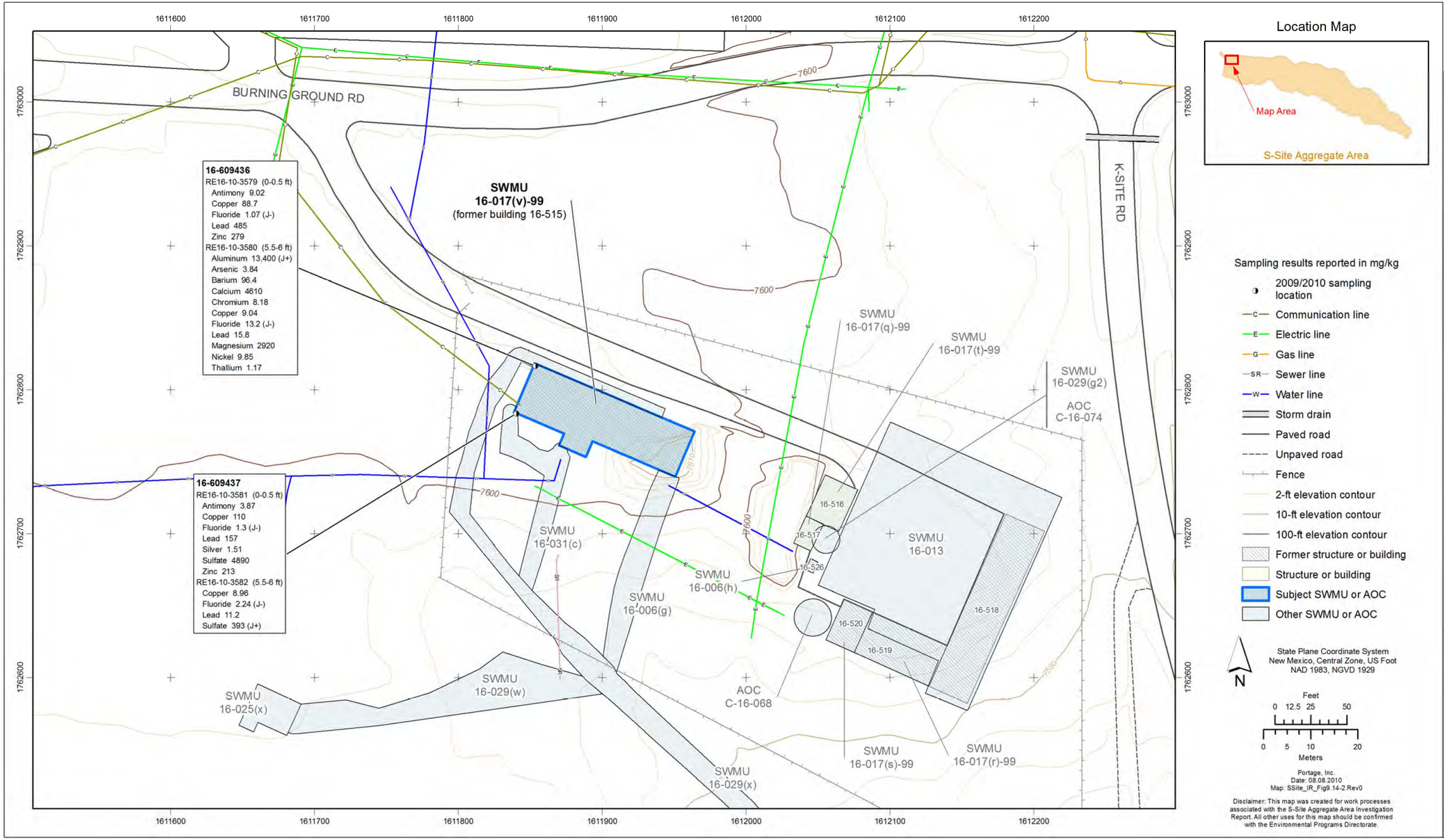


Figure 9.14-2 Inorganic chemicals detected above BVs at SWMU 16-017(v)-99

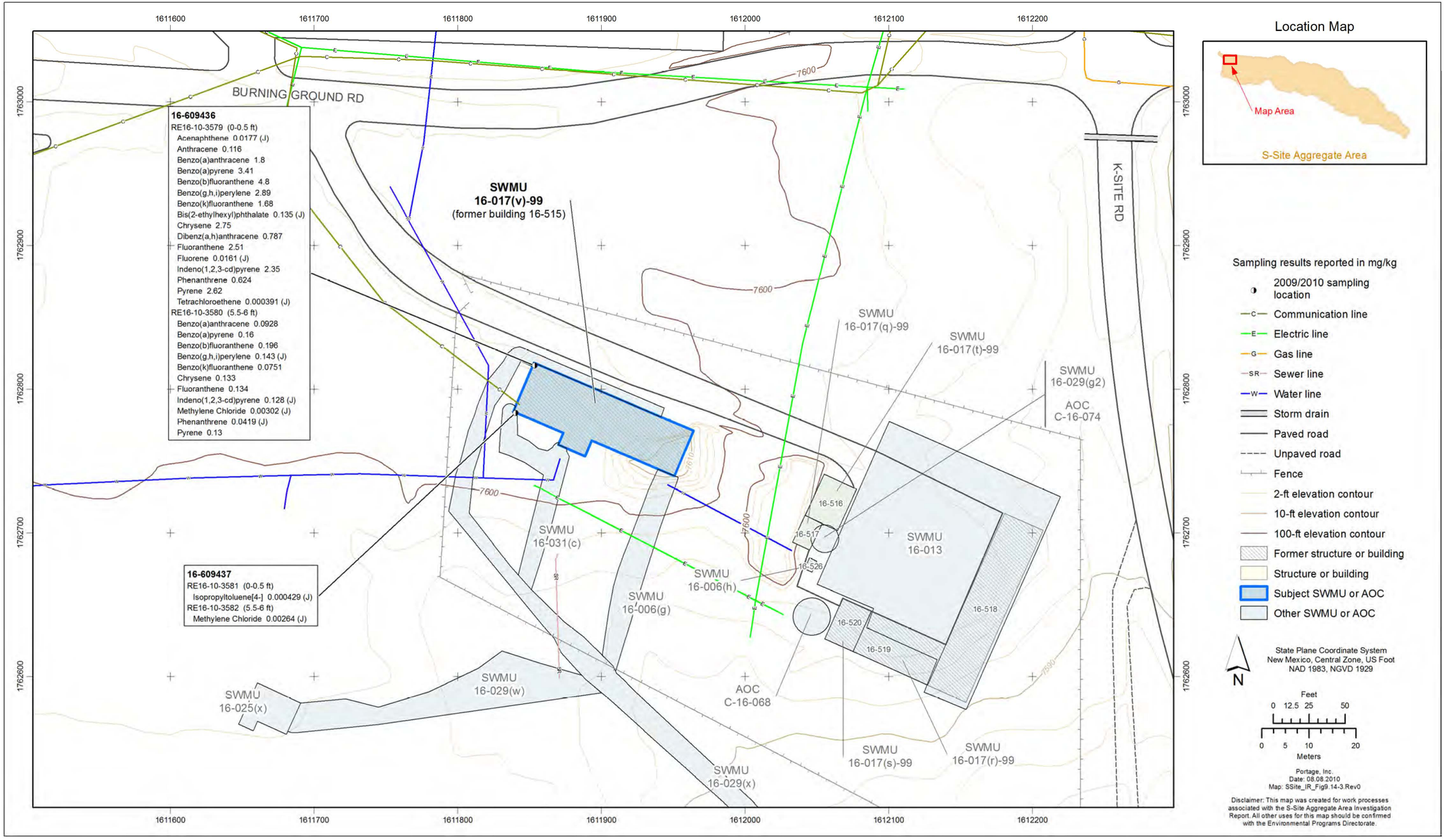


Figure 9.14-3 Organic chemicals detected in samples at SWMU 16-017(v)-99

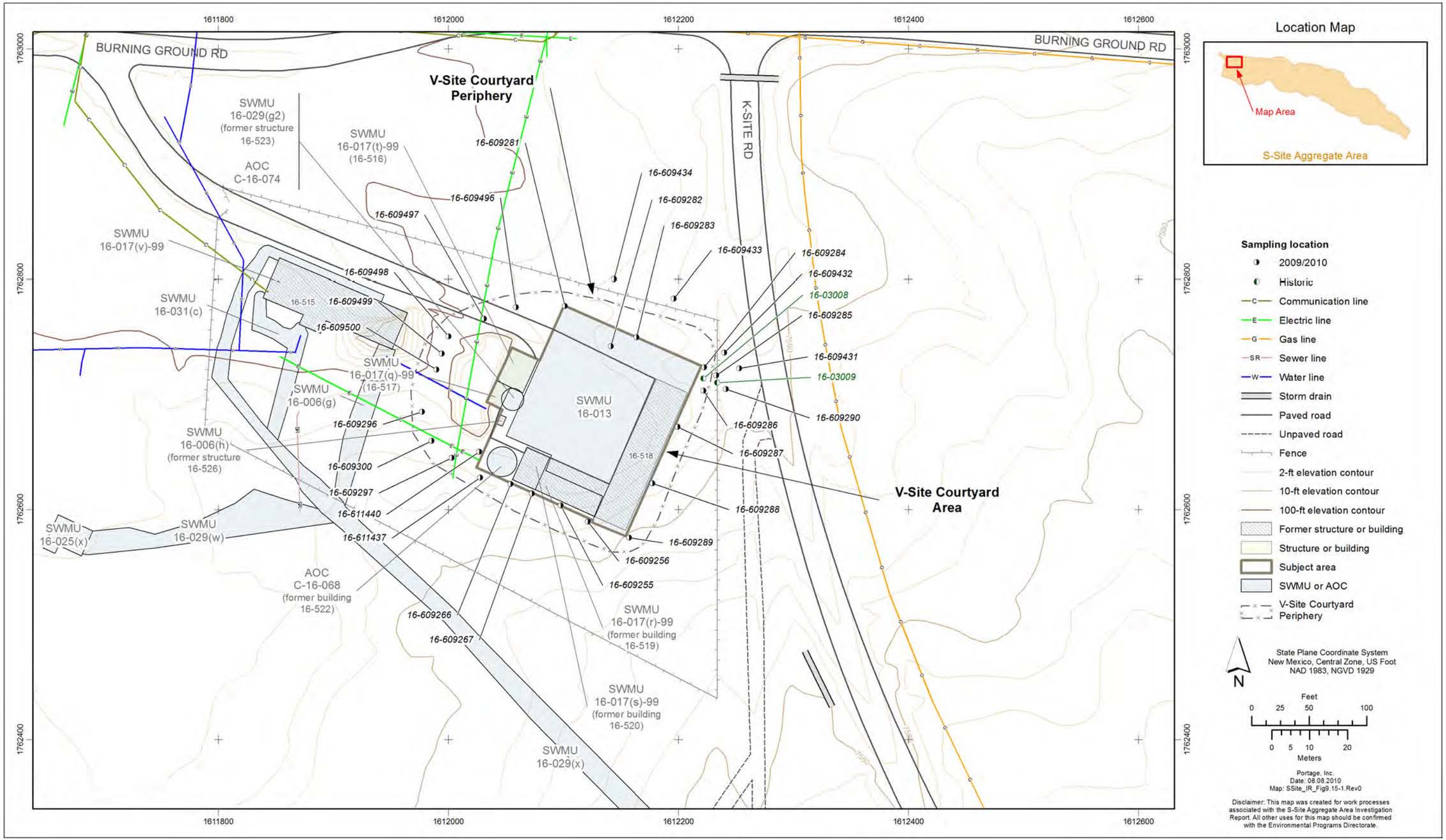


Figure 9.15-1 Locations sampled at the V-Site Courtyard Periphery and the drainage north of the Courtyard

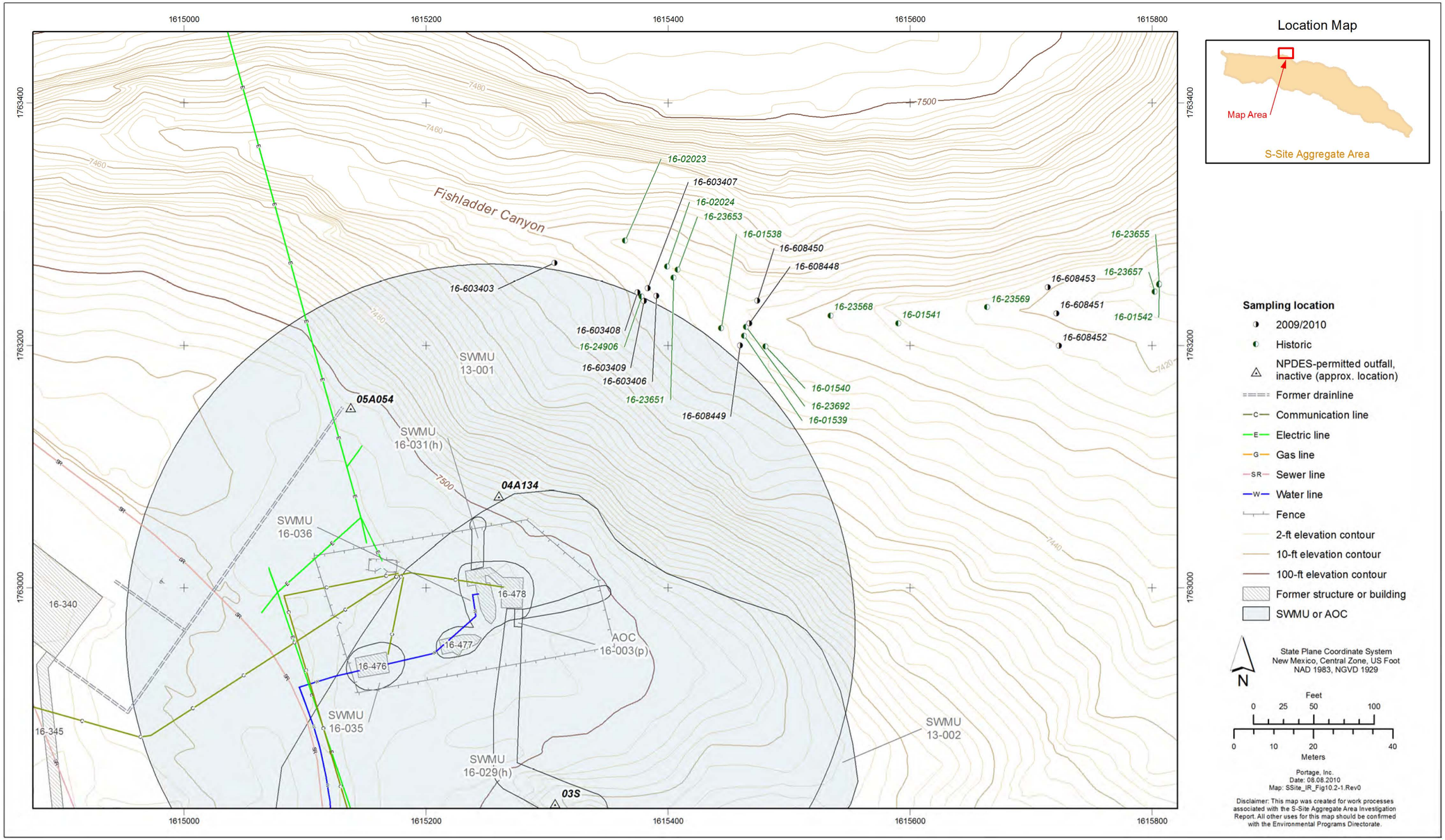


Figure 10.2-1 Locations sampled for Fishladder Canyon Drainages

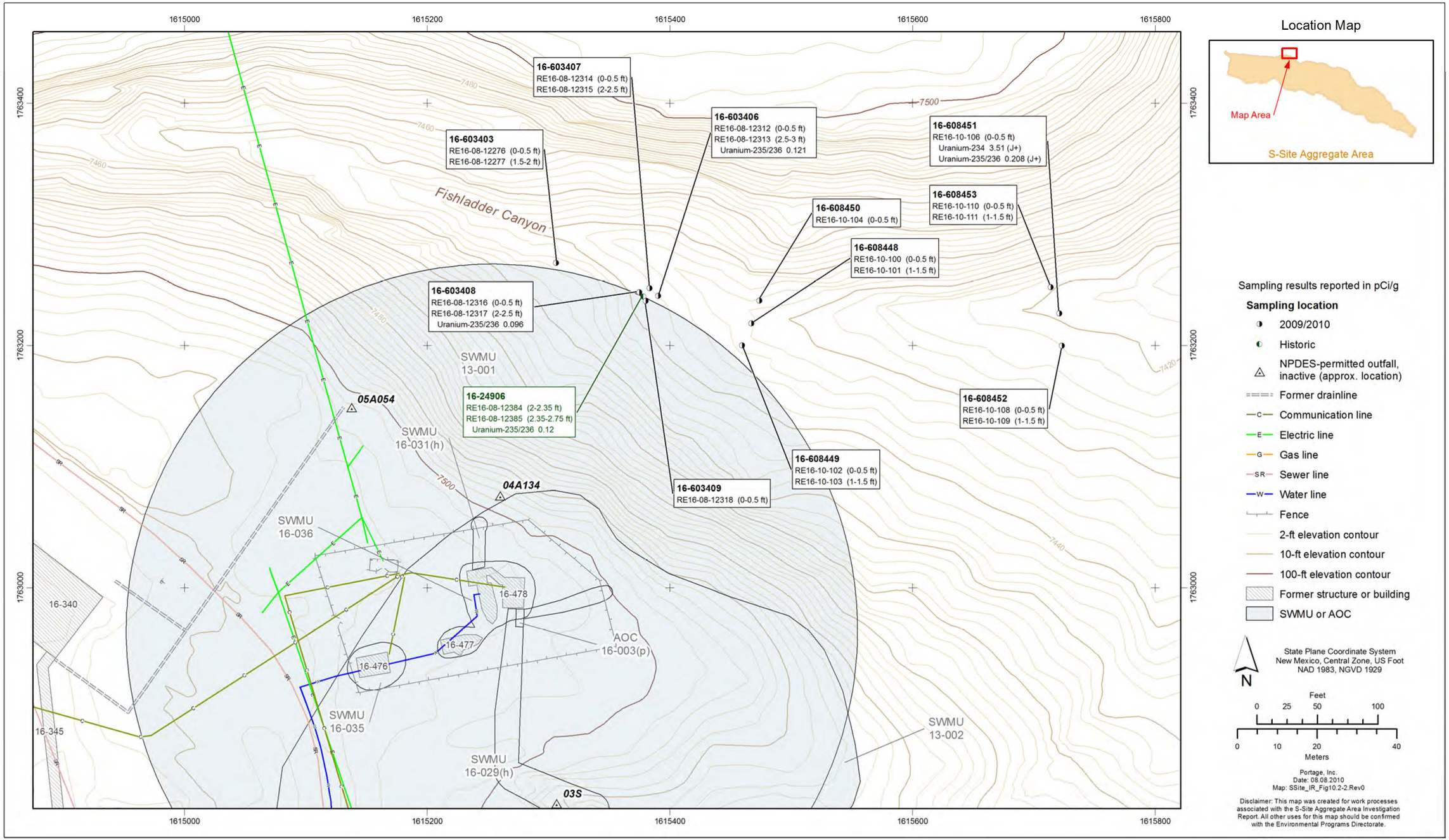


Figure 10.2-2 Radionuclides detected or detected above BVs/FVs for the Fishladder Canyon Drainages

Table 1.1-1
S-Site Aggregate Area List of Consolidated Units, SWMUs, and AOCs

Consolidated Unit	Site Number	Description	Reference	Comment
TA-11				
n/a*	SWMU 11-001(b)	Firing Pit	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
n/a	AOC 11-003(a)	Inactive Mortar Impact Area	EPA 2005, 088464	NFA approved
n/a	AOC 11-003(b)	Former Mortar Impact Area	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
11-004(a)-99	SWMU 11-004(a)	Drop Tower	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
	SWMU 11-004(b)	Concrete pad	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
	SWMU 11-004(c)	Hoist	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
	SWMU 11-004(d)	Hoist	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
	SWMU 11-004(e)	Asphalt drop pad	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
	AOC 11-004(f)	Asphalt drop pad	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
n/a	SWMU 11-005(a)	Septic system	Investigation report, section 6.3	Sampled in the 2009 investigation
n/a	SWMU 11-005(b)	Septic system	Investigation report, section 6.4	Sampled in the 2009 investigation
n/a	SWMU 11-005(c)	Outfall and Drainline	Investigation report, section 6.9	Sampled in the 2009 investigation
11-006(a)-99	SWMU 11-001(a)	Former Firing Pit	March 1, 2005 Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
	SWMU 11-002	Burning Area	March 1, 2005 Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
	SWMU 11-006(a)	HE Sump	Investigation report, section 6.5	Sampled in the 2009 investigation
	SWMU 11-006(b)	Catch Basin	Investigation report, section 6.6	Sampled in the 2009 investigation
	SWMU 11-006(c)	Catch Basin	Investigation report, section 6.7	Sampled in the 2009 investigation

Table 1.1-1 (continued)

Consolidated Unit	Site Number	Description	Reference	Comment
11-006(a)-99 (continued)	SWMU 11-006(d)	Catch Basin	Investigation report, section 6.8	Sampled in the 2009 investigation
	AOC C-11-001	Former Building	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
n/a	SWMU 11-007	Surface Disposal Area	NMED 1998, 063042	Removed from the Laboratory's Hazardous Waste Facility Permit, 12/23/98
n/a	AOC 11-008	Surface Disposal Area	EPA 2005, 088464	NFA approved
n/a	SWMU 11-009	MDA S, Experimental Test Plot	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
n/a	AOC 11-010(a)	Storage Area	EPA 2005, 088464	NFA approved
n/a	AOC 11-010(b)	Storage Area	EPA 2005, 088464	NFA approved
11-011(a)-00	SWMU 11-011(a)	Outfall and Drainline	Investigation report, section 6.10	Sampled in the 2009 investigation
	SWMU 11-011(b)	Outfall and Drainline	Investigation report, section 6.11	Sampled in the 2009 investigation
n/a	SWMU 11-011(c)	Boiler Discharge (misidentified)	NMED 2001, 070010	Removed from the Laboratory's Hazardous Waste Facility Permit, 05/02/01
n/a	SWMU 11-011(d)	Outfall	Investigation report, section 6.12	Sampled in the 2009 investigation
n/a	AOC 11-012(c)	Potential Soil Contamination Associated with Former Building 11-9	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
n/a	AOC 11-012(d)	Potential Soil Contamination Associated with Former Building 11-10	March 1, 2005, Compliance Order on Consent, Table IV-2	Investigation deferred per Consent Order Table IV-2
n/a	AOC C-11-002	Area of Potential Soil Contamination Associated with Former Building 11-12	Investigation report, section 6.2	Sampled in the 2009 investigation
n/a	AOC C-11-003	Potential Soil Contamination Associated with a One-Time Spill	EPA 2005, 088464	NFA approved

Table 1.1-1 (continued)

Consolidated Unit	Site Number	Description	Reference	Comment
TA-13 (Former) and TA-16				
13-001-99	SWMU 13-001	Firing Site	Investigation report, section 7.10	Sampled in the 2009 investigation
	SWMU 13-002	Surface Disposal Area	Investigation report, section 7.11	Sampled in the 2009 investigation
	SWMU 16-035	Potential soil contamination associated with Former Building 16-476	Investigation report, section 7.2	Sampled in the 2009 investigation
	SWMU 16-036	Potential Soil Contamination Associated with Former Building 16-477 and 16-478	Investigation report, section 7.3	Sampled in the 2009 investigation
13-003(a)-99	SWMU 13-003(a)	Septic tank (removed)	LANL 2009, 105061	This site is included in the investigation of the 16-340 Complex.
	AOC 13-003(b)	Drainfield	LANL 2009, 105061	This site is included in the investigation of the 16-340 Complex.
n/a	SWMU 13-004	Burning Pits	Investigation report, section 7.14	Sampled in the 2009 investigation
16-003(d)-99	SWMU 16-001(e)	Dry Well	Investigation report, section 8.3	Sampled in the 2009 investigation
	SWMU 16-003(d)	Sumps	Investigation report, section 8.4	Sampled in the 2009 investigation
	SWMU 16-003(e)	Sumps	Investigation report, section 8.5	Sampled in the 2009 investigation
	SWMU 16-003(f)	Sumps	Investigation report, section 8.6	Sampled in the 2009 investigation
	SWMU 16-003(g)	Sumps	Investigation report, section 8.7	Sampled in the 2009 investigation
16-004(a)-99	SWMU 16-004(a)	Imhoff tank	Investigation report, section 7.15	Sampled in the 2009 investigation
	SWMU 16-004(b)	Trickling filter	Investigation report, section 7.16	Sampled in the 2009 investigation
	SWMU 16-004(c)	Tank	Investigation report, section 7.17	Sampled in the 2009 investigation
	SWMU 16-004(d)	Sludge Drying Bed	Investigation report, section 7.18	Sampled in the 2009 investigation
	SWMU 16-004(e)	Filter Screen	Investigation report, section 7.19	Sampled in the 2009 investigation
	SWMU 16-004(f)	Sludge Drying Bed	Investigation report, section 7.20	Sampled in the 2009 investigation

Table 1.1-1 (continued)

Consolidated Unit	Site Number	Description	Reference	Comment
n/a	SWMU 16-005(i)	Septic Tank (Structure 13-12); Duplicate of SWMU 13-003(a)	NMED 1998, 063042	Removed from the Laboratory's Hazardous Waste Facility Permit, 12/23/98
n/a	SWMU 16-012(i)	Satellite Accumulation Area	NMED 1998, 063042	Removed from the Laboratory's Hazardous Waste Facility Permit, 12/23/98
n/a	SWMU 16-012(j)	Satellite Accumulation Area	NMED 1998, 063042	Removed from the Laboratory's Hazardous Waste Facility Permit, 12/23/98
n/a	SWMU 16-012(k)	HE Rest House	NMED 1998, 063042	Removed from the Laboratory's Hazardous Waste Facility Permit, 12/23/98
n/a	SWMU 16-012(l)	Satellite Accumulation Area	NMED 1998, 063042	Removed from the Laboratory's Hazardous Waste Facility Permit, 12/23/98
n/a	SWMU 16-012(m)	Satellite Accumulation Area	NMED 1998, 063042	Removed from the Laboratory's Hazardous Waste Facility Permit, 12/23/98
16-013-99	SWMU 16-006(h)	Pit	Investigation report, section 9.15.1.1	Not sampled in the 2009 investigation (included with other sites in the Courtyard Periphery Area)
	SWMU 16-013	Decommissioned Storage Area	Investigation report, section 9.15.1.2	Sampled in the 2009 investigation
	SWMU 16-017(q)-99	Storage Building 16-517	Investigation report, section 9.15.1.3	Sampled in the 2009 investigation
	SWMU 16-017(r)-99	Former Building 16-519	Investigation report, section 9.15.1.4	Sampled in the 2009 investigation
	SWMU 16-017(s)-99	Former Building 16-520	Investigation report, section 9.15.1.5	Sampled in the 2009 investigation
	SWMU 16-017(t)-99	High Bay Building 16-516	Investigation report, section 9.15.1.6	Sampled in the 2009 investigation
	SWMU 16-029(g2)	Pit	Investigation report, section 9.3	Sampled in the 2009 investigation
	AOC C-16-068	Former Building 16-522	Investigation report, section 9.2	Sampled in the 2009 investigation
	AOC C-16-074	Storage Area	Investigation report, section 9.4	Not sampled in the 2009 investigation [collocated with SWMU 16-029(g)]
n/a	SWMU 16-017(p)-99	Former storage magazine 16-61	Investigation report, section 9.8	Sampled in the 2009 investigation
n/a	SWMU 16-017(w)-99	Former storage magazine 16-73	Investigation report, section 9.9	Sampled in the 2009 investigation

Table 1.1-1 (continued)

Consolidated Unit	Site Number	Description	Reference	Comment
n/a	AOC 16-024(a)	Potential Soil Contamination Associated with Former Magazine 16-488	Investigation report, section 7.6	Sampled in the 2009 investigation
n/a	AOC 16-024(m)	Potential Soil Contamination Associated with Former HE Magazine 16-66	Investigation report, section 9.13	Sampled in the 2009 investigation
n/a	AOC 16-024(n)	Potential Soil Contamination Associated with Former Magazine 16-84	Investigation report, section 9.11	Sampled in the 2009 investigation
n/a	AOC 16-024(u)	Potential Soil Contamination Associated with Former Magazine 16-481	Investigation report, section 7.7	Sampled in the 2009 investigation
n/a	SWMU 16-025(d2)	Potential Soil Contamination Associated with Former Building 16-480	Investigation report, section 7.4	Sampled in the 2009 investigation
16-026(b)-99	SWMU 16-026(b)	Outfall	Investigation report, section 8.8	Sampled in the 2009 investigation
	SWMU 16-026(c)	Outfall	Investigation report, section 8.9	Sampled in the 2009 investigation
	SWMU 16-026(d)	Outfall	Investigation report, section 8.10	Sampled in the 2009 investigation
	SWMU 16-026(e)	Outfall	Investigation report, section 8.11	Sampled in the 2009 investigation
	SWMU 16-029(a)	Sumps	Investigation report, section 8.12	Sampled in the 2009 investigation
	SWMU 16-029(b)	Sumps	Investigation report, section 8.13	Sampled in the 2009 investigation
	SWMU 16-029(c)	Sumps	Investigation report, section 8.14	Sampled in the 2009 investigation
	SWMU 16-029(d)	Sumps	Investigation report, section 8.15	Sampled in the 2009 investigation
n/a	SWMU 16-026(f)	Outfalls	NMED 2008, 100116	Received Certificate of Completion Without Controls
n/a	SWMU 16-026(z)	Outfall	Investigation report, section 8.2	Sampled in the 2009 investigation

Table 1.1-1 (continued)

Consolidated Unit	Site Number	Description	Reference	Comment
16-029(h)-99	AOC 16-003(p)	Sump	Investigation report, section 7.13	Sampled in the 2009 investigation
	SWMU 16-029(h)	Outfall and Drainlines	Investigation report, section 7.12	Sampled in the 2009 investigation
16-029(x)-99	SWMU 16-006(g)	Former Septic System	Investigation report, section 9.16	Not sampled in the 2009 investigation (historic preservation constraints)
	SWMU 16-017(v)-99	Former HE Processing Building 16-515	Investigation report, section 9.14	Sampled in the 2009 investigation
	SWMU 16-025(x)	Potential Soil Contamination Associated with Former Building 16-100	Investigation report, section 9.7	Sampled in the 2009 investigation
	SWMU 16-029(w)	Sump (Former) and Outfall	Investigation report, section 9.6	Sampled in the 2009 investigation
	SWMU 16-029(x)	Sump (Former) and Outfall	Investigation report, section 9.5	Sampled in the 2009 investigation
	SWMU 16-031(c)	Former Drainline	Investigation report, section 9.17	Not sampled in the 2009 investigation (historic preservation constraints)
n/a	SWMU 16-031(h)	Outfall	Investigation report, section 7.5	Sampled in the 2009 investigation
n/a	SWMU 16-034(g)	Duplicate of SWMU 16-017(q)-99	NMED 1998, 063042	Removed from the Laboratory's Hazardous Waste Facility Permit, 12/23/98
n/a	SWMU 16-034(m)	Potential Soil Contamination Associated with Former Building 16-86	Investigation report, section 9.10	Sampled in the 2009 investigation
n/a	SWMU 16-034(n)	Potential Soil Contamination Associated with Former Building 16-83	Investigation report, section 9.12	Sampled in the 2009 investigation
n/a	AOC C-16-007	Tank stand	EPA 2005, 088464	NFA approved
n/a	AOC C-16-049	Former Building	Investigation report, section 7.21	Not sampled in the 2009 investigation (NFA to be proposed)
n/a	AOC C-16-050	Former Building 16-482	Investigation report, section 7.8	Sampled in the 2009 investigation
n/a	AOC C-16-056	Steam manhole (removed)	EPA 2005, 088464	NFA approved
n/a	AOC C-16-057	Steam manhole (removed)	EPA 2005, 088464	NFA approved
n/a	AOC C-16-059	Former Pit (Structure 16-0524)	EPA 2005, 088464	NFA approved

Table 1.1-1 (continued)

Consolidated Unit	Site Number	Description	Reference	Comment
n/a	AOC C-16-060	Former Building 16-479	Investigation report, section 7.9	Sampled in the 2009 investigation
n/a	AOC C-16-062	Former Manhole	Investigation report, section 7.22	Not sampled in the 2009 investigation (NFA to be proposed)
n/a	AOC C-16-063	Former Manhole	Investigation report, section 7.23	Not sampled in the 2009 investigation (NFA to be proposed)
TA-25 (Former)				
n/a	AOC 25-001	Duplicate of SWMU 16-029(g2)	EPA 2005, 088464	NFA approved
n/a	AOC C-25-001	Duplicate of AOC C-16-068	EPA 2005, 088464	NFA approved

*n/a = Not applicable.

Table 6.2-1
Summary of Samples Collected and Analyses Requested at AOC C-11-002

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1560	11-608716	0.0–0.5	Soil	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1561	11-608716	5.5–6.0	Qbt 4	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1562	11-608717	0.0–0.5	Soil	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1563	11-608717	5.5–6.0	Qbt 4	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1564	11-608718	0.0–0.5	Soil	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1565	11-608718	5.5–6.0	Qbt 4	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1566	11-608719	0.0–0.5	Soil	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1567	11-608719	5.5–6.0	Qbt 4	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1568	11-608720	0.0–0.5	Soil	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1569	11-608720	5.5–6.0	Qbt 4	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1570	11-608721	0.0–0.5	Soil	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1571	11-608721	5.5–6.0	Qbt 4	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1572	11-608722	0.0–0.5	Qbt 4	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976
RE11-10-1573	11-608722	5.5–6.0	Qbt 4	10-1977	10-1976	10-1975	10-1977	10-1977	10-1976	10-1976	10-1975	10-1975	10-1976

Table 6.2-2
Summary of Inorganic Chemicals above BVs at AOC C-11-002

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Nickel	Nitrate	Perchlorate	Selenium	Vanadium
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**	**1690**	**6.58**	**na**	**na**	**0.3**	**17**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**15.4**	**na**	**na**	**1.52**	**39.6**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**	**na**	**22700**	**1820000**	**795**	**5680**	**5680**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**	**na**	**15800**	**1260000**	**555**	**3960**	**3960**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**	**na**	**1560**	**125000**	**54.8**	**391**	**391**
RE11-10-1560	11-608716	0.0–0.5	Soil	—[g]	1.28 (U)	—	—	—	—	—	—	—	—	—	2.92 (J-)	—	—	—	—	—	—	—	—
RE11-10-1561	11-608716	5.5–6.0	Qbt 4	—	1.12 (U)	—	—	—	—	—	—	—	—	—	2.44 (J-)	—	—	—	—	—	—	1.02 (U)	—
RE11-10-1562	11-608717	0.0–0.5	Soil	—	1.21 (U)	—	—	—	—	—	—	—	—	—	1.6 (J-)	—	—	—	—	—	—	—	—
RE11-10-1563	11-608717	5.5–6.0	Qbt 4	—	1.04 (U)	—	50.9	—	—	—	8.07	—	—	—	2.45 (J-)	—	—	—	—	—	—	1.04 (U)	—
RE11-10-1564	11-608718	0.0–0.5	Soil	—	1.16 (U)	—	—	—	—	—	—	—	—	—	1.34 (J-)	—	—	—	—	1.48	—	—	—
RE11-10-1565	11-608718	5.5–6.0	Qbt 4	—	1.06 (U)	—	—	—	—	—	—	—	—	—	4.46 (J-)	—	—	—	—	—	—	1.09 (U)	—
RE11-10-1566	11-608719	0.0–0.5	Soil	—	1.23 (U)	—	—	—	—	—	—	—	—	—	1.21 (J-)	—	—	—	—	—	0.000973 (J)	—	—
RE11-10-1567	11-608719	5.5–6.0	Qbt 4	—	1.03 (U)	—	—	—	—	—	—	—	—	—	1.51	—	—	—	—	—	—	1.05 (U)	—
RE11-10-1568	11-608720	0.0–0.5	Soil	—	1.21 (U)	—	—	—	—	—	—	—	—	—	1.39 (J-)	—	—	—	—	1.3	—	—	—
RE11-10-1569	11-608720	5.5–6.0	Qbt 4	—	1.1 (U)	—	—	—	—	—	—	—	—	—	1.43 (J-)	—	—	—	—	—	—	1.03 (U)	—
RE11-10-1570	11-608721	0.0–0.5	Soil	—	1.71 (U)	—	—	—	0.854 (U)	—	—	—	—	—	1.72 (J-)	—	—	—	—	—	—	1.58 (U)	—
RE11-10-1571	11-608721	5.5–6.0	Qbt 4	—	1.09 (U)	—	—	—	—	—	—	—	—	—	1.11 (J-)	—	—	—	—	—	—	1.01 (U)	—
RE11-10-1572	11-608722	0.0–0.5	Qbt 4	18800	1.23 (U)	3.14	217	1.6	—	2580	8.76	5.12	8.47	0.676	1.41 (J-)	17500	14.4	2340 (J+)	9.7	—	—	1.15 (U)	23.8
RE11-10-1573	11-608722	5.5–6.0	Qbt 4	—	0.975 (U)	—	—	—	—	—	—	—	—	—	2.06 (J-)	—	—	—	—	—	—	1.04 (U)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 6.2-3
Summary of Organic Chemicals Detected at AOC C-11-002

Sample ID	Location ID	Depth (ft)	Media	Bis(2-ethylhexyl)phthalate	HMX	Isopropyltoluene[4-]	Methylene Chloride	Toluene
Industrial SSL[a]				**1370**	**34200**	**14900**[b]	**1090**	**57900**
Recreational SSL[c]				**1830**	**19900**	**52700**[b]	**4520**	**60800**
Residential SSL[a]				**347**	**3060**	**3210**[b]	**199**	**5570**
RE11-10-1560	11-608716	0.0–0.5	Soil	—[d]	—	—	0.00523 (J)	0.00055 (J)
RE11-10-1561	11-608716	5.5–6.0	Qbt 4	—	—	—	0.00546 (J)	—
RE11-10-1562	11-608717	0.0–0.5	Soil	—	—	0.000613 (J)	—	0.000746 (J)
RE11-10-1563	11-608717	5.5–6.0	Qbt 4	—	—	—	0.00507 (J)	—
RE11-10-1564	11-608718	0.0–0.5	Soil	0.159 (J)	—	—	0.00263 (J)	—
RE11-10-1566	11-608719	0.0–0.5	Soil	0.102 (J)	—	—	—	—
RE11-10-1568	11-608720	0.0–0.5	Soil	0.085 (J)	0.391 (J)	0.000395 (J)	—	—
RE11-10-1570	11-608721	0.0–0.5	Soil	—	—	0.000636 (J)	0.0077 (J)	0.00183 (J)
RE11-10-1572	11-608722	0.0–0.5	Qbt 4	0.106 (J)	0.207 (J+)	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] Isopropylbenzene used as a surrogate based on structural similarity.
[c] SSLs from LANL (2010, 108613).
[d] — = Not detected or not detected above BV.

Table 6.3-1
Summary of Samples Collected and Analyses Requested at SWMU 11-005(a)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1587	11-608724	0.0–0.5	Soil	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1588	11-608724	5.5–6.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1589	11-608725	0.5–1.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1590	11-608725	5.5–6.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1591	11-608726	0.5–1.0	Soil	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1592	11-608726	6.5–7.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1593	11-608727	1.0–1.5	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1594	11-608727	6.5–7.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1595	11-608728	1.0–1.5	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1596	11-608728	6.5–7.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1597	11-608729	1.0–1.5	Soil	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1598	11-608729	6.5–7.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1599	11-608730	3.5–4.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1600	11-608730	8.0–8.5	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1601	11-608731	3.5–4.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1602	11-608731	8.5–9.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1603	11-608732	3.5–4.0	Qbt 3	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1604	11-608732	8.5–9.0	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1605	11-608733	3.0–3.5	Qbt 4	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1607	11-608734	0.0–0.5	Soil	10-2079	10-2078	10-2077	10-2079	10-2079	10-2078	10-2078	10-2077	10-2077	10-2078
RE11-10-1608	11-608734	4.0–4.5	Qbt 4	10-2081	10-2081	10-2080	10-2081	10-2081	10-2081	10-2081	10-2080	10-2080	10-2081
RE11-10-1609	11-608735	0.0–0.5	Sed	10-2478	10-2478	10-2477	10-2478	10-2478	10-2478	10-2478	10-2477	10-2477	10-2478
RE11-10-1610	11-608735	5.5–6.0	Qbt 4	10-2478	10-2478	10-2477	10-2478	10-2478	10-2478	10-2478	10-2477	10-2477	10-2478

Table 6.3-2
Summary of Inorganic Chemicals above BVs at SWMU 11-005(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Cyanide (Total)	Fluoride	Lead	Mercury	Nitrate	Selenium	Silver	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**1.63**	**7.14**	**4.66**	**0.5**	**na[b]**	**11.2**	**0.1**	**na**	**0.3**	**1**	**63.5**
Sediment BV[a]				**0.83**	**0.4**	**10.5**	**11.2**	**0.82**	**na**	**19.7**	**0.1**	**na**	**0.3**	**1**	**60.2**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**14.7**	**0.5**	**na**	**22.3**	**0.1**	**na**	**1.52**	**1**	**48.8**
Industrial SSL[c]				**454**	**1120**	**2920[d]**	**45400**	**22700**	**68100**	**800**	**310[e]**	**1820000**	**5680**	**5680**	**341000**
Recreational SSL[f]				**317**	**784**	**1910[d]**	**31700**	**15800**	**47500**	**560**	**238**	**1260000**	**3960**	**3960**	**238000**
Residential SSL[c]				**31.3**	**77.9**	**219[d]**	**3130**	**1560**	**4690**	**400**	**23**	**125000**	**391**	**391**	**23500**
RE11-10-1587	11-608724	0.0–0.5	Soil	3.98	—[g]	189	34.6	4.03	1.97 (J-)	222	0.362	2.77	—	60.5	74.5
RE11-10-1588	11-608724	5.5–6.0	Qbt 4	0.864 (J)	—	33.7	9.26	—	2.47 (J-)	27.6	—	—	1.04 (U)	11.8	—
RE11-10-1589	11-608725	0.5–1.0	Qbt 4	1.17 (U)	—	—	—	—	1.06 (J-)	—	—	—	1.06 (U)	—	—
RE11-10-1590	11-608725	5.5–6.0	Qbt 4	1.06 (U)	—	—	—	—	1.53 (J-)	—	—	—	1.05 (U)	—	—
RE11-10-1591	11-608726	0.5–1.0	Soil	1.14 (U)	0.57 (U)	—	—	—	1.32 (J-)	—	—	1.31	—	1.15	—
RE11-10-1592	11-608726	6.5–7.0	Qbt 4	0.995 (U)	—	—	—	—	2.3 (J-)	—	—	—	1.01 (U)	—	—
RE11-10-1593	11-608727	1.0–1.5	Qbt 4	1.08 (U)	—	—	—	—	1.08 (J-)	—	—	—	1.07 (U)	—	—
RE11-10-1594	11-608727	6.5–7.0	Qbt 4	1.04 (U)	—	—	—	—	2.16 (J-)	—	—	—	1.09 (U)	—	—
RE11-10-1595	11-608728	1.0–1.5	Qbt 4	1.11 (U)	—	—	—	—	1.29 (J-)	—	—	1.47	1.08 (U)	3.3	—
RE11-10-1596	11-608728	6.5–7.0	Qbt 4	1.02 (U)	—	—	—	—	1.38 (J-)	—	—	1.21	1.08 (U)	—	—
RE11-10-1597	11-608729	1.0–1.5	Soil	1.09 (U)	0.547 (U)	—	—	—	1.61 (J-)	—	—	1.92	—	3.51	—
RE11-10-1598	11-608729	6.5–7.0	Qbt 4	1.02 (U)	—	9.31	—	—	3.37 (J-)	—	—	2.32	1 (U)	3	—
RE11-10-1599	11-608730	3.5–4.0	Qbt 4	1.05 (U)	—	—	—	—	1.72 (J-)	—	—	1.41	0.99 (U)	—	—
RE11-10-1600	11-608730	8.0–8.5	Qbt 4	1.12 (U)	—	—	—	—	2.03 (J-)	—	—	1.54	1.12 (U)	—	—
RE11-10-1601	11-608731	3.5–4.0	Qbt 4	0.977 (U)	—	—	—	—	2.15 (J-)	—	—	—	1.07 (U)	—	—
RE11-10-1602	11-608731	8.5–9.0	Qbt 4	1.06 (U)	—	—	—	—	2.65 (J-)	—	—	—	1.08 (U)	—	—
RE11-10-1603	11-608732	3.5–4.0	Qbt 3	1.1 (U)	—	—	—	—	1.25 (J-)	—	—	—	1.09 (U)	—	—
RE11-10-1604	11-608732	8.5–9.0	Qbt 4	1.03 (U)	—	—	—	—	1.76 (J-)	—	—	—	1.06 (U)	—	—
RE11-10-1605	11-608733	3.0–3.5	Qbt 4	1.07 (U)	—	—	—	—	1.24 (J-)	—	—	1.3	0.949 (U)	—	—
RE11-10-1607	11-608734	0.0–0.5	Soil	1.5 (U)	—	—	—	—	1.69 (J-)	—	—	—	1.57 (U)	—	56.1
RE11-10-1608	11-608734	4.0–4.5	Qbt 4	1.03 (UJ)	—	12.2 (J+)	4.8	—	1.62 (J-)	—	—	—	1.07 (U)	—	—
RE11-10-1609	11-608735	0.0–0.5	Sed	1.45 (UJ)	—	37.9	—	—	—	26.1	0.3	4 (J-)	1.42 (UJ)	56.1	62.9
RE11-10-1610	11-608735	5.5–6.0	Qbt 4	1.04 (UJ)	—	—	—	0.504	—	—	—	—	1.05 (UJ)	3.1 (J)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 6.3-3
Summary of Organic Chemicals Detected at SWMU 11-005(a)

Sample ID	Location ID	Depth (ft)	Media	Acetone	HMX	Methylene Chloride	RDX
Industrial SSL[a]				**851000**	**34200**	**1090**	**174**
Recreational SSL[b]				**702000**	**19900**	**4520**	**233**
Residential SSL[a]				**67500**	**3060**	**199**	**44.2**
RE11-10-1595	11-608728	1.0–1.5	Qbt 4	—[c]	0.438 (J)	—	—
RE11-10-1596	11-608728	6.5–7.0	Qbt 4	—	—	—	0.592 (J)
RE11-10-1601	11-608731	3.5–4.0	Qbt 4	0.0058 (J)	—	—	—
RE11-10-1605	11-608733	3.0–3.5	Qbt 4	0.00262 (J)	—	—	—
RE11-10-1607	11-608734	0.0–0.5	Soil	0.00296 (J)	—	0.0047 (J)	—
RE11-10-1609	11-608735	0.0–0.5	Sed	—	—	0.00528 (J)	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] SSLs from LANL (2010, 108613).
[c] — = Not detected or not detected above BV.

Table 6.3-4
Summary of Radionuclides Detected at SWMU 11-005(a)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-239/240	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**1.98**	**0.09**	**1.93**
Sediment BV/FV[a]				**0.04**	**0.068**	**2.59**	**0.2**	**2.29**
Soil BV/FV[a]				**0.013**	**0.054**	**2.59**	**0.2**	**2.29**
Industrial SAL[c]				**180**	**210**	**1500**	**87**	**430**
Recreational SAL[c]				**280**	**300**	**3200**	**520**	**2100**
Residential SAL[c]				**30**	**33**	**170**	**17**	**87**
RE11-10-1587	11-608724	0.0–0.5	Soil	—[d]	0.168	3.92	0.226	3.78
RE11-10-1593	11-608727	1.0–1.5	Qbt 4	—	—	—	0.103	—
RE11-10-1607	11-608734	0.0–0.5	Soil	0.0427	0.193	—	—	—
RE11-10-1609	11-608735	0.0–0.5	Sed	—	—	—	—	2.57

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.
[a] BVs/FVs from LANL (1998, 059730).
[b] na = Not available.
[c] SALs for radionuclides from LANL (2009, 107655).
[d] — = Not detected or not detected above BV/FV.

Table 6.4-1
Summary of Samples Collected and Analyses Requested at SWMU 11-005(b)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1747	11-608783	0.0–0.5	Soil	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1748	11-608783	5.0–5.5	Qbt 4	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1749	11-608784	3.5–4.0	Soil	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1750	11-608784	8.5–9.0	Soil	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1751	11-608785	3.5–4.0	Soil	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1752	11-608785	8.5–9.0	Qbt 4	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1753	11-608786	3.0–3.5	Fill	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1754	11-608786	9.0–9.5	Qbt 4	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1755	11-608787	1.0–1.5	Fill	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1756	11-608787	6.5–7.0	Qbt 4	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1757	11-608788	3.5–4.0	Fill	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1758	11-608788	8.5–9.0	Qbt 4	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1759	11-608789	3.5–4.0	Qbt 4	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1760	11-608789	9.0–9.5	Qbt 4	10-2235	10-2234	10-2233	10-2235	10-2235	10-2234	10-2234	10-2233	10-2233	10-2234
RE11-10-1761	11-608790	3.5–4.0	Soil	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1762	11-608790	8.5–9.0	Qbt 4	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1763	11-608791	3.0–3.5	Fill	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1764	11-608791	8.5–9.0	Qbt 4	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1765	11-608792	0.0–0.5	Soil	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1766	11-608792	5.5–6.0	Qbt 4	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1767	11-608793	0.0–0.5	Soil	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1768	11-608793	5.5–6.0	Qbt 4	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1769	11-608794	0.0–0.5	Soil	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1770	11-608794	5.5–6.0	Qbt 4	10-2290	10-2289	10-2288	10-2290	10-2290	10-2289	10-2289	10-2288	10-2288	10-2289
RE11-10-1771	11-608795	1.5–2.0	Qbt 4	10-2480	10-2480	10-2479	10-2480	10-2480	10-2480	10-2480	10-2479	10-2479	10-2480
RE11-10-1772	11-608795	7.0–7.5	Qbt 4	10-2480	10-2480	10-2479	10-2480	10-2480	10-2480	10-2480	10-2479	10-2479	10-2480

Table 6.4-2
Summary of Inorganic Chemicals above BVs at SWMU 11-005(b)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Nickel	Nitrate	Perchlorate	Selenium	Silver	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**	**na**[b]	**14500**	**11.2**	**1690**	**6.58**	**na**	**na**	**0.3**	**1**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**15.4**	**na**	**na**	**1.52**	**1**	**39.6**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**na**	**2920**[d]	**300**[e]	**45400**	**22700**	**68100**	**795000**	**800**	**na**	**22700**	**1820000**	**795**	**5680**	**5680**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**na**	**1910**[d]	**238**	**31700**	**15800**	**47500**	**554000**	**560**	**na**	**15800**	**1260000**	**555**	**3960**	**3960**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**na**	**219**[d]	**23**[e]	**3130**	**1560**	**4690**	**54800**	**400**	**na**	**1560**	**125000**	**54.8**	**391**	**391**	**391**	**23500**
RE11-10-1747	11-608783	0.0–0.5	Soil	—[g]	1.19 (UJ)	—	—	—	—	—	20.6	—	—	1.09	2.22 (J-)	—	—	—	—	10.5	0.00156 (J+)	—	—	—	62.9
RE11-10-1748	11-608783	5.0–5.5	Qbt 4	—	1.07 (UJ)	—	—	—	—	—	17.8	—	—	—	4.39 (J-)	—	—	—	—	1.27	0.000586 (J+)	1.02 (U)	—	—	—
RE11-10-1749	11-608784	3.5–4.0	Soil	—	1.22 (UJ)	—	—	—	—	—	—	—	—	—	5.9 (J-)	—	—	—	—	1.91	0.00106 (J+)	—	—	—	49.8
RE11-10-1750	11-608784	8.5–9.0	Soil	—	1.19 (UJ)	—	—	—	—	—	—	—	—	—	4.33 (J-)	—	—	—	—	2.44	—	—	—	—	55.1
RE11-10-1751	11-608785	3.5–4.0	Soil	—	5.17 (UJ)	—	—	—	—	—	—	—	—	—	6.13 (J-)	—	—	—	—	1.73	0.0021 (J+)	—	—	—	—
RE11-10-1752	11-608785	8.5–9.0	Qbt 4	—	1.13 (UJ)	—	63.5	—	—	—	17.6	—	5.61	—	1.64 (J-)	—	—	—	—	1.49	—	1.08 (U)	—	—	—
RE11-10-1753	11-608786	3.0–3.5	Fill	—	5.34 (UJ)	—	—	—	—	—	—	—	—	—	1.45 (J-)	—	—	—	—	2.04	0.00124 (J+)	—	—	—	—
RE11-10-1754	11-608786	9.0–9.5	Qbt 4	—	5.24 (UJ)	—	—	—	—	—	—	—	—	—	2.2 (J-)	—	—	—	—	3.01	—	1 (U)	—	—	—
RE11-10-1755	11-608787	1.0–1.5	Fill	—	5.68 (UJ)	—	—	—	—	—	—	—	—	—	11.3 (J-)	—	—	—	—	1.34	0.00165 (J+)	—	—	—	—
RE11-10-1756	11-608787	6.5–7.0	Qbt 4	—	5.18 (U)	—	—	—	—	—	—	—	—	—	2.77	—	—	—	—	—	—	1.07 (U)	—	—	—
RE11-10-1757	11-608788	3.5–4.0	Fill	—	6.05 (UJ)	—	—	—	—	—	—	—	—	—	6.33 (J-)	—	—	—	—	—	0.000789 (J+)	—	—	—	—
RE11-10-1758	11-608788	8.5–9.0	Qbt 4	—	5.51 (UJ)	—	—	—	—	217	—	—	—	—	2.59 (J-)	—	—	—	—	1.42	—	1.09 (U)	—	—	—
RE11-10-1759	11-608789	3.5–4.0	Qbt 4	—	5.5 (UJ)	—	—	—	—	—	—	—	4.9	—	2.33 (J-)	—	—	—	—	2.33	—	1.15 (U)	—	—	—
RE11-10-1760	11-608789	9.0–9.5	Qbt 4	—	1.04 (UJ)	—	—	—	—	—	9.31	—	—	—	1.88 (J-)	—	—	—	—	1.3	—	1.06 (U)	—	—	—
RE11-10-1761	11-608790	3.5–4.0	Soil	—	5.86 (U)	—	—	—	14100 (J+)	—	—	—	—	—	7.94	—	—	—	—	—	—	—	—	—	—
RE11-10-1762	11-608790	8.5–9.0	Qbt 4	—	5.79 (U)	—	120 (J)	—	—	321	9.22	—	5.48	—	2.2	—	12.1	—	—	—	—	1.18 (U)	—	—	—
RE11-10-1763	11-608791	3.0–3.5	Fill	—	5.42 (U)	—	—	—	—	—	—	—	—	—	3.16	—	—	—	—	—	0.00119 (J)	—	1.75	—	48.8 (J)
RE11-10-1764	11-608791	8.5–9.0	Qbt 4	—	1.02 (U)	—	56.2 (J)	—	—	—	19.5	—	—	—	1.85	—	—	—	—	—	—	1.01 (U)	—	—	—
RE11-10-1765	11-608792	0.0–0.5	Soil	—	6.17 (U)	—	—	—	—	—	—	—	—	—	2.45	—	—	—	—	—	—	—	—	—	—
RE11-10-1766	11-608792	5.5–6.0	Qbt 4	—	5.81 (U)	—	—	—	—	—	8.24	—	—	—	3.22	—	—	—	—	—	—	1.13 (U)	—	—	—
RE11-10-1767	11-608793	0.0–0.5	Soil	—	6.44 (U)	—	—	—	—	—	—	—	—	—	1.63	—	—	—	—	7.77	0.00116 (J)	—	—	—	—
RE11-10-1768	11-608793	5.5–6.0	Qbt 4	—	5.23 (U)	—	49.8 (J)	—	—	—	10.6	—	—	—	0.857 (J)	—	—	—	—	—	0.000894 (J)	1.1 (U)	—	—	—
RE11-10-1769	11-608794	0.0–0.5	Soil	—	8.12 (U)	—	—	0.424 (U)	—	—	—	—	—	—	4.07	—	—	—	—	—	—	1.61 (U)	—	—	59.3 (J)
RE11-10-1770	11-608794	5.5–6.0	Qbt 4	—	1.01 (U)	—	—	—	—	—	10.4	—	—	—	1.31	—	—	—	—	—	—	1.1 (U)	—	—	—
RE11-10-1771	11-608795	1.5–2.0	Qbt 4	9720	1.17 (UJ)	3.75	398	—	—	—	9.59	6.01	9.15	—	3.14 (J-)	15400	15.1	2450	10.6 (J-)	—	—	1.12 (UJ)	—	28.6	—
RE11-10-1772	11-608795	7.0–7.5	Qbt 4	10000	1.11 (UJ)	2.81	380	—	—	—	9.24	6.22	9.34	—	1.77 (J-)	14800	14.1	2340	7.76 (J-)	—	0.000642 (J)	1.1 (UJ)	—	26.2	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 6.4-3
Summary of Organic Chemicals Detected at SWMU 11-005(b)

Sample ID	Location ID	Depth (ft)	Media	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	HMX	Pyrene	Trichloroethane[1,1,1-]	Trichloroethene
Industrial SSL[a]				**2.34**	**23.4**	**234**	**2500000**[b]	**1370**	**2340**	**24400**	**34200**	**18300**	**77100**	**253**
Recreational SSL[c]				**3.01**	**30.1**	**301**	**1590000**	**1830**	**3010**	**13900**	**19900**	**10400**	**500000**	**1450**
Residential SSL[a]				**0.621**	**6.21**	**62.1**	**240000**[b]	**347**	**621**	**2290**	**3060**	**1720**	**21800**	**45.7**
RE11-10-1747	11-608783	0.0–0.5	Soil	0.0239 (J)	0.0451	0.0154 (J)	0.674 (J)	—[d]	0.0529	0.0429	0.247 (J-)	0.0375 (J)	—	—
RE11-10-1749	11-608784	3.5–4.0	Soil	—	—	—	—	—	—	—	5.35 (J-)	—	—	—
RE11-10-1753	11-608786	3.0–3.5	Fill	—	—	—	—	—	—	—	1.98 (J-)	—	—	—
RE11-10-1757	11-608788	3.5–4.0	Fill	—	—	—	—	—	—	—	0.159 (J-)	—	—	—
RE11-10-1760	11-608789	9.0–9.5	Qbt 4	—	—	—	—	—	—	—	0.239 (J-)	—	—	—
RE11-10-1762	11-608790	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	0.614 (J-)	—	—	0.000591 (J)
RE11-10-1763	11-608791	3.0–3.5	Fill	—	—	—	—	—	—	—	0.157 (J-)	—	—	0.00293
RE11-10-1765	11-608792	0.0–0.5	Soil	—	—	—	—	—	—	—	29.4 (J-)	—	—	—
RE11-10-1766	11-608792	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	0.569 (J-)	—	—	—
RE11-10-1767	11-608793	0.0–0.5	Soil	—	0.0154 (J)	—	—	—	—	—	2.47 (J-)	—	0.00213	0.00342
RE11-10-1768	11-608793	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.00279
RE11-10-1769	11-608794	0.0–0.5	Soil	—	—	—	—	0.396 (J)	—	—	0.582 (J-)	—	—	—
RE11-10-1772	11-608795	7.0–7.5	Qbt 4	—	0.0184 (J)	—	—	—	0.0297 (J)	0.0397	—	0.0425	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

Table 6.4-4
Summary of Radionuclides Detected at SWMU 11-005(b)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240	Uranium-238
Soil BV/FV[a]				**0.054**	**2.29**
Industrial SAL[b]				**210**	**430**
Recreational SAL[b]				**300**	**2100**
Residential SAL[b]				**33**	**87**
RE11-10-1763	11-608791	3.0–3.5	Fill	0.0326	—[c]
RE11-10-1767	11-608793	0.0–0.5	Soil	—	2.69
RE11-10-1769	11-608794	0.0–0.5	Soil	—	2.38

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.
[a] BVs/FVs from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).
[c] — = Not detected or not detected above BV/FV.

Table 6.5-1
Summary of Samples Collected and Analyses Requested at SWMU 11-006(a)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1725	11-608775	0.5–1.0	Soil	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1726	11-608775	6.0–6.5	Qbt 4	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1727	11-608776	0.5–1.0	Soil	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1728	11-608776	6.0–6.5	Qbt 4	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1729	11-608777	0.5–1.0	Soil	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1730	11-608777	6.0–6.5	Qbt 4	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1731	11-608778	4.5–5.0	Qbt 4	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1732	11-608778	10.0–10.5	Qbt 4	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1733	11-608779	5.0–5.5	Qbt 4	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1734	11-608779	10.0–10.5	Qbt 4	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1735	11-608780	4.5–5.0	Soil	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1736	11-608780	10.0–10.5	Qbt 4	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1737	11-608781	4.5–5.0	Fill	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211
RE11-10-1739	11-608782	4.5–5.0	Fill	10-2212	10-2211	10-2210	10-2212	10-2212	10-2211	10-2211	10-2210	10-2210	10-2211

Table 6.5-2
Summary of Inorganic Chemicals above BVs at SWMU 11-006(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Calcium	Chromium	Copper	Fluoride	Lead	Selenium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**1.63**	**2200**	**7.14**	**4.66**	**na[b]**	**11.2**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**6120**	**19.3**	**14.7**	**na**	**22.3**	**1.52**	**48.8**
Industrial SSL[c]				**454**	**1120**	**na**	**2920[d]**	**45400**	**68100**	**800**	**5680**	**341000**
Recreational SSL[e]				**317**	**784**	**na**	**1910[d]**	**31700**	**47500**	**560**	**3960**	**238000**
Residential SSL[c]				**31.3**	**77.9**	**na**	**219[d]**	**3130**	**4690**	**400**	**391**	**23500**
RE11-10-1725	11-608775	0.5–1.0	Soil	0.972 (U)	0.486 (U)	—[f]	—	—	1 (J-)	—	—	—
RE11-10-1726	11-608775	6.0–6.5	Qbt 4	1.15 (U)	—	—	—	—	2.01 (J-)	—	1.11 (U)	—
RE11-10-1727	11-608776	0.5–1.0	Soil	1.08 (U)	0.585	—	—	22 (J)	0.836 (J-)	34.4	—	71.2 (J+)
RE11-10-1728	11-608776	6.0–6.5	Qbt 4	1.15 (U)	—	2930 (J-)	—	—	1.2 (J-)	—	1.03 (U)	—
RE11-10-1729	11-608777	0.5–1.0	Soil	0.992 (U)	0.496 (U)	—	—	—	0.815 (J-)	—	—	—
RE11-10-1730	11-608777	6.0–6.5	Qbt 4	1.17 (U)	—	—	—	—	1.27 (J-)	—	1.18 (U)	—
RE11-10-1731	11-608778	4.5–5.0	Qbt 4	1.18 (U)	—	—	8.87	—	0.863 (J-)	—	1.22 (U)	—
RE11-10-1732	11-608778	10-10.5	Qbt 4	1.11 (U)	—	—	7.43	—	0.812 (J-)	—	1.11 (U)	—
RE11-10-1733	11-608779	5.0–5.5	Qbt 4	1.18 (U)	—	—	—	—	0.928 (J-)	—	1.25 (U)	—
RE11-10-1734	11-608779	10.0–10.5	Qbt 4	1.15 (U)	—	—	—	—	0.807 (J-)	—	1.18 (U)	—
RE11-10-1735	11-608780	4.5–5.0	Soil	1.19 (U)	0.594 (U)	—	—	—	1.22 (J-)	—	—	—
RE11-10-1736	11-608780	10.0–10.5	Qbt 4	1.14 (U)	—	—	9.07	—	0.94 (J-)	—	1.17 (U)	—
RE11-10-1737	11-608781	4.5–5.0	Fill	1.09 (U)	0.547 (U)	—	—	—	0.755 (J-)	—	—	—
RE11-10-1739	11-608782	4.5–5.0	Fill	1.03 (U)	—	—	—	—	0.835 (J-)	—	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSL for chromium hexavalent ion.

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

Table 6.5-3
Summary of Organic Chemicals Detected at SWMU 11-006(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	HMX	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	TATB	Trimethylbenzene[1,2,4-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**1370**	**2340**	**24400**	**34200**	**23.4**	**20500**	**18300**	**na**[c]	**260**[d]	**3610**
Recreational SSL[e]				**20800**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**1830**	**3010**	**13900**	**19900**	**30.1**	**12000**	**10400**	**na**	**6880**	**27800**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**347**	**621**	**2290**	**3060**	**6.21**	**1830**	**1720**	**na**	**62**[d]	**1090**
RE11-10-1725	11-608775	0.5–1.0	Soil	—[f]	—	—	—	—	—	—	—	—	0.636 (J-)	—	—	—	—	—	—
RE11-10-1726	11-608775	6.0–6.5	Qbt 4	—	—	—	—	—	—	—	—	—	0.237 (J-)	—	—	—	—	—	—
RE11-10-1727	11-608776	0.5–1.0	Soil	—	—	0.479	0.382 (J)	0.808	0.214 (J)	—	0.401	0.899	6.25 (J-)	0.201 (J)	0.241 (J)	0.87	34.7 (J)	—	—
RE11-10-1728	11-608776	6.0–6.5	Qbt 4	0.0132 (J)	0.0322 (J)	0.179	0.139	0.263	0.0687	—	0.151	0.396	0.195 (J-)	0.0664	0.137	0.342	1.33 (J)	—	—
RE11-10-1729	11-608777	0.5–1.0	Soil	—	—	—	—	—	—	—	—	—	0.567 (J-)	—	—	—	—	—	—
RE11-10-1733	11-608779	5.0–5.5	Qbt 4	—	—	—	—	—	—	0.168 (J)	—	—	—	—	—	—	—	—	—
RE11-10-1735	11-608780	4.5–5.0	Soil	—	—	—	—	—	—	—	—	—	4.18 (J-)	—	—	—	—	—	0.000689 (J+)
RE11-10-1736	11-608780	10.0–10.5	Qbt 4	—	—	—	—	—	—	—	—	—	5.15 (J-)	—	—	—	—	—	—
RE11-10-1737	11-608781	4.5–5.0	Fill	—	—	—	—	—	—	—	—	—	9.76 (J-)	—	—	—	0.564 (J)	—	—
RE11-10-1739	11-608782	4.5–5.0	Fill	—	—	—	—	—	—	—	—	—	5.8 (J-)	—	—	—	0.782 (J)	0.000433 (J+)	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] na = Not available.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

Table 6.6-1
Summary of Samples Collected and Analyses Requested at SWMU 11-006(b)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1835	11-608816	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1836	11-608816	1.0–1.5	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1837	11-608817	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1839	11-608818	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1840	11-608818	1.5–2.0	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1841	11-608819	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1842	11-608819	5.5–6.0	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1843	11-608820	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1844	11-608820	1.5–2.0	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1845	11-608821	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1846	11-608821	4.5–5.0	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1847	11-608822	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1848	11-608822	4.5–5.0	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1849	11-608823	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1850	11-608823	4.5–5.0	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1851	11-608824	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1852	11-608824	5.5–6.0	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1853	11-608825	1.0–1.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1854	11-608825	5.5–6.0	Qbt 4	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1855	11-608826	0.0–0.5	Soil	10-2130	10-2129	10-2128	10-2130	10-2130	10-2129	10-2129	10-2128	10-2128	10-2129
RE11-10-1856	11-608826	3.0–3.5	Qbt 4	10-2133	10-2132	10-2131	10-2133	10-2133	10-2132	10-2132	10-2131	10-2131	10-2132
RE11-10-1857	11-608827	0.0–0.5	Soil	10-2133	10-2132	10-2131	10-2133	10-2133	10-2132	10-2132	10-2131	10-2131	10-2132
RE11-10-1858	11-608827	5.5–6.0	Qbt 4	10-2133	10-2132	10-2131	10-2133	10-2133	10-2132	10-2132	10-2131	10-2131	10-2132
RE11-10-1859	11-608828	0.0–0.5	Qbt 4	10-2133	10-2132	10-2131	10-2133	10-2133	10-2132	10-2132	10-2131	10-2131	10-2132
RE11-10-1860	11-608828	5.5–6.0	Qbt 4	10-2133	10-2132	10-2131	10-2133	10-2133	10-2132	10-2132	10-2131	10-2131	10-2132
RE11-10-1861	11-608829	0.0–0.5	Soil	10-2192	10-2191	10-2190	10-2192	10-2192	10-2191	10-2191	10-2190	10-2190	10-2191
RE11-10-1862	11-608829	5.5–6.0	Qbt 4	10-2192	10-2191	10-2190	10-2192	10-2192	10-2191	10-2191	10-2190	10-2190	10-2191
RE11-10-1863	11-608830	0.0–0.5	Soil	10-2192	10-2191	10-2190	10-2192	10-2192	10-2191	10-2191	10-2190	10-2190	10-2191
RE11-10-1864	11-608830	5.5–6.0	Qbt 4	10-2192	10-2191	10-2190	10-2192	10-2192	10-2191	10-2191	10-2190	10-2190	10-2191
RE11-10-1865	11-608831	0.0–0.5	Soil	10-2192	10-2191	10-2190	10-2192	10-2192	10-2191	10-2191	10-2190	10-2190	10-2191
RE11-10-1866	11-608831	1.5–2.0	Soil	10-2192	10-2191	10-2190	10-2192	10-2192	10-2191	10-2191	10-2190	10-2190	10-2191
RE11-10-1867	11-608832	2.5–3.0	Fill	10-2192	10-2191	10-2190	10-2192	10-2192	10-2191	10-2191	10-2190	10-2190	10-2191
RE11-10-1868	11-608832	8.0–8.5	Qbt 4	10-2192	10-2191	10-2190	10-2192	10-2192	10-2191	10-2191	10-2190	10-2190	10-2191
RE16-98-2003	16-05903	0.0–0.5	Sed	—*	—	4958R	—	—	4957R, 4959R	—	4956R	—	—
RE16-98-2004	16-05904	0.0–0.5	Sed	—	—	4958R	—	—	4957R, 4959R	—	4956R	—	—

*— = Analyses not requested.

Table 6.6-2
Summary of Inorganic Chemicals above BVs at SWMU 11-006(b)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bromide	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**na[b]**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**	**na**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**na**	**0.4**	**4420**	**17.1**	**10.5**	**4.73**	**11.2**	**0.82**	**na**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**na**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**	**na**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**na**	**1120**	**na**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**na**	**784**	**na**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**na**	**77.9**	**na**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**
RE11-10-1835	11-608816	0.0–0.5	Soil	—[g]	1.16 (J)	—	—	—	—	—	—	—	—	—	—	—	2.09 (J-)
RE11-10-1836	11-608816	1.0–1.5	Qbt 4	8420	0.655 (J)	2.94	71.9	—	—	—	—	—	10.7 (J)	3.26	7.74	—	2.06 (J-)
RE11-10-1837	11-608817	0.0–0.5	Soil	—	1.25 (U)	—	—	—	—	—	—	—	—	—	—	—	1.65 (J-)
RE11-10-1839	11-608818	0.0–0.5	Soil	—	1.28 (U)	—	—	—	—	—	—	—	—	—	—	—	2.11 (J-)
RE11-10-1840	11-608818	1.5–2.0	Qbt 4	—	0.959 (U)	—	—	—	—	—	—	—	35.8	—	13.5	—	2.17 (J-)
RE11-10-1841	11-608819	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	1.89 (J-)
RE11-10-1842	11-608819	5.5–6.0	Qbt 4	—	1.02 (U)	—	—	—	—	—	—	—	—	—	—	—	1.34 (J-)
RE11-10-1843	11-608820	0.0–0.5	Soil	—	1.19 (U)	—	—	—	—	—	—	—	—	—	—	—	1.34 (J-)
RE11-10-1844	11-608820	1.5–2.0	Qbt 4	11300	0.871 (J)	—	167	—	0.775 (J)	—	2710	—	7.43 (J)	—	5.79	—	7.61 (J-)
RE11-10-1845	11-608821	0.0–0.5	Soil	—	1.14 (U)	—	—	—	—	—	—	—	—	—	—	—	1.66 (J-)
RE11-10-1846	11-608821	4.5–5.0	Qbt 4	—	1 (U)	—	—	—	—	—	—	—	7.53 (J)	—	5.7	—	1.57 (J-)
RE11-10-1847	11-608822	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	2.92 (J-)
RE11-10-1848	11-608822	4.5–5.0	Qbt 4	14700	1.1 (U)	2.85	138	—	—	—	2360	—	17.2	5.44	12.6	—	3.21 (J-)
RE11-10-1849	11-608823	0.0–0.5	Soil	—	0.981 (J)	—	—	—	—	—	—	—	—	—	—	—	1.57 (J-)
RE11-10-1850	11-608823	4.5–5.0	Qbt 4	8230	0.948 (U)	—	—	—	—	—	—	—	10.6 (J)	—	7.21	—	3.07 (J-)
RE11-10-1851	11-608824	0.0–0.5	Soil	—	0.859 (J)	—	—	—	—	—	—	—	—	—	46.3	—	1.46 (J-)
RE11-10-1852	11-608824	5.5–6.0	Qbt 4	—	1.02 (U)	—	—	—	—	—	—	—	—	—	—	—	1.82 (J-)
RE11-10-1853	11-608825	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	1.18 (J-)
RE11-10-1854	11-608825	5.5–6.0	Qbt 4	—	1.11 (U)	—	72.3	—	—	—	—	—	—	—	—	—	1.64 (J-)
RE11-10-1855	11-608826	0.0–0.5	Soil	—	1.33 (U)	—	—	—	—	—	—	—	—	—	—	—	1.27 (J-)
RE11-10-1856	11-608826	3.0–3.5	Qbt 4	—	1.1 (U)	—	—	—	—	—	—	—	—	—	—	—	2.3 (J-)
RE11-10-1857	11-608827	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	1.59 (J-)
RE11-10-1858	11-608827	5.5–6.0	Qbt 4	—	—	—	71.5	—	0.803 (J)	—	2900	—	10.2	—	7.11	—	6.7 (J-)
RE11-10-1859	11-608828	0.0–0.5	Qbt 4	—	1.06 (U)	—	—	—	—	—	—	—	—	—	—	4.87	2.37 (J-)
RE11-10-1860	11-608828	5.5–6.0	Qbt 4	—	1.07 (U)	—	—	—	—	—	—	—	8.38	—	—	—	1.3 (J-)
RE11-10-1861	11-608829	0.0–0.5	Soil	—	1.54 (UJ)	—	—	—	—	0.768 (U)	—	—	—	—	—	0.687	1.73 (J-)
RE11-10-1862	11-608829	5.5–6.0	Qbt 4	12400	1.14 (UJ)	—	88.7 (J-)	1.4	2.23 (J)	—	3560	118 (J-)	9.28	—	7.1	—	18 (J-)

Table 6.6-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bromide	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**na[b]**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**	**na**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**na**	**0.4**	**4420**	**17.1**	**10.5**	**4.73**	**11.2**	**0.82**	**na**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**na**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**	**na**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**na**	**1120**	**na**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**na**	**784**	**na**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**na**	**77.9**	**na**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**
RE11-10-1863	11-608830	0.0–0.5	Soil	—	1.35 (UJ)	—	—	—	—	0.674 (U)	—	—	—	—	—	—	1.37 (J-)
RE11-10-1864	11-608830	5.5–6.0	Qbt 4	—	1.07 (UJ)	—	52.3 (J-)	—	—	—	—	—	—	—	—	—	4.8 (J-)
RE11-10-1865	11-608831	0.0–0.5	Soil	—	1.31 (UJ)	—	—	—	—	0.657 (U)	—	—	—	—	—	—	2.01 (J-)
RE11-10-1866	11-608831	1.5–2.0	Soil	—	1.16 (UJ)	—	—	—	—	0.581 (U)	—	—	—	—	—	—	2.98 (J-)
RE11-10-1867	11-608832	2.5–3.0	Fill	—	1.21 (UJ)	—	—	—	—	0.603 (U)	—	—	—	—	—	—	2.53 (J-)
RE11-10-1868	11-608832	8.0–8.5	Qbt 4	11800	1.26 (UJ)	2.93	116 (J-)	2.97	—	—	3010	—	8.84	—	10.3	—	4.86 (J-)
RE16-98-2003	16-05903	0.0–0.5	Sed	—	11 (UJ)	—	—	—	NA[h]	0.54 (U)	—	NA	—	—	—	NA	NA
RE16-98-2004	16-05904	0.0–0.5	Sed	—	13 (UJ)	4	130	—	NA	0.63 (U)	—	NA	—	—	—	NA	NA

Table 6.6-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Iron	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Sulfate	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**14500**	**11.2**	**1690**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**157**	**1.1**	**2.40**	**17**	**63.5**
Sediment BV[a]				**13800**	**19.7**	**2370**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**58.2**	**0.73**	**2.22**	**19.7**	**60.2**
Soil BV[a]				**21500**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**293**	**0.73**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**795000**	**800**	**na**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Recreational SSL[f]				**554000**	**560**	**na**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**na**	**52.3**	**2380**	**3960**	**238000**
Residential SSL[c]				**54800**	**400**	**na**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
RE11-10-1835	11-608816	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA[j]	—	—
RE11-10-1836	11-608816	1.0–1.5	Qbt 4	23000	21	—	—	—	—	—	1.18 (U)	—	—	—	NA	54.3	—
RE11-10-1837	11-608817	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1839	11-608818	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1840	11-608818	1.5–2.0	Qbt 4	—	—	—	—	—	—	—	1.05 (U)	—	—	—	NA	—	—
RE11-10-1841	11-608819	0.0–0.5	Soil	—	—	—	—	—	1.89 (J-)	—	—	—	—	—	NA	—	—
RE11-10-1842	11-608819	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	1.03 (U)	—	—	—	NA	—	—
RE11-10-1843	11-608820	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1844	11-608820	1.5–2.0	Qbt 4	—	—	—	—	—	—	0.00295	0.989 (U)	—	—	—	NA	17.2	—
RE11-10-1845	11-608821	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1846	11-608821	4.5–5.0	Qbt 4	—	—	—	—	—	1.52 (J-)	—	1.09 (U)	—	—	—	NA	—	—
RE11-10-1847	11-608822	0.0–0.5	Soil	—	—	—	—	—	4 (J-)	—	—	—	—	—	NA	—	—
RE11-10-1848	11-608822	4.5–5.0	Qbt 4	17400	11.7	2810 (J+)	—	8.62	1.47 (J-)	—	1.14 (U)	—	—	—	NA	30.9	—
RE11-10-1849	11-608823	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1850	11-608823	4.5–5.0	Qbt 4	—	—	—	—	—	—	0.000657 (J)	0.992 (U)	—	—	—	NA	—	—
RE11-10-1851	11-608824	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	88.1
RE11-10-1852	11-608824	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	0.947 (U)	—	—	—	NA	—	—
RE11-10-1853	11-608825	1.0–1.5	Soil	—	—	—	—	—	1.7 (J-)	—	—	—	—	—	NA	—	—
RE11-10-1854	11-608825	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	1.06 (U)	—	—	—	NA	—	—
RE11-10-1855	11-608826	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1856	11-608826	3.0–3.5	Qbt 4	—	—	—	—	—	—	—	1.06 (U)	—	—	—	NA	—	—
RE11-10-1857	11-608827	0.0–0.5	Soil	—	—	—	—	—	1.99 (J-)	—	—	—	—	—	NA	—	—
RE11-10-1858	11-608827	5.5–6.0	Qbt 4	—	—	—	—	7.28 (J)	—	0.00411	1.11 (U)	—	169 (J-)	—	NA	—	—
RE11-10-1859	11-608828	0.0–0.5	Qbt 4	—	—	—	—	—	2.22 (J-)	—	1.13 (U)	—	—	—	NA	—	—
RE11-10-1860	11-608828	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	1.06 (U)	—	—	—	NA	—	—
RE11-10-1861	11-608829	0.0–0.5	Soil	—	—	—	—	—	—	—	1.53 (UJ)	—	—	—	NA	—	—
RE11-10-1862	11-608829	5.5–6.0	Qbt 4	—	—	2380	—	7.91	—	0.00506 (J)	1.14 (UJ)	—	—	—	NA	—	—
RE11-10-1863	11-608830	0.0–0.5	Soil	—	—	—	—	16.5	—	—	—	—	—	—	NA	—	—
RE11-10-1864	11-608830	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	1.06 (UJ)	—	—	—	NA	—	—

Table 6.6-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Iron	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Sulfate	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**14500**	**11.2**	**1690**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**157**	**1.1**	**2.40**	**17**	**63.5**
Sediment BV[a]				**13800**	**19.7**	**2370**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**58.2**	**0.73**	**2.22**	**19.7**	**60.2**
Soil BV[a]				**21500**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**293**	**0.73**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**795000**	**800**	**na**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Recreational SSL[f]				**554000**	**560**	**na**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**na**	**52.3**	**2380**	**3960**	**238000**
Residential SSL[c]				**54800**	**400**	**na**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
RE11-10-1865	11-608831	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1866	11-608831	1.5–2.0	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1867	11-608832	2.5–3.0	Fill	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE11-10-1868	11-608832	8.0–8.5	Qbt 4	—	—	2820	—	8.77	—	—	1.24 (UJ)	—	—	—	NA	17.3	—
RE16-98-2003	16-05903	0.0–0.5	Sed	—	—	—	0.11 (U)	—	NA	NA	1.1 (U)	2.2 (U)	NA	2.2 (U)	—	—	—
RE16-98-2004	16-05904	0.0–0.5	Sed	—	—	—	0.13 (U)	—	NA	NA	1.3 (U)	2.5 (U)	NA	2.5 (U)	2.84	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 6.6-3
Summary of Organic Chemicals Detected at SWMU 11-006(b)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Bis(2-ethylhexyl)phthalate	Dichloroethene[1,1-]	Fluoranthene	HMX	Isopropyltoluene[4-]	Pyrene	RDX	TATB	Toluene	Trichloroethene
Industrial SSL[a]				**851000**	**1370**	**42.8**	**24400**	**34200**	**14900**[b]	**18300**	**174**	**na**[c]	**57900**	**253**
Recreational SSL[d]				**702000**	**1830**	**13800**	**13900**	**19900**	**52700**[b]	**10400**	**233**	**na**	**60800**	**1450**
Residential SSL[a]				**67500**	**347**	**618**	**2290**	**3060**	**3210**[b]	**1720**	**44.2**	**na**	**5570**	**45.7**
RE11-10-1835	11-608816	0.0–0.5	Soil	0.00282 (J)	0.154 (J)	—[e]	—	—	—	—	—	—	—	—
RE11-10-1836	11-608816	1.0–1.5	Qbt 4	—	—	—	—	—	0.000424 (J)	—	—	—	0.000562 (J)	—
RE11-10-1837	11-608817	0.0–0.5	Soil	0.00301 (J)	0.376 (J)	—	—	0.232 (J-)	—	—	—	—	0.000797 (J+)	—
RE11-10-1839	11-608818	0.0–0.5	Soil	0.00806 (J)	—	—	—	0.231 (J-)	0.00112 (J+)	—	—	—	0.00153 (J+)	—
RE11-10-1841	11-608819	0.0–0.5	Soil	0.00449 (J)	—	—	—	—	—	—	—	—	—	—
RE11-10-1845	11-608821	0.0–0.5	Soil	—	0.112 (J)	—	—	2.59 (J-)	—	—	—	0.552 (J)	—	—
RE11-10-1847	11-608822	0.0–0.5	Soil	—	—	—	—	0.941 (J-)	—	—	—	—	—	—
RE11-10-1849	11-608823	0.0–0.5	Soil	—	0.117 (J)	—	—	0.601 (J-)	—	—	—	0.472 (J)	—	—
RE11-10-1851	11-608824	0.0–0.5	Soil	—	0.295 (J)	—	—	0.453 (J-)	—	—	—	—	—	—
RE11-10-1852	11-608824	5.5–6.0	Qbt 4	—	—	—	—	0.21 (J-)	—	—	—	—	—	—
RE11-10-1853	11-608825	1.0–1.5	Soil	—	—	—	—	0.871 (J-)	—	—	—	—	—	—
RE11-10-1854	11-608825	5.5–6.0	Qbt 4	—	—	—	—	0.257 (J-)	—	—	—	—	—	—
RE11-10-1855	11-608826	0.0–0.5	Soil	0.00522 (J)	—	—	—	63.3 (J-)	—	—	0.11 (J-)	1.86	—	0.000685 (J)
RE11-10-1856	11-608826	3.0–3.5	Qbt 4	—	—	—	—	0.42 (J)	—	—	—	—	—	—
RE11-10-1857	11-608827	0.0–0.5	Soil	—	—	—	—	22.4 (J)	—	—	0.145 (J)	—	—	—
RE11-10-1861	11-608829	0.0–0.5	Soil	—	—	0.00187	—	2.14 (J)	—	—	—	—	—	—
RE11-10-1863	11-608830	0.0–0.5	Soil	—	—	—	—	0.328 (J)	—	—	—	—	—	—
RE11-10-1865	11-608831	0.0–0.5	Soil	—	—	—	—	0.387 (J)	—	—	—	2.44	—	—
RE11-10-1866	11-608831	1.5–2.0	Soil	—	—	—	0.0127 (J)	2.9 (J)	—	—	—	3.07	—	—
RE11-10-1867	11-608832	2.5–3.0	Fill	—	1.33	—	0.0137 (J)	3.5 (J)	—	0.0141 (J)	—	—	—	—
RE11-10-1868	11-608832	8.0–8.5	Qbt 4	—	0.279 (J)	—	—	2.45 (J)	—	—	0.362 (J)	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Isopropylbenzene was used as a surrogate based on structural similarity.

[c] na = Not available.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 6.6-4
Summary of Radionuclides Detected at SWMU 11-006(b)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-238	Plutonium-239/240	Uranium-234	Uranium-238
Soil BV/FV[a]				**0.023**	**0.054**	**2.59**	**2.29**
Industrial SAL[b]				**240**	**210**	**1500**	**430**
Recreational SAL[b]				**330**	**300**	**3200**	**2100**
Residential SAL[b]				**37**	**33**	**170**	**87**
RE11-10-1835	11-608816	0.0–0.5	Soil	0.0384	—[c]	—	—
RE11-10-1837	11-608817	0.0–0.5	Soil	—	—	2.75	3.09
RE11-10-1843	11-608820	0.0–0.5	Soil	0.0397	—	—	—
RE11-10-1847	11-608822	0.0–0.5	Soil	—	—	—	2.4
RE11-10-1851	11-608824	0.0–0.5	Soil	—	—	2.76	2.9
RE11-10-1857	11-608827	0.0–0.5	Soil	—	—	2.76	3.06
RE11-10-1867	11-608832	2.5–3.0	Fill	—	0.0616	—	—

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.
[a] BVs/FVs from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).
[c] — = Not detected or not detected above BV/FV.

Table 6.7-1
Summary of Samples Collected and Analyses Requested at SWMU 11-006(c)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1621	11-608736	2.5–3.0	Qbt 4	10-2084	10-2083	10-2082	10-2084	10-2084	10-2083	10-2083	10-2082	10-2082	10-2083
RE11-10-1622	11-608736	8.0–8.5	Qbt 4	10-2084	10-2083	10-2082	10-2084	10-2084	10-2083	10-2083	10-2082	10-2082	10-2083
RE11-10-1623	11-608737	0.0–0.5	Soil	10-2084	10-2083	10-2082	10-2084	10-2084	10-2083	10-2083	10-2082	10-2082	10-2083
RE11-10-1624	11-608737	5.5–6.0	Qbt 4	10-2084	10-2083	10-2082	10-2084	10-2084	10-2083	10-2083	10-2082	10-2082	10-2083
RE11-10-1625	11-608738	0.0–0.5	Soil	10-2084	10-2083	10-2082	10-2084	10-2084	10-2083	10-2083	10-2082	10-2082	10-2083
RE11-10-1626	11-608738	5.5–6.0	Qbt 4	10-2084	10-2083	10-2082	10-2084	10-2084	10-2083	10-2083	10-2082	10-2082	10-2083
RE11-10-1627	11-608739	0.0–0.5	Soil	10-2084	10-2083	10-2082	10-2084	10-2084	10-2083	10-2083	10-2082	10-2082	10-2083
RE11-10-1628	11-608739	5.5–6.0	Qbt 4	10-2084	10-2083	10-2082	10-2084	10-2084	10-2083	10-2083	10-2082	10-2082	10-2083
RE11-10-1629	11-608740	0.0–0.5	Fill	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1630	11-608740	5.5–6.0	Qbt 4	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1631	11-608741	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1632	11-608741	5.5–6.0	Qbt 4	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1633	11-608742	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1634	11-608742	5.5–6.0	Qbt 4	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1635	11-608743	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1636	11-608743	5.5–6.0	Qbt 4	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1637	11-608744	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1638	11-608744	2.0–2.5	Qbt 4	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1639	11-608745	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1640	11-608745	4.5–5.0	Qbt 4	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1641	11-608746	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1642	11-608746	3.5–4.0	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1643	11-608747	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1644	11-608747	3.0–3.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1645	11-608748	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1646	11-608748	1.0–1.5	Qbt 4	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1647	11-608749	0.0–0.5	Soil	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1648	11-608749	2.0–2.5	Qbt 4	10-2118	10-2117	10-2116	10-2118	10-2118	10-2117	10-2117	10-2116	10-2116	10-2117
RE11-10-1649	11-608750	0.0–0.5	Soil	10-2243	10-2243	10-2242	10-2243	10-2243	10-2243	10-2243	10-2242	10-2242	10-2243
RE11-10-1650	11-608750	5.5–6.0	Qbt 4	10-2243	10-2243	10-2242	10-2243	10-2243	10-2243	10-2243	10-2242	10-2242	10-2243
RE11-10-13789	11-611743	0.0–0.5	Soil	10-2243	10-2243	10-2242	10-2243	10-2243	10-2243	10-2243	10-2242	10-2242	10-2243
RE11-10-13790	11-611743	5.5–6.0	Qbt 4	10-2243	10-2243	10-2242	10-2243	10-2243	10-2243	10-2243	10-2242	10-2242	10-2243
RE16-98-2002	16-05902	0.0–0.5	Sed	—*	—	4958R	—	—	4957R, 4959R	—	4956R	—	—
RE16-98-2003	16-05903	0.0–0.5	Sed	—	—	4958R	—	—	4957R, 4959R	—	4956R	—	—

*— = Analyses not requested.

Table 6.7-2
Summary of Inorganic Chemicals above BVs at SWMU 11-006(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Copper	Fluoride	Mercury	Nitrate	Perchlorate	Selenium	Silver	Thallium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**7.14**	**4.66**	**na[b]**	**0.1**	**na**	**na**	**0.3**	**1**	**1.1**	**63.5**
Sediment BV[a]				**0.83**	**127**	**0.4**	**10.5**	**11.2**	**na**	**0.1**	**na**	**na**	**0.3**	**1**	**0.73**	**60.2**
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**14.7**	**na**	**0.1**	**na**	**na**	**1.52**	**1**	**0.73**	**48.8**
Industrial SSL[c]				**454**	**224000**	**1120**	**2920[d]**	**45400**	**68100**	**310[e]**	**1820000**	**795**	**5680**	**5680**	**74.9**	**341000**
Recreational SSL[f]				**317**	**158000**	**784**	**1910[d]**	**31700**	**47500**	**238**	**1260000**	**555**	**3960**	**3960**	**52.3**	**238000**
Residential SSL[a]				**31.3**	**15600**	**77.9**	**219[d]**	**3130**	**4690**	**23[e]**	**125000**	**54.8**	**391**	**391**	**5.16**	**23500**
RE11-10-1621	11-608736	2.5–3.0	Qbt 4	1.22 (UJ)	193	—[g]	—	5.52	1.7 (J-)	—	—	—	1.33 (U)	—	—	—
RE11-10-1622	11-608736	8.0–8.5	Qbt 4	1.21 (UJ)	126	—	—	—	2.71 (J-)	—	—	—	1.21 (U)	—	—	—
RE11-10-1623	11-608737	0.0–0.5	Soil	1.1 (UJ)	—	—	—	—	1.99 (J-)	—	—	—	—	—	—	73
RE11-10-1624	11-608737	5.5–6.0	Qbt 4	1.15 (UJ)	—	—	—	—	1.4 (J-)	—	—	—	1.15 (U)	—	—	—
RE11-10-1625	11-608738	0.0–0.5	Soil	1.29 (UJ)	—	—	—	—	1.29 (J-)	—	—	—	—	—	—	—
RE11-10-1626	11-608738	5.5–6.0	Qbt 4	1.1 (UJ)	—	—	—	—	1.31 (J-)	—	—	—	1.17 (U)	—	—	—
RE11-10-1627	11-608739	0.0–0.5	Soil	1.43 (UJ)	—	—	—	—	1.32 (J-)	—	—	—	—	—	—	—
RE11-10-1628	11-608739	5.5–6.0	Qbt 4	1.09 (UJ)	—	—	—	—	1.46 (J-)	—	—	—	1.12 (U)	—	—	—
RE11-10-1629	11-608740	0.0–0.5	Fill	1.03 (U)	307	0.517 (U)	—	—	1.33 (J-)	—	2.81 (J-)	—	—	—	—	—
RE11-10-1630	11-608740	5.5–6.0	Qbt 4	1.32 (U)	—	—	—	—	1.18 (J-)	—	—	—	1.31 (U)	—	—	—
RE11-10-1631	11-608741	0.0–0.5	Soil	1.26 (U)	—	0.632 (U)	—	—	1.11 (J-)	—	5.27 (J-)	—	—	—	—	—
RE11-10-1632	11-608741	5.5–6.0	Qbt 4	0.97 (U)	—	—	—	—	1.51 (J-)	—	1.43 (J-)	0.00355	0.874 (U)	—	—	—
RE11-10-1633	11-608742	0.0–0.5	Soil	1.29 (U)	—	0.644 (U)	—	—	1.37 (J-)	—	1.7 (J-)	—	—	—	—	—
RE11-10-1634	11-608742	5.5–6.0	Qbt 4	0.897 (U)	—	—	9.47 (J)	5.01 (J)	1.87 (J-)	—	1.4 (J-)	0.000618 (J)	1.05 (U)	—	—	—
RE11-10-1635	11-608743	0.0–0.5	Soil	1.28 (U)	—	0.64 (U)	—	—	0.945 (J-)	—	3.01 (J-)	—	—	—	—	—
RE11-10-1636	11-608743	5.5–6.0	Qbt 4	1.12 (U)	—	—	—	—	—	—	—	—	1.11 (U)	—	—	—
RE11-10-1637	11-608744	0.0–0.5	Soil	1.19 (U)	—	0.593 (U)	—	—	1.16 (J-)	—	2.19 (J-)	—	—	—	—	—
RE11-10-1638	11-608744	2.0–2.5	Qbt 4	0.993 (U)	47.8	—	—	5.14 (J)	1.43 (J-)	—	1.49 (J-)	—	1.05 (U)	—	—	—
RE11-10-1639	11-608745	0.0–0.5	Soil	1.49 (U)	—	0.747 (U)	—	—	1.89 (J-)	—	2.11 (J-)	—	—	—	—	—
RE11-10-1640	11-608745	4.5–5.0	Qbt 4	1.04 (U)	—	—	—	—	1.28 (J-)	—	1.55 (J-)	—	0.936 (U)	—	—	—
RE11-10-1641	11-608746	0.0–0.5	Soil	1.26 (U)	—	0.631 (U)	—	—	1.24 (J-)	—	—	—	—	—	—	—
RE11-10-1642	11-608746	3.5–4.0	Soil	1.02 (U)	—	0.508 (U)	—	—	2.11 (J-)	—	1.61 (J-)	—	—	—	—	—
RE11-10-1643	11-608747	0.0–0.5	Soil	1.45 (U)	—	—	—	—	1.68 (J-)	—	—	—	1.55 (U)	—	—	—
RE11-10-1644	11-608747	3.0–3.5	Soil	1.28 (U)	—	0.642 (U)	—	—	3.81 (J-)	—	—	—	—	—	—	—
RE11-10-1645	11-608748	0.0–0.5	Soil	1.42 (U)	—	0.709 (U)	—	—	1.25 (J-)	—	—	—	—	—	—	—
RE11-10-1646	11-608748	1.0–1.5	Qbt 4	1.09 (U)	—	—	21.5 (J)	7.05 (J)	1.06 (J-)	—	—	—	0.997 (U)	—	—	—
RE11-10-1647	11-608749	0.0–0.5	Soil	1.15 (U)	—	0.574 (U)	—	—	1.16 (J-)	—	2.26 (J-)	—	—	—	—	—
RE11-10-1648	11-608749	2.0–2.5	Qbt 4	0.933 (U)	—	—	22.5 (J)	6.35 (J)	2.83 (J-)	—	—	0.00131 (J)	1.05 (U)	—	—	—

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Copper	Fluoride	Mercury	Nitrate	Perchlorate	Selenium	Silver	Thallium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**7.14**	**4.66**	**na[b]**	**0.1**	**na**	**na**	**0.3**	**1**	**1.1**	**63.5**
Sediment BV[a]				**0.83**	**127**	**0.4**	**10.5**	**11.2**	**na**	**0.1**	**na**	**na**	**0.3**	**1**	**0.73**	**60.2**
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**14.7**	**na**	**0.1**	**na**	**na**	**1.52**	**1**	**0.73**	**48.8**
Industrial SSL[c]				**454**	**224000**	**1120**	**2920[d]**	**45400**	**68100**	**310[e]**	**1820000**	**795**	**5680**	**5680**	**74.9**	**341000**
Recreational SSL[f]				**317**	**158000**	**784**	**1910[d]**	**31700**	**47500**	**238**	**1260000**	**555**	**3960**	**3960**	**52.3**	**238000**
Residential SSL[a]				**31.3**	**15600**	**77.9**	**219[d]**	**3130**	**4690**	**23[e]**	**125000**	**54.8**	**391**	**391**	**5.16**	**23500**
RE11-10-1649	11-608750	0.0–0.5	Soil	6.48 (UJ)	—	—	—	—	1.5 (J-)	—	1.7	—	—	—	—	—
RE11-10-1650	11-608750	5.5–6.0	Qbt 4	5.05 (UJ)	—	—	9.09	—	1.94 (J-)	—	—	0.00279	1.06 (U)	—	—	—
RE11-10-13789	11-611743	0.0–0.5	Soil	6.66 (UJ)	—	—	—	—	1.85 (J-)	—	—	—	—	—	—	—
RE11-10-13790	11-611743	5.5–6.0	Qbt 4	5.68 (UJ)	—	—	7.62	—	1.12 (J-)	—	—	—	1.1 (U)	—	—	—
RE16-98-2002	16-05902	0.0–0.5	Sed	11 (UJ)	130	0.56 (U)	—	83	NA[h]	0.11 (U)	NA	NA	1.1 (U)	2.2 (U)	2.2 (U)	—
RE16-98-2003	16-05903	0.0–0.5	Sed	11 (UJ)	—	0.54 (U)	—	—	NA	0.11 (U)	NA	NA	1.1 (U)	2.2 (U)	2.2 (U)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 6.7-3
Summary of Organic Chemicals Detected at SWMU 11-006(c)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	HMX	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene	RDX	TATB	Toluene
Industrial SSL[a]				**36700**	**851000**	**183000**	**2.34**	**23.4**	**2500000**[b]	**1370**	**2340**	**24400**	**34200**	**14900**[c]	**1090**	**20500**	**18300**	**174**	**na**[d]	**57900**
Recreational SSL[e]				**20800**	**702000**	**104000**	**3.01**	**30.1**	**1590000**	**1830**	**3010**	**13900**	**19900**	**52700**[c]	**4520**	**12000**	**10400**	**233**	**na**	**60800**
Residential SSL[a]				**3440**	**67500**	**17200**	**0.621**	**6.21**	**240000**[b]	**347**	**621**	**2290**	**3060**	**3210**[c]	**199**	**1830**	**1720**	**44.2**	**na**	**5570**
RE11-10-1621	11-608736	2.5–3.0	Qbt 4	—[f]	—	—	—	—	—	—	—	—	1.08 (J-)	—	—	—	—	—	1.18	—
RE11-10-1622	11-608736	8.0–8.5	Qbt 4	—	—	—	—	—	—	—	—	—	2.62 (J-)	—	—	—	—	—	0.696 (J)	—
RE11-10-1623	11-608737	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	1.47 (J-)	—	—	—	—	—	—	—
RE11-10-1624	11-608737	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.394 (J-)	—	—	—	—	—	—	—
RE11-10-1625	11-608738	0.0–0.5	Soil	0.0708	—	0.00961 (J)	—	0.0148 (J)	—	—	—	0.025 (J)	86.4 (J-)	—	—	—	0.0207 (J)	—	6.89	—
RE11-10-1626	11-608738	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	4.94 (J-)	—	—	—	—	—	—	—
RE11-10-1627	11-608739	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	3.08 (J-)	—	—	—	—	—	1.52	—
RE11-10-1628	11-608739	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.151 (J-)	—	—	—	—	—	—	—
RE11-10-1629	11-608740	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	13.3 (J-)	—	—	—	—	—	0.833 (J+)	—
RE11-10-1630	11-608740	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.515 (J-)	—	—	—	—	—	—	—
RE11-10-1631	11-608741	0.0–0.5	Soil	—	—	—	—	—	0.722 (J)	—	—	—	0.497 (J-)	—	—	—	—	—	—	—
RE11-10-1633	11-608742	0.0–0.5	Soil	0.454	0.00514 (J)	—	—	—	—	—	—	—	5.33 (J-)	0.000803 (J)	0.00275 (J)	—	—	—	1.52 (J+)	—
RE11-10-1634	11-608742	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.491 (J-)	—	—	—	—	—	—	—
RE11-10-1635	11-608743	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.83 (J+)	—
RE11-10-1636	11-608743	5.5–6.0	Qbt 4	—	—	—	—	0.0118 (J)	—	0.11 (J)	—	—	—	—	—	—	—	—	—	—
RE11-10-1637	11-608744	0.0–0.5	Soil	—	—	—	—	—	—	0.25 (J)	—	—	26.1 (J-)	—	—	—	—	4.9 (J-)	0.457 (J+)	—
RE11-10-1638	11-608744	2.0–2.5	Qbt 4	—	—	—	—	—	—	0.0741 (J)	—	—	1.8 (J-)	—	—	—	—	—	—	—
RE11-10-1639	11-608745	0.0–0.5	Soil	1.17	0.00463 (J)	—	—	—	0.977 (J)	—	—	—	—	—	0.0032 (J)	—	—	—	—	—
RE11-10-1641	11-608746	0.0–0.5	Soil	—	—	—	—	0.0239 (J)	—	—	—	0.0187 (J)	366 (J-)	—	—	—	0.0176 (J)	—	0.32 (J+)	0.000485 (J)
RE11-10-1642	11-608746	3.5–4.0	Soil	—	—	—	—	0.0223 (J)	—	0.168 (J)	—	—	97.8 (J-)	—	—	—	—	0.267 (J-)	0.499 (J+)	—
RE11-10-1643	11-608747	0.0–0.5	Soil	—	—	—	0.019 (J)	0.0402 (J)	0.973 (J)	0.131 (J)	—	0.0529 (J)	6.4 (J-)	0.00153 (J)	—	0.0218 (J)	0.0451 (J)	—	0.994 (J+)	—
RE11-10-1644	11-608747	3.0–3.5	Soil	—	—	—	—	—	0.814 (J)	—	0.0204 (J)	—	3.8 (J-)	—	—	—	—	—	—	—
RE11-10-1645	11-608748	0.0–0.5	Soil	—	0.00448 (J)	—	—	—	0.947 (J)	—	—	—	0.176 (J-)	—	—	—	—	—	0.346 (J+)	—
RE11-10-1646	11-608748	1.0–1.5	Qbt 4	—	0.0031 (J)	—	—	—	0.648 (J)	—	—	—	—	—	—	—	—	—	—	—

Table 6.7-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	HMX	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene	RDX	TATB	Toluene
Industrial SSL[a]				**36700**	**851000**	**183000**	**2.34**	**23.4**	**2500000**[b]	**1370**	**2340**	**24400**	**34200**	**14900**[c]	**1090**	**20500**	**18300**	**174**	**na**[d]	**57900**
Recreational SSL[e]				**20800**	**702000**	**104000**[f]	**3.01**	**30.1**	**1590000**[f]	**1830**	**3010**	**13900**	**19900**	**52700**[c]	**4520**	**12000**	**10400**	**233**	**na**	**60800**
Residential SSL[a]				**3440**	**67500**	**17200**	**0.621**	**6.21**	**240000**[b]	**347**	**621**	**2290**	**3060**	**3210**[c]	**199**	**1830**	**1720**	**44.2**	**na**	**5570**
RE11-10-1647	11-608749	0.0–0.5	Soil	—	—	—	—	0.016 (J)	—	—	—	—	6.91 (J-)	—	—	—	—	—	—	—
RE11-10-1648	11-608749	2.0–2.5	Qbt 4	0.147	—	—	—	—	—	—	—	—	0.938 (J-)	—	—	—	—	—	—	—
RE11-10-1649	11-608750	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.507 (J+)	—	—	—	—	0.145 (J)	—	—
RE11-10-1650	11-608750	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.192 (J+)	—	—	—	—	—	—	—
RE11-10-13789	11-611743	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.506 (J+)	—	—	—	—	—	—	—
RE11-10-13790	11-611743	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.175 (J+)	—	0.00255 (J-)	—	—	—	—	—
RE16-98-2002	16-05902	0.0–0.5	Sed	—	NA[g]	—	—	—	—	—	—	—	10	NA	NA	—	—	—	NA	NA

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Isopropylbenzene was used as a surrogate based on structural similarity.

[d] na = Not available.

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

Table 6.7-4
Summary of Radionuclides Detected at SWMU 11-006(c)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240
Soil BV/FV[a]				**0.054**
Industrial SAL[b]				**210**
Recreational SAL[b]				**300**
Residential SAL[b]				**33**
RE11-10-1637	11-608744	0.0–0.5	Soil	0.0604
RE11-10-1642	11-608746	3.5–4.0	Soil	0.0288
RE11-10-1649	11-608750	0.0–0.5	Soil	0.0614

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

Table 6.8-1
Summary of Samples Collected and Analyses Requested at SWMU 11-006(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1701	11-608766	0.0–0.5	Soil	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1702	11-608766	5.5–6.0	Qbt 4	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1703	11-608767	2.5–3.0	Soil	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1704	11-608767	8.0–8.5	Qbt 4	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1705	11-608768	0.0–0.5	Soil	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1706	11-608768	5.5–6.0	Qbt 4	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1707	11-608769	0.0–0.5	Soil	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1708	11-608769	4.5–5.0	Soil	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1709	11-608770	0.0–0.5	Fill	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1710	11-608770	5.5–6.0	Qbt 4	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1711	11-608771	0.0–0.5	Soil	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1712	11-608771	5.5–6.0	Qbt 4	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1713	11-608772	0.0–0.5	Soil	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1714	11-608772	4.5–5.0	Qbt 4	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1715	11-608773	0.0–0.5	Soil	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE11-10-1716	11-608773	4.5–5.0	Qbt 4	10-2189	10-2188	10-2187	10-2189	10-2189	10-2188	10-2188	10-2187	10-2187	10-2188
RE16-98-2000	16-05900	0.0–0.5	Sed	—*	—	4958R	—	—	4957R, 4959R	—	4956R	—	—
RE16-98-2001	16-05901	0.0–0.5	Sed	—	—	4958R	—	—	4957R, 4959R	—	4956R	—	—

*— = Analyses not requested.

Table 6.8-2
Summary of Inorganic Chemicals above BVs at SWMU 11-006(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Copper	Cyanide (Total)	Fluoride	Mercury	Nitrate	Perchlorate	Selenium	Silver	Thallium	Uranium
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**7.14**	**4.66**	**0.5**	**na[b]**	**0.1**	**na**	**na**	**0.3**	**1**	**1.1**	**na**
Sediment BV[a]				**0.83**	**127**	**0.4**	**10.5**	**11.2**	**na**	**na**	**0.1**	**na**	**na**	**0.3**	**1**	**0.73**	**2.22**
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**14.7**	**0.5**	**na**	**0.1**	**na**	**na**	**1.52**	**1**	**0.73**	**na**
Industrial SSL[c]				**454**	**224000**	**1120**	**2920[d]**	**45400**	**22700**	**68100**	**310[e]**	**1820000**	**795**	**5680**	**5680**	**74.9**	**3410**
Recreational SSL[f]				**317**	**158000**	**784**	**1910[d]**	**31700**	**15800**	**47500**	**238**	**1260000**	**555**	**3960**	**3960**	**52.3**	**2380**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**219[d]**	**3130**	**1560**	**4690**	**23[e]**	**125000**	**54.8**	**391**	**391**	**5.16**	**235**
RE11-10-1701	11-608766	0.0–0.5	Soil	1.44 (U)	—[g]	—	—	—	—	1.38 (J-)	—	12.3	0.00213 (J)	—	—	—	NA[h]
RE11-10-1702	11-608766	5.5–6.0	Qbt 4	1.08 (U)	—	—	—	—	—	3.21 (J-)	—	3.06	0.000999 (J)	1.13 (U)	—	—	NA
RE11-10-1703	11-608767	2.5–3.0	Soil	1.17 (U)	—	—	—	—	—	3.19 (J-)	—	1.55	—	—	—	—	NA
RE11-10-1704	11-608767	8.0–8.5	Qbt 4	1.16 (U)	52.2	—	—	—	—	1.3 (J-)	—	—	—	1.16 (U)	—	—	NA
RE11-10-1705	11-608768	0.0–0.5	Soil	1.29 (U)	—	0.644 (U)	—	—	—	1.1 (J-)	—	2.05	—	—	—	—	NA
RE11-10-1706	11-608768	5.5–6.0	Qbt 4	1.05 (U)	—	—	—	—	—	1.52 (J-)	—	—	—	1.08 (U)	—	—	NA
RE11-10-1707	11-608769	0.0–0.5	Soil	1.77 (U)	—	—	—	—	0.901	1.94 (J-)	—	—	—	1.68 (U)	—	—	NA
RE11-10-1708	11-608769	4.5–5.0	Soil	1.01 (U)	—	0.504 (U)	—	—	—	2.18 (J-)	—	—	—	—	—	—	NA
RE11-10-1709	11-608770	0.0–0.5	Fill	—	—	—	—	19.5	—	1.06 (J-)	—	4.51	—	—	—	—	NA
RE11-10-1710	11-608770	5.5–6.0	Qbt 4	0.984 (U)	—	—	—	—	—	1.39 (J-)	—	1.17	—	1.01 (U)	—	—	NA
RE11-10-1711	11-608771	0.0–0.5	Soil	1.41 (U)	—	0.704 (U)	—	—	—	1.63 (J-)	—	—	—	—	—	—	NA
RE11-10-1712	11-608771	5.5–6.0	Qbt 4	1.13 (U)	—	—	—	—	—	1.66 (J-)	—	—	—	1.14 (U)	—	—	NA
RE11-10-1713	11-608772	0.0–0.5	Soil	1.16 (U)	—	0.578 (U)	—	—	—	0.985 (J-)	—	3.62	—	—	—	—	NA
RE11-10-1714	11-608772	4.5–5.0	Qbt 4	1.17 (U)	—	—	—	—	—	0.995 (J-)	—	1.29	—	1.12 (U)	—	—	NA
RE11-10-1715	11-608773	0.0–0.5	Soil	1.58 (U)	—	—	—	—	—	1.78 (J-)	—	—	—	—	—	—	NA
RE11-10-1716	11-608773	4.5–5.0	Qbt 4	1.08 (U)	—	—	7.67	—	3.78	4.72 (J-)	—	—	0.00139 (J)	1.04 (U)	—	—	NA
RE16-98-2000	16-05900	0.0–0.5	Sed	12 (UJ)	—	0.6 (U)	—	—	NA	NA	0.12 (U)	NA	NA	1.2 (U)	2.4 (U)	2.4 (U)	2.79 (J)
RE16-98-2001	16-05901	0.0–0.5	Sed	13 (UJ)	—	0.66 (U)	—	—	NA	NA	0.13 (U)	NA	NA	1.3 (U)	2.6 (U)	2.6 (U)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 6.8-3
Summary of Organic Chemicals Detected at SWMU 11-006(d)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chrysene	Dichloroethene[1,1-]	Fluoranthene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Phenanthrene	Pyrene	RDX	TATB
Industrial SSL[a]				**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**2500000**[c]	**1370**	**369000**	**2340**	**2220**	**24400**	**34200**	**23.4**	**14900**[d]	**20500**	**18300**	**174**	**na**[e]
Recreational SSL[f]				**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**1590000**	**1830**	**446000**	**3010**	**13800**	**13900**	**19900**	**30.1**	**52700**[d]	**12000**	**10400**	**233**	**na**
Residential SSL[a]				**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**240000**[c]	**347**	**39600**	**621**	**618**	**2290**	**3060**	**6.21**	**3210**[d]	**1830**	**1720**	**44.2**	**na**
RE11-10-1701	11-608766	0.0–0.5	Soil	—[g]	—	—	—	—	—	0.869 (J)	—	—	—	—	—	1.65 (J)	—	—	—	—	—	0.37 (J)
RE11-10-1702	11-608766	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	0.348 (J)	—	—	—	—	—	—
RE11-10-1703	11-608767	2.5–3.0	Soil	—	—	—	—	0.0167 (J)	—	—	0.25 (J)	—	—	—	—	3.55 (J)	—	—	—	—	—	2.98
RE11-10-1704	11-608767	8.0–8.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	40.8 (J+)	—	—	—	—	—	3.7
RE11-10-1705	11-608768	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	17 (J+)	—	—	—	—	—	—
RE11-10-1706	11-608768	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	0.555 (J+)	—	—	—	—	—	—
RE11-10-1707	11-608769	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.00419 (J)	—	—	—	0.193 (J)	—	0.00125 (J)	—	—	—	4.16
RE11-10-1709	11-608770	0.0–0.5	Fill	—	0.117 (J)	0.522	0.387 (J)	0.74	0.273 (J)	—	—	—	0.487	—	1.2	74 (J+)	0.238 (J)	—	0.585	0.968	1.81 (J)	33.6
RE11-10-1710	11-608770	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	0.396 (J)	—	—	—	—	—	—
RE11-10-1711	11-608771	0.0–0.5	Soil	—	0.0205 (J)	0.126	0.0922	0.184	0.0559	—	0.164 (J)	—	0.1	—	0.252	15.2 (J+)	0.0472 (J)	—	0.133	0.27	—	0.567 (J)
RE11-10-1712	11-608771	5.5–6.0	Qbt 4	0.00246 (J)	—	—	—	—	—	—	—	—	—	—	—	0.982 (J+)	—	—	—	—	—	—
RE11-10-1713	11-608772	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.389 (J)	—	—	—	—	—	—
RE11-10-1715	11-608773	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	0.000715 (J+)	—	—	—	—	—	—	—	—
RE11-10-1716	11-608773	4.5–5.0	Qbt 4	0.0122	—	—	—	—	—	7.86	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-2000	16-05900	0.0–0.5	Sed	NA[h]	—	—	—	—	—	—	—	NA	—	NA	—	8.6	—	NA	—	—	—	NA
RE16-98-2001	16-05901	0.0–0.5	Sed	NA	—	—	—	—	—	—	—	NA	—	NA	—	46	—	NA	—	—	—	NA

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Isopropylbenzene was used as a surrogate based on structural similarity.

[e] na = Not available.

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 6.8-4
Summary of Radionuclides Detected at SWMU 11-006(d)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240	Uranium-234	Uranium-238
Soil BV[a]				**0.054**	**2.59**	**2.29**
Industrial SAL[b]				**210**	**1500**	**430**
Recreational SAL[b]				**300**	**3200**	**2100**
Residential SAL[b]				**33**	**170**	**87**
RE11-10-1703	11-608767	2.5–3.0	Soil	0.0449	—[c]	—
RE11-10-1707	11-608769	0.0–0.5	Soil	—	3.97	3.86

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 6.9-1
Summary of Samples Collected and Analyses Requested at SWMU 11-005(c)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1661	11-608751	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1662	11-608751	5.5–6.0	Qbt 4	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1663	11-608752	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1664	11-608752	5.5–6.0	Qbt 4	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1665	11-608753	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1666	11-608753	5.5–6.0	Qbt 4	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1667	11-608754	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1668	11-608754	5.5–6.0	Qbt 4	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	—*
RE11-10-1669	11-608755	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1670	11-608755	5.5–6.0	Qbt 4	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1671	11-608756	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1672	11-608756	5.5–6.0	Qbt 4	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1673	11-608757	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1674	11-608757	5.5–6.0	Qbt 4	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1675	11-608758	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1676	11-608758	2.5–3.0	Qbt 4	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1677	11-608759	0.0–0.5	Soil	10-2282	—	10-2280	10-2282	10-2282	—	—	10-2280	10-2280	—
RE11-10-1678	11-608759	5.5–6.0	Qbt 4	10-2282	—	10-2280	10-2282	10-2282	—	—	10-2280	10-2280	—
RE11-10-1680	11-608760	0.0–0.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-1679	11-608760	1.0–1.5	Soil	10-2067	10-2066	10-2065	10-2067	10-2067	10-2066	10-2066	10-2065	10-2065	10-2066
RE11-10-13791	11-611744	0.0–0.5	Soil	10-2282	—	10-2280	10-2282	10-2282	—	—	10-2280	10-2280	—
RE11-10-13792	11-611744	5.5–6.0	Qbt 4	10-2282	—	10-2280	10-2282	10-2282	—	—	10-2280	10-2280	—

*— = Analyses not requested.

Table 6.9-2
Summary of Inorganic Chemicals above BVs at SWMU 11-005(c)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Cadmium	Chromium	Copper	Fluoride	Lead	Mercury	Nitrate	Perchlorate	Selenium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**46**	**1.63**	**7.14**	**4.66**	**na**[b]	**11.2**	**0.1**	**na**	**na**	**0.3**	**63.5**
Soil BV[a]				**29200**	**0.83**	**295**	**0.4**	**19.3**	**14.7**	**na**	**22.3**	**0.1**	**na**	**na**	**1.52**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**224000**	**1120**	**2920**[d]	**45400**	**68100**	**800**	**310**[e]	**1820000**	**795**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**158000**	**784**	**1910**[d]	**31700**	**47500**	**560**	**238**	**1260000**	**555**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**15600**	**77.9**	**219**[d]	**3130**	**4690**	**400**	**23**[e]	**125000**	**54.8**	**391**	**23500**
RE11-10-1661	11-608751	0.0–0.5	Soil	—[g]	1.51 (U)	—	0.887	—	26.4	2.16 (J-)	32.1	—	5.22	—	—	113 (J)
RE11-10-1662	11-608751	5.5–6.0	Qbt 4	10000	1.22 (U)	89.2	—	—	5.96	4.32 (J-)	—	—	1.78	—	1.21 (U)	—
RE11-10-1663	11-608752	0.0–0.5	Soil	—	1.1 (U)	—	—	—	19.4	0.867 (J-)	—	—	5.47	—	—	—
RE11-10-1664	11-608752	5.5–6.0	Qbt 4	—	1.08 (U)	—	—	—	8.25	7.57 (J-)	—	—	—	—	1.11 (U)	—
RE11-10-1665	11-608753	0.0–0.5	Soil	—	1.37 (U)	—	—	—	—	1.62 (J-)	33.8	—	—	0.000889 (J)	—	—
RE11-10-1666	11-608753	5.5–6.0	Qbt 4	—	1.02 (U)	—	—	—	—	1.97 (J-)	—	—	—	—	1.07 (U)	—
RE11-10-1667	11-608754	0.0–0.5	Soil	—	1.22 (U)	—	—	—	18.3	1.77 (J-)	—	—	1.76	—	—	—
RE11-10-1668	11-608754	5.5–6.0	Qbt 4	—	1.04 (U)	—	—	14.9	7.75	5.57 (J-)	—	—	—	—	1.1 (U)	—
RE11-10-1669	11-608755	0.0–0.5	Soil	—	1.31 (U)	—	—	—	—	1.89 (J-)	—	—	—	—	—	—
RE11-10-1670	11-608755	5.5–6.0	Qbt 4	—	1.06 (U)	—	—	—	—	2 (J-)	—	—	—	—	1.02 (U)	—
RE11-10-1671	11-608756	0.0–0.5	Soil	—	1.24 (U)	—	0.505 (J)	—	33.9	1.45 (J-)	—	0.253	9.74	0.001 (J)	—	70.6 (J)
RE11-10-1672	11-608756	5.5–6.0	Qbt 4	—	1.14 (U)	—	—	—	4.93	2.69 (J-)	—	—	2.27	—	1.1 (U)	—
RE11-10-1673	11-608757	0.0–0.5	Soil	—	1.17 (U)	—	—	—	—	0.954 (J-)	—	—	—	—	—	—
RE11-10-1674	11-608757	5.5–6.0	Qbt 4	—	1.08 (U)	—	—	25.7	9.94	6.85 (J-)	—	—	—	—	1.06 (U)	—
RE11-10-1675	11-608758	0.0–0.5	Soil	—	1.18 (U)	—	—	—	—	4.64 (J-)	—	—	1.97	—	—	—
RE11-10-1676	11-608758	2.5–3.0	Qbt 4	—	1.06 (U)	—	—	—	—	3.32 (J-)	—	—	—	—	0.973 (U)	—
RE11-10-1677	11-608759	0-0.5	SOIL	na	—	1.21 (U)	—	0.604 (U)	—	—	2.23 (J-)	-	-	-	—	-
RE11-10-1678	11-608759	5.5-6	QBT4	na	—	1.09 (U)	—	—	—	—	2 (J-)	-	-	-	—	1.08 (U)
RE11-10-1680	11-608760	0.0–0.5	Soil	—	1.39 (U)	—	—	—	—	1.78 (J-)	—	—	—	—	—	—
RE11-10-1679	11-608760	1.0–1.5	Soil	—	1.27 (U)	—	—	—	—	1.45 (J-)	—	—	—	—	—	—
RE11-10-13791	11-611744	0-0.5	SOIL	na	—	1.14 (U)	—	0.569 (U)	—	—	1.5 (J-)	—	—	—	—	—
RE11-10-13792	11-611744	5.5-6	QBT4	na	—	1.14 (U)	—	—	11.1	—	1.5 (J-)	—	—	—	—	1.09 (U)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 6.9-3
Summary of Organic Chemicals Detected at SWMU 11-005(c)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	HMX	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene	RDX	TATB	Trichloroethane[1,1,1-]	Trichloroethene
Industrial SSL[a]				**36700**	**851000**	**23.4**	**2.34**	**23.4**	**1370**	**2340**	**24400**	**34200**	**14900**[b]	**1090**	**20500**	**18300**	**174**	**na**[c]	**77100**	**253**
Recreational SSL[d]				**20800**	**702000**	**30.1**	**3.01**	**30.1**	**1830**	**3010**	**13900**	**19900**	**52700**[b]	**4520**	**12000**	**10400**	**233**	**na**	**500000**	**1450**
Residential SSL[a]				**3440**	**67500**	**6.21**	**0.621**	**6.21**	**347**	**621**	**2290**	**3060**	**3210**[b]	**199**	**1830**	**1720**	**44.2**	**na**	**21800**	**45.7**
RE11-10-1661	11-608751	0.0–0.5	Soil	—[e]	—	—	—	—	—	—	—	0.37 (J)	—	—	—	—	—	—	—	—
RE11-10-1665	11-608753	0.0–0.5	Soil	0.0432 (J)	—	—	—	—	—	—	—	0.483 (J)	—	0.00449 (J)	—	—	—	0.76 (J)	—	—
RE11-10-1667	11-608754	0.0–0.5	Soil	—	0.00425 (J)	—	—	—	—	—	—	0.288 (J)	—	0.00313 (J+)	—	—	—	—	—	—
RE11-10-1669	11-608755	0.0–0.5	Soil	—	—	—	—	—	—	—	—	3.89	—	0.00298 (J+)	—	—	—	—	—	—
RE11-10-1670	11-608755	5.5–6.0	Qbt4	—	—	—	—	—	—	—	—	—	—	0.00264 (J)	—	—	—	—	—	—
RE11-10-1671	11-608756	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.158 (J-)	—	—	—	—	—	—	—	—
RE11-10-1672	11-608756	5.5–6.0	Qbt4	—	—	—	—	—	0.0902 (J)	—	—	0.295 (J)	—	—	—	—	—	—	—	—
RE11-10-1673	11-608757	0.0–0.5	Soil	—	—	—	—	—	—	—	—	84.4 (J-)	—	—	—	—	0.144 (J)	—	—	—
RE11-10-1674	11-608757	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	0.281 (J-)	—	—	—	—	—	—	—	—
RE11-10-1676	11-608758	2.5–3.0	Qbt 4	—	0.00498 (J)	—	—	—	—	—	—	—	0.000842 (J)	—	—	—	—	—	—	—
RE11-10-1677	11-608759	0.0–0.5	Soil	—	—	0.0326 (J)	0.0222 (J)	0.0414 (J)	—	0.0325 (J)	0.0652	—	—	—	0.0245 (J)	0.057	—	—	0.000443 (J)	0.00452
RE11-10-13791	11-611744	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00044 (J)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Isopropylbenzene was used as a surrogate based on structural similarity.

[c] na = Not available.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 6.9-4
Summary of Radionuclides Detected at SWMU 11-005(c)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2,3,4 BV[a]				**1.98**	**0.09**	**1.93**
Soil BV/FV[a]				**2.59**	**0.2**	**2.29**
Industrial SAL[b]				**1500**	**87**	**430**
Recreational SAL[b]				**3200**	**520**	**2100**
Residential SAL[b]				**170**	**17**	**87**
RE11-10-1661	11-608751	0.0–0.5	Soil	3.47	—[c]	3.69
RE11-10-1662	11-608751	5.5–6.0	Qbt 4	—	0.121	—
RE11-10-1663	11-608752	0.0–0.5	Soil	3.11	—	3.03
RE11-10-1665	11-608753	0.0–0.5	Soil	5.27	0.399	5.64
RE11-10-1667	11-608754	0.0–0.5	Soil	2.6	—	3.23
RE11-10-1669	11-608755	0.0–0.5	Soil	4.13	—	4.02
RE11-10-1671	11-608756	0.0–0.5	Soil	4.61	0.287	4.6

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 6.10-1
Summary of Samples Collected and Analyses Requested at SWMU 11-011(a)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE11-10-1785	11-608797	0.0–0.5	Soil	10-2088	10-2088	10-2088	10-2088	10-2088	10-2088	10-2088	10-2088	10-2088
RE11-10-1786	11-608797	3.0–3.5	Qbt 4	10-2088	10-2088	10-2088	10-2088	10-2088	10-2088	10-2088	10-2088	10-2088
RE11-10-1787	11-608798	0.0–0.5	Soil	10-2209	10-2208	10-2207	10-2209	10-2209	10-2208	10-2208	10-2207	10-2207
RE11-10-1788	11-608798	5.0–5.5	Qbt 4	10-2209	10-2208	10-2207	10-2209	10-2209	10-2208	10-2208	10-2207	10-2207
RE11-10-1789	11-608799	0.0–0.5	Soil	10-2209	10-2208	10-2207	10-2209	10-2209	10-2208	10-2208	10-2207	10-2207
RE11-10-1790	11-608799	4.5–5.0	Qbt 4	10-2209	10-2208	10-2207	10-2209	10-2209	10-2208	10-2208	10-2207	10-2207
RE11-10-1791	11-608800	0.0–0.5	Soil	10-2209	10-2208	10-2207	10-2209	10-2209	10-2208	10-2208	10-2207	10-2207
RE11-10-1792	11-608800	5.5–6.0	Qbt 4	10-2209	10-2208	10-2207	10-2209	10-2209	10-2208	10-2208	10-2207	10-2207
RE11-10-1793	11-608801	0.0–0.5	Soil	10-2209	10-2208	10-2207	10-2209	10-2209	10-2208	10-2208	10-2207	10-2207
RE11-10-1794	11-608801	5.5–6.0	Qbt 4	10-2209	10-2208	10-2207	10-2209	10-2209	10-2208	10-2208	10-2207	10-2207
RE11-10-1795	11-608802	0.0–0.5	Soil	10-2238	10-2237	10-2236	10-2238	10-2238	10-2237	10-2237	10-2236	10-2236
RE11-10-1796	11-608802	1.0–1.5	Soil	10-2238	10-2237	10-2236	10-2238	10-2238	10-2237	10-2237	10-2236	10-2236
RE11-10-1797	11-608803	0.0–0.5	Soil	10-2238	10-2237	10-2236	10-2238	10-2238	10-2237	10-2237	10-2236	10-2236
RE11-10-1798	11-608803	3.5–4.0	Qbt 4	10-2238	10-2237	10-2236	10-2238	10-2238	10-2237	10-2237	10-2236	10-2236
RE11-10-1799	11-608804	0.0–0.5	Soil	10-2238	10-2237	10-2236	10-2238	10-2238	10-2237	10-2237	10-2236	10-2236
RE11-10-1800	11-608804	3.5–4.0	Qbt 4	10-2238	10-2237	10-2236	10-2238	10-2238	10-2237	10-2237	10-2236	10-2236
RE11-10-1801	11-608805	0.0–0.5	Soil	10-2238	10-2237	10-2236	10-2238	10-2238	10-2237	10-2237	10-2236	10-2236
RE11-10-1802	11-608805	5.5–6.0	Qbt 4	10-2238	10-2237	10-2236	10-2238	10-2238	10-2237	10-2237	10-2236	10-2236

Table 6.10-2
Summary of Inorganic Chemicals above BVs at SWMU 11-011(a)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Fluoride	Iron	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**na[b]**	**14500**	**11.2**	**1690**	**0.1**	**6.58**	**na**	**na**	**0.3**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**na**	**21500**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**39.6**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**68100**	**795000**	**800**	**na**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**158000**	**784**	**na**	**1910[d]**	**31700**	**47500**	**554000**	**560**	**na**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**4690**	**54800**	**400**	**na**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**23500**
RE11-10-1785	11-608797	0.0–0.5	Soil	—[g]	1.59 (U)	—	—	—	—	—	1.81 (J-)	—	—	—	—	—	—	—	1.62 (U)	—	—
RE11-10-1786	11-608797	3.0–3.5	Qbt 4	—	0.918 (U)	—	—	—	30	7.54	1.26 (J-)	—	—	—	—	—	—	—	0.958 (U)	—	—
RE11-10-1787	11-608798	0.0–0.5	Soil	—	1.26 (U)	—	0.631 (U)	—	—	—	1.52	—	—	—	0.59	—	12.1	0.00105 (J)	—	—	—
RE11-10-1788	11-608798	5.0–5.5	Qbt 4	—	1.03 (U)	—	—	—	10.8	—	2.07	—	—	—	0.164	—	1.33	—	1.04 (UJ)	—	—
RE11-10-1789	11-608799	0.0–0.5	Soil	—	1.53 (U)	—	—	—	—	96.4	1.08 (J)	—	—	—	—	—	8.6	0.00284 (J)	1.54 (UJ)	—	307
RE11-10-1790	11-608799	4.5–5.0	Qbt 4	—	0.984 (U)	—	—	—	7.56	—	1.15	—	—	—	—	—	1.1	—	1.03 (UJ)	—	—
RE11-10-1791	11-608800	0.0–0.5	Soil	—	1.04 (U)	—	—	—	—	17.2	1.21	—	—	—	—	—	8.65	0.000953 (J)	—	—	—
RE11-10-1792	11-608800	5.5–6.0	Qbt 4	—	0.979 (U)	—	—	—	12.1	4.93	4.35	—	—	—	—	—	1.55	—	1.07 (UJ)	—	—
RE11-10-1793	11-608801	0.0–0.5	Soil	—	1.38 (U)	—	—	—	—	—	1.35 (J)	—	—	—	0.253	—	5.41	0.00191 (J)	—	—	—
RE11-10-1794	11-608801	5.5–6.0	Qbt 4	—	1.01 (U)	—	—	—	10.1	—	2.46	—	—	—	—	—	1.31	—	1.08 (UJ)	—	—
RE11-10-1795	11-608802	0.0–0.5	Soil	—	1.34 (U)	—	—	—	—	—	2.33 (J-)	—	—	—	—	—	3.58	—	—	—	—
RE11-10-1796	11-608802	1.0–1.5	Soil	—	1.05 (U)	—	—	—	—	—	3.69 (J-)	—	—	—	—	—	1.9	—	—	—	—
RE11-10-1797	11-608803	0.0–0.5	Soil	—	1.24 (U)	—	—	—	—	22.4	1.64 (J-)	—	—	—	0.477	—	2.62	—	—	—	—
RE11-10-1798	11-608803	3.5–4.0	Qbt 4	10900	1.14 (U)	110 (J-)	—	3430	30.4	12.5	7.37 (J-)	15500	—	2280	—	8.45	—	—	1.1 (U)	17.3	—
RE11-10-1799	11-608804	0.0–0.5	Soil	—	1.31 (U)	—	0.803	—	—	18.2	1.45 (J-)	—	—	—	0.125	—	1.49	—	—	—	56.7
RE11-10-1800	11-608804	3.5–4.0	Qbt 4	—	0.985 (U)	—	—	—	20.6	—	1.61 (J-)	—	—	—	—	—	—	—	0.943 (U)	—	—
RE11-10-1801	11-608805	0.0–0.5	Soil	—	2.17 (U)	—	0.428 (J)	12200	—	—	1.99 (J-)	—	—	—	—	—	—	0.00119 (J)	2.16 (U)	—	—
RE11-10-1802	11-608805	5.5–6.0	Qbt 4	—	0.992 (U)	—	—	—	8.82	—	2.11 (J-)	—	—	—	—	—	—	—	1.02 (U)	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 6.10-3
Summary of Organic Chemicals Detected at SWMU 11-011(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Butanone[2-]	Chloroform	Chrysene	Dichloroethene[1,1-]	Ethylbenzene
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**369000**	**31.9**	**2340**	**42.8**	**385**
Recreational SSL[c]				**20800**	**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**446000**	**224**	**3010**	**13800**	**2060**
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**39600**	**5.72**	**621**	**618**	**69.7**
RE11-10-1785	11-608797	0.0–0.5	Soil	—[d]	—	—	—	—	—	—	—	—	—	—	—
RE11-10-1786	11-608797	3.0–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE11-10-1787	11-608798	0.0–0.5	Soil	—	—	—	—	0.0399 (J)	0.0665	0.0292 (J)	—	—	0.0404 (J)	—	—
RE11-10-1789	11-608799	0.0–0.5	Soil	—	—	0.0155 (J)	0.128	0.143	0.231	0.103	—	—	0.137	—	—
RE11-10-1790	11-608799	4.5–5.0	Qbt 4	—	—	—	—	0.0249 (J)	0.0415	0.0195 (J)	—	—	0.0265 (J)	—	—
RE11-10-1791	11-608800	0.0–0.5	Soil	0.0252 (J)	—	0.0178 (J)	0.107	0.151	0.246	0.128	—	—	0.167	—	—
RE11-10-1793	11-608801	0.0–0.5	Soil	—	—	—	—	0.0313 (J)	0.0487	0.0261 (J)	—	—	0.0299 (J)	0.0027 (J+)	—
RE11-10-1794	11-608801	5.5–6.0	Qbt 4	—	—	—	—	0.0212 (J)	0.0348 (J)	0.0177 (J)	—	—	0.0217 (J)	—	—
RE11-10-1795	11-608802	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	0.000556 (J+)
RE11-10-1797	11-608803	0.0–0.5	Soil	—	0.0228 (J+)	—	—	—	—	—	0.00534 (J+)	—	—	—	—
RE11-10-1798	11-608803	3.5–4.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE11-10-1799	11-608804	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.0342 (J)	—	—
RE11-10-1801	11-608805	0.0–0.5	Soil	—	0.00701 (J+)	—	—	—	—	—	—	0.00384 (J+)	—	—	—

Table 6.10-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene	Styrene	Toluene	Trichloroethene	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**24400**	**24400**	**34200**	**23.4**	**14900[e]**	**1090**	**20500**	**18300**	**51200**	**57900**	**253**	**3610**
Recreational SSL[c]				**13900**	**13900**	**19900**	**30.1**	**52700[e]**	**4520**	**12000**	**10400**	**126000**	**60800**	**1450**	**27800**
Residential SSL[a]				**2290**	**2290**	**3060**	**6.21**	**3210[e]**	**199**	**1830**	**1720**	**8970**	**5570**	**45.7**	**1090**
RE11-10-1785	11-608797	0.0–0.5	Soil	—	—	—	—	0.00201	—	—	—	—	0.00241	—	—
RE11-10-1786	11-608797	3.0–3.5	Qbt 4	—	—	—	—	—	0.00229 (J)	—	—	—	—	—	—
RE11-10-1787	11-608798	0.0–0.5	Soil	0.0678	—	—	0.0231 (J)	—	—	—	0.0622	—	—	—	—
RE11-10-1789	11-608799	0.0–0.5	Soil	0.275	—	—	0.0847	—	—	0.117	0.232	—	—	—	—
RE11-10-1790	11-608799	4.5–5.0	Qbt 4	0.0571	—	—	0.0152 (J)	—	—	—	0.0503	—	—	—	—
RE11-10-1791	11-608800	0.0–0.5	Soil	0.34	0.0128 (J)	—	0.101	—	—	0.164	0.275	—	—	—	—
RE11-10-1793	11-608801	0.0–0.5	Soil	0.0585	—	—	0.0197 (J)	—	—	—	0.0518	—	—	—	—
RE11-10-1794	11-608801	5.5–6.0	Qbt 4	0.0446	—	—	0.0135 (J)	—	—	—	0.0368	—	—	—	—
RE11-10-1795	11-608802	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE11-10-1797	11-608803	0.0–0.5	Soil	—	—	—	—	—	0.00394 (J+)	—	—	—	0.000989 (J+)	—	0.000745 (J+)
RE11-10-1798	11-608803	3.5–4.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.000383 (J)
RE11-10-1799	11-608804	0.0–0.5	Soil	0.0726	—	—	—	—	—	0.0324 (J)	0.0693	—	—	0.000467 (J+)	—
RE11-10-1801	11-608805	0.0–0.5	Soil	0.0272 (J)	—	—	—	0.012 (J+)	—	—	0.0236 (J)	0.000953 (J+)	0.0289 (J+)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

[e] Isopropylbenzene was used as a surrogate based on structural similarity.

Table 6.10-4
Summary of Radionuclides Detected at SWMU 11-011(a)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2,3,4 BV[a]				**na**[b]	**1.98**	**0.09**	**1.93**
Soil BV/FV[a]				**0.054**	**2.59**	**0.2**	**2.29**
Industrial SAL[c]				**210**	**1500**	**87**	**430**
Recreational SAL[c]				**300**	**3200**	**520**	**2100**
Residential SAL[c]				**33**	**170**	**17**	**87**
RE11-10-1785	11-608797	0.0–0.5	Soil	—[d]	—	—	3.6
RE11-10-1788	11-608798	5.0–5.5	Qbt 4	—	3 (J+)	—	2.78 (J+)
RE11-10-1801	11-608805	0.0–0.5	Soil	0.0804	5.29 (J+)	0.311 (J+)	5.72 (J+)

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

[d] — = Not detected or not detected above BV/FV.

Table 6.11-1
Summary of Samples Collected and Analyses Requested at SWMU 11-011(b)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE11-10-1811	11-608807	0.0–0.5	Soil	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1812	11-608807	5.5–6.0	Qbt 4	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1813	11-608808	0.0–0.5	Fill	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1814	11-608808	5.5–6.0	Qbt 4	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1815	11-608809	0.0–0.5	Soil	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1816	11-608809	5.5–6.0	Qbt 4	10-2241	10-2240	10-2239	10-2241	10-2241	10-2240	10-2240	10-2239	10-2239
RE11-10-1817	11-608810	0.0–0.5	Soil	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1818	11-608810	5.5–6.0	Qbt 4	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1819	11-608811	0.0–0.5	Soil	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1820	11-608811	5.5–6.0	Qbt 4	10-2206	10-2205	10-2204	10-2206	10-2206	10-2205	10-2205	10-2204	10-2204
RE11-10-1821	11-608812	0.0–0.5	Soil	10-2241	10-2240	10-2239	10-2241	10-2241	10-2240	10-2240	10-2239	10-2239
RE11-10-1822	11-608812	1.0–1.5	Soil	10-2241	10-2240	10-2239	10-2241	10-2241	10-2240	10-2240	10-2239	10-2239
RE11-10-1823	11-608813	0.0–0.5	Soil	10-2241	10-2240	10-2239	10-2241	10-2241	10-2240	10-2240	10-2239	10-2239
RE11-10-1824	11-608813	2.0–2.5	Qbt 4	10-2241	10-2240	10-2239	10-2241	10-2241	10-2240	10-2240	10-2239	10-2239
RE11-10-1825	11-608814	0.0–0.5	Soil	10-2241	10-2240	10-2239	10-2241	10-2241	10-2240	10-2240	10-2239	10-2239
RE11-10-1826	11-608814	2.5–3.0	Qbt 4	10-2241	10-2240	10-2239	10-2241	10-2241	10-2240	10-2240	10-2239	10-2239

Table 6.11-2
Summary of Inorganic Chemicals above BVs at SWMU 11-011(b)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Cobalt	Copper	Fluoride	Mercury	Nitrate	Perchlorate	Selenium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**7.14**	**3.14**	**4.66**	**na[b]**	**0.1**	**na**	**na**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**8.64**	**14.7**	**na**	**0.1**	**na**	**na**	**1.52**	**48.8**
Industrial SSL[c]				**454**	**224000**	**1120**	**2920[d]**	**300[e]**	**45400**	**68100**	**310[e]**	**1820000**	**795**	**5680**	**341000**
Recreational SSL[f]				**317**	**158000**	**784**	**1910[d]**	**238**	**31700**	**47500**	**238**	**1260000**	**555**	**3960**	**238000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**219[d]**	**23[e]**	**3130**	**4690**	**23[e]**	**125000**	**54.8**	**391**	**23500**
RE11-10-1811	11-608807	0.0–0.5	Soil	1.25 (U)	—[g]	—	—	12.6	74.4 (J)	1.27	—	3.3	0.00107 (J)	—	50.5
RE11-10-1812	11-608807	5.5–6.0	Qbt 4	1.09 (U)	—	—	9.35 (J)	—	—	1.32	—	1.51	0.00514	1.07 (U)	—
RE11-10-1813	11-608808	0.0–0.5	Fill	1.22 (U)	—	0.608 (U)	—	—	—	1.18 (J)	—	12.2	0.00157 (J)	—	—
RE11-10-1814	11-608808	5.5–6.0	Qbt 4	1.14 (U)	54.2	—	16.7 (J)	—	6.89 (J)	2.9	—	3.61	0.00102 (J)	1.13 (U)	—
RE11-10-1815	11-608809	0.0–0.5	Soil	1.14 (U)	—	—	—	—	—	1.89	—	3.09	—	—	—
RE11-10-1816	11-608809	5.5–6.0	Qbt 4	4.76 (U)	—	—	—	—	—	1.71 (J-)	—	—	—	1.01 (U)	—
RE11-10-1817	11-608810	0.0–0.5	Soil	1.65 (U)	—	—	—	16.2	57.3 (J)	1.66 (J)	0.175	2.06	—	1.69 (U)	—
RE11-10-1818	11-608810	5.5–6.0	Qbt 4	1.12 (U)	—	—	10.2 (J)	—	7.36 (J)	1.43	—	1.2	0.000711 (J)	1.11 (U)	—
RE11-10-1819	11-608811	0.0–0.5	Soil	1.29 (U)	—	—	—	—	—	1.08 (J)	0.311	2.11	—	—	55.1
RE11-10-1820	11-608811	5.5–6.0	Qbt 4	1.1 (U)	—	—	9.67 (J)	—	—	1.61	—	1.17	—	1.12 (U)	—
RE11-10-1821	11-608812	0.0–0.5	Soil	7.77 (U)	—	0.421 (U)	—	—	—	1.55 (J-)	—	—	—	1.57 (U)	—
RE11-10-1822	11-608812	1.0–1.5	Soil	5.86 (U)	—	—	—	—	—	2.15 (J-)	—	—	—	—	—
RE11-10-1823	11-608813	0.0–0.5	Soil	1.4 (U)	—	—	—	—	—	—	—	2.16	—	—	—
RE11-10-1824	11-608813	2.0–2.5	Qbt 4	1.06 (U)	—	—	9.56	—	—	1.66 (J-)	—	1.14	—	1.09 (U)	—
RE11-10-1825	11-608814	0.0–0.5	Soil	6.91 (U)	—	—	—	—	—	1.03 (J-)	—	—	—	—	—
RE11-10-1826	11-608814	2.5–3.0	Qbt 4	1.07 (U)	—	—	10.6	—	—	1.25 (J-)	—	—	—	1.05 (U)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 6.11-3
Summary of Organic Chemicals Detected at SWMU 11-011(b)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Fluoranthene
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**2340**	**24400**
Recreational SSL[c]				**20800**	**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**3010**	**13900**
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**621**	**2290**
RE11-10-1811	11-608807	0.0–0.5	Soil	—[d]	—	0.03 (J)	0.33 (J)	0.488 (J)	0.707 (J)	0.491 (J)	0.306 (J)	0.468 (J)
RE11-10-1813	11-608808	0.0–0.5	Fill	0.0491 (J)	—	0.0398 (J)	0.183 (J)	0.213 (J)	0.353 (J)	0.162 (J)	0.228 (J)	0.524 (J)
RE11-10-1814	11-608808	5.5–6.0	Qbt 4	—	—	—	—	—	0.0129 (J)	—	—	0.0131 (J)
RE11-10-1815	11-608809	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—
RE11-10-1817	11-608810	0.0–0.5	Soil	—	—	—	—	—	0.0287 (J)	—	—	0.0225 (J)
RE11-10-1819	11-608811	0.0–0.5	Soil	—	—	0.0114 (J)	0.0525 (J)	0.0534 (J)	0.0943 (J)	0.0435 (J)	0.0545 (J)	0.114 (J)
RE11-10-1821	11-608812	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—
RE11-10-1822	11-608812	1.0–1.5	Soil	—	0.133	—	—	—	—	—	—	—
RE11-10-1825	11-608814	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—

Table 6.11-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Phenanthrene	Pyrene	Styrene	Toluene
Industrial SSL[a]				**24400**	**23.4**	**14900[e]**	**1090**	**4100[f]**	**20500**	**18300**	**51200**	**57900**
Recreational SSL[c]				**13900**	**30.1**	**52700[e]**	**4520**	**3170**	**12000**	**10400**	**126000**	**60800**
Residential SSL[a]				**2290**	**6.21**	**3210[e]**	**199**	**310[f]**	**1830**	**1720**	**8970**	**5570**
RE11-10-1811	11-608807	0.0–0.5	Soil	—	0.388 (J)	—	—	—	0.173 (J)	0.47 (J)	—	—
RE11-10-1813	11-608808	0.0–0.5	Fill	0.0263 (J)	0.139 (J)	—	—	0.0107 (J)	0.3 (J)	0.508 (J)	—	—
RE11-10-1814	11-608808	5.5–6.0	Qbt 4	—	—	—	—	—	—	0.0131 (J)	—	—
RE11-10-1815	11-608809	0.0–0.5	Soil	—	—	—	0.00334 (J)	—	—	—	—	—
RE11-10-1817	11-608810	0.0–0.5	Soil	—	—	—	—	—	—	0.0235 (J)	—	—
RE11-10-1819	11-608811	0.0–0.5	Soil	—	0.0325 (J)	—	—	—	0.0666 (J)	0.135 (J)	—	—
RE11-10-1821	11-608812	0.0–0.5	Soil	—	—	—	0.00501 (J-)	—	—	—	—	0.00088 (J-)
RE11-10-1822	11-608812	1.0–1.5	Soil	—	—	0.0341	—	—	—	—	0.000413 (J)	0.00739
RE11-10-1825	11-608814	0.0–0.5	Soil	—	—	—	0.00408 (J-)	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

[e] Isopropylbenzene was used as a surrogate based on structural similarity.

[f] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table 6.11-4
Summary of Radionuclides Detected at SWMU 11-011(b)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Uranium-238
Soil BV/FV[a]				**0.013**	**2.29**
Industrial SAL[b]				**180**	**430**
Recreational SAL[b]				**280**	**2100**
Residential SAL[b]				**30**	**87**
RE11-10-1821	11-608812	0.0–0.5	Soil	—[c]	2.42 (J+)
RE11-10-1823	11-608813	0.0–0.5	Soil	0.0282	—

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 6.12-1
Summary of Samples Collected and Analyses Requested at SWMU 11-011(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE11-10-1688	11-608761	0.0–0.5	Fill	10-2087	10-2086	10-2085	10-2087	10-2087	10-2086	10-2086	10-2085	10-2085	10-2086
RE11-10-1689	11-608761	6.0–6.5	Qbt 4	10-2087	10-2086	10-2085	10-2087	10-2087	10-2086	10-2086	10-2085	10-2085	10-2086
RE11-10-1690	11-608762	0.0–0.5	Fill	10-2087	10-2086	10-2085	10-2087	10-2087	10-2086	10-2086	10-2085	10-2085	10-2086
RE11-10-1691	11-608762	5.5–6.0	Qbt 4	10-2087	10-2086	10-2085	10-2087	10-2087	10-2086	10-2086	10-2085	10-2085	10-2086
RE11-10-1692	11-608763	0.0–0.5	Fill	10-2087	10-2086	10-2085	10-2087	10-2087	10-2086	10-2086	10-2085	10-2085	10-2086
RE11-10-1693	11-608763	6.0–6.5	Qbt 4	10-2087	10-2086	10-2085	10-2087	10-2087	10-2086	10-2086	10-2085	10-2085	10-2086
RE11-10-1694	11-608764	0.0–0.5	Soil	10-2629	10-2629	10-2628	10-2629	10-2629	10-2629	10-2629	10-2628	10-2628	10-2629
RE11-10-1695	11-608764	3.5–4.0	Qbt 4	10-2629	10-2629	10-2628	10-2629	10-2629	10-2629	10-2629	10-2628	10-2628	10-2629
RE11-10-1696	11-608765	2.0–2.5	Soil	10-2087	10-2086	10-2085	10-2087	10-2087	10-2086	10-2086	10-2085	10-2085	10-2086
RE11-10-1697	11-608765	7.5–8.0	Soil	10-2087	10-2086	10-2085	10-2087	10-2087	10-2086	10-2086	10-2085	10-2085	10-2086

Table 6.12-2
Summary of Inorganic Chemicals above BVs at SWMU 11-011(d)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**0.5**	**na**[b]	**14500**	**11.2**	**1690**	**0.1**	**6.58**	**na**	**na**	**0.3**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**39.6**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**224000**	**1120**	**na**	**2920**[d]	**45400**	**22700**	**68100**	**795000**	**800**	**na**	**310**[e]	**22700**	**1820000**	**795**	**5680**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**158000**	**784**	**na**	**1910**[d]	**31700**	**15800**	**47500**	**554000**	**560**	**na**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**15600**	**77.9**	**na**	**219**[d]	**3130**	**1560**	**4690**	**54800**	**400**	**na**	**23**[e]	**1560**	**125000**	**54.8**	**391**	**391**	**23500**
RE11-10-1688	11-608761	0.0–0.5	Fill	—[g]	5.06 (U)	—	—	—	—	29.6	—	1.37 (J-)	—	22.9	—	—	—	1.66	—	—	—	—
RE11-10-1689	11-608761	6.0–6.5	Qbt 4	—	1.13 (U)	—	—	—	—	—	—	2.3 (J-)	—	—	—	—	—	1.41	—	1.16 (U)	—	—
RE11-10-1690	11-608762	0.0–0.5	Fill	—	1.09 (U)	—	0.506 (J)	—	—	27.2	—	1.15 (J-)	—	—	—	—	—	3.56	—	—	—	52.7
RE11-10-1691	11-608762	5.5–6.0	Qbt 4	—	0.994 (U)	—	—	—	—	7.63	—	1.79 (J-)	—	—	—	—	—	2.59	—	1.08 (U)	—	—
RE11-10-1692	11-608763	0.0–0.5	Fill	—	1.1 (U)	—	—	—	—	18.7	—	1.16 (J-)	—	—	—	—	—	5.62	0.000736 (J)	—	—	—
RE11-10-1693	11-608763	6.0–6.5	Qbt 4	—	1.03 (U)	47.6	—	—	—	7.88	—	2.15 (J-)	—	—	2020 (J+)	—	—	1.64	—	1.05 (U)	—	—
RE11-10-1694	11-608764	0.0–0.5	Soil	—	—	—	—	—	—	26.6	—	1.1 (J)	—	—	—	—	—	1.2	—	—	—	52.9
RE11-10-1695	11-608764	3.5–4.0	Qbt 4	—	—	—	—	—	27.7	5.6	0.61 (U)	2.1	—	—	—	—	12.7	0.1 (J)	—	1	—	—
RE11-10-1696	11-608765	2.0–2.5	Soil	—	5.86 (U)	—	—	—	—	—	—	1.54 (J-)	—	—	—	—	—	1.66	0.000687 (J)	—	—	—
RE11-10-1697	11-608765	7.5–8.0	Soil	—	1.21 (U)	—	—	—	—	—	—	1.47 (J-)	—	—	—	—	—	1.49	—	—	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] SSL for chromium hexavalent ion.
[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[f] SSLs from LANL (2010, 108613).
[g] — = Not detected or not detected above BV.

Table 6.12-3
Summary of Organic Chemicals Detected at SWMU 11-011(d)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Fluoranthene	HMX	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene
Industrial SSL[a]				**851000**	**23.4**	**2.34**	**23.4**	**2340**	**24400**	**34200**	**14900**[b]	**1090**	**20500**	**18300**[c]
Recreational SSL[d]				**702000**	**30.1**	**3.01**	**30.1**	**3010**	**13900**	**19900**	**52700**[b]	**4520**	**12000**	**10400**
Residential SSL[a]				**67500**	**6.21**	**0.621**	**6.21**	**621**	**2290**	**3060**	**3210**[b]	**199**	**1830**	**1720**
RE11-10-1689	11-608761	6.0–6.5	Qbt 4	0.00756	—[e]	—	—	0.00358	—	—	—	—	—	—
RE11-10-1690	11-608762	0.0–0.5	Fill	—	—	0.0303 (J)	—	—	—	—	0.0321 (J)	—	—	0.0321 (J)
RE11-10-1691	11-608762	5.5–6.0	Qbt 4	—	—	—	—	—	0.00249 (J)	—	—	0.00249 (J)	—	—
RE11-10-1692	11-608763	0.0–0.5	Fill	—	0.0214 (J)	0.0448	—	—	—	0.0218 (J)	0.0387 (J)	—	0.0218 (J)	0.0387 (J)
RE11-10-1696	11-608765	2.0–2.5	Soil	—	—	—	0.414 (J-)	—	—	—	—	—	—	—
RE11-10-1697	11-608765	7.5–8.0	Soil	—	—	—	0.257 (J-)	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Isopropylbenzene was used as a surrogate based on structural similarity.

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 6.12-4
Summary of Radionuclides Detected at SWMU 11-011(d)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2,3,4 BV[a]				**na**[b]	**1.98**	**0.09**	**1.93**
Soil BV/FV[a]				**0.054**	**2.59**	**0.2**	**2.29**
Industrial SAL[c]				**210**	**1500**	**87**	**430**
Recreational SAL[c]				**300**	**3200**	**520**	**2100**
Residential SAL[c]				**33**	**170**	**17**	**87**
RE11-10-1688	11-608761	0.0–0.5	Fill	0.0769	4.62 (J+)	—[d]	5.28 (J+)
RE11-10-1689	11-608761	6.0–6.5	Qbt 4	—	—	0.138	—
RE11-10-1690	11-608762	0.0–0.5	Fill	0.125	—	0.224 (J+)	—
RE11-10-1691	11-608762	5.5–6.0	Qbt 4	0.0259	—	—	—
RE11-10-1692	11-608763	0.0–0.5	Fill	0.3	2.95 (J+)	—	3.36 (J+)
RE11-10-1694	11-608764	0.0–0.5	Soil	0.144	—	NA[e]	—
RE11-10-1696	11-608765	2.0–2.5	Soil	0.0569	—	—	—

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g. Data qualifiers are defined in Appendix A.

[a] BVs/FVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

[d] — = Not detected or not detected above BV/FV.

[e] NA = Not analyzed.

Table 7.4-1
Summary of Samples Collected and Analyses Requested at SWMU 16-025(d2)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1278	16-608950	0.0–0.5	Fill	10-1202	10-1203	10-1202	10-1202	10-1202	10-1202	10-1203	10-1203	10-1202	10-1202
RE16-10-1279	16-608950	5.5–6.0	Soil	10-1435	10-1435	10-1435	10-1435	10-1435	10-1435	10-1435	10-1435	10-1435	10-1435
RE16-10-1280	16-608951	0.0–0.5	Soil	10-1202	10-1203	10-1202	10-1202	10-1202	10-1202	10-1203	10-1203	10-1202	10-1202
RE16-10-1281	16-608951	5.5–6.0	Fill	10-1492	10-1493	10-1492	10-1492	10-1492	10-1492	10-1493	10-1493	10-1492	10-1492
RE16-10-1282	16-608952	0.0–0.5	Fill	10-1202	10-1203	10-1202	10-1202	10-1202	10-1202	10-1203	10-1203	10-1202	10-1202
RE16-10-1283	16-608952	5.5–6.0	Fill	10-1492	10-1493	10-1492	10-1492	10-1492	10-1492	10-1493	10-1493	10-1492	10-1492
RE16-10-1284	16-608953	0.0–0.5	Fill	10-1202	10-1203	10-1202	10-1202	10-1202	10-1202	10-1203	10-1203	10-1202	10-1202
RE16-10-1285	16-608953	5.0–6.0	Fill	10-1492	10-1493	10-1492	10-1492	10-1492	10-1492	10-1493	10-1493	10-1492	10-1492
RE16-10-1286	16-608954	0.0–0.5	Fill	10-1218	10-1218	10-1218	10-1218	10-1218	10-1218	10-1218	10-1218	10-1218	10-1218
RE16-10-1287	16-608954	5.5–6.0	Fill	10-1492	10-1493	10-1492	10-1492	10-1492	10-1492	10-1493	10-1493	10-1492	10-1492

Table 7.4-2
Summary of Inorganic Chemicals above BVs at SWMU 16-025(d2)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Fluoride	Nitrate	Perchlorate
Soil BV[a]				**0.83**	**0.4**	**na**[b]	**na**	**na**
Industrial SSL[c]				**454**	**1120**	**68100**	**1820000**	**795**
Recreational SSL[d]				**317**	**784**	**47500**	**1260000**	**555**
Residential SSL[c]				**31.3**	**77.9**	**4690**	**125000**	**54.8**
RE16-10-1278	16-608950	0.0–0.5	Fill	1.34 (U)	0.671 (U)	—[e]	—	—
RE16-10-1279	16-608950	5.5–6.0	Soil	1.13 (U)	0.564 (U)	2.61 (J-)	-	—
RE16-10-1280	16-608951	0.0–0.5	Soil	1.29 (U)	0.644 (U)	—	—	—
RE16-10-1281	16-608951	5.5–6.0	Fill	—	0.57 (U)	2.55 (J-)	1.52	—
RE16-10-1282	16-608952	0.0–0.5	Fill	1.13 (U)	0.565 (U)	—	—	—
RE16-10-1283	16-608952	5.5–6.0	Fill	—	0.533 (U)	2.95 (J-)	1.26	—
RE16-10-1284	16-608953	0.0–0.5	Fill	1.16 (U)	0.582 (U)	—	2.88	0.00103 (J)
RE16-10-1285	16-608953	5.0–6.0	Fill	—	0.532 (U)	2.5 (J-)	1.3	—
RE16-10-1286	16-608954	0.0–0.5	Fill	1.17 (U)	—	—	—	—
RE16-10-1287	16-608954	5.5–6.0	Fill	—	0.5 (U)	3.72 (J-)	1.24	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070).
[d] SSLs from LANL (2010, 108613).
[e] — = Not detected or not detected above BV.

Table 7.4-3
Summary of Organic Chemicals Detected at SWMU 16-025(d2)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Butanone[2-]	Chrysene	Dibromoethane[1,2-]	Fluoranthene
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**369000**	**2340**	**3.14**	**24400**
Recreational SSL[c]				**20800**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**301**	**446000**	**3010**	**14.6**	**13900**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**39600**	**621**	**0.574**	**2290**
RE16-10-1278	16-608950	0.0–0.5	Fill	0.0181 (J)	0.0257 (J)	0.0799	0.0878	0.154	0.0516	0.0601	—[d]	0.126	—	0.197
RE16-10-1280	16-608951	0.0–0.5	Soil	—	0.00902 (J)	0.0276 (J)	0.0261 (J)	0.0588	—	0.024 (J)	—	0.048	0.000953 (J)	0.0698
RE16-10-1282	16-608952	0.0–0.5	Fill	0.0224 (J)	—	0.0161 (J)	—	0.0172 (J)	—	—	—	0.0128 (J)	—	0.0233 (J)
RE16-10-1284	16-608953	0.0–0.5	Fill	0.914	—	0.0207 (J)	0.0219 (J)	0.0436	—	—	0.00458 (J)	0.02 (J)	—	0.0241 (J)
RE16-10-1286	16-608954	0.0–0.5	Fill	0.0137 (J)	0.0214 (J)	0.0659	0.0561	0.222	0.0419	—	—	0.0688	—	0.138
RE16-10-1287	16-608954	5.5–6.0	Fill	0.132	0.108	0.0683	0.0179 (J)	0.0186 (J)	—	—	—	0.0618	—	0.259

Table 7.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Pentachlorophenol	Phenanthrene	Pyrene	TATB
Industrial SSL[a]				**24400**	**23.4**	**14900**[e]	**1090**	**4100**[f]	**252**	**100**	**20500**	**18300**	**na**[g]
Recreational SSL[c]				**13900**	**30.1**	**52700**[e]	**4520**	**3170**	**1950**	**117**	**12000**	**10400**	**na**
Residential SSL[a]				**2290**	**6.21**	**3210**[e]	**199**	**310**[f]	**45**	**29.8**	**1830**	**1720**	**na**
RE16-10-1278	16-608950	0.0–0.5	Fill	—	0.179	—	0.00285 (J)	—	—	0.324 (J)	0.116	0.188	—
RE16-10-1280	16-608951	0.0–0.5	Soil	—	0.142	—	—	—	—	—	0.0306 (J)	0.0687	—
RE16-10-1282	16-608952	0.0–0.5	Fill	—	—	—	—	—	—	—	0.0147 (J)	0.0243 (J)	1.32
RE16-10-1284	16-608953	0.0–0.5	Fill	—	—	0.000592 (J)	—	—	—	—	0.0169 (J)	0.03 (J)	0.816 (J)
RE16-10-1286	16-608954	0.0–0.5	Fill	—	0.018 (J)	—	—	—	—	—	0.0946	0.13	—
RE16-10-1287	16-608954	5.5–6.0	Fill	0.103	—	—	—	0.0521	0.0498	—	0.328	0.227	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

[e] Isopropylbenzene was used as a surrogate based on structural similarity.

[f] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[g] na = Not available.

Table 7.4-4
Summary of Radionuclides Detected at SWMU 16-025(d2)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137
Soil BV[a]				**1.65**
Industrial SAL[b]				**23**
Recreational SAL[b]				**210**
Residential SAL[b]				**5.6**
RE16-10-1283	16-608952	5.5–6.0	Fill	0.147

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.5-1
Summary of Samples Collected and Analyses Requested at SWMU 16-031(h)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1502	16-608695	0.0–0.5	Fill	10-1279	10-1280	10-1279	10-1279	10-1279	10-1279	10-1280	10-1280	10-1279	10-1279
RE16-10-1503	16-608695	5.5–6.0	Qbt 4	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427
RE16-10-1504	16-608696	0.0–0.5	Fill	10-1279	10-1280	10-1279	10-1279	10-1279	10-1279	10-1280	10-1280	10-1279	10-1279
RE16-10-1505	16-608696	5.5–6.0	Qbt 4	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427
RE16-10-1506	16-608697	0.0–0.5	Fill	10-1279	10-1280	10-1279	10-1279	10-1279	10-1279	10-1280	10-1280	10-1279	10-1279
RE16-10-1507	16-608697	5.5–6.0	Qbt 4	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427	10-1427
RE16-10-15344	16-611905	0.0–0.5	Fill	10-2632	10-2631	10-2632	10-2630	10-2632	10-2632	10-2631	10-2631	10-2630	10-2630
RE16-10-15345	16-611905	5.5–6.0	Qbt 4	10-2632	10-2631	10-2632	10-2630	10-2632	10-2632	10-2631	10-2631	10-2630	10-2630
RE16-10-15346	16-611906	0.0–0.5	Fill	10-2632	10-2631	10-2632	10-2630	10-2632	10-2632	10-2631	10-2631	10-2630	10-2630
RE16-10-15347	16-611906	5.5–6.0	Qbt 4	10-2632	10-2631	10-2632	10-2630	10-2632	10-2632	10-2631	10-2631	10-2630	10-2630

Table 7.5-2
Summary of Inorganic Chemicals above BVs at SWMU 16-031(h)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Copper	Fluoride	Lead	Magnesium	Mercury	Nitrate	Perchlorate	Selenium	Silver	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**na[b]**	**11.2**	**1690**	**0.1**	**na**	**na**	**0.3**	**1**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**na**	**22.3**	**4610**	**0.1**	**na**	**na**	**1.52**	**1**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**68100**	**800**	**na**	**310[e]**	**1820000**	**795**	**5680**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**1910[d]**	**31700**	**47500**	**560**	**na**	**238**	**1260000**	**555**	**3960**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**4690**	**400**	**na**	**23[e]**	**125000**	**54.8**	**391**	**391**	**23500**
RE16-10-1502	16-608695	0.0–0.5	Fill	—[g]	1.11 (U)	—	—	0.622	—	—	28.3	1.31 (J-)	35.9	—	0.108	2.61	—	—	1.5	61.9
RE16-10-1503	16-608695	5.5–6.0	Qbt 4	—	1.04 (U)	—	—	—	—	—	—	13.6 (J-)	—	—	—	—	—	1.04 (U)	—	—
RE16-10-1504	16-608696	0.0–0.5	Fill	—	—	—	—	0.611 (U)	—	—	—	1.89 (J-)	—	—	0.632	2.01	—	—	—	—
RE16-10-1505	16-608696	5.5–6.0	Qbt 4	8910	1.13 (U)	2.86	75.9	—	2240	7.94 (J)	6.2	17.9 (J-)	—	1700 (J+)	—	—	0.00079 (J)	1.11 (U)	—	—
RE16-10-1506	16-608697	0.0–0.5	Fill	—	1.17 (U)	—	—	—	6790	—	—	1.79 (J-)	29.4	—	0.11	1.33	—	—	—	—
RE16-10-1507	16-608697	5.5–6.0	Qbt 4	—	1.06 (U)	—	64.7	—	—	—	—	15.4 (J-)	—	—	—	—	—	1.03 (U)	—	—
RE16-10-15344	16-611905	0.0–0.5	Fill	—	2.5	—	—	—	—	—	17.8	0.77 (J)	26.3	—	—	0.31	—	—	—	—
RE16-10-15345	16-611905	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	6.7	6.9	—	—	—	0.15 (J)	—	1.6	—	—
RE16-10-15346	16-611906	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.64 (J)	—	—	—	0.092 (J)	—	—	—	—
RE16-10-15347	16-611906	5.5–6.0	Qbt 4	—	4.5	—	55	—	—	—	—	12.8	—	—	—	0.076 (J)	—	1.3	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 7.5-3
Summary of Organic Chemicals Detected at SWMU 16-031(h)

Sample ID	Location ID	Depth (ft)	Media	Anthracene	Benzo(a)anthracene	Ben zo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenz(a,h)anthracene	Diethylphthalate	Fluoranthene	HMX	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	TATB
Industrial SSL[a]				**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**2340**	**2.34**	**547000**	**24400**	**34200**	**23.4**	**252**	**20500**	**18300**	**na[c]**
Recreational SSL[d]				**104000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**301**	**1830**	**3010**	**3.01**	**319000**	**13900**	**19900**	**30.1**	**1950**	**12000**	**10400**	**na**
Residential SSL[a]				**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**621**	**0.621**	**48900**	**2290**	**3060**	**6.21**	**45**	**1830**	**1720**	**na**
RE16-10-1502	16-608695	0.0–0.5	Fill	—[e]	0.0645	0.0192 (J)	0.151	0.0591	—	—	—	—	—	0.0441	—	0.148	0.0124 (J)	—	0.0399	—
RE16-10-1503	16-608695	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.154 (J)	—	—	—	—	—
RE16-10-1504	16-608696	0.0–0.5	Fill	—	0.0217 (J)	0.0158 (J)	0.027 (J)	—	—	—	0.0185 (J)	—	—	0.0385 (J)	—	—	—	0.0275 (J)	0.0316 (J)	1.54
RE16-10-1506	16-608697	0.0–0.5	Fill	—	—	—	—	—	—	0.193 (J)	—	—	—	—	—	—	—	—	—	—
RE16-10-15344	16-611905	0.0–0.5	Fill	0.062 (J)	0.091 (J)	0.23 (J)	1.5	0.4	0.89	0.051 (J)	0.7	0.073 (J)	—	0.47	0.057 (J+)	0.32 (J)	—	0.065 (J)	0.28 (J)	—
RE16-10-15345	16-611905	5.5–6.0	Qbt 4	—	—	—	0.083 (J)	0.04 (J)	0.058 (J)	—	0.051 (J)	—	—	—	—	—	—	—	—	—
RE16-10-15346	16-611906	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	0.037 (J)	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Pyrene was used as a surrogate based on structural similarity.

[c] na = Not available.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 7.6-1
Summary of Samples Collected and Analyses Requested at AOC 16-024(a)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1374	16-608906	0.0–0.5	Fill	10-1277	10-1278	10-1277	10-1277	10-1277	10-1277	10-1278	10-1278	10-1277	10-1277
RE16-10-1375	16-608906	5.5–6.0	Soil	10-1486	10-1487	10-1486	10-1486	10-1486	10-1486	10-1487	10-1487	10-1486	10-1486
RE16-10-1376	16-608907	0.0–0.5	Soil	10-1277	10-1278	10-1277	10-1277	10-1277	10-1277	10-1278	10-1278	10-1277	10-1277
RE16-10-1377	16-608907	5.5–6.0	Fill	10-1486	10-1487	10-1486	10-1486	10-1486	10-1486	10-1487	10-1487	10-1486	10-1486
RE16-10-1378	16-608908	0.0–0.5	Soil	10-1277	10-1278	10-1277	10-1277	10-1277	10-1277	10-1278	10-1278	10-1277	10-1277
RE16-10-1379	16-608908	5.5–6.0	Soil	10-1486	10-1487	10-1486	10-1486	10-1486	10-1486	10-1487	10-1487	10-1486	10-1486
RE16-10-1380	16-608909	0.0–0.5	Fill	10-1277	10-1278	10-1277	10-1277	10-1277	10-1277	10-1278	10-1278	10-1277	10-1277
RE16-10-1381	16-608909	5.5–6.0	Qbt 4	10-1486	10-1487	10-1486	10-1486	10-1486	10-1486	10-1487	10-1487	10-1486	10-1486
RE16-10-1382	16-608910	0.0–0.5	Soil	10-1277	10-1278	10-1277	10-1277	10-1277	10-1277	10-1278	10-1278	10-1277	10-1277
RE16-10-1383	16-608910	5.5–6.0	Qbt 4	10-1486	10-1487	10-1486	10-1486	10-1486	10-1486	10-1487	10-1487	10-1486	10-1486

Table 7.6-2
Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at AOC 16-024(a)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Bromide	Cadmium	Calcium	Chromium	Cobalt	Copper	Fluoride	Iron	Lead	Magnesium	Nickel	Nitrate	Perchlorate	Selenium	Sulfate	Vanadium
Qbt 4 BV[a]				**7340**	**0.5**	**46**	**na[b]**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na**	**14500**	**11.2**	**1690**	**6.58**	**na**	**na**	**0.3**	**157**	**17**
Soil BV[a]				**29200**	**0.83**	**295**	**na**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**na**	**21500**	**22.3**	**4610**	**15.4**	**na**	**na**	**1.52**	**293**	**39.6**
Industrial SSL[c]				**1130000**	**454**	**224000**	**na**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**68100**	**795000**	**800**	**na**	**22700**	**1820000**	**795**	**5680**	**na**	**5680**
Recreational SSL[f]				**791000**	**317**	**158000**	**na**	**784**	**na**	**1910[d]**	**238**	**31700**	**47500**	**554000**	**560**	**na**	**15800**	**1260000**	**555**	**3960**	**na**	**3960**
Residential SSL[c]				**78100**	**31.3**	**15600**	**na**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**4690**	**54800**	**400**	**na**	**1560**	**125000**	**54.8**	**391**	**na**	**391**
RE16-10-1374	16-608906	0.0–0.5	Fill	—[g]	—	—	—	0.649 (U)	—	—	—	—	1.37 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-1375	16-608906	5.5–6.0	Soil	—	0.862 (U)	—	1.45 (J)	0.534 (U)	—	—	—	—	3.36 (J-)	—	—	—	—	—	0.00433 (J+)	-	1510	—
RE16-10-1376	16-608907	0.0–0.5	Soil	—	1.19 (U)	—	—	0.597 (U)	—	—	—	—	1.21 (J-)	—	—	—	—	1.57	—	—	—	—
RE16-10-1377	16-608907	5.5–6.0	Fill	—	1.07 (U)	—	—	0.53 (U)	—	—	—	—	8.69 (J-)	—	—	—	—	—	0.00196 (J+)	—	—	—
RE16-10-1378	16-608908	0.0–0.5	Soil	—	1.37 (U)	—	—	0.684 (U)	—	—	—	—	1.43 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-1379	16-608908	5.5–6.0	Soil	—	—	—	—	0.541 (U)	—	—	—	—	4.58 (J-)	—	—	—	—	—	0.00383 (J+)	—	—	—
RE16-10-1380	16-608909	0.0–0.5	Fill	—	1.16 (U)	—	—	0.578 (U)	—	—	—	—	1.58 (J-)	—	—	—	—	—	0.000645 (J)	—	—	—
RE16-10-1381	16-608909	5.5–6.0	Qbt 4	12000	1.07 (UJ)	175	—	—	2710	10.8	4.09	8.39	3.55 (J-)	15600	14.2 (J)	2020	6.91	—	0.00337 (J+)	1.09 (U)	-	22.6
RE16-10-1382	16-608910	0.0–0.5	Soil	—	0.994 (U)	—	—	0.701 (U)	—	—	9.81	—	1.49 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-1383	16-608910	5.5–6.0	Qbt 4	—	0.608 (U)	67.2	—	-	—	9.59	—	5.42	3.74 (J-)	—	—	—	7.35	—	0.0017 (J+)	1.04 (U)	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] SSL for chromium hexavalent ion.
[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[f] SSLs from LANL (2010, 108613).
[g] — = Not detected or not detected above BV.

Table 7.6-3
Summary of Organic Chemicals Detected at AOC 16-024(a)

Sample ID	Location ID	Depth (ft)	Media	Benzo(a)anthracene	Benzo(a)pyrene	Benzoic Acid	Butanone[2-]	Chrysene	Fluoranthene	Isopropyltoluene[4-]	Pyrene
Industrial SSL[a]				**23.4**	**2.34**	**2500000**[b]	**369000**	**2340**[c]	**24400**	**14900**	**18300**
Recreational SSL[d]				**30.1**	**3.01**	**1590000**	**446000**	**3010**	**13900**	**52700**[c]	**10400**
Residential SSL[a]				**6.21**	**0.621**	**240000**[b]	**39600**	**621**	**2290**	**3210**[c]	**1720**
RE16-10-1374	16-608906	0.0–0.5	Fill	0.0207 (J)	0.0192 (J)	—[e]	—	0.0153 (J)	0.0188 (J)	—	0.0209 (J)
RE16-10-1376	16-608907	0.0–0.5	Soil	—	—	0.624 (J)	—	—	—	0.000373 (J)	0.0122 (J)
RE16-10-1377	16-608907	5.5–6.0	Fill	—	—	—	0.00258 (J)	—	—	—	—
RE16-10-1380	16-608909	0.0–0.5	Fill	—	—	—	—	—	—	0.000583 (J)	—
RE16-10-1382	16-608910	0.0–0.5	Soil	—	—	—	—	—	0.0163 (J)	0.000681 (J+)	0.0179 (J)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Isopropylbenzene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 7.6-4
Summary of Radionuclides Detected at AOC 16-024(a)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Plutonium-239/240
Soil BV/FV[a]				**1.65**	**0.054**
Industrial SAL[b]				**23**	**210**
Recreational SAL[b]				**210**	**300**
Residential SAL[b]				**5.6**	**33**
RE16-10-1378	16-608908	0.0–0.5	Soil	—[c]	0.0597
RE16-10-1379	16-608908	5.5–6.0	Soil	0.194	—

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.7-1
Summary of Samples Collected and Analyses Requested at AOC 16-024(u)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1342	16-608917	0.0–0.5	Soil	10-1222	10-1222	10-1222	10-1221	10-1222	10-1222	10-1222	10-1222	10-1221	10-1221
RE16-10-1343	16-608917	5.5–6.0	Soil	10-1438	10-1437	10-1438	10-1436	10-1438	10-1438	10-1437	10-1437	10-1436	10-1436
RE16-10-1344	16-608918	0.0–0.5	Soil	10-1222	10-1222	10-1222	10-1221	10-1222	10-1222	10-1222	10-1222	10-1221	10-1221
RE16-10-1345	16-608918	5.5–6.0	Soil	10-1438	10-1437	10-1438	10-1436	10-1438	10-1438	10-1437	10-1437	10-1436	10-1436
RE16-10-1346	16-608919	0.0–0.5	Fill	10-1222	10-1222	10-1222	10-1221	10-1222	10-1222	10-1222	10-1222	10-1221	10-1221
RE16-10-1347	16-608919	5.5–6.0	Soil	10-1438	10-1437	10-1438	10-1436	10-1438	10-1438	10-1437	10-1437	10-1436	10-1436
RE16-10-1348	16-608920	0.0–0.5	Fill	10-1222	10-1222	10-1222	10-1221	10-1222	10-1222	10-1222	10-1222	10-1221	10-1221
RE16-10-1349	16-608920	5.5–6.0	Soil	10-1438	10-1437	10-1438	10-1436	10-1438	10-1438	10-1437	10-1437	10-1436	10-1436
RE16-10-1350	16-608921	0.0–0.5	Soil	10-1222	10-1222	10-1222	10-1221	10-1222	10-1222	10-1222	10-1222	10-1221	10-1221
RE16-10-1351	16-608921	5.5–6.0	Soil	10-1438	10-1437	10-1438	10-1436	10-1438	10-1438	10-1437	10-1437	10-1436	10-1436

Table 7.7-2
Summary of Inorganic Chemicals above BVs at AOC 16-024(u)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Fluoride	Perchlorate
Soil BV[a]				**0.83**	**0.4**	**na**[b]	**na**
Industrial SSL[c]				**454**	**1120**	**68100**	**795**
Recreational SSL[d]				**317**	**784**	**47500**	**555**
Residential SSL[c]				**31.3**	**77.9**	**4690**	**54.8**
RE16-10-1342	16-608917	0.0–0.5	Soil	1.17 (UJ)	—[e]	—	0.00101 (J)
RE16-10-1343	16-608917	5.5–6.0	Soil	1.15 (U)	0.575 (U)	2.18 (J-)	—
RE16-10-1344	16-608918	0.0–0.5	Soil	1.15 (UJ)	—	—	—
RE16-10-1345	16-608918	5.5–6.0	Soil	1.07 (U)	0.535 (U)	2.97 (J-)	—
RE16-10-1346	16-608919	0.0–0.5	Fill	1.1 (UJ)	—	0.627 (J-)	—
RE16-10-1347	16-608919	5.5–6.0	Soil	1.07 (U)	0.537 (U)	5.08 (J-)	—
RE16-10-1348	16-608920	0.0–0.5	Fill	1.16 (UJ)	—	—	0.00062 (J)
RE16-10-1349	16-608920	5.5–6.0	Soil	1.07 (U)	0.534 (U)	1.97 (J-)	—
RE16-10-1350	16-608921	0.0–0.5	Soil	1.14 (UJ)	—	—	—
RE16-10-1351	16-608921	5.5–6.0	Soil	1.03 (U)	0.516 (U)	4.9 (J-)	0.00107 (J)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 7.7-3
Summary of Organic Chemicals Detected at AOC 16-024(u)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Aniline	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dimethyl phthalate
Industrial SSL[a]				**36700**	**851000**	**300[b]**	**183000**	**23.4**	**2.34**	**23.4**	**18300[c]**	**234**	**2340**	**2.34**	**1000[b]**	**6840000**
Recreational SSL[d]				**20800**	**702000**	**na[e]**	**104000**	**30.1**	**3.01**	**30.1**	**10400[c]**	**301**	**3010**	**3.01**	**399**	**3970000**
Residential SSL[a]				**3440**	**67500**	**850[b]**	**17200**	**6.21**	**0.621**	**6.21**	**1720[c]**	**62.1**	**621**	**0.621**	**78[b]**	**611000**
RE16-10-1342	16-608917	0.0–0.5	Soil	—[f]	—	—	—	0.0163 (J)	—	0.0175 (J)	—	—	0.0148 (J)	—	—	—
RE16-10-1343	16-608917	5.5–6.0	Soil	—	—	—	—	0.0388	0.0424	0.0603	0.0444	0.0202 (J)	0.0418	—	—	—
RE16-10-1344	16-608918	0.0–0.5	Soil	—	—	—	—	0.027 (J)	0.0131 (J)	0.0147 (J)	—	—	0.0232 (J)	—	—	—
RE16-10-1348	16-608920	0.0–0.5	Fill	0.915	0.00279 (J)	—	1.46	3.64	4.08	4.97	2.39 (J)	2.02	4.22	0.768	0.484 (J)	—
RE16-10-1349	16-608920	5.5–6.0	Soil	0.0192 (J)	—	—	0.0304 (J)	0.0937	0.103	0.128	0.0829	0.0561	0.103	—	—	—
RE16-10-1350	16-608921	0.0–0.5	Soil	0.387	—	—	0.651	1.21	1.35	1.69	0.733 (J)	0.623	1.34	—	0.222 (J)	—
RE16-10-1351	16-608921	5.5–6.0	Soil	—	—	0.178 (J)	—	—	—	—	—	—	—	—	—	0.263 (J)

Table 7.7-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dinitro-2-methylphenol[4,6-]	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isophorone	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Nitroso-di-n-propylamine[N-]	Phenanthrene	Pyrene
Industrial SSL[a]				**68.4**	**103**	**24400**	**24400**	**23.4**	**20200**	**1090**	**4100[b]**	**252**	**2.50[b]**	**20500**	**18300**
Recreational SSL[d]				**na**	**82.5**	**13900**	**13900**	**30.1**	**26900**	**4520**	**3170**	**1950**	**na**	**12000**	**10400**
Residential SSL[a]				**6.11**	**15.7**	**2290**	**2290**	**6.21**	**5120**	**199**	**310[b]**	**45**	**0.690[b]**	**1830**	**1720**
RE16-10-1342	16-608917	0.0–0.5	Soil	—	—	0.0343 (J)	—	—	—	—	—	—	—	0.0182 (J)	0.0343 (J)
RE16-10-1343	16-608917	5.5–6.0	Soil	—	—	0.0681	—	0.148	—	—	—	—	—	0.0377 (J)	0.0561
RE16-10-1344	16-608918	0.0–0.5	Soil	—	—	0.0525	—	—	—	0.00238 (J)	—	—	—	0.0281 (J)	0.0555
RE16-10-1348	16-608920	0.0–0.5	Fill	—	—	9.19	0.877	2.42	—	0.00259 (J)	0.28	0.699	—	6.76	8.09
RE16-10-1349	16-608920	5.5–6.0	Soil	—	—	0.262	0.0146 (J)	0.174	—	—	—	—	—	—	0.206
RE16-10-1350	16-608921	0.0–0.5	Soil	—	—	2.85	0.394	0.72	—	0.00238 (J)	0.153	0.398	—	2.34	2.59
RE16-10-1351	16-608921	5.5–6.0	Soil	0.277 (J)	0.656	—	0.017 (J)	—	0.562	—	—	—	0.209 (J)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] na = Not available.

[f] — = Not detected or not detected above BV.

Table 7.8-1
Summary of Samples Collected and Analyses Requested at AOC C-16-050

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1438	16-609514	0.0–0.5	Soil	10-1223	10-1224	10-1223	10-1223	10-1223	10-1223	10-1224	10-1224	10-1223	10-1223
RE16-10-1439	16-609514	5.5–6.0	Qbt 4	10-1488	10-1489	10-1488	10-1488	10-1488	10-1488	10-1489	10-1489	10-1488	10-1488
RE16-10-1440	16-609515	0.0–0.5	Fill	10-1223	10-1224	10-1223	10-1223	10-1223	10-1223	10-1224	10-1224	10-1223	10-1223
RE16-10-1441	16-609515	5.5–6.0	Qbt 4	10-1488	10-1489	10-1488	10-1488	10-1488	10-1488	10-1489	10-1489	10-1488	10-1488
RE16-10-1442	16-609516	0.0–0.5	Fill	10-1223	10-1224	10-1223	10-1223	10-1223	10-1223	10-1224	10-1224	10-1223	10-1223
RE16-10-1443	16-609516	5.5–6.0	Qbt 4	10-1488	10-1489	10-1488	10-1488	10-1488	10-1488	10-1489	10-1489	10-1488	10-1488
RE16-10-1444	16-609517	0.0–0.5	Soil	10-1223	10-1224	10-1223	10-1223	10-1223	10-1223	10-1224	10-1224	10-1223	10-1223
RE16-10-1445	16-609517	5.5–6.0	Qbt 4	10-1488	10-1489	10-1488	10-1488	10-1488	10-1488	10-1489	10-1489	10-1488	10-1488
RE16-10-1446	16-609518	0.0–0.5	Soil	10-1223	10-1224	10-1223	10-1223	10-1223	10-1223	10-1224	10-1224	10-1223	10-1223
RE16-10-1447	16-609518	5.5–6.0	Qbt 4	10-1488	10-1489	10-1488	10-1488	10-1488	10-1488	10-1489	10-1489	10-1488	10-1488
RE16-10-1451	16-609518	8.5–9.0	Qbt 4	10-2572	10-2571	10-2572	10-2570	10-2572	10-2572	10-2571	10-2571	10-2570	10-2570
RE16-10-1448	16-609519	0.0–0.5	Soil	10-2572	10-2571	10-2572	10-2570	10-2572	10-2572	10-2571	10-2571	10-2570	10-2570
RE16-10-1449	16-609519	5.5–6.0	Qbt 4	10-2572	10-2571	10-2572	10-2570	10-2572	10-2572	10-2571	10-2571	10-2570	10-2570
RE16-10-1450	16-609519	8.5–9.0	Qbt 4	10-2572	10-2571	10-2572	10-2570	10-2572	10-2572	10-2571	10-2571	10-2570	10-2570

Table 7.8-2
Summary of Inorganic Chemicals above BVs at AOC C-16-050

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Calcium	Fluoride	Nitrate	Perchlorate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**1.63**	**2200**	**na[b]**	**na**	**na**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**6120**	**na**	**na**	**na**	**1.52**
Industrial SSL[c]				**454**	**1120**	**na**	**68100**	**1820000**	**795**	**5680**
Recreational SSL[d]				**317**	**784**	**na**	**47500**	**1260000**	**555**	**3960**
Residential SSL[c]				**31.3**	**77.9**	**na**	**4690**	**125000**	**54.8**	**391**
RE16-10-1438	16-609514	0.0–0.5	Soil	1.24 (UJ)	—[e]	7150	—	—	—	—
RE16-10-1439	16-609514	5.5–6.0	Qbt 4	0.949 (U)	—	3210	1.05 (J)	1.25	—	1.1 (U)
RE16-10-1440	16-609515	0.0–0.5	Fill	1.22 (UJ)	—	11300	—	—	0.000829 (J)	—
RE16-10-1441	16-609515	5.5–6.0	Qbt 4	0.642 (U)	—	—	2.07	—	—	1.11 (U)
RE16-10-1442	16-609516	0.0–0.5	Fill	1.18 (UJ)	0.588 (U)	—	—	—	—	—
RE16-10-1443	16-609516	5.5–6.0	Qbt 4	—	—	—	1.19	—	—	1.09 (U)
RE16-10-1444	16-609517	0.0–0.5	Soil	1.16 (UJ)	—	—	0.421 (J-)	—	—	—
RE16-10-1445	16-609517	5.5–6.0	Qbt 4	0.61 (U)	—	—	1.36	—	—	1.03 (U)
RE16-10-1446	16-609518	0.0–0.5	Soil	1.05 (UJ)	—	—	0.54 (J-)	—	0.000591 (J)	—
RE16-10-1447	16-609518	5.5–6.0	Qbt 4	1.13 (UJ)	—	—	2.92	—	—	1.12 (U)
RE16-10-1451	16-609518	8.5–9.0	Qbt 4	—	—	—	5	—	—	1.3
RE16-10-1448	16-609519	0.0–0.5	Soil	—	—	—	1.4	—	—	—
RE16-10-1449	16-609519	5.5–6.0	Qbt 4	—	—	—	1.3	—	—	1.2
RE16-10-1450	16-609519	8.5–9.0	Qbt 4	0.53 (U)	—	—	0.88 (J)	—	—	1.1

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 7.8-3
Summary of Organic Chemicals Detected at AOC C-16-050

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Aniline	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene
Industrial SSL[a]				**36700**	**851000**	**3000**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2340**	**2.34**
Recreational SSL[d]				**20800**	**702000**	**na**[e]	**104000**	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**3010**	**3.01**
Residential SSL[a]				**3440**	**67500**	**850**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**621**	**0.621**
RE16-10-1438	16-609514	0.0–0.5	Soil	2.23	—[f]	—	4.17	6.44	7.08	8.27	3.67 (J)	3.3	6.6	1.12 (J)
RE16-10-1439	16-609514	5.5–6.0	Qbt 4	0.0206 (J)	—	—	0.0501	0.113	0.107	0.181	0.0662 (J)	—	0.116	—
RE16-10-1440	16-609515	0.0–0.5	Fill	1.72	—	—	3.33	6.24	6.57	7.67	3.33	3.55	6.93	0.93
RE16-10-1441	16-609515	5.5–6.0	Qbt 4	0.0132 (J)	—	—	0.0166 (J)	0.0433	0.0398	0.0682	0.0224 (J)	—	0.0447	—
RE16-10-1442	16-609516	0.0–0.5	Fill	0.211	—	—	0.426	1.17	1.23	1.51	0.782 (J)	0.523	1.29	0.19 (J)
RE16-10-1443	16-609516	5.5–6.0	Qbt 4	0.0581	—	—	0.138	0.192	0.185	0.295	0.112 (J)	—	0.188	—
RE16-10-1444	16-609517	0.0–0.5	Soil	0.0323 (J)	—	—	0.0461	0.22	0.29	0.354	0.187	0.145	0.288	0.0489
RE16-10-1445	16-609517	5.5–6.0	Qbt 4	0.0162 (J)	—	—	0.0216 (J)	0.0618	0.0618	0.109	0.0345 (J)	—	0.0667	—
RE16-10-1446	16-609518	0.0–0.5	Soil	0.0618	—	—	0.0777	0.237	0.256	0.319	0.161	0.144	0.271	0.047
RE16-10-1451	16-609518	8.5–9.0	Qbt 4	—	0.027 (J+)	—	—	—	—	—	—	—	—	—
RE16-10-1448	16-609519	0.0–0.5	Soil	—	—	0.082 (J)	—	0.11 (J)	0.1 (J)	0.079 (J)	0.063 (J)	0.1 (J)	0.13 (J)	—

Table 7.8-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]
Industrial SSL[a]				**1000**[b]	**24400**	**24400**	**23.4**	**14900**[g]	**4100**[b]	**252**	**20500**	**18300**	**260**[b]	**10000**[b]
Recreational SSL[d]				**399**	**13900**	**13900**	**30.1**	**52700**[g]	**3170**	**1950**	**12000**	**10400**	**6880**	**7930**
Residential SSL[a]				**78**[b]	**2290**	**2290**	**6.21**	**3210**[g]	**310**[b]	**45**	**1830**	**1720**	**62**[b]	**780**[b]
RE16-10-1438	16-609514	0.0–0.5	Soil	1.27	19.5	2.26	3.62 (J)	0.000502 (J)	0.988	2.22	15.3	15.2	0.000502 (J)	—
RE16-10-1439	16-609514	5.5–6.0	Qbt 4	—	0.229	0.018 (J)	0.062 (J)	—	—	—	0.168	0.256	—	—
RE16-10-1440	16-609515	0.0–0.5	Fill	0.831	16.9	1.66	3.33	—	0.5	1.04	12.5	15	0.000973 (J)	0.000407 (J)
RE16-10-1441	16-609515	5.5–6.0	Qbt 4	—	0.0872	—	0.0217 (J)	—	—	—	0.0693	0.0978	—	—
RE16-10-1442	16-609516	0.0–0.5	Fill	0.09 (J)	3.85	0.165	0.735 (J)	—	0.0586	0.136	2.07	2.74	—	—
RE16-10-1443	16-609516	5.5–6.0	Qbt 4	—	0.411	0.0562	0.104 (J)	—	0.0229 (J)	0.0703 (J)	0.39	0.429	—	—
RE16-10-1444	16-609517	0.0–0.5	Soil	—	0.56	0.0235 (J)	0.168	—	—	—	0.274	0.498	—	—
RE16-10-1445	16-609517	5.5–6.0	Qbt 4	—	0.125	—	0.0316 (J)	—	—	—	0.0885	0.139	—	—
RE16-10-1446	16-609518	0.0–0.5	Soil	—	0.619	0.0475	0.144	—	0.0155 (J)	0.0332 (J)	0.436	0.613	—	—
RE16-10-1451	16-609518	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1448	16-609519	0.0–0.5	Soil	—	0.3 (J)	—	0.051 (J)	—	—	—	0.22 (J)	0.25 (J)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] na = Not available.

[f] — = Not detected or not detected above BV.

[g] Isopropylbenzene was used as a surrogate based on structural similarity.

Table 7.9-1
Summary of Samples Collected and Analyses Requested at AOC C-16-060

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1406	16-609503	0.0–0.5	Fill	10-1194	10-1195	10-1194	10-1194	10-1194	10-1194	10-1195	10-1195	10-1194	10-1194
RE16-10-1407	16-609503	5.5–6.0	Fill	10-1490	10-1491	10-1490	10-1490	10-1490	10-1490	10-1491	10-1491	10-1490	10-1490
RE16-10-1408	16-609504	0.0–0.5	Soil	10-1194	10-1195	10-1194	10-1194	10-1194	10-1194	10-1195	10-1195	10-1194	10-1194
RE16-10-1409	16-609504	5.5–6.0	Fill	10-1490	10-1491	10-1490	10-1490	10-1490	10-1490	10-1491	10-1491	10-1490	10-1490
RE16-10-1410	16-609505	0.0–0.5	Fill	10-1194	10-1195	10-1194	10-1194	10-1194	10-1194	10-1195	10-1195	10-1194	10-1194
RE16-10-1411	16-609505	5.5–6.0	Fill	10-1490	10-1491	10-1490	10-1490	10-1490	10-1490	10-1491	10-1491	10-1490	10-1490
RE16-10-1412	16-609506	0.0–0.5	Fill	10-1194	10-1195	10-1194	10-1194	10-1194	10-1194	10-1195	10-1195	10-1194	10-1194
RE16-10-1413	16-609506	5.5–6.0	Fill	10-1490	10-1491	10-1490	10-1490	10-1490	10-1490	10-1491	10-1491	10-1490	10-1490
RE16-10-1414	16-609507	0.0–0.5	Fill	10-1194	10-1195	10-1194	10-1194	10-1194	10-1194	10-1195	10-1195	10-1194	10-1194
RE16-10-1415	16-609507	5.5–6.0	Fill	10-1490	10-1491	10-1490	10-1490	10-1490	10-1490	10-1491	10-1491	10-1490	10-1490

Table 7.9-2
Summary of Inorganic Chemicals above BVs at AOC C-16-060

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Cobalt	Fluoride	Manganese	Nitrate	Perchlorate
Soil BV[a]				**0.83**	**295**	**0.4**	**8.64**	**na**[b]	**671**	**na**	**na**
Industrial SSL[c]				**454**	**224000**	**1120**	**300**[d]	**68100**	**145000**	**1820000**	**795**
Recreational SSL[e]				**317**	**158000**	**784**	**238**	**47500**	**110000**	**1260000**	**555**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**23**[d]	**4690**	**10700**	**125000**	**54.8**
RE16-10-1406	16-609503	0.0–0.5	Fill	1.11 (U)	—[f]	0.556 (U)	—	1.75 (J-)	—	1.35	—
RE16-10-1407	16-609503	5.5–6.0	Fill	1.19 (U)	—	0.554 (U)	—	11.2 (J-)	—	—	—
RE16-10-1408	16-609504	0.0–0.5	Soil	1.2 (U)	—	0.602 (U)	—	1.32 (J-)	—	—	—
RE16-10-1409	16-609504	5.5–6.0	Fill	—	—	0.597 (U)	—	9.65 (J-)	—	—	—
RE16-10-1410	16-609505	0.0–0.5	Fill	1.17 (U)	332	—	15.2	1.36 (J-)	2320	2.67	0.00164 (J)
RE16-10-1411	16-609505	5.5–6.0	Fill	0.983 (U)	—	0.535 (U)	—	5.22 (J-)	—	—	0.000573 (J)
RE16-10-1412	16-609506	0.0–0.5	Fill	1.09 (U)	—	0.545 (U)	—	1.37 (J-)	—	1.33	—
RE16-10-1413	16-609506	5.5–6.0	Fill	—	—	0.551 (U)	—	4.41 (J-)	—	—	—
RE16-10-1414	16-609507	0.0–0.5	Fill	1.08 (U)	—	0.542 (U)	—	1.05 (J-)	—	1.67	—
RE16-10-1415	16-609507	5.5–6.0	Fill	1.12 (U)	—	0.558 (U)	—	6.93 (J-)	—	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[e] SSLs from LANL (2010, 108613).
[f] — = Not detected or not detected above BV.

Table 7.9-3
Summary of Organic Chemicals Detected at AOC C-16-060

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Aniline	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid
Industrial SSL[a]				**36700**	**851000**	**300**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2500000**[b]
Recreational SSL[d]				**20800**	**702000**[f]	**na**[e]	**104000**	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1590000**
Residential SSL[a]				**3440**	**67500**	**850**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**240000**[b]
RE16-10-1406	16-609503	0.0–0.5	Fill	0.408	—[f]	—	0.527	0.73	0.702	0.886	0.341	0.398	0.55 (J)
RE16-10-1408	16-609504	0.0–0.5	Soil	—	—	0.15 (J)	0.0154 (J)	0.0762	0.0663	—	—	—	—
RE16-10-1409	16-609504	5.5–6.0	Fill	—	0.00204 (J)	—	—	—	—	—	—	—	—
RE16-10-1410	16-609505	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—
RE16-10-1411	16-609505	5.5–6.0	Fill	—	0.00272 (J)	—	—	—	—	—	—	—	—
RE16-10-1412	16-609506	0.0–0.5	Fill	0.0704	—	—	0.132	0.479	0.46	0.657	0.223	0.246	—
RE16-10-1414	16-609507	0.0–0.5	Fill	0.0319 (J)	—	—	—	0.0346 (J)	0.0307 (J)	0.0478	0.0182 (J)	0.0155 (J)	—

Table 7.9-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene
Industrial SSL[a]				**2340**	**1000**[b]	**24400**	**24400**	**23.4**	**1090**	**4100**[b]	**252**	**20500**	**18300**
Recreational SSL[d]				**3010**	**399**	**13900**	**13900**	**30.1**	**4520**	**3170**	**1950**	**12000**	**10400**
Residential SSL[a]				**621**	**78**[b]	**2290**	**2290**	**6.21**	**199**	**310**[b]	**45**	**1830**	**1720**
RE16-10-1406	16-609503	0.0–0.5	Fill	0.831	0.274 (J)	1.69	0.421	0.415	—	0.243	0.789	1.89	1.94
RE16-10-1408	16-609504	0.0–0.5	Soil	0.0888	—	0.133	—	0.151	—	—	0.0153 (J)	0.101	0.157
RE16-10-1409	16-609504	5.5–6.0	Fill	—	—	—	—	—	—	—	—	—	—
RE16-10-1410	16-609505	0.0–0.5	Fill	—	—	0.0796 (J)	—	—	0.00276 (J+)	—	—	0.0625 (J)	0.0932 (J)
RE16-10-1411	16-609505	5.5–6.0	Fill	—	—	—	—	—	—	—	—	—	—
RE16-10-1412	16-609506	0.0–0.5	Fill	0.509	—	0.95	0.0602	0.3	—	0.0166 (J)	0.0329 (J)	0.584	1.05
RE16-10-1414	16-609507	0.0–0.5	Fill	0.0354 (J)	—	0.0599	—	0.122	—	—	—	0.0397	0.07

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] na = Not available.

[f] — = Not detected or not detected above BV.

Table 7.9-4
Summary of Radionuclides Detected at AOC C-16-060

Sample ID	Location ID	Depth (ft)	Media	Cesium-137
Soil BV[a]				**1.65**
Industrial SAL[b]				**23**
Recreational SAL[b]				**210**
Residential SAL[b]				**5.6**
RE16-10-1415	16-609507	5.5–6.0	Fill	0.0823

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.10-1
Summary of Samples Collected and Analyses Requested at SWMU 13-001

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-936	16-608606	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-937	16-608606	5.5–6.0	Qbt 4	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-938	16-608607	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-939	16-608607	5.5–6.0	Qbt 4	10-1332	10-1331	10-1332	10-1330	10-1332	10-1332	10-1331	10-1331	10-1330	10-1330
RE16-10-940	16-608608	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-941	16-608608	1.5–2.0	Fill	10-1285	10-1286	10-1285	10-1285	10-1285	10-1285	10-1286	10-1286	10-1285	10-1285
RE16-10-942	16-608609	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-943	16-608609	5.5–6.0	Qbt 4	10-1285	10-1286	10-1285	10-1285	10-1285	10-1285	10-1286	10-1286	10-1285	10-1285
RE16-10-944	16-608610	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-945	16-608610	5.5–6.0	Qbt 4	10-1285	10-1286	10-1285	10-1285	10-1285	10-1285	10-1286	10-1286	10-1285	10-1285
RE16-10-946	16-608611	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-947	16-608611	5.5–6.0	Qbt 4	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-948	16-608612	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-949	16-608612	5.5–6.0	Qbt 4	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-950	16-608613	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-951	16-608613	5.5–6.0	Qbt 4	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-952	16-608614	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-953	16-608614	5.5–6.0	Qbt 4	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-954	16-608615	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-955	16-608615	5.5–6.0	Soil	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-956	16-608616	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-957	16-608616	5.5–6.0	Qbt 4	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374
RE16-10-958	16-608617	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-959	16-608617	5.5–6.0	Qbt 4	10-1332	10-1331	10-1332	10-1330	10-1332	10-1332	10-1331	10-1331	10-1330	10-1330
RE16-10-964	16-608620	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-965	16-608620	4.0–4.5	Qbt 4	10-1332	10-1331	10-1332	10-1330	10-1332	10-1332	10-1331	10-1331	10-1330	10-1330
RE16-10-966	16-608621	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-968	16-608622	0.0–0.5	Soil	10-1080	10-1079	10-1080	10-1078	10-1080	10-1080	10-1079	10-1079	10-1078	10-1078
RE16-10-969	16-608622	5.5–6.0	Soil	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-970	16-608623	0.0–0.5	Soil	10-1072	10-1071	10-1072	10-1070	10-1072	10-1072	10-1071	10-1071	10-1070	10-1070
RE16-10-971	16-608623	5.5–6.0	Qbt 4	10-1332	10-1331	10-1332	10-1330	10-1332	10-1332	10-1331	10-1331	10-1330	10-1330
RE16-10-972	16-608624	0.0–0.5	Soil	10-1080	10-1079	10-1080	10-1078	10-1080	10-1080	10-1079	10-1079	10-1078	10-1078
RE16-10-973	16-608624	5.5–6.0	Fill	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-974	16-608625	0.0–0.5	Soil	10-1080	10-1079	10-1080	10-1078	10-1080	10-1080	10-1079	10-1079	10-1078	10-1078

Table 7.10-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-975	16-608625	2.5–3.0	Soil	10-1332	10-1331	10-1332	10-1330	10-1332	10-1332	10-1331	10-1331	10-1330	10-1330
RE16-10-976	16-608626	0.0–0.5	Soil	10-1080	10-1079	10-1080	10-1078	10-1080	10-1080	10-1079	10-1079	10-1078	10-1078
RE16-10-977	16-608626	5.5–6.0	Qbt 4	10-1332	10-1331	10-1332	10-1330	10-1332	10-1332	10-1331	10-1331	10-1330	10-1330
RE16-10-978	16-608627	0.0–0.5	Soil	10-1080	10-1079	10-1080	10-1078	10-1080	10-1080	10-1079	10-1079	10-1078	10-1078
RE16-10-979	16-608627	5.5–6.0	Qbt 4	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374	10-1374
RE16-10-980	16-608628	0.0–0.5	Soil	10-1080	10-1079	10-1080	10-1078	10-1080	10-1080	10-1079	10-1079	10-1078	10-1078
RE16-10-981	16-608628	2.0–2.5	Qbt 4	10-1332	10-1331	10-1332	10-1330	10-1332	10-1332	10-1331	10-1331	10-1330	10-1330
RE16-10-982	16-608629	0.0–0.5	Soil	10-1080	10-1079	10-1080	10-1078	10-1080	10-1080	10-1079	10-1079	10-1078	10-1078
RE16-10-983	16-608629	3.5–4.0	Qbt 4	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-984	16-608630	0.0–0.5	Soil	10-1080	10-1079	10-1080	10-1078	10-1080	10-1080	10-1079	10-1079	10-1078	10-1078
RE16-10-985	16-608630	4.5–5.0	Qbt 4	10-1294	10-1295	10-1294	10-1294	10-1294	10-1294	10-1295	10-1295	10-1294	10-1294
RE16-10-1027	16-608631	0.0–0.5	Soil	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083
RE16-10-1028	16-608631	5.5–6.0	Qbt 4	10-1335	10-1335	10-1335	10-1334	10-1335	10-1335	10-1335	10-1335	10-1334	10-1334
RE16-10-1029	16-608632	0.0–0.5	Soil	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083
RE16-10-1030	16-608632	5.5–6.0	Qbt 4	10-1335	10-1335	10-1335	10-1334	10-1335	10-1335	10-1335	10-1335	10-1334	10-1334
RE16-10-1031	16-608633	0.0–0.5	Soil	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083	10-1083
RE16-10-1032	16-608633	5.5–6.0	Qbt 4	10-1335	10-1335	10-1335	10-1334	10-1335	10-1335	10-1335	10-1335	10-1334	10-1334

Table 7.10-2
Summary of Inorganic Chemicals above BVs at SWMU 13-001

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Fluoride	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Sodium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na[b]**	**11.2**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**2770**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**na**	**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**915**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**68100**	**800**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**na**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**1910[d]**	**238**	**31700**	**47500**	**560**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**na**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**4690**	**400**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**na**	**23500**
RE16-10-936	16-608606	0.0–0.5	Soil	—[g]	—	—	—	0.575 (U)	—	—	—	—	1.44 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-937	16-608606	5.5–6.0	Qbt 4	—	1.06 (U)	—	—	—	—	—	—	—	6.12 (J-)	—	—	—	—	—	—	1.03 (U)	—	—
RE16-10-938	16-608607	0.0–0.5	Soil	—	—	—	—	0.634 (U)	—	—	—	—	—	—	—	—	—	1.18	—	—	—	—
RE16-10-939	16-608607	5.5–6.0	Qbt 4	9300	1.13 (U)	6.22	—	—	—	7.93	—	4.75	11.6 (J-)	—	—	—	6.99	—	—	1.14 (U)	—	—
RE16-10-940	16-608608	0.0–0.5	Soil	—	1.07 (U)	—	—	0.536 (U)	—	—	—	—	0.376 (J-)	—	—	—	—	1.51	—	—	—	—
RE16-10-941	16-608608	1.5–2.0	Fill	—	1.11	—	—	—	45200	—	—	17.1	2.04 (J-)	234	—	0.69	—	7.07	0.000754 (J)	—	—	96.4
RE16-10-942	16-608609	0.0–0.5	Soil	—	1.1 (U)	—	—	0.551 (U)	—	—	—	—	0.994 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-943	16-608609	5.5–6.0	Qbt 4	—	1.13 (U)	5.09	59.3	—	—	—	—	—	6.31 (J-)	—	—	—	—	1.63	—	1.12 (U)	—	—
RE16-10-944	16-608610	0.0–0.5	Soil	—	1.08 (U)	—	—	1.64	—	—	—	—	0.35 (J-)	—	—	—	—	—	—	—	—	55.5
RE16-10-945	16-608610	5.5–6.0	Qbt 4	—	1.11 (U)	—	—	—	—	—	—	—	9.16 (J-)	—	—	—	—	—	—	1.07 (U)	—	—
RE16-10-946	16-608611	0.0–0.5	Soil	—	1.29 (U)	—	—	0.644 (U)	—	—	—	—	0.832 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-947	16-608611	5.5–6.0	Qbt 4	—	1.1 (U)	—	—	—	—	—	—	—	7.06 (J-)	—	—	—	—	—	—	1.05 (U)	—	—
RE16-10-948	16-608612	0.0–0.5	Soil	—	—	—	—	0.614 (U)	—	—	—	—	0.649 (J-)	24.6	—	—	—	—	—	—	—	—
RE16-10-949	16-608612	5.5–6.0	Qbt 4	—	1.12 (U)	3.31	47.9	—	—	—	—	—	7.71 (J-)	—	—	—	—	—	—	1.07 (U)	—	—
RE16-10-950	16-608613	0.0–0.5	Soil	—	1.06 (U)	—	—	0.531 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-951	16-608613	5.5–6.0	Qbt 4	—	1.04 (U)	—	—	—	—	—	—	—	4.31 (J-)	—	—	—	—	—	—	0.946 (U)	—	—
RE16-10-952	16-608614	0.0–0.5	Soil	—	1.44 (U)	—	—	0.719 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-953	16-608614	5.5–6.0	Qbt 4	—	1.01 (U)	—	—	—	—	—	—	—	6.77 (J-)	—	—	—	—	—	—	1.02 (U)	—	—
RE16-10-954	16-608615	0.0–0.5	Soil	—	1.12 (U)	—	—	0.56 (U)	—	—	—	—	0.39 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-955	16-608615	5.5–6.0	Soil	—	1.12 (U)	—	—	0.56 (U)	—	—	—	—	6.32 (J-)	—	—	—	—	4.87	—	—	—	—
RE16-10-956	16-608616	0.0–0.5	Soil	—	1.32 (U)	—	—	0.66 (U)	—	—	—	—	0.629 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-957	16-608616	5.5–6.0	Qbt 4	—	1.18 (U)	—	—	—	—	—	—	—	3.13 (J-)	—	—	—	—	—	—	1.17 (U)	—	—
RE16-10-958	16-608617	0.0–0.5	Soil	—	1.24 (U)	—	—	0.622 (U)	—	—	—	—	0.97 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-959	16-608617	5.5–6.0	Qbt 4	—	1.18 (U)	—	53.5 (J+)	—	—	—	—	—	7.51 (J-)	—	—	—	—	—	—	1.17 (U)	—	—
RE16-10-964	16-608620	0.0–0.5	Soil	—	1.31 (U)	—	—	0.655 (U)	—	—	—	—	1.11 (J-)	—	—	—	—	1.71	—	—	—	—
RE16-10-965	16-608620	4.0–4.5	Qbt 4	—	0.699 (U)	—	—	—	—	40.3	—	—	6.05 (J-)	—	—	—	—	—	—	1.1 (U)	—	—
RE16-10-966	16-608621	0.0–0.5	Soil	—	1.16 (U)	—	—	0.579 (U)	—	—	—	—	0.441 (J-)	—	—	—	—	3.64	—	—	—	—
RE16-10-968	16-608622	0.0–0.5	Soil	—	1.15 (U)	—	—	—	—	—	—	—	1.31 (J-)	—	—	—	—	1.39 (J-)	0.00126 (J)	—	—	—

Table 7.10-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Fluoride	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Sodium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na[b]**	**11.2**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**2770**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**na**	**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**915**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**68100**	**800**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**na**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**1910[d]**	**238**	**31700**	**47500**	**560**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**na**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**4690**	**400**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**na**	**23500**
RE16-10-969	16-608622	5.5–6.0	Soil	—	1.09 (U)	—	—	0.544 (U)	—	—	—	—	4.52 (J-)	—	—	—	—	—	0.00484	—	—	—
RE16-10-970	16-608623	0.0–0.5	Soil	—	1.19 (U)	—	—	0.596 (U)	—	—	—	—	—	51.3	—	—	—	—	—	—	—	—
RE16-10-971	16-608623	5.5–6.0	Qbt 4	—	1.04 (U)	—	—	—	—	—	—	—	4.79 (J-)	—	—	—	—	—	0.000758 (J)	1 (U)	—	—
RE16-10-972	16-608624	0.0–0.5	Soil	—	—	—	—	0.549 (U)	—	—	—	—	1.48 (J-)	—	—	—	—	1.69 (J-)	—	—	—	—
RE16-10-973	16-608624	5.5–6.0	Fill	—	0.977 (U)	—	—	0.538 (U)	88400 (J+)	—	—	28	—	—	—	—	—	—	0.000835 (J)	—	992	239
RE16-10-974	16-608625	0.0–0.5	Soil	—	1.12 (U)	—	—	0.559 (U)	—	—	—	—	0.64 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-975	16-608625	2.5–3.0	Soil	—	1.1 (U)	—	—	0.551 (U)	—	—	—	—	3.17 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-976	16-608626	0.0–0.5	Soil	—	1.15 (U)	—	—	0.574 (U)	—	—	—	—	1.22 (J-)	—	—	—	—	2.78 (J-)	—	—	—	—
RE16-10-977	16-608626	5.5–6.0	Qbt 4	—	1.03 (U)	—	—	—	—	—	—	—	3.9 (J-)	—	—	—	—	—	0.0034	1.03 (U)	—	—
RE16-10-978	16-608627	0.0–0.5	Soil	—	1.23 (U)	—	—	0.617 (U)	—	—	12.1	—	—	—	747	—	—	2.21 (J-)	—	—	—	—
RE16-10-979	16-608627	5.5–6.0	Qbt 4	—	1.07 (U)	—	—	—	—	—	—	—	1.99 (J-)	—	—	—	—	—	—	1.01 (U)	—	—
RE16-10-980	16-608628	0.0–0.5	Soil	—	—	—	—	0.63 (U)	—	—	—	—	0.628 (J-)	—	—	—	—	2.16 (J-)	—	—	—	—
RE16-10-981	16-608628	2.0–2.5	Qbt 4	—	1.08 (U)	—	62.5 (J+)	—	—	—	—	14	2.09 (J-)	11.2	—	—	—	—	—	1.09 (U)	—	—
RE16-10-982	16-608629	0.0–0.5	Soil	—	1.4 (U)	—	—	0.699 (U)	—	—	—	—	0.501 (J-)	—	—	—	—	—	0.00078 (J)	—	—	97.7
RE16-10-983	16-608629	3.5–4.0	Qbt 4	—	1.1 (U)	—	—	—	—	—	—	—	1.6 (J-)	—	—	—	—	—	—	1.01 (U)	—	—
RE16-10-984	16-608630	0.0–0.5	Soil	—	—	—	—	0.587 (U)	—	—	—	—	0.559 (J-)	47.9	—	—	—	—	0.000689 (J)	—	—	—
RE16-10-985	16-608630	4.5–5.0	Qbt 4	—	1.02 (U)	—	—	—	—	7.76	—	—	13.1 (J-)	—	—	—	—	—	—	1.03 (U)	—	—
RE16-10-1027	16-608631	0.0–0.5	Soil	—	1.13 (U)	—	—	0.563 (U)	—	—	—	—	0.627 (J-)	—	—	—	—	—	—	—	—	—
RE16-10-1028	16-608631	5.5–6.0	Qbt 4	—	1.03 (U)	—	—	—	—	—	—	—	13.5 (J-)	—	—	—	—	—	0.0015 (J)	1.02 (U)	—	—
RE16-10-1029	16-608632	0.0–0.5	Soil	—	1.3 (U)	—	—	0.65 (U)	—	—	—	16	0.691 (J-)	—	—	—	—	—	—	—	—	59.8
RE16-10-1030	16-608632	5.5–6.0	Qbt 4	—	1.03 (U)	—	69.6 (J+)	—	—	—	—	—	4.81 (J-)	—	—	—	—	—	—	1.06 (U)	—	—
RE16-10-1031	16-608633	0.0–0.5	Soil	—	1.23 (U)	—	—	0.613 (U)	—	—	—	—	1.8 (J-)	—	—	—	—	—	—	—	—	80.6
RE16-10-1032	16-608633	5.5–6.0	Qbt 4	—	1.05 (U)	—	—	—	—	—	—	—	2.21 (J-)	—	—	—	—	—	—	1.08 (U)	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 7.10-3
Summary of Organic Chemicals Detected at SWMU 13-001

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Butylbenzylphthalate	Chrysene	Dibenz(a,h)anthracene	Di-n-butylphthalate
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**2500000[c]**	**1370**	**369000**	**9100[c]**	**2340**	**2.34**	**68400**
Recreational SSL[d]				**20800**	**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**301**	**1590000**	**1830**	**446000**	**13500**	**3010**	**3.01**	**39900**
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**240000[c]**	**347**	**39600**	**2600[c]**	**621**	**0.621**	**6110**
RE16-10-936	16-608606	0.0–0.5	Soil	0.251	—[e]	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-938	16-608607	0.0–0.5	Soil	—	—	—	0.0151 (J)	0.0149 (J)	0.0178 (J)	—	—	—	0.157 (J)	—	—	0.0138 (J)	—	—
RE16-10-941	16-608608	1.5–2.0	Fill	—	0.0324 (J)	—	—	—	—	—	—	NA*	—	0.00618	—	—	—	0.337 (J)
RE16-10-942	16-608609	0.0–0.5	Soil	0.0191 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-944	16-608610	0.0–0.5	Soil	—	—	0.0138 (J-)	0.0466 (J-)	0.041 (J-)	0.0603 (J-)	0.0339 (J-)	0.0295 (J-)	—	1.36 (J-)	—	0.315 (J-)	0.0482 (J-)	—	—
RE16-10-946	16-608611	0.0–0.5	Soil	—	—	—	0.0266 (J)	0.0252 (J)	0.0353 (J)	0.0188 (J)	0.0173 (J)	—	—	—	—	0.0319 (J)	—	—
RE16-10-948	16-608612	0.0–0.5	Soil	0.038 (J)	—	0.0426	0.153	0.192	0.235	0.122 (J)	—	—	—	—	—	0.185	0.0414 (J)	—
RE16-10-950	16-608613	0.0–0.5	Soil	—	—	—	0.0167 (J)	0.0199 (J)	0.0246 (J)	—	0.0116 (J)	—	—	—	—	0.0188 (J)	—	—
RE16-10-952	16-608614	0.0–0.5	Soil	0.0371 (J)	—	0.0115 (J)	0.0371 (J)	0.0346 (J)	0.0455 (J)	0.0271 (J)	0.0172 (J)	—	—	—	—	0.0376 (J)	—	—
RE16-10-954	16-608615	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-955	16-608615	5.5–6.0	Soil	0.0142 (J)	—	0.0178 (J)	0.0321 (J)	0.0233 (J)	0.0295 (J)	—	—	—	—	—	—	0.0285 (J)	—	—
RE16-10-956	16-608616	0.0–0.5	Soil	—	—	0.00956 (J)	0.0579	0.0692	0.0883	0.0402 (J)	0.0379 (J)	—	—	—	—	0.067	—	—
RE16-10-959	16-608617	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-964	16-608620	0.0–0.5	Soil	—	—	—	0.0166 (J)	—	0.0195 (J)	—	—	—	1.4 (J)	—	—	0.0139 (J)	—	—
RE16-10-965	16-608620	4.0–4.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-966	16-608621	0.0–0.5	Soil	—	—	—	0.0205 (J)	0.0209 (J)	0.0269 (J)	—	0.0131 (J)	—	—	—	—	0.0198 (J)	—	—
RE16-10-970	16-608623	0.0–0.5	Soil	—	—	—	0.0158 (J)	—	0.0412 (J)	—	—	—	—	—	—	0.0202 (J)	—	—
RE16-10-973	16-608624	5.5–6.0	Fill	—	0.0379 (J)	—	—	—	—	—	—	—	—	0.00229 (J)	—	—	—	—
RE16-10-976	16-608626	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-981	16-608628	2.0–2.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-982	16-608629	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.711 (J)	—	—	—	—	—	—
RE16-10-984	16-608630	0.0–0.5	Soil	—	—	—	—	—	0.0128 (J)	—	—	—	—	—	—	—	—	0.863
RE16-10-985	16-608630	4.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.0748 (J)	—	—	—	—	—
RE16-10-1030	16-608632	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1031	16-608633	0.0–0.5	Soil	0.0147 (J)	—	0.0177 (J)	0.0959	0.115	0.14	0.0751 (J)	0.0613	—	—	—	—	0.112	—	—
RE16-10-1032	16-608633	5.5–6.0	Qbt 4	0.0129 (J)	—	0.0203 (J)	0.0398	0.0295 (J)	0.0451	0.0214 (J)	—	—	—	—	—	0.0346 (J)	—	—

Table 7.10-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	RDX	Styrene	TATB	Toluene
Industrial SSL[a]				**24400**	**24400**	**34200**	**23.4**	**14900**[f]	**1090**	**4100**[c]	**252**	**20500**	**18300**	**174**	**51200**	**na**[g]	**57900**
Recreational SSL[e]				**13900**	**13900**	**19900**	**30.1**	**52700**[f]	**4520**	**3170**	**1950**	**12000**	**10400**	**233**	**126000**	**na**	**60800**
Residential SSL[a]				**2290**	**2290**	**3060**	**6.21**	**3210**[f]	**199**	**310**[c]	**45**	**1830**	**1720**	**44.2**	**8970**	**na**	**5570**
RE16-10-936	16-608606	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-938	16-608607	0.0–0.5	Soil	0.0245 (J)	—	—	—	—	—	—	—	0.0181 (J)	0.0297 (J)	—	—	—	—
RE16-10-941	16-608608	1.5–2.0	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-942	16-608609	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-944	16-608610	0.0–0.5	Soil	0.0684 (J-)	—	—	0.0301 (J-)	—	—	—	—	0.0517 (J-)	0.103 (J-)	—	—	2.38 (J+)	—
RE16-10-946	16-608611	0.0–0.5	Soil	0.0616	—	—	0.0172 (J)	—	—	—	—	0.0285 (J)	0.0548	—	—	—	—
RE16-10-948	16-608612	0.0–0.5	Soil	0.323	0.0268 (J)	0.176 (J)	0.131 (J)	—	—	0.00912 (J)	—	0.229	0.349	—	0.00239	1.61 (J+)	—
RE16-10-950	16-608613	0.0–0.5	Soil	0.0372	—	—	0.0116 (J)	—	—	—	—	0.0247 (J)	0.0372	—	—	1.93 (J+)	—
RE16-10-952	16-608614	0.0–0.5	Soil	0.0718	—	—	0.028 (J)	—	—	—	—	0.0607	0.0812	—	—	0.682 (J+)	—
RE16-10-954	16-608615	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.0147 (J)	—	—	—	—
RE16-10-955	16-608615	5.5–6.0	Soil	0.0698	—	—	0.0127 (J)	—	—	—	0.0193 (J)	0.0707	0.0625	—	—	—	—
RE16-10-956	16-608616	0.0–0.5	Soil	0.107	—	—	0.04 (J)	—	—	—	—	0.0597	0.14	—	—	—	—
RE16-10-959	16-608617	5.5–6.0	Qbt 4	—	—	—	—	—	0.00259 (J)	—	—	—	—	—	—	—	—
RE16-10-964	16-608620	0.0–0.5	Soil	0.0197 (J)	—	1.97	—	—	—	—	—	—	0.0296 (J)	3.39	—	4.88 (J+)	—
RE16-10-965	16-608620	4.0–4.5	Qbt 4	—	—	0.397 (J)	—	—	0.00232 (J)	—	—	—	—	—	—	—	—
RE16-10-966	16-608621	0.0–0.5	Soil	0.0305 (J)	—	—	—	—	—	—	—	0.0212 (J)	0.0465	—	—	1.4 (J+)	—
RE16-10-970	16-608623	0.0–0.5	Soil	0.0319 (J)	—	—	—	—	—	—	—	0.0197 (J)	0.0401 (J)	—	—	—	—
RE16-10-973	16-608624	5.5–6.0	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-976	16-608626	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	1.33 (J+)	—
RE16-10-981	16-608628	2.0–2.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00108 (J)
RE16-10-982	16-608629	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-984	16-608630	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-985	16-608630	4.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1030	16-608632	5.5–6.0	Qbt 4	—	—	—	—	0.000735 (J)	—	—	—	—	—	—	—	—	—
RE16-10-1031	16-608633	0.0–0.5	Soil	0.195	—	—	0.0712 (J)	—	—	—	—	0.104	0.212	—	—	—	—
RE16-10-1032	16-608633	5.5–6.0	Qbt 4	0.077	0.0134 (J)	—	0.123	—	—	—	0.0237 (J)	0.0795	0.0684	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] Isopropylbenzene was used as a surrogate based on structural similarity.

[g] na = Not available.

Table 7.10-4
Summary of Radionuclides Detected at SWMU 13-001

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-239/240
Soil BV/FV[a]				**0.013**	**1.65**	**0.054**
Industrial SAL[b]				**180**	**23**	**210**
Recreational SAL[b]				**280**	**210**	**300**
Residential SAL[b]				**30**	**5.6**	**33**
RE16-10-968	16-608622	0.0–0.5	Soil	0.0394	—[c]	0.081
RE16-10-974	16-608625	0.0–0.5	Soil	—	—	0.0558
RE16-10-984	16-608630	0.0–0.5	Soil	0.0316	1.71	0.0807

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.11-1
Summary of Samples Collected and Analyses Requested at SWMU 13-002

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1101	16-608656	0.0–0.5	Soil	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077
RE16-10-1102	16-608656	5.5–6.0	Qbt 4	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375
RE16-10-1103	16-608657	0.0–0.5	Soil	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077
RE16-10-1104	16-608657	5.5–6.0	Qbt 4	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375	10-1375
RE16-10-1105	16-608658	0.0–0.5	Soil	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077	10-1077
RE16-10-1106	16-608658	5.5–6.0	Qbt 4	10-1336	10-1336	10-1336	10-1336	10-1336	10-1336	10-1336	10-1336	10-1336	10-1336
RE16-10-1107	16-608659	0.0–0.5	Soil	10-2285	10-2284	10-2285	10-2283	10-2285	10-2285	10-2284	10-2284	10-2283	10-2283
RE16-10-1108	16-608659	5.5–6.0	Qbt 4	10-2285	10-2284	10-2285	10-2283	10-2285	10-2285	10-2284	10-2284	10-2283	10-2283
RE16-10-1109	16-608660	0.0–0.5	Soil	10-2285	10-2284	10-2285	10-2283	10-2285	10-2285	10-2284	10-2284	10-2283	10-2283
RE16-10-1111	16-608661	0.0–0.5	Soil	10-2285	10-2284	10-2285	10-2283	10-2285	10-2285	10-2284	10-2284	10-2283	10-2283
RE16-10-1112	16-608661	2.5–3.0	Qbt 3	10-2285	10-2284	10-2285	10-2283	10-2285	10-2285	10-2284	10-2284	10-2283	10-2283
RE16-10-1113	16-608662	0.0–0.5	Soil	10-2285	10-2284	10-2285	10-2283	10-2285	10-2285	10-2284	10-2284	10-2283	10-2283
RE16-10-1114	16-608662	5.5–6.0	Qbt 4	10-2285	10-2284	10-2285	10-2283	10-2285	10-2285	10-2284	10-2284	10-2283	10-2283

Table 7.11-2
Summary of Inorganic Chemicals above BVs at SWMU 13-002

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Copper	Fluoride	Lead	Mercury	Nitrate	Perchlorate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**7.14**	**4.66**	**na[b]**	**11.2**	**0.1**	**na**	**na**	**0.3**
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**14.7**	**na**	**22.3**	**0.1**	**na**	**na**	**1.52**
Industrial SSL[c]				**454**	**224000**	**1120**	**2920[d]**	**45400**	**68100**	**800**	**310[e]**	**1820000**	**795**	**5680**
Recreational SSL[f]				**317**	**158000**	**784**	**1910[d]**	**31700**	**47500**	**560**	**238**	**1260000**	**555**	**3960**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**219[d]**	**3130**	**4690**	**400**	**23[e]**	**125000**	**54.8**	**391**
RE16-10-1101	16-608656	0.0–0.5	Soil	1.23 (U)	—[g]	0.613 (U)	—	—	1 (J-)	—	—	2.04 (J-)	0.00147 (J)	—
RE16-10-1102	16-608656	5.5–6.0	Qbt 4	1.06 (U)	—	—	—	—	2.48 (J-)	—	—	—	0.000727 (J)	1.06 (U)
RE16-10-1103	16-608657	0.0–0.5	Soil	1.33 (U)	—	0.664 (U)	—	—	0.603 (J-)	28.5	—	—	—	—
RE16-10-1104	16-608657	5.5–6.0	Qbt 4	1.08 (U)	57	—	—	—	3.41 (J-)	—	—	—	—	1.08 (U)
RE16-10-1105	16-608658	0.0–0.5	Soil	1.2 (U)	—	0.6 (U)	—	—	1.19 (J-)	—	—	3.52 (J-)	0.00113 (J)	—
RE16-10-1106	16-608658	5.5–6.0	Qbt 4	1.07 (U)	—	—	15.4	—	0.977 (J-)	—	—	—	—	1.11 (U)
RE16-10-1107	16-608659	0.0–0.5	Soil	1.32 (U)	—	0.658 (U)	—	—	1.91	—	—	—	—	—
RE16-10-1108	16-608659	5.5–6.0	Qbt 4	1.17 (U)	199	—	—	—	2.81	—	—	1.41	—	1.15 (U)
RE16-10-1109	16-608660	0.0–0.5	Soil	1.45 (U)	—	0.723 (U)	—	—	1.26 (J)	—	—	—	—	—
RE16-10-1111	16-608661	0.0–0.5	Soil	1.2 (U)	—	—	—	—	3.2	—	0.229	1.7	—	—
RE16-10-1112	16-608661	2.5–3.0	Qbt 3	1.13 (U)	—	—	13.5 (J)	4.91	2.59	—	—	1.26	—	1.09 (U)
RE16-10-1113	16-608662	0.0–0.5	Soil	1.75 (U)	—	0.876 (U)	—	—	1.54 (J)	—	—	—	—	1.91 (U)
RE16-10-1114	16-608662	5.5–6.0	Qbt 4	1.12 (U)	—	—	—	—	1.27	—	—	—	—	1.1 (U)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 7.11-3
Summary of Organic Chemicals Detected at SWMU 13-002

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Phenanthrene	Pyrene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene
Industrial SSL[a]				**36700**	**851000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**2340**	**24400**	**23.4**	**1090**	**20500**	**18300**	**57900**	**77100**	**253**
Recreational SSL[c]				**20800**	**702000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**3010**	**13900**	**30.1**	**4520**	**12000**	**10400**	**60800**	**500000**	**1450**
Residential SSL[a]				**3440**	**67500**	**6.21**	**0.621**	**6.21**	**1720[b]**	**621**	**2290**	**6.21**	**199**	**1830**	**1720**	**5570**	**21800**	**45.7**
RE16-10-1101	16-608656	0.0–0.5	Soil	0.0901	—[d]	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1102	16-608656	5.5–6.0	Qbt 4	0.0542	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1103	16-608657	0.0–0.5	Soil	—	0.00224 (J)	0.0373 (J)	0.038 (J)	0.0661	0.0281 (J)	0.0363 (J)	0.0675	0.0261 (J)	0.00788	0.0279 (J)	0.074	0.000431 (J)	—	—
RE16-10-1105	16-608658	0.0–0.5	Soil	0.0244 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1107	16-608659	0.0–0.5	Soil	—	—	—	—	—	—	—	0.0205 (J)	—	0.00406 (J)	0.0174 (J)	0.0185 (J)	—	0.00118 (J)	0.00372
RE16-10-1108	16-608659	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	0.0123 (J)	—	—	—	—	—	—	—
RE16-10-1109	16-608660	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.00426 (J)	—	—	—	—	0.00133 (J)
RE16-10-1111	16-608661	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.00512 (J)	—	—	—	0.00176	0.00646
RE16-10-1112	16-608661	2.5–3.0	Qbt 3	—	—	—	—	—	—	—	—	—	0.0037 (J)	—	—	—	—	0.000468 (J)
RE16-10-1113	16-608662	0.0–0.5	Soil	—	0.00758 (J)	—	—	—	—	—	—	—	—	—	—	0.00104 (J)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] Pyrene was used as a surrogate based on structural similarity.
[c] SSLs from LANL (2010, 108613).
[d] — = Not detected or not detected above BV.

Table 7.12-1
Summary of Samples Collected and Analyses Requested at SWMU 16-029(h)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1515	16-608700	0.0–0.5	Soil	10-1214	10-1215	10-1214	10-1214	10-1214	10-1214	10-1215	10-1215	10-1214	10-1214
RE16-10-1516	16-608700	5.5–6.0	Qbt 4	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-1517	16-608701	0.0–0.5	Soil	10-1214	10-1215	10-1214	10-1214	10-1214	10-1214	10-1215	10-1215	10-1214	10-1214
RE16-10-1518	16-608701	5.5–6.0	Qbt 4	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-1519	16-608702	0.0–0.5	Fill	10-1214	10-1215	10-1214	10-1214	10-1214	10-1214	10-1215	10-1215	10-1214	10-1214
RE16-10-1520	16-608702	5.5–6.0	Qbt 4	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-1521	16-608703	0.0–0.5	Soil	10-1214	10-1215	10-1214	10-1214	10-1214	10-1214	10-1215	10-1215	10-1214	10-1214
RE16-10-1522	16-608703	5.5–6.0	Qbt 4	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-1523	16-608704	0.0–0.5	Fill	10-1214	10-1215	10-1214	10-1214	10-1214	10-1214	10-1215	10-1215	10-1214	10-1214
RE16-10-1524	16-608704	5.5–6.0	Qbt 4	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-1525	16-608705	0.0–0.5	Soil	10-1214	10-1215	10-1214	10-1214	10-1214	10-1214	10-1215	10-1215	10-1214	10-1214
RE16-10-1526	16-608705	5.5–6.0	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1527	16-608706	0.0–0.5	Soil	10-1214	10-1215	10-1214	10-1214	10-1214	10-1214	10-1215	10-1215	10-1214	10-1214
RE16-10-1528	16-608706	5.5–6.0	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1529	16-608707	0.0–0.5	Soil	10-1283	10-1282	10-1283	10-1281	10-1283	10-1283	10-1282	10-1282	10-1281	10-1281
RE16-10-1530	16-608707	5.5–6.0	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1531	16-608708	0.0–0.5	Soil	10-1283	10-1282	10-1283	10-1281	10-1283	10-1283	10-1282	10-1282	10-1281	10-1281
RE16-10-1532	16-608708	5.5–6.0	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1533	16-608709	0.0–0.5	Soil	10-1283	10-1282	10-1283	10-1281	10-1283	10-1283	10-1282	10-1282	10-1281	10-1281
RE16-10-1534	16-608709	4.0–4.5	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1535	16-608710	0.0–0.5	Soil	10-1283	10-1282	10-1283	10-1281	10-1283	10-1283	10-1282	10-1282	10-1281	10-1281
RE16-10-1536	16-608710	5.5–6.0	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1537	16-608711	0.0–0.5	Soil	10-1283	10-1282	10-1283	10-1281	10-1283	10-1283	10-1282	10-1282	10-1281	10-1281
RE16-10-1538	16-608711	3.0–3.5	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1539	16-608712	0.0–0.5	Soil	10-1283	10-1282	10-1283	10-1281	10-1283	10-1283	10-1282	10-1282	10-1281	10-1281
RE16-10-1540	16-608712	3.0–3.5	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1541	16-608713	0.0–0.5	Soil	10-1283	10-1282	10-1283	10-1281	10-1283	10-1283	10-1282	10-1282	10-1281	10-1281
RE16-10-1542	16-608713	3.0–3.5	Qbt 4	10-1426	10-1425	10-1426	10-1424	10-1426	10-1426	10-1425	10-1425	10-1424	10-1424
RE16-10-1543	16-608714	0.0–0.5	Fill	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-1544	16-608714	5.5–6.0	Qbt 4	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-1514	16-608714	9.0–9.5	Qbt 4	10-1955	10-1954	10-1955	10-1953	10-1955	10-1955	10-1954	10-1954	10-1953	10-1953
RE16-10-1545	16-608715	0.0–0.5	Fill	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-1546	16-608715	5.5–6.0	Fill	10-1410	10-1409	10-1410	10-1408	10-1410	10-1410	10-1409	10-1409	10-1408	10-1408
RE16-10-13141	16-611541	0.0–0.5	Fill	10-1955	10-1954	10-1955	10-1953	10-1955	10-1955	10-1954	10-1954	10-1953	10-1953
RE16-10-13142	16-611541	5.5–6.0	Qbt 4	10-1955	10-1954	10-1955	10-1953	10-1955	10-1955	10-1954	10-1954	10-1953	10-1953
RE16-10-13143	16-611541	9.0–9.5	Qbt 4	10-1955	10-1954	10-1955	10-1953	10-1955	10-1955	10-1954	10-1954	10-1953	10-1953

Table 7.12-2
Summary of Inorganic Chemicals above BVs at SWMU 16-029(h)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Fluoride	Iron	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Thallium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na[b]**	**14500**	**11.2**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**1.1**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**na**	**21500**	**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**0.73**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**68100**	**795000**	**800**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**74.9**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**1910[d]**	**238**	**31700**	**47500**	**554000**	**560**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**52.3**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**4690**	**54800**	**400**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**5.16**	**23500**
RE16-10-1515	16-608700	0.0–0.5	Soil	—[g]	—	—	—	0.584 (U)	—	—	—	—	2.25 (J-)	—	—	—	—	—	1.49	—	—	—	—	—
RE16-10-1516	16-608700	5.5–6.0	Qbt 4	—	0.983 (U)	—	—	—	—	—	—	—	1.33	—	—	—	—	—	—	—	0.989 (U)	—	—	—
RE16-10-1517	16-608701	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	2.09 (J-)	—	39.9	—	—	—	2.58	—	—	—	—	—
RE16-10-1518	16-608701	5.5–6.0	Qbt 4	—	1.07 (U)	—	85.3	—	—	—	—	—	2.4	—	—	—	—	6.82	—	—	1.07 (U)	—	—	—
RE16-10-1519	16-608702	0.0–0.5	Fill	—	1.11 (UJ)	—	—	—	—	—	14.8	—	2.1 (J-)	—	23.2	1420	—	—	1.37	—	—	—	—	—
RE16-10-1520	16-608702	5.5–6.0	Qbt 4	—	1.08 (U)	—	—	—	—	—	—	—	1.91	—	—	—	—	—	—	—	1.01 (U)	—	—	—
RE16-10-1521	16-608703	0.0–0.5	Soil	—	5.75 (UJ)	—	—	—	—	—	—	—	1.35 (J-)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1522	16-608703	5.5–6.0	Qbt 4	9500 (J+)	1.09 (U)	9.92	204	—	—	—	—	—	23.9	20400	11.9	—	—	—	—	0.00115 (J)	1.05 (U)	1.16	—	—
RE16-10-1523	16-608704	0.0–0.5	Fill	—	3.26 (J-)	—	—	—	22900	—	—	15.3	1.05 (J-)	—	47.8	—	0.256	—	—	—	—	—	—	73.8
RE16-10-1524	16-608704	5.5–6.0	Qbt 4	—	1.04 (U)	—	—	—	—	—	—	—	5.52	—	—	—	—	—	—	—	1.04 (U)	—	—	—
RE16-10-1525	16-608705	0.0–0.5	Soil	—	—	—	—	—	—	—	—	34.7	2.43 (J-)	—	125	—	0.955	—	1.5	—	—	—	0.753	—
RE16-10-1526	16-608705	5.5–6.0	Qbt 4	—	1.04 (U)	3.46	—	—	—	—	—	—	6.16	—	—	—	—	—	—	—	1.01 (U)	—	—	—
RE16-10-1527	16-608706	0.0–0.5	Soil	—	—	—	—	—	—	—	—	15.5	1.78 (J-)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1528	16-608706	5.5–6.0	Qbt 4	—	1.08 (U)	3.94	60.3	—	—	—	—	—	6.49	—	—	—	—	—	—	—	1.04 (U)	—	—	—
RE16-10-1529	16-608707	0.0–0.5	Soil	—	1.34 (U)	—	—	0.671 (U)	—	—	—	—	1.46 (J-)	—	—	—	—	—	2.31	—	—	—	—	—
RE16-10-1530	16-608707	5.5–6.0	Qbt 4	—	1.08 (U)	3.19	86.5	—	—	—	—	—	5.96	—	11.6	—	—	—	—	—	1.02 (U)	—	—	—
RE16-10-1531	16-608708	0.0–0.5	Soil	—	1.27 (U)	—	—	0.636 (U)	—	—	—	—	1.44 (J-)	—	—	—	—	—	1.65	0.000729 (J)	—	—	—	—
RE16-10-1532	16-608708	5.5–6.0	Qbt 4	7350 (J+)	1.01 (U)	5.76	60.7	—	—	—	—	—	6.13	—	—	—	—	15.6 (J-)	—	0.000935 (J)	1.05 (U)	—	—	—
RE16-10-1533	16-608709	0.0–0.5	Soil	—	1.18 (U)	—	—	0.59 (U)	—	—	—	20.6	1.58 (J-)	—	30.2	—	—	—	2.48	—	—	—	—	—
RE16-10-1534	16-608709	4.0–4.5	Qbt 4	—	1.02 (U)	—	—	—	—	—	—	—	3.03	—	—	—	—	—	—	—	0.974 (U)	—	—	—
RE16-10-1535	16-608710	0.0–0.5	Soil	—	1.36 (U)	—	—	—	—	—	—	—	1.59 (J-)	—	—	—	—	—	5.31	—	—	—	—	—
RE16-10-1536	16-608710	5.5–6.0	Qbt 4	—	1.06 (U)	—	—	—	—	—	—	—	3.76	—	—	—	—	—	—	—	1.1 (U)	—	—	—
RE16-10-1537	16-608711	0.0–0.5	Soil	—	1.14 (U)	—	—	—	—	—	—	45.7	1.48 (J-)	—	51.6	—	—	—	1.78	—	—	—	—	53.5
RE16-10-1538	16-608711	3.0–3.5	Qbt 4	—	1.09 (U)	—	—	—	—	—	—	—	2.42	—	—	—	—	—	—	—	1.05 (U)	—	—	—
RE16-10-1539	16-608712	0.0–0.5	Soil	—	1.38 (U)	—	—	0.69 (U)	—	—	—	—	1.25 (J-)	—	—	—	—	—	2.03	—	—	—	—	—
RE16-10-1540	16-608712	3.0–3.5	Qbt 4	—	0.927 (J)	—	—	—	—	59	—	15.5	3.89	—	—	—	—	—	—	0.000761 (J)	1.06 (U)	—	—	—
RE16-10-1541	16-608713	0.0–0.5	Soil	—	1.26 (U)	—	—	0.63 (U)	—	—	—	34	1.85 (J-)	—	28.1	—	—	—	8.85	—	—	—	—	—
RE16-10-1542	16-608713	3.0–3.5	Qbt 4	—	1 (U)	—	—	—	—	—	—	—	2.97	—	—	—	—	—	—	—	0.983 (U)	—	—	—

Table 7.12-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Fluoride	Iron	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Thallium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na[b]**	**14500**	**11.2**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**1.1**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**na**	**21500**	**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**0.73**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**68100**	**795000**	**800**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**74.9**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**1910[d]**	**238**	**31700**	**47500**	**554000**	**560**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**52.3**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**4690**	**54800**	**400**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**5.16**	**23500**
RE16-10-1543	16-608714	0.0–0.5	Fill	—	1.07 (U)	—	—	0.536 (U)	—	—	—	—	2.24	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1544	16-608714	5.5–6.0	Qbt 4	—	1.06 (U)	—	—	—	—	—	—	—	3.76	—	—	—	—	—	—	—	1.1 (U)	—	—	—
RE16-10-1514	16-608714	9.0–9.5	Qbt 4	—	1.08 (U)	—	—	—	—	—	—	—	11.9 (J-)	—	—	—	—	—	—	—	1.07 (U)	—	—	—
RE16-10-1545	16-608715	0.0–0.5	Fill	—	1.31 (U)	—	—	0.656 (U)	79100	—	—	—	1.77	—	48.7	—	0.149	—	—	—	—	3.28 (U)	—	68.4
RE16-10-1546	16-608715	5.5–6.0	Fill	—	1.09 (U)	—	—	0.543 (U)	—	—	—	—	3.5	—	28.3	—	—	—	—	—	—	—	—	—
RE16-10-13141	16-611541	0.0–0.5	Fill	—	1.16 (U)	—	—	—	—	—	—	—	2.79 (J-)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-13142	16-611541	5.5–6.0	Qbt 4	—	1.06 (U)	—	114	—	—	—	—	—	3.22 (J-)	—	—	—	—	—	—	—	1 (U)	—	—	—
RE16-10-13143	16-611541	9.0–9.5	Qbt 4	—	1.08 (U)	—	—	—	—	—	—	—	12.5 (J-)	—	—	—	—	—	—	—	1.08 (U)	—	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 7.12-3
Summary of Organic Chemicals Detected at SWMU 16-029(h)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chrysene	Di-n-butylphthalate	Fluoranthene
Industrial SSL[a]				**36700**	**851000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2500000**[c]	**1370**	**369000**	**2340**	**68400**	**24400**
Recreational SSL[d]				**20800**	**702000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**301**	**1590000**	**1830**	**446000**	**3010**	**39900**	**13900**
Residential SSL[a]				**3440**	**67500**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**240000**[c]	**347**	**39600**	**621**	**6110**	**2290**
RE16-10-1515	16-608700	0.0–0.5	Soil	—[e]	—	—	0.0146 (J)	0.0254 (J)	—	—	—	—	—	0.0139 (J)	—	0.0293 (J)
RE16-10-1517	16-608701	0.0–0.5	Soil	—	—	—	0.0171 (J)	0.0404 (J)	0.0135 (J)	0.0156 (J)	—	—	—	0.0229 (J)	—	0.0491
RE16-10-1520	16-608702	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	0.587 (J)	—	—	—	—	—
RE16-10-1521	16-608703	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1522	16-608703	5.5–6.0	Qbt 4	—	0.0278 (J)	—	—	—	—	—	—	—	0.00824 (J)	—	—	—
RE16-10-1523	16-608704	0.0–0.5	Fill	—	—	0.0338 (J)	0.0142 (J)	0.0224 (J)	0.0137 (J)	0.0139 (J)	—	—		0.027 (J)	0.242 (J)	0.0685
RE16-10-1525	16-608705	0.0–0.5	Soil	—	—	—	0.0166 (J)	—	0.0133 (J)	—	—	—	—	0.0235 (J)	0.582	0.0463
RE16-10-1526	16-608705	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1527	16-608706	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.02 (J)
RE16-10-1529	16-608707	0.0–0.5	Soil	0.0661	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1530	16-608707	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1532	16-608708	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1533	16-608709	0.0–0.5	Soil	—	—	0.0174 (J)	0.0131 (J)	0.0178 (J)	—	—	—	—	—	0.0142 (J)	—	0.029 (J)
RE16-10-1535	16-608710	0.0–0.5	Soil	—	—	0.0304 (J)	0.026 (J)	0.0373 (J)	—	0.0195 (J)	0.734 (J)	—	—	0.0287 (J)	—	0.0588
RE16-10-1537	16-608711	0.0–0.5	Soil	—	—	0.0197 (J)	0.0155 (J)	0.0222 (J)	—	—	—	—	—	0.0162 (J)	—	0.0269 (J)
RE16-10-1539	16-608712	0.0–0.5	Soil	—	—	—	—	0.0176 (J)	—	—	0.681 (J)	—	—	—	—	0.0232 (J)
RE16-10-1541	16-608713	0.0–0.5	Soil	—	—	0.0201 (J)	0.0178 (J)	0.0228 (J)	—	0.0159 (J)	—	—	—	0.0161 (J)	—	0.0313 (J)
RE16-10-1542	16-608713	3.0–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1543	16-608714	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1544	16-608714	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	0.102 (J)	—	—	—	—
RE16-10-1514	16-608714	9.0–9.5	Qbt 4	—	0.00187 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-1545	16-608715	0.0–0.5	Fill	—	—	—	—	0.0169 (J)	—	—	—	0.128 (J)	—	—	—	0.0144 (J)
RE16-10-1546	16-608715	5.5–6.0	Fill	—	—	0.0187 (J)	—	—	—	—	—	—	—	—	—	—
RE16-10-13141	16-611541	0.0–0.5	Fill	—	0.00198 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-13142	16-611541	5.5–6.0	Qbt 4	—	0.0022 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-13143	16-611541	9.0–9.5	Qbt 4	—	0.00279 (J)	—	—	—	—	—	—	—	—	—	—	—

Table 7.12-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene	RDX	TATB	Trimethylbenzene[1,2,4-]	Tris (o-cresyl) phosphate
Industrial SSL[a]				**34200**	**23.4**	**14900**[f]	**1090**	**20500**	**18300**	**174**	**na**[g]	**280**[c]	**na**
Recreational SSL[d]				**19900**	**30.1**	**52700**[f]	**4520**	**12000**	**10400**	**233**	**na**	**6880**	**na**
Residential SSL[a]				**3060**	**6.21**	**3210**[f]	**199**	**1830**	**1720**	**44.2**	**na**	**62**[c]	**na**
RE16-10-1515	16-608700	0.0–0.5	Soil	—	—	—	0.00261 (J)	0.0149 (J)	0.0314 (J)	—	—	—	—
RE16-10-1517	16-608701	0.0–0.5	Soil	—	—	—	—	0.0202 (J)	0.0491	—	—	—	—
RE16-10-1520	16-608702	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—
RE16-10-1521	16-608703	0.0–0.5	Soil	—	—	—	—	—	—	—	0.324 (J)	—	—
RE16-10-1522	16-608703	5.5–6.0	Qbt 4	0.387 (J)	—	—	—	—	—	0.142 (J)	—	—	—
RE16-10-1523	16-608704	0.0–0.5	Fill	—	0.133	—	0.00317 (J)	0.0228 (J)	0.0614	—	—	—	—
RE16-10-1525	16-608705	0.0–0.5	Soil	—	0.135	—	—	0.0208 (J)	0.0447	—	—	—	—
RE16-10-1526	16-608705	5.5–6.0	Qbt 4	—	—	—	0.00364 (J)	—	—	—	—	—	—
RE16-10-1527	16-608706	0.0–0.5	Soil	—	—	—	—	—	0.0194 (J)	—	—	—	—
RE16-10-1529	16-608707	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-1530	16-608707	5.5–6.0	Qbt 4	—	—	—	0.00321 (J)	—	—	—	—	—	—
RE16-10-1532	16-608708	5.5–6.0	Qbt 4	—	—	—	0.00407 (J)	—	—	—	—	—	—
RE16-10-1533	16-608709	0.0–0.5	Soil	—	0.124	—	—	0.0219 (J)	0.028 (J)	—	—	—	—
RE16-10-1535	16-608710	0.0–0.5	Soil	—	—	—	—	0.044 (J)	0.0584	—	0.615 (J)	—	—
RE16-10-1537	16-608711	0.0–0.5	Soil	—	—	—	—	0.0186 (J)	0.0289 (J)	—	—	—	—
RE16-10-1539	16-608712	0.0–0.5	Soil	—	—	—	—	0.0145 (J)	0.0266 (J)	—	—	—	—
RE16-10-1541	16-608713	0.0–0.5	Soil	—	—	—	—	0.0216 (J)	0.0327 (J)	—	—	—	0.329 (J)
RE16-10-1542	16-608713	3.0–3.5	Qbt 4	—	—	—	0.00275 (J)	—	—	—	—	—	—
RE16-10-1543	16-608714	0.0–0.5	Fill	—	—	—	0.00243 (J)	—	—	—	—	—	—
RE16-10-1544	16-608714	5.5–6.0	Qbt 4	47.2	—	—	—	—	—	23.9 (J)	0.357 (J)	—	—
RE16-10-1514	16-608714	9.0–9.5	Qbt 4	—	—	—	—	—	—	—	—	—	—
RE16-10-1545	16-608715	0.0–0.5	Fill	—	—	—	—	—	0.0188 (J)	—	7.06 (J)	0.000892 (J)	—
RE16-10-1546	16-608715	5.5–6.0	Fill	—	—	—	—	—	—	—	0.397 (J)	—	—
RE16-10-13141	16-611541	0.0–0.5	Fill	—	—	0.000704 (J)	—	—	—	—	—	—	—

Table 7.12-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene	RDX	TATB	Trimethylbenzene[1,2,4-]	Tris (o-cresyl) phosphate
Industrial SSL[a]				**34200**	**23.4**	**14900**[f]	**1090**	**20500**	**18300**	**174**	**na**[g]	**280**[c]	**na**
Recreational SSL[d]				**19900**	**30.1**	**52700**[f]	**4520**	**12000**	**10400**	**233**	**na**	**6880**	**na**
Residential SSL[a]				**3060**	**6.21**	**3210**[f]	**199**	**1830**	**1720**	**44.2**	**na**	**62**[c]	**na**
RE16-10-13142	16-611541	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—
RE16-10-13143	16-611541	9.0–9.5	Qbt 4	—	—	—	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] Isopropylbenzene was used as a surrogate based on structural similarity.

[g] na = Not available.

Table 7.12-4
Summary of Radionuclides Detected at SWMU 16-029(h)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-239/240
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**
Soil BV/FV[a]				**0.013**	**1.65**	**0.054**
Industrial SAL[c]				**180**	**23**	**210**
Recreational SAL[c]				**280**	**210**	**300**
Residential SAL[c]				**30**	**5.6**	**33**
RE16-10-1535	16-608710	0.0–0.5	Soil	—[d]	—	0.0541
RE16-10-1536	16-608710	5.5–6.0	Qbt 4	—	0.103	—
RE16-10-1537	16-608711	0.0–0.5	Soil	0.0185	—	—
RE16-10-1539	16-608712	0.0–0.5	Soil	0.0246	—	—
RE16-10-1541	16-608713	0.0–0.5	Soil	0.0199	—	—

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.
[a] BVs/FVs from LANL (1998, 059730).
[b] na = Not available.
[c] SALs for radionuclides from LANL (2009, 107655).
[d] — = Not detected or not detected above BV/FV.

Table 7.13-1
Summary of Samples Collected and Analyses Requested at AOC 16-003(p)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC
RE16-10-1130	16-608666	0.0–0.5	Fill	10-1428	10-1428	10-1428	10-1428	10-1428	10-1428	10-1428	10-1428	10-1428	10-1428
RE16-10-1131	16-608666	5.5–6.0	Fill	10-1557	10-1557	10-1557	10-1556	10-1557	10-1557	10-1557	10-1557	10-1556	10-1556
RE16-10-1132	16-608667	0.0–0.5	Fill	10-1577	10-1577	10-1577	10-1577	10-1577	10-1577	10-1577	10-1577	10-1577	10-1577
RE16-10-1133	16-608667	5.5–6.0	Qbt 4	10-1731	10-1731	10-1731	10-1731	10-1731	10-1731	10-1731	10-1731	10-1731	10-1731
RE16-10-1134	16-608668	0.5–1.0	Fill	10-1557	10-1557	10-1557	10-1556	10-1557	10-1557	10-1557	10-1557	10-1556	10-1556
RE16-10-1135	16-608668	6.0–6.5	Fill	10-1557	10-1557	10-1557	10-1556	10-1557	10-1557	10-1557	10-1557	10-1556	10-1556
RE16-10-15355	16-611909	0.0–0.5	Fill	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627
RE16-10-15356	16-611909	5.5–6.0	Fill	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627	10-2627

Table 7.13-2
Summary of Inorganic Chemicals above BVs at AOC 16-003(p)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Fluoride	Lead	Manganese	Nickel	Nitrate	Perchlorate	Selenium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na**[b]	**11.2**	**482**	**6.58**	**na**	**na**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**na**	**22.3**	**671**	**15.4**	**na**	**na**	**1.52**	**48.8**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920**[d]	**300**[e]	**45400**	**68100**	**800**	**145000**	**22700**	**1820000**	**795**	**5680**	**341000**
Recreational SSL[f]				**317**	**158000**	**784**	**na**	**1910**[d]	**238**	**31700**	**47500**	**560**	**110000**	**15800**	**1260000**	**555**	**3960**	**238000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219**[d]	**23**[e]	**3130**	**4690**	**400**	**10700**	**1560**	**125000**	**54.8**	**391**	**23500**
RE16-10-1130	16-608666	0.0–0.5	Fill	1.61	—[g]	0.556 (U)	41900	—	—	—	0.984 (J-)	126 (J-)	—	—	1.71	—	—	78.5 (J+)
RE16-10-1131	16-608666	5.5–6.0	Fill	1.41 (U)	—	0.54 (U)	16100 (J)	—	—	—	3.44	24.8	—	—	—	—	—	—
RE16-10-1132	16-608667	0.0–0.5	Fill	1.99 (U)	—	0.551 (U)	38600	27.6	—	21.9	1.66 (J-)	36.5	—	15.7	2	0.0917	—	72.7
RE16-10-1133	16-608667	5.5–6.0	Qbt 4	1.13 (U)	79.2 (J+)	—	2430	—	5.82	11.9	12.1 (J-)	—	561	7	—	0.00161 (J)	1.12 (U)	—
RE16-10-1134	16-608668	0.5–1.0	Fill	0.976 (U)	—	0.49 (U)	—	—	—	—	4.49	28.7	—	—	—	—	—	—
RE16-10-1135	16-608668	6.0–6.5	Fill	—	—	0.512 (U)	—	—	—	—	7.72	—	—	—	—	—	—	—
RE16-10-15355	16-611909	0.0–0.5	Fill	—	—	—	8160	—	—	—	0.47 (J)	76.5	—	36.4	—	—	—	—
RE16-10-15356	16-611909	5.5–6.0	Fill	—	—	—	7930	—	—	—	3.7	34.4	—	—	0.9	—	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 7.13-3
Summary of Organic Chemicals Detected at AOC 16-003(p)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Butylbenzylphthalate	HMX	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	RDX	TATB
Industrial SSL[a]				**851000**	**1370**	**369000**	**9100**[b]	**34200**	**14900**[c]	**73300**	**174**	**na**[d]
Recreational SSL[e]				**702000**	**1830**	**446000**	**13500**	**19900**	**52700**[c]	**62300**	**233**	**na**
Residential SSL[a]				**67500**	**347**	**39600**	**2600**[b]	**3060**	**3210**[c]	**5950**	**44.2**	**na**
RE16-10-1130	16-608666	0.0–0.5	Fill	0.0107 (J-)	0.233 (J)	—[f]	—	1.59	—	—	—	0.468 (J)
RE16-10-1131	16-608666	5.5–6.0	Fill	—	—	0.00238 (J)	—	0.407 (J)	—	—	—	—
RE16-10-1132	16-608667	0.0–0.5	Fill	0.0586	6.34	0.00804	2.48	0.851 (J)	—	0.0108	—	1.23
RE16-10-1133	16-608667	5.5–6.0	Qbt 4	—	—	—	—	1.34	—	—	0.206 (J)	0.374 (J+)
RE16-10-15356	16-611909	5.5–6.0	Fill	0.035 (J-)	—	0.0078 (J-)	—	—	0.00047 (J-)	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Isopropylbenzene was used as a surrogate based on structural similarity.

[d] na = Not available.

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

Table 7.13-4
Summary of Radionuclides Detected at AOC 16-003(p)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Plutonium-239/240
Soil BV/FV[a]				**1.65**	**0.054**
Industrial SAL[b]				**23**	**210**
Recreational SAL[b]				**210**	**300**
Residential SAL[b]				**5.6**	**33**
RE16-10-1134	16-608668	0.5–1.0	Fill	—[c]	0.0865
RE16-10-15356	16-611909	5.5–6.0	Fill	0.105	—

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.15-1
Summary of Samples Collected and Analyses Requested at SWMU 16-004(a)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-1150	16-608673	22.0–23.5	Qbt 4	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573
RE16-10-1151	16-608673	27.5–30.0	Qbt 4	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573	10-1573
RE16-10-1152	16-608674	22.0–25.0	Qbt 4	10-1627	10-1627	10-1627	10-1626	10-1627	10-1627	10-1627	10-1627	10-1626	10-1626	10-1627
RE16-10-1153	16-608674	27.5–30.0	Qbt 4	10-1627	10-1627	10-1627	10-1626	10-1627	10-1627	10-1627	10-1627	10-1626	10-1626	10-1627
RE16-10-1154	16-608675	20.0–24.0	Qbt 4	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849
RE16-10-1155	16-608675	28.0–30.0	Qbt 4	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849	10-1849
RE16-10-1156	16-608676	22.0–24.0	Qbt 4	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701
RE16-10-1157	16-608676	27.5–30.0	Qbt 4	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701	10-1701

Table 7.15-2
Summary of Inorganic Chemicals above BVs at SWMU 16-004(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Beryllium	Fluoride	Nickel	Nitrate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.21**	**na**[b]	**6.58**	**na**	**0.3**
Industrial SSL[c]				**454**	**224000**	**2260**	**68100**	**22700**	**1820000**	**5680**
Recreational SSL[d]				**317**	**158000**	**1580**	**47500**	**15800**	**1260000**	**3960**
Residential SSL[c]				**31.3**	**15600**	**156**	**4690**	**1560**	**125000**	**391**
RE16-10-1150	16-608673	22.0–23.5	Qbt 4	1.16 (U)	47.3 (J-)	—[e]	1.23	—	1.37	1.13 (UJ)
RE16-10-1151	16-608673	27.5–30.0	Qbt 4	1.12 (U)	—	—	1.16	—	2.61	1.16 (UJ)
RE16-10-1152	16-608674	22.0–25.0	Qbt 4	0.877 (U)	—	—	1.24	—	—	1.1 (U)
RE16-10-1153	16-608674	27.5–30.0	Qbt 4	1.09 (U)	—	—	1.16	—	—	1.09 (U)
RE16-10-1154	16-608675	20.0–24.0	Qbt 4	1.17 (U)	48.6	1.41	1.25 (J-)	8.07 (J-)	—	1.18 (U)
RE16-10-1155	16-608675	28.0–30.0	Qbt 4	1.11 (U)	—	—	1.03 (J-)	—	—	1.14 (U)
RE16-10-1156	16-608676	22.0–24.0	Qbt 4	—	—	—	1.53 (J-)	—	1.71	1.07 (U)
RE16-10-1157	16-608676	27.5–30.0	Qbt 4	0.65 (U)	—	—	0.955 (J-)	—	1.26	1.08 (U)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 7.15-3
Summary of Organic Chemicals Detected at SWMU 16-004(a)

Sample ID	Location ID	Depth (ft)	Media	Methylene Chloride
Industrial SSL[a]				**1090**
Recreational SSL[b]				**4520**
Residential SSL[a]				**199**
RE16-10-1154	16-608675	20.0–24.0	Qbt 4	0.00384 (J)
RE16-10-1155	16-608675	28.0–30.0	Qbt 4	0.0035 (J)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] SSLs from LANL (2010, 108613).

Table 7.16-1
Summary of Samples Collected and Analyses Requested at SWMU 16-004(b)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-1214	16-608684	20.0–24.0	Qbt 4	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748
RE16-10-1215	16-608684	28.0–30.0	Qbt 4	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748	10-1748
RE16-10-1216	16-608685	20.0–24.0	Qbt 4	10-1838	10-1837	10-1838	10-1838	10-1838	10-1838	10-1837	10-1837	10-1838	10-1838	10-1837
RE16-10-1217	16-608685	28.0–30.0	Qbt 4	10-1838	10-1837	10-1838	10-1838	10-1838	10-1838	10-1837	10-1837	10-1838	10-1838	10-1837
RE16-10-1218	16-608686	20.0–22.0	Qbt 4	10-1838	10-1837	10-1838	10-1838	10-1838	10-1838	10-1837	10-1837	10-1838	10-1838	10-1837
RE16-10-1219	16-608686	28.0–30.0	Qbt 4	10-1838	10-1837	10-1838	10-1838	10-1838	10-1838	10-1837	10-1837	10-1838	10-1838	10-1837
RE16-10-1220	16-608687	20.0–24.0	Qbt 4	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830
RE16-10-1221	16-608687	28.0–30.0	Qbt 4	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830	10-1830

Table 7.16-2
Summary of Inorganic Chemicals above BVs at SWMU 16-004(b)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Fluoride	Nitrate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**46**	**na[b]**	**na**	**0.3**
Industrial SSL[c]				**454**	**224000**	**68100**	**1820000**	**5680**
Recreational SSL[d]				**317**	**158000**	**47500**	**1260000**	**3960**
Residential SSL[c]				**31.3**	**15600**	**4690**	**125000**	**391**
RE16-10-1214	16-608684	20.0–24.0	Qbt 4	0.926 (U)	—[e]	3.22	1.64	1.15 (U)
RE16-10-1215	16-608684	28.0–30.0	Qbt 4	—	—	1.76	1.41	1.1 (U)
RE16-10-1216	16-608685	20.0–24.0	Qbt 4	1.08 (U)	48.8	2.34	2.04	1.02 (U)
RE16-10-1217	16-608685	28.0–30.0	Qbt 4	1.1 (U)	—	2.09	1.78	1.09 (U)
RE16-10-1218	16-608686	20.0–22.0	Qbt 4	1.05 (U)	—	—	—	1.02 (U)
RE16-10-1219	16-608686	28.0–30.0	Qbt 4	1.04 (U)	—	—	1.21	1.08 (U)
RE16-10-1220	16-608687	20.0–24.0	Qbt 4	1.14 (U)	—	1.58 (J-)	—	1.16 (U)
RE16-10-1221	16-608687	28.0–30.0	Qbt 4	1.09 (U)	—	1.06 (J-)	—	1.09 (U)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 7.16-3
Summary of Organic Chemicals Detected at SWMU 16-004(b)

Sample ID	Location ID	Depth (ft)	Media	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Methylene Chloride
Industrial SSL[a]				**2500000[b]**	**1370**	**1090**
Recreational SSL[c]				**1590000**	**1830**	**4520**
Residential SSL[a]				**240000[b]**	**347**	**199**
RE16-10-1214	16-608684	20.0–24.0	Qbt 4	—[d]	0.112 (J)	—
RE16-10-1215	16-608684	28.0–30.0	Qbt 4	—	0.0877 (J)	—
RE16-10-1218	16-608686	20.0–22.0	Qbt 4	0.351 (J)	—	—
RE16-10-1220	16-608687	20.0–24.0	Qbt 4	—	—	0.00259 (J)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

Table 7.16-4
Summary of Radionuclides Detected at SWMU 16-004(b)

Sample ID	Location ID	Depth (ft)	Media	Uranium-235/236
Qbt 2,3,4 BV[a]				**0.09**
Industrial SAL[b]				**87**
Recreational SAL[b]				**520**
Residential SAL[b]				**17**
RE16-10-1217	16-608685	28.0–30.0	Qbt 4	0.117
RE16-10-1221	16-608687	28.0–30.0	Qbt 4	0.0964

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.17-1
Summary of Samples Collected and Analyses Requested at SWMU 16-004(c)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-1246	16-608884	20.0–24.0	Qbt 4	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702
RE16-10-1247	16-608884	28.0–30.0	Qbt 4	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702	10-1702
RE16-10-1248	16-608885	20.0–23.5	Qbt 4	10-1730	10-1729	10-1730	10-1728	10-1730	10-1730	10-1729	10-1729	10-1728	10-1728	10-1729
RE16-10-1249	16-608885	28.0–30.0	Qbt 4	10-1730	10-1729	10-1730	10-1728	10-1730	10-1730	10-1729	10-1729	10-1728	10-1728	10-1729
RE16-10-1250	16-608886	20.0–22.5	Qbt 4	10-1730	10-1729	10-1730	10-1728	10-1730	10-1730	10-1729	10-1729	10-1728	10-1728	10-1729
RE16-10-1251	16-608886	28.0–30.0	Qbt 4	10-1730	10-1729	10-1730	10-1728	10-1730	10-1730	10-1729	10-1729	10-1728	10-1728	10-1729
RE16-10-1252	16-608887	20.0–24.0	Qbt 4	10-1730	10-1729	10-1730	10-1728	10-1730	10-1730	10-1729	10-1729	10-1728	10-1728	10-1729
RE16-10-1253	16-608887	28.0–30.0	Qbt 4	10-1730	10-1729	10-1730	10-1728	10-1730	10-1730	10-1729	10-1729	10-1728	10-1728	10-1729

Table 7.17-2
Summary of Inorganic Chemicals above BVs at SWMU 16-004(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Fluoride	Lead	Nitrate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**na**[b]	**11.2**	**na**	**0.3**
Industrial SSL[c]				**454**	**68100**	**800**	**1820000**	**5680**
Recreational SSL[d]				**317**	**47500**	**560**	**1260000**	**3960**
Residential SSL[c]				**31.3**	**4690**	**400**	**125000**	**391**
RE16-10-1246	16-608884	20.0–24.0	Qbt 4	0.541(U)	0.952(J)	—[e]	—	1.06(U)
RE16-10-1247	16-608884	28.0–30.0	Qbt 4	1.1(U)	1.33	—	—	1.05(U)
RE16-10-1248	16-608885	20.0–23.5	Qbt 4	1.04(UJ)	1.3	—	—	1.11(U)
RE16-10-1249	16-608885	28.0–30.0	Qbt 4	1.03(UJ)	1.12	—	1.42	1.09(U)
RE16-10-1250	16-608886	20.0–22.5	Qbt 4	1.03(UJ)	—	—	—	1.06(U)
RE16-10-1251	16-608886	28.0–30.0	Qbt 4	1.13(UJ)	1.7	—	—	1.13(U)
RE16-10-1252	16-608887	20.0–24.0	Qbt 4	1.08(UJ)	3.35	23.4	—	1.1(U)
RE16-10-1253	16-608887	28.0–30.0	Qbt 4	1.04(UJ)	1.36	—	—	1.04(U)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 7.17-3
Summary of Radionuclides above BVs at SWMU 16-004(c)

Sample ID	Location ID	Depth (ft)	Media	Uranium-235/236
Qbt 2,3,4 BV[a]				**0.09**
Industrial SAL[b]				**87**
Recreational SAL[b]				**520**
Residential SAL[b]				**17**
RE16-10-1249	16-608885	28.0–30.0	Qbt 4	0.126
RE16-10-1250	16-608886	20.0–22.5	Qbt 4	0.0909
RE16-10-1251	16-608886	28.0–30.0	Qbt 4	0.118
RE16-10-1252	16-608887	20.0–24.0	Qbt 4	0.195
RE16-10-1253	16-608887	28.0–30.0	Qbt 4	0.149

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.18-1
Summary of Samples Collected and Analyses Requested at SWMU 16-004(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	HEX	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-1470	16-608939	3.5–4.0	Qbt 4	10-1555	10-1554	10-1555	10-1553	10-1555	10-1555	10-1554	10-1554	10-1553	10-1553	10-1554
RE16-10-1471	16-608939	9.5–10.0	Qbt 4	10-1555	10-1554	10-1555	10-1553	10-1555	10-1555	10-1554	10-1554	10-1553	10-1553	10-1554
RE16-10-1472	16-608940	3.0–3.5	Qbt 4	10-1555	10-1554	10-1555	10-1553	10-1555	10-1555	10-1554	10-1554	10-1553	10-1553	10-1554
RE16-10-1473	16-608940	9.5–10.0	Qbt 4	10-1555	10-1554	10-1555	10-1553	10-1555	10-1555	10-1554	10-1554	10-1553	10-1553	10-1554
RE16-10-1474	16-608941	3.0–3.5	Qbt 4	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509
RE16-10-1475	16-608941	9.0–9.5	Qbt 4	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509	10-1509
RE16-10-1476	16-608942	3.0–3.5	Qbt 4	10-1555	10-1554	10-1555	10-1553	10-1555	10-1555	10-1554	10-1554	10-1553	10-1553	10-1554
RE16-10-1477	16-608942	9.5–10.0	Qbt 4	10-1555	10-1554	10-1555	10-1553	10-1555	10-1555	10-1554	10-1554	10-1553	10-1553	10-1554
RE16-10-1478	16-608943	4.0–4.5	Qbt 4	10-1555	10-1554	10-1555	10-1553	10-1555	10-1555	10-1554	10-1554	10-1553	10-1553	10-1554
RE16-10-1479	16-608943	9.5–10.0	Qbt 4	10-1555	10-1554	10-1555	10-1553	10-1555	10-1555	10-1554	10-1554	10-1553	10-1553	10-1554

Table 7.18-2
Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at SWMU 16-004(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Calcium	Chromium	Copper	Fluoride	Mercury	Nitrate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**46**	**2200**	**7.14**	**4.66**	**na**[b]	**0.1**	**na**	**0.3**
Industrial SSL[c]				**454**	**224000**	**na**	**2920**[d]	**45400**	**68100**	**310**[e]	**1820000**	**5680**
Recreational SSL[f]				**317**	**158000**	**na**	**1910**[d]	**31700**	**47500**	**238**	**1260000**	**3960**
Residential SSL[c]				**31.3**	**15600**	**na**	**219**[d]	**3130**	**4690**	**23**[e]	**125000**	**391**
RE16-10-1470	16-608939	3.5–4.0	Qbt 4	2.02 (U)	—[g]	—	—	—	1.19	—	—	0.571 (J-)
RE16-10-1471	16-608939	9.5–10.0	Qbt 4	1.14 (U)	—	—	—	—	1.41	—	—	1.13 (UJ)
RE16-10-1472	16-608940	3.0–3.5	Qbt 4	1.13 (U)	—	—	—	—	1.29	0.123	—	1.18 (U)
RE16-10-1473	16-608940	9.5–10.0	Qbt 4	1.08 (U)	—	—	—	—	1.21	—	2.61	1.08 (UJ)
RE16-10-1474	16-608941	3.0–3.5	Qbt 4	—	57.4	—	—	6.7	1.29 (J-)	0.269	—	1.32 (U)
RE16-10-1475	16-608941	9.0–9.5	Qbt 4	1.2 (U)	58.5	—	—	—	1.76 (J-)	—	—	1.19 (U)
RE16-10-1476	16-608942	3.0–3.5	Qbt 4	1.15 (U)	—	2260 (J)	—	—	1.2	—	—	1.16 (UJ)
RE16-10-1477	16-608942	9.5–10.0	Qbt 4	0.901 (U)	—	3400 (J)	—	—	1.3	—	—	1.15 (UJ)
RE16-10-1478	16-608943	4.0–4.5	Qbt 4	—	46.8	—	—	—	2.77	—	—	1.18 (UJ)
RE16-10-1479	16-608943	9.5–10.0	Qbt 4	0.658 (U)	77.2	—	10.1	—	3.36	—	—	1.12 (UJ)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] SSL for chromium hexavalent ion.
[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[f] SSLs from LANL (2010, 108613).
[g] — = Not detected or not detected above BV.

Table 7.18-3
Summary of Organic Chemicals Detected at SWMU 16-004(d)

Sample ID	Location ID	Depth (ft)	Media	Acetone	TATB
Industrial SSL[a]				**851000**	**na**[b]
Recreational SSL[c]				**702000**	**na**
Residential SSL[a]				**67500**	**na**
RE16-10-1472	16-608940	3.0–3.5	Qbt 4	—[d]	0.319 (J)
RE16-10-1474	16-608941	3.0–3.5	Qbt 4	0.00333 (J)	0.925 (J)
RE16-10-1475	16-608941	9.0–9.5	Qbt 4	—	0.385 (J)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] na = Not available.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

Table 7.18-4
Summary of Radionuclides above BVs at SWMU 16-004(d)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-235/236
Qbt 2,3,4 BV[a]				**0.1**	**0.09**
Industrial SAL[b]				**23**	**87**
Recreational SAL[b]				**210**	**520**
Residential SAL[b]				**5.6**	**17**
RE16-10-1470	16-608939	3.5–4.0	Qbt 4	—[c]	0.0926
RE16-10-1474	16-608941	3.0–3.5	Qbt 4	0.0739	—

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.19-1
Summary of Samples Collected and Analyses Requested at SWMU 16-004(e)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-1310	16-608928	3.0–3.5	Fill	10-1549	10-1548	10-1549	10-1547	10-1549	10-1549	10-1548	10-1548	10-1547	10-1547	10-1548
RE16-10-1311	16-608928	8.5–9.0	Fill	10-1549	10-1548	10-1549	10-1547	10-1549	10-1549	10-1548	10-1548	10-1547	10-1547	10-1548
RE16-10-1313	16-608929	3.0–3.5	Soil	10-1561	10-1561	10-1561	10-1561	10-1561	10-1561	10-1561	10-1561	10-1561	10-1561	10-1561
RE16-10-1312	16-608929	8.5–9.0	Fill	10-1549	10-1548	10-1549	10-1547	10-1549	10-1549	10-1548	10-1548	10-1547	10-1547	10-1548
RE16-10-1314	16-608930	3.0–3.5	Fill	10-1549	10-1548	10-1549	10-1547	10-1549	10-1549	10-1548	10-1548	10-1547	10-1547	10-1548
RE16-10-1315	16-608930	8.5–9.0	Fill	10-1549	10-1548	10-1549	10-1547	10-1549	10-1549	10-1548	10-1548	10-1547	10-1547	10-1548
RE16-10-1316	16-608931	3.0–3.5	Fill	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831
RE16-10-1317	16-608931	8.5–9.0	Fill	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831	10-1831

Table 7.19-2
Summary of Inorganic Chemicals above BVs at SWMU 16-004(e)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Calcium	Fluoride	Nitrate
Soil BV[a]				**0.83**	**0.4**	**6120**	**na**[b]	**na**
Industrial SSL[c]				**454**	**1120**	**na**	**68100**	**1820000**
Recreational SSL[d]				**317**	**784**	**na**	**47500**	**1260000**
Residential SSL[c]				**31.3**	**77.9**	**na**	**4690**	**125000**
RE16-10-1310	16-608928	3.0–3.5	Fill	1.07 (UJ)	0.535 (U)	7630 (J)	1.57	—[e]
RE16-10-1311	16-608928	8.5–9.0	Fill	1.11 (UJ)	0.554 (U)	—	1.68	—
RE16-10-1313	16-608929	3.0–3.5	Soil	1.04 (U)	0.521 (U)	—	1.42	—
RE16-10-1312	16-608929	8.5–9.0	Fill	1.11 (UJ)	0.557 (U)	—	1.66	—
RE16-10-1314	16-608930	3.0–3.5	Fill	1.12 (UJ)	0.561 (U)	—	1.94	1.22
RE16-10-1315	16-608930	8.5–9.0	Fill	1.12 (UJ)	0.562 (U)	—	2.23	1.36
RE16-10-1316	16-608931	3.0–3.5	Fill	1.28 (U)	0.641 (U)	—	1.78 (J-)	—
RE16-10-1317	16-608931	8.5–9.0	Fill	1.18 (U)	0.591 (U)	—	2.46 (J-)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 7.19-3
Summary of Organic Chemicals Detected at SWMU 16-004(e)

Sample ID	Location ID	Depth (ft)	Media	Benzo(a)anthracene	Benzo(b)fluoranthene	Fluoranthene	Pyrene
Industrial SSL[a]				**23.4**	**23.4**	**24400**	**18300**
Recreational SSL[b]				**30.1**	**30.1**	**13900**	**10400**
Residential SSL[a]				**6.21**	**6.21**	**2290**	**1720**
RE16-10-1313	16-608929	3.0–3.5	Soil	0.0147 (J)	0.0176 (J)	0.0163 (J)	0.0146 (J)
RE16-10-1314	16-608930	3.0–3.5	Fill	—[c]	0.018 (J)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] SSLs from LANL (2010, 108613).

[c] — = Not detected or not detected above BV.

Table 7.20-1
Summary of Samples Collected and Analyses Requested at SWMU 16-004(f)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-1182	16-608895	2.5–3.0	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1183	16-608895	8.5–9.0	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1184	16-608896	3.5–4.0	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1185	16-608896	9.5–10.0	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1186	16-608897	3.5–4.0	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1187	16-608897	7.5–8.0	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1188	16-608898	2.5–3.0	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1189	16-608898	8.5–9.0	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1190	16-608899	4.0–4.5	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551
RE16-10-1191	16-608899	10.0–10.5	Qbt 4	10-1552	10-1551	10-1552	10-1550	10-1552	10-1552	10-1551	10-1551	10-1550	10-1550	10-1551

Table 7.20-2
Summary of Inorganic Chemicals above BVs at SWMU 16-004(f)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Chromium	Copper	Fluoride	Mercury	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**46**	**7.14**	**4.66**	**na[b]**	**0.1**	**0.3**
Industrial SSL[c]				**454**	**224000**	**2920[d]**	**45400**	**68100**	**310[e]**	**5680**
Recreational SSL[f]				**317**	**158000**	**1910[d]**	**31700**	**47500**	**238**	**3960**
Residential SSL[c]				**31.3**	**15600**	**219[d]**	**3130**	**4690**	**23[e]**	**391**
RE16-10-1182	16-608895	2.5–3.0	Qbt 4	0.575 (U)	—[g]	—	—	2.15	—	1.19 (U)
RE16-10-1183	16-608895	8.5–9.0	Qbt 4	1.22 (U)	—	—	—	1.71	—	1.24 (U)
RE16-10-1184	16-608896	3.5–4.0	Qbt 4	0.841 (U)	47.5	—	5.23	1.74	—	1.22 (U)
RE16-10-1185	16-608896	9.5–10.0	Qbt 4	0.781 (U)	—	—	—	1.27	—	1.19 (U)
RE16-10-1186	16-608897	3.5–4.0	Qbt 4	—	—	—	4.89	1.77	0.155	1.18 (U)
RE16-10-1187	16-608897	7.5–8.0	Qbt 4	0.618 (U)	—	—	—	2.37	—	1.11 (U)
RE16-10-1188	16-608898	2.5–3.0	Qbt 4	1.03 (U)	—	—	—	1.82	—	1.2 (U)
RE16-10-1189	16-608898	8.5–9.0	Qbt 4	0.618 (U)	—	15.2 (J)	—	1.2	—	1.13 (U)
RE16-10-1190	16-608899	4.0–4.5	Qbt 4	1.1 (U)	—	—	—	1.42	—	1.14 (U)
RE16-10-1191	16-608899	10.0–10.5	Qbt 4	0.634 (U)	—	10.1 (J)	—	1.15 (J)	—	1.12 (U)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 7.20-3
Summary of Organic Chemicals Detected at SWMU 16-004(f)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzo(b)fluoranthene	Fluoranthene	Pyrene	TATB
Industrial SSL[a]				**851000**	**23.4**	**24400**	**18300**	**na[b]**
Recreational SSL[c]				**702000**	**30.1**	**13900**	**10400**	**na**
Residential SSL[a]				**67500**	**6.21**	**2290**	**1720**	**na**
RE16-10-1186	16-608897	3.5–4.0	Qbt 4	—[d]	—	—	—	0.504 (J)
RE16-10-1187	16-608897	7.5–8.0	Qbt 4	0.00445 (J)	0.0128 (J)	0.0194 (J)	0.0185 (J)	—
RE16-10-1188	16-608898	2.5–3.0	Qbt 4	0.00329 (J)	—	—	—	—
RE16-10-1189	16-608898	8.5–9.0	Qbt 4	0.00234 (J)	—	—	—	—
RE16-10-1190	16-608899	4.0–4.5	Qbt 4	0.00372 (J)	—	—	—	—
RE16-10-1191	16-608899	10.0–10.5	Qbt 4	0.00275 (J)	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] na = Not available.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

Table 7.20-4
Summary of Radionuclides Detected at SWMU 16-004(f)

Sample ID	Location ID	Depth (ft)	Media	Uranium-235/236
Qbt 2,3,4 BV[a]				**0.09**
Industrial SAL[b]				**87**
Recreational SAL[b]				**520**
Residential SAL[b]				**17**
RE16-10-1182	16-608895	2.5–3.0	Qbt 4	0.0984

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

Table 8.2-1
Summary of Samples Collected and Analyses Requested at SWMU 16-026(z)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2888	16-609204	0.0–0.5	Soil	10-1521	10-1520	10-1521	10-1520	10-1521	10-1521	10-1521	10-1520	10-1520	10-1520	10-1520
RE16-10-2889	16-609204	5.5–6.0	Qbt 4	10-1521	10-1520	10-1521	10-1520	10-1521	10-1521	10-1521	10-1520	10-1520	10-1520	10-1520
RE16-10-2887	16-609205	0.0–0.5	Fill	10-1521	10-1520	10-1521	10-1520	10-1521	10-1521	10-1521	10-1520	10-1520	10-1520	10-1520
RE16-10-2890	16-609205	5.5–6.0	Qbt 4	10-1521	10-1520	10-1521	10-1520	10-1521	10-1521	10-1521	10-1520	10-1520	10-1520	10-1520
RE16-10-2891	16-609206	0.0–0.5	Fill	10-1521	10-1520	10-1521	10-1520	10-1521	10-1521	10-1521	10-1520	10-1520	10-1520	10-1520
RE16-10-2892	16-609206	5.5–6.0	Fill	10-1521	10-1520	10-1521	10-1520	10-1521	10-1521	10-1521	10-1520	10-1520	10-1520	10-1520
RE16-10-2893	16-609207	0.0–0.5	Fill	10-1521	10-1520	10-1521	10-1520	10-1521	10-1521	10-1521	10-1520	10-1520	10-1520	10-1520
RE16-10-2894	16-609207	4.5–5.0	Qbt 4	10-1521	10-1520	10-1521	10-1520	10-1521	10-1521	10-1521	10-1520	10-1520	10-1520	10-1520

Table 8.2-2
Summary of Inorganic Chemicals above BVs at SWMU 16-026(z)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Cadmium	Cobalt	Fluoride	Lead	Nitrate	Selenium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**46**	**1.63**	**3.14**	**na**[b]	**11.2**	**na**	**0.3**	**63.5**
Soil BV[a]				**29200**	**0.83**	**295**	**0.4**	**8.64**	**na**	**22.3**	**na**	**1.52**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**224000**	**1120**	**300**[d]	**68100**	**800**	**1820000**	**5680**	**341000**
Recreational SSL[e]				**791000**	**317**	**158000**	**784**	**238**	**47500**	**560**	**1260000**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**15600**	**77.9**	**23**[d]	**4690**	**400**	**125000**	**391**	**23500**
RE16-10-2888	16-609204	0.0–0.5	Soil	—[f]	1.08 (U)	—	0.582 (U)	—	1.43	—	—	—	—
RE16-10-2889	16-609204	5.5–6.0	Qbt 4	—	1.14 (U)	54	—	4.17	8.28	11.6	1.29	1.18 (U)	—
RE16-10-2887	16-609205	0.0–0.5	Fill	—	—	—	0.6 (U)	—	2.19	27.1	—	—	—
RE16-10-2890	16-609205	5.5–6.0	Qbt 4	8730	0.684 (U)	115	—	—	4.62	12.5	1.42	1.25 (U)	—
RE16-10-2891	16-609206	0.0–0.5	Fill	—	—	—	0.543 (U)	—	1.2	25.6	—	—	—
RE16-10-2892	16-609206	5.5–6.0	Fill	—	—	—	0.571 (U)	—	8.67	—	1.35	—	—
RE16-10-2893	16-609207	0.0–0.5	Fill	—	—	—	0.525 (U)	—	1.69	—	1.32	—	50.3
RE16-10-2894	16-609207	4.5–5.0	Qbt 4	—	1.15 (U)	74.8	—	—	13.1	—	1.36	1.14 (U)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

Table 8.2-3
Summary of Organic Chemicals Detected at SWMU 16-026(z)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Trichloroethane[1,1,1-]
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**2340**	**24400**	**24400**	**23.4**	**4100[c]**	**252**	**20500**	**18300**	**77100**
Recreational SSL[d]				**20800**	**104000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**301**	**3010**	**13900**	**13900**	**30.1**	**3170**	**1950**	**12000**	**10400**	**500000**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**621**	**2290**	**2290**	**6.21**	**310[c]**	**45**	**1830**	**1720**	**21800**
RE16-10-2888	16-609204	0.0–0.5	Soil	—[e]	0.00963 (J)	0.0369 (J)	0.0342 (J)	0.0398 (J)	0.0228 (J)	0.0176 (J)	0.0373 (J)	0.0774	—	0.0184 (J)	—	—	0.0444	0.0664	—
RE16-10-2889	16-609204	0.0–0.5	Qbt 4	—	—	—	—	—	—	—	—	0.0129 (J)	—	—	—	—	—	—	—
RE16-10-2887	16-609205	0.0–0.5	Fill	—	0.0221 (J)	0.147	0.17	0.215	0.126	0.0915	0.178	0.319	—	0.104	—	—	0.112	0.262	—
RE16-10-2890	16-609205	0.0–0.5	Qbt 4	0.0257 (J)	0.0376 (J)	0.0685	0.0595	0.0665	0.0355 (J)	0.0299 (J)	0.0654	0.161	0.023 (J)	0.03 (J)	0.0117 (J)	0.0436	0.141	0.136	—
RE16-10-2891	16-609206	0.0–0.5	Fill	0.0234 (J)	0.0388	0.134	0.126	0.17	0.0783	0.0708	0.156	0.356	0.0203 (J)	0.0706	—	0.0171 (J)	0.224	0.268	—
RE16-10-2893	16-609207	0.0–0.5	Fill	0.0334 (J)	0.0708	0.404	0.444	0.698	0.257	0.262	0.541	1.16	0.0345 (J)	0.25	—	0.0117 (J)	0.574	0.98	0.00089 (J)
RE16-10-2894	16-609207	0.0–0.5	Qbt 4	—	—	—	—	0.0141 (J)	—	—	—	0.0214 (J)	—	—	—	—	—	0.0174 (J)	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 8.3-1
Summary of Samples Collected and Analyses Requested at SWMU 16-001(e)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2779	16-609170	0.0–0.5	Fill	10-1150	10-1150	10-1150	10-1149	10-1150	10-1150	10-1150	10-1150	10-1149	10-1149	10-1150
RE16-10-14146	16-609170	20.0–21.5	Qbt 4	10-2466	10-2465	10-2466	10-2464	10-2466	10-2466	10-2466	10-2465	10-2464	10-2464	10-2465
RE16-10-14147	16-609170	25.0–26.5	Qbt 4	10-2466	10-2465	10-2466	10-2464	10-2466	10-2466	10-2466	10-2465	10-2464	10-2464	10-2465
RE16-10-2782	16-609171	0.0–0.5	Fill	10-1150	10-1150	10-1150	10-1149	10-1150	10-1150	10-1150	10-1150	10-1149	10-1149	10-1150
RE16-10-2783	16-609171	5.5–6.0	Qbt 4	10-1216	10-1216	10-1216	10-1216	10-1216	10-1216	10-1216	10-1216	10-1216	10-1216	10-1216
RE16-10-14145	16-609171	20.0–21.5	Qbt 4	10-2466	10-2465	10-2466	10-2464	10-2466	10-2466	10-2466	10-2465	10-2464	10-2464	10-2465
RE16-10-14144	16-609171	25.0–26.5	Qbt 4	10-2466	10-2465	10-2466	10-2464	10-2466	10-2466	10-2466	10-2465	10-2464	10-2464	10-2465
RE16-10-2784	16-609172	0.0–0.5	Fill	10-1150	10-1150	10-1150	10-1149	10-1150	10-1150	10-1150	10-1150	10-1149	10-1149	10-1150
RE16-10-14142	16-609172	20.0–23.0	Qbt 4	10-2466	10-2465	10-2466	10-2464	10-2466	10-2466	10-2466	10-2465	10-2464	10-2464	10-2465
RE16-10-14143	16-609172	25.0–28.0	Qbt 4	10-2466	10-2465	10-2466	10-2464	10-2466	10-2466	10-2466	10-2465	10-2464	10-2464	10-2465
RE16-10-2786	16-609173	0.0–0.5	Fill	10-1150	10-1150	10-1150	10-1149	10-1150	10-1150	10-1150	10-1150	10-1149	10-1149	10-1150
RE16-10-2787	16-609173	5.5–6.0	Qbt 4	10-2350	10-2350	10-2350	10-2350	10-2350	10-2350	10-2350	10-2350	10-2350	10-2350	10-2350
RE16-10-2789	16-609173	15.0–17.0	Fill	10-2466	10-2465	10-2466	10-2464	10-2466	10-2466	10-2466	10-2465	10-2464	10-2464	10-2465
RE16-10-2788	16-609174	10.0–21.0	Fill	10-2466	10-2465	10-2466	10-2464	10-2466	10-2466	10-2466	10-2465	10-2464	10-2464	10-2465

Table 8.3-2
Summary of Inorganic Chemicals above BVs at SWMU 16-001(e)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Copper	Fluoride	Mercury	Nitrate	Selenium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**4.66**	**na[b]**	**0.1**	**na**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**14.7**	**na**	**0.1**	**na**	**1.52**	**48.8**
Industrial SSL[c]				**454**	**224000**	**1120**	**45400**	**68100**	**310[d]**	**1820000**	**5680**	**341000**
Recreational SSL[e]				**317**	**158000**	**784**	**31700**	**47500**	**238**	**1260000**	**3960**	**238000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**3130**	**4690**	**23[d]**	**125000**	**391**	**23500**
RE16-10-2779	16-609170	0.0–0.5	Fill	1.18 (U)	—[f]	0.59 (U)	15.8	0.973 (J-)	1.31	1.75	—	67.1
RE16-10-14146	16-609170	20.0–21.5	Qbt 4	1.05 (U)	—	—	—	1.13 (J-)	—	—	1.13 (UJ)	—
RE16-10-14147	16-609170	25.0–26.5	Qbt 4	1.12 (U)	—	—	—	1.64 (J-)	—	—	1.18 (UJ)	—
RE16-10-2782	16-609171	0.0–0.5	Fill	—	—	0.558 (U)	27.8	0.905 (J-)	1.19	1.76	—	52.8
RE16-10-2783	16-609171	5.5–6.0	Qbt 4	1.1 (U)	—	—	5.2	1.08 (J-)	—	—	1.05 (U)	—
RE16-10-14145	16-609171	20.0–21.5	Qbt 4	1.06 (U)	—	—	—	1.65 (J-)	—	—	1.14 (UJ)	—
RE16-10-14144	16-609171	25.0–26.5	Qbt 4	0.951 (U)	—	—	—	2.02 (J-)	—	—	1.04 (UJ)	—
RE16-10-2784	16-609172	0.0–0.5	Fill	1.07 (U)	—	0.537 (U)	—	0.868 (J-)	0.362	1.09	—	—
RE16-10-14142	16-609172	20.0–23.0	Qbt 4	1.17 (U)	—	—	—	2.12 (J-)	—	—	1.16 (UJ)	—
RE16-10-14143	16-609172	25.0–28.0	Qbt 4	1.1 (U)	52.4	—	—	1.12 (J-)	—	—	1.09 (UJ)	—
RE16-10-2786	16-609173	0.0–0.5	Fill	1.1 (U)	—	0.549 (U)	—	—	2.13	—	—	—
RE16-10-2787	16-609173	5.5–6.0	Qbt 4	1.09 (U)	265	—	23.9 (J+)	1.98	3.04	—	1.06 (U)	165 (J+)
RE16-10-2789	16-609173	15.0–17.0	Fill	1.25 (U)	321	0.627 (U)	—	—	—	—	—	—
RE16-10-2788	16-609174	10.0–21.0	Fill	1.04 (U)	—	0.519 (U)	—	—	0.235	—	—	81.1

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

Table 8.3-3
Summary of Organic Chemicals Detected at SWMU 16-001(e)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene
Industrial SSL[a]				**36700**	**851000**	**2000**[b]	**1900**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**1370**	**2340**
Recreational SSL[d]				**20800**	**702000**	**1440**	**1440**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1830**	**3010**
Residential SSL[a]				**3440**	**67500**	**150**[b]	**150**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**347**	**621**
RE16-10-2779	16-609170	0.0–0.5	Fill	0.0277(J)	—[e]	—	—	0.0597	0.143	0.161	0.19	0.11	0.0729	—	0.159
RE16-10-14146	16-609170	20.0–21.5	Qbt 4	—	0.0379(J)	—	—	—	—	—	—	—	—	—	—
RE16-10-14147	16-609170	25.0–26.5	Qbt 4	—	0.0917(J)	—	—	—	—	—	0.0139(J)	—	—	—	—
RE16-10-2782	16-609171	0.0–0.5	Fill	0.14	—	0.579	0.169(J)	0.292	0.518	0.546	0.598	0.354	0.261	—	0.553
RE16-10-2783	16-609171	5.5–6.0	Qbt 4	—	—	—	—	0.00935(J)	0.0227(J)	0.0137(J)	0.127	—	—	—	0.0198(J)
RE16-10-14145	16-609171	20.0–21.5	Qbt 4	—	0.0856(J)	—	—	—	—	—	—	—	—	—	—
RE16-10-14144	16-609171	25.0–26.5	Qbt 4	—	0.0286(J)	—	—	—	—	—	—	—	—	—	—
RE16-10-2784	16-609172	0.0–0.5	Fill	0.019(J)	—	0.166(J)	—	0.0405	0.113	0.122	0.141	0.0956	0.0595	—	0.125
RE16-10-14142	16-609172	20.0–23.0	Qbt 4	—	0.0802(J)	—	—	—	—	—	—	—	—	—	—
RE16-10-14143	16-609172	25.0–28.0	Qbt 4	—	0.142(J)	—	—	—	—	—	0.0125(J)	—	—	—	—
RE16-10-2786	16-609173	0.0–0.5	Fill	0.0227(J)	—	0.109(J)	—	0.0477	0.126	0.142	0.167	0.107	0.0643	—	0.138
RE16-10-2787	16-609173	5.5–6.0	Qbt 4	0.342	—	0.359(J-)	0.693(J-)	0.596	0.99	0.923	1.48	—	—	0.089(J)	1.02
RE16-10-2789	16-609173	15.0–17.0	Fill	—	0.105(J)	—	—	—	—	—	0.0258(J)	—	—	—	—
RE16-10-2788	16-609174	10.0–21.0	Fill	0.0401	—	—	—	0.089	0.153	0.134	0.2	0.12	—	—	0.146

Table 8.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethane[1,1-]	Dichloroethene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene
Industrial SSL[a]				**2.34**	**1000**[b]	**350**	**42.8**	**385**	**24400**	**24400**	**23.4**	**1090**	**4100**[b]	**252**	**20500**
Recreational SSL[d]				**3.01**	**399**	**2240**	**13800**	**2060**	**13900**	**13900**	**30.1**	**4520**	**3170**	**1950**	**12000**
Residential SSL[a]				**0.621**	**78**[b]	**62.9**	**618**	**69.7**	**2290**	**2290**	**6.21**	**199**	**310**[b]	**45**	**1830**
RE16-10-2779	16-609170	0.0–0.5	Fill	0.0255 (J)	—	—	—	—	0.338	0.0243 (J)	0.0934	—	—	0.0145 (J)	0.222
RE16-10-14146	16-609170	20.0–21.5	Qbt 4	—	—	—	—	—	—	—	—	0.00275 (J)	—	—	—
RE16-10-14147	16-609170	25.0–26.5	Qbt 4	—	—	—	—	—	—	—	—	0.00274 (J)	—	—	—
RE16-10-2782	16-609171	0.0–0.5	Fill	0.0936	—	—	—	—	1.33	0.145	0.322	—	0.0445	0.118	1.09
RE16-10-2783	16-609171	5.5–6.0	Qbt 4	—	—	—	—	—	0.0444	—	—	—	—	—	0.0352 (J)
RE16-10-14145	16-609171	20.0–21.5	Qbt 4	—	—	—	—	—	—	—	—	0.00328 (J)	—	—	—
RE16-10-14144	16-609171	25.0–26.5	Qbt 4	—	—	—	—	—	—	—	—	0.00233 (J)	—	—	—
RE16-10-2784	16-609172	0.0–0.5	Fill	0.0235 (J)	—	—	—	—	0.259	0.0164 (J)	0.0797	—	—	0.0115 (J)	0.162
RE16-10-14142	16-609172	20.0–23.0	Qbt 4	—	—	—	—	—	—	—	—	0.00264 (J)	—	—	—
RE16-10-14143	16-609172	25.0–28.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2786	16-609173	0.0–0.5	Fill	0.0289 (J)	—	—	—	—	0.283	0.0182 (J)	0.094	—	—	0.0119 (J)	0.181
RE16-10-2787	16-609173	5.5–6.0	Qbt 4	—	0.191 (J)	0.0971	0.784 (J-)	0.000411 (J)	2.34	0.366	—	—	0.0963	0.223	2.39
RE16-10-2789	16-609173	15.0–17.0	Fill	—	—	—	—	—	—	—	—	0.00305 (J)	—	—	—
RE16-10-2788	16-609174	10.0–21.0	Fill	—	—	—	—	—	0.402	0.041	0.0957 (J)	—	0.0111 (J)	0.0245 (J)	0.303

Table 8.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Pyrene	RDX	TATB	Tetrachloroethene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**18300**	**174**	**na[f]**	**36.4**	**57900**	**77100**	**253**	**260[b]**	**10000[b]**	**469**	**31500**	**3610**
Recreational SSL[d]				**10400**	**233**	**na**	**91.7**	**60800**	**500000**	**1450**	**6880**	**7920**	**301**	**248000**	**27800**
Residential SSL[a]				**1720**	**44.2**	**na**	**6.99**	**5570**	**21800**	**45.7**	**62[b]**	**780[b]**	**35.9**	**9550**	**1090**
RE16-10-2779	16-609170	0.0–0.5	Fill	0.313	—	—	—	—	—	—	—	—	NA[g]	—	—
RE16-10-14146	16-609170	20.0–21.5	Qbt 4	—	—	—	—	—	0.000694 (J)	—	—	—	—	—	—
RE16-10-14147	16-609170	25.0–26.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2782	16-609171	0.0–0.5	Fill	1.14	0.115 (J)	—	—	—	—	—	—	—	NA	—	—
RE16-10-2783	16-609171	5.5–6.0	Qbt 4	0.0466	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14145	16-609171	20.0–21.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14144	16-609171	25.0–26.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2784	16-609172	0.0–0.5	Fill	0.238	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-14142	16-609172	20.0–23.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14143	16-609172	25.0–28.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2786	16-609173	0.0–0.5	Fill	0.264	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-2787	16-609173	5.5–6.0	Qbt 4	1.94	0.371 (J-)	0.511 (J)	0.00141	0.00929	8.77 (J-)	0.00738	0.000726 (J)	0.000453 (J)	0.804 (J-)	0.000397 (J)	0.000648 (J)
RE16-10-2789	16-609173	15.0–17.0	Fill	—	—	—	—	—	0.00127	—	—	—	—	—	—
RE16-10-2788	16-609174	10.0–21.0	Fill	0.266 (J)	—	—	—	—	0.00586	—	—	—	0.337 (J)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] na = Not available.

[g] NA = Not analyzed.

Table 8.3-4
Summary of Radionuclides Detected at SWMU 16-001(e)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240
Qbt 2,3,4 BV[a]				**na**[b]
Industrial SAL[c]				**210**
Recreational SAL[c]				**300**
Residential SAL[c]				**33**
RE16-10-14146	16-609170	20.0–21.5	Qbt 4	0.0273

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

Table 8.4-1
Summary of Samples Collected and Analyses Requested at SWMU 16-003(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2797	16-609176	6.5–7.0	Soil	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	—
RE16-10-2798	16-609176	9.5–10.0	Fill	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	10-1284	—
RE16-10-2799	16-609177	6.0–6.5	Soil	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415
RE16-10-2800	16-609177	9.5–10.0	Qbt 4	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415	10-2415
RE16-10-14899	16-611883	13.5–15.0	Fill	10-2568	10-2567	10-2568	10-2566	10-2568	10-2568	10-2568	10-2567	10-2566	10-2566	—
RE16-10-14902	16-611884	5.0–8.5	Fill	10-2568	10-2567	10-2568	10-2566	10-2568	10-2568	10-2568	10-2567	10-2566	10-2566	—
RE16-10-14903	16-611884	10.0–12.0	Fill	10-2568	10-2567	10-2568	10-2566	10-2568	10-2568	10-2568	10-2567	10-2566	10-2566	—
RE16-10-14904	16-611884	13.5–15.0	Qbt 4	10-2568	10-2567	10-2568	10-2566	10-2568	10-2568	10-2568	10-2567	10-2566	10-2566	—

Table 8.4-2
Summary of Inorganic Chemicals above BVs at SWMU 16-003(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chloride	Fluoride	Lead	Nitrate	Phosphorus, Orthophosphate (Expressed as PO_4)	Selenium	Thallium
Qbt 2,3,4 BV[a]				**0.5**	**1.63**	**94.6**	**na[b]**	**11.2**	**na**	**na**	**0.3**	**1.1**
Soil BV[a]				**0.83**	**0.4**	**231**	**na**	**22.3**	**na**	**na**	**1.52**	**0.73**
Industrial SSL[c]				**454**	**1120**	**na**	**68100**	**800**	**1820000**	**na**	**5680**	**74.9**
Recreational SSL[d]				**317**	**784**	**na**	**47500**	**560**	**1260000**	**na**	**3960**	**52.3**
Residential SSL[c]				**31.3**	**77.9**	**na**	**4690**	**400**	**125000**	**na**	**391**	**5.16**
RE16-10-2797	16-609176	6.5–7.0	Soil	1.09 (U)	—[e]	—	1.93 (J-)	—	5.12 (J-)	NA[f]	—	—
RE16-10-2798	16-609176	9.5–10.0	Fill	1.17 (U)	0.587 (U)	—	3.09 (J-)	—	7.1 (J-)	NA	—	—
RE16-10-2799	16-609177	6.0–6.5	Soil	1.06 (U)	0.529 (U)	—	4.21	—	1.46	NA	—	—
RE16-10-2800	16-609177	9.5–10.0	Qbt 4	1.09 (U)	—	—	2.7	—	1.66	NA	1.16 (UJ)	—
RE16-10-14899	16-611883	13.5–15.0	Fill	—	—	—	3.9	—	3.5	—	—	—
RE16-10-14902	16-611884	5.0–8.5	Fill	—	—	232 (J)	3.6	—	0.1 (J)	0.76 (J)	—	—
RE16-10-14903	16-611884	10.0–12.0	Fill	—	—	—	4.6	28.2	0.81	—	—	1.2
RE16-10-14904	16-611884	13.5–15.0	Qbt 4	—	—	109 (J)	0.76 (J)	—	3.5	—	1	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] NA = Not analyzed.

Table 8.4-3
Summary of Organic Chemicals Detected at SWMU 16-003(d)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	HMX	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	RDX	Trimethylbenzene[1,2,4-]	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**851000**	**183000**	**23.4**	**2.34**	**23.4**	**1370**	**2340**	**24400**	**34200**	**23.4**	**252**	**20500**	**18300**	**174**	**260**[b]	**469**
Recreational SSL[c]				**702000**	**104000**	**30.1**	**3.01**	**30.1**	**1830**	**3010**	**13900**	**19900**	**30.1**	**1950**	**12000**	**10400**	**233**	**6880**	**301**
Residential SSL[a]				**67500**	**17200**	**6.21**	**0.621**	**6.21**	**347**	**621**	**2290**	**3060**	**6.21**	**45**	**1830**	**1720**	**44.2**	**62**[b]	**35.9**
RE16-10-2797	16-609176	6.5–7.0	Soil	—[d]	0.0149 (J)	0.0214 (J)	0.0129 (J)	0.0141 (J)	—	0.0144 (J)	0.0406	—	0.113	0.0125 (J)	0.0446	0.034 (J)	0.222 (J)	—	—
RE16-10-2798	16-609176	9.5–10.0	Fill	—	—	—	—	—	—	—	0.0146 (J)	1.08 (J)	—	—	0.0165 (J)	0.0131 (J)	2.51 (J)	—	0.127 (J)
RE16-10-2799	16-609177	6.0–6.5	Soil	0.00465 (J)	0.012 (J)	—	0.018 (J)	0.025 (J)	—	0.0194 (J)	0.0434	—	—	—	0.0374 (J)	0.0341 (J)	—	—	—
RE16-10-2800	16-609177	9.5–10.0	Qbt 4	0.00399 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14899	16-611883	13.5–15.0	Fill	—	—	—	—	—	—	—	—	0.16 (J)	—	—	—	—	0.26 (J)	—	—
RE16-10-14902	16-611884	5.0–8.5	Fill	0.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14903	16-611884	10.0–12.0	Fill	—	—	—	—	—	0.065 (J-)	—	—	—	—	—	—	—	—	0.00053 (J)	—
RE16-10-14904	16-611884	13.5–15.0	Qbt 4	0.037	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

Table 8.5-1
Summary of Samples Collected and Analyses Requested at SWMU 16-003(e)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-95-0107	16-01443	3.5–5.0	Soil	—*	—	—	1192	—	—	1193	—	1192	1192	1193
0316-95-0109	16-01647	3.0–4.5	Soil	—	—	—	1192	—	—	1193	—	1192	1192	1193
RE16-10-2806	16-609179	5.0–5.5	Fill	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867
RE16-10-2807	16-609179	9.0–9.5	Qbt 4	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867	10-1867
RE16-10-2808	16-609180	4.5–5.0	Soil	10-2530	10-2530	10-2530	10-2530	10-2530	10-2530	10-2530	10-2530	10-2530	10-2530	—

*— = Analyses not requested.

Table 8.5-2
Summary of Inorganic Chemicals above BVs at SWMU 16-003(e)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Cobalt	Copper	Cyanide (Total)	Fluoride	Nickel	Nitrate	Selenium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**3.14**	**4.66**	**0.5**	**na[b]**	**6.58**	**na**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**8.64**	**14.7**	**0.5**	**na**	**15.4**	**na**	**1.52**	**48.8**
Industrial SSL[c]				**454**	**224000**	**1120**	**300[d]**	**45400**	**22700**	**68100**	**22700**	**1820000**	**5680**	**341000**
Recreational SSL[e]				**317**	**158000**	**784**	**238**	**31700**	**15800**	**47500**	**15800**	**1260000**	**3960**	**238000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**23[d]**	**3130**	**1560**	**4690**	**1560**	**125000**	**391**	**23500**
0316-95-0107	16-01443	3.5–5.0	Soil	5.6 (U)	—[f]	0.56 (U)	16.2	196	1.2 (U)	NA[g]	49.7 (J+)	NA	—	108
0316-95-0109	16-01647	3.0–4.5	Soil	5.7 (U)	—	0.57 (U)	—	—	1.2 (U)	NA	—	NA	—	—
RE16-10-2806	16-609179	5.0–5.5	Fill	5.39 (U)	—	—	—	—	—	3.92 (J-)	—	—	—	—
RE16-10-2807	16-609179	9.0–9.5	Qbt 4	1.18 (U)	67.3	—	—	4.74	—	3.54 (J-)	—	—	1.27 (UJ)	—
RE16-10-2808	16-609180	4.5–5.0	Soil	—	—	—	—	—	NA	5.4	—	0.26	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

Table 8.5-3
Summary of Organic Chemicals Detected at SWMU 16-003(e)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Ch rysene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Meth ylnaphthalene[2-]	Phenanthrene	Pyrene	RDX
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**1370**	**2340**	**24400**	**24400**	**34200**	**23.4**	**1090**	**4100**[c]	**20500**	**18300**	**174**
Recreational SSL[d]				**20800**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**301**	**1830**	**3010**	**13900**	**13900**	**19900**	**30.1**	**4520**	**3170**	**12000**	**10400**	**233**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**347**	**621**	**2290**	**2290**	**3060**	**6.21**	**199**	**310**[c]	**1830**	**1720**	**44.2**
0316-95-0107	16-01443	3.5–5.0	Soil	—[e]	—	—	—	—	—	—	0.16 (J)	0.072 (J)	0.11 (J)	—	0.341	—	0.003 (J)	—	0.084 (J)	0.098 (J)	0.271
0316-95-0109	16-01647	3.0–4.5	Soil	0.043 (J)	0.076 (J)	0.16 (J)	0.14 (J)	0.14 (J)	0.089 (J)	0.071 (J)	0.81	0.21 (J)	0.35 (J)	0.039 (J)	—	0.096 (J)	0.004 (J)	—	0.29 (J)	0.29 (J)	—
RE16-10-2806	16-609179	5.0–5.5	Fill	—	—	0.0153 (J)	—	—	—	—	—	0.0147 (J)	0.0271 (J)	—	—	—	—	0.0154 (J)	0.034 (J)	0.0239 (J)	—
RE16-10-2807	16-609179	9.0–9.5	Qbt 4	—	—	0.0161 (J)	—	—	0.0133 (J)	—	—	—	0.0236 (J)	—	—	—	—	—	0.0204 (J)	0.0197 (J)	—
RE16-10-2808	16-609180	4.5–5.0	Soil	—	—	0.063 (J)	0.052 (J)	0.05 (J)	—	0.053 (J)	—	0.063 (J)	0.16 (J)	—	0.042 (J-)	—	—	—	0.12 (J)	0.13 (J)	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 8.6-1
Summary of Samples Collected and Analyses Requested at SWMU 16-003(f)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2980	16-609239	1.0–1.5	Soil	10-2353	10-2353	10-2353	10-2352	10-2353	10-2353	10-2353	10-2353	10-2352	10-2352	10-2353
RE16-10-2981	16-609239	6.5–7.0	Soil	10-2353	10-2353	10-2353	10-2352	10-2353	10-2353	10-2353	10-2353	10-2352	10-2352	—*
RE16-10-2768	16-609166	5.0–5.5	Soil	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	—
RE16-10-2769	16-609166	8.5–9.0	Qbt 4	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	10-2349	—
RE16-10-2770	16-609167	5.0–5.5	Fill	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749
RE16-10-2771	16-609167	9.0–9.5	Fill	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749	10-1749

*— = Analyses not requested.

Table 8.6-2
Summary of Inorganic Chemicals above BVs at SWMU 16-003(f)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Lead	Mercury	Nitrate	Selenium	Sodium	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**2.79**	**46**	**1.63**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**11.2**	**0.1**	**na**	**0.3**	**2770**	**1.1**	**17**	**63.5**
Sediment BV[a]				**0.83**	**3.98**	**127**	**0.4**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**19.7**	**0.1**	**na**	**0.3**	**1470**	**0.73**	**19.7**	**60.2**
Soil BV[a]				**0.83**	**8.17**	**295**	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**22.3**	**0.1**	**na**	**1.52**	**915**	**0.73**	**39.6**	**48.8**
Industrial SSL[c]				**454**	**17.7**	**224000**	**1120**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**800**	**310[e]**	**1820000**	**5680**	**na**	**74.9**	**5680**	**341000**
Recreational SSL[f]				**317**	**27.7**	**158000**	**784**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**560**	**238**	**1260000**	**3960**	**na**	**52.3**	**3960**	**238000**
Residential SSL[c]				**31.3**	**3.9**	**15600**	**77.9**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**400**	**23[e]**	**125000**	**391**	**na**	**5.16**	**391**	**23500**
RE16-10-2980	16-609239	1.0–1.5	Soil	1.02 (UJ)	—[g]	—	0.509 (U)	—	32.7	—	—	4.1 (J-)	—	—	1.77	—	1100	—	—	—
RE16-10-2981	16-609239	6.5–7.0	Soil	1.07 (UJ)	—	—	0.537 (U)	38.3	—	—	NA[h]	2.65 (J-)	—	—	1.54	—	—	—	—	—
RE16-10-2768	16-609166	5.0–5.5	Soil	1.15 (UJ)	—	470 (J)	0.573 (U)	—	—	—	NA	1.1 (J-)	—	—	4.08	—	—	—	—	—
RE16-10-2769	16-609166	8.5.0–9.0	Qbt 4	1.12 (UJ)	—	89.2 (J)	—	20.7 (J)	3.41 (J)	5	NA	2.29 (J-)	—	—	5.48	1.14 (UJ)	—	—	—	—
RE16-10-2770	16-609167	5.0–5.5	Fill	1.33 (U)	—	—	0.589 (U)	—	—	—	—	1.14 (J-)	—	—	—	—	—	—	—	—
RE16-10-2771	16-609167	9.0–9.5	Fill	1.68 (U)	9.61	—	0.601 (U)	—	—	—	—	2.42 (J-)	29.3	—	1.5	—	—	4.78	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 8.6-3
Summary of Organic Chemicals Detected at SWMU 16-003(f)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenz(a,h)anthracene
Industrial SSL[a]				**36700**	**851000**	**2000**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2500000**[b]	**1370**	**2340**	**2.34**
Recreational SSL[d]				**20800**	**702000**	**1440**	**104000**[e]	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1590000**	**1830**	**3010**	**3.01**
Residential SSL[a]				**3440**	**67500**	**150**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**240000**[b]	**347**	**621**	**0.621**
RE16-10-2980	16-609239	1.0–1.5	Soil	0.0243 (J)	—[e]	—	0.0479	0.119	0.151	0.214	0.14	—	—	—	0.123	0.0394 (J)
RE16-10-2981	16-609239	6.5–7.0	Soil	—	—	—	—	0.0235 (J)	0.0167 (J)	0.02 (J)	—	—	—	—	0.0194 (J)	—
RE16-10-2768	16-609166	5.0–5.5	Soil	—	0.0101 (J)	0.122 (J-)	—	0.024 (J)	0.0167 (J)	0.0274 (J)	—	—	—	—	0.0204 (J)	—
RE16-10-2769	16-609166	8.5–9.0	Qbt 4	0.024 (J)	0.00938 (J)	—	0.0503	0.0932	0.079	0.0971	0.0511	—	—	—	0.0872	—
RE16-10-2770	16-609167	5.0–5.5	Fill	0.0604	—	—	0.0945	0.113	0.0891	0.103	0.0701 (J)	0.043	—	0.145 (J)	0.115	—
RE16-10-2771	16-609167	9.0–9.5	Fill	0.0826	—	—	0.148	0.178	0.144	0.167	0.107 (J)	0.0665	—	0.168 (J)	0.184	—

Table 8.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	RDX	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]
Industrial SSL[a]				**24400**	**24400**	**34200**	**23.4**	**4100**[b]	**3420**[f]	**252**	**20500**	**18300**	**174**	**27000**[b]	**469**	**31500**
Recreational SSL[d]				**13900**	**13900**	**19900**	**30.1**	**3170**	**na**[g]	**1950**	**12000**	**10400**	**233**	**19900**	**301**	**248000**
Residential SSL[a]				**2290**	**2290**	**3060**	**6.21**	**310**[b]	**310**[f]	**45**	**1830**	**1720**	**44.2**	**2200**[b]	**35.9**	**9550**
RE16-10-2980	16-609239	1.0–1.5	Soil	0.22	0.0179 (J)	—	0.118	—	—	—	0.165	0.205	—	—	—	0.000398 (J)
RE16-10-2981	16-609239	6.5–7.0	Soil	0.0363 (J)	—	—	0.0133 (J)	—	—	—	0.0227 (J)	0.0357 (J)	—	—	—	—
RE16-10-2768	16-609166	5.0–5.5	Soil	0.0376 (J)	—	0.475 (J-)	—	—	—	—	0.0279 (J)	0.0391 (J)	0.382 (J-)	—	0.443 (J-)	—
RE16-10-2769	16-609166	8.5–9.0	Qbt 4	0.188	0.0234 (J)	—	0.0424	—	—	0.0253 (J)	0.172	0.187	0.106 (J-)	0.165 (J-)	—	—
RE16-10-2770	16-609167	5.0–5.5	Fill	0.327	0.0565	—	0.0573 (J)	0.0291 (J)	—	0.101	0.344	0.261	—	—	—	—
RE16-10-2771	16-609167	9.0–9.5	Fill	0.522	0.0866	—	0.0955 (J)	0.0374 (J)	—	0.124	0.558	0.429	0.66	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] SSL from EPA (2007, 099314).

[g] na = Not available.

Table 8.6-4
Summary of Radionuclides Detected at SWMU 16-003(f)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240
Soil BV[a]				**0.054**
Industrial SAL[b]				**210**
Recreational SAL[b]				**300**
Residential SAL[b]				**33**
RE16-10-2980	16-609239	1.0–1.5	Soil	0.0369

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

Table 8.7-1
Summary of Samples Collected and Analyses Requested at SWMU 16-003(g)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2826	16-609186	5.0–5.5	Soil	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351
RE16-10-2827	16-609186	10.5–11.0	Soil	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351	10-2351
RE16-10-2828	16-609187	5.0–5.5	Qbt 4	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751
RE16-10-2829	16-609187	9.5–10.0	Qbt 4	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751	10-1751

Table 8.7-2
Summary of Inorganic Chemicals above BVs at SWMU 16-003(g)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Cobalt	Fluoride	Lead	Nitrate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**3.14**	**na**[b]	**11.2**	**na**	**0.3**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**8.64**	**na**	**22.3**	**na**	**1.52**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**300**[d]	**68100**	**800**	**1820000**	**5680**
Recreational SSL[e]				**317**	**158000**	**784**	**na**	**238**	**47500**	**560**	**1260000**	**3960**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**23**[d]	**4690**	**400**	**125000**	**391**
RE16-10-2826	16-609186	5.0–5.5	Soil	1.15 (UJ)	—[f]	0.574 (U)	—	—	2.66 (J-)	—	6.73	—
RE16-10-2827	16-609186	10.5–11.0	Soil	1.19 (UJ)	—	0.595 (U)	—	12	0.999 (J-)	34.1 (J)	2.07	—
RE16-10-2828	16-609187	5.0–5.5	Qbt 4	1.15 (U)	75.6	—	—	—	5.72 (J-)	—	—	1.13 (U)
RE16-10-2829	16-609187	9.5–10.0	Qbt 4	1.25 (U)	562	—	12900	—	2.33 (J-)	—	1.58	1.14 (U)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

Table 8.7-3
Summary of Organic Chemicals Detected at SWMU 16-003(g)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	Fluorene
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**1370**	**2340**	**24400**	**24400**
Recreational SSL[c]				**20800**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**1830**	**3010**	**13900**	**13900**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**347**	**621**	**2290**	**2290**
RE16-10-2826	16-609186	5.0–5.5	Soil	0.0144 (J)	0.0288 (J)	0.0693	0.0619	0.0668	0.041	—[d]	0.0676	0.137	—
RE16-10-2827	16-609186	10.5–11.0	Soil	0.0187 (J)	0.0384 (J)	0.0927	0.076	0.123	0.051	—	0.089	0.194	0.0169 (J)
RE16-10-2828	16-609187	5.0–5.5	Qbt 4	—	0.0182 (J)	0.0324 (J)	0.0241 (J)	—	0.0198 (J)	0.0981 (J)	0.0313 (J)	0.0696	—
RE16-10-2829	16-609187	9.5–10.0	Qbt 4	—	—	—	—	—	—	—	—	—	—

Table 8.7-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**23.4**	**1090**	**4100**[e]	**252**	**20500**	**18300**	**260**[e]	**10000**[e]	**31500**	**3610**
Recreational SSL[c]				**30.1**	**4520**	**3170**	**1950**	**12000**	**10400**	**6880**	**7920**	**248000**	**27800**
Residential SSL[a]				**6.21**	**199**	**310**[e]	**45**	**1830**	**1720**	**62**[e]	**780**[e]	**9550**	**1090**
RE16-10-2826	16-609186	5.0–5.5	Soil	0.0348 (J)	0.00281 (J)	—	—	0.101	0.13	—	—	—	—
RE16-10-2827	16-609186	10.5–11.0	Soil	0.0509	—	—	—	0.16	0.171	—	—	—	—
RE16-10-2828	16-609187	5.0–5.5	Qbt 4	0.0162 (J)	—	0.00886 (J)	0.0126 (J)	0.0648	0.0573	0.00228	0.000641 (J)	0.000538 (J)	0.000878 (J)
RE16-10-2829	16-609187	9.5–10.0	Qbt 4	—	—	—	—	—	—	0.000985 (J)	0.000579 (J)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table 8.8-1
Summary of Samples Collected and Analyses Requested at SWMU 16-026(b)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-95-0116	16-01454	0.0–0.5	Sed	—*	—	—	130	—	—	131,132	—	130	—	131
0316-95-0117	16-01455	0.0–0.5	Sed	—	—	—	130	—	—	131,132	—	130	—	131
0316-95-0118	16-01456	0.0–0.5	Sed	—	—	—	—	—	—	310,311	—	309	—	310
0316-95-0113	16-01654	0.0–0.5	Sed	—	—	—	972	—	—	978,979	—	972	—	978
0316-95-0114	16-01654	0.25–1.0	Qbt 4	—	—	—	972	—	—	978,979	—	972	972	978
0316-95-0115	16-01654	5.0–6.0	Qbt 4	—	—	—	972	—	—	978,979	—	972	972	978
RE16-10-2835	16-609189	0.0–0.5	Soil	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069
RE16-10-2836	16-609189	5.5–6.0	Qbt 4	10–1081	10–1081	10–1081	10–1081	10–1081	10–1081	10–1081	10–1081	10–1081	10–1081	10–1081
RE16-10-2837	16-609190	0.0–0.5	Soil	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069
RE16-10-2838	16-609190	5.5–6.0	Qbt 4	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069	10–1069
RE16-10-2841	16-609192	0.0–0.5	Soil	10–1010	10–1010	10–1010	10–1009	10–1010	10–1010	10–1010	10–1010	10–1009	10–1009	—
RE16-10-2842	16-609192	5.0–6.0	Qbt 4	10–1010	10–1010	10–1010	10–1009	10–1010	10–1010	10–1010	10–1010	10–1009	10–1009	—
RE16-10-2843	16-609192	11.0–12.0	Qbt 4	10–1010	10–1010	10–1010	10–1009	10–1010	10–1010	10–1010	10–1010	10–1009	10–1009	—
RE16-10-2844	16-609192	19.0–20.0	Qbt 4	10–1010	10–1010	10–1010	10–1009	10–1010	10–1010	10–1010	10–1010	10–1009	10–1009	—

*— = Analyses not requested.

Table 8.8-2
Summary of Inorganic Chemicals above BVs at SWMU 16-026(b)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Cadmium	Chromium	Cyanide (Total)	Fluoride	Iron	Nitrate	Selenium	Uranium
Qbt 2, 3, 4 BV[a]				**0.5**	**2.79**	**46**	**1.63**	**7.14**	**0.5**	**na**[b]	**14500**	**na**	**0.3**	**2.4**
Sediment BV[a]				**0.83**	**3.98**	**127**	**0.4**	**10.5**	**0.82**	**na**	**13800**	**na**	**0.3**	**2.22**
Soil BV[a]				**0.83**	**8.17**	**295**	**0.4**	**19.3**	**0.5**	**na**	**21500**	**na**	**1.52**	**1.82**
Industrial SSL[c]				**454**	**17.7**	**224000**	**1120**	**2920**[d]	**45400**	**22700**	**68100**	**795000**	**1820000**	**5680**
Recreational SSL[e]				**317**	**27.7**	**158000**	**784**	**1910**[d]	**31700**	**15800**	**47500**	**554000**	**1260000**	**3960**
Residential SSL[c]				**31.3**	**3.9**	**15600**	**77.9**	**219**[d]	**3130**	**1560**	**4690**	**54800**	**125000**	**391**
0316-95-0116	16-01454	0.0–0.5	Sed	5.6 (U)	—[f]	—	0.56 (U)	—	1.1 (U)	NA[g]	—	NA	—	2.24
0316-95-0117	16-01455	0.0–0.5	Sed	5.6 (U)	—	139	0.56 (U)	—	1.1 (U)	NA	—	NA	—	3.14
0316-95-0118	16-01456	0.0–0.5	Sed	5.3 (U)	—	1190	0.53 (U)	—	1.1 (U)	NA	—	NA	—	3.86
0316-95-0113	16-01654	0.0–0.5	Sed	5.2 (U)	—	455 (J+)	0.52 (U)	—	1.1 (U)	NA	—	NA	—	—
0316-95-0114	16-01654	0.25–1.0	Qbt 4	5.3 (U)	—	568 (J+)	—	—	1.1 (U)	NA	—	NA	—	—
0316-95-0115	16-01654	5.0–6.0	Qbt 4	5.1 (U)	—	319 (J+)	—	—	1 (U)	NA	—	NA	—	—
RE16-10-2835	16-609189	0.0–0.5	Soil	1.09 (U)	—	—	0.545 (U)	—	—	0.766 (J-)	—	1.51	—	NA
RE16-10-2836	16-609189	5.5–6.0	Qbt 4	1.02 (U)	—	161 (J+)	—	—	0.647	1.23 (J-)	—	—	1.04 (U)	NA
RE16-10-2837	16-609190	0.0–0.5	Soil	1.12 (U)	—	—	0.561 (U)	—	—	—	—	1.68	—	NA
RE16-10-2838	16-609190	5.5–6.0	Qbt 4	1.1 (U)	3.24	83	—	23.6	—	2.44 (J-)	14800	—	1.07 (UJ)	NA
RE16-10-2841	16-609192	0.0–0.5	Soil	1.17 (U)	—	—	0.585 (U)	—	NA	—	—	—	—	NA
RE16-10-2842	16-609192	5.0–6.0	Qbt 4	1.08 (U)	—	—	—	—	NA	0.652 (J-)	—	—	1.08 (U)	NA
RE16-10-2843	16-609192	11.0–12.0	Qbt 4	1.06 (U)	—	55.4	—	—	NA	2.53 (J-)	—	—	1.07 (U)	NA
RE16-10-2844	16-609192	19.0–20.0	Qbt 4	1.05 (U)	—	—	—	—	NA	1.03 (J-)	—	—	1.06 (U)	NA

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSL for chromium hexavalent ion.

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

Table 8.8-3
Summary of Organic Chemicals Detected at SWMU 16-026(b)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Di-n-butylphthalate
Industrial SSL[a]				**36700**	**851000**	**1900**[b]	**2000**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2500000**[b]	**1370**	**2340**	**68400**
Recreational SSL[d]				**20800**	**702000**	**1440**	**1440**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1590000**	**1830**	**3010**	**39900**
Residential SSL[a]				**3440**	**67500**	**150**[b]	**150**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**240000**[b]	**347**	**621**	**6110**
0316-95-0116	16-01454	0.0–0.5	Sed	—[e]	NA[f]	0.237	0.286	0.041 (J)	—	—	0.059 (J)	—	—	—	0.28 (J)	—	—
0316-95-0117	16-01455	0.0–0.5	Sed	—	NA	—	0.174	0.054 (J)	0.26 (J)	0.31 (J)	0.48	0.16 (J)	—	—	0.072 (J)	0.36 (J)	0.08 (J)
0316-95-0118	16-01456	0.0–0.5	Sed	—	NA	NA	NA	—	0.13 (J)	0.16 (J)	0.33 (J)	0.082 (J)	0.12 (J)	0.14 (J)	—	0.21 (J)	—
0316-95-0113	16-01654	0.0–0.5	Sed	0.17 (J)	NA	0.151	0.102	0.36	1.4	1.3	2.3	0.71	0.86	—	—	2.2	—
0316-95-0114	16-01654	0.25–1.0	Qbt 4	—	0.011 (J)	0.219	0.192	—	—	0.064 (J)	0.18 (J)	0.06 (J)	0.066 (J)	—	—	0.12 (J)	—
0316-95-0115	16-01654	5.0–6.0	Qbt 4	0.035 (J)	—	0.219	0.241	0.1 (J)	0.42	0.42	0.62	0.22 (J)	0.24 (J)	—	—	0.64	—
RE16-10-2835	16-609189	0.0–0.5	Soil	0.594	—	—	—	1.45	4.12	3.54	7.29	1.83	—	—	—	4.07	—
RE16-10-2836	16-609189	5.5–6.0	Qbt 4	0.0423	—	—	0.151 (J)	0.0395	0.145	0.15	0.205	0.0766	0.0849	—	—	0.168	—
RE16-10-2837	16-609190	0.0–0.5	Soil	0.0343 (J)	—	—	—	0.0846	0.372	0.346	0.678	0.186	—	—	—	0.406	—
RE16-10-2838	16-609190	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	0.012 (J)	—	—	—	—	—	—
RE16-10-2841	16-609192	0.0–0.5	Soil	—	—	—	—	0.0591 (J)	0.446	0.445	1.04	0.212	—	—	—	0.515	—
RE16-10-2842	16-609192	5.0–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2843	16-609192	11.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2844	16-609192	19.0–20.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 8.8-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibenz(a,h)anthracene	Dibenzofuran	Dinitrotoluene[2,4—]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3—cd)pyrene	Methylnaphthalene[2—]	Naphthalene	Nitroaniline[4—]	Phenanthrene	Pyrene	RDX	Trinitrotoluene[2,4,6—]
Industrial SSL[a]				**2.34**	**1000**[b]	**103**	**24400**	**24400**	**34200**	**23.4**	**4100**[b]	**252**	**860**[b]	**20500**	**18300**	**174**	**469**
Recreational SSL[d]				**3.01**	**399**	**82.5**	**13900**	**13900**	**19900**	**30.1**	**3170**	**1950**	**na**[g]	**12000**	**10400**	**233**	**301**
Residential SSL[a]				**0.621**	**78**[b]	**15.7**	**2290**	**2290**	**3060**	**6.21**	**310**[b]	**45**	**240**[b]	**1830**	**1720**	**44.2**	**35.9**
0316-95-0116	16-01454	0.0–0.5	Sed	—	—	—	0.086 (J)	—	0.652	—	—	—	—	—	0.071 (J)	—	—
0316-95-0117	16-01455	0.0–0.5	Sed	—	—	—	0.76	—	2.5	0.15 (J)	—	—	0.68	0.34 (J)	0.68	—	—
0316-95-0118	16-01456	0.0–0.5	Sed	—	—	0.12 (J)	0.41	—	NA[i]	0.1 (J)	—	—	—	0.15 (J)	0.38	NA	NA
0316-95-0113	16-01654	0.0–0.5	Sed	0.19 (J)	0.078 (J)	—	3.5	0.18 (J)	320	0.84	—	—	—	1.9	2.4	0.512	0.312
0316-95-0114	16-01654	0.25–1.0	Qbt 4	—	—	—	0.16 (J)	—	159	0.083 (J)	—	—	—	0.064 (J)	0.096 (J)	—	—
0316-95-0115	16-01654	5.0–6.0	Qbt 4	0.064 (J)	—	—	1.1	—	66.5	0.24 (J)	—	—	—	0.55	0.63	—	—
RE16-10-2835	16-609189	0.0–0.5	Soil	—	0.268 (J)	—	10.4	0.703	20.1	1.86	0.0198 (J)	0.0337 (J)	—	7.37	8.23	—	—
RE16-10-2836	16-609189	5.5–6.0	Qbt 4	0.0194 (J)	—	—	0.311	0.0178 (J)	7.68	0.077 (J)	—	—	—	0.233	0.382	—	—
RE16-10-2837	16-609190	0.0–0.5	Soil	—	—	—	0.926	0.0323 (J)	—	0.181	—	—	—	0.493	0.628	—	—
RE16-10-2838	16-609190	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2841	16-609192	0.0–0.5	Soil	—	—	—	0.937	—	—	0.146	—	—	—	0.381	0.811	—	—
RE16-10-2842	16-609192	5.0–6.0	Qbt 4	—	—	—	—	—	0.452 (J)	—	—	—	—	—	—	—	—
RE16-10-2843	16-609192	11.0–12.0	Qbt 4	—	—	—	—	—	0.366 (J)	—	—	—	—	—	—	0.338 (J)	—
RE16-10-2844	16-609192	19.0–20.0	Qbt 4	—	—	—	—	—	0.307 (J)	—	—	—	—	—	—	0.311 (J)	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] NA = Not analyzed.

[g] na = Not available.

Table 8.9-1
Summary of Samples Collected and Analyses Requested at SWMU 16-026(c)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-95-0121	16-01459	0.0–0.5	Sed	—*	—	—	621	—	—	622	—	621	—	622
0316-95-0122	16-01459	1.75–2.25	Qbt 4	—	—	—	621	—	—	622	—	621	621	622
0316-95-0123	16-01459	3.5–4.5	Qbt 4	—	—	—	874	—	—	875	—	874	874	875
0316-95-0127	16-01460	0.0–0.5	Sed	—	—	—	118	—	—	120	—	118	—	120
0316-95-0128	16-01461	0.0–0.5	Sed	—	—	—	118	—	—	120	—	118	—	120
0316-95-0129	16-01462	0.0–0.5	Sed	—	—	—	118	—	—	120	—	118	—	120
0316-95-0130	16-01463	0.0–0.5	Soil	—	—	—	118	—	—	120	—	118	—	120
0316-95-0131	16-01464	0.0–0.5	Sed	—	—	—	118	—	—	120	—	118	—	120
0316-95-0124	16-01655	0.0–0.5	Sed	—	—	—	621	—	—	622	—	621	—	622
0316-95-0125	16-01655	1.0–1.5	Qbt 4	—	—	—	621	—	—	622	—	621	621	622
0316-95-0126	16-01655	3.5–4.5	Qbt 4	—	—	—	874	—	—	875	—	874	874	875
RE16-10-2858	16-609193	5.5–6.0	Qbt 4	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096
RE16-10-2853	16-609194	0.0–0.5	Soil	10-1067	10-1066	10-1067	10-1065	10-1067	10-1067	10-1067	10-1066	10-1065	10-1065	10-1066
RE16-10-2854	16-609194	5.5–6.0	Qbt 4	10-1067	10-1066	10-1067	10-1065	10-1067	10-1067	10-1067	10-1066	10-1065	10-1065	10-1066
RE16-10-2855	16-609195	0.0–0.5	Soil	10-1067	10-1066	10-1067	10-1065	10-1067	10-1067	10-1067	10-1066	10-1065	10-1065	10-1066
RE16-10-2856	16-609195	5.5–6.0	Qbt 4	10-1067	10-1066	10-1067	10-1065	10-1067	10-1067	10-1067	10-1066	10-1065	10-1065	10-1066
RE16-10-2862	16-609197	0.0–0.5	Soil	10-1067	10-1066	10-1067	10-1065	10-1067	10-1067	10-1067	10-1066	10-1065	10-1065	10-1066
RE16-10-2860	16-609197	5.0–6.0	Qbt 4	10-1067	10-1066	10-1067	10-1065	10-1067	10-1067	10-1067	10-1066	10-1065	10-1065	10-1066
RE16-10-2861	16-609197	11.0–12.0	Qbt 4	10-1067	10-1066	10-1067	10-1065	10-1067	10-1067	10-1067	10-1066	10-1065	10-1065	10-1066
RE16-10-2859	16-609197	19.0–20.0	Qbt 4	10-1067	10-1066	10-1067	10-1065	10-1067	10-1067	10-1067	10-1066	10-1065	10-1065	10-1066
RE16-10-2852	16-609193	0.0–0.5	Soil	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096	10-1096

*— = Analyses not requested.

Table 8.9-2
Summary of Inorganic Chemicals above BVs at SWMU 16-026(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Nickel	Nitrate	Perchlorate	Selenium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**7.14**	**3.14**	**4.66**	**0.5**	**na**[b]	**14500**	**11.2**	**1690**	**482**	**6.58**	**na**	**na**	**0.3**	**17**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**15.4**	**na**	**na**	**1.52**	**39.6**	**48.8**
Industrial SSL[c]				**454**	**224000**	**1120**	**2920**[d]	**300**[e]	**45400**	**22700**	**68100**	**795000**	**800**	**na**	**145000**	**22700**	**1820000**	**795**	**5680**	**5680**	**341000**
Recreational SSL[f]				**317**	**158000**	**784**	**1910**[d]	**238**	**31700**	**15800**	**47500**	**554000**	**560**	**na**	**110000**	**15800**	**1260000**	**555**	**3960**	**3960**	**238000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**219**[d]	**23**[e]	**3130**	**1560**	**4690**	**54800**	**400**	**na**	**10700**	**1560**	**125000**	**54.8**	**391**	**391**	**23500**
0316-95-0121	16-01459	0.0–0.5	Sed	6.1 (U)	254	0.61 (U)	—[g]	6.5	11.8	1.2 (U)	NA[h]	19200	33.5	—	—	10.1	NA	NA	—	—	148 (J-)
0316-95-0122	16-01459	1.75–2.25	Qbt 4	5.8 (U)	183	—	—	—	5.6	1.2 (U)	NA	—	15.2	—	—	—	NA	NA	—	—	—
0316-95-0123	16-01459	3.5-4.5	Qbt 4	6 (U)	—	—	22.7	—	—	1.2 (U)	NA	—	—	—	—	—	NA	NA	—	—	—
0316-95-0127	16-01460	0.0–0.5	Sed	5.6 (U)	140	0.56 (U)	—	—	—	1.1 (U)	NA	—	—	—	—	—	NA	NA	—	—	—
0316-95-0128	16-01461	0.0–0.5	Sed	5.4 (U)	243	0.54 (U)	—	—	—	1.1 (U)	NA	—	—	—	—	—	NA	NA	—	—	—
0316-95-0129	16-01462	0.0–0.5	Sed	5.4 (U)	633	0.54 (U)	—	—	—	1.1 (U)	NA	—	—	—	—	—	NA	NA	—	24.1	73.5
0316-95-0130	16-01463	0.0–0.5	Soil	5.5 (U)	—	0.55 (U)	—	—	—	1.1 (U)	NA	—	—	—	—	—	NA	NA	—	—	—
0316-95-0131	16-01464	0.0–0.5	Sed	5.8 (U)	170	0.58 (U)	—	—	42	1.2 (U)	NA	—	—	—	—	—	NA	NA	—	—	142
0316-95-0124	16-01655	0.0–0.5	Sed	5.8 (U)	156	0.58 (U)	—	—	—	1.2 (U)	NA	—	47.6	—	—	—	NA	NA	—	—	—
0316-95-0125	16-01655	1.0–1.5	Qbt 4	6.5 (U)	245	—	—	—	7.3	1.3 (U)	NA	—	18.1	—	—	—	NA	NA	0.32 (J-)	—	—
0316-95-0126	16-01655	3.5–4.5	Qbt 4	5.8 (U)	128	—	15	—	—	1.2 (U)	NA	—	—	—	—	—	NA	NA	—	—	—
RE16-10-2858	16-609193	5.5–6.0	Qbt 4	1.11 (U)	56.1 (J+)	—	—	—	—	—	2.42 (J-)	—	—	—	—	—	—	—	1.12 (U)	—	—
RE16-10-2853	16-609194	0.0–0.5	Soil	1.09 (U)	—	0.544 (U)	—	11.2	—	—	0.807 (J-)	—	—	—	890 (J+)	—	1.67	0.000732 (J)	—	—	55.9
RE16-10-2854	16-609194	5.5–6.0	Qbt 4	1.09 (U)	183	—	31	—	—	—	1.86 (J-)	—	—	—	—	—	—	—	1.13 (UJ)	—	—
RE16-10-2855	16-609195	0.0–0.5	Soil	1.12 (U)	475	0.559 (U)	—	—	—	—	0.617 (J-)	—	—	—	—	—	—	—	—	—	64.5
RE16-10-2856	16-609195	5.5–6.0	Qbt 4	1.12 (U)	143	—	—	—	—	—	0.776 (J-)	—	—	—	—	—	—	—	1.07 (UJ)	—	—
RE16-10-2862	16-609197	0.0–0.5	Soil	1.11 (U)	561	0.556 (U)	—	—	—	—	0.699 (J-)	—	—	—	—	—	1.82	0.000615 (J)	—	—	52
RE16-10-2860	16-609197	5.0–6.0	Qbt 4	0.937 (U)	47.8	—	—	—	—	—	1.13 (J-)	—	—	2470 (J+)	—	—	—	—	0.485 (J-)	—	—
RE16-10-2861	16-609197	11.0–12.0	Qbt 4	1.03 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.04 (UJ)	—	—
RE16-10-2859	16-609197	19.0–20.0	Qbt 4	1.04 (U)	—	—	—	—	—	—	0.602 (J-)	—	—	—	—	—	—	—	1.07 (UJ)	—	—
RE16-10-2852	16-609193	0.0–0.5	Soil	1.41 (U)	—	—	—	—	35.5	—	1.18 (J-)	—	—	—	—	—	—	—	—	—	121

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 8.9-3
Summary of Organic Chemicals Detected at SWMU 16-026(c)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Chrysene	Dibenz(a,h)anthracene
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2500000**[c]	**2340**	**2.34**
Recreational SSL[d]				**20800**	**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**301**	**1590000**	**3010**	**3.01**
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**240000**[c]	**621**	**0.621**
0316-95-0121	16-01459	0.0–0.5	Sed	0.12 (J)	NA[e]	0.19 (J)	0.57	0.62	0.89	0.28 (J)	0.38 (J)	—[f]	0.75	0.079 (J)
0316-95-0122	16-01459	1.75–2.25	Qbt 4	0.18 (J)	—	0.5 (J)	0.74 (J)	0.74	1	0.43	0.4	—	0.8 (J)	0.12 (J)
0316-95-0127	16-01460	0.0–0.5	Sed	—	NA	—	0.068 (J)	0.084 (J)	0.12 (J)	—	—	—	0.099 (J)	—
0316-95-0128	16-01461	0.0–0.5	Sed	—	NA	—	—	—	—	—	—	—	—	—
0316-95-0129	16-01462	0.0–0.5	Sed	—	NA	—	—	0.059 (J)	0.083 (J)	—	—	—	0.06 (J)	—
0316-95-0130	16-01463	0.0–0.5	Soil	—	NA	—	0.087 (J)	0.1 (J)	0.16 (J)	0.06 (J)	0.072 (J)	—	0.12 (J)	—
0316-95-0131	16-01464	0.0–0.5	Sed	—	NA	—	—	—	0.087 (J)	—	—	—	—	—
0316-95-0124	16-01655	0.0–0.5	Sed	0.061 (J)	NA	0.1 (J)	0.32 (J)	0.39 (J)	0.88 (J)	0.2 (J)	0.28 (J)	0.082 (J)	0.52	0.056 (J)
0316-95-0125	16-01655	1.0–1.5	Qbt 4	—	0.008 (J)	0.07 (J)	0.14 (J)	0.12 (J)	0.19 (J)	0.089 (J)	—	—	0.17 (J)	—
RE16-10-2853	16-609194	0.0–0.5	Soil	—	—	0.0122 (J)	0.11	0.0918	0.177	0.0598	—	—	0.114	—
RE16-10-2854	16-609194	5.5–6.0	Qbt 4	—	—	—	—	—	0.0124 (J)	—	—	—	—	—
RE16-10-2855	16-609195	0.0–0.5	Soil	0.0176 (J)	—	0.0617	0.106	0.0986	0.163	0.0493	—	—	0.104	—
RE16-10-2856	16-609195	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2862	16-609197	0.0–0.5	Soil	—	—	—	0.0201 (J)	0.0171 (J)	0.0335 (J)	0.0151 (J)	—	—	0.02 (J)	—
RE16-10-2860	16-609197	5.0–6.0	Qbt 4	—	—	—	—	—	—	—	—	0.861	—	—
RE16-10-2861	16-609197	11.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	0.536 (J)	—	—
RE16-10-2852	16-609193	0.0–0.5	Soil	0.0367 (J)	—	0.0463 (J)	0.218	0.236	0.362	0.122 (J)	0.136	—	0.275	—

Table 8.9-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibenzofuran	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	RDX	Styrene	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**1000[c]**	**24400**	**24400**	**34200**	**23.4**	**4100[c]**	**252**	**20500**	**18300**	**174**	**51200**	**469**
Recreational SSL[d]				**399**	**13900**	**13900**	**19900**	**30.1**	**3170**	**1950**	**12000**	**10400**	**233**	**126000**	**301**
Residential SSL[a]				**78[c]**	**2290**	**2290**	**3060**	**6.21**	**310[c]**	**45**	**1830**	**1720**	**44.2**	**8970**	**35.9**
0316-95-0121	16-01459	0.0–0.5	Sed	0.043 (J)	1.6	0.11 (J)	—	0.31 (J)	—	0.05 (J)	1.1	1.5	—	NA	—
0316-95-0122	16-01459	1.75–2.25	Qbt 4	0.097 (J)	1.6 (J)	0.19 (J)	—	0.44	0.049 (J)	0.067 (J)	1.2 (J)	2.2 (J)	—	—	—
0316-95-0127	16-01460	0.0–0.5	Sed	—	0.2 (J)	—	—	—	—	—	0.11 (J)	0.16 (J)	—	NA	—
0316-95-0128	16-01461	0.0–0.5	Sed	—	0.051 (J)	—	—	—	—	—	—	0.048 (J)	—	NA	—
0316-95-0129	16-01462	0.0–0.5	Sed	—	0.11 (J)	—	—	—	—	—	0.074 (J)	0.17 (J)	—	NA	—
0316-95-0130	16-01463	0.0–0.5	Soil	—	0.21 (J)	—	—	0.068 (J)	—	—	0.15 (J)	0.36 (J)	—	NA	—
0316-95-0131	16-01464	0.0–0.5	Sed	—	0.11 (J)	—	—	—	—	—	0.071 (J)	0.19 (J)	—	NA	—
0316-95-0124	16-01655	0.0–0.5	Sed	—	0.92	0.058 (J)	—	0.21 (J)	—	—	0.64 (J)	1.4	—	NA	—
0316-95-0125	16-01655	1.0–1.5	Qbt 4	—	0.35 (J)	—	—	0.078 (J)	—	—	0.28 (J)	0.39 (J)	—	—	0.133
RE16-10-2853	16-609194	0.0–0.5	Soil	—	0.281	0.0161 (J)	—	0.0576	—	—	0.2	0.244	—	—	—
RE16-10-2854	16-609194	5.5–6.0	Qbt 4	—	0.0154 (J)	—	—	—	—	—	—	0.0143 (J)	—	—	—
RE16-10-2855	16-609195	0.0–0.5	Soil	—	0.28	0.0264 (J)	29	0.048	—	—	0.225	0.243	0.242 (J)	—	—
RE16-10-2856	16-609195	5.5–6.0	Qbt 4	—	0.0148 (J)	—	1.22	—	—	—	—	0.0128 (J)	—	—	—
RE16-10-2862	16-609197	0.0–0.5	Soil	—	0.0424	—	—	0.0131 (J)	—	—	—	0.0375 (J)	—	—	—
RE16-10-2860	16-609197	5.0–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2861	16-609197	11.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2852	16-609193	0.0–0.5	Soil	—	0.595	0.0323 (J)	—	0.124 (J)	—	—	0.408	0.564	—	0.000484 (J+)	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] NA = Not analyzed.

[f] — = Not detected or not detected above BV.

Table 8.10-1
Summary of Samples Collected and Analyses Requested at SWMU 16-026(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-95-0132	16-01465	0.0–0.5	Sed	—*	—	—	546	—	—	547	—	546	—	547
0316-95-0133	16-01465	0.58—1.0	Qbt 4	—	—	—	546	—	—	547	—	546	546	547
0316-95-0134	16-01465	3.0–5.0	Qbt 4	—	—	—	546	—	—	547	—	546	546	547
0316-95-0138	16-01466	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0139	16-01467	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0140	16-01468	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0141	16-01469	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0142	16-01470	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0135	16-01656	0.0–0.5	Sed	—	—	—	546	—	—	547	—	546	—	547
0316-95-0136	16-01656	0.5-0.83	Qbt 4	—	—	—	546	—	—	547	—	546	546	547
0316-95-0137	16-01656	5.0–6.5	Qbt 4	—	—	—	546	—	—	547	—	546	546	547
RE16-10-11743	16-609182	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	10-1518
RE16-10-2815	16-609182	0.0–0.5	Soil	10-639	10-639	10-639	10-639	10-639	10-639	10-639	10-639	10-639	10-639	—
RE16-10-2816	16-609182	5.0–5.5	Soil	10-883	10-883	10-883	10-883	10-883	10-883	10-883	10-883	10-883	10-883	10-883
RE16-10-11744	16-609183	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	10-1518
RE16-10-2817	16-609183	0.0–0.5	Soil	10-639	10-639	10-639	10-639	10-639	10-639	10-639	10-639	10-639	10-639	—
RE16-10-2818	16-609183	4.5-5	Soil	10-904	10-904	10-904	10-904	10-904	10-904	10-904	10-904	10-904	10-904	10-904
RE16-10-2819	16-609184	0.0–0.5	Qbt 4	10-904	10-904	10-904	10-904	10-904	10-904	10-904	10-904	10-904	10-904	10-904
RE16-10-2820	16-609184	5.0–5.5	Qbt 4	10-946	10-946	10-946	10-946	10-946	10-946	10-946	10-946	10-946	10-946	10-946
RE16-10-2821	16-609185	0.0–0.5	Qbt 4	10-1560	10-1559	10-1560	10-1558	10-1560	10-1560	10-1560	10-1559	10-1558	10-1558	10-1559
RE16-10-2822	16-609185	5.5–6.0	Qbt 4	10-1560	10-1559	10-1560	10-1558	10-1560	10-1560	10-1560	10-1559	10-1558	10-1558	10-1559
RE16-10-10118	16-611015	0.0–0.5	Soil	10-1563	10-1563	10-1563	10-1562	10-1563	10-1563	10-1563	10-1563	10-1562	10-1562	—
RE16-10-10119	16-611015	5.0–5.5	Qbt 4	10-1563	10-1563	10-1563	10-1562	10-1563	10-1563	10-1563	10-1563	10-1562	10-1562	—
RE16-10-10121	16-611016	0.0–0.5	Fill	10-1563	10-1563	10-1563	10-1562	10-1563	10-1563	10-1563	10-1563	10-1562	10-1562	—
RE16-10-10120	16-611016	5.0–5.5	Qbt 4	10-1560	10-1559	10-1560	10-1558	10-1560	10-1560	10-1560	10-1559	10-1558	10-1558	10-1559
RE16-10-10123	16-611017	0.0–0.5	Fill	10-1563	10-1563	10-1563	10-1562	10-1563	10-1563	10-1563	10-1563	10-1562	10-1562	—
RE16-10-10122	16-611017	5.0–5.5	Qbt 4	10-1560	10-1559	10-1560	10-1558	10-1560	10-1560	10-1560	10-1559	10-1558	10-1558	10-1559

*— = Analyses not requested.

Table 8.10-2
Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at SWMU 16-026(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chloride	Copper	Fluoride	Lead	Mercury	Nitrate	Selenium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**94.6**	**4.66**	**na[b]**	**11.2**	**0.1**	**na**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**231**	**14.7**	**na**	**22.3**	**0.1**	**na**	**1.52**	**48.8**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**na**	**45400**	**68100**	**800**	**310[d]**	**1820000**	**5680**	**341000**
Recreational SSL[e]				**317**	**158000**	**784**	**na**	**na**	**31700**	**47500**	**560**	**238**	**1260000**	**3960**	**238000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**na**	**3130**	**4690**	**400**	**23[d]**	**125000**	**391**	**23500**
0316-95-0132	16-01465	0.0–0.5	Sed	5.5 (U)	267 (J-)	0.55 (U)	—[f]	NA[g]	—	—	—	1.1 (U)	NA	21.9	—
0316-95-0133	16-01465	0.58—1.0	Qbt 4	5.7 (U)	263 (J-)	—	—	NA	17	4.1 (J)	5.9	1.2 (U)	NA	60.5	—
0316-95-0134	16-01465	3.0–5.0	Qbt 4	5.5 (U)	100 (J-)	—	—	NA	40.1	—	—	1.1 (U)	NA	—	—
0316-95-0138	16-01466	0.0–0.5	Sed	5.4 (U)	196	0.54 (U)	—	NA	—	—	—	1.1 (U)	NA	—	—
0316-95-0139	16-01467	0.0–0.5	Sed	5.1 (U)	209	0.51 (U)	—	NA	—	—	—	1 (U)	NA	—	—
0316-95-0140	16-01468	0.0–0.5	Sed	5.1 (U)	155	0.51 (U)	—	NA	—	—	—	1 (U)	NA	—	—
0316-95-0141	16-01469	0.0–0.5	Sed	5.4 (U)	239	0.54 (U)	—	NA	—	—	—	1.1 (U)	NA	—	—
0316-95-0142	16-01470	0.0–0.5	Sed	6 (U)	186	0.6 (U)	—	NA	—	—	—	1.2 (U)	NA	—	—
0316-95-0135	16-01656	0.0–0.5	Sed	5.2 (U)	129 (J-)	0.52 (U)	—	NA	—	—	—	1.1 (U)	NA	—	—
0316-95-0136	16-01656	0.5—0.83	Qbt 4	5.4 (U)	190 (J-)	—	—	NA	—	—	6.8	1.1 (U)	NA	79.8	—
0316-95-0137	16-01656	5.0–6.5	Qbt 4	5.3 (U)	292 (J-)	—	—	NA	72.7	—	—	1.1 (U)	NA	—	—
RE16-10-2815	16-609182	0.0–0.5	Soil	1.73 (U)	—	0.448 (J)	—	—	—	—	25.9	—	—	—	252
RE16-10-2816	16-609182	5.0–5.5	Soil	1.1 (U)	—	0.548 (U)	—	—	—	1.77	—	—	—	—	88.2
RE16-10-2817	16-609183	0.0–0.5	Soil	2.22 (J)	347	—	—	—	—	0.949 (J-)	—	—	—	—	54.3
RE16-10-2818	16-609183	4.5.0–5	Soil	1.03 (U)	745	0.517 (U)	—	—	—	3.84	—	—	—	—	—
RE16-10-2819	16-609184	0.0–0.5	Qbt 4	1.16 (U)	610	—	—	—	—	0.863 (J)	—	—	1.66	1.16 (U)	—
RE16-10-2820	16-609184	5.0–5.5	Qbt 4	1.07 (U)	212 (J+)	—	—	—	—	0.978 (J)	—	—	—	1.12 (U)	—
RE16-10-2821	16-609185	0.0–0.5	Qbt 4	1.14 (U)	114	—	—	—	—	1.42	—	—	1.42	1.14 (U)	—
RE16-10-2822	16-609185	5.5.0–6	Qbt 4	1.06 (U)	—	—	—	—	—	1.32	—	—	—	0.57 (J)	—
RE16-10-10118	16-611015	0.0–0.5	Soil	1.29 (U)	—	0.565 (U)	—	—	—	1.32	—	—	3.18	—	—
RE16-10-10119	16-611015	5.0–5.5	Qbt 4	1.09 (U)	—	—	—	—	—	2.75	—	—	—	1.12 (U)	—
RE16-10-10121	16-611016	0.0–0.5	Fill	—	—	0.622 (U)	—	678	—	1.23 (J)	—	—	—	—	—
RE16-10-10120	16-611016	5.0–5.5	Qbt 4	1.15 (U)	—	—	—	—	—	2	—	—	1.37	1.05 (U)	—
RE16-10-10123	16-611017	0.0–0.5	Fill	0.96 (U)	—	0.539 (U)	7940	—	65.8	1.14	—	0.167	1.97	—	—
RE16-10-10122	16-611017	5.0–5.5	Qbt 4	1.1 (U)	145	—	—	—	—	2.15	—	—	—	1.08 (U)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

Table 8.10-3
Summary of Organic Chemicals Detected at SWMU 16-026(d)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene
Industrial SSL[a]				**na**[b]	**36700**	**2000**[c]	**1900**[c]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[d]	**234**
Recreational SSL[e]				**na**	**20800**	**1440**	**1440**	**104000**[f]	**30.1**	**3.01**	**30.1**	**10400**[d]	**301**
Residential SSL[a]				**na**	**3440**	**150**[c]	**150**[c]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[d]	**62.1**
0316-95-0132	16-01465	0.0–0.5	SED	NA[f]	0.063 (J)	—[g]	—	0.1 (J)	0.26 (J)	—	—	—	0.52
0316-95-0133	16-01465	0.58—1.0	QBT4	NA	0.095 (J)	—	—	0.14 (J)	0.31 (J)	0.16 (J)	0.55	—	—
0316-95-0134	16-01465	3.0–5.0	QBT4	NA	—	—	—	—	—	—	—	—	—
0316-95-0138	16-01466	0.0–0.5	SED	NA	—	—	—	—	—	—	—	—	—
0316-95-0139	16-01467	0.0–0.5	SED	NA	—	—	—	—	—	—	—	—	—
0316-95-0140	16-01468	0.0–0.5	SED	NA	—	—	—	—	0.059 (J)	0.082 (J)	0.12 (J)	0.045 (J)	—
0316-95-0141	16-01469	0.0–0.5	SED	NA	—	—	—	—	0.072 (J)	0.078 (J)	0.13 (J)	0.038 (J)	—
0316-95-0142	16-01470	0.0–0.5	SED	NA	0.042 (J)	—	—	0.078 (J)	0.24 (J)	0.26 (J)	0.41	0.13 (J)	—
0316-95-0136	16-01656	0.5-0.83	QBT4	NA	—	0.168	—	—	—	—	—	—	—
0316-95-0137	16-01656	5.0–6.5	QBT4	NA	—	—	—	—	—	—	—	—	—
RE16-10-2815	16-609182	0.0–0.5	Soil	—	—	—	—	0.0114 (J)	0.0443	0.0372	0.0496	0.0181 (J)	0.0255 (J)
RE16-10-2816	16-609182	5.0–5.5	Soil	—	0.0159 (J)	—	—	0.0363 (J)	0.0753 (J)	0.0365 (J)	0.0932 (J)	0.0387 (J)	0.0338 (J)
RE16-10-2817	16-609183	0.0–0.5	Soil	—	—	—	—	0.0087 (J)	0.0327 (J)	0.0256 (J)	0.0409 (J)	0.02 (J)	—
RE16-10-2818	16-609183	4.5–5.0	Soil	—	—	—	—	0.00819 (J)	—	—	—	—	—
RE16-10-2819	16-609184	0.0–0.5	Qbt 4	0.366 (J)	—	0.319 (J)	0.738 (J)	—	—	—	—	—	—
RE16-10-10118	16-611015	0.0–0.5	Soil	—	—	—	—	0.00954 (J)	0.074 (J)	0.0846 (J)	0.126 (J)	0.0472 (J)	0.0554 (J)
RE16-10-10119	16-611015	5.0–5.5	Qbt 4	—	—	—	—	—	—	—	—	—	—
RE16-10-10123	16-611017	0.0–0.5	Fill	—	—	—	—	0.0189 (J)	0.0626 (J)	0.032 (J)	0.0346 (J)	0.0288 (J)	0.0286 (J)
RE16-10-10122	16-611017	5.0–5.5	Qbt 4	—	—	—	—	—	0.0191 (J)	0.0136 (J)	0.0264 (J)	—	—

Table 8.10-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	RDX	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**1370**	**2340**	**24400**	**24400**	**34200**	**23.4**	**20500**	**18300**	**174**	**3610**
Recreational SSL[e]				**1830**	**3010**	**13900**	**13900**	**19900**	**30.1**	**12000**	**10400**	**233**	**27800**
Residential SSL[a]				**347**	**621**	**2290**	**2290**	**3060**	**6.21**	**1830**	**1720**	**44.2**	**1090**
RE16-10-2815	16-609182	0.0–0.5	Soil	—	0.05	0.0917	—	—	0.0551	0.0584	0.0911	0.102 (J)	—
RE16-10-2816	16-609182	5.0–5.5	Soil	—	0.0796 (J)	0.189 (J)	0.0176 (J)	—	0.147 (J)	0.148 (J)	0.167 (J)	—	—
RE16-10-2817	16-609183	0.0–0.5	Soil	—	0.03 (J)	0.0592	—	—	0.0597	0.0409 (J)	0.0662	0.109 (J)	—
RE16-10-2818	16-609183	4.5–5.0	Soil	—	—	—	—	0.353 (J)	—	—	0.0117 (J)	0.47 (J)	0.000377 (J)
RE16-10-2819	16-609184	0.0–0.5	Qbt 4	0.111 (J)	—	—	—	6.9	—	—	—	112	—
RE16-10-10118	16-611015	0.0–0.5	Soil	—	0.0977 (J)	0.24 (J)	—	—	0.156 (J)	0.128 (J)	0.184 (J)	—	—
RE16-10-10119	16-611015	5.0–5.5	Qbt 4	—	0.0132 (J)	0.0322 (J)	—	—	—	0.0143 (J)	0.0227 (J)	—	—
RE16-10-10123	16-611017	0.0–0.5	Fill	—	0.057 (J)	0.139 (J)	—	—	0.13 (J)	0.108 (J)	0.154 (J)	—	—
RE16-10-10122	16-611017	5.0–5.5	Qbt 4	—	0.0143 (J)	0.0349 (J)	—	0.305 (J)	—	0.0285 (J)	0.0325 (J)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] na = Not available.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Pyrene was used as a surrogate based on structural similarity.

[e] SSLs from LANL (2010, 108613).

[f] NA = Not analyzed.

[g] — = Not detected or not detected above BV.

Table 8.10-4
Summary of Radionuclides Detected at SWMU 16-026(d)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137
Qbt 2,3,4 BV[a]				**0.1**
Industrial SAL[b]				**23**
Recreational SAL[b]				**210**
Residential SAL[b]				**5.6**
RE16-10-10122	16-611017	5.0–5.5	Qbt 4	0.0493

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

Table 8.11-1
Summary of Samples Collected and Analyses Requested at SWMU 16-026(e)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-95-0143	16-01471	0.0–0.5	Sed	—*	—	—	525	—	—	526	—	525	—	526
0316-95-0144	16-01471	1.75–2.25	Qbt 4	—	—	—	525	—	—	526	—	525	525	526
0316-95-0145	16-01471	5.5–7.0	Qbt 4	—	—	—	525	—	—	526	—	525	525	526
0316-95-0149	16-01472	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0150	16-01473	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0151	16-01474	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0152	16-01475	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0153	16-01476	0.0–0.5	Sed	—	—	—	121	—	—	122	—	121	—	122
0316-95-0146	16-01657	0.0–0.5	Sed	—	—	—	525	—	—	526	—	525	—	526
0316-95-0147	16-01657	0.75-1.25	Qbt 4	—	—	—	525	—	—	526	—	525	525	526
0316-95-0148	16-01657	7.5–9.0	Qbt 4	—	—	—	525	—	—	526	—	525	525	526
0316-97-0606	16-01657	8.0–8.5	Qbt 4	—	—	—	—	—	—	3676R	—	—	—	—
0316-97-0614	16-01657	10.5-11.5	Qbt 4	—	—	—	—	—	—	3724R	—	—	—	—
RE16-10-2876	16-609200	0.0–0.5	Soil	10-638	10-638	10-638	10-638	10-638	10-638	10-638	10-638	10-638	10-638	10-638
RE16-10-2877	16-609200	5.0–5.5	Qbt 4	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947
RE16-10-14222	16-609200	8.5–9.0	Qbt 4	10-2469	10-2468	10-2469	10-2467	10-2469	10-2469	10-2469	10-2468	10-2467	10-2467	10-2468
RE16-10-2878	16-609201	0.0–0.5	Soil	10-903	10-903	10-903	10-903	10-903	10-903	10-903	10-903	10-903	10-903	10-903
RE16-10-2879	16-609201	5.5–6.0	Qbt 4	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947
RE16-10-2880	16-609202	0.0–0.5	Soil	10-903	10-903	10-903	10-903	10-903	10-903	10-903	10-903	10-903	10-903	10-903
RE16-10-2881	16-609202	4.5–5.0	Qbt 4	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947	10-947
RE16-10-14221	16-609202	9.0–9.5	Qbt 4	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14202	16-611813	0.0–0.5	Soil	10-2469	10-2468	10-2469	10-2467	10-2469	10-2469	10-2469	10-2468	10-2467	10-2467	10-2468
RE16-10-14203	16-611813	5.5–6.0	Qbt 4	10-2469	10-2468	10-2469	10-2467	10-2469	10-2469	10-2469	10-2468	10-2467	10-2467	10-2468
RE16-10-14204	16-611813	9.0–9.5	Qbt 4	10-2469	10-2468	10-2469	10-2467	10-2469	10-2469	10-2469	10-2468	10-2467	10-2467	10-2468
RE16-10-14205	16-611814	0.0–0.5	Soil	10-2469	10-2468	10-2469	10-2467	10-2469	10-2469	10-2469	10-2468	10-2467	10-2467	10-2468
RE16-10-14206	16-611814	5.5–6.0	Qbt 4	10-2469	10-2468	10-2469	10-2467	10-2469	10-2469	10-2469	10-2468	10-2467	10-2467	10-2468
RE16-10-14207	16-611814	9.0–9.5	Qbt 4	10-2469	10-2468	10-2469	10-2467	10-2469	10-2469	10-2469	10-2468	10-2467	10-2467	10-2468
RE16-10-14208	16-611815	0.0–0.5	Soil	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14209	16-611815	5.5–6.0	Qbt 4	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14210	16-611815	8.5–9.0	Qbt 4	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14211	16-611816	0.0–0.5	Soil	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14212	16-611816	5.5–6.0	Soil	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14213	16-611816	8.5–9.0	Qbt 4	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14214	16-611817	0.0–0.5	Soil	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475

Table 8.11-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-14215	16-611817	5.5–6.0	Qbt 4	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14216	16-611817	8.5–9.0	Qbt 4	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14217	16-611818	0.0–0.5	Soil	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14218	16-611818	5.5–6.0	Qbt 4	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14219	16-611818	9.0–9.5	Qbt 4	10-2476	10-2475	10-2476	10-2474	10-2476	10-2476	10-2476	10-2475	10-2474	10-2474	10-2475
RE16-10-14220	16-611819	8.5–9.0	Qbt 4	10-2469	10-2468	10-2469	10-2467	10-2469	10-2469	10-2469	10-2468	10-2467	10-2467	10-2468
RE16-10-14884	16-611878	0.0–0.5	Fill	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569
RE16-10-14885	16-611878	5.5–6.0	Soil	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569	10-2569

*— = Analyses not requested.

Table 8.11-2
Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at SWMU 16-026(e)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Lead	Manganese	Nickel	Nitrate	Phosphorus, Orthophosphate (Expressed as PO_4)	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**	**na**[b]	**11.2**	**482**	**6.58**	**na**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**0.4**	**4420**	**17.1**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**19.7**	**543**	**9.38**	**na**	**na**	**0.3**	**1**	**0.73**	**19.7**	**60.2**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**22.3**	**671**	**15.4**	**na**	**na**	**1.52**	**1**	**0.73**	**39.6**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**na**	**2920**[d]	**300**[e]	**45400**	**22700**	**68100**	**800**	**145000**	**22700**	**1820000**	**na**	**5680**	**5680**	**74.9**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**na**	**1910**[d]	**238**	**31700**	**15800**	**47500**	**560**	**110000**	**15800**	**1260000**	**na**	**3960**	**3960**	**52.3**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**na**	**219**[d]	**23**[e]	**3130**	**1560**	**4690**	**400**	**10700**	**1560**	**125000**	**na**	**391**	**391**	**5.16**	**391**	**23500**
0316-95-0143	16-01471	0.0–0.5	Sed	—[g]	5.8 (U)	—	153	0.58 (U)	—	NA[h]	—	5.5 (J)	—	1.2 (U)	NA	20.4	—	—	NA	NA	NA	—	—	20.8	103 (J+)
0316-95-0144	16-01471	1.75–2.25	Qbt 4	—	6.4 (U)	—	1420	—	9550	NA	—	6.5	7.8	1.3 (U)	NA	—	—	—	NA	NA	NA	—	—	17.9	474 (J+)
0316-95-0145	16-01471	5.5–7.0	Qbt 4	—	5.6 (U)	—	270	—	—	NA	11.2	—	—	1.1 (U)	NA	—	—	—	NA	NA	NA	—	—	—	—
0316-95-0149	16-01472	0.0–0.5	Sed	—	6 (U)	—	146	0.6 (U)	—	NA	—	8.2	—	1.2 (U)	NA	—	—	—	NA	NA	—	—	—	—	72.4
0316-95-0150	16-01473	0.0–0.5	Sed	—	6.3 (U)	—	766	0.63 (U)	—	NA	—	—	—	1.3 (U)	NA	51.7	—	—	NA	NA	0.32 (U)	—	—	20.1	95.4
0316-95-0151	16-01474	0.0–0.5	Sed	—	5.5 (U)	—	1100	0.55 (U)	—	NA	—	—	—	1.1 (U)	NA	24.7	—	—	NA	NA	—	—	—	—	—
0316-95-0152	16-01475	0.0–0.5	Sed	—	5.5 (U)	—	224	0.55 (U)	—	NA	—	—	—	1.1 (U)	NA	—	—	—	NA	NA	—	—	—	—	—
0316-95-0153	16-01476	0.0–0.5	Sed	—	5.1 (U)	—	200	0.51 (U)	—	NA	—	—	—	1 (U)	NA	—	—	—	NA	NA	—	—	—	—	—
0316-95-0146	16-01657	0.0–0.5	Sed	—	6.2 (U)	—	183	0.62 (U)	—	NA	—	7.1	—	1.3 (U)	NA	26.3	554	—	NA	NA	NA	—	—	—	77.7 (J+)
0316-95-0147	16-01657	0.75–1.25	Qbt 4	—	6.5 (U)	—	604	—	—	NA	—	3.2 (J)	5.4	1.3 (U)	NA	16.9	—	—	NA	NA	NA	—	—	—	—
0316-95-0148	16-01657	7.5–9.0	Qbt 4	—	5.7 (U)	2.8	239	—	—	NA	439	—	—	1.1 (U)	NA	—	—	9.6	NA	NA	NA	—	—	—	—
0316-97-0606	16-01657	8.0–8.5	Qbt 4	—	NA	—	200	—	—	NA	17	1600	11000	NA	NA	—	—	2100	NA	NA	1 (U)	8.6	1.3 (U)	—	4400
0316-97-0614	16-01657	10.5–11.5	Qbt 4	—	0.76 (U)	—	332	—	—	NA	—	—	—	NA	NA	—	—	—	NA	NA	0.61 (U)	—	—	—	—
RE16-10-2876	16-609200	0.0–0.5	Soil	—	1.6 (U)	—	—	0.51 (J)	—	—	—	—	15.3	—	1.66 (J-)	29.3	—	—	—	NA	—	—	—	—	218
RE16-10-2877	16-609200	5.0–5.5	Qbt 4	—	1.16 (U)	—	591	—	—	—	10.1	—	—	—	4.22	—	—	—	—	NA	1.16 (UJ)	—	—	—	64.5 (J)
RE16-10-14222	16-609200	8.5–9.0	Qbt 4	—	1.01 (UJ)	—	272	—	—	155	—	—	—	—	8.4	—	—	—	—	NA	1.07 (UJ)	—	—	—	—
RE16-10-2878	16-609201	0.0–0.5	Soil	—	1.07 (U)	—	—	0.536 (U)	—	—	—	—	—	—	0.877 (J)	—	—	—	1.63	NA	—	—	—	—	—
RE16-10-2879	16-609201	5.5–6.0	Qbt 4	7930 (J+)	1.23 (U)	10.5	501	—	—	—	9.3	—	—	—	16.2	15.3	—	—	—	NA	1.2 (UJ)	—	—	—	—
RE16-10-2880	16-609202	0.0–0.5	Soil	—	1.07 (U)	—	313	0.537 (U)	—	—	—	—	—	—	0.976 (J)	—	—	—	2.27	NA	—	—	—	—	—
RE16-10-2881	16-609202	4.5–5.0	Qbt 4	—	1.1 (U)	—	—	—	—	—	13.3	—	—	—	2.37 (J-)	—	—	—	—	NA	1.07 (U)	—	—	—	—
RE16-10-14221	16-609202	9.0–9.5	Qbt 4	—	1.2 (UJ)	—	—	—	—	201	—	—	—	—	3.89 (J-)	—	—	—	—	NA	1.14 (UJ)	—	—	—	—
RE16-10-14202	16-611813	0.0–0.5	Soil	—	1.06 (UJ)	—	—	0.53 (U)	—	—	—	—	—	—	—	—	—	—	1.45	NA	—	—	—	—	—
RE16-10-14203	16-611813	5.5–6.0	Qbt 4	—	0.984 (UJ)	—	232	—	—	—	—	—	—	—	2.12	—	—	—	—	NA	0.99 (UJ)	—	—	—	—
RE16-10-14204	16-611813	9.0–9.5	Qbt 4	—	1.1 (UJ)	—	208	—	—	—	—	—	—	—	1.78	—	—	—	—	NA	1.07 (UJ)	—	—	—	—

Table 8.11-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Lead	Manganese	Nickel	Nitrate	Phosphorus, Orthophosphate (Expressed as PO_4)	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**11.2**	**482**	**6.58**	**na**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**0.4**	**4420**	**17.1**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**19.7**	**543**	**9.38**	**na**	**na**	**0.3**	**1**	**0.73**	**19.7**	**60.2**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**22.3**	**671**	**15.4**	**na**	**na**	**1.52**	**1**	**0.73**	**39.6**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**800**	**145000**	**22700**	**1820000**	**na**	**5680**	**5680**	**74.9**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**560**	**110000**	**15800**	**1260000**	**na**	**3960**	**3960**	**52.3**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**400**	**10700**	**1560**	**125000**	**na**	**391**	**391**	**5.16**	**391**	**23500**
RE16-10-14205	16-611814	0.0–0.5	Soil	—	1.08 (UJ)	—	1250	0.54 (U)	—	—	—	—	—	—	1.49	26.4	—	—	1.76	NA	—	—	—	—	56.3
RE16-10-14206	16-611814	5.5–6.0	Qbt 4	—	1.07 (UJ)	—	124	—	—	—	—	—	—	—	2.37	—	—	—	—	NA	1.04 (UJ)	—	—	—	—
RE16-10-14207	16-611814	9.0–9.5	Qbt 4	—	1.05 (UJ)	7.69	331	—	—	—	—	—	—	—	9.94	—	—	—	—	NA	1.11 (UJ)	—	—	—	—
RE16-10-14208	16-611815	0.0–0.5	Soil	—	1.19 (UJ)	—	—	0.595 (U)	—	—	—	—	—	—	1.46 (J-)	—	702	—	—	NA	—	—	—	—	—
RE16-10-14209	16-611815	5.5–6.0	Qbt 4	—	1.09 (UJ)	8.73	57.9	—	—	—	—	—	—	—	17.1 (J-)	—	—	—	—	NA	1.09 (UJ)	—	—	—	—
RE16-10-14210	16-611815	8.5–9.0	Qbt 4	—	1.11 (UJ)	—	—	—	—	—	—	—	—	—	5.62 (J-)	—	—	—	—	NA	1.06 (UJ)	—	—	—	—
RE16-10-14211	16-611816	0.0–0.5	Soil	—	1.1 (UJ)	—	—	0.552 (U)	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—
RE16-10-14212	16-611816	5.5–6.0	Soil	—	1.17 (UJ)	—	—	0.587 (U)	—	—	—	—	—	—	1.75 (J-)	—	—	—	—	NA	—	—	—	—	—
RE16-10-14213	16-611816	8.5–9.0	Qbt 4	—	1.1 (UJ)	—	60.9	—	—	—	—	—	—	—	11 (J-)	—	—	—	—	NA	1.11 (UJ)	—	—	—	—
RE16-10-14214	16-611817	0.0–0.5	Soil	—	1.29 (UJ)	—	—	0.644 (U)	—	—	—	—	—	—	1.63 (J-)	—	—	—	—	NA	—	—	—	—	—
RE16-10-14215	16-611817	5.5–6.0	Qbt 4	—	1.16 (UJ)	—	—	—	—	—	—	—	—	—	1.4 (J-)	—	—	—	—	NA	1.14 (UJ)	—	—	—	—
RE16-10-14216	16-611817	8.5–9.0	Qbt 4	—	1.18 (UJ)	—	—	—	—	—	—	—	—	—	5.51 (J-)	—	—	—	—	NA	1.18 (UJ)	167	—	—	—
RE16-10-14217	16-611818	0.0–0.5	Soil	—	1.18 (UJ)	—	—	0.592 (U)	—	—	—	—	—	—	—	—	—	—	1.64 (J-)	NA	—	—	—	—	—
RE16-10-14218	16-611818	5.5–6.0	Qbt 4	—	1.16 (UJ)	—	—	—	—	—	—	—	—	—	1.41 (J-)	—	—	—	—	NA	1.11 (UJ)	—	—	—	—
RE16-10-14219	16-611818	9.0–9.5	Qbt 4	—	1.12 (UJ)	—	—	—	—	—	—	—	—	—	2.02 (J-)	—	—	—	—	NA	1.1 (UJ)	—	—	—	—
RE16-10-14220	16-611819	8.5–9.0	Qbt 4	—	1.11 (UJ)	—	—	—	—	—	—	—	—	—	1.34	—	—	—	—	NA	1.15 (UJ)	—	—	—	—
RE16-10-14884	16-611878	0.0–0.5	Fill	—	—	—	803	—	—	—	—	—	—	0.57 (UJ)	1.1	35	—	NA	0.77	4.5 (J)	—	—	—	—	60.6
RE16-10-14885	16-611878	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	0.57 (UJ)	9.7	—	—	NA	0.15 (J)	4.1 (J)	—	—	—	—	273

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 8.11-3
Summary of Organic Chemicals Detected at SWMU 16-026(e)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene
Industrial SSL[a]				**na**[b]	**36700**	**851000**	**2000**[c]	**1900**[c]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[d]	**234**	**1370**	**2340**
Recreational SSL[e]				**na**	**20800**	**702000**	**1440**	**1440**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[d]	**301**	**1830**	**3010**
Residential SSL[a]				**na**	**3440**	**67500**	**150**[c]	**150**[c]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[d]	**62.1**	**347**	**621**
0316-95-0143	16-01471	0.0–0.5	Sed	NA[f]	0.057 (J)	NA	—[g]	—	0.19 (J)	0.48	0.47	0.59	0.24 (J)	0.25 (J)	—	0.56
0316-95-0144	16-01471	1.75–2.25	Qbt 4	NA	—	—	0.305	0.199	—	—	—	—	—	—	—	—
0316-95-0145	16-01471	5.5–7.0	Qbt 4	NA	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0149	16-01472	0.0–0.5	Sed	NA	0.064 (J)	NA	—	—	0.091 (J)	0.16 (J)	0.23 (J)	0.38 (J)	0.11 (J)	—	—	0.22 (J)
0316-95-0150	16-01473	0.0–0.5	Sed	NA	—	NA	0.236	—	—	—	—	—	—	—	—	—
0316-95-0151	16-01474	0.0–0.5	Sed	NA	—	NA	0.167	—	—	—	—	0.098 (J)	—	—	—	0.059 (J)
0316-95-0152	16-01475	0.0–0.5	Sed	NA	—	NA	—	0.172	—	—	0.057 (J)	0.085 (J)	—	—	—	0.061 (J)
0316-95-0147	16-01657	0.75–1.25	Qbt 4	NA	—	—	0.202	0.102	—	0.096 (J)	0.12 (J)	0.18 (J)	—	—	—	0.12 (J)
RE16-10-2876	16-609200	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2877	16-609200	5.0–5.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14222	16-609200	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	—	0.0182 (J)	—	—	—	—
RE16-10-2879	16-609201	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14202	16-611813	0.0–0.5	Soil	—	—	—	—	—	—	0.0237 (J)	0.0322 (J)	0.0504	0.0193 (J)	—	—	0.0162 (J)
RE16-10-14203	16-611813	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	0.0285 (J)	0.0496	0.0205 (J)	—	—	—
RE16-10-14204	16-611813	9.0–9.5	Qbt 4	—	—	0.0203 (J)	—	—	—	—	—	0.0174 (J)	—	—	—	—
RE16-10-14205	16-611814	0.0–0.5	Soil	—	—	—	0.171 (J)	0.205 (J)	0.0184 (J)	0.059	0.0622	0.102	0.0412	—	—	0.0571
RE16-10-14206	16-611814	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	0.0135 (J)	0.0204 (J)	—	—	—	—
RE16-10-14207	16-611814	9.0–9.5	Qbt 4	—	—	—	—	—	—	—	—	0.025 (J)	—	—	—	—
RE16-10-14208	16-611815	0.0–0.5	Soil	—	—	—	NA	NA	—	—	—	—	—	—	—	—
RE16-10-14210	16-611815	8.5–9.0	Qbt 4	—	—	—	NA	NA	—	—	—	—	—	—	—	—
RE16-10-14211	16-611816	0.0–0.5	Soil	—	—	—	NA	NA	—	—	—	—	—	—	—	—
RE16-10-14212	16-611816	5.5–6.0	Soil	—	—	—	NA	NA	—	—	—	—	—	—	—	—
RE16-10-14214	16-611817	0.0–0.5	Soil	—	—	—	NA	NA	—	—	—	—	—	—	—	—
RE16-10-14220	16-611819	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	—	0.0166 (J)	—	—	—	—
RE16-10-14884	16-611878	0.0–0.5	Fill	0.0078 (J)	0.08 (J)	—	0.21	0.25	0.093 (J)	0.2 (J)	0.19 (J)	0.19 (J)	0.12 (J)	0.2 (J)	1.4	0.21 (J)
RE16-10-14885	16-611878	5.5–6.0	Soil	—	—	—	0.018 (J)	0.012 (J)	—	—	—	—	—	—	—	—

Table 8.11-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibenz(a,h)anthracene	Diethylphthalate	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Trinitrotoluene[2,4,6-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**2.34**	**547000**	**24400**	**24400**	**34200**	**23.4**	**1090**	**20500**	**18300**	**174**	**36.4**	**469**	**3610**
Recreational SSL[e]				**3.01**	**319000**	**13900**	**13900**	**19900**	**30.1**	**4520**	**12000**	**10400**	**233**	**91.7**	**301**	**27800**
Residential SSL[a]				**0.621**	**48900**	**2290**	**2290**	**3060**	**6.21**	**199**	**1830**	**1720**	**44.2**	**6.99**	**35.9**	**1090**
0316-95-0143	16-01471	0.0–0.5	Sed	0.066 (J)	—	1.1	0.059 (J)	—	0.26 (J)	NA	0.72	0.89	—	NA	—	NA
0316-95-0144	16-01471	1.75–2.25	Qbt 4	—	—	—	—	0.26	—	—	—	—	—	—	0.321	NA
0316-95-0145	16-01471	5.5–7.0	Qbt 4	—	0.12 (J)	—	—	—	—	—	—	—	—	—	0.141	NA
0316-95-0149	16-01472	0.0–0.5	Sed	0.11 (J)	—	0.39 (J)	0.044 (J)	—	0.1 (J)	NA	0.34 (J)	0.77	—	NA	—	NA
0316-95-0150	16-01473	0.0–0.5	Sed	—	—	—	—	—	—	NA	—	0.075 (J)	—	NA	0.127	NA
0316-95-0151	16-01474	0.0–0.5	Sed	—	—	0.1 (J)	—	—	—	NA	0.087 (J)	0.18 (J)	—	NA	0.169	NA
0316-95-0152	16-01475	0.0–0.5	Sed	—	—	0.13 (J)	—	—	—	NA	0.1 (J)	0.16 (J)	—	NA	—	NA
0316-95-0147	16-01657	0.75–1.25	Qbt 4	—	—	0.25 (J)	—	—	—	—	0.19 (J)	0.24 (J)	—	—	0.195	NA
RE16-10-2876	16-609200	0.0–0.5	Soil	—	—	0.0264 (J)	—	—	—	—	0.0192 (J)	0.0264 (J)	—	—	—	—
RE16-10-2877	16-609200	5.0–5.5	Qbt 4	—	—	—	—	—	—	0.00292 (J)	—	—	—	—	—	—
RE16-10-14222	16-609200	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2879	16-609201	5.5–6.0	Qbt 4	—	—	—	—	0.855 (J-)	—	0.00438 (J)	—	—	1.02 (J-)	—	—	0.000427 (J)
RE16-10-14202	16-611813	0.0–0.5	Soil	—	—	0.0258 (J)	—	—	0.0184 (J)	—	—	0.0178 (J)	—	—	—	—
RE16-10-14203	16-611813	5.5–6.0	Qbt 4	—	—	—	—	—	0.0199 (J)	—	—	—	—	—	—	—
RE16-10-14204	16-611813	9.0–9.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14205	16-611814	0.0–0.5	Soil	—	—	0.126	—	42.5	0.0356 (J)	—	0.073	0.0862	25.1	0.000905 (J+)	0.124 (J)	—
RE16-10-14206	16-611814	5.5–6.0	Qbt 4	—	—	—	—	1.2	—	0.00284 (J)	—	—	1.64 (J)	—	—	—
RE16-10-14207	16-611814	9.0–9.5	Qbt 4	—	—	0.0126 (J)	—	1.23	—	—	0.0127 (J)	0.0127 (J)	1.18	—	—	—
RE16-10-14208	16-611815	0.0–0.5	Soil	—	—	—	—	NA	—	—	—	—	NA	0.000611 (J)	NA	—
RE16-10-14210	16-611815	8.5–9.0	Qbt 4	—	—	—	—	0.2 (J-)	—	—	—	—	NA	—	NA	—
RE16-10-14211	16-611816	0.0–0.5	Soil	—	—	—	—	NA	—	0.00259 (J)	—	—	NA	—	NA	—
RE16-10-14212	16-611816	5.5–6.0	Soil	—	—	—	—	NA	—	0.00408 (J-)	—	—	NA	—	NA	—
RE16-10-14214	16-611817	0.0–0.5	Soil	—	—	0.0179 (J)	—	NA	—	—	—	0.0169 (J)	NA	—	NA	—
RE16-10-14220	16-611819	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 8.11-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibenz(a,h)anthracene	Diethylphthalate	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Trinitrotoluene[2,4,6-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**2.34**	**547000**	**24400**	**24400**	**34200**	**23.4**	**1090**	**20500**	**18300**	**174**	**36.4**	**469**	**3610**
Recreational SSL[e]				**3.01**	**319000**	**13900**	**13900**	**19900**	**30.1**	**4520**	**12000**	**10400**	**233**	**91.7**	**301**	**27800**
Residential SSL[a]				**0.621**	**48900**	**2290**	**2290**	**3060**	**6.21**	**199**	**1830**	**1720**	**44.2**	**6.99**	**35.9**	**1090**
RE16-10-14884	16-611878	0.0–0.5	Fill	—	—	0.59	0.062 (J)	45	0.076 (J)	—	0.45	0.45	380	—	0.44 (J+)	NA
RE16-10-14885	16-611878	5.5–6.0	Soil	—	—	—	—	2.6	—	0.0056 (J)	—	—	3.6	—	0.0082 (J+)	NA

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] na = Not available.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Pyrene was used as a surrogate based on structural similarity.

[e] SSLs from LANL (2010, 108613).

[f] NA = Not analyzed.

[g] — = Not detected or not detected above BV.

Table 8.11-4

Summary of Radionuclides Detected at SWMU 16-026(e)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-239/240
Qbt 2,3,4 BV[a]				**0.05**	**na[b]**
Soil BV[a]				**0.013**	**0.054**
Industrial SAL[c]				**180**	**210**
Recreational SAL[c]				**280**	**300**
Residential SAL[c]				**30**	**33**
RE16-10-2876	16-609200	0.0–0.5	Soil	0.0355	—[d]
RE16-10-14204	16-611813	9.0–9.5	Qbt 4	—	0.189
RE16-10-14216	16-611817	8.5–9.0	Qbt 4	—	0.0344

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

[d] — = Not detected or not detected above BV/FV.

Table 8.12-1
Summary of Samples Collected and Analyses Requested at SWMU 16-029(a)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-95-0110	16-01453	0.0–0.5	Sed	—*	—	—	972	—	—	978, 979	—	972	—	978
0316-95-0111	16-01453	0.33—1.33	Qbt 4	—	—	—	972	—	—	978, 979	—	972	972	978
0316-95-0112	16-01453	3.0–4.0	Qbt 4	—	—	—	972	—	—	978, 979	—	972	972	978
RE16-10-2900	16-609209	5.0–5.5	Fill	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865
RE16-10-2901	16-609209	9.0–9.5	Qbt 4	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865	10-1865
RE16-10-2902	16-609210	5.0–5.5	Soil	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421
RE16-10-2903	16-609210	9.0–9.5	Qbt 4	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421	10-2421

*— = Analyses not requested.

Table 8.12-2
Summary of Inorganic Chemicals above BVs at SWMU 16-029(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Cyanide (Total)	Fluoride	Nitrate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**2.79**	**46**	**1.63**	**7.14**	**4.66**	**0.5**	**na**[b]	**na**	**0.3**
Sediment BV[a]				**0.83**	**3.98**	**127**	**0.4**	**10.5**	**11.2**	**0.82**	**na**	**na**	**0.3**
Soil BV[a]				**0.83**	**8.17**	**295**	**0.4**	**19.3**	**14.7**	**0.5**	**na**	**na**	**1.52**
Industrial SSL[c]				**454**	**17.7**	**224000**	**1120**	**2920**[d]	**45400**	**22700**	**68100**	**1820000**	**5680**
Recreational SSL[e]				**317**	**27.7**	**158000**	**784**	**1910**[d]	**31700**	**15800**	**47500**	**1260000**	**3960**
Residential SSL[c]				**31.3**	**3.9**	**15600**	**77.9**	**219**[d]	**3130**	**1560**	**4690**	**125000**	**391**
0316-95-0110	16-01453	0.0–0.5	Sed	5.9 (U)	—[f]	151 (J+)	0.59 (U)	—	—	1.2 (U)	NA[g]	NA	—
0316-95-0111	16-01453	0.33—1.33	Qbt 4	5.9 (U)	—	852 (J+)	—	—	8	1.2 (U)	NA	NA	—
0316-95-0112	16-01453	3.0–4.0	Qbt 4	5.3 (U)	—	233 (J+)	—	30.7	—	1.1 (U)	NA	NA	—
RE16-10-2900	16-609209	5.0–5.5	Fill	1.18 (U)	9.28	—	0.592 (U)	—	—	—	13.7 (J-)	—	—
RE16-10-2901	16-609209	9.0–9.5	Qbt 4	1.13 (U)	—	61.6	—	—	—	—	6.63 (J-)	—	1.12 (U)
RE16-10-2902	16-609210	5.0–5.5	Soil	1.05 (U)	—	—	0.526 (U)	—	—	—	6.27	1.56	—
RE16-10-2903	16-609210	9.0–9.5	Qbt 4	1.05 (U)	—	—	—	—	—	—	4.08	1.42	1.17 (U)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

Table 8.12-3
Summary of Organic Chemicals Detected at SWMU 16-029(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Diethylphthalate	Dinitrotoluene[2,4-]
Industrial SSL[a]				**36700**	**851000**	**2000**[b]	**1900**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2340**	**2.34**	**547000**	**103**
Recreational SSL[d]				**20800**	**702000**	**1440**	**1440**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**3010**	**3.01**	**319000**	**82.5**
Residential SSL[a]				**3440**	**67500**	**150**[b]	**150**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**621**	**0.621**	**48900**	**15.7**
0316-95-0110	16-01453	0.0–0.5	Sed	0.058 (J)	NA[e]	0.914	0.785	0.2 (J)	1.3	1.5	3	0.94	1	2.2	0.28 (J)	—[f]	—
0316-95-0111	16-01453	0.33—1.33	Qbt 4	—	0.012 (J)	—	16.5	0.76 (J)	NA	19	28	11	11	—	3.5 (J)	—	0.381
0316-95-0112	16-01453	3.0–4.0	Qbt 4	0.042 (J)	0.013 (J)	1.68	1.07	0.17 (J)	1.3	2	3.1	1.2	1.4	2	0.39	0.058 (J)	—
RE16-10-2900	16-609209	5.0–5.5	Fill	—	—	—	—	—	0.0138 (J)	—	—	—	—	—	—	—	—
RE16-10-2901	16-609209	9.0–9.5	Qbt 4	—	—	—	—	0.0107 (J)	0.0272 (J)	0.0199 (J)	0.023 (J)	0.0205 (J)	—	0.0274 (J)	—	—	—
RE16-10-2902	16-609210	5.0–5.5	Soil	—	0.128 (J)	—	—	—	—	0.0166 (J)	0.0384 (J)	0.0136 (J)	—	—	—	—	—
RE16-10-2903	16-609210	9.0–9.5	Qbt 4	—	0.0748 (J)	—	—	—	—	—	0.0225 (J)	—	—	—	—	—	—

Table 8.12-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Nitrobenzene	Nitrotoluene[3-]	Phenanthrene	Pyrene	RDX	Toluene	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**385**	**24400**	**24400**	**34200**	**23.4**	**277**	**22700**	**20500**	**18300**	**174**	**57900**	**27000**[b]	**469**	**31500**	**3610**
Recreational SSL[d]				**2060**	**13900**	**13900**	**19900**	**30.1**	**1510**	**15800**	**12000**	**10400**	**233**	**60800**	**19900**	**301**	**248000**	**27800**
Residential SSL[a]				**69.7**	**2290**	**2290**	**3060**	**6.21**	**49.4**	**1560**	**1830**	**1720**	**44.2**	**5570**	**2200**[b]	**35.9**	**9550**	**1090**
0316-95-0110	16-01453	0.0–0.5	Sed	NA	2.3	—	1100	1.1	—	—	0.71	1.9	8.45	NA	—	5.02	NA	NA
0316-95-0111	16-01453	0.33—1.33	Qbt 4	—	15	—	2850	13	0.165	0.264	1.2 (J)	12	125	—	0.691	243	NA	NA
0316-95-0112	16-01453	3.0–4.0	Qbt 4	—	2	0.047 (J)	1190	1.3	—	—	0.62	1.6	13.6	—	—	12.2	NA	NA
RE16-10-2900	16-609209	5.0–5.5	Fill	0.00314	0.0125 (J)	—	—	—	—	—	0.0144 (J)	—	—	0.000764 (J)	—	—	0.00508	0.0121
RE16-10-2901	16-609209	9.0–9.5	Qbt 4	—	0.064	—	—	0.0138 (J)	—	—	0.0555	0.0529	—	—	—	—	—	—
RE16-10-2902	16-609210	5.0–5.5	Soil	—	0.0314 (J)	—	—	0.0123 (J)	—	—	0.0165 (J)	0.0204 (J)	—	—	—	—	—	—
RE16-10-2903	16-609210	9.0–9.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] NA = Not analyzed.

[f] — = Not detected or not detected above BV.

Table 8.13-1
Summary of Samples Collected and Analyses Requested at SWMU 16-029(b)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2869	16-609198	5.0–5.5	Qbt 4	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866
RE16-10-2870	16-609198	9.0–9.5	Qbt 4	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866	10-1866
RE16-10-2871	16-609199	5.0–5.5	Qbt 4	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419
RE16-10-2872	16-609199	9.0–9.5	Qbt 4	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419	10-2419

Table 8.13-2
Summary of Inorganic Chemicals above BVs at SWMU 16-029(b)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Calcium	Chloride	Copper	Fluoride	Selenium
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**46**	**2200**	**94.6**	**4.66**	**na**[b]	**0.3**
Industrial SSL[c]				**1130000**	**454**	**224000**	**na**	**na**	**45400**	**68100**	**5680**
Recreational SSL[d]				**791000**	**317**	**158000**	**na**	**na**	**31700**	**47500**	**3960**
Residential SSL[c]				**78100**	**31.3**	**15600**	**na**	**na**	**3130**	**4690**	**391**
RE16-10-2869	16-609198	5.0–5.5	Qbt 4	—[e]	1.05 (U)	48	—	—	—	5.05 (J-)	1.06 (UJ)
RE16-10-2870	16-609198	9.0–9.5	Qbt 4	—	1.06 (U)	—	—	—	—	3.99 (J-)	1.09 (UJ)
RE16-10-2871	16-609199	5.0–5.5	Qbt 4	7980	1.09 (U)	113	2510 (J+)	251	6.06	2.31	1.12 (U)
RE16-10-2872	16-609199	9.0–9.5	Qbt 4	—	1.14 (U)	59.1	3320 (J+)	—	—	1.5	0.586 (J)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 8.13-3
Summary of Organic Chemicals Detected at SWMU 16-029(b)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**2340**	**24400**	**24400**	**23.4**	**20500**	**18300**
Recreational SSL[c]				**20800**	**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**3010**	**13900**	**13900**	**30.1**	**12000**	**10400**
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**621**	**2290**	**2290**	**6.21**	**1830**	**1720**
RE16-10-2869	16-609198	5.0–5.5	Qbt 4	0.0151 (J)	0.00297 (J)	0.0308 (J)	0.0836	0.0607	0.115	0.0537 (J)	0.0916	0.217	0.0142 (J)	0.0472 (J)	0.174	0.158
RE16-10-2870	16-609198	9.0–9.5	Qbt 4	—[d]	—	—	0.0133 (J)	—	—	—	—	0.0199 (J)	—	—	0.0155 (J)	0.0157 (J)
RE16-10-2871	16-609199	5.0–5.5	Qbt 4	—	0.0694 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2872	16-609199	9.0–9.5	Qbt 4	—	0.116 (J)	0.0199 (J)	0.0477	0.035 (J)	0.053	0.0244 (J)	0.0416	0.0937	—	0.0211 (J)	0.0674	0.0752

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

Table 8.14-1
Summary of Samples Collected and Analyses Requested at SWMU 16-029(c)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2914	16-609213	5.0–5.5	Qbt 4	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750
RE16-10-2915	16-609213	9.5–10.0	Qbt 4	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750	10-1750
RE16-10-2916	16-609214	5.0–5.5	Qbt 4	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418
RE16-10-2917	16-609214	9.0–9.5	Qbt 4	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418	10-2418

Table 8.14-2
Summary of Inorganic Chemicals above BVs at SWMU 16-029(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Fluoride	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**na**[b]	**0.3**
Industrial SSL[c]				**454**	**68100**	**5680**
Recreational SSL[d]				**317**	**47500**	**3960**
Residential SSL[c]				**31.3**	**4690**	**391**
RE16-10-2914	16-609213	5.0–5.5	Qbt 4	0.648 (U)	1.31 (J-)	1.1 (U)
RE16-10-2915	16-609213	9.5–10.0	Qbt 4	—[e]	1.31 (J-)	1.1 (U)
RE16-10-2916	16-609214	5.0–5.5	Qbt 4	1.04 (U)	1.28	0.589 (J)
RE16-10-2917	16-609214	9.0–9.5	Qbt 4	1.11 (U)	1.38	0.609 (J)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 8.14-3
Summary of Organic Chemicals Detected at SWMU 16-029(c)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**1370**	**2340**	**24400**	**24400**	**23.4**	**4100[c]**	**252**	**20500**	**18300**
Recreational SSL[d]				**20800**	**104000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**1830**	**3010**	**13900**	**13900**	**30.1**	**3170**	**1950**	**12000**	**10400**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**347**	**621**	**2290**	**2290**	**6.21**	**310[c]**	**45**	**1830**	**1720**
RE16-10-2914	16-609213	5.0–5.5	Qbt 4	—[e]	0.0102 (J)	—	—	—	—	0.135 (J)	—	0.0138 (J)	—	—	—	—	—	0.0116 (J)
RE16-10-2915	16-609213	9.5–10.0	Qbt 4	—	—	—	—	—	—	0.129 (J)	—	—	—	—	—	—	—	—
RE16-10-2916	16-609214	5.0–5.5	Qbt 4	0.0558	0.0879	0.155	0.136	0.204	0.089	—	0.166	0.353	0.0463	0.0775	0.0188 (J)	0.0506	0.297	0.295
RE16-10-2917	16-609214	9.0–9.5	Qbt 4	—	0.00864 (J)	—	0.0173 (J)	0.0267 (J)	0.015 (J)	—	0.0201 (J)	0.0429	—	0.0126 (J)	—	—	0.03 (J)	0.0328 (J)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 8.15-1
Summary of Samples Collected and Analyses Requested at SWMU 16-029(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2907	16-609211	5.0–5.5	Fill	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871
RE16-10-2908	16-609211	9.0–9.5	Qbt 4	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871	10-1871
RE16-10-2909	16-609212	5.0–5.5	Soil	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417
RE16-10-2910	16-609212	9.0–9.5	Qbt 4	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417	10-2417

Table 8.15-2
Summary of Inorganic Chemicals above BVs at SWMU 16-029(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Fluoride	Nitrate	Selenium
Qbt 2,3,4 BV[a]				**0.5**	**1.63**	**na[b]**	**na**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**na**	**na**	**1.52**
Industrial SSL[c]				**454**	**1120**	**68100**	**1820000**	**5680**
Recreational SSL[d]				**317**	**784**	**47500**	**1260000**	**3960**
Residential SSL[c]				**31.3**	**77.9**	**4690**	**125000**	**391**
RE16-10-2907	16-609211	5.0–5.5	Fill	1.12 (U)	—[e]	—	—	—
RE16-10-2908	16-609211	9.0–9.5	Qbt 4	1.11 (U)	—	1.49 (J-)	—	1.15 (UJ)
RE16-10-2909	16-609212	5.0–5.5	Soil	—	0.557 (U)	2.13	1.41	—
RE16-10-2910	16-609212	9.0–9.5	Qbt 4	1.04 (U)	—	1.79	1.22	1.08 (UJ)

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 8.15-3
Summary of Organic Chemicals Detected at SWMU 16-029(d)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Tetrachloroethene
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**2340**	**24400**	**24400**	**23.4**	**4100[c]**	**252**	**20500**	**18300**	**36.4**
Recreational SSL[d]				**20800**	**104000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**3010**	**13900**	**13900**	**30.1**	**3170**	**1950**	**12000**	**10400**	**91.7**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**621**	**2290**	**2290**	**6.21**	**310[c]**	**45**	**1830**	**1720**	**6.99**
RE16-10-2907	16-609211	5.0–5.5	Fill	0.0662	0.0896	0.181	0.176	0.262	0.181 (J)	0.2	0.483	0.0557	0.15 (J)	0.0183 (J)	0.0485	0.411	0.378	0.00062 (J)
RE16-10-2908	16-609211	9.0–9.5	Qbt 4	0.0274 (J)	0.0361 (J)	0.0701	0.0675	0.106	0.061 (J)	0.0792	0.19	0.0224 (J)	0.0504 (J)	—[e]	—	0.172	0.171	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 8.16-1
Summary of Samples Collected and Analyses Requested at Shared Drainages

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-95-0092	16-01411	0.0–0.5	Fill	—[a]	—	—	980	—	—	981,982	—	980	—	981
0316-95-0093	16-01411	0.5–1.0	Soil	—	—	—	980	—	—	981,982	—	980	980	981
0316-95-0094	16-01411	3.5–5.0	Qbt 4	—	—	—	980	—	—	981,982	—	980	980	981
0316-95-0095	16-01434	0.0–0.5	Sed	—	—	—	980	—	—	981	—	980	—	981
0316-95-0096	16-01434	0.33—0.83	Sed	—	—	—	980	—	—	981	—	980	980	981
0316-95-0097	16-01434	2.5–3.5	Qbt 4	—	—	—	980	—	—	981	—	980	980	981
0316-95-0101	16-01435	0.0–0.5	Sed	—	—	—	116	—	—	117	—	116	—	117
0316-95-0102	16-01436	0.0–0.5	Sed	—	—	—	116	—	—	117	—	116	—	117
0316-95-0103	16-01437	0.0–0.5	Sed	—	—	—	116	—	—	117	—	116	—	117
0316-95-0104	16-01438	0.0–0.5	Sed	—	—	—	118	—	—	120	—	118	—	120
0316-95-0105	16-01439	0.0–0.5	Sed	—	—	—	118	—	—	120	—	118	—	120
0316-95-0119	16-01457	0.0–0.5	Sed	—	—	—	130	—	—	131,132	—	130	—	131
0316-95-0120	16-01458	0.0–0.5	Sed	—	—	—	130	—	—	131,132	—	130	—	131
0316-95-0098	16-01653	0.0–0.5	Sed	—	—	—	995	—	—	996	—	995	—	996
0316-95-0099	16-01653	0.5–1.25	Soil	—	—	—	995	—	—	996	—	995	995	996
0316-95-0100	16-01653	4.5–5.5	Qbt 4	—	—	—	995	—	—	996	—	995	995	996
RE16-10-2778	16-609169	0.0–0.5	Soil	na[b]	10-416	10-416	10-416	10-416	10-416	10-416	10-416	10-416	10-416	10-416
RE16-10-2921	16-609215	0.0–0.5	Soil	10-1099	10-1099	10-1099	10-1098	10-1099	10-1099	10-1099	10-1099	10-1098	10-1098	10-1099
RE16-10-2922	16-609215	5.5–6.0	Qbt 4	10-1099	10-1099	10-1099	10-1098	10-1099	10-1099	10-1099	10-1099	10-1098	10-1098	10-1099
RE16-10-2923	16-609216	0.0–0.5	Soil	10-1099	10-1099	10-1099	10-1098	10-1099	10-1099	10-1099	10-1099	10-1098	10-1098	10-1099
RE16-10-2924	16-609216	5.5–6.0	Qbt 4	10-1220	10-1220	10-1220	10-1219	10-1220	10-1220	10-1220	10-1220	10-1219	10-1219	—
RE16-10-2925	16-609217	0.0–0.5	Fill	10-1099	10-1099	10-1099	10-1098	10-1099	10-1099	10-1099	10-1099	10-1098	10-1098	10-1099
RE16-10-2926	16-609217	4.5–5.0	Qbt 4	10-1220	10-1220	10-1220	10-1219	10-1220	10-1220	10-1220	10-1220	10-1219	10-1219	10-1220
RE16-10-2927	16-609218	0.0–0.5	Soil	10-1099	10-1099	10-1099	10-1098	10-1099	10-1099	10-1099	10-1099	10-1098	10-1098	10-1099
RE16-10-2928	16-609218	1.5–2.0	Qbt 4	10-1220	10-1220	10-1220	10-1219	10-1220	10-1220	10-1220	10-1220	10-1219	10-1219	—
RE16-10-2929	16-609219	0.0–0.5	Soil	10-1099	10-1099	10-1099	10-1098	10-1099	10-1099	10-1099	10-1099	10-1098	10-1098	10-1099
RE16-10-2930	16-609219	5.5–6.0	Qbt 4	10-1220	10-1220	10-1220	10-1219	10-1220	10-1220	10-1220	10-1220	10-1219	10-1219	10-1220
RE16-10-2931	16-609220	0.0–0.5	Fill	10-1099	10-1099	10-1099	10-1098	10-1099	10-1099	10-1099	10-1099	10-1098	10-1098	10-1099
RE16-10-2932	16-609220	5.5–6.0	Fill	10-1220	10-1220	10-1220	10-1219	10-1220	10-1220	10-1220	10-1220	10-1219	10-1219	—
RE16-10-2933	16-609221	0.0–0.5	Soil	10-1099	10-1099	10-1099	10-1098	10-1099	10-1099	10-1099	10-1099	10-1098	10-1098	10-1099
RE16-10-2947	16-609229	0.0–0.5	Soil	10-1154	10-1154	10-1154	10-1153	10-1154	10-1154	10-1154	10-1154	10-1153	10-1153	10-1154
RE16-10-2948	16-609229	4.0–5.5	Qbt 4	10-1154	10-1154	10-1154	10-1153	10-1154	10-1154	10-1154	10-1154	10-1153	10-1153	10-1154
RE16-10-2949	16-609229	10.0–12.0	Qbt 4	10-1154	10-1154	10-1154	10-1153	10-1154	10-1154	10-1154	10-1154	10-1153	10-1153	10-1154
RE16-10-2950	16-609229	17.5–20.0	Qbt 4	10-1154	10-1154	10-1154	10-1153	10-1154	10-1154	10-1154	10-1154	10-1153	10-1153	10-1154
RE16-10-2945	16-609229	23.0–25.0	Qbt 4	10-1154	10-1154	10-1154	10-1153	10-1154	10-1154	10-1154	10-1154	10-1153	10-1153	10-1154
RE16-10-2780	16-611945	0.0–0.5	Soil	na	10-416	10-416	10-416	10-416	10-416	10-416	10-416	10-416	10-416	10-416

[a] — = Analyses not requested.
[b] na = Not available.

Table 8.16-2
Summary of Inorganic Chemicals above BVs at Shared Drainages

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese
Qbt 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**	**na**[b]	**14500**	**11.2**	**1690**	**482**
Sed BV[a]				**15400**	**0.83**	**3.98**	**127**	**0.4**	**4420**	**17.1**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**13800**	**19.7**	**2370**	**543**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**na**	**2920**[d]	**300**[e]	**45400**	**22700**	**68100**	**795000**	**800**	**na**	**145000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**na**	**1910**[d]	**238**	**31700**	**15800**	**47500**	**554000**	**560**	**na**	**110000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**na**	**219**[d]	**23**[e]	**3130**	**1560**	**4690**	**54800**	**400**	**na**	**10700**
0316-95-0092	16—01411	0.0–0.5	Fill	—[g]	5.3 (U)	—	—	0.53 (U)	—	NA[h]	—	—	—	1.1 (U)	NA	—	—	—	—
0316-95-0093	16—01411	0.5–1.0	Soil	—	5.4 (U)	—	—	0.54 (U)	—	NA	—	—	—	1.1 (U)	NA	—	—	—	—
0316-95-0094	16—01411	3.5–5.0	Qbt 4	—	5.9 (U)	—	90.4	—	—	NA	—	—	—	1.2 (U)	NA	—	—	—	—
0316-95-0095	16—01434	0.0–0.5	Sed	—	7.3 (U)	5.6	247	2.4	—	NA	42.8	—	408	1.5 (U)	NA	39500	203	—	—
0316-95-0096	16—01434	0.33—0.83	Sed	—	7 (U)	4.1	249	3.3	—	NA	31.4	—	430	1.4 (U)	NA	18100	278	—	—
0316-95-0097	16—01434	2.5–3.5	Qbt 4	—	5.4 (U)	—	—	—	—	NA	24.5	—	39.7	1.1 (U)	NA	—	29.4	—	—
0316-95-0101	16—01435	0.0–0.5	Sed	—	6.3 (U)	—	—	0.63 (U)	11900	NA	—	—	24.3	1.3 (U)	NA	—	31.9	—	—
0316-95-0102	16—01436	0.0–0.5	Sed	—	8.4 (U)	—	241	0.84 (U)	—	NA	14.4	—	134	1.7 (U)	NA	—	78	—	—
0316-95-0103	16—01437	0.0–0.5	Sed	—	10.5 (U)	—	608	1 (U)	—	NA	32.7	—	195	2.1 (U)	NA	—	249	—	—
0316-95-0104	16—01438	0.0–0.5	Sed	—	9.3 (U)	—	—	0.93 (U)	—	NA	31	—	358	1.9 (U)	NA	—	105	—	—
0316-95-0105	16—01439	0.0–0.5	Sed	—	12.8 (U)	9.6	1870	1.3 (U)	5100	NA	17.9	—	90.8	2.6 (U)	NA	16600	108	—	—
0316-95-0119	16—01457	0.0–0.5	Sed	—	5.6 (U)	—	191	0.56 (U)	—	NA	—	—	—	1.1 (U)	NA	—	—	—	—
0316-95-0120	16—01458	0.0–0.5	Sed	—	5.4 (U)	—	—	0.54 (U)	—	NA	—	—	17.4	1.1 (U)	NA	—	—	—	—
0316-95-0098	16—01653	0.0–0.5	Sed	—	7.03 (U)	—	—	0.703 (U)	—	NA	10.9	—	132	1.46 (U)	NA	—	50	—	—
0316-95-0099	16—01653	0.5–1.25	Soil	—	6.3 (U)	—	809 (J+)	0.63 (U)	—	NA	—	—	38.2	1.31 (U)	NA	—	34.6	—	—
0316-95-0100	16—01653	4.5–5.5	Qbt 4	9010	5.88 (U)	—	151 (J+)	—	2670	NA	12.4	5.42 (J)	11	1.2 (U)	NA	—	17.8	2070	—
RE16-10-2778	16-609169	0.0–0.5	Soil	—	1.09 (U)	—	—	0.543 (U)	—	—	—	—	—	NA	—	—	—	—	—
RE16-10-2921	16—609215	0.0–0.5	Soil	—	1.11 (U)	—	—	0.556 (U)	—	—	—	—	—	—	0.733 (J-)	—	—	—	—
RE16-10-2922	16—609215	5.5–6.0	Qbt 4	7440	1.1 (U)	3.92	77.6 (J+)	—	—	174 (J-)	9.55	4.58	—	—	9.24 (J-)	—	—	—	—
RE16-10-2923	16—609216	0.0–0.5	Soil	—	1.15 (U)	—	—	0.577 (U)	—	—	—	—	19.4	—	0.592 (J-)	—	45.6	—	—
RE16-10-2924	16—609216	5.5–6.0	Qbt 4	—	1.15 (U)	—	49.8	—	—	—	—	—	—	NA	—	—	—	—	—
RE16-10-2925	16—609217	0.0–0.5	Fill	—	1.17 (U)	—	—	0.587 (U)	—	—	—	—	—	—	0.794 (J-)	—	—	—	—
RE16-10-2926	16—609217	4.5–5.0	Qbt 4	—	1.15 (U)	5.57	48.5	—	—	—	—	—	—	—	1.19 (J-)	—	—	—	—
RE16-10-2927	16—609218	0.0–0.5	Soil	—	1.03 (U)	—	—	0.517 (U)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2928	16—609218	1.5–2.0	Qbt 4	—	1.04 (U)	—	—	—	—	—	23.5	—	6.44	NA	—	—	—	—	—
RE16-10-2929	16—609219	0.0–0.5	Soil	—	1.17 (U)	—	—	0.586 (U)	—	—	—	—	—	—	0.998 (J-)	—	—	—	—
RE16-10-2930	16—609219	5.5–6.0	Qbt 4	10300 (J+)	1.09 (U)	—	172	—	2680	—	9	11.8	8.55	—	0.761 (J-)	17600	32.1	1850	713
RE16-10-2931	16—609220	0.0–0.5	Fill	—	1.25 (U)	—	—	0.623 (U)	—	—	—	—	20.1	—	0.616 (J-)	—	28.2	—	—
RE16-10-2932	16—609220	5.5–6.0	Fill	—	1.01 (U)	—	—	0.507 (U)	—	—	—	—	—	NA	0.701 (J-)	—	—	—	—
RE16-10-2933	16—609221	0.0–0.5	Soil	—	1.07 (U)	—	—	—	—	—	—	—	14.9	—	—	—	59	—	—
RE16-10-2947	16—609229	0.0–0.5	Soil	—	1.11 (U)	—	—	0.554 (U)	—	—	—	—	—	—	1.19 (J-)	—	—	—	—
RE16-10-2948	16—609229	4.0–5.5	Qbt 4	—	1.07 (U)	—	—	—	—	—	—	—	—	—	0.612 (J-)	—	—	—	—
RE16-10-2949	16—609229	10.0–12.0	Qbt 4	—	1.07 (U)	—	—	—	—	—	—	—	—	—	1.2 (J-)	—	—	—	—
RE16-10-2950	16—609229	17.5–20.0	Qbt 4	—	1.02 (U)	—	53.7	—	—	—	—	—	—	—	0.929 (J-)	—	—	—	—
RE16-10-2945	16—609229	23.0–25.0	Qbt 4	—	0.985 (U)	—	—	—	—	—	—	—	—	—	0.62 (J-)	—	—	—	—
RE16-10-2780	16-611945	0.0–0.5	Soil	—	1.18 (U)	—	—	0.591 (U)	—	—	—	—	—	NA	0.801 (J-)	—	—	—	—

Table 8.16-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Uranium	Vanadium	Zinc
Qbt 4 BV[a]				**0.1**	**6.58**	**na**[b]	**na**	**0.3**	**1**	**2.4**	**17**	**63.5**
Sed BV[a]				**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**2.22**	**19.7**	**60.2**
Soil BV[a]				**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**310**[e]	**22700**	**1820000**	**795**	**5680**	**5680**	**3410**	**5680**	**341000**
Recreational SSL[f]				**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**2380**	**3960**	**238000**
Residential SSL[c]				**23**[e]	**1560**	**125000**	**54.8**	**391**	**391**	**235**	**391**	**23500**
0316-95-0092	16—01411	0.0–0.5	Fill	0.23 (U)	—	NA	NA	—	—	—	—	—
0316-95-0093	16—01411	0.5–1.0	Soil	0.11 (U)	—	NA	NA	—	—	—	—	—
0316-95-0094	16—01411	3.5–5.0	Qbt 4	—	—	NA	NA	—	—	—	—	355 (J-)
0316-95-0095	16—01434	0.0–0.5	Sed	5.7	14.3	NA	NA	0.37 (J-)	1.5	NA	25	1050 (J-)
0316-95-0096	16—01434	0.33—0.83	Sed	233	10.7	NA	NA	0.34 (J-)	—	NA	26	516 (J-)
0316-95-0097	16—01434	2.5–3.5	Qbt 4	4.1	—	NA	NA	—	—	NA	—	—
0316-95-0101	16—01435	0.0–0.5	Sed	0.23	—	NA	NA	0.31 (U)	—	NA	—	145
0316-95-0102	16—01436	0.0–0.5	Sed	2.4	—	NA	NA	0.43 (U)	4.2 (U)	NA	23.3	127
0316-95-0103	16—01437	0.0–0.5	Sed	5	—	NA	NA	0.98 (J)	—	NA	23.8	229
0316-95-0104	16—01438	0.0–0.5	Sed	2.2	—	NA	NA	0.46 (U)	—	NA	23.9	297
0316-95-0105	16—01439	0.0–0.5	Sed	0.96	—	NA	NA	0.62 (U)	1.3 (U)	NA	54.5	136
0316-95-0119	16—01457	0.0–0.5	Sed	—	—	NA	NA	—	—	—	—	—
0316-95-0120	16—01458	0.0–0.5	Sed	—	—	NA	NA	—	—	2.36	—	84
0316-95-0098	16—01653	0.0–0.5	Sed	1.6	—	NA	NA	0.35 (U)	—	NA	—	241 (J+)
0316-95-0099	16—01653	0.5–1.25	Soil	0.881	—	NA	NA	—	—	NA	—	64.2 (J+)
0316-95-0100	16—01653	4.5–5.5	Qbt 4	—	—	NA	NA	—	—	NA	20.6	—
RE16-10-2778	16-609169	0.0–0.5	Soil	—	—	—	—	-	-	NA	—	—
RE16-10-2921	16—609215	0.0–0.5	Soil	—	—	1.35 (J-)	—	—	—	NA	—	—
RE16-10-2922	16—609215	5.5–6.0	Qbt 4	—	—	—	0.000635 (J)	1.06 (U)	—	NA	—	—
RE16-10-2923	16—609216	0.0–0.5	Soil	—	—	1.57 (J-)	—	—	—	NA	—	68.5
RE16-10-2924	16—609216	5.5–6.0	Qbt 4	—	—	—	—	1.25 (U)	—	NA	—	—
RE16-10-2925	16—609217	0.0–0.5	Fill	—	—	—	—	—	—	NA	—	—
RE16-10-2926	16—609217	4.5–5.0	Qbt 4	—	—	—	—	1.18 (U)	—	NA	—	—
RE16-10-2927	16—609218	0.0–0.5	Soil	—	—	—	—	—	—	NA	—	—
RE16-10-2928	16—609218	1.5–2.0	Qbt 4	—	—	—	—	0.973 (U)	—	NA	—	—
RE16-10-2929	16—609219	0.0–0.5	Soil	—	—	—	—	—	—	NA	—	—
RE16-10-2930	16—609219	5.5–6.0	Qbt 4	—	9.54	—	0.0017 (J)	1.12 (U)	—	NA	32.5	—
RE16-10-2931	16—609220	0.0–0.5	Fill	—	—	—	—	—	—	NA	—	64
RE16-10-2932	16—609220	5.5–6.0	Fill	—	—	—	—	—	—	NA	—	—
RE16-10-2933	16—609221	0.0–0.5	Soil	0.16	—	—	—	—	—	NA	—	54.4
RE16-10-2947	16—609229	0.0–0.5	Soil	—	—	1.2	—	—	—	NA	—	—

Table 8.16-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Uranium	Vanadium	Zinc
Qbt 4 BV[a]				**0.1**	**6.58**	**na**[b]	**na**	**0.3**	**1**	**2.4**	**17**	**63.5**
Sed BV[a]				**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**2.22**	**19.7**	**60.2**
Soil BV[a]				**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**310**[e]	**22700**	**1820000**	**795**	**5680**	**5680**	**3410**	**5680**	**341000**
Recreational SSL[f]				**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**2380**	**3960**	**238000**
Residential SSL[c]				**23**[e]	**1560**	**125000**	**54.8**	**391**	**391**	**235**	**391**	**23500**
RE16-10-2948	16—609229	4.0–5.5	Qbt 4	—	—	—	—	1.04 (U)	—	NA	—	—
RE16-10-2949	16—609229	10.0–12.0	Qbt 4	—	—	—	—	1.17 (U)	—	NA	—	—
RE16-10-2950	16—609229	17.5–20.0	Qbt 4	—	—	—	—	1.08 (U)	—	NA	—	—
RE16-10-2945	16—609229	23.0–25.0	Qbt 4	—	—	—	—	0.998 (U)	—	NA	—	—
RE16-10-2780	16-611945	0.0–0.5	Soil	—	—	—	—	—	—	NA	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 8.16-3
Summary of Organic Chemicals Detected at Shared Drainages

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]
Industrial SSL[a]				**36700**	**18300**[b]	**851000**	**1900**[c]	**2000**[c]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2500000**[c]	**1370**	**369000**
Recreational SSL[d]				**20800**	**10400**[b]	**702000**	**1440**	**1440**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**301**	**1590000**	**1830**	**446000**
Residential SSL[a]				**3440**	**1720**[b]	**67500**	**150**[c]	**150**[c]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**240000**[c]	**347**	**39600**
0316-95-0092	16-01411	0.0–0.5	Fill	—[e]	—	NA[f]	—	—	—	—	—	—	—	—	—	0.058 (J)	NA
0316-95-0093	16-01411	0.5–1.0	Soil	—	—	0.008 (J)	—	—	0.17 (J)	0.24 (J)	—	—	—	—	—	4.3	—
0316-95-0094	16-01411	3.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	0.11 (J)	—
0316-95-0095	16-01434	0.0–0.5	Sed	2.4 (J)	—	NA	—	0.877	3.9 (J)	7.3 (J)	7.9 (J)	5.8 (J)	6 (J)	—	—	3 (J)	NA
0316-95-0096	16-01434	0.33—0.83	Sed	7.2	0.091 (J)	—	—	1.53	27	31	31	22	23	29	—	7.5	0.01 (J)
0316-95-0097	16-01434	2.5–3.5	Qbt 4	0.17 (J)	—	—	—	—	0.82	0.64	0.6	0.52	0.46	—	—	0.12 (J)	0.006 (J)
0316-95-0101	16-01435	0.0–0.5	Sed	0.045 (J)	—	NA	—	—	0.066 (J)	0.14 (J)	0.16 (J)	0.19 (J)	0.09 (J)	0.077 (J)	—	—	NA
0316-95-0102	16-01436	0.0–0.5	Sed	0.31 (J)	—	NA	0.092	0.093	1	1.5	1.7	2.3	0.62	0.91	0.18 (J)	—	NA
0316-95-0103	16-01437	0.0–0.5	Sed	—	—	NA	0.094	—	0.13 (J)	0.47 (J)	0.58 (J)	0.89	0.24 (J)	0.31 (J)	0.51 (J)	—	NA
0316-95-0104	16-01438	0.0–0.5	Sed	—	—	NA	—	—	—	—	0.067 (J)	0.085 (J)	—	—	—	—	NA
0316-95-0105	16-01439	0.0–0.5	Sed	0.3 (J)	—	NA	—	0.098	0.64 (J)	1.1 (J)	1.2 (J)	2.2	0.64 (J)	—	—	—	NA
0316-95-0119	16-01457	0.0–0.5	Sed	—	—	NA	0.354	0.362	—	0.094 (J)	0.11 (J)	0.17 (J)	—	—	—	0.045 (J)	NA
0316-95-0120	16-01458	0.0–0.5	Sed	0.045 (J)	—	NA	—	—	0.076 (J)	0.1 (J)	0.13 (J)	0.17 (J)	—	—	—	0.042 (J)	NA
0316-95-0098	16-01653	0.0–0.5	Sed	0.1 (J)	—	NA	—	—	0.2 (J)	0.51	0.54	0.57	0.42 (J)	0.48 (J)	—	0.37 (J)	NA
0316-95-0099	16-01653	0.5–1.25	Soil	0.61	—	0.031	—	—	1.2	2.6	2.3	2.1	2	1.7	—	0.39 (J)	—
0316-95-0100	16-01653	4.5–5.5	Qbt 4	—	—	0.009 (J)	—	0.126	—	—	—	—	—	—	—	0.21 (J)	—
RE16-10-2778	16-609169	0.0–0.5	Soil	—	—	—	—	—	0.00835 (J)	—	—	0.0196 (J)	—	—	—	—	—
RE16-10-2921	16-609215	0.0–0.5	Soil	0.596	—	0.00277 (J)	—	—	1.29	3.78	3.82	7.4	1.65 (J)	2.45	—	—	—
RE16-10-2922	16-609215	5.5–6.0	Qbt 4	0.0143 (J)	—	0.0216 (J)	—	—	0.0353 (J)	0.0996	0.0963	0.139	0.0473 (J)	0.0521	—	0.157 (J)	—
RE16-10-2923	16-609216	0.0–0.5	Soil	—	—	—	—	—	—	0.0331 (J)	0.0462	0.0919	0.0448 (J)	0.0351 (J)	—	—	—
RE16-10-2924	16-609216	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2925	16-609217	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2926	16-609217	4.5–5.0	Qbt 4	—	—	0.00548 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2927	16-609218	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2929	16-609219	0.0–0.5	Soil	—	—	—	—	—	0.0123 (J)	0.0709	0.0823	0.116	—	0.0529	—	—	—
RE16-10-2930	16-609219	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2931	16-609220	0.0–0.5	Fill	—	—	—	—	—	—	0.0305 (J)	0.038 (J)	0.0521	0.0239 (J)	0.0279 (J)	—	—	—
RE16-10-2932	16-609220	5.5–6.0	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2933	16-609221	0.0–0.5	Soil	—	—	0.00291 (J)	—	—	—	0.0199 (J)	—	—	—	—	—	—	—
RE16-10-2948	16-609229	4.0–5.5	Qbt 4	—	—	0.00242 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2780	16-611945	0.0–0.5	Soil	—	—	0.00227 (J-)	—	—	0.0181 (J)	0.0596	0.0516	0.0922	0.0306 (J)	—	—	—	—

Table 8.16-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dimethylphenol[2,4-]	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[2-]
Industrial SSL[a]				**2340**	**2.34**	**1000**[c]	**13700**	**68400**	**103**	**24400**	**24400**	**34200**	**23.4**	**14900**[g]	**1090**	**4100**[c]	**34200**[h]
Recreational SSL[d]				**3010**	**3.01**	**399**	**7970**	**39900**	**82.5**	**13900**	**13900**	**19900**	**30.1**	**52700**[g]	**4520**	**3170**	**na**[i]
Residential SSL[a]				**621**	**0.621**	**78**[c]	**1220**	**6110**	**15.7**	**2290**	**2290**	**3060**	**6.21**	**3210**[g]	**199**	**310**[c]	**3100**[h]
0316-95-0092	16-01411	0.0–0.5	Fill	—	—	—	—	—	—	0.057 (J)	—	—	—	NA	NA	—	—
0316-95-0093	16-01411	0.5–1.0	Soil	0.32 (J)	—	—	—	—	—	0.27 (J)	—	—	—	—	0.004 (J)	—	—
0316-95-0094	16-01411	3.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0095	16-01434	0.0–0.5	Sed	9.9 (J)	—	1.6 (J)	—	—	0.406	11	2.7 (J)	0.818	4.9 (J)	NA	NA	1.2 (J)	—
0316-95-0096	16-01434	0.33—0.83	Sed	43	—	4.7	0.29 (J)	0.24 (J)	0.417	57	7	20.7	19	—	—	3.3	0.12 (J)
0316-95-0097	16-01434	2.5–3.5	Qbt 4	0.93	—	0.11 (J)	—	—	—	1.6	0.21 (J)	—	0.37 (J)	—	—	0.062 (J)	—
0316-95-0101	16-01435	0.0–0.5	Sed	0.18 (J)	0.074 (J)	—	—	—	—	0.38 (J)	0.043 (J)	—	—	NA	NA	—	—
0316-95-0102	16-01436	0.0–0.5	Sed	1.6	0.17 (J)	0.14 (J)	—	—	—	3	0.31 (J)	1.14	0.79	NA	NA	0.086 (J)	—
0316-95-0103	16-01437	0.0–0.5	Sed	0.61 (J)	—	—	—	—	—	1.1	—	—	0.29 (J)	NA	NA	—	—
0316-95-0104	16-01438	0.0–0.5	Sed	0.076 (J)	—	—	—	—	—	0.13 (J)	—	—	—	NA	NA	—	—
0316-95-0105	16-01439	0.0–0.5	Sed	1.2 (J)	—	—	—	—	—	2.5	0.29 (J)	1.06	0.72 (J)	NA	NA	—	1.7
0316-95-0119	16-01457	0.0–0.5	Sed	0.12 (J)	—	—	—	—	—	0.26 (J)	—	143	—	NA	NA	—	—
0316-95-0120	16-01458	0.0–0.5	Sed	0.15 (J)	—	—	—	—	—	0.25 (J)	0.04 (J)	—	0.068 (J)	NA	NA	—	—
0316-95-0098	16-01653	0.0–0.5	Sed	0.77	—	0.057 (J)	—	—	0.48 (J)	0.83	0.11 (J)	—	0.36 (J)	NA	NA	—	—
0316-95-0099	16-01653	0.5–1.25	Soil	3.5	—	0.36 (J)	—	—	—	4.6	0.7	0.18	1.8	—	0.007	0.24 (J)	—
0316-95-0100	16-01653	4.5–5.5	Qbt 4	0.045 (J)	—	—	—	—	—	0.066 (J)	—	—	—	—	0.005 (J)	—	—
RE16-10-2778	16-609169	0.0–0.5	Soil	—	—	—	—	—	—	0.0188 (J)	—	—	—	—	—	—	—
RE16-10-2921	16-609215	0.0–0.5	Soil	4.19	—	0.281 (J)	—	—	—	12.3	0.621	—	1.72 (J)	0.00043 (J)	—	0.0246 (J)	—
RE16-10-2922	16-609215	5.5–6.0	Qbt 4	0.109	—	—	—	—	—	0.209	0.016 (J)	0.248 (J)	0.045 (J)	—	—	—	—
RE16-10-2923	16-609216	0.0–0.5	Soil	0.0525	—	—	—	—	—	0.0694	—	—	0.0383 (J)	—	—	—	—
RE16-10-2924	16-609216	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2925	16-609217	0.0–0.5	Fill	—	—	—	—	—	—	0.0182 (J)	—	—	—	—	—	—	—
RE16-10-2926	16-609217	4.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2927	16-609218	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2929	16-609219	0.0–0.5	Soil	0.084	—	—	—	—	—	0.135	—	—	0.0394 (J)	—	—	—	—
RE16-10-2930	16-609219	5.5–6.0	Qbt 4	—	—	—	—	—	—	0.0175 (J)	—	—	—	—	—	—	—
RE16-10-2931	16-609220	0.0–0.5	Fill	0.0432	—	—	—	—	—	0.055	—	—	0.0225 (J)	—	—	—	—
RE16-10-2932	16-609220	5.5–6.0	Fill	—	—	—	—	—	—	0.0143 (J)	—	—	—	0.000375 (J)	—	—	—
RE16-10-2933	16-609221	0.0–0.5	Soil	0.018 (J)	—	—	—	—	—	0.0294 (J)	—	—	—	0.000399 (J)	—	—	—
RE16-10-2948	16-609229	4.0–5.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2780	16-611945	0.0–0.5	Soil	0.0625	—	—	—	—	—	0.122	—	—	0.0294 (J)	—	—	—	—

Table 8.16-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	RDX	TATB	Tetryl	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichlorofluoromethane	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**3420**[h]	**252**	**20500**	**18300**	**174**	**na**	**2740**	**57900**	**339000**	**77100**	**6760**	**27000**[c]	**469**	**3610**
Recreational SSL[d]				**na**	**1950**	**12000**	**10400**	**233**	**na**	**1590**	**60800**	**2750000**	**500000**	**49800**	**19900**	**301**	**27800**
Residential SSL[a]				**310**[h]	**45**	**1830**	**1720**	**44.2**	**na**	**244**	**5570**	**104000**	**21800**	**2010**	**2200**[c]	**35.9**	**1090**
0316-95-0092	16-01411	0.0–0.5	Fill	—	—	0.098 (J)	0.059 (J)	—	NA	—	NA	NA	NA	NA	—	0.132	NA
0316-95-0093	16-01411	0.5–1.0	Soil	—	—	0.36 (J)	0.81	—	NA	—	—	—	—	—	—	—	NA
0316-95-0094	16-01411	3.5–5.0	Qbt 4	—	—	—	—	—	NA	—	—	—	—	—	—	0.139	NA
0316-95-0095	16-01434	0.0–0.5	Sed	—	3.8 (J)	15	26	1.1	NA	1.13	NA	NA	NA	NA	0.262	90.1	NA
0316-95-0096	16-01434	0.33—0.83	Sed	0.38 (J)	12	69	110	24.5	NA	0.514	—	—	0.043	—	0.097	50.9	NA
0316-95-0097	16-01434	2.5–3.5	Qbt 4	—	0.14 (J)	1.5	1.6	—	NA	—	—	—	—	—	—	1.71	NA
0316-95-0101	16-01435	0.0–0.5	Sed	—	0.06 (J)	0.34 (J)	0.34 (J)	—	—	—	NA	NA	NA	NA	—	—	NA
0316-95-0102	16-01436	0.0–0.5	Sed	0.16 (J)	0.26 (J)	2.2	2.9	—	—	0.094	NA	NA	NA	NA	—	4.49	NA
0316-95-0103	16-01437	0.0–0.5	Sed	0.089 (J)	—	0.54 (J)	0.98	—	—	—	NA	NA	NA	NA	—	0.533	NA
0316-95-0104	16-01438	0.0–0.5	Sed	—	—	0.082 (J)	0.12 (J)	—	—	—	NA	NA	NA	NA	—	0.488	NA
0316-95-0105	16-01439	0.0–0.5	Sed	—	—	2	4.5	—	—	—	NA	NA	NA	NA	—	2.89	NA
0316-95-0119	16-01457	0.0–0.5	Sed	—	—	0.12 (J)	0.23 (J)	0.649	—	—	NA	NA	NA	NA	—	—	NA
0316-95-0120	16-01458	0.0–0.5	Sed	—	—	0.24 (J)	0.4	—	—	—	NA	NA	NA	NA	—	—	NA
0316-95-0098	16-01653	0.0–0.5	Sed	—	0.061 (J)	0.83	2	—	NA	—	NA	NA	NA	NA	—	1.1	NA
0316-95-0099	16-01653	0.5–1.25	Soil	—	0.74	4.7	8.5	—	NA	—	—	0.003 (J)	—	0.014	—	1.85	NA
0316-95-0100	16-01653	4.5–5.5	Qbt 4	—	—	0.058 (J)	0.062 (J)	—	NA	—	—	—	—	0.008	—	2.04	NA
RE16-10-2778	16-609169	0.0–0.5	Soil	—	—	—	0.0199 (J)	—	—	—	—	—	—	—	—	—	—
RE16-10-2921	16-609215	0.0–0.5	Soil	—	0.0354 (J)	10.2	15.2	—	—	—	0.00043 (J)	—	—	—	—	—	—
RE16-10-2922	16-609215	5.5–6.0	Qbt 4	—	—	0.173	0.234	—	—	—	—	—	—	—	—	—	—
RE16-10-2923	16-609216	0.0–0.5	Soil	—	—	0.032 (J)	0.0975	—	—	—	—	—	—	—	—	—	—
RE16-10-2924	16-609216	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000807 (J)
RE16-10-2925	16-609217	0.0–0.5	Fill	—	—	—	0.0268 (J)	—	—	—	—	—	—	—	—	—	—
RE16-10-2926	16-609217	4.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2927	16-609218	0.0–0.5	Soil	—	—	—	0.0122 (J)	—	—	—	—	—	—	—	—	—	—
RE16-10-2929	16-609219	0.0–0.5	Soil	—	—	0.0731	0.194	—	1.13	—	—	—	—	—	—	—	—
RE16-10-2930	16-609219	5.5–6.0	Qbt 4	—	—	—	0.0175 (J)	—	—	—	—	—	—	—	—	—	—
RE16-10-2931	16-609220	0.0–0.5	Fill	—	—	0.0291 (J)	0.0743	—	—	—	—	—	—	—	—	—	—

Table 8.16-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	RDX	TATB	Tetryl	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichlorofluoromethane	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**3420**[h]	**252**	**20500**	**18300**	**174**	**na**	**2740**	**57900**	**339000**	**77100**	**6760**	**27000**[c]	**469**	**3610**
Recreational SSL[d]				**na**	**1950**	**12000**	**10400**	**233**	**na**	**1590**	**60800**	**2750000**	**500000**	**49800**	**19900**	**301**	**27800**
Residential SSL[a]				**310**[h]	**45**	**1830**	**1720**	**44.2**	**na**	**244**	**5570**	**104000**	**21800**	**2010**	**2200**[c]	**35.9**	**1090**
RE16-10-2932	16-609220	5.5–6.0	Fill	—	—	—	0.0125 (J)	—	—	—	—	—	—	—	—	—	0.000375 (J)
RE16-10-2933	16-609221	0.0–0.5	Soil	—	—	0.0192 (J)	0.0471	—	—	—	0.000919 (J)	—	—	—	—	0.174 (J)	—
RE16-10-2948	16-609229	4.0–5.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2780	16-611945	0.0–0.5	Soil	—	—	0.0758	0.126	—	—	—	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] NA = Not analyzed.

[g] Isopropylbenzene was used as a surrogate based on structural similarity.

[h] SSL from EPA (2007, 099314).

[i] na = Not available.

Table 8.17-1
Summary of Samples Collected and Analyses Requested at the Liquid Waste Trunk Line

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-11752	16-609232	1.5–2.0	Soil	—*	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2966	16-609232	1.5–2.0	Soil	10-945	10-945	10-945	10-944	10-945	10-945	10-945	10-945	10-944	10-944	—
RE16-10-11753	16-609232	5.5–6.0	Fill	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2967	16-609232	5.5–6.0	Soil	10-945	10-945	10-945	10-944	10-945	10-945	10-945	10-945	10-944	10-944	—
RE16-10-11754	16-609233	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2968	16-609233	0.0–0.5	Soil	10-945	10-945	10-945	10-944	10-945	10-945	10-945	10-945	10-944	10-944	—
RE16-10-11755	16-609233	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2969	16-609233	5.5–6.0	Soil	10-945	10-945	10-945	10-944	10-945	10-945	10-945	10-945	10-944	10-944	—
RE16-10-11756	16-609234	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2970	16-609234	0.0–0.5	Soil	10-1013	10-1012	10-1013	10-1011	10-1013	10-1013	10-1013	10-1012	10-1011	10-1011	—
RE16-10-11757	16-609234	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2971	16-609234	5.5–6.0	Soil	10-1013	10-1012	10-1013	10-1011	10-1013	10-1013	10-1013	10-1012	10-1011	10-1011	—
RE16-10-11758	16-609235	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2972	16-609235	0.0–0.5	Soil	10-1013	10-1012	10-1013	10-1011	10-1013	10-1013	10-1013	10-1012	10-1011	10-1011	—
RE16-10-11759	16-609235	1.5–2.0	Fill	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2973	16-609235	1.5–2.0	Soil	10-1013	10-1012	10-1013	10-1011	10-1013	10-1013	10-1013	10-1012	10-1011	10-1011	—
RE16-10-14801	16-609235	8.5–9.0	Soil	10-2524	10-2523	10-2524	10-2522	10-2524	10-2524	10-2524	10-2523	10-2522	10-2522	10-2523
RE16-10-11760	16-609236	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2974	16-609236	0.0–0.5	Soil	10-1013	10-1012	10-1013	10-1011	10-1013	10-1013	10-1013	10-1012	10-1011	10-1011	—
RE16-10-11761	16-609236	2.5–3.0	Soil	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2975	16-609236	2.5–3.0	Soil	10-1013	10-1012	10-1013	10-1011	10-1013	10-1013	10-1013	10-1012	10-1011	10-1011	—
RE16-10-11762	16-609237	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2976	16-609237	0.0–0.5	Soil	10-1013	10-1012	10-1013	10-1011	10-1013	10-1013	10-1013	10-1012	10-1011	10-1011	—
RE16-10-11763	16-609237	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	10-1519
RE16-10-2977	16-609237	5.5–6.0	Qbt 4	10-1013	10-1012	10-1013	10-1011	10-1013	10-1013	10-1013	10-1012	10-1011	10-1011	—
RE16-10-14802	16-609237	8.5–9.0	Qbt 4	10-2575	10-2574	10-2575	10-2573	10-2575	10-2575	10-2575	10-2574	10-2573	10-2573	10-2574
RE16-10-2978	16-609238	1.0–2.0	Fill	10-2353	10-2353	10-2353	10-2352	10-2353	10-2353	10-2353	10-2353	10-2352	10-2352	10-2353
RE16-10-2979	16-609238	6.5–7.0	Qbt 4	10-2420	10-2420	10-2420	10-2420	10-2420	10-2420	10-2420	10-2420	10-2420	10-2420	10-2420
RE16-10-2980	16-609239	1.0–1.5	Soil	10-2353	10-2353	10-2353	10-2352	10-2353	10-2353	10-2353	10-2353	10-2352	10-2352	10-2353
RE16-10-2981	16-609239	6.5–7.0	Soil	10-2353	10-2353	10-2353	10-2352	10-2353	10-2353	10-2353	10-2353	10-2352	10-2352	—
RE16-10-2982	16-609240	1.0–1.5	Soil	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416
RE16-10-2983	16-609240	6.5–7.0	Fill	10-2470	10-2470	10-2470	10-2470	10-2470	10-2470	10-2470	10-2470	10-2470	10-2470	10-2470
RE16-10-2984	16-609241	1.0–1.5	Soil	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416
RE16-10-2985	16-609241	6.5–7.0	Soil	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416	10-2416

Table 8.17-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-2986	16-609242	0.0–0.5	Soil	10-2524	10-2523	10-2524	10-2522	10-2524	10-2524	10-2524	10-2523	10-2522	10-2522	10-2523
RE16-10-2987	16-609242	5.5–6.0	Soil	10-2524	10-2523	10-2524	10-2522	10-2524	10-2524	10-2524	10-2523	10-2522	10-2522	10-2523
RE16-10-2988	16-609242	8.5–9.0	Soil	10-2524	10-2523	10-2524	10-2522	10-2524	10-2524	10-2524	10-2523	10-2522	10-2522	10-2523
RE16-10-2989	16-609244	0.0–0.5	Soil	10-2524	10-2523	10-2524	10-2522	10-2524	10-2524	10-2524	10-2523	10-2522	10-2522	10-2523
RE16-10-2990	16-609244	5.5–6.0	Qbt 4	10-2524	10-2523	10-2524	10-2522	10-2524	10-2524	10-2524	10-2523	10-2522	10-2522	10-2523
RE16-10-2991	16-609244	8.5–9.0	Qbt 4	10-2524	10-2523	10-2524	10-2522	10-2524	10-2524	10-2524	10-2523	10-2522	10-2522	10-2523
RE16-10-14806	16-611848	0.0–0.5	Fill	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14807	16-611848	5.5–6.0	Soil	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14808	16-611849	0.0–0.5	Fill	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14809	16-611849	5.5–6.0	Soil	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14810	16-611850	0.0–0.5	Fill	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14811	16-611850	5.5–6.0	Soil	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14812	16-611851	0.0–0.5	Fill	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14813	16-611851	5.5–6.0	Qbt 4	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14814	16-611852	0.0–0.5	Soil	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14815	16-611852	5.5–6.0	Soil	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14816	16-611853	0.0–0.5	Soil	10-2565	10-2564	10-2565	10-2563	10-2565	10-2565	10-2565	10-2564	10-2563	10-2563	10-2564
RE16-10-14817	16-611853	5.5–6.0	Qbt 4	10-2575	10-2574	10-2575	10-2573	10-2575	10-2575	10-2575	10-2574	10-2573	10-2573	10-2574
RE16-10-14818	16-611854	0.0–0.5	Soil	10-2575	10-2574	10-2575	10-2573	10-2575	10-2575	10-2575	10-2574	10-2573	10-2573	10-2574
RE16-10-14819	16-611854	5.5–6.0	Qbt 4	10-2575	10-2574	10-2575	10-2573	10-2575	10-2575	10-2575	10-2574	10-2573	10-2573	10-2574
RE16-10-14820	16-611854	8.5–9.0	Qbt 4	10-2575	10-2574	10-2575	10-2573	10-2575	10-2575	10-2575	10-2574	10-2573	10-2573	10-2574
RE16-10-14821	16-611856	0.0–0.5	Soil	10-2575	10-2574	10-2575	10-2573	10-2575	10-2575	10-2575	10-2574	10-2573	10-2573	10-2574
RE16-10-14822	16-611856	5.5–6.0	Qbt 4	10-2575	10-2574	10-2575	10-2573	10-2575	10-2575	10-2575	10-2574	10-2573	10-2573	10-2574
RE16-10-14823	16-611856	8.5–9.0	Qbt 4	10-2575	10-2574	10-2575	10-2573	10-2575	10-2575	10-2575	10-2574	10-2573	10-2573	10-2574

*— = Analyses not requested.

Table 8.17-2
Summary of Inorganic Chemicals above BVs at the Liquid Waste Trunk Line

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**[c]	**na**	**2920**[d]	**300**[e]	**45400**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**na**	**1910**[d]	**238**	**31700**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**na**	**219**[d]	**23**[e]	**3130**
RE16-10-2966	16-609232	1.5–2.0	Soil	—[g]	1.32 (U)	—	—	—	0.659 (U)	—	250 (U)	—	—	—
RE16-10-2967	16-609232	5.5–6.0	Soil	—	1.38 (U)	—	—	—	0.692 (U)	—	—	—	—	—
RE16-10-2968	16-609233	0.0–0.5	Soil	—	1.09 (U)	—	—	—	0.544 (U)	—	—	—	—	—
RE16-10-2969	16-609233	5.5–6.0	Soil	—	1.17 (U)	—	—	—	0.583 (U)	—	—	—	—	—
RE16-10-2970	16-609234	0.0–0.5	Soil	—	1.13 (U)	—	—	—	0.566 (U)	—	—	—	—	—
RE16-10-2971	16-609234	5.5–6.0	Soil	—	1.15 (U)	—	—	—	0.573 (U)	—	—	—	—	—
RE16-10-2972	16-609235	0.0–0.5	Soil	—	1.21 (U)	—	—	—	1.4	—	—	—	—	—
RE16-10-2973	16-609235	1.5–2.0	Soil	—	1.14 (U)	—	—	—	0.569 (U)	—	—	—	—	—
RE16-10-14801	16-609235	8.5–9.0	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2974	16-609236	0.0–0.5	Soil	—	1.19 (U)	—	—	—	0.595 (U)	—	—	—	—	—
RE16-10-2975	16-609236	2.5–3.0	Soil	—	1.09 (U)	—	—	—	0.545 (U)	—	—	—	—	—
RE16-10-2976	16-609237	0.0–0.5	Soil	—	1.18 (U)	—	—	—	0.588 (U)	—	—	—	—	—
RE16-10-2977	16-609237	5.5–6.0	Qbt 4	—	1.1 (U)	—	—	—	—	—	—	—	—	—
RE16-10-14802	16-609237	8.5–9.0	Qbt 4	—	—	—	139	—	—	—	—	—	—	—
RE16-10-2978	16-609238	1.0–2.0	Fill	—	1.6 (UJ)	—	—	—	0.798 (U)	—	—	—	37.5	—
RE16-10-2979	16-609238	6.5–7.0	Qbt 4	10900	1.19 (U)	—	85.1	—	—	5060 (J+)	164	—	—	—
RE16-10-2980	16-609239	1.0–1.5	Soil	—	1.02 (UJ)	—	—	—	0.509 (U)	—	—	—	32.7	—
RE16-10-2981	16-609239	6.5–7.0	Soil	—	1.07 (UJ)	—	—	—	0.537 (U)	—	—	38.3	—	—
RE16-10-2982	16-609240	1.0–1.5	Soil	—	1.08 (U)	—	—	—	0.538 (U)	9920 (J+)	—	—	—	—
RE16-10-2983	16-609240	6.5–7.0	Fill	—	0.972 (UJ)	—	—	—	0.486 (U)	—	—	—	—	—
RE16-10-2984	16-609241	1.0–1.5	Soil	—	0.945 (J)	—	—	—	0.584 (U)	16400 (J+)	380	—	—	23.8
RE16-10-2985	16-609241	6.5–7.0	Soil	—	1.12 (U)	—	—	—	—	—	—	—	—	—
RE16-10-2986	16-609242	0.0–0.5	Soil	—	—	—	—	—	0.9	—	—	—	—	—
RE16-10-2987	16-609242	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2988	16-609242	8.5–9.0	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2989	16-609244	0.0–0.5	Soil	—	—	—	—	—	2	—	—	—	—	14.8
RE16-10-2990	16-609244	5.5–6.0	Qbt 4	—	—	—	123	—	—	2240 (J+)	—	—	—	—
RE16-10-2991	16-609244	8.5–9.0	Qbt 4	—	—	—	52.2	—	—	—	—	—	—	—
RE16-10-14806	16-611848	0.0–0.5	Fill	—	—	—	—	—	—	6330	—	—	—	—

Table 8.17-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na[c]**	**na**	**2920[d]**	**300[e]**	**45400**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**na**	**1910[d]**	**238**	**31700**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**na**	**219[d]**	**23[e]**	**3130**
RE16-10-14807	16-611848	5.5–6.0	Soil	—	—	—	—	—	—	—	254	—	—	—
RE16-10-14808	16-611849	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14809	16-611849	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14810	16-611850	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14811	16-611850	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14812	16-611851	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14813	16-611851	5.5–6.0	Qbt 4	9050	—	—	77.5 (J+)	—	—	—	—	—	—	—
RE16-10-14814	16-611852	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14815	16-611852	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14816	16-611853	0.0–0.5	Soil	—	—	—	—	—	0.95	—	—	—	—	—
RE16-10-14817	16-611853	5.5–6.0	Qbt 4	14400 (J+)	—	2.9	225	1.4	—	2760 (J+)	—	—	3.7	8.2
RE16-10-14818	16-611854	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14819	16-611854	5.5–6.0	Qbt 4	10300 (J+)	—	—	102	—	—	—	—	—	—	5.9
RE16-10-14820	16-611854	8.5–9.0	Qbt 4	—	—	—	65.1	—	—	—	—	—	—	—
RE16-10-14821	16-611856	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14822	16-611856	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14823	16-611856	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—

Table 8.17-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Cyanide (Total)	Fluoride	Lead	Magnesium	Manganese	Nickel	Nitrate	Perchlorate	Selenium	Sodium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**na**	**11.2**	**1690**	**482**	**6.58**	**na**	**na**	**0.3**	**2770**	**63.5**
Soil BV[a]				**0.5**	**na**	**22.3**	**4610**	**671**	**15.4**	**na**	**na**	**1.52**	**915**	**48.8**
Industrial SSL[b]				**22700**	**68100**	**800**	**na**	**145000**	**22700**	**1820000**	**795**	**5680**	**na**	**341000**
Recreational SSL[f]				**15800**	**47500**	**560**	**na**	**110000**	**15800**	**1260000**	**555**	**3960**	**na**	**238000**
Residential SSL[b]				**1560**	**4690**	**400**	**na**	**10700**	**1560**	**125000**	**54.8**	**391**	**na**	**23500**
RE16-10-2966	16-609232	1.5–2.0	Soil	NA[h]	2.43	—	—	—	—	—	—	—	—	161
RE16-10-2967	16-609232	5.5–6.0	Soil	NA	2.78	—	—	—	—	—	—	—	—	51.7
RE16-10-2968	16-609233	0.0–0.5	Soil	NA	0.937 (J)	—	—	—	—	—	—	—	—	—
RE16-10-2969	16-609233	5.5–6.0	Soil	NA	8.26	—	—	—	—	—	—	—	—	—
RE16-10-2970	16-609234	0.0–0.5	Soil	NA	0.44 (J)	—	—	—	—	—	—	—	—	—
RE16-10-2971	16-609234	5.5–6.0	Soil	NA	3.73	—	—	—	—	—	—	—	—	—
RE16-10-2972	16-609235	0.0–0.5	Soil	NA	—	33.6	—	—	—	—	—	—	—	58.4
RE16-10-2973	16-609235	1.5–2.0	Soil	NA	—	—	—	—	—	—	—	—	—	—
RE16-10-14801	16-609235	8.5–9.0	Soil	NA	1.3	—	—	—	—	—	—	—	—	—
RE16-10-2974	16-609236	0.0–0.5	Soil	NA	2.43	26.2	—	—	—	1.71 (J-)	—	—	—	—
RE16-10-2975	16-609236	2.5–3.0	Soil	NA	7.06	—	—	—	—	—	—	—	—	—
RE16-10-2976	16-609237	0.0–0.5	Soil	NA	0.88 (J)	—	—	—	—	—	—	—	—	—
RE16-10-2977	16-609237	5.5–6.0	Qbt 4	NA	2.4	—	—	—	—	—	—	1.12 (UJ)	—	—
RE16-10-14802	16-609237	8.5–9.0	Qbt 4	0.57 (U)	0.69 (J)	—	—	—	NA	0.059 (J)	—	1.4	—	—
RE16-10-2978	16-609238	1.0–2.0	Fill	—	3.98 (J-)	—	—	—	—	2.2	0.000936 (J)	—	—	—
RE16-10-2979	16-609238	6.5–7.0	Qbt 4	—	17.7	—	—	—	—	3.43	—	1.15 (U)	—	—
RE16-10-2980	16-609239	1.0–1.5	Soil	—	4.1 (J-)	—	—	—	—	1.77	—	—	1100	—
RE16-10-2981	16-609239	6.5–7.0	Soil	NA	2.65 (J-)	—	—	—	—	1.54	—	—	—	—
RE16-10-2982	16-609240	1.0–1.5	Soil	—	2.92	—	—	—	—	1.43	—	—	—	—
RE16-10-2983	16-609240	6.5–7.0	Fill	—	1.83	—	—	—	—	—	—	—	—	—
RE16-10-2984	16-609241	1.0–1.5	Soil	—	1.33	—	—	—	—	1.76	—	—	—	—
RE16-10-2985	16-609241	6.5–7.0	Soil	—	3.01	—	—	—	—	2.85	—	—	—	—
RE16-10-2986	16-609242	0.0–0.5	Soil	NA	2.3	84.4 (J)	—	—	—	—	—	—	—	62.3
RE16-10-2987	16-609242	5.5–6.0	Soil	NA	1.8	—	—	—	—	—	—	—	—	—
RE16-10-2988	16-609242	8.5–9.0	Soil	NA	0.8 (J)	—	—	—	—	—	—	—	—	—
RE16-10-2989	16-609244	0.0–0.5	Soil	NA	2.7	61.7 (J)	—	—	—	—	—	—	—	81.8
RE16-10-2990	16-609244	5.5–6.0	Qbt 4	NA	4.8	—	—	—	—	—	—	0.59 (J)	—	—
RE16-10-2991	16-609244	8.5–9.0	Qbt 4	NA	1.3	—	—	—	—	—	—	1	—	—
RE16-10-14806	16-611848	0.0–0.5	Fill	0.53 (U)	0.93 (J)	—	—	—	—	0.094 (J)	—	—	—	107
RE16-10-14807	16-611848	5.5–6.0	Soil	0.59 (U)	5	—	—	—	—	0.074 (J)	—	—	—	—

Table 8.17-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Cyanide (Total)	Fluoride	Lead	Magnesium	Manganese	Nickel	Nitrate	Perchlorate	Selenium	Sodium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**na**	**11.2**	**1690**	**482**	**6.58**	**na**	**na**	**0.3**	**2770**	**63.5**
Soil BV[a]				**0.5**	**na**	**22.3**	**4610**	**671**	**15.4**	**na**	**na**	**1.52**	**915**	**48.8**
Industrial SSL[b]				**22700**	**68100**	**800**	**na**	**145000**	**22700**	**1820000**	**795**	**5680**	**na**	**341000**
Recreational SSL[f]				**15800**	**47500**	**560**	**na**	**110000**	**15800**	**1260000**	**555**	**3960**	**na**	**238000**
Residential SSL[b]				**1560**	**4690**	**400**	**na**	**10700**	**1560**	**125000**	**54.8**	**391**	**na**	**23500**
RE16-10-14808	16-611849	0.0–0.5	Fill	0.57 (U)	1.4	—	—	—	—	0.28	—	—	—	—
RE16-10-14809	16-611849	5.5–6.0	Soil	0.6 (U)	6.3	—	—	—	—	0.15 (J)	—	—	—	—
RE16-10-14810	16-611850	0.0–0.5	Fill	0.54 (U)	0.46 (J)	—	—	—	—	0.087 (J)	—	—	—	—
RE16-10-14811	16-611850	5.5–6.0	Soil	0.58 (U)	5.9	—	—	—	—	0.26	—	—	—	—
RE16-10-14812	16-611851	0.0–0.5	Fill	0.55 (U)	0.65 (J)	—	—	—	—	0.2 (J)	—	—	—	—
RE16-10-14813	16-611851	5.5–6.0	Qbt 4	0.62 (U)	6.5	—	—	—	6.6	0.3	—	1.3	—	—
RE16-10-14814	16-611852	0.0–0.5	Soil	0.63 (U)	2.1	—	—	—	—	0.3	—	—	—	—
RE16-10-14815	16-611852	5.5–6.0	Soil	0.59 (U)	6.9	—	—	—	—	0.15 (J)	—	—	—	—
RE16-10-14816	16-611853	0.0–0.5	Soil	0.71 (U)	2.6	26.7	—	—	—	0.25 (J)	—	—	—	191
RE16-10-14817	16-611853	5.5–6.0	Qbt 4	0.73 (U)	4.6	17.1	2140	—	NA	0.091 (J)	—	1.6	—	—
RE16-10-14818	16-611854	0.0–0.5	Soil	0.63 (U)	0.75 (J)	—	—	—	NA	0.36	—	—	—	—
RE16-10-14819	16-611854	5.5–6.0	Qbt 4	0.57 (U)	3.1	—	—	—	NA	—	—	0.84	—	—
RE16-10-14820	16-611854	8.5–9.0	Qbt 4	0.58 (U)	2.5	—	—	—	NA	0.059 (J)	—	0.58 (J)	—	—
RE16-10-14821	16-611856	0.0–0.5	Soil	0.68 (U)	1.3 (J)	22.7	—	742	NA	0.22 (J)	—	—	—	—
RE16-10-14822	16-611856	5.5–6.0	Qbt 4	0.59 (U)	1.6	—	—	—	NA	0.83	—	1	—	—
RE16-10-14823	16-611856	8.5–9.0	Qbt 4	0.59 (U)	1.4	—	—	—	NA	0.064 (J)	—	1.2	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 8.17-3
Summary of Organic Chemicals Detected at the Liquid Waste Trunk Line

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acetone	Anthracene	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Butylbenzene[n-]	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Diethylphthalate
Industrial SSL[a]				**na**[b]	**36700**	**851000**	**183000**	**85.4**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**1370**	**369000**	**610**[d]	**2340**	**2.34**	**1000**[e]	**547000**
Recreational SSL[f]				**na**	**20800**	**702000**	**104000**	**442**	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1830**	**446000**	**69600**	**3010**	**3.01**	**399**	**319000**
Residential SSL[a]				**na**	**3440**	**67500**	**17200**	**15.5**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**347**	**39600**	**140**[d]	**621**	**0.621**	**78**[e]	**48900**
RE16-10-2966	16-609232	1.5–2.0	Soil	—[g]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2967	16-609232	5.5–6.0	Soil	—	—	—	0.0357 (J)	—	0.0803	0.0786	0.0489	0.044 (J)	0.0359 (J)	—	—	—	0.072	—	—	—
RE16-10-2968	16-609233	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2970	16-609234	0.0–0.5	Soil	—	—	—	—	—	—	—	0.453	—	—	—	—	—	—	—	—	—
RE16-10-2972	16-609235	0.0–0.5	Soil	—	0.378 (J)	—	0.481	—	1.25	1.08	2.94	0.569	—	—	—	—	1.41	—	—	—
RE16-10-2973	16-609235	1.5–2.0	Soil	—	0.399	—	0.567	—	0.917	0.817	1.44	0.32	—	—	—	—	0.958	0.076 (J)	0.195 (J)	—
RE16-10-2974	16-609236	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2978	16-609238	1.0–2.0	Fill	—	—	0.0074 (J)	0.0372 (J)	—	0.107	0.101	0.142	0.086	—	—	—	—	0.0983	—	—	—
RE16-10-2979	16-609238	6.5–7.0	Qbt 4	—	—	0.148 (J)	0.0126 (J)	—	—	0.0206 (J)	0.033 (J)	0.0178 (J)	—	—	—	—	—	—	—	—
RE16-10-2980	16-609239	1.0–1.5	Soil	—	0.0243 (J)	—	0.0479	—	0.119	0.151	0.214	0.14	—	—	—	—	0.123	0.0394 (J)	—	—
RE16-10-2981	16-609239	6.5–7.0	Soil	—	—	—	—	—	0.0235 (J)	0.0167 (J)	0.02 (J)	—	—	—	—	—	0.0194 (J)	—	—	—
RE16-10-2982	16-609240	1.0–1.5	Soil	—	—	0.012	0.014 (J)	—	—	0.0546	0.0849	0.036 (J)	—	—	—	—	0.0625	—	—	—
RE16-10-2983	16-609240	6.5–7.0	Fill	—	0.0696	0.00457 (J)	0.117	—	0.179	0.137	0.207	0.061	—	—	—	—	0.127	—	—	—
RE16-10-2984	16-609241	1.0–1.5	Soil	—	0.122	0.0145	0.2	0.000724 (J)	0.301	0.241	0.358	0.162	—	—	0.00211 (J)	—	0.245	—	—	—
RE16-10-2985	16-609241	6.5–7.0	Soil	—	0.0719	0.0223	0.131	—	0.214	0.168	0.246	0.107	—	—	—	—	0.181	—	—	—
RE16-10-2986	16-609242	0.0–0.5	Soil	0.017 (J)	0.066 (J)	—	0.089 (J)	—	0.28 (J)	0.26 (J)	0.28 (J)	0.11 (J)	0.28 (J)	—	—	—	0.32 (J)	—	—	—
RE16-10-2987	16-609242	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2988	16-609242	8.5–9.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-2989	16-609244	0.0–0.5	Soil	—	0.062 (J)	—	0.081 (J)	—	0.28 (J)	0.27 (J)	0.25 (J)	0.12 (J)	0.28 (J)	—	—	—	0.32 (J)	—	—	—
RE16-10-2991	16-609244	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14806	16-611848	0.0–0.5	Fill	—	0.041 (J)	—	0.064 (J)	—	0.2 (J)	0.18 (J)	0.17 (J)	0.12 (J)	0.22 (J)	0.087 (J)	—	—	0.22 (J)	—	—	—
RE16-10-14808	16-611849	0.0–0.5	Fill	—	—	—	0.061 (J)	—	0.27 (J)	0.25 (J)	0.24 (J)	0.14 (J)	0.28 (J)	—	—	—	0.29 (J)	0.042 (J)	—	—
RE16-10-14810	16-611850	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	0.2 (J)	—	—	—	—	—	—
RE16-10-14811	16-611850	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.8
RE16-10-14812	16-611851	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14813	16-611851	5.5–6.0	Qbt 4	—	—	—	—	—	0.061 (J)	0.047 (J)	0.043 (J)	—	0.056 (J)	1.4	—	—	0.058 (J)	—	—	—
RE16-10-14816	16-611853	0.0–0.5	Soil	—	—	—	0.053 (J)	—	0.14 (J)	0.12 (J)	0.13 (J)	0.07 (J)	0.15 (J)	—	—	—	0.16 (J)	—	—	—
RE16-10-14821	16-611856	0.0–0.5	Soil	—	—	NA[h]	—	—	—	—	—	—	—	—	—	0.00084 (J)	—	—	—	—

Table 8.17-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Phenol	Pyrene	RDX	Toluene	Trinitrotoluene[2,4,6-]	Tris (o-cresyl) phosphate	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**68400**	**103**	**24400**	**24400**	**23.4**	**1090**	**4100**[e]	**252**	**20500**	**205000**	**18300**	**174**	**57900**	**469**	**na**	**31500**	**3610**
Recreational SSL[f]				**39900**	**82.5**	**13900**	**13900**	**30.1**	**4520**	**3170**	**1950**	**12000**	**120000**	**10400**	**233**	**60800**	**301**	**na**	**248000**	**27800**
Residential SSL[a]				**6110**	**15.7**	**2290**	**2290**	**6.21**	**199**	**310**[e]	**45**	**1830**	**18300**	**1720**	**44.2**	**5570**	**35.9**	**na**	**9550**	**1090**
RE16-10-2966	16-609232	1.5–2.0	Soil	—	—	0.0412 (J)	—	—	—	—	—	0.0298 (J)	—	0.0417 (J)	—	—	—	—	—	—
RE16-10-2967	16-609232	5.5–6.0	Soil	—	—	0.192	0.0164 (J)	0.176	—	—	—	0.133	—	0.173	—	—	—	—	—	—
RE16-10-2968	16-609233	0.0–0.5	Soil	—	—	0.0145 (J)	—	—	—	—	—	—	—	0.0128 (J)	—	—	—	—	—	—
RE16-10-2970	16-609234	0.0–0.5	Soil	—	—	0.0638 (J)	—	—	—	—	—	—	—	0.0728 (J)	—	—	—	—	—	—
RE16-10-2972	16-609235	0.0–0.5	Soil	—	—	3.06	0.318 (J)	0.293 (J)	—	0.107 (J)	0.28 (J)	2.39	—	3.14	—	—	—	—	—	—
RE16-10-2973	16-609235	1.5–2.0	Soil	—	—	2.36	0.371	0.238	—	0.154	0.542	2.21	—	2.3	—	—	—	—	—	—
RE16-10-2974	16-609236	0.0–0.5	Soil	—	—	0.0517 (J)	—	—	—	—	—	—	—	0.0545 (J)	—	—	—	—	—	—
RE16-10-2978	16-609238	1.0–2.0	Fill	—	—	0.198	—	0.0749	—	—	—	0.129	—	0.177	—	—	—	—	—	—
RE16-10-2979	16-609238	6.5–7.0	Qbt 4	—	—	0.0574	—	0.0144 (J)	—	—	—	0.0413 (J)	—	0.0432	—	—	—	—	—	—
RE16-10-2980	16-609239	1.0–1.5	Soil	—	—	0.22	0.0179 (J)	0.118	—	—	—	0.165	—	0.205	—	—	—	—	0.000398 (J)	—
RE16-10-2981	16-609239	6.5–7.0	Soil	—	—	0.0363 (J)	—	0.0133 (J)	—	—	—	0.0227 (J)	—	0.0357 (J)	—	—	—	—	—	—
RE16-10-2982	16-609240	1.0–1.5	Soil	—	—	0.101	—	0.0334 (J)	—	—	—	0.0474	—	0.0932	—	—	—	—	—	—
RE16-10-2983	16-609240	6.5–7.0	Fill	—	—	0.429	0.0566	0.0578	0.0047 (J)	0.0356 (J)	0.136	0.339	—	0.305	—	—	—	—	—	—
RE16-10-2984	16-609241	1.0–1.5	Soil	—	—	0.649	0.116	0.14	—	0.0693	0.24	0.614	—	0.56	—	0.00164	—	—	—	0.000776 (J)
RE16-10-2985	16-609241	6.5–7.0	Soil	—	—	0.475	0.0699	0.0906	—	0.0339 (J)	0.107	0.429	—	0.383	—	—	—	—	—	—
RE16-10-2986	16-609242	0.0–0.5	Soil	—	—	0.74	0.059 (J)	0.081 (J)	—	—	—	0.5	—	0.58	0.024 (J-)	—	0.078 (J)	0.83	NA	NA
RE16-10-2987	16-609242	5.5–6.0	Soil	—	0.0047 (J)	0.088 (J)	—	—	—	—	—	0.061 (J)	—	0.069 (J)	—	—	0.067 (J)	0.22	NA	NA
RE16-10-2988	16-609242	8.5–9.0	Soil	—	—	0.046 (J)	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA
RE16-10-2989	16-609244	0.0–0.5	Soil	—	0.007 (J)	0.73	—	0.1 (J)	—	—	—	0.45 (J)	—	0.59	—	—	0.021 (J)	0.25	NA	NA
RE16-10-2991	16-609244	8.5–9.0	Qbt 4	—	—	0.041 (J)	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA
RE16-10-14806	16-611848	0.0–0.5	Fill	0.086 (J)	—	0.49	0.036 (J)	0.082 (J)	—	—	—	0.29 (J)	0.11 (J)	0.41	—	—	—	NA	NA	NA
RE16-10-14808	16-611849	0.0–0.5	Fill	—	—	0.54	—	0.11 (J)	—	—	—	0.29 (J)	—	0.47	—	—	—	NA	NA	NA
RE16-10-14810	16-611850	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	NA
RE16-10-14811	16-611850	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	NA
RE16-10-14812	16-611851	0.0–0.5	Fill	—	—	0.048 (J)	—	—	—	—	—	—	—	0.04 (J)	—	—	—	NA	NA	NA
RE16-10-14813	16-611851	5.5–6.0	Qbt 4	—	—	0.16 (J)	—	—	—	—	—	0.086 (J)	—	0.11 (J)	—	—	—	NA	NA	NA

Table 8.17-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Phenol	Pyrene	RDX	Toluene	Trinitrotoluene[2,4,6-]	Tris (o-cresyl) phosphate	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**68400**	**103**	**24400**	**24400**	**23.4**	**1090**	**4100**[e]	**252**	**20500**	**205000**	**18300**	**174**	**57900**	**469**	**na**	**31500**	**3610**
Recreational SSL[f]				**39900**	**82.5**	**13900**	**13900**	**30.1**	**4520**	**3170**	**1950**	**12000**	**120000**	**10400**	**233**	**60800**	**301**	**na**	**248000**	**27800**
Residential SSL[a]				**6110**	**15.7**	**2290**	**2290**	**6.21**	**199**	**310**[e]	**45**	**1830**	**18300**	**1720**	**44.2**	**5570**	**35.9**	**na**	**9550**	**1090**
RE16-10-14816	16-611853	0.0–0.5	Soil	—	—	0.38 (J)	—	0.053 (J)	—	—	—	0.27 (J)	—	0.3 (J)	—	—	—	NA	NA	NA
RE16-10-14821	16-611856	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	NA	0.0022 (J)	—	NA	NA	NA

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] na = Not available.

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSL from EPA (2007, 099314).

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 8.17-4
Summary of Radionuclides Detected at the Liquid Waste Trunk Line

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Plutonium-238	Plutonium-239/240	Sodium-22	Uranium-235/236
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**0.09**
Soil BV/FV[a]				**1.65**	**0.023**	**0.054**	**na**	**0.2**
Industrial SAL[c]				**23**	**240**	**210**	**6.5**	**87**
Recreational SAL[c]				**210**	**330**	**300**	**58**	**520**
Residential SAL[c]				**5.6**	**37**	**33**	**1.6**	**17**
RE16-10-2966	16-609232	1.5–2.0	Soil	0.135	—[d]	—	—	—
RE16-10-2973	16-609235	1.5–2.0	Soil	0.131	—	—	—	—
RE16-10-2977	16-609237	5.5–6.0	Qbt 4	—	—	—	—	0.095
RE16-10-14802	16-609237	8.5–9.0	Qbt 4	—	0.0229	—	—	—
RE16-10-2979	16-609238	6.5–7.0	Qbt 4	—	—	—	—	0.0919
RE16-10-2980	16-609239	1.0–1.5	Soil	—	—	0.0369	—	—
RE16-10-2986	16-609242	0.0–0.5	Soil	—	0.0303	—	—	—
RE16-10-2987	16-609242	5.5–6.0	Soil	0.225	—	0.0294	—	—
RE16-10-2988	16-609242	8.5–9.0	Soil	0.129	—	—	—	—
RE16-10-14809	16-611849	5.5–6.0	Soil	—	0.027	—	—	—
RE16-10-14810	16-611850	0.0–0.5	Fill	—	0.0288	—	—	—
RE16-10-14812	16-611851	0.0–0.5	Fill	—	—	—	0	—
RE16-10-14822	16-611856	5.5–6.0	Qbt 4	—	0.036	—	—	—

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

[d] — = Not detected or not detected above BV/FV.

Table 9.2-1
Summary of Samples Collected and Analyses Requested at AOC C-16-068

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Boron	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-97-0007	16-03028	0.0–0.5	Soil	—*	—	3088R	—	—	3086R, 3087R	—	—	3085R	3085R	3086R
RE16-10-3205	16-609298	0.0–0.5	Soil	10-1757	10-1756	10-1755	10-1757	10-1757	10-1756	10-1756	10-1756	10-1755	10-1755	—
RE16-10-3207	16-609299	0.0–0.5	Fill	10-1757	10-1756	10-1755	10-1757	10-1757	10-1756	10-1756	10-1756	10-1755	10-1755	—
RE16-10-3208	16-609299	5.5–6.0	Soil	10-1851	10-1850	10-1852	10-1851	10-1851	10-1850	10-1850	10-1850	10-1852	10-1852	—
RE16-10-12616	16-611438	0.0–0.5	Soil	10-1757	10-1756	10-1755	10-1757	10-1757	10-1756	10-1756	10-1756	10-1755	10-1755	—
RE16-10-12617	16-611438	5.5–6.0	Qbt 4	10-1851	10-1850	10-1852	10-1851	10-1851	10-1850	10-1850	10-1850	10-1852	10-1852	—
RE16-10-12618	16-611439	0.0–0.5	Soil	10-1757	10-1756	10-1755	10-1757	10-1757	10-1756	10-1756	10-1756	10-1755	10-1755	—
RE16-10-12619	16-611439	5.5–6.0	Qbt 4	10-1851	10-1850	10-1852	10-1851	10-1851	10-1850	10-1850	10-1850	10-1852	10-1852	—

*— = Analyses not requested.

Table 9.2-2
Summary of Inorganic Chemicals above BVs at AOC C-16-068

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Cadmium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Mercury	Perchlorate	Selenium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**46**	**1.63**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**	**0.1**	**na**	**0.3**	**2.40**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**295**	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**0.1**	**na**	**1.52**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**224000**	**1120**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**	**310[e]**	**795**	**5680**	**3410**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**158000**	**784**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**	**238**	**555**	**3960**	**2380**	**3960**	**238000[g]**
Residential SSL[c]				**78100**	**31.3**	**15600**	**77.9**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**	**23[e]**	**54.8**	**391**	**235**	**391**	**23500**
0316-97-0007	16-03028	0.0–0.5	Soil	—[g]	4.48 (U)	—	0.448 (U)	—	—	17.8	1.26 (U)	NA[h]	—	43	0.102 (J)	NA	—	2.66	—	58.6
RE16-10-3205	16-609298	0.0–0.5	Soil	—	1.15 (U)	—	0.612 (U)	—	—	—	NA	0.716 (J-)	—	41.7 (J)	—	—	—	NA	—	—
RE16-10-3207	16-609299	0.0–0.5	Fill	—	1.89 (U)	—	0.519 (U)	—	—	37.9	NA	—	—	43.2 (J)	—	—	—	NA	—	65.4
RE16-10-3208	16-609299	5.5–6.0	Soil	—	1.11 (U)	—	0.556 (U)	—	—	—	NA	1.32	—	—	—	—	—	NA	—	—
RE16-10-12616	16-611438	0.0–0.5	Soil	—	1.22 (U)	—	0.626 (U)	—	—	27.6	NA	0.642 (J-)	—	43.7 (J)	1.32	—	—	NA	—	69.1
RE16-10-12617	16-611438	5.5–6.0	Qbt 4	7530	1.05 (U)	73.1	—	8.95 (J)	3.75	5.17	NA	2.67	14700	14.2	—	0.00065 (J)	1.03 (UJ)	NA	17.8	—
RE16-10-12618	16-611439	0.0–0.5	Soil	—	1.45 (U)	—	0.699 (U)	—	—	39	NA	0.746 (J-)	—	102 (J)	0.485	—	—	NA	—	150
RE16-10-12619	16-611439	5.5–6.0	Qbt 4	—	1.02 (U)	46.8	—	—	—	—	NA	2.47	—	—	—	—	1.08 (UJ)	NA	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 9.2-3
Summary of Organic Chemicals Detected at AOC C-16-068

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	Acetone	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Di-n-butylphthalate	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
Industrial SSL[a]				**36700**	**18300[b]**	**851000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**2340**	**68400**	**24400**	**23.4**	**20500**	**18300**
Recreational SSL[c]				**20800**	**7970[b]**	**702000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**301**	**1830**	**3010**	**39900**	**13900**	**30.1**	**12000**	**10400**
Residential SSL[a]				**3440**	**1720[b]**	**67500**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**621**	**6110**	**2290**	**6.21**	**1830**	**1720**
0316-97-0007	16-03028	0.0–0.5	Soil	0.048 (J)	0.094 (J)	—[d]	0.12 (J)	0.27 (J)	0.3 (J)	0.18 (J)	0.12 (J)	0.37 (J)	0.21 (J)	0.22 (J)	0.15 (J)	0.15 (J)	—	0.19 (J)
RE16-10-3205	16-609298	0.0–0.5	Soil	—	—	—	—	0.0136 (J)	0.0377 (J)	—	0.0147 (J)	0.133 (J)	0.0283 (J)	—	0.0352 (J)	—	—	0.0348 (J)
RE16-10-3207	16-609299	0.0–0.5	Fill	—	—	—	—	0.0242 (J)	0.0433	—	0.0173 (J)	0.2 (J)	0.0372 (J)	0.104 (J)	0.0432	—	—	0.0527
RE16-10-3208	16-609299	5.5–6.0	Soil	—	—	—	—	—	—	—	—	0.175 (J)	—	—	—	—	—	—
RE16-10-12616	16-611438	0.0–0.5	Soil	—	—	—	—	0.0592	0.0742	0.0384 (J)	0.0279 (J)	0.266 (J)	0.0508	—	0.0157 (J)	0.033 (J)	—	0.0273 (J)
RE16-10-12618	16-611439	0.0–0.5	Soil	—	—	—	—	0.0295 (J)	0.141	0.0486	0.0394 (J)	0.228 (J)	0.0914	—	0.117	0.0395 (J)	0.0324 (J)	0.0996
RE16-10-12619	16-611439	5.5–6.0	Qbt 4	—	—	0.00837	—	—	—	—	—	9.78	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

Table 9.3-1
Summary of Samples Collected and Analyses Requested at SWMU 16-029(g2)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-3668	16-609456	5.0–9.0	Qbt 4	10-2610	10-2609	10-2608	10-2610	10-2610	10-2609	10-2609	10-2608	10-2608	—*
RE16-10-3669	16-609456	10.0–12.0	Qbt 4	10-2610	10-2609	10-2608	10-2610	10-2610	10-2609	10-2609	10-2608	10-2608	—
RE16-10-3670	16-609456	15.0–17.0	Qbt 4	10-2610	10-2609	10-2608	10-2610	10-2610	10-2609	10-2609	10-2608	10-2608	—
RE16-10-3671	16-609456	19.0–20.0	Qbt 4	10-2610	10-2609	10-2608	10-2610	10-2610	10-2609	10-2609	10-2608	10-2608	—

*— = Analyses not requested.

Table 9.3-2
Summary of Inorganic Chemicals above BVs at SWMU 16-029(g2)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Lead	Mercury	Nickel	Selenium	Silver	Uranium
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**11.2**	**0.1**	**6.58**	**0.3**	**1**	**2.4**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**22.3**	**0.1**	**15.4**	**1.52**	**1**	**1.82**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**800**	**310[e]**	**22700**	**5680**	**5680**	**3410**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**560**	**238**	**15800**	**3960**	**3960**	**2380**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**400**	**23[e]**	**1560**	**391**	**391**	**235**
RE16-10-3668	16-609456	5.0–9.0	Qbt 4	—[g]	—	2.8	—	—	—	—	—	NA[h]	4.7	—	—	—	5.7	—	NA
RE16-10-3669	16-609456	10.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	NA	1.4	—	—	—	2.4	—	NA
RE16-10-3670	16-609456	15.0–17.0	Qbt 4	—	0.55 (U)	—	—	—	—	—	—	NA	0.53 (J)	—	—	—	1.5	—	NA
RE16-10-3671	16-609456	19.0–20.0	Qbt 4	—	0.54 (U)	—	—	—	—	—	—	NA	0.55 (J)	—	—	—	1.3	—	NA

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 9.3-3
Summary of Organic Chemicals Detected at SWMU 16-029(g2)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**851000**	**469**
Recreational SSL[b]				**702000**	**301**
Residential SSL[a]				**67500**	**35.9**
RE16-10-3668	16-609456	5.0–9.0	Qbt 4	—[c]	0.0065 (J+)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSLs from LANL (2010, 108613).

[c] — = Not detected or not detected above BV.

Table 9.4-1
Summary of Samples Collected and Analyses Requested at AOC C-16-074

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-99-0013	16-05820	0.0–0.5	Soil	—*	—	—	—	—	5211R	—	—	—	—
RE16-98-0041	16-05820	2.0–4.0	Soil	—	—	4379R	—	—	4378R, 4380R	—	4377R	4377R	4378R
RE16-98-0042	16-05820	4.0–6.0	Qbt 4	—	—	4379R	—	—	4378R, 4380R	—	4377R	4377R	—
RE16-99-0006	16-05820	7.6—8.0	Qbt 4	—	—	—	—	—	5210R	—	—	—	—
RE16-99-0022	16-05820	10.0–11.0	Qbt 4	—	—	—	—	—	5461R	—	—	—	—
RE16-10-3668	16-609456	5.0–9.0	Qbt 4	10-2610	10-2609	10-2608	10-2610	10-2610	10-2609	10-2609	10-2608	10-2608	—
RE16-10-3669	16-609456	10.0–12.0	Qbt 4	10-2610	10-2609	10-2608	10-2610	10-2610	10-2609	10-2609	10-2608	10-2608	—
RE16-10-3670	16-609456	15.0–17.0	Qbt 4	10-2610	10-2609	10-2608	10-2610	10-2610	10-2609	10-2609	10-2608	10-2608	—
RE16-10-3671	16-609456	19.0–20.0	Qbt 4	10-2610	10-2609	10-2608	10-2610	10-2610	10-2609	10-2609	10-2608	10-2608	—

*— = Analyses not requested.

Table 9.4-2
Summary of Inorganic Chemicals above BVs at AOC C-16-074

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Lead	Mercury	Nickel	Selenium	Silver	Uranium
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**7.14**	**3.14**	**4.66**	**0.5**	**na**[b]	**11.2**	**0.1**	**6.58**	**0.3**	**1**	**2.4**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**22.3**	**0.1**	**15.4**	**1.52**	**1**	**1.82**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**2920**[d]	**300**[e]	**45400**	**22700**	**68100**	**800**	**310**[e]	**22700**	**5680**	**5680**	**3410**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**1910**[d]	**238**	**31700**	**15800**	**47500**	**560**	**238**	**15800**	**3960**	**3960**	**2380**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**219**[d]	**23**[e]	**3130**	**1560**	**4690**	**400**	**23**[e]	**1560**	**391**	**391**	**235**
RE16-98-0041	16-05820	2.0–4.0	Soil	—[g]	NA[h]	—	—	0.56 (U)	—	—	20	0.56 (U)	NA	—	0.11 (U)	—	—	2.2 (UJ)	17.7 (U)
RE16-98-0042	16-05820	4.0–6.0	Qbt 4	—	NA	—	—	—	91	—	25	NA	NA	—	0.11 (U)	22 (J-)	1.1 (UJ)	2.1 (UJ)	16.7 (U)
RE16-99-0006	16-05820	7.6—8.0	Qbt 4	7900	—	2.9	70	—	—	3.4	13	NA	NA	21	0.11 (U)	—	1.1 (U)	—	NA
RE16-10-3668	16-609456	5.0–9.0	Qbt 4	—	—	2.8	—	—	—	—	—	NA	4.7	—	—	—	5.7	—	NA
RE16-10-3669	16-609456	10.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	NA	1.4	—	—	—	2.4	—	NA
RE16-10-3670	16-609456	15.0–17.0	Qbt 4	—	0.55 (U)	—	—	—	—	—	—	NA	0.53 (J)	—	—	—	1.5	—	NA
RE16-10-3671	16-609456	19.0–20.0	Qbt 4	—	0.54 (U)	—	—	—	—	—	—	NA	0.55 (J)	—	—	—	1.3	—	NA

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] SSL for chromium hexavalent ion.
[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[f] SSLs from LANL (2010, 108613).
[g] — = Not detected or not detected above BV.
[h] NA = Not analyzed.

Table 9.4-3
Summary of Organic Chemicals Detected at AOC C-16-074

Sample ID	Location ID	Depth (ft)	Media	Acetone	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**851000**	**469**
Recreational SSL[b]				**702000**	**301**
Residential SSL[a]				**67500**	**35.9**
RE16-98-0041	16-05820	2.0–4.0	Soil	0.065	—[c]
RE16-10-3668	16-609456	5.0–9.0	Qbt 4	—	0.0065 (J+)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSLs from LANL (2010, 108613).

[c] — = Not detected or not detected above BV.

Table 9.5-1
Summary of Samples Collected and Analyses Requested at SWMU 16-029(x)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	PCB	Perchlorate	PEST	PESTPCB	SVOC	URANIUM	VOC	Cyanide (Total)
RE16-98-0051	16-03054	3.0–3.5	Qbt 4	—*	—	4507R	—	—	4508R, 4509R	—	—	—	—	4506R	—	4506R	—
RE16-98-0017	16-03054	5.0–6.0	Qbt 4	—	—	4492R	—	—	4493R, 4494R	—	—	—	—	4491R	—	4491R	—
0316-97-0021	16-03058	4.75–5.0	Soil	—	—	3889R	—	—	3890R, 3891R	3888R	-	3888R	-	3888R	—	3888R	—
RE16-98-0046	16-03064	4.25–4.5	Qbt 4	—	—	4497R	—	—	4498R, 4499R	—	—	—	—	4496R	—	4496R	—
0316-97-0020	16-03066	5.0–5.5	Soil	—	—	3889R	—	—	3890R, 3891R	3888R	—	3888R	—	3888R	—	3888R	—
RE16-98-0053	16-03068	3.0–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	-	—	4506R	—
RE16-98-0020	16-03068	3.5–4.5	Soil	—	—	4492R	—	—	4493R, 4494R	—	—	—	—	4491R	—	—	—
RE16-98-0021	16-03068	4.5–5.5	Soil	—	—	4492R	—	—	4493R, 4494R	—	—	—	—	4491R	—	4491R	—
0316-97-0017	16-03071	4.0–4.33	Soil	—	—	3872R	—	—	3873R, 3874R	-	-	-	3871R	3871R	—	3871R	—
RE16-98-0018	16-03072	3.5–4.5	Qbt 4	—	—	4492R	—	—	4493R, 4494R	—	—	—	—	4491R	—	—	—
RE16-98-0052	16-03072	3.5–4.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	4506R	—
RE16-98-0019	16-03072	5.0–5.5	Soil	—	—	4492R	—	—	4493R, 4494R	—	—	—	—	4491R	—	4491R	—
0316-97-0015	16-03077	3.5–4.0	Soil	—	—	3872R	—	—	3873R, 3874R	—	—	—	3871R	3871R	—	3871R	—
0316-97-0014	16-03082	3.0–3.5	Soil	—	—	3872R	—	—	3873R, 3874R	—	—	—	3871R	3871R	—	3871R	—
0316-97-0012	16-03088	4.5–5.0	Soil	—	—	3872R	—	—	3873R, 3874R	—	—	—	3871R	3871R	—	3871R	—
0316-97-0013	16-03088	4.5–5.0	Soil	—	—	3872R	—	—	3873R, 3874R	—	—	—	3871R	3871R	—	3871R	—
0316-97-0011	16-03092	4.0–4.5	Soil	—	—	3868R	—	—	3869R, 3870R	3867R	—	3867R	—	3867R	—	3867R	—
0316-97-0010	16-03094	4.5–5.0	Soil	—	—	3868R	—	—	3869R, 3870R	3867R	—	3867R	—	3867R	—	3867R	—
0316-97-0009	16-03100	3.0–3.5	Soil	—	—	3868R	—	—	3869R, 3870R	3867R	—	3867R	—	3867R	—	3867R	—
0316-97-0008	16-03104	1.5–2.0	Soil	—	—	3868R	—	—	3869R, 3870R	3867R	—	3867R	—	3867R	—	3867R	—
0316-97-0027	16-03148	0.0–1.5	Soil	—	—	3242R	—	—	3241R	—	—	—	—	3240R	3243R	3240R	3241R
0316-97-0023	16-03153	0.0–2.5	Soil	—	—	3149R	—	—	3150R, 3151R	—	—	—	—	3148R	—	3148R	3150R
0316-97-0024	16-03153	10.0–10.75	Qbt 4	—	—	3149R	—	—	3150R, 3151R	—	—	—	—	3148R	—	3148R	3150R
0316-97-0025	16-03156	0.0–2.5	Qbt 4	—	—	3175R	—	—	3176R	—	—	—	—	3174R	3177R	3174R	3176R
0316-97-0026	16-03156	9.7—11.01	Qbt 4	—	—	3185R	—	—	3186R, 3187R	—	—	—	—	3184R	—	3184R	3186R
0316-97-0028	16-03174	0.0–1.5	Fill	—	—	3242R	—	—	3241R	—	—	—	—	3240R	3243R	3240R	3241R
RE16-98-0016	16-05845	3.5–4.5	Soil	—	—	4492R	—	—	4493R, 4494R	—	—	—	—	4491R	—	—	—
RE16-10-13752	16-609461	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	-	—	—	—
RE16-10-3719	16-609461	0.0–0.5	Soil	10-1700	10-1699	10-1698	10-1700	10-1700	10-1699	—	10-1699	—	—	10-1698	—	10-1698	10-1699
RE16-10-3720	16-609461	9.5–13.0	Qbt 4	10-2499	10-2498	10-2497	10-2499	10-2499	10-2498	—	10-2498	10-2497	—	10-2497	—	10-2497	10-2498
RE16-10-3721	16-609461	16.5–19.0	Qbt 4	10-2499	10-2498	10-2497	10-2499	10-2499	10-2498	—	10-2498	10-2497	—	10-2497	—	10-2497	10-2498
RE16-10-13753	16-609462	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3722	16-609462	0.0–0.5	Soil	10-1700	10-1699	10-1698	10-1700	10-1700	10-1699	—	10-1699	—	—	10-1698	—	10-1698	10-1699
RE16-10-3723	16-609462	11.5–13.0	Qbt 4	10-2499	10-2498	10-2497	10-2499	10-2499	10-2498	—	10-2498	10-2497	—	10-2497	—	10-2497	10-2498

Table 9.5-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	PCB	Perchlorate	PEST	PESTPCB	SVOC	URANIUM	VOC	Cyanide (Total)
RE16-10-3724	16-609462	16.5–18.0	Qbt 4	10-2499	10-2498	10-2497	10-2499	10-2499	10-2498	—	10-2498	10-2497	—	10-2497	—	10-2497	10-2498
RE16-10-13757	16-609463	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3725	16-609463	0.0–0.5	Soil	10-1700	10-1699	10-1698	10-1700	10-1700	10-1699	—	10-1699	—	—	10-1698	—	10-1698	10-1699
RE16-10-3726	16-609463	11.0–13.0	Qbt 4	10-2537	10-2536	10-2535	10-2537	10-2537	10-2536	—	10-2536	10-2535	—	10-2535	—	10-2535	10-2536
RE16-10-3727	16-609463	16.5–18.0	Qbt 4	10-2537	10-2536	10-2535	10-2537	10-2537	10-2536	—	10-2536	10-2535	—	10-2535	—	10-2535	10-2536
RE16-10-13755	16-609464	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3730	16-609464	0.0–0.5	Soil	10-1700	10-1699	10-1698	10-1700	10-1700	10-1699	—	10-1699	—	—	10-1698	—	10-1698	10-1699
RE16-10-3728	16-609464	9.2—13.5	Qbt 4	10-2537	10-2536	10-2535	10-2537	10-2537	10-2536	—	10-2536	10-2535	—	10-2535	—	10-2535	10-2536
RE16-10-3729	16-609464	16.5–18.0	Qbt 4	10-2537	10-2536	10-2535	10-2537	10-2537	10-2536	—	10-2536	10-2535	—	10-2535	—	10-2535	10-2536
RE16-10-13751	16-609465	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3731	16-609465	0.0–0.5	Soil	10-1700	10-1699	10-1698	10-1700	10-1700	10-1699	—	10-1699	—	—	10-1698	—	10-1698	10-1699
RE16-10-3732	16-609465	11.0–13.0	Qbt 4	10-2537	10-2536	10-2535	10-2537	10-2537	10-2536	—	10-2536	10-2535	—	10-2535	—	10-2535	10-2536
RE16-10-3733	16-609465	16.5–18.0	Qbt 4	10-2537	10-2536	10-2535	10-2537	10-2537	10-2536	—	10-2536	10-2535	—	10-2535	—	10-2535	10-2536
RE16-10-13750	16-609466	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3734	16-609466	0.0–0.5	Fill	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-3736	16-609466	10.0–12.0	Qbt 4	10-2537	10-2536	10-2535	10-2537	10-2537	10-2536	—	10-2536	10-2535	—	10-2535	—	10-2535	10-2536
RE16-10-3735	16-609466	16.5–18.0	Qbt 4	10-2536	10-2536	10-2535	10-2536	10-2536	10-2536	—	10-2536	10-2535	—	10-2535	—	10-2535	10-2536
RE16-10-13749	16-609467	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3737	16-609467	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3738	16-609467	11.5–13.0	Qbt 4	10-2367	10-2367	10-2366	10-2367	10-2367	10-2367	—	10-2367	10-2366	—	10-2366	—	10-2366	10-2367
RE16-10-3739	16-609467	15.5–17.5	Qbt 4	10-2367	10-2367	10-2366	10-2367	10-2367	10-2367	—	10-2367	10-2366	—	10-2366	—	10-2366	10-2367
RE16-10-13754	16-609468	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3740	16-609468	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-3741	16-609468	11.0–14.0	Qbt 4	10-2367	10-2367	10-2366	10-2367	10-2367	10-2367	—	10-2367	10-2366	—	10-2366	—	10-2366	10-2367
RE16-10-3742	16-609468	16.5–18.0	Qbt 4	10-2367	10-2367	10-2366	10-2367	10-2367	10-2367	—	10-2367	10-2366	—	10-2366	—	10-2366	10-2367
RE16-10-3743	16-609469	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-3746	16-609470	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-3749	16-609471	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-3752	16-609472	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-13735	16-609473	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3755	16-609473	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-3756	16-609473	11.0–13.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-3757	16-609473	16.5–18.5	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13738	16-609474	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3758	16-609474	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740

Table 9.5-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	PCB	Perchlorate	PEST	PESTPCB	SVOC	URANIUM	VOC	Cyanide (Total)
RE16-10-3759	16-609474	11.0–13.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-3760	16-609474	15.0–17.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13736	16-609475	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3761	16-609475	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-3762	16-609475	11.5–15.0	Qbt 4	10-2287	10-2287	10-2286	10-2287	10-2287	10-2287	—	10-2287	10-2286	—	10-2286	—	10-2286	10-2287
RE16-10-3763	16-609475	18.0–20.0	Qbt 4	10-2287	10-2287	10-2286	10-2287	10-2287	10-2287	—	10-2287	10-2286	—	10-2286	—	10-2286	10-2287
RE16-10-13756	16-609476	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3764	16-609476	0.0–0.5	Soil	10-1741	10-1740	10-1739	10-1741	10-1741	10-1740	—	10-1740	—	—	10-1739	—	10-1739	10-1740
RE16-10-3765	16-609476	10.0–12.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-3766	16-609476	15.0–18.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13737	16-609477	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3767	16-609477	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3768	16-609477	11.5–13.5	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13739	16-609478	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3770	16-609478	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3771	16-609478	10.0–12.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-3772	16-609478	15.5–17.5	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13741	16-609479	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3773	16-609479	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3774	16-609479	10.0–12.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-3775	16-609479	15.0–16.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13740	16-609480	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3776	16-609480	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3777	16-609480	10.0–12.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-3778	16-609480	16.5–18.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13742	16-609481	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3779	16-609481	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3780	16-609481	10.0–13	Qbt 4	10-2527	10-2526	10-2525	10-2527	10-2527	10-2526	—	10-2526	10-2525	—	10-2525	—	10-2525	10-2526
RE16-10-3781	16-609481	16.5–18.5	Qbt 4	10-2527	10-2526	10-2525	10-2527	10-2527	10-2526	—	10-2526	10-2525	—	10-2525	—	10-2525	10-2526
RE16-10-3782	16-609482	0.0–0.0	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-13743	16-609482	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3783	16-609482	10.0–12.0	Qbt 4	10-2527	10-2526	10-2525	10-2527	10-2527	10-2526	—	10-2526	10-2525	—	10-2525	—	10-2525	10-2526
RE16-10-3784	16-609482	15.0–17.0	Qbt 4	10-2527	10-2526	10-2525	10-2527	10-2527	10-2526	—	10-2526	10-2525	—	10-2525	—	10-2525	10-2526
RE16-10-13744	16-609483	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-13747	16-609483	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—

Table 9.5-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	PCB	Perchlorate	PEST	PESTPCB	SVOC	URANIUM	VOC	Cyanide (Total)
RE16-10-3785	16-609483	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3786	16-609483	11.5–13.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13745	16-609484	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-13748	16-609484	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2359	—	—	—	—	—
RE16-10-3788	16-609484	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3789	16-609484	10.0–11.5	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-3790	16-609484	15.0–17.0	Qbt 4	10-2358	10-2357	10-2356	10-2358	10-2358	10-2357	—	10-2357	10-2356	—	10-2356	—	10-2356	10-2357
RE16-10-13746	16-609485	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10-2286	—	—	—	—	—
RE16-10-3791	16-609485	0.0–0.5	Soil	10-1754	10-1753	10-1752	10-1754	10-1754	10-1753	—	10-1753	—	—	10-1752	—	10-1752	10-1753
RE16-10-3792	16-609485	17.5–20.0	Qbt 4	10-2287	10-2287	10-2286	10-2287	10-2287	10-2287	—	10-2287	10-2286	—	10-2286	—	10-2286	10-2287
RE16-10-14023	16-611771	0.0–0.5	Soil	10-2655	10-2655	10-2654	10-2655	10-2655	10-2655	—	10-2655	10-2654	—	10-2654	—	10-2654	10-2655
RE16-10-14024	16-611771	3.0–3.5	Qbt 4	10-2655	10-2655	10-2654	10-2655	10-2655	10-2655	—	10-2655	10-2654	—	10-2654	—	10-2654	10-2655
RE16-98-0047	16-03064	5.25–5.5	Qbt 4	—	—	4507R	—	—	4508R, 4509R	—	—	—	—	4506R	—	4506R	—

*— = Analyses not requested.

Table 9.5-2
Summary of Inorganic Chemicals above BVs at SWMU 16-029(x)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Boron	Bromide	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**na**[b]	**na**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**na**	**na**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**227000**	**na**	**1120**	**na**	**2920**[d]	**300**[e]	**45400**	**22700**	**68100**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**158000**	**na**	**784**	**na**	**1910**[d]	**238**	**31700**	**15800**	**47500**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**15600**	**na**	**77.9**	**na**	**219**[d]	**23**[e]	**3130**	**1560**	**4690**
RE16-98-0051	16-03054	3.0–3.5	Qbt 4	—[g]	11 (UJ)	—	61	—	NA[h]	—	—	—	—	—	NA	NA
RE16-98-0017	16-03054	5.0–6.0	Qbt 4	—	12 (UJ)	—	110 (J-)	—	NA	—	—	—	—	6.3	NA	NA
0316-97-0021	16-03058	4.75–5.0	Soil	—	—	—	—	14.1	NA	—	—	—	—	—	NA	NA
RE16-98-0046	16-03064	4.25–4.5	Qbt 4	—	12 (UJ)	—	57	—	NA	—	—	—	—	—	NA	NA
0316-97-0020	16-03066	5.0–5.5	Soil	—	—	—	—	16.8	NA	—	—	—	—	—	NA	NA
RE16-98-0020	16-03068	3.5–4.5	Soil	—	12 (UJ)	—	—	—	NA	0.59 (U)	—	—	—	—	NA	NA
RE16-98-0021	16-03068	4.5–5.5	Soil	—	12 (UJ)	—	—	—	NA	0.59 (U)	—	—	—	—	NA	NA
0316-97-0017	16-03071	4.0–4.33	Soil	—	—	—	355	9.8	NA	—	—	—	—	—	NA	NA
RE16-98-0018	16-03072	3.5–4.5	Qbt 4	12000	12 (UJ)	2.9 (J-)	590 (J-)	—	NA	—	—	—	—	5.6	NA	NA
RE16-98-0019	16-03072	5.0–5.5	Soil	—	11 (UJ)	—	600 (J-)	—	NA	0.57 (U)	—	—	—	—	NA	NA
0316-97-0015	16-03077	3.5–4.0	Soil	—	—	—	444	5.8	NA	—	—	—	—	26.3	NA	NA
0316-97-0014	16-03082	3.0–3.5	Soil	—	—	—	—	4.9	NA	—	—	—	—	—	NA	NA
0316-97-0012	16-03088	4.5–5.0	Soil	—	—	—	—	7.5	NA	—	—	—	—	25.2	NA	NA
0316-97-0013	16-03088	4.5–5.0	Soil	—	—	—	—	5.8	NA	—	—	—	—	19.2	NA	NA
0316-97-0011	16-03092	4.0–4.5	Soil	—	—	—	—	5.2	NA	—	—	—	—	—	NA	NA
0316-97-0010	16-03094	4.5–5.0	Soil	—	—	—	—	6	NA	—	—	—	—	37.5	NA	NA
0316-97-0009	16-03100	3.0–3.5	Soil	—	—	—	—	6.6	NA	—	—	—	—	18.5	NA	NA
0316-97-0008	16-03104	1.5–2.0	Soil	—	—	—	—	8.6	NA	—	—	—	—	15.1	NA	NA
0316-97-0027	16-03148	0.0–1.5	Soil	—	—	8.7	—	4.7 (J)	NA	—	—	—	9.8 (J)	27.5	—	NA
0316-97-0023	16-03153	0.0–2.5	Soil	—	1.1 (UJ)	—	—	NA	NA	0.57 (U)	—	—	—	—	—	NA
0316-97-0024	16-03153	10.0–10.75	Qbt 4	—	1.1 (UJ)	—	—	NA	NA	—	—	—	—	—	—	NA
0316-97-0025	16-03156	0.0–2.5	Qbt 4	—	NA	NA	NA	NA	NA	—	—	NA	NA	NA	0.6 (U)	NA
0316-97-0026	16-03156	9.7—11.01	Qbt 4	—	5.34 (U)	—	—	NA	NA	—	—	—	—	—	1.1 (U)	NA
0316-97-0028	16-03174	0.0–1.5	Fill	—	—	—	—	2.5 (J)	NA	—	—	—	—	71.2	—	NA
RE16-98-0016	16-05845	3.5–4.5	Soil	—	12 (UJ)	—	4200 (J-)	—	NA	0.6 (U)	—	—	—	—	NA	NA
RE16-10-3719	16-609461	0.0–0.5	Soil	—	—	—	—	—	—	0.612 (U)	—	—	—	—	—	1.37 (J-)
RE16-10-3720	16-609461	9.5–13.0	Qbt 4	—	0.978 (U)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3721	16-609461	16.5–19.0	Qbt 4	—	1.05 (U)	—	—	1.46 (J)	—	—	—	—	—	—	—	—
RE16-10-3722	16-609462	0.0–0.5	Soil	—	1.07 (U)	—	—	—	—	0.535 (U)	—	—	—	—	—	1.65 (J-)
RE16-10-3723	16-609462	11.5–13.0	Qbt 4	—	1.02 (U)	—	—	—	—	—	—	—	—	—	—	0.795 (J-)

Table 9.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Boron	Bromide	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**na[b]**	**na**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**na**	**na**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**227000**	**na**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**158000**	**na**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**15600**	**na**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**
RE16-10-3724	16-609462	16.5–18.0	Qbt 4	—	0.974 (U)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3725	16-609463	0.0–0.5	Soil	—	0.918 (U)	—	—	—	—	0.586 (U)	—	—	—	—	—	1.78 (J-)
RE16-10-3726	16-609463	11.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.52 (U)	1.7
RE16-10-3727	16-609463	16.5-18.0	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	—	—	0.52 (U)	0.85 (J)
RE16-10-3730	16-609464	0.0–0.5	Soil	—	0.96 (U)	—	—	—	—	0.529 (U)	—	—	—	—	—	2.12 (J-)
RE16-10-3728	16-609464	9.2—13.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.52 (U)	0.94 (J)
RE16-10-3729	16-609464	16.5–18.0	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	—	—	0.52 (U)	0.55 (J)
RE16-10-3731	16-609465	0.0–0.5	Soil	—	—	—	—	—	—	0.597 (U)	—	—	—	—	—	1.85 (J-)
RE16-10-3732	16-609465	11.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.52 (U)	0.49 (J)
RE16-10-3733	16-609465	16.5–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.54 (U)	0.91 (J)
RE16-10-3734	16-609466	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	0.92 (J-)
RE16-10-3736	16-609466	10.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.55 (U)	0.58 (J)
RE16-10-3735	16-609466	16.5–18.0	Qbt 4	—	0.54 (U)	—	—	—	—	—	—	—	—	—	0.54 (U)	0.34 (J)
RE16-10-3737	16-609467	0.0–0.5	Soil	—	1.2 (U)	—	—	—	—	0.616 (U)	—	—	—	—	—	0.927 (J-)
RE16-10-3738	16-609467	11.5–13.0	Qbt 4	—	1.06 (U)	—	—	4.17 (J)	—	—	2410 (J+)	—	—	—	—	4.79
RE16-10-3739	16-609467	15.5–17.5	Qbt 4	—	1.02 (U)	—	—	2.29 (J)	—	—	—	—	—	—	—	1.06
RE16-10-3740	16-609468	0.0–0.5	Soil	—	1.12 (U)	—	—	—	—	0.427 (J)	—	—	—	—	—	1.43 (J-)
RE16-10-3741	16-609468	11.0–14.0	Qbt 4	—	1.01 (U)	—	—	—	—	—	—	—	—	—	—	1.06
RE16-10-3742	16-609468	16.5–18.0	Qbt 4	—	1.02 (U)	—	—	—	—	—	—	—	—	—	—	1.1
RE16-10-3743	16-609469	0.0–0.5	Soil	—	—	—	—	—	—	0.401 (J)	—	—	—	—	—	1.52 (J-)
RE16-10-3746	16-609470	0.0–0.5	Soil	—	1.12 (U)	—	—	—	—	—	—	—	—	—	—	2.03 (J-)
RE16-10-3749	16-609471	0.0–0.5	Soil	—	—	—	—	—	—	0.449 (J)	—	—	—	—	—	1.91 (J-)
RE16-10-3752	16-609472	0.0–0.5	Soil	—	1.11 (U)	—	—	—	—	—	—	—	—	—	—	1.63 (J-)
RE16-10-3755	16-609473	0.0–0.5	Soil	—	0.988 (U)	—	302	—	—	0.604	—	—	—	—	—	1.97 (J-)
RE16-10-3756	16-609473	11.0–13.0	Qbt 4	—	1.03 (U)	—	—	—	—	—	—	—	—	—	—	0.847 (J)
RE16-10-3757	16-609473	16.5–18.5	Qbt 4	—	1.04 (U)	—	—	—	—	—	—	—	—	—	—	1.03 (J)
RE16-10-3758	16-609474	0.0–0.5	Soil	—	1.25 (U)	—	—	—	—	0.521 (J)	—	—	—	—	—	1.93 (J-)
RE16-10-3759	16-609474	11.0–13.0	Qbt 4	—	1.08 (U)	—	—	—	—	—	—	—	—	—	—	1.59
RE16-10-3760	16-609474	15.0–17.0	Qbt 4	—	1.09 (U)	—	—	—	—	—	—	—	—	—	—	1.59
RE16-10-3761	16-609475	0.0–0.5	Soil	—	—	—	—	—	—	0.527 (J)	—	—	—	—	—	3.6 (J-)
RE16-10-3762	16-609475	11.5-15.0	Qbt 4	—	0.962 (U)	—	—	—	—	—	—	—	—	—	—	1.61 (J+)

Table 9.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Boron	Bromide	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**na[b]**	**na**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**na**	**na**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**227000**	**na**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**158000**	**na**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**15600**	**na**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**
RE16-10-3763	16-609475	18.0–20.0	Qbt 4	—	0.996 (U)	—	—	—	—	—	—	—	—	—	—	1.11 (J+)
RE16-10-3764	16-609476	0.0–0.5	Soil	—	1.01 (U)	—	—	—	—	0.45 (J)	—	—	—	—	—	3.36 (J-)
RE16-10-3765	16-609476	10.0–12.0	Qbt 4	—	1.04 (U)	—	—	—	—	—	—	—	—	—	—	2.46
RE16-10-3766	16-609476	15.0–18.0	Qbt 4	—	1.01 (U)	—	—	—	—	—	—	—	—	—	—	1.02 (J)
RE16-10-3767	16-609477	0.0–0.5	Soil	—	—	—	—	—	—	0.552 (U)	—	—	—	—	—	1.36 (J-)
RE16-10-3768	16-609477	11.5–13.5	Qbt 4	—	1.04 (U)	—	48	—	—	—	—	—	—	—	—	—
RE16-10-3770	16-609478	0.0–0.5	Soil	—	1.01 (U)	—	—	—	—	0.527 (U)	—	—	12.5	—	—	1.47 (J-)
RE16-10-3771	16-609478	10.0–12.0	Qbt 4	—	1.05 (U)	—	—	—	—	—	—	—	—	—	—	0.903 (J)
RE16-10-3772	16-609478	15.5-17.5	Qbt 4	—	1 (U)	—	—	—	—	—	—	—	—	—	—	0.947 (J)
RE16-10-3773	16-609479	0.0–0.5	Soil	—	0.963 (U)	—	—	—	—	0.61 (U)	—	—	—	—	—	1.19 (J-)
RE16-10-3774	16-609479	10.0–12.0	Qbt 4	—	0.99 (U)	—	—	—	—	—	—	—	—	—	—	1.06
RE16-10-3775	16-609479	15.0–16.0	Qbt 4	—	0.907 (U)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3776	16-609480	0.0–0.5	Soil	—	—	—	—	—	—	0.583 (U)	—	—	—	—	—	—
RE16-10-3777	16-609480	10.0–12.0	Qbt 4	—	1.05 (U)	—	—	1.31 (J)	—	—	—	—	—	—	—	1.49
RE16-10-3778	16-609480	16.5–18.0	Qbt 4	—	1.04 (U)	—	—	—	—	—	—	—	—	—	—	1.05
RE16-10-3779	16-609481	0.0–0.5	Soil	—	—	—	—	—	—	0.616 (U)	—	—	—	—	—	1.5 (J-)
RE16-10-3780	16-609481	10.0–13.0	Qbt 4	—	0.53 (U)	—	—	—	—	—	—	—	—	—	NA	0.4 (J)
RE16-10-3781	16-609481	16.5–18.5	Qbt 4	—	0.53 (U)	—	—	—	—	—	—	—	—	—	NA	0.37 (J)
RE16-10-3782	16-609482	0.0–0.5	Soil	—	—	—	—	—	—	0.623 (U)	—	—	—	—	—	0.889 (J-)
RE16-10-3783	16-609482	10.0–12.0	Qbt 4	—	0.53 (U)	—	—	—	—	—	—	—	—	—	NA	0.47 (J)
RE16-10-3784	16-609482	15.0–17.0	Qbt 4	—	0.53 (U)	—	—	—	—	—	—	—	—	—	NA	0.32 (J)
RE16-10-3785	16-609483	0.0–0.5	Soil	—	—	—	—	—	—	0.565 (U)	—	—	—	—	—	—
RE16-10-3786	16-609483	11.5–13.0	Qbt 4	—	0.993 (U)	—	—	—	—	—	—	—	—	—	—	1.61
RE16-10-3788	16-609484	0.0–0.5	Soil	—	—	—	—	—	5.36	0.571 (U)	—	—	—	—	—	1.09 (J-)
RE16-10-3789	16-609484	10.0–11.5	Qbt 4	—	1.05 (U)	—	—	—	—	—	—	—	—	—	—	1.14
RE16-10-3790	16-609484	15.0–17.0	Qbt 4	—	1.01 (U)	—	—	—	—	—	—	—	—	—	—	1.02 (J)
RE16-10-3791	16-609485	0.0–0.5	Soil	—	1.14 (U)	—	—	—	—	0.57 (U)	—	—	—	—	—	0.847 (J-)
RE16-10-3792	16-609485	17.5–20.0	Qbt 4	—	1.03 (U)	—	—	—	4.14	—	—	—	—	—	—	—
RE16-10-14023	16-611771	0.0–0.5	Soil	—	—	—	—	NA	—	—	—	—	—	—	0.57 (U)	1.3
RE16-10-14024	16-611771	3.0–3.5	Qbt 4	—	—	—	—	NA	—	—	—	19	—	—	0.52 (U)	2.2
RE16-98-0047	16-03064	5.25–5.5	Qbt 4	—	12 (UJ)	—	170	—	NA	—	—	—	—	—	NA	NA

Table 9.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**0.73**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**800**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**74.9**	**3410**	**5680**	**341000**
Recreational SSL[f]				**560**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**52.3**	**2380**	**3960**	**238000**
Residential SSL[c]				**400**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**5.16**	**235**	**391**	**23500**
RE16-98-0051	16-03054	3.0–3.5	Qbt 4	—	—	0.11 (UJ)	—	NA	NA	—	2.2 (U)	—	28.2 (U)	—	120
RE16-98-0017	16-03054	5.0–6.0	Qbt 4	—	—	0.12 (U)	—	NA	NA	0.41 (UJ)	2.4 (U)	—	30.2 (U)	—	—
0316-97-0021	16-03058	4.75–5.0	Soil	—	—	—	—	NA	NA	—	NA	—	—	—	—
RE16-98-0046	16-03064	4.25–4.5	Qbt 4	—	—	0.12 (U)	—	NA	NA	—	2.4 (U)	—	30 (U)	—	—
0316-97-0020	16-03066	5.0–5.5	Soil	—	—	—	—	NA	NA	—	NA	—	—	—	—
RE16-98-0020	16-03068	3.5–4.5	Soil	—	—	0.12 (U)	—	NA	NA	—	2.4 (U)	—	29.2 (U)	—	—
RE16-98-0021	16-03068	4.5–5.5	Soil	—	—	0.12 (U)	—	NA	NA	—	2.4 (U)	0.88	29.2 (U)	—	—
0316-97-0017	16-03071	4.0–4.33	Soil	—	—	—	—	NA	NA	—	55.6 (J-)	—	—	—	—
RE16-98-0018	16-03072	3.5–4.5	Qbt 4	—	—	0.12 (U)	6.7	NA	NA	0.39 (UJ)	27	—	29.6 (U)	—	—
RE16-98-0019	16-03072	5.0–5.5	Soil	—	—	0.11 (U)	—	NA	NA	—	26	—	29.3 (U)	—	—
0316-97-0015	16-03077	3.5–4.0	Soil	—	—	—	471	NA	NA	—	15.9 (J-)	—	1.98	—	—
0316-97-0014	16-03082	3.0–3.5	Soil	—	863	—	—	NA	NA	—	3.5 (J-)	—	2.66	—	—
0316-97-0012	16-03088	4.5–5.0	Soil	—	—	—	—	NA	NA	—	26.3 (J-)	—	—	—	—
0316-97-0013	16-03088	4.5–5.0	Soil	—	—	—	—	NA	NA	—	8.9 (J-)	—	—	—	—
0316-97-0011	16-03092	4.0–4.5	Soil	—	—	—	—	NA	NA	—	10.7 (J-)	—	2.72	—	—
0316-97-0010	16-03094	4.5–5.0	Soil	—	—	—	—	NA	NA	—	10.1 (J-)	—	2.04	—	—
0316-97-0009	16-03100	3.0–3.5	Soil	—	—	—	—	NA	NA	—	15.6 (J-)	—	2.41	—	—
0316-97-0008	16-03104	1.5–2.0	Soil	—	—	—	—	NA	NA	—	6 (J-)	—	2.95	—	—
0316-97-0027	16-03148	0.0–1.5	Soil	23.5	961	—	—	NA	NA	—	40.2	0.85 (U)	2.5	40.1	—
0316-97-0023	16-03153	0.0–2.5	Soil	—	—	0.11 (U)	—	NA	NA	NA	2.3 (U)	—	—	—	—
0316-97-0024	16-03153	10.0–10.75	Qbt 4	—	—	0.11 (U)	—	NA	NA	NA	2.1 (U)	—	—	—	—
0316-97-0025	16-03156	0.0–2.5	Qbt 4	—	—	NA	—	NA	NA	NA	3.6	NA	—	NA	—
0316-97-0026	16-03156	9.7—11.01	Qbt 4	—	—	—	—	NA	NA	—	—	—	—	—	—
0316-97-0028	16-03174	0.0–1.5	Fill	—	—	—	—	NA	NA	—	49.8	0.87 (U)	2.09	—	—
RE16-98-0016	16-05845	3.5–4.5	Soil	—	—	0.12 (U)	—	NA	NA	—	68	—	29.3 (U)	—	—
RE16-10-3719	16-609461	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3720	16-609461	9.5–13.0	Qbt 4	—	—	—	—	—	—	0.945 (U)	—	—	NA	—	—
RE16-10-3721	16-609461	16.5–19.0	Qbt 4	—	—	—	—	—	—	0.96 (U)	—	—	NA	—	—
RE16-10-3722	16-609462	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3723	16-609462	11.5–13.0	Qbt 4	—	—	—	—	—	—	0.996 (U)	—	—	NA	—	—
RE16-10-3724	16-609462	16.5–18.0	Qbt 4	—	—	—	—	—	—	1.01 (U)	—	—	NA	—	—

Table 9.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**0.73**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**800**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**74.9**	**3410**	**5680**	**341000**
Recreational SSL[f]				**560**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**52.3**	**2380**	**3960**	**238000**
Residential SSL[c]				**400**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**5.16**	**235**	**391**	**23500**
RE16-10-3725	16-609463	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3726	16-609463	11.0–13.0	Qbt 4	—	—	—	—	—	—	1.4	—	—	NA	—	—
RE16-10-3727	16-609463	16.5-18.0	Qbt 4	—	—	—	—	0.076 (J)	—	1	—	—	NA	—	—
RE16-10-3730	16-609464	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3728	16-609464	9.2—13.5	Qbt 4	—	—	—	—	0.064 (J)	—	0.98	—	—	NA	—	—
RE16-10-3729	16-609464	16.5–18.0	Qbt 4	—	—	—	—	0.11 (J)	—	0.93	—	—	NA	—	—
RE16-10-3731	16-609465	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3732	16-609465	11.0–13.0	Qbt 4	—	—	—	—	0.066 (J)	—	1.1	—	—	NA	—	—
RE16-10-3733	16-609465	16.5–18.0	Qbt 4	—	—	—	—	0.088 (J)	—	1.1	—	—	NA	—	—
RE16-10-3734	16-609466	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3736	16-609466	10.0–12.0	Qbt 4	—	—	—	—	—	—	1.3	—	—	NA	—	—
RE16-10-3735	16-609466	16.5–18.0	Qbt 4	—	—	—	—	0.18 (J)	—	1.2	—	—	NA	—	—
RE16-10-3737	16-609467	0.0–0.5	Soil	—	—	—	—	3.51	—	—	—	—	NA	—	—
RE16-10-3738	16-609467	11.5–13.0	Qbt 4	—	—	—	—	—	—	1.02 (U)	—	—	NA	—	—
RE16-10-3739	16-609467	15.5–17.5	Qbt 4	—	—	—	—	—	—	0.994 (U)	—	—	NA	—	—
RE16-10-3740	16-609468	0.0–0.5	Soil	—	—	—	—	1.6	—	—	—	—	NA	—	—
RE16-10-3741	16-609468	11.0–14.0	Qbt 4	—	—	—	—	—	—	0.893 (U)	—	—	NA	—	—
RE16-10-3742	16-609468	16.5–18.0	Qbt 4	—	—	—	—	—	—	0.998 (U)	—	—	NA	—	—
RE16-10-3743	16-609469	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3746	16-609470	0.0–0.5	Soil	—	—	—	—	1.78	—	—	—	—	NA	—	—
RE16-10-3749	16-609471	0.0–0.5	Soil	—	—	—	—	1.99	—	—	—	—	NA	—	—
RE16-10-3752	16-609472	0.0–0.5	Soil	—	—	—	—	—	—	—	2.33	—	NA	—	—
RE16-10-3755	16-609473	0.0–0.5	Soil	—	—	—	—	2.24	—	—	5.06	—	NA	—	—
RE16-10-3756	16-609473	11.0–13.0	Qbt 4	—	—	—	—	—	—	1.05 (U)	—	—	NA	—	—
RE16-10-3757	16-609473	16.5–18.5	Qbt 4	—	—	—	—	—	—	0.996 (U)	—	—	NA	—	—
RE16-10-3758	16-609474	0.0–0.5	Soil	—	—	—	—	3.75	—	—	1.17	—	NA	—	—
RE16-10-3759	16-609474	11.0–13.0	Qbt 4	—	—	—	—	—	—	1.11 (U)	—	—	NA	—	—
RE16-10-3760	16-609474	15.0–17.0	Qbt 4	—	—	—	—	—	—	1.08 (U)	—	—	NA	—	—
RE16-10-3761	16-609475	0.0–0.5	Soil	—	—	—	—	—	—	—	4.26	—	NA	—	—
RE16-10-3762	16-609475	11.5-15.0	Qbt 4	—	—	—	—	—	—	0.988 (U)	—	—	NA	—	—
RE16-10-3763	16-609475	18.0–20.0	Qbt 4	—	—	—	—	1.19	—	1.03 (U)	—	—	NA	—	—

Table 9.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**0.73**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**800**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**74.9**	**3410**	**5680**	**341000**
Recreational SSL[f]				**560**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**52.3**	**2380**	**3960**	**238000**
Residential SSL[c]				**400**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**5.16**	**235**	**391**	**23500**
RE16-10-3764	16-609476	0.0–0.5	Soil	—	675	—	—	—	—	—	1.93	—	NA	—	—
RE16-10-3765	16-609476	10.0–12.0	Qbt 4	—	—	—	—	—	—	1.04 (U)	—	—	NA	—	—
RE16-10-3766	16-609476	15.0–18.0	Qbt 4	—	—	—	—	1.23	—	1.02 (U)	—	—	NA	—	—
RE16-10-3767	16-609477	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3768	16-609477	11.5–13.5	Qbt 4	—	—	—	—	—	—	0.949 (U)	—	—	NA	—	—
RE16-10-3770	16-609478	0.0–0.5	Soil	—	748	—	—	1.69	0.000759 (J)	—	—	—	NA	—	—
RE16-10-3771	16-609478	10.0–12.0	Qbt 4	—	—	—	—	—	—	1.05 (U)	—	—	NA	—	—
RE16-10-3772	16-609478	15.5-17.5	Qbt 4	—	—	—	—	—	—	1.05 (U)	—	—	NA	—	—
RE16-10-3773	16-609479	0.0–0.5	Soil	—	—	—	—	2.18	—	—	—	—	NA	—	—
RE16-10-3774	16-609479	10.0–12.0	Qbt 4	—	—	—	—	—	—	1.04 (U)	—	—	NA	—	—
RE16-10-3775	16-609479	15.0–16.0	Qbt 4	—	—	—	—	—	—	1.02 (U)	—	—	NA	—	—
RE16-10-3776	16-609480	0.0–0.5	Soil	—	—	—	—	1.51	—	—	—	—	NA	—	—
RE16-10-3777	16-609480	10.0–12.0	Qbt 4	—	—	—	—	—	—	1.05 (U)	—	—	NA	—	—
RE16-10-3778	16-609480	16.5–18.0	Qbt 4	—	—	—	—	—	—	1.03 (U)	—	—	NA	—	—
RE16-10-3779	16-609481	0.0–0.5	Soil	—	732	—	—	3.84	0.000733 (J)	—	1.71	—	NA	—	—
RE16-10-3780	16-609481	10.0–13.0	Qbt 4	—	—	—	NA	—	—	1.1	—	—	NA	—	—
RE16-10-3781	16-609481	16.5–18.5	Qbt 4	—	—	—	NA	—	—	1.2	—	—	NA	—	—
RE16-10-3782	16-609482	0.0–0.5	Soil	—	—	—	—	3.08	—	—	1.63	—	NA	—	51
RE16-10-3783	16-609482	10.0–12.0	Qbt 4	—	—	—	NA	—	—	1.2	—	—	NA	—	—
RE16-10-3784	16-609482	15.0–17.0	Qbt 4	—	—	—	NA	0.083 (J)	—	1.1	—	—	NA	—	—
RE16-10-3785	16-609483	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3786	16-609483	11.5–13.0	Qbt 4	—	—	—	—	—	—	0.973 (U)	—	—	NA	—	—
RE16-10-3788	16-609484	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-10-3789	16-609484	10.0–11.5	Qbt 4	—	—	—	—	—	—	1.03 (U)	—	—	NA	—	—
RE16-10-3790	16-609484	15.0–17.0	Qbt 4	—	—	—	—	—	—	1.01 (U)	—	—	NA	—	—
RE16-10-3791	16-609485	0.0–0.5	Soil	—	—	—	—	1.46	—	—	—	—	NA	—	—
RE16-10-3792	16-609485	17.5–20.0	Qbt 4	—	—	—	—	2.15	—	1.02 (U)	—	—	NA	—	—
RE16-10-14023	16-611771	0.0–0.5	Soil	—	—	—	—	1.3	—	—	1.5	—	NA	—	—

Table 9.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**0.73**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**800**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**74.9**	**3410**	**5680**	**341000**
Recreational SSL[f]				**560**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**52.3**	**2380**	**3960**	**238000**
Residential SSL[c]				**400**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**5.16**	**235**	**391**	**23500**
RE16-10-14024	16-611771	3.0–3.5	Qbt 4	—	—	—	9.4	0.1 (J)	—	2.3	—	—	NA	—	—
RE16-98-0047	16-03064	5.25–5.5	Qbt 4	—	—	0.12 (UJ)	—	NA	NA	—	2.4 (U)	—	29.8 (U)	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 9.5-3
Summary of Organic Chemicals Detected at SWMU 16-029(x)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-chloroethyl)ether
Industrial SSL[a]				**na[b]**	**36700**	**851000**	**1900[c]**	**2000[c]**	**183000**	**23.4**	**2.34**	**23.4**	**18300[d]**	**234**	**13.6**
Recreational SSL[e]				**na**	**20800**	**702000**	**1440**	**1440**	**104000**	**30.1**	**3.01**	**30.1**	**10400[d]**	**301**	**40.6**
Residential SSL[a]				**na**	**3440**	**67500**	**150[c]**	**150[c]**	**17200**	**6.21**	**0.621**	**6.21**	**1720[d]**	**62.1**	**2.56**
RE16-98-0051	16-03054	3.0–3.5	Qbt 4	NA[f]	—[g]	—	—	—	—	—	—	—	—	—	—
0316-97-0021	16-03058	4.75–5.0	Soil	NA	—	—	0.553	0.431	—	—	—	—	—	—	—
RE16-98-0046	16-03064	4.25–4.5	Qbt 4	NA	—	—	0.3	0.3	—	—	—	—	—	—	—
0316-97-0020	16-03066	5.0–5.5	Soil	NA	—	—	0.815	1.1	—	—	—	—	—	—	—
RE16-98-0053	16-03068	3.0–3.5	Qbt 4	NA	NA	—	NA	NA	NA	NA	NA	NA	NA	NA	NA
0316-97-0017	16-03071	4.0–4.33	Soil	NA	—	—	0.217	0.268	—	—	—	—	—	—	—
RE16-98-0052	16-03072	3.5–4.5	Qbt 4	NA	NA	—	NA	NA	NA	NA	NA	NA	NA	NA	NA
0316-97-0015	16-03077	3.5–4.0	Soil	NA	—	—	0.576	0.879	—	—	—	—	—	—	—
0316-97-0014	16-03082	3.0–3.5	Soil	NA	—	—	0.201	0.427	—	—	—	—	—	—	—
0316-97-0012	16-03088	4.5–5.0	Soil	NA	—	—	—	—	—	—	—	—	—	—	—
0316-97-0013	16-03088	4.5–5.0	Soil	NA	—	—	—	0.1	—	—	—	—	—	—	—
0316-97-0011	16-03092	4.0–4.5	Soil	NA	—	—	—	0.123	—	—	—	—	—	—	—
0316-97-0010	16-03094	4.5–5.0	Soil	NA	—	—	—	—	—	—	—	—	—	—	—
0316-97-0009	16-03100	3.0–3.5	Soil	NA	—	—	0.116	0.112	—	—	—	—	—	—	—
0316-97-0008	16-03104	1.5–2.0	Soil	NA	—	—	0.501	1.15	—	—	—	—	—	—	—
0316-97-0023	16-03153	0.0–2.5	Soil	NA	—	0.043	—	—	—	—	—	—	—	—	—
0316-97-0024	16-03153	10.0–10.75	Qbt 4	NA	—	—	—	—	—	—	—	—	—	—	—
0316-97-0026	16-03156	9.7—11.01	Qbt 4	NA	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3720	16-609461	9.5–13.0	Qbt 4	—	—	0.0632	—	—	—	—	—	—	—	—	—
RE16-10-3721	16-609461	16.5–19.0	Qbt 4	—	—	0.0399	—	—	—	—	—	—	—	—	—
RE16-10-3723	16-609462	11.5–13.0	Qbt 4	—	—	0.065	—	—	—	—	—	—	—	—	—
RE16-10-3730	16-609464	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3736	16-609466	10.0–12.0	Qbt 4	—	—	—	0.0068 (J)	—	—	—	—	—	—	—	—
RE16-10-3738	16-609467	11.5–13.0	Qbt 4	—	—	0.0379 (J)	—	—	—	—	—	—	—	—	—
RE16-10-3739	16-609467	15.5–17.5	Qbt 4	—	—	0.026 (J)	—	—	—	—	—	—	—	—	—
RE16-10-3740	16-609468	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3741	16-609468	11.0–14.0	Qbt 4	—	—	0.0165 (J)	—	—	—	—	—	—	—	—	—
RE16-10-3742	16-609468	16.5–18.0	Qbt 4	—	—	0.015 (J)	—	—	—	—	—	—	—	—	—

Table 9.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-chloroethyl)ether
Industrial SSL[a]				**na[b]**	**36700**	**851000**	**1900[c]**	**2000[c]**	**183000**	**23.4**	**2.34**	**23.4**	**18300[d]**	**234**	**13.6**
Recreational SSL[e]				**na**	**20800**	**702000**	**1440**	**1440**	**104000**	**30.1**	**3.01**	**30.1**	**10400[d]**	**301**	**40.6**
Residential SSL[a]				**na**	**3440**	**67500**	**150[c]**	**150[c]**	**17200**	**6.21**	**0.621**	**6.21**	**1720[d]**	**62.1**	**2.56**
RE16-10-3749	16-609471	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3752	16-609472	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3755	16-609473	0.0–0.5	Soil	—	—	—	—	—	—	—	0.0208 (J)	0.0273 (J)	—	—	—
RE16-10-3756	16-609473	11.0–13.0	Qbt 4	—	—	0.00186 (J)	—	—	—	—	—	—	—	—	—
RE16-10-3757	16-609473	16.5–18.5	Qbt 4	—	—	0.0502	—	—	—	—	—	—	—	—	—
RE16-10-3758	16-609474	0.0–0.5	Soil	—	0.0203 (J)	—	—	—	0.0314 (J)	0.079	0.0665	0.0835	0.0448	0.0336 (J)	—
RE16-10-3759	16-609474	11.0–13.0	Qbt 4	—	—	0.051	—	—	—	—	—	—	—	—	—
RE16-10-3760	16-609474	15.0–17.0	Qbt 4	—	—	0.0206	—	—	—	—	—	—	—	—	—
RE16-10-3761	16-609475	0.0–0.5	Soil	—	—	—	—	—	—	—	0.0316 (J)	0.0375 (J)	—	0.0155 (J)	—
RE16-10-3762	16-609475	11.5–15.0	Qbt 4	—	—	0.00305 (J)	—	—	—	—	—	—	—	—	—
RE16-10-3763	16-609475	18.0–20.0	Qbt 4	—	—	0.00262 (J)	—	—	—	—	—	—	—	—	—
RE16-10-3764	16-609476	0.0–0.5	Soil	—	—	—	—	—	—	—	0.0222 (J)	0.0256 (J)	—	—	—
RE16-10-3765	16-609476	10.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3766	16-609476	15.0–18.0	Qbt 4	—	—	0.0276	—	—	—	—	—	—	—	—	—
RE16-10-3767	16-609477	0.0–0.5	Soil	—	—	—	—	—	0.0131 (J)	0.034 (J)	0.0295 (J)	0.0354 (J)	0.0188 (J)	0.0167 (J)	—
RE16-10-3770	16-609478	0.0–0.5	Soil	—	0.0164 (J)	—	—	—	0.0292 (J)	0.0752	0.0651	0.0753	0.04	0.0362 (J)	—
RE16-10-3775	16-609479	15.0–16.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3778	16-609480	16.5–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.0708 (J)
RE16-10-3779	16-609481	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3780	16-609481	10.0–13.0	Qbt 4	0.0095 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3781	16-609481	16.5–18.5	Qbt 4	0.0066 (J)	—	—	0.0067 (J)	0.0098 (J)	—	—	—	—	—	—	—
RE16-10-3782	16-609482	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.0203 (J)	—	—	—
RE16-10-3783	16-609482	10.0–12.0	Qbt 4	0.012 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3784	16-609482	15.0–17.0	Qbt 4	0.0088 (J)	—	—	—	0.0071 (J)	—	—	—	—	—	—	—
RE16-10-3785	16-609483	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3788	16-609484	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3789	16-609484	10.0–11.5	Qbt 4	—	—	0.0549 (J-)	—	—	—	—	—	0.012 (J)	—	—	—
RE16-10-3792	16-609485	17.5-20.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14023	16-611771	0.0–0.5	Soil	—	—	—	—	—	—	0.051 (J-)	—	—	—	0.04 (J-)	—
RE16-98-0047	16-03064	5.25–5.5	Qbt 4	NA	—	—	—	1.9	—	—	—	—	—	—	—

Table 9.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Butylbenzene[n-]	Chrysene	DDE[4,4'-]	DDT[4,4'-]	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene
Industrial SSL[a]				**1370**	**369000**	**610**	**2340**	**56.3**	**78.1**	**68400**	**103**	**24400**	**24400**	**34200**	**23.4**
Recreational SSL[e]				**1830**	**446000**	**69600**	**3010**	**75.3**	**122**	**39900**	**82.5**	**13900**	**13900**	**19900**	**30.1**
Residential SSL[a]				**347**	**39600**	**140**	**621**	**14.3**	**17.2**	**6110**	**15.7**	**2290**	**2290**	**3060**	**6.21**
RE16-98-0051	16-03054	3.0–3.5	Qbt 4	—	—	—	—	NA	NA	—	—	—	—	—	—
0316-97-0021	16-03058	4.75–5.0	Soil	—	—	—	—	—	—	—	—	0.079	—	0.253	—
RE16-98-0046	16-03064	4.25–4.5	Qbt 4	—	—	—	—	NA	NA	—	—	—	—	—	—
0316-97-0020	16-03066	5.0–5.5	Soil	—	—	—	—	—	0.00147	—	—	—	—	0.799	—
RE16-98-0053	16-03068	3.0–3.5	Qbt 4	NA	—	—	NA	NA	NA	NA	NA	NA	NA	NA	NA
0316-97-0017	16-03071	4.0–4.33	Soil	—	—	—	—	—	—	—	—	—	—	2.11	—
RE16-98-0052	16-03072	3.5–4.5	Qbt 4	NA	—	—	NA	NA	NA	NA	NA	NA	NA	NA	NA
0316-97-0015	16-03077	3.5–4.0	Soil	—	—	0.002 (J)	—	—	—	—	—	—	—	1.23	—
0316-97-0014	16-03082	3.0–3.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
0316-97-0012	16-03088	4.5–5.0	Soil	—	0.002 (J)	—	—	—	—	—	—	—	—	—	—
0316-97-0013	16-03088	4.5–5.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—
0316-97-0011	16-03092	4.0–4.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
0316-97-0010	16-03094	4.5–5.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—
0316-97-0009	16-03100	3.0–3.5	Soil	—	—	—	—	0.00122	—	—	—	—	—	—	—
0316-97-0008	16-03104	1.5–2.0	Soil	—	—	—	—	—	—	0.44	—	—	—	0.655	—
0316-97-0023	16-03153	0.0–2.5	Soil	—	—	—	—	NA	NA	—	—	—	—	—	—
0316-97-0024	16-03153	10.0–10.75	Qbt 4	—	—	—	—	NA	NA	—	—	—	—	—	—
0316-97-0026	16-03156	9.7—11.01	Qbt 4	—	—	—	—	NA	NA	—	—	—	—	—	—
RE16-10-3720	16-609461	9.5–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3721	16-609461	16.5–19.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3723	16-609462	11.5–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3730	16-609464	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	—	—
RE16-10-3736	16-609466	10.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3738	16-609467	11.5–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3739	16-609467	15.5–17.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3740	16-609468	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	—	—
RE16-10-3741	16-609468	11.0–14.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3742	16-609468	16.5–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3749	16-609471	0.0–0.5	Soil	0.131 (J)	—	—	—	NA	NA	—	—	0.0135 (J)	—	—	—
RE16-10-3752	16-609472	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	—	—

Table 9.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Butylbenzene[n-]	Chrysene	DDE[4,4'-]	DDT[4,4'-]	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene
Industrial SSL[a]				**1370**	**369000**	**610**	**2340**	**56.3**	**78.1**	**68400**	**103**	**24400**	**24400**	**34200**	**23.4**
Recreational SSL[e]				**1830**	**446000**	**69600**	**3010**	**75.3**	**122**	**39900**	**82.5**	**13900**	**13900**	**19900**	**30.1**
Residential SSL[a]				**347**	**39600**	**140**	**621**	**14.3**	**17.2**	**6110**	**15.7**	**2290**	**2290**	**3060**	**6.21**
RE16-10-3755	16-609473	0.0–0.5	Soil	—	—	—	0.0192 (J)	NA	NA	—	—	0.0345 (J)	—	—	—
RE16-10-3756	16-609473	11.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3757	16-609473	16.5–18.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3758	16-609474	0.0–0.5	Soil	0.159 (J)	—	—	0.0801	NA	NA	—	—	0.177	0.0165 (J)	—	0.0375 (J)
RE16-10-3759	16-609474	11.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3760	16-609474	15.0–17.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3761	16-609475	0.0–0.5	Soil	0.091 (J)	—	—	0.03 (J)	NA	NA	—	—	0.0596	—	—	—
RE16-10-3762	16-609475	11.5–15.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3763	16-609475	18.0–20.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3764	16-609476	0.0–0.5	Soil	—	—	—	0.0246 (J)	NA	NA	—	—	0.0516	—	—	—
RE16-10-3765	16-609476	10.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3766	16-609476	15.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3767	16-609477	0.0–0.5	Soil	—	—	—	0.0313 (J)	NA	NA	—	—	0.078	—	—	0.0176 (J)
RE16-10-3770	16-609478	0.0–0.5	Soil	—	—	—	0.0789	NA	NA	—	—	0.192	0.0148 (J)	—	0.0363 (J)
RE16-10-3775	16-609479	15.0–16.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3778	16-609480	16.5–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3779	16-609481	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	—	—
RE16-10-3780	16-609481	10.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.13 (J-)	—
RE16-10-3781	16-609481	16.5–18.5	Qbt 4	—	—	—	—	—	—	—	0.0095 (J)	—	—	0.078 (J-)	—
RE16-10-3782	16-609482	0.0–0.5	Soil	—	—	—	0.0354 (J)	NA	NA	—	—	0.0522	—	—	—
RE16-10-3783	16-609482	10.0–12.0	Qbt 4	—	—	—	—	—	—	—	0.0057 (J)	—	—	0.062 (J-)	—
RE16-10-3784	16-609482	15.0–17.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.076 (J-)	—
RE16-10-3785	16-609483	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	—	—
RE16-10-3788	16-609484	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	—	—
RE16-10-3789	16-609484	10.0–11.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3792	16-609485	17.5-20.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14023	16-611771	0.0–0.5	Soil	—	—	—	0.051 (J-)	—	—	—	—	0.11 (J-)	—	—	—
RE16-98-0047	16-03064	5.25–5.5	Qbt 4	—	—	—	—	NA	NA	—	—	—	—	—	—

Table 9.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methylene Chloride	Naphthalene	Pentachlorophenol	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**14900**[h]	**1090**	**252**	**100**	**20500**	**18300**	**174**	**36.4**	**57900**	**339000**	**27000**[c]	**469**
Recreational SSL[e]				**52700**[h]	**4520**	**1950**	**117**	**12000**	**10400**	**233**	**91.7**	**60800**	**2750000**	**19900**	**301**
Residential SSL[a]				**3210**[h]	**199**	**45**	**29.8**	**1830**	**1720**	**44.2**	**6.99**	**5570**	**104000**	**2200**[c]	**35.9**
RE16-98-0051	16-03054	3.0–3.5	Qbt 4	—	0.0079	—	—	—	—	—	—	—	0.0063	—	—
0316-97-0021	16-03058	4.75–5.0	Soil	—	—	—	—	—	0.096	—	—	—	—	—	0.972
RE16-98-0046	16-03064	4.25–4.5	Qbt 4	—	—	—	—	—	—	1.5	—	—	—	—	5
0316-97-0020	16-03066	5.0–5.5	Soil	—	—	—	—	—	—	0.652	—	—	—	—	2.54
RE16-98-0053	16-03068	3.0–3.5	Qbt 4	—	0.0075	NA	NA	NA	NA	NA	—	—	—	NA	NA
0316-97-0017	16-03071	4.0–4.33	Soil	—	—	—	—	—	—	—	0.002 (J)	0.002 (J)	—	—	0.091
RE16-98-0052	16-03072	3.5–4.5	Qbt 4	—	0.0085	NA	NA	NA	NA	NA	—	—	—	NA	NA
0316-97-0015	16-03077	3.5–4.0	Soil	—	—	—	—	—	—	1.04	—	0.006	—	—	9.11
0316-97-0014	16-03082	3.0–3.5	Soil	—	—	—	—	—	—	—	0.002 (J)	—	—	—	—
0316-97-0012	16-03088	4.5–5.0	Soil	—	—	—	—	—	—	—	—	0.002 (J)	—	—	—
0316-97-0013	16-03088	4.5–5.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—
0316-97-0011	16-03092	4.0–4.5	Soil	—	0.006	—	—	—	—	—	—	—	—	—	—
0316-97-0010	16-03094	4.5–5.0	Soil	—	0.007	—	—	—	—	—	—	—	—	—	—
0316-97-0009	16-03100	3.0–3.5	Soil	—	0.01	—	—	—	—	—	—	—	—	—	—
0316-97-0008	16-03104	1.5–2.0	Soil	—	—	—	—	—	—	0.508	—	—	—	—	—
0316-97-0023	16-03153	0.0–2.5	Soil	0.012	—	—	—	—	—	—	0.0072	—	—	—	—
0316-97-0024	16-03153	10.0–10.75	Qbt 4	—	—	—	—	—	—	0.296	—	—	—	—	—
0316-97-0026	16-03156	9.7—11.01	Qbt 4	—	—	—	—	—	—	0.24	—	—	—	—	—
RE16-10-3720	16-609461	9.5–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3721	16-609461	16.5–19.0	Qbt 4	—	—	—	—	—	—	0.133 (J-)	—	—	—	—	—
RE16-10-3723	16-609462	11.5–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3730	16-609464	0.0–0.5	Soil	—	—	—	—	—	—	—	0.00052 (J)	—	—	—	—
RE16-10-3736	16-609466	10.0–12.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.04 (J)	0.026 (J+)
RE16-10-3738	16-609467	11.5–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3739	16-609467	15.5–17.5	Qbt 4	—	—	—	—	—	—	0.101 (J-)	—	—	—	—	—
RE16-10-3740	16-609468	0.0–0.5	Soil	—	—	—	—	—	—	—	0.00161	—	—	—	—
RE16-10-3741	16-609468	11.0–14.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—

Table 9.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methylene Chloride	Naphthalene	Pentachlorophenol	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**14900**[h]	**1090**	**252**	**100**	**20500**	**18300**	**174**	**36.4**	**57900**	**339000**	**27000**[c]	**469**
Recreational SSL[e]				**52700**[h]	**4520**	**1950**	**117**	**12000**	**10400**	**233**	**91.7**	**60800**	**2750000**	**19900**	**301**
Residential SSL[a]				**3210**[h]	**199**	**45**	**29.8**	**1830**	**1720**	**44.2**	**6.99**	**5570**	**104000**	**2200**[c]	**35.9**
RE16-10-3742	16-609468	16.5–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3749	16-609471	0.0–0.5	Soil	—	—	—	0.333 (J)	—	—	—	—	—	—	—	—
RE16-10-3752	16-609472	0.0–0.5	Soil	—	—	—	0.35 (J)	—	—	—	—	—	—	—	—
RE16-10-3755	16-609473	0.0–0.5	Soil	—	—	—	—	0.0209 (J)	0.0337 (J)	—	—	—	—	—	—
RE16-10-3756	16-609473	11.0–13.0	Qbt 4	—	—	—	—	—	—	0.191 (J-)	—	—	—	—	—
RE16-10-3757	16-609473	16.5–18.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3758	16-609474	0.0–0.5	Soil	—	0.00281 (J)	—	—	0.14	0.189	—	—	0.000428 (J)	—	—	—
RE16-10-3759	16-609474	11.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3760	16-609474	15.0–17.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3761	16-609475	0.0–0.5	Soil	—	—	—	—	0.0239 (J)	0.0553	—	0.000543 (J)	—	—	—	—
RE16-10-3762	16-609475	11.5–15.0	Qbt 4	—	—	—	—	—	—	0.583 (J-)	—	—	—	0.646 (J-)	—
RE16-10-3763	16-609475	18.0–20.0	Qbt 4	—	—	—	—	—	—	0.504 (J-)	—	—	—	0.202 (J-)	—
RE16-10-3764	16-609476	0.0–0.5	Soil	—	—	—	—	0.0317 (J)	0.0473	—	0.000657 (J)	—	—	—	—
RE16-10-3765	16-609476	10.0–12.0	Qbt 4	—	—	—	—	—	—	1.33 (J-)	—	—	—	0.108 (J-)	—
RE16-10-3766	16-609476	15.0–18.0	Qbt 4	—	—	—	—	—	—	0.421 (J-)	—	—	—	—	—
RE16-10-3767	16-609477	0.0–0.5	Soil	—	—	—	—	0.0544	0.0695	—	—	—	—	—	—
RE16-10-3770	16-609478	0.0–0.5	Soil	—	—	0.011 (J)	—	0.134	0.166	—	—	—	—	—	—
RE16-10-3775	16-609479	15.0–16.0	Qbt 4	—	—	—	—	—	—	0.383 (J-)	—	—	—	—	—
RE16-10-3778	16-609480	16.5–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3779	16-609481	0.0–0.5	Soil	—	—	—	—	—	—	0.122 (J)	0.0109	—	—	—	—
RE16-10-3780	16-609481	10.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.097	0.022 (J)
RE16-10-3781	16-609481	16.5–18.5	Qbt 4	—	—	—	—	—	—	0.15 (J-)	—	—	—	0.099	0.006 (J)
RE16-10-3782	16-609482	0.0–0.5	Soil	—	—	—	—	0.018 (J)	0.0663	—	0.00598	—	—	—	—
RE16-10-3783	16-609482	10.0–12.0	Qbt 4	—	—	—	—	—	—	0.031 (J-)	—	—	—	0.09	0.014 (J)
RE16-10-3784	16-609482	15.0–17.0	Qbt 4	—	—	—	—	—	—	0.086 (J-)	—	—	—	0.17	0.0077 (J)
RE16-10-3785	16-609483	0.0–0.5	Soil	—	—	—	—	—	—	—	0.00275	—	—	—	—
RE16-10-3788	16-609484	0.0–0.5	Soil	—	—	—	—	—	—	—	0.00483	—	—	—	—

Table 9.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methylene Chloride	Naphthalene	Pentachlorophenol	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**14900**[h]	**1090**	**252**	**100**	**20500**	**18300**	**174**	**36.4**	**57900**	**339000**	**27000**[c]	**469**
Recreational SSL[e]				**52700**[h]	**4520**	**1950**	**117**	**12000**	**10400**	**233**	**91.7**	**60800**	**2750000**	**19900**	**301**
Residential SSL[a]				**3210**[h]	**199**	**45**	**29.8**	**1830**	**1720**	**44.2**	**6.99**	**5570**	**104000**	**2200**[c]	**35.9**
RE16-10-3789	16-609484	10.0–11.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3792	16-609485	17.5-20.0	Qbt 4	—	—	—	—	—	—	0.67 (J-)	—	—	—	—	—
RE16-10-14023	16-611771	0.0–0.5	Soil	—	—	—	—	0.08 (J-)	0.1 (J-)	—	—	—	—	—	0.0092 (J+)
RE16-98-0047	16-03064	5.25–5.5	Qbt 4	—	—	—	—	—	—	5.2	—	—	—	—	54

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] na = Not available.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Pyrene was used as a surrogate based on structural similarity.

[e] SSLs from LANL (2010, 108613).

[f] NA = Not analyzed.

[g] — = Not detected or not detected above BV.

[h] Isopropylbenzene was used as a surrogate based on structural similarity.

Table 9.5-4
Summary of Radionuclides Detected at SWMU 16-029(x)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-238
Qbt 2,3,4 BV[a]				**na**[b]
Industrial SAL[c]				**240**
Recreational SAL[c]				**330**
Residential SAL[c]				**37**
RE16-10-3732	16-609465	11.0–13.0	Qbt 4	0.0229
RE16-10-3781	16-609481	16.5–18.5	Qbt 4	0.0293

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

Table 9.6-1
Summary of Samples Collected and Analyses Requested at SWMU 16-029(w)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	PEST	SVOC	VOC	Cyanide (Total)
RE16-99-0007	16-03409	3.0–3.5	Qbt 4	—*	—	5199R	—	—	5198R	—	—	5197R	5197R	—
RE16-99-0008	16-03409	4.5–5.0	Qbt 4	—	—	5199R	—	—	5198R	—	—	5197R	5197R	—
RE16-99-0016	16-03409	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	5221R	—
RE16-98-0022	16-05829	2.0–2.5	Qbt 4	—	—	4473R	—	—	4474R	—	—	4472R	4472R	—
RE16-98-0023	16-05836	4.0–4.33	Qbt 4	—	—	4473R	—	—	4474R	—	—	4472R	4472R	—
RE16-99-0017	16-05985	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	5228R	—	—
RE16-10-3835	16-609486	10.0–14.0	Qbt 4	10-2529	10-2529	10-2528	10-2529	10-2529	10-2529	10-2529	10-2528	10-2528	10-2528	10-2529
RE16-10-3836	16-609486	16.0–18.0	Qbt 4	10-2529	10-2529	10-2528	10-2529	10-2529	10-2529	10-2529	10-2528	10-2528	10-2528	10-2529
RE16-10-3837	16-609487	11.0–13.0	Qbt 4	10-2562	10-2561	10-2560	10-2562	10-2562	10-2561	10-2561	10-2560	10-2560	10-2560	10-2561
RE16-10-3838	16-609487	16.0–18.0	Qbt 4	10-2562	10-2561	10-2560	10-2562	10-2562	10-2561	10-2561	10-2560	10-2560	10-2560	10-2561
RE16-10-3839	16-609488	6.0–7.5	Qbt 4	10-2562	10-2561	10-2560	10-2562	10-2562	10-2561	10-2561	10-2560	10-2560	10-2560	10-2561
RE16-10-3840	16-609488	12.0–13.5	Qbt 4	10-2562	10-2561	10-2560	10-2562	10-2562	10-2561	10-2561	10-2560	10-2560	10-2560	10-2561
RE16-10-3841	16-609489	5.0–7.0	Qbt 4	10-2562	10-2561	10-2560	10-2562	10-2562	10-2561	10-2561	10-2560	10-2560	10-2560	10-2561
RE16-10-3842	16-609489	15.0–17.0	Qbt 4	10-2562	10-2561	10-2560	10-2562	10-2562	10-2561	10-2561	10-2560	10-2560	10-2560	10-2561

*— = Analyses not requested.

Table 9.6-2
Summary of Inorganic Chemicals above BVs at SWMU 16-029(w)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Mercury	Nickel	Nitrate	Selenium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**[b]	**14500**	**11.2**	**1690**	**0.1**	**6.58**	**na**	**0.3**	**17**	**63.5**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**na**	**2920**[d]	**300**[e]	**45400**	**22700**	**68100**	**795000**	**800**	**na**	**310**[e]	**22700**	**1820000**	**5680**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**na**	**1910**[d]	**238**	**31700**	**15800**	**47500**	**554000**	**560**	**na**	**238**	**15800**	**1260000**	**3960**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**na**	**219**[d]	**23**[e]	**3130**	**1560**	**4690**	**54800**	**400**	**na**	**23**[e]	**1560**	**125000**	**391**	**391**	**23500**
RE16-99-0007	16-03409	3.0–3.5	Qbt 4	23000	NA[g]	5.7	280 (J-)	—[h]	—	7.3	—	—	NA	NA	—	45	2600	0.12 (U)	8.6	NA	1.2 (U)	—	—
RE16-99-0008	16-03409	4.5–5.0	Qbt 4	33000	NA	11	150 (J-)	1.6	3600	12	5.2	7.8	NA	NA	15000	110	4500	—	17	NA	1.2 (U)	18	78
RE16-98-0022	16-05829	2.0–2.5	Qbt 4	13300	—	4.2	114 (J-)	—	—	9.1 (J-)	3.3	5.1	NA	NA	—	11.5	—	—	—	NA	0.49	24.2 (J-)	—
RE16-10-3835	16-609486	10.0–14.0	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	0.52 (U)	0.59 (J)	—	—	—	—	NA	—	1.2	—	—
RE16-10-3836	16-609486	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.52 (U)	0.47 (J)	—	—	—	—	NA	—	1	—	—
RE16-10-3837	16-609487	11.0–13.0	Qbt 4	7840	—	—	—	—	3080	—	—	—	0.53 (U)	9	—	—	—	—	—	0.073 (J)	1.3	—	—
RE16-10-3838	16-609487	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.48 (J)	—	—	—	—	—	0.07 (J)	1.1	—	—
RE16-10-3839	16-609488	6.0–7.5	Qbt 4	—	—	—	—	—	—	—	—	—	0.51 (U)	0.5 (J)	—	—	—	—	—	0.1 (J)	1.2	—	—
RE16-10-3840	16-609488	12.0–13.5	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	0.51 (U)	0.31 (J)	—	—	—	—	—	0.088 (J)	1.3	—	—
RE16-10-3841	16-609489	5.0–7.0	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	0.52 (U)	0.8 (J)	—	—	—	—	—	0.056 (J)	1.4	—	—
RE16-10-3842	16-609489	15.0–17.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.53 (U)	0.66 (J)	—	—	—	—	—	0.15 (J)	1.2	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] NA = Not analyzed.

[h] — = Not detected or not detected above BV.

Table 9.6-3
Summary of Organic Chemicals Detected at SWMU 16-029(w)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Amino-2,6-dinitrotoluene[4-]	Benzene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Butylbenzene[tert-]	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chlorodibromomethane	Chloroethane
Industrial SSL[a]				**851000**	**1900[b]**	**85.4**	**2500000[b]**	**1370**	**1800[b]**	**na[c]**	**29.2**	**2420**	**83.6**	**369000**	**610[d]**	**450[d]**	**550[d]**	**7540**	**24.3**	**2140**	**61.3**	**137000**
Recreational SSL[e]				**702000**	**1440**	**442**	**1590000**	**1830**	**5730**	**na**	**190**	**3240**	**468**	**446000**	**69600**	**69600**	**68800**	**38300**	**141**	**9170**	**305**	**1280000**
Residential SSL[a]				**67500**	**150[b]**	**15.5**	**240000[b]**	**347**	**300[b]**	**na**	**5.25**	**616**	**22.3**	**39600**	**140[d]**	**110[d]**	**130[d]**	**1940**	**4.38**	**508**	**11.9**	**43600**
RE16-99-0007	16-03409	3.0–3.5	Qbt 4	0.5	—[f]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-99-0008	16-03409	4.5–5.0	Qbt 4	0.38	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-99-0016	16-03409	5.5–6.0	Qbt 4	—	NA[g]	—	NA	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-0022	16-05829	2.0–2.5	Qbt 4	—	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-0023	16-05836	4.0–4.33	Qbt 4	—	NA	0.006 (J)	0.041 (J)	—	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.011 (J)	0.022 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.011 (J)
RE16-10-3835	16-609486	10.0–14.0	Qbt 4	—	0.0058 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3836	16-609486	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3837	16-609487	11.0–13.0	Qbt 4	0.084 (J)	—	—	—	0.14 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3838	16-609487	16.0–18.0	Qbt 4	0.011 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3840	16-609488	12.0–13.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3841	16-609489	5.0–7.0	Qbt 4	0.014 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3842	16-609489	15.0–17.0	Qbt 4	0.056 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 9.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chloroform	Chloromethane	Chlorotoluene[2-]	Chlorotoluene[4-]	Dibromo-3-Chloropropane[1,2-]	Dibromoethane[1,2-]	Dibromomethane	Dichlorobenzene[1,2-]	Dichlorobenzene[1,3-]	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dichloropropane[1,3-]
Industrial SSL[a]				**31.9**	**61.3**	**22700**	**72000**[b]	**1.09**	**3.14**	**11400**	**14300**	**180**[d]	**180**	**1550**	**350**	**42.8**	**2220**	**11400**	**995**	**81.7**	**20000**[b]
Recreational SSL[e]				**224**	**305**	**15800**	**na**	**70.7**	**14.6**	**7920**	**48600**	**36100**	**1260**	**13000**	**2240**	**235**	**13800**	**7920**	**5960**	**483**	**na**
Residential SSL[a]				**5.72**	**11.9**	**1560**	**5500**[b]	**0.194**	**0.574**	**782**	**3010**	**69**[d]	**32.2**	**481**	**62.9**	**7.74**	**618**	**782**	**273**	**14.7**	**1600**[b]
RE16-99-0007	16-03409	3.0–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-99-0008	16-03409	4.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-99-0016	16-03409	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-0022	16-05829	2.0–2.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-0023	16-05836	4.0–4.33	Qbt 4	0.006 (J)	0.011 (J)	0.006 (J)	0.006 (J)	0.011 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.011 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)
RE16-10-3835	16-609486	10.0–14.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—
RE16-10-3836	16-609486	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—
RE16-10-3837	16-609487	11.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—
RE16-10-3838	16-609487	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—
RE16-10-3840	16-609488	12.0–13.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—
RE16-10-3841	16-609489	5.0–7.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—
RE16-10-3842	16-609489	15.0–17.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—

Table 9.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dichloropropane[2,2-]	Dichloropropene[1,1-]	Dichloropropene[cis-1,3-]	Dichloropropene[trans-1,3-]	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Hexanone[2-]	Iodomethane	Isopropylbenzene	Isopropyltoluene[4-]	Methoxychlor[4,4'-]	Methyl-2-pentanone[4-]	Propylbenzene[1-]	Styrene
Industrial SSL[a]				**na**	**na**	**na**	**na**	**68400**	**103**	**385**	**1400**	**na**	**14900**	**14900**[h]	**3100**[b]	**73300**	**21000**[b]	**51200**
Recreational SSL[e]				**na**	**na**	**na**	**na**	**39900**	**82.5**	**2060**	**na**	**na**	**52700**	**52700**[h]	**1990**	**62300**	**69600**	**126000**
Residential SSL[a]				**na**	**na**	**na**	**na**	**6110**	**15.7**	**69.7**	**210**	**na**	**3210**	**3210**[h]	**310**[b]	**5950**	**3400**[b]	**8970**
RE16-99-0007	16-03409	3.0–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.00057 (J)	NA	—	—	—
RE16-99-0008	16-03409	4.5–5.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—
RE16-99-0016	16-03409	5.5–6.0	Qbt 4	—	—	—	—	NA	NA	—	—	—	—	—	NA	—	—	—
RE16-98-0022	16-05829	2.0–2.5	Qbt 4	—	—	—	—	0.19 (J)	—	—	—	—	—	—	NA	—	—	—
RE16-98-0023	16-05836	4.0–4.33	Qbt 4	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.12 (J)	—	0.006 (J)	0.022 (J)	0.006 (J)	0.006 (J)	0.006 (J)	NA	0.022 (J)	0.006 (J)	0.006 (J)
RE16-10-3835	16-609486	10.0–14.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3836	16-609486	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.00085 (J)	—	—	—
RE16-10-3837	16-609487	11.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3838	16-609487	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3840	16-609488	12.0–13.5	Qbt 4	—	—	—	—	—	0.0043 (J)	—	—	—	—	—	—	—	—	—
RE16-10-3841	16-609489	5.0–7.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3842	16-609489	15.0–17.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 9.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Tetrachloroethane[1,1,1,2-]	Tetrachloroethane[1,1,2,2-]	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Trichloropropane[1,2,3-]	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Vinyl Chloride	Xylene (Total)
Industrial SSL[a]				**161**	**43.3**	**36.4**	**57900**	**339000**	**77100**	**94.3**	**253**	**6760**	**4.54**	**260**[b]	**10000**[b]	**469**	**25.9**	**3610**
Recreational SSL[e]				**865**	**175**	**91.7**	**60800**	**2750000**	**500000**	**466**	**1450**	**49800**	**8.08**	**6880**	**7930**	**301**	**67.5**	**27800**
Residential SSL[a]				**29.2**	**7.98**	**6.99**	**5570**	**104000**	**21800**	**17.2**	**45.7**	**2010**	**0.915**	**62**[b]	**780**[b]	**35.9**	**0.865**	**1090**
RE16-99-0007	16-03409	3.0–3.5	Qbt 4	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—
RE16-99-0008	16-03409	4.5–5.0	Qbt 4	—	—	—	—	NA	—	—	—	—	—	—	—	—	—	—
RE16-99-0016	16-03409	5.5–6.0	Qbt 4	—	—	0.0027 (J)	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-98-0022	16-05829	2.0–2.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-0023	16-05836	4.0–4.33	Qbt 4	0.006 (J)	0.006 (J)	0.006 (J)	0.001 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	0.006 (J)	—	0.011 (J)	0.006 (J)
RE16-10-3835	16-609486	10.0–14.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3836	16-609486	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3837	16-609487	11.0–13.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3838	16-609487	16.0–18.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3840	16-609488	12.0–13.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	0.0063 (J+)	—	—
RE16-10-3841	16-609489	5.0–7.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3842	16-609489	15.0–17.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] na = Not available.

[d] SSL from EPA (2007, 099314).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

[h] Isopropylbenzene was used as a surrogate based on structural similarity.

Table 9.6-4
Summary of Radionuclides Detected at SWMU 16-029(w)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-238
Qbt 2,3,4 BV[a]				**na**[b]
Industrial SAL[c]				**240**
Recreational SAL[c]				**330**
Residential SAL[c]				**37**
RE16-10-3841	16-609489	5.0–7.0	Qbt 4	0.043

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

Table 9.7-1
Summary of Samples Collected and Analyses Requested at SWMU 16-025(x)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
0316-97-0003	16-03015	0.0–1.0	Fill	—*	—	3237R	—	—	3238R, 3239R	—	3236R	3236R	—
0316-97-0004	16-03017	0.0–1.0	Fill	—	—	3237R	—	—	3238R, 3239R	—	3236R	3236R	—
0316-97-0005	16-03022	0.0–1.0	Soil	—	—	3237R	—	—	3238R, 3239R	—	3236R	3236R	—
RE16-10-3864	16-609492	0.0–0.5	Soil	10-1687	10-1687	10-1685	10-1687	10-1687	10-1686	10-1687	10-1685	10-1685	10-1687
RE16-10-3865	16-609492	5.5–6.0	Qbt 4	10-1687	10-1686	10-1685	10-1687	10-1687	10-1686	10-1686	10-1685	10-1685	10-1686
RE16-10-3866	16-609493	0.0–0.5	Soil	10-1687	10-1686	10-1685	10-1687	10-1687	10-1686	10-1686	10-1685	10-1685	10-1686
RE16-10-3867	16-609493	5.5–6.0	Qbt 4	10-1687	10-1686	10-1685	10-1687	10-1687	10-1686	10-1686	10-1685	10-1685	10-1686
RE16-10-3868	16-609494	0.0–0.5	Soil	10-1687	10-1686	10-1685	10-1687	10-1687	10-1686	10-1686	10-1685	10-1685	10-1686
RE16-10-3869	16-609494	5.5–6.0	Qbt 4	10-1687	10-1686	10-1685	10-1687	10-1687	10-1686	10-1686	10-1685	10-1685	10-1686

*— = Analyses not requested.

Table 9.7-2
Summary of Inorganic Chemicals above BVs at SWMU 16-025(x)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Bromide	Cadmium	Fluoride	Lead	Mercury	Selenium	Silver	Thallium	Uranium
Qbt 2,3,4 BV[a]				**0.5**	**46**	**na**[b]	**1.63**	**na**	**11.2**	**0.1**	**0.3**	**1**	**1.1**	**2.40**
Soil BV[a]				**0.83**	**295**	**na**	**0.4**	**na**	**22.3**	**0.1**	**1.52**	**1**	**0.73**	**1.82**
Industrial SSL[c]				**454**	**224000**	**na**	**1120**	**68100**	**800**	**310**[d]	**5680**	**5680**	**74.9**	**3410**
Recreational SSL[e]				**317**	**158000**	**na**	**784**	**47500**	**560**	**238**	**3960**	**3960**	**52.3**	**2380**
Residential SSL[c]				**31.3**	**15600**	**na**	**77.9**	**4690**	**400**	**23**[d]	**391**	**391**	**5.16**	**235**
0316-97-0003	16-03015	0.0–1.0	Fill	11 (UJ)	—[f]	NA[g]	0.55 (U)	NA	—	0.11 (UJ)	—	2.2 (U)	1.4 (U)	10.3
0316-97-0004	16-03017	0.0–1.0	Fill	11 (UJ)	—	NA	0.54 (U)	NA	25	0.11 (UJ)	—	2.2 (U)	1.4 (U)	5.13
0316-97-0005	16-03022	0.0–1.0	Soil	11 (UJ)	—	NA	0.55 (U)	NA	—	0.11 (UJ)	—	2.2 (U)	1.4 (U)	—
RE16-10-3864	16-609492	0.0–0.5	Soil	—	—	—	0.526 (U)	2.67 (J-)	—	—	—	—	—	NA
RE16-10-3865	16-609492	5.5–6.0	Qbt 4	0.661 (J)	—	—	—	1.53 (J-)	—	—	1 (U)	—	—	NA
RE16-10-3866	16-609493	0.0–0.5	Soil	—	—	—	0.542 (U)	2.91 (J-)	—	—	—	—	—	NA
RE16-10-3867	16-609493	5.5–6.0	Qbt 4	—	46.6	—	—	6.82 (J-)	—	—	1.03 (U)	—	—	NA
RE16-10-3868	16-609494	0.0–0.5	Soil	1.03 (U)	—	—	0.516 (U)	5.9 (J-)	—	—	—	—	—	NA
RE16-10-3869	16-609494	5.5–6.0	Qbt 4	0.981 (U)	116	1.55 (J)	—	19.2 (J-)	37.9	—	1.01 (U)	—	—	NA

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV

[g] NA = Not analyzed.

Table 9.7-3
Summary of Organic Chemicals Detected at SWMU 16-025(x)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Anthracene	Butanone[2-]	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Tetrachloroethene	Toluene
Industrial SSL[a]				**851000**	**183000**	**369000**	**14900[b]**	**4100[c]**	**252**	**20500**	**36.4**	**57900**
Recreational SSL[d]				**702000**	**104000**	**446000**	**52700[b]**	**3170**	**1950**	**12000**	**91.7**	**60800**
Residential SSL[a]				**67500**	**17200**	**39600**	**3210[b]**	**310[c]**	**45**	**1830**	**6.99**	**5570**
0316-97-0003	16-03015	0.0–1.0	Fill	—[e]	—	—	—	1.1 (J)	1.8 (J)	—	—	—
0316-97-0004	16-03017	0.0–1.0	Fill	—	1.2 (J)	—	—	—	—	1.1 (J)	—	—
RE16-10-3864	16-609492	0.0–0.5	Soil	0.0313 (J)	—	0.0018 (J)	0.00483	—	—	—	0.000579 (J)	0.0008 (J)
RE16-10-3866	16-609493	0.0–0.5	Soil	0.144 (J)	—	0.00196 (J)	0.0113	—	—	—	0.00185	0.00289
RE16-10-3867	16-609493	5.5–6.0	Qbt 4	0.00191 (J)	—	—	—	—	—	—	—	—
RE16-10-3868	16-609494	0.0–0.5	Soil	—	—	—	0.00275	—	—	—	0.00824	0.000498 (J)
RE16-10-3869	16-609494	5.5–6.0	Qbt 4	0.00281 (J)	—	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Isopropylbenzene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 9.8-1
Summary of Samples Collected and Analyses Requested at SWMU 16-017(p)-99

Sample ID	Location ID	Depth (ft)	Media	Anions	High Explosives	Metals	Perchlorate	SVOC	VOC
RE16-10-3044	16-609260	0.0–0.5	Soil	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3045	16-609260	5.5–6.0	Soil	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3046	16-609261	0.0–0.5	Fill	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3047	16-609261	5.5–6.0	Soil	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3048	16-609262	0.0–0.5	Fill	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3049	16-609262	5.5–6.0	Fill	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3050	16-609263	0.0–0.5	Fill	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3051	16-609263	5.5–6.0	Fill	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3052	16-609264	0.0–0.5	Fill	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575
RE16-10-3053	16-609264	5.5–6.0	Soil	10-1576	10-1575	10-1576	10-1576	10-1575	10-1575

Table 9.8-2
Summary of Inorganic Chemicals above BVs at SWMU 16-017(p)-99

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Cobalt	Copper	Fluoride	Lead	Manganese	Nitrate	Perchlorate	Selenium	Vanadium	Zinc
Soil BV[a]				**0.83**	**0.4**	**8.64**	**14.7**	**na**[b]	**22.3**	**671**	**na**	**na**	**1.52**	**39.6**	**48.8**
Industrial SSL[c]				**454**	**1120**	**300**[d]	**45400**	**68100**	**800**	**145000**	**1820000**	**795**	**5680**	**5680**	**341000**
Recreational SSL[e]				**317**	**784**	**238**	**31700**	**47500**	**560**	**110000**	**1260000**	**555**	**3960**	**3960**	**238000**
Residential SSL[c]				**31.3**	**77.9**	**23**[d]	**3130**	**4690**	**400**	**10700**	**125000**	**54.8**	**391**	**391**	**23500**
RE16-10-3044	16-609260	0.0–0.5	Soil	0.946 (U)	0.59 (U)	—[f]	—	3.06 (J-)	—	—	1.36	—	—	—	49.6
RE16-10-3045	16-609260	5.5–6.0	Soil	1.1 (U)	0.632 (U)	—	—	7.95 (J-)	—	—	—	—	—	—	—
RE16-10-3046	16-609261	0.0–0.5	Fill	1.31 (U)	0.596 (U)	11.6	17.7	2.88 (J-)	23.3	680	—	—	—	40.3	—
RE16-10-3047	16-609261	5.5–6.0	Soil	1 (U)	0.55 (U)	—	—	7.25 (J-)	—	—	—	0.00113 (J)	2.12 (UJ)	—	—
RE16-10-3048	16-609262	0.0–0.5	Fill	—	0.634 (U)	—	—	3.46 (J-)	—	—	—	—	—	—	—
RE16-10-3049	16-609262	5.5–6.0	Fill	1.12 (U)	0.555 (U)	—	—	5.74 (J-)	—	—	—	0.000573 (J)	—	—	—
RE16-10-3050	16-609263	0.0–0.5	Fill	—	0.634 (U)	—	—	2.8 (J-)	—	—	1.8	—	—	—	—
RE16-10-3051	16-609263	5.5–6.0	Fill	0.843 (U)	0.563 (U)	—	—	7.38 (J-)	—	—	6.77	—	—	—	—
RE16-10-3052	16-609264	0.0–0.5	Fill	1.01 (U)	0.617 (U)	9.81	—	1.24 (J-)	25.9	942	—	—	—	—	—
RE16-10-3053	16-609264	5.5–6.0	Soil	—	0.548 (U)	—	—	4.06 (J-)	—	—	1.32	—	—	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

Table 9.8-3
Summary of Organic Chemicals Detected at SWMU 16-017(p)-99

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Phenanthrene	Pyrene
Industrial SSL[a]				**36700**	**2.34**	**23.4**	**2340**	**14900**[b]	**4100**[c]	**20500**	**18300**
Recreational SSL[d]				**20800**	**3.01**	**30.1**	**3010**	**52700**[b]	**3170**	**12000**	**10400**
Residential SSL[a]				**3440**	**0.621**	**6.21**	**621**	**3210**[b]	**310**[c]	**1830**	**1720**
RE16-10-3046	16-609261	0.0–0.5	Fill	—[e]	0.0223 (J)	0.0156 (J)	0.016 (J)	—	0.00877 (J)	0.0154 (J)	0.0243 (J)
RE16-10-3052	16-609264	0.0–0.5	Fill	0.291	—	—	—	0.036	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Isopropylbenzene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 9.9-1
Summary of Samples Collected and Analyses Requested at SWMU 16-017(w)-99

Sample ID	Location ID	Depth (ft)	Media	Anions	High Explosives	Metals	Perchlorate	SVOC	VOC
RE16-10-3600	16-609441	0.0–0.5	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3601	16-609441	5.5–6.0	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3602	16-609442	0.0–0.5	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3603	16-609442	5.0–6.0	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-13936	16-609442	8.5–9.0	Soil	10-2355	10-2354	10-2355	10-2355	10-2354	10-2354
RE16-10-3604	16-609443	0.0–0.5	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3605	16-609443	5.5–6.0	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3606	16-609444	0.0–0.5	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3607	16-609444	5.5–6.0	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3608	16-609445	0.0–0.5	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3609	16-609445	5.5–6.0	Soil	10-1572	10-1571	10-1572	10-1572	10-1571	10-1571
RE16-10-3611	16-609446	5.5–6.0	Soil	10-2355	10-2354	10-2355	10-2355	10-2354	10-2354
RE16-10-3610	16-609446	8.5–9.0	Soil	10-2355	10-2354	10-2355	10-2355	10-2354	10-2354

Table 9.9-2
Summary of Inorganic Chemicals above BVs at SWMU 16-017(w)-99

Sample ID	Location ID	Depth (ft)	Media	Antimony	Bromide	Cadmium	Calcium	Chromium	Cobalt	Fluoride	Nitrate	Perchlorate	Zinc
Soil BV[a]				**0.83**	**na**[b]	**0.4**	**6120**	**19.3**	**8.64**	**na**	**na**	**na**	**48.8**
Industrial SSL[c]				**454**	**na**	**1120**	**na**	**2920**[d]	**300**[e]	**68100**	**1820000**	**795**	**341000**
Recreational SSL[f]				**317**	**na**	**784**	**na**	**1910**[d]	**238**	**47500**	**1260000**	**555**	**238000**
Residential SSL[c]				**31.3**	**na**	**77.9**	**na**	**219**[d]	**23**[e]	**4690**	**125000**	**54.8**	**23500**
RE16-10-3600	16-609441	0.0–0.5	Soil	1.33 (U)	—[g]	0.562 (U)	—	—	—	2.06 (J-)	3.82	0.00085 (J)	—
RE16-10-3601	16-609441	5.5–6.0	Soil	1.01 (U)	—	0.555 (U)	—	—	—	4.09 (J-)	8.82	0.000619 (J)	—
RE16-10-3602	16-609442	0.0–0.5	Soil	1.16 (U)	—	0.563 (U)	—	—	—	2.03 (J-)	1.44	—	—
RE16-10-3603	16-609442	5.0–6.0	Soil	0.839 (U)	—	0.499 (U)	—	—	—	4.65 (J-)	—	—	—
RE16-10-13936	16-609442	8.5–9.0	Soil	1.09 (UJ)	—	0.546 (U)	—	—	9.8	3.09	14.5	—	—
RE16-10-3604	16-609443	0.0–0.5	Soil	1.05 (U)	—	0.512 (U)	—	—	—	2.31 (J-)	—	—	—
RE16-10-3605	16-609443	5.5–6.0	Soil	1.64 (U)	—	0.548 (U)	—	—	—	3.16 (J-)	—	—	—
RE16-10-3606	16-609444	0.0–0.5	Soil	0.978 (U)	—	0.522 (U)	—	—	—	2.5 (J-)	—	—	—
RE16-10-3607	16-609444	5.5–6.0	Soil	—	—	0.546 (U)	—	—	—	6.14 (J-)	10.2	0.000847 (J)	—
RE16-10-3608	16-609445	0.0–0.5	Soil	1.74 (U)	—	0.559 (U)	—	—	—	2.25 (J-)	—	—	—
RE16-10-3609	16-609445	5.5–6.0	Soil	1.23 (U)	—	0.511 (U)	6730	20.5	—	3.31 (J-)	6.83	0.000709 (J)	50.2
RE16-10-3611	16-609446	5.5–6.0	Soil	1.1 (UJ)	1.43 (J)	0.548 (U)	—	—	—	4.12	2.04	—	—
RE16-10-3610	16-609446	8.5–9.0	Soil	1.08 (UJ)	—	0.538 (U)	—	—	—	4.36	1.59	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

Table 9.9-3
Summary of Organic Chemicals Detected at SWMU 16-017(w)-99

Sample ID	Location ID	Depth (ft)	Media	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Butanone[2-]	Fluoranthene	Methylene Chloride	Pyrene
Industrial SSL[a]				**23.4**	**2.34**	**23.4**	**369000**	**24400**	**1090**	**18300**
Recreational SSL[b]				**30.1**	**3.01**	**30.1**	**446000**	**13900**	**4520**	**10400**
Residential SSL[a]				**6.21**	**0.621**	**6.21**	**39600**	**2290**	**199**	**1720**
RE16-10-3600	16-609441	0.0–0.5	Soil	0.0147 (J)	0.0129 (J)	0.0209 (J)	—[c]	0.015 (J)	—	0.0179 (J)
RE16-10-3602	16-609442	0.0–0.5	Soil	—	—	0.0141 (J)	—	—	—	0.0143 (J)
RE16-10-3604	16-609443	0.0–0.5	Soil	—	—	0.0123 (J)	—	—	—	0.014 (J)
RE16-10-3607	16-609444	5.5–6.0	Soil	—	—	—	—	—	0.00229 (J)	—
RE16-10-3608	16-609445	0.0–0.5	Soil	—	—	—	—	—	—	0.0137 (J)
RE16-10-3609	16-609445	5.5–6.0	Soil	—	—	—	0.00359 (J)	—	—	—
RE16-10-3611	16-609446	5.5–6.0	Soil	—	—	—	—	0.0229 (J)	—	0.0138 (J)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSLs from LANL (2010, 108613).

[c] — = Not detected or not detected above BV.

Table 9.10-1
Summary of Samples Collected and Analyses Requested at SWMU 16-034(m)

Sample ID	Location ID	Depth (ft)	Media	Anions	High Explosives	Metals	Perchlorate	SVOC	VOC
0316-97-0528	16-04037	0.0–1.0	Soil	—*	3458R	3459R	—	3457R	—
0316-97-0578	16-04038	0.0–1.0	Soil	—	3458R	3459R	—	3457R	—
RE16-10-3001	16-609245	0.0–0.5	Soil	10-1629	10-1628	10-1629	10-1629	10-1628	10-1628
RE16-10-3002	16-609245	5.5–6.0	Qbt 4	10-1629	10-1628	10-1629	10-1629	10-1628	10-1628
RE16-10-14304	16-609245	8.5–9.0	Qbt 4	10-2521	10-2520	10-2521	10-2521	10-2520	10-2520
RE16-10-3003	16-609246	0.0–0.5	Soil	10-1629	10-1628	10-1629	10-1629	10-1628	10-1628
RE16-10-3004	16-609246	5.5–6.0	Soil	10-1629	10-1628	10-1629	10-1629	10-1628	10-1628
RE16-10-3005	16-609246	0.0–0.5	Fill	10-1629	10-1628	10-1629	10-1629	10-1628	10-1628
RE16-10-3006	16-609247	5.5–6.0	Qbt 4	10-1629	10-1628	10-1629	10-1629	10-1628	10-1628
RE16-10-14305	16-609247	8.5–9.0	Qbt 4	10-2521	10-2520	10-2521	10-2521	10-2520	10-2520
RE16-10-3007	16-609248	0.0–0.5	Fill	10-1629	10-1628	10-1629	10-1629	10-1628	10-1628
RE16-10-3008	16-609248	5.5–6.0	Qbt 4	10-1629	10-1628	10-1629	10-1629	10-1628	10-1628
RE16-10-14306	16-611840	0.0–0.5	Soil	10-2521	10-2520	10-2521	10-2521	10-2520	10-2520
RE16-10-14307	16-611840	5.5–6.0	Soil	10-2521	10-2520	10-2521	10-2521	10-2520	10-2520
RE16-10-14308	16-611840	8.5–9.0	Qbt 4	10-2521	10-2520	10-2521	10-2521	10-2520	10-2520
RE16-10-14309	16-611841	0.0–0.5	Soil	10-2521	10-2520	10-2521	10-2521	10-2520	10-2520
RE16-10-14310	16-611841	5.5–6.0	Qbt 4	10-2521	10-2520	10-2521	10-2521	10-2520	10-2520
RE16-10-14311	16-611841	8.5–9.0	Qbt 4	10-2521	10-2520	10-2521	10-2521	10-2520	10-2520

*— = Analyses not requested.

Table 9.10-2
Summary of Inorganic Chemicals above BVs at SWMU 16-034(m)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Cadmium	Chloride	Chromium	Copper	Fluoride	Lead	Nickel	Nitrate	Perchlorate	Selenium	Silver	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**46**	**1.63**	**94.6**	**7.14**	**4.66**	**na**[b]	**11.2**	**6.58**	**na**	**na**	**0.3**	**1**	**63.5**
Soil BV[a]				**29200**	**0.83**	**295**	**0.4**	**231**	**19.3**	**14.7**	**na**	**22.3**	**15.4**	**na**	**na**	**1.52**	**1**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**224000**	**1120**	**na**	**2920**[d]	**45400**	**68100**	**800**	**22700**	**1820000**	**795**	**5680**	**5680**	**341000**
Recreational SSL[e]				**791000**	**317**	**158000**	**784**	**na**	**1910**[d]	**31700**	**47500**	**560**	**15800**	**1260000**	**555**	**3960**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**15600**	**77.9**	**na**	**219**[d]	**3130**	**4690**	**400**	**1560**	**125000**	**54.8**	**391**	**391**	**23500**
0316-97-0528	16-04037	0.0–1.0	Soil	—[f]	9.6 (J-)	—	0.65 (U)	NA[g]	—	71.5	NA	64.5	—	NA	NA	—	2.2	190
0316-97-0578	16-04038	0.0–1.0	Soil	—	6.7 (J-)	—	0.58 (U)	NA	—	24	NA	—	—	NA	NA	—	—	57.7
RE16-10-3001	16-609245	0.0–0.5	Soil	—	1.48 (U)	—	2.63	—	29.9 (J)	2180	1.35 (J-)	153	—	—	—	—	4.12	1070
RE16-10-3002	16-609245	5.5–6.0	Qbt 4	—	0.536 (U)	—	—	—	—	17.8	4.06 (J-)	—	—	—	—	1.02 (U)	—	—
RE16-10-14304	16-609245	8.5–9.0	Qbt 4	—	—	—	—	—	—	18.8	2.4	—	—	—	—	1.1	—	—
RE16-10-3003	16-609246	0.0–0.5	Soil	—	0.844 (U)	—	0.558 (U)	—	—	15.2	1.47 (J-)	—	—	1.48	—	—	—	—
RE16-10-3004	16-609246	5.5–6.0	Soil	—	1.07 (U)	—	0.533 (U)	—	—	—	4.5 (J-)	—	—	—	—	—	—	—
RE16-10-3005	16-609247	0.0–0.5	Fill	—	1.53 (U)	—	0.547 (U)	—	—	19.1	1.14 (J-)	63.4	—	1.24	0.000624 (J)	—	—	134
RE16-10-3006	16-609247	5.5–6.0	Qbt 4	—	0.546 (U)	86.2	—	—	—	4.94	6.75 (J-)	—	6.9	—	—	1.08 (U)	—	—
RE16-10-14305	16-609247	8.5–9.0	Qbt 4	8140	—	127	—	114	—	—	10.1	13.4	—	0.058 (J)	—	0.57 (J-)	—	—
RE16-10-3007	16-609248	0.0–0.5	Fill	—	1.2 (U)	—	0.591 (U)	—	—	—	1.32 (J-)	—	—	—	—	—	—	57
RE16-10-3008	16-609248	5.5–6.0	Qbt 4	—	1.07 (U)	—	—	—	—	—	2.38 (J-)	—	—	—	—	1.07 (U)	—	—
RE16-10-14306	16-611840	0.0–0.5	Soil	—	0.87 (U)	—	—	—	—	43.1	0.4 (J)	29.7	—	0.19 (J)	—	—	—	69.1
RE16-10-14307	16-611840	5.5–6.0	Soil	—	—	—	—	—	—	—	5.4	—	—	0.093 (J)	—	—	—	—
RE16-10-14308	16-611840	8.5–9.0	Qbt 4	—	—	—	—	—	—	—	5.7	—	—	—	—	1.2	—	—
RE16-10-14309	16-611841	0.0–0.5	Soil	—	—	—	—	—	—	—	0.93 (J)	26.5	—	0.25 (J)	—	—	—	50.6
RE16-10-14310	16-611841	5.5–6.0	Qbt 4	8500	—	76.6	—	113	—	—	5.1	—	—	—	—	0.56 (J-)	—	—
RE16-10-14311	16-611841	8.5–9.0	Qbt 4	8590	—	109	—	184	—	—	6.3	—	—	0.073 (J)	—	0.56 (J-)	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSL for chromium hexavalent ion.

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

Table 9.10-3
Summary of Organic Chemicals Detected at SWMU 16-034(m)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Benzoic Acid	Butanone[2-]	Di-n-butylphthalate	Phenol	Trimethylbenzene[1,2,4-]
Industrial SSL[a]				**36700**	**851000**	**2500000**[b]	**369000**	**68400**	**205000**	**260**[b]
Recreational SSL[c]				**20800**	**702000**	**1590000**	**446000**	**39900**	**120000**	**6880**
Residential SSL[a]				**3440**	**67500**	**240000**[b]	**39600**	**6110**	**18300**	**62**[b]
0316-97-0528	16-04037	0.0–1.0	Soil	—[d]	NA[e]	—	NA	—	0.043 (J)	NA
0316-97-0578	16-04038	0.0–1.0	Soil	—	NA	0.11 (J)	NA	—	—	NA
RE16-10-3001	16-609245	0.0–0.5	Soil	—	—	—	—	0.518	—	—
RE16-10-3006	16-609247	5.5–6.0	Qbt 4	0.051	0.0324 (J)	—	0.00212 (J)	—	—	—
RE16-10-14306	16-611840	0.0–0.5	Soil	—	—	—	—	—	—	0.0034 (J)
RE16-10-14308	16-611840	8.5–9.0	Qbt 4	—	0.0073 (J)	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

[e] NA = Not analyzed.

Table 9.11-1
Summary of Samples Collected and Analyses Requested at AOC 16-024(n)

Sample ID	Location ID	Depth (ft)	Media	Anions	High Explosives	Metals	Perchlorate	SVOC	VOC
RE16-10-3238	16-609301	0.0–0.5	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3239	16-609301	5.5–6.0	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3240	16-609302	0.0–0.5	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3241	16-609302	5.5–6.0	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3242	16-609303	0.0–0.5	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3243	16-609303	5.5–6.0	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3244	16-609304	0.0–0.5	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3245	16-609304	5.5–6.0	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3246	16-609305	0.0–0.5	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632
RE16-10-3247	16-609305	5.5–6.0	Soil	10-1633	10-1632	10-1633	10-1633	10-1632	10-1632

Table 9.11-2
Summary of Inorganic Chemicals above BVs at AOC 16-024(n)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Copper	Fluoride	Lead	Nitrate	Perchlorate	Zinc
Soil BV[a]				**0.83**	**0.4**	**14.7**	**na**[b]	**22.3**	**na**	**na**	**48.8**
Industrial SSL[c]				**454**	**1120**	**45400**	**68100**	**800**	**1820000**	**795**	**341000**
Recreational SSL[d]				**317**	**784**	**31700**	**47500**	**560**	**1260000**	**555**	**238000**
Residential SSL[c]				**31.3**	**77.9**	**3130**	**4690**	**400**	**125000**	**54.8**	**23500**
RE16-10-3238	16-609301	0.0–0.5	Soil	—[e]	0.538 (J)	—	—	—	7.14	0.00102 (J+)	57.9
RE16-10-3239	16-609301	5.5–6.0	Soil	1.15 (U)	0.574 (U)	—	—	—	1.74	—	—
RE16-10-3240	16-609302	0.0–0.5	Soil	1.36 (U)	0.627 (J)	—	—	38.4	—	—	81.3
RE16-10-3241	16-609302	5.5–6.0	Soil	1.18 (U)	0.592 (U)	—	3.89 (J-)	—	—	—	—
RE16-10-3242	16-609303	0.0–0.5	Soil	0.977 (J)	0.609 (U)	—	—	—	—	—	—
RE16-10-3243	16-609303	5.5–6.0	Soil	1.1 (U)	0.552 (U)	—	—	—	—	—	—
RE16-10-3244	16-609304	0.0–0.5	Soil	—	0.672 (U)	28.8	—	32.8	—	—	55.8
RE16-10-3245	16-609304	5.5–6.0	Soil	1.13 (U)	0.564 (U)	—	—	—	—	—	—
RE16-10-3246	16-609305	0.0–0.5	Soil	1.25 (U)	0.625 (U)	73.5	—	32.6	2.51	—	81.7
RE16-10-3247	16-609305	5.5–6.0	Soil	1.18 (U)	0.588 (U)	—	—	—	—	0.00077 (J+)	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070).
[d] SSLs from LANL (2010, 108613).
[e] — = Not detected or not detected above BV.

Table 9.11-3
Summary of Organic Chemicals Detected at AOC 16-024(n)

Sample ID	Location ID	Depth (ft)	Media	Benzoic Acid	Butanone[2-]	Isopropyltoluene[4-]	Methylene Chloride
Industrial SSL[a]				**2500000[b]**	**369000**	**14900[c]**	**1090**
Recreational SSL[d]				**1590000**	**446000**	**52700[c]**	**4520**
Residential SSL[a]				**245000[b]**	**39600**	**3210[c]**	**199**
RE16-10-3238	16-609301	0.0–0.5	Soil	1.11	—[e]	—	0.00593 (J)
RE16-10-3240	16-609302	0.0–0.5	Soil	0.272 (J)	—	0.0506	—
RE16-10-3241	16-609302	5.5–6.0	Soil	—	0.00213 (J)	—	—
RE16-10-3242	16-609303	0.0–0.5	Soil	1.09	—	0.0151	0.00369 (J)
RE16-10-3243	16-609303	5.5–6.0	Soil	—	—	0.000651 (J)	—
RE16-10-3244	16-609304	0.0–0.5	Soil	—	—	0.000815 (J)	—
RE16-10-3246	16-609305	0.0–0.5	Soil	—	—	0.000461 (J)	—
RE16-10-3247	16-609305	5.5–6.0	Soil	—	0.00315 (J)	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[c] Isopropylbenzene was used as a surrogate based on structural similarity.
[d] SSLs from LANL (2010, 108613).
[e] — = Not detected or not detected above BV.

Table 9.12-1
Summary of Samples Collected and Analyses Requested at SWMU 16-034(n)

Sample ID	Location ID	Depth (ft)	Media	Anions	High Explosives	Metals	Perchlorate	SVOC	VOC
0316-97-0527	16-04029	0.0–1.0	Soil	—*	3353R	3352R	—	3351R	—
0316-97-0577	16-04032	0.0–1.0	Soil	—	3353R	3352R	—	3351R	—
RE16-10-4567	16-609772	0.0–0.5	Soil	10-1638	10-1637	10-1638	10-1638	10-1637	10-1637
RE16-10-4568	16-609772	5.5–6.0	Soil	10-1638	10-1637	10-1638	10-1638	10-1637	10-1637
RE16-10-4569	16-609773	0.0–0.5	Soil	10-1638	10-1637	10-1638	10-1638	10-1637	10-1637
RE16-10-4570	16-609773	5.5–6.0	Soil	10-1638	10-1637	10-1638	10-1638	10-1637	10-1637
RE16-10-4571	16-609774	0.0–0.5	Soil	10-1638	10-1637	10-1638	10-1638	10-1637	10-1637
RE16-10-4572	16-609774	5.5–6.0	Soil	10-1638	10-1637	10-1638	10-1638	10-1637	10-1637
RE16-10-4573	16-609775	0.0–0.5	Soil	10-1638	10-1637	10-1638	10-1638	10-1637	10-1637
RE16-10-4574	16-609775	5.5–6.0	Soil	10-1638	10-1637	10-1638	10-1638	10-1637	10-1637

*— = Analyses not requested.

Table 9.12-2
Summary of Inorganic Chemicals above BVs at SWMU 16-034(n)

Sample ID	Location ID	Depth (ft)	Media	Field Prep	Antimony	Cadmium	Fluoride	Lead	Mercury	Perchlorate	Sulfate	Zinc
Soil BV[a]					**0.83**	**0.4**	**na**[b]	**22.3**	**0.1**	**na**	**293**	**48.8**
Industrial SSL[c]					**454**	**1120**	**68100**	**800**	**310**[d]	**795**	**na**	**341000**
Recreational SSL[e]					**317**	**784**	**47500**	**560**	**238**	**555**	**na**	**238000**
Residential SSL[c]					**31.3**	**77.9**	**4690**	**400**	**23**[d]	**54.8**	**na**	**23500**
0316-97-0527	16-04029	0.0–1.0	Soil	na	—[f]	—	NA[g]	63.6	35	NA	NA	104
0316-97-0577	16-04032	0.0–1.0	Soil	na	—	—	NA	23.1	3	NA	NA	—
RE16-10-4567	16-609772	0.0–0.5	Soil	na	—	0.551 (U)	1.41 (J-)	—	0.467	—	—	—
RE16-10-4568	16-609772	5.5–6.0	Soil	na	0.84 (J)	0.534 (U)	6.51 (J-)	—	—	0.00342	—	—
RE16-10-4569	16-609773	0.0–0.5	Soil	na	—	0.587 (U)	1.13 (J-)	107	166	—	—	129
RE16-10-4570	16-609773	5.5–6.0	Soil	na	1.03 (J)	0.596 (U)	1.92 (J-)	44.1	28.4	—	718	64.1
RE16-10-4571	16-609774	0.0–0.5	Soil	na	—	0.539 (U)	1.56 (J-)	—	4.32	—	—	—
RE16-10-4572	16-609774	5.5–6.0	Soil	na	—	0.548 (U)	6.75 (J-)	—	0.824	—	—	—
RE16-10-4573	16-609775	0.0–0.5	Soil	na	1.05	0.518 (U)	1.14 (J-)	—	0.581	—	—	—
RE16-10-4574	16-609775	5.5–6.0	Soil	na	1.09 (U)	0.547 (U)	6.82 (J-)	—	—	0.00175 (J)	1010	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

Table 9.12-3
Summary of Organic Chemicals Detected at SWMU 16-034(n)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Fluoranthene	Isopropyltoluene[4-]	Phenanthrene	Pyrene	Toluene
Industrial SSL[a]				**851000**	**183000**	**23.4**	**2.34**	**23.4**	**234**	**2340**	**24400**	**14900**[b]	**20500**	**18300**	**57900**
Recreational SSL[c]				**702000**	**104000**	**30.1**	**3.01**	**30.1**	**301**	**3010**	**13900**	**52700**[b]	**12000**	**10400**	**60800**
Residential SSL[a]				**67500**	**17200**	**6.21**	**0.621**	**6.21**	**62.1**	**621**	**2290**	**3210**[b]	**1830**	**1720**	**5570**
RE16-10-4567	16-609772	0.0–0.5	Soil	—[d]	—	—	—	—	—	—	—	—	—	—	0.000556 (J+)
RE16-10-4568	16-609772	5.5–6.0	Soil	0.00572	—	—	—	—	—	—	—	0.000558 (J)	—	—	—
RE16-10-4569	16-609773	0.0–0.5	Soil	0.00448 (J+)	0.0129 (J)	0.0378 (J)	0.0347 (J)	0.0475	0.0147 (J)	0.0378 (J)	0.0711	0.00168	0.052	0.0724	0.00268 (J+)
RE16-10-4570	16-609773	5.5–6.0	Soil	0.00247 (J)	—	—	—	—	—	—	—	—	—	—	0.0006 (J)
RE16-10-4572	16-609774	5.5–6.0	Soil	0.00433 (J)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-4574	16-609775	5.5–6.0	Soil	0.0192	—	—	—	—	—	—	—	0.00112	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Isopropylbenzene was used as a surrogate based on structural similarity.

[c] SSLs from LANL (2010, 108613).

[d] — = Not detected or not detected above BV.

Table 9.13-1
Summary of Samples Collected and Analyses Requested at AOC 16-024(m)

Sample ID	Location ID	Depth (ft)	Media	Anions	High Explosives	Metals	Perchlorate	SVOC	VOC
0316-97-0529	16-04041	0.0–1.0	Soil	—*	3353R	3352R	—	3351R	—
RE16-10-3018	16-609250	0.0–0.5	Fill	10-1574	10-1574	10-1574	10-1574	10-1574	10-1574
RE16-10-3019	16-609250	3.0–3.5	Qbt 4	10-1574	10-1574	10-1574	10-1574	10-1574	10-1574
RE16-10-14280	16-609250	8.5–9.0	Qbt 4	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-3020	16-609251	0.0–0.5	Fill	10-1574	10-1574	10-1574	10-1574	10-1574	10-1574
RE16-10-3021	16-609251	5.5–6.0	Soil	10-1574	10-1574	10-1574	10-1574	10-1574	10-1574
RE16-10-14281	16-609251	8.5–9.0	Qbt 4	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-3022	16-609252	0.0–0.5	Soil	10-1631	10-1630	10-1631	10-1631	10-1630	10-1630
RE16-10-3023	16-609252	5.5–6.0	Soil	10-1631	10-1630	10-1631	10-1631	10-1630	10-1630
RE16-10-14282	16-609252	8.5–9.0	Qbt 4	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-3024	16-609253	0.0–0.5	Soil	10-1631	10-1630	10-1631	10-1631	10-1630	10-1630
RE16-10-3025	16-609253	5.5–6.0	Soil	10-1631	10-1630	10-1631	10-1631	10-1630	10-1630
RE16-10-14319	16-609253	8.5–9.0	Qbt 4	10-2519	10-2518	10-2519	10-2519	10-2518	10-2518
RE16-10-14283	16-611836	0.0–0.5	Fill	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14284	16-611836	5.5–6.0	Fill	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14285	16-611836	8.5–9.0	Qbt 4	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14286	16-611837	0.0–0.5	Fill	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14287	16-611837	5.5-6.0	Qbt 4	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14288	16-611837	8.5-9.0	Qbt 4	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14292	16-611838	0.0–0.5	Soil	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14290	16-611838	5.5–6.0	Qbt 4	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14291	16-611838	8.5–9.0	Qbt 4	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14289	16-611839	0.0–0.5	Fill	10-2501	10-2500	10-2501	10-2501	10-2500	10-2500
RE16-10-14293	16-611839	5.5–6.0	Qbt 4	10-2519	10-2518	10-2519	10-2519	10-2518	10-2518
RE16-10-14294	16-611839	8.5–9.0	Qbt 4	10-2519	10-2518	10-2519	10-2519	10-2518	10-2518

*— = Analyses not requested.

Table 9.13-2
Summary of Inorganic Chemicals above BVs at AOC 16-024(m)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Fluoride	Iron	Lead	Magnesium	Manganese	Nickel	Nitrate	Perchlorate	Selenium	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na[b]**	**14500**	**11.2**	**1690**	**482**	**6.58**	**na**	**na**	**0.3**	**1.1**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**na**	**21500**	**22.3**	**4610**	**671**	**15.4**	**na**	**na**	**1.52**	**0.73**	**39.6**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**68100**	**795000**	**800**	**na**	**145000**	**22700**	**1820000**	**795**	**5680**	**74.9**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**1910[d]**	**238**	**31700**	**47500**	**554000**	**560**	**na**	**110000**	**15800**	**1260000**	**555**	**3960**	**52.3**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**4690**	**54800**	**400**	**na**	**10700**	**1560**	**125000**	**54.8**	**391**	**5.16**	**391**	**23500**
0316-97-0529	16-04041	0.0–1.0	Soil	—[g]	—	—	—	—	—	—	8.9 (J)	—	NA[h]	—	—	—	—	—	NA	NA	—	—	—	—
RE16-10-3018	16-609250	0.0–0.5	Fill	—	1.07 (UJ)	—	—	0.533 (U)	—	—	—	—	1.64 (J-)	—	—	—	—	—	1.34	—	—	—	—	—
RE16-10-3019	16-609250	3.0–3.5	Qbt 4	10000	1.08 (UJ)	—	265 (J-)	—	3540 (J)	13.9	5.46	11.3	7.11 (J-)	—	—	—	—	8.47	—	—	1.06 (UJ)	—	29.7	—
RE16-10-14280	16-609250	8.5–9.0	Qbt 4	—	1.08 (U)	—	62.8 (J+)	—	—	—	3.87	5.1	8.11 (J-)	—	17.9	—	629	8.93 (J-)	—	—	1.04 (U)	1.92 (J)	—	—
RE16-10-3020	16-609251	0.0–0.5	Fill	—	1.13 (UJ)	—	—	0.566 (U)	—	—	—	—	1.87 (J-)	—	30.4	—	—	—	—	—	—	—	—	72.5
RE16-10-3021	16-609251	5.5–6.0	Soil	—	1.06 (UJ)	—	—	0.532 (U)	—	—	—	—	5.32 (J-)	—	—	—	—	—	—	0.00114 (J)	—	—	—	—
RE16-10-14281	16-609251	8.5–9.0	Qbt 4	8050	1.04 (U)	—	246 (J+)	—	2230 (J+)	9.21	5.88	8.91	4.08 (J-)	—	19.5	1720 (J+)	—	—	—	—	1.03 (U)	—	27.2	—
RE16-10-3022	16-609252	0.0–0.5	Soil	—	1.14 (J)	—	—	0.611 (U)	—	—	—	—	2.53 (J-)	—	—	—	—	—	1.49	—	—	—	—	—
RE16-10-3023	16-609252	5.5–6.0	Soil	—	1.19	—	—	0.544 (U)	—	—	—	—	4.14 (J-)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14282	16-609252	8.5–9.0	Qbt 4	—	1.05 (U)	—	—	—	—	—	—	—	7.03 (J-)	—	—	—	—	—	—	—	1.09 (U)	—	—	—
RE16-10-3024	16-609253	0.0–0.5	Soil	—	1.21 (U)	—	—	0.605 (U)	—	—	—	—	1.94 (J-)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3025	16-609253	5.5–6.0	Soil	—	1.34	—	—	0.57 (U)	—	—	—	—	8.59 (J-)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14319	16-609253	8.5–9.0	Qbt 4	—	—	—	94.6	—	—	—	—	—	4.6	—	—	—	—	—	0.18 (J)	—	1.3 (J-)	—	—	—
RE16-10-14283	16-611836	0.0–0.5	Fill	—	1.12 (U)	—	—	0.559 (U)	—	—	—	—	2.18 (J-)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14284	16-611836	5.5–6.0	Fill	—	1.13 (U)	—	—	0.567 (U)	—	—	—	—	18.5 (J-)	—	—	—	—	—	—	0.00077 (J)	—	1.34 (J)	—	—
RE16-10-14285	16-611836	8.5–9.0	Qbt 4	15100	1.06 (U)	—	140 (J+)	—	3270 (J+)	10.4	3.28	8.06	22.2 (J-)	15500	23.2	2190 (J+)	—	—	—	—	1.06 (U)	—	20.9	—
RE16-10-14286	16-611837	0.0–0.5	Fill	—	1.16 (U)	—	—	0.581 (U)	—	—	—	—	1.65 (J-)	—	—	—	—	—	—	—	—	—	—	—
RE16-10-14287	16-611837	5.5–6.0	Qbt 4	7680	1.08 (U)	—	115 (J+)	—	2760 (J+)	13.8	5.84	9.79	3.91 (J-)	15700	—	—	—	9.64 (J-)	—	—	1.04 (U)	—	26.3	—
RE16-10-14288	16-611837	8.5–9.0	Qbt 4	—	1.05 (U)	—	140 (J+)	—	—	—	4.22	5.59	4.24 (J-)	—	—	—	—	—	—	0.00175 (J)	1.03 (U)	—	18.9	—
RE16-10-14292	16-611838	0.0–0.5	Soil	—	1.29 (U)	—	—	0.646 (U)	—	—	—	—	2.49 (J-)	24100	29.5	—	—	—	—	—	—	—	—	57.7
RE16-10-14290	16-611838	5.5–6.0	Qbt 4	20400	1.15 (U)	—	215 (J+)	—	5840 (J+)	17.1	7.41	12.1	13 (J-)	24500	15.2	3400 (J+)	—	15.3 (J-)	—	0.000685 (J)	1.12 (U)	—	37.2	—
RE16-10-14291	16-611838	8.5–9.0	Qbt 4	10300	1.08 (U)	—	109 (J+)	—	—	8.27	5.58	8.31	7.9 (J-)	—	11.7	1740 (J+)	—	—	—	—	0.99 (U)	—	20.9	—
RE16-10-14289	16-611839	0.0–0.5	Fill	—	1.17 (U)	—	—	0.583 (U)	—	—	—	—	1.56 (J-)	—	—	—	—	—	—	—	—	—	—	—

Table 9.13-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Fluoride	Iron	Lead	Magnesium	Manganese	Nickel	Nitrate	Perchlorate	Selenium	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**na**[b]	**14500**	**11.2**	**1690**	**482**	**6.58**	**na**	**na**	**0.3**	**1.1**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**na**	**21500**	**22.3**	**4610**	**671**	**15.4**	**na**	**na**	**1.52**	**0.73**	**39.6**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**2920**[d]	**300**[e]	**45400**	**68100**	**795000**	**800**	**na**	**145000**	**22700**	**1820000**	**795**	**5680**	**74.9**	**5680**	**341000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**1910**[d]	**238**	**31700**	**47500**	**554000**	**560**	**na**	**110000**	**15800**	**1260000**	**555**	**3960**	**52.3**	**3960**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**219**[d]	**23**[e]	**3130**	**4690**	**54800**	**400**	**na**	**10700**	**1560**	**125000**	**54.8**	**391**	**5.16**	**391**	**23500**
RE16-10-14293	16-611839	5.5–6.0	Qbt 4	13800	—	2.8	246	—	3540	9.3	3.6	6.3	10.5	—	12.6	2300	—	10.1	—	—	1.6 (J-)	—	19.1	—
RE16-10-14294	16-611839	8.5–9.0	Qbt 4	—	—	—	99.7	—	—	—	—	—	7.2	—	—	—	—	—	0.093 (J)	—	1.8 (J-)	—	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 9.13-3
Summary of Organic Chemicals Detected at AOC 16-024(m)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Bromomethane	Isopropyltoluene[4-]	Methylene Chloride
Industrial SSL[a]				**36700**	**851000**	**2500000[b]**	**1370**	**83.6**	**14900[c]**	**1090**
Recreational SSL[d]				**20800**	**702000**	**1590000**	**1830**	**468**	**52700[c]**	**4520**
Residential SSL[a]				**3440**	**67500**	**240000[b]**	**347**	**22.3**	**3210[c]**	**199**
0316-97-0529	16-04041	0.0–1.0	Soil	—[e]	NA[f]	0.095 (J)	0.038 (J)	NA	NA	NA
RE16-10-3018	16-609250	0.0–0.5	Fill	—	—	—	—	0.00112	—	—
RE16-10-3019	16-609250	3.0–3.5	Qbt 4	—	—	—	—	—	0.00117	—
RE16-10-3020	16-609251	0.0–0.5	Fill	—	—	—	—	0.00118	—	—
RE16-10-3021	16-609251	5.5–6.0	Soil	—	—	—	—	0.00107	—	—
RE16-10-3022	16-609252	0.0–0.5	Soil	0.0883	—	—	—	—	—	—
RE16-10-3023	16-609252	5.5–6.0	Soil	—	—	—	—	—	—	0.00227 (J)
RE16-10-14282	16-609252	8.5–9.0	Qbt 4	—	—	—	—	—	—	0.00246 (J)
RE16-10-3025	16-609253	5.5–6.0	Soil	—	—	—	—	—	—	0.0026 (J)
RE16-10-14319	16-609253	8.5–9.0	Qbt 4	—	—	—	—	—	—	0.013 (J)
RE16-10-14286	16-611837	0.0–0.5	Fill	—	—	—	—	—	0.000642 (J)	—
RE16-10-14288	16-611837	8.5–9.0	Qbt 4	—	—	—	—	—	—	0.00271 (J)
RE16-10-14293	16-611839	5.5–6.0	Qbt 4	—	—	—	—	—	—	0.012 (J)
RE16-10-14294	16-611839	8.5–9.0	Qbt 4	—	0.041 (J)	—	—	—	—	0.012 (J)

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Isopropylbenzene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] NA = Not analyzed.

Table 9.14-1
Summary of Samples Collected and Analyses Requested at SWMU 16-017(v)-99

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	BORON	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-3579	16-609436	0.0–0.5	Fill	10-1738	10-1737	10-1736	10-1738	10-1738	10-1737	10-1737	10-1737	10-1736	10-1736	10-1737
RE16-10-3580	16-609436	5.5–6.0	Qbt 4	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828
RE16-10-3581	16-609437	0.0–0.5	Fill	10-1738	10-1737	10-1736	10-1738	10-1738	10-1737	10-1737	10-1737	10-1736	10-1736	10-1737
RE16-10-3582	16-609437	5.5–6.0	Qbt 4	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828	10-1828

Table 9.14-2
Summary of Inorganic Chemicals above BVs at SWMU 16-017(v)-99

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Copper	Fluoride	Lead	Magnesium	Nickel	Selenium	Silver	Sulfate	Thallium	Zinc
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**na**[b]	**11.2**	**1690**	**6.58**	**0.3**	**1**	**157**	**1.1**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**na**	**22.3**	**4610**	**15.4**	**1.52**	**1**	**293**	**0.73**	**48.8**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**1120**	**na**	**2920**[d]	**45400**	**68100**	**800**	**na**	**22700**	**5680**	**5680**	**na**	**74.9**	**341000**
Recreational SSL[e]				**791000**	**317**	**27.7**	**158000**	**784**	**na**	**1910**[d]	**31700**	**47500**	**560**	**na**	**15800**	**3960**	**3960**	**na**	**52.3**	**238000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**77.9**	**na**	**219**[d]	**3130**	**4690**	**400**	**na**	**1560**	**391**	**391**	**na**	**5.16**	**23500**
RE16-10-3579	16-609436	0.0–0.5	Fill	—[f]	9.02	—	—	—	—	—	88.7	1.07 (J-)	485	—	—	—	—	—	—	279
RE16-10-3580	16-609436	5.5–6.0	Qbt 4	13400 (J+)	1.23 (U)	3.84	96.4	—	4610	8.18	9.04	13.2 (J-)	15.8	2920	9.85	1.22 (U)	—	—	1.17	—
RE16-10-3581	16-609437	0.0–0.5	Fill	—	3.87	—	—	0.56 (U)	—	—	110	1.3 (J-)	157	—	—	—	1.51	4890	—	213
RE16-10-3582	16-609437	5.5–6.0	Qbt 4	—	1.12 (U)	—	—	—	—	—	8.96	2.24 (J-)	11.2	—	—	1.11 (U)	—	393 (J+)	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not detected above BV.

Table 9.14-3
Summary of Organic Chemicals Detected at SWMU 16-017(v)-99

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene	Tetrachloroethene
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**1370**	**2340**	**2.34**	**24400**	**24400**	**23.4**	**14900**[c]	**1090**	**20500**	**18300**	**36.4**
Recreational SSL[d]				**20800**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**301**	**1830**	**3010**	**3.01**	**13900**	**13900**	**30.1**	**52700**[c]	**4520**	**12000**	**10400**	**91.7**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**347**	**621**	**0.621**	**2290**	**2290**	**6.21**	**3210**[c]	**199**	**1830**	**1720**	**6.99**
RE16-10-3579	16-609436	0.0–0.5	Fill	0.0177 (J)	0.116	1.8	3.41	4.8	2.89	1.68	0.135 (J)	2.75	0.787	2.51	0.0161 (J)	2.35	—[e]	—	0.624	2.62	0.000391 (J)
RE16-10-3580	16-609436	5.5–6.0	Qbt 4	—	—	0.0928	0.16	0.196	0.143 (J)	0.0751	—	0.133	—	0.134	—	0.128 (J)	—	0.00302 (J)	0.0419 (J)	0.13	—
RE16-10-3581	16-609437	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000429 (J)	—	—	—	—
RE16-10-3582	16-609437	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00264 (J)	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] Pyrene was used as a surrogate based on structural similarity.

[c] Isopropylbenzene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

Table 9.15-1
Summary of Samples Collected and Analyses Requested at the Courtyard Periphery Area

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	BORON	Perchlorate	SVOC	Uranium	VOC	Cyanide (Total)
0316-97-0001	16-03008	0.0–0.5	Soil	—*	—	3242R	—	—	3241R		—	3240R	3243R	—	3241R
0316-97-0002	16-03009	0.0–0.5	Sed	—	—	3242R	—	—	3241R		—	3240R	3243R	—	3241R
RE16-10-3031	16-609255	0.0–0.5	Soil	10-1745	10-1745	10-1745	10-1745	10-1745	10-1745	—	10-1745	10-1745	—	10-1745	10-1745
RE16-10-3032	16-609255	5.5–6.0	Qbt 4	10-1853	10-1853	10-1853	10-1853	10-1853	10-1853	—	10-1853	10-1853	—	10-1853	10-1853
RE16-10-3033	16-609256	0.0–0.5	Soil	10-1745	10-1745	10-1745	10-1745	10-1745	10-1745	—	10-1745	10-1745	—	10-1745	10-1745
RE16-10-3034	16-609256	5.5–6.0	Soil	10-1853	10-1853	10-1853	10-1853	10-1853	10-1853	—	10-1853	10-1853	—	10-1853	10-1853
RE16-10-3062	16-609266	0.0–0.5	Soil	10-1732	10-1732	10-1732	10-1732	10-1732	10-1732	10-1732	10-1732	10-1732	—	10-1732	10-1732
RE16-10-3063	16-609266	5.5–6.0	Qbt 4	10-1860	10-1859	10-1860	10-1860	10-1860	10-1859	10-1859	10-1859	10-1860	—	10-1860	10-1859
RE16-10-3064	16-609267	0.0–0.5	Soil	10-1732	10-1732	10-1732	10-1732	10-1732	10-1732	10-1732	10-1732	10-1732	—	10-1732	10-1732
RE16-10-3065	16-609267	5.5–6.0	Qbt 4	10-1860	10-1859	10-1860	10-1860	10-1860	10-1859	10-1859	10-1859	10-1860	—	10-1860	10-1859
RE16-10-3151	16-609281	0.0–0.5	Fill	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3152	16-609281	5.5–6.0	Soil	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3153	16-609282	0.0–0.5	Fill	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3154	16-609282	5.5–6.0	Soil	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3155	16-609283	0.0–0.5	Fill	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3156	16-609283	5.5–6.0	Soil	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3157	16-609284	0.0–0.5	Fill	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3158	16-609284	5.5–6.0	Soil	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3159	16-609285	0.0–0.5	Fill	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3160	16-609285	5.5–6.0	Qbt 4	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3162	16-609286	0.0–0.5	Soil	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3161	16-609286	5.5–6.0	Qbt 4	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3163	16-609287	0.0–0.5	Soil	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3164	16-609287	5.5–6.0	Qbt 4	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3165	16-609288	0.0–0.5	Soil	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3166	16-609288	5.5–6.0	Qbt 4	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3167	16-609289	0.0–0.5	Soil	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3168	16-609289	5.5–6.0	Qbt 4	10-1869	10-1868	10-1870	10-1869	10-1869	10-1868	10-1868	10-1868	10-1870	—	10-1870	10-1868
RE16-10-3169	16-609290	0.0–0.5	Fill	10-1690	10-1689	10-1688	10-1690	10-1690	10-1689	10-1689	10-1689	10-1688	—	10-1688	10-1689
RE16-10-3170	16-609290	5.5–6.0	Qbt 4	10-1829	10-1829	10-1829	10-1829	10-1829	10-1829	10-1829	10-1829	10-1829	—	10-1829	10-1829
RE16-10-3201	16-609296	0.0–0.5	Fill	10-1757	10-1756	10-1755	10-1757	10-1757	10-1756	10-1756	10-1756	10-1755	—	10-1755	—
RE16-10-3209	16-609296	5.5–6.0	Qbt 4	10-1851	10-1850	10-1852	10-1851	10-1851	10-1850	10-1850	10-1850	10-1852	—	10-1852	—
RE16-10-3203	16-609297	0.0–0.5	Soil	10-1757	10-1756	10-1755	10-1757	10-1757	10-1756	10-1756	10-1756	10-1755	—	10-1755	—
RE16-10-12614	16-609297	5.5–6.0	Qbt 4	10-1851	10-1850	10-1852	10-1851	10-1851	10-1850	10-1850	10-1850	10-1852	—	10-1852	—

Table 9.15-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	BORON	Perchlorate	SVOC	Uranium	VOC	Cyanide (Total)
RE16-10-3202	16-609300	0.0–0.5	Soil	10-1757	10-1756	10-1755	10-1757	10-1757	10-1756	10-1756	10-1756	10-1755	—	10-1755	—
RE16-10-3210	16-609300	5.5–6.0	Qbt 4	10-1851	10-1850	10-1852	10-1851	10-1851	10-1850	10-1850	10-1850	10-1852	—	10-1852	—
RE16-10-3566	16-609431	0.0–0.5	Fill	10-1735	10-1734	10-1733	10-1735	10-1735	10-1734	10-1734	10-1734	10-1733	—	10-1733	10-1734
RE16-10-3567	16-609431	5.5–6.0	Qbt 4	10-1735	10-1734	10-1733	10-1735	10-1735	10-1734	10-1734	10-1734	10-1733	—	10-1733	10-1734
RE16-10-3568	16-609432	0.0–0.5	Fill	10-1735	10-1734	10-1733	10-1735	10-1735	10-1734	10-1734	10-1734	10-1733	—	10-1733	10-1734
RE16-10-3569	16-609432	5.5–6.0	Qbt 4	10-1735	10-1734	10-1733	10-1735	10-1735	10-1734	10-1734	10-1734	10-1733	—	10-1733	10-1734
RE16-10-3570	16-609433	0.0–0.5	Soil	10-1735	10-1734	10-1733	10-1735	10-1735	10-1734	10-1734	10-1734	10-1733	—	10-1733	10-1734
RE16-10-3571	16-609433	5.5–6.0	Qbt 4	10-1735	10-1734	10-1733	10-1735	10-1735	10-1734	10-1734	10-1734	10-1733	—	10-1733	10-1734
RE16-10-3572	16-609434	0.0–0.5	Soil	10-1735	10-1734	10-1733	10-1735	10-1735	10-1734	10-1734	10-1734	10-1733	—	10-1733	10-1734
RE16-10-3573	16-609434	5.5–6.0	Qbt 4	10-1735	10-1734	10-1733	10-1735	10-1735	10-1734	10-1734	10-1734	10-1733	—	10-1733	10-1734
RE16-10-3875	16-609496	0.0–0.5	Soil	10-1744	10-1743	10-1742	10-1744	10-1744	10-1743	—	10-1743	10-1742	—	10-1742	—
RE16-10-3876	16-609496	5.5–6.0	Qbt 4	10-1827	10-1827	10-1827	10-1827	10-1827	10-1827	—	10-1827	10-1827	—	10-1827	—
RE16-10-3878	16-609497	0.0–0.5	Soil	10-1827	10-1827	10-1827	10-1827	10-1827	10-1827	—	10-1827	10-1827	—	10-1827	—
RE16-10-3877	16-609497	5.5–6.0	Qbt 4	10-1827	10-1827	10-1827	10-1827	10-1827	10-1827	—	10-1827	10-1827	—	10-1827	—
RE16-10-3879	16-609498	0.0–0.5	Fill	10-1744	10-1743	10-1742	10-1744	10-1744	10-1743	—	10-1743	10-1742	—	10-1742	—
RE16-10-3881	16-609499	0.0–0.5	Fill	10-1744	10-1743	10-1742	10-1744	10-1744	10-1743	—	10-1743	10-1742	—	10-1742	—
RE16-10-3883	16-609500	0.0–0.5	Soil	10-1744	10-1743	10-1742	10-1744	10-1744	10-1743	—	10-1743	10-1742	—	10-1742	—
RE16-10-3884	16-609500	5.5–6.0	Qbt 4	10-1854	10-1854	10-1854	10-1854	10-1854	10-1854	—	10-1854	10-1854	—	10-1854	—
RE16-10-3204	16-611437	0.0–0.5	Soil	10-1757	10-1756	10-1755	10-1757	10-1757	10-1756	10-1756	10-1756	10-1755	—	10-1755	—
RE16-10-12615	16-611437	5.5–6.0	Qbt 4	10-1851	10-1850	10-1852	10-1851	10-1851	10-1850	10-1850	10-1850	10-1852	—	10-1852	—
RE16-10-12620	16-611440	0.0–0.5	Soil	10-1832	10-1832	10-1832	10-1832	10-1832	10-1832	10-1832	10-1832	10-1832	—	10-1832	—
RE16-10-12621	16-611440	5.5–6.0	Qbt 4	10-1832	10-1832	10-1832	10-1832	10-1832	10-1832	10-1832	10-1832	10-1832	—	10-1832	—

*— = Analyses not requested.

Table 9.15-2
Summary of Inorganic Chemicals Detected above BVs or Detected with No BVs at the Courtyard Periphery Area

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Boron	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**na**[b]	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**na**	**0.4**	**4420**	**17.1**	**10.5**	**4.73**	**11.2**	**0.82**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**na**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**227000**	**1120**	**na**	**na**	**2920**[d]	**300**[e]	**45400**	**22700**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**158000**	**784**	**na**	**na**	**1910**[d]	**238**	**31700**	**15800**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**15600**	**77.9**	**na**	**na**	**219**[d]	**23**[e]	**3130**	**1560**
0316-97-0001	16-03008	0.0–0.5	Soil	—[g]	—	—	—	—	—	—	NA[h]	—	—	82.6	—
0316-97-0002	16-03009	0.0–0.5	Sed	—	—	4.3	—	—	—	—	NA	—	—	66.6	—
RE16-10-3031	16-609255	0.0–0.5	Soil	—	0.887 (U)	—	—	NA	—	—	—	—	—	347 (J)	—
RE16-10-3032	16-609255	5.5–6.0	Qbt 4	—	1.06 (U)	—	86.5	NA	—	—	—	—	3.18	—	—
RE16-10-3033	16-609256	0.0–0.5	Soil	—	1.11 (U)	—	—	NA	—	—	—	—	—	55.4 (J)	—
RE16-10-3034	16-609256	5.5–6.0	Soil	—	1.05 (U)	—	—	NA	0.525 (U)	—	308	—	—	—	—
RE16-10-3062	16-609266	0.0–0.5	Soil	—	1.29 (U)	—	—	—	0.639 (J)	—	—	—	—	—	0.534
RE16-10-3063	16-609266	5.5–6.0	Qbt 4	9730	1.06 (U)	—	94.4	—	—	—	—	7.48 (J)	3.37	4.96	—
RE16-10-3064	16-609267	0.0–0.5	Soil	—	1.01 (U)	—	—	—	0.562 (J)	—	—	—	—	88.8	—
RE16-10-3065	16-609267	5.5–6.0	Qbt 4	—	1.05 (U)	—	85.6	—	—	—	—	—	—	—	—
RE16-10-3151	16-609281	0.0–0.5	Fill	—	0.992 (U)	—	—	—	0.549 (U)	—	—	—	—	23.5	—
RE16-10-3152	16-609281	5.5–6.0	Soil	—	1.08 (U)	—	—	—	—	—	—	—	—	—	—
RE16-10-3153	16-609282	0.0–0.5	Fill	—	0.945 (U)	—	—	—	0.532 (U)	—	—	—	—	42.2	—
RE16-10-3154	16-609282	5.5–6.0	Soil	—	1.1 (U)	—	—	—	—	—	—	—	—	—	—
RE16-10-3155	16-609283	0.0–0.5	Fill	—	1.46 (U)	—	—	—	0.572 (U)	—	—	—	—	26.9	—
RE16-10-3156	16-609283	5.5–6.0	Soil	—	1.12 (U)	—	—	—	—	—	—	—	—	—	—
RE16-10-3157	16-609284	0.0–0.5	Fill	—	1.18 (U)	—	—	—	0.653 (U)	—	—	—	—	15.1	—
RE16-10-3158	16-609284	5.5–6.0	Soil	—	1.08 (U)	—	—	—	—	—	—	—	—	—	—
RE16-10-3159	16-609285	0.0–0.5	Fill	—	—	—	—	—	0.552 (U)	—	—	—	—	—	—
RE16-10-3160	16-609285	5.5–6.0	Qbt 4	—	1.1 (U)	—	—	—	—	—	—	—	—	—	—
RE16-10-3162	16-609286	0.0–0.5	Soil	—	0.924 (U)	—	—	—	0.573 (U)	—	—	—	—	—	—
RE16-10-3161	16-609286	5.5–6.0	Qbt 4	—	1.21 (U)	—	—	—	—	—	—	—	—	—	—
RE16-10-3163	16-609287	0.0–0.5	Soil	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—
RE16-10-3164	16-609287	5.5–6.0	Qbt 4	—	1.11 (U)	—	73.1	—	—	—	—	—	4.23	6.06	—
RE16-10-3165	16-609288	0.0–0.5	Soil	—	1.23 (U)	—	—	—	0.623 (U)	—	—	—	—	—	—
RE16-10-3166	16-609288	5.5–6.0	Qbt 4	9740	1.04 (U)	—	99.8	—	—	—	—	7.31 (J)	3.18	6.25	—
RE16-10-3167	16-609289	0.0–0.5	Soil	—	1.12 (U)	—	—	—	0.614 (U)	—	—	—	—	17.9	—
RE16-10-3168	16-609289	5.5–6.0	Qbt 4	—	1.05 (U)	—	71.8	—	—	—	—	10.2 (J)	—	6.75	—
RE16-10-3169	16-609290	0.0–0.5	Fill	—	1.29 (U)	—	—	—	0.623 (U)	—	—	—	—	18	—

Table 9.15-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Boron	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**na[b]**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**na**	**0.4**	**4420**	**17.1**	**10.5**	**4.73**	**11.2**	**0.82**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**na**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**227000**	**1120**	**na**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**158000**	**784**	**na**	**na**	**1910[d]**	**238**	**31700**	**15800**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**15600**	**77.9**	**na**	**na**	**219[d]**	**23[e]**	**3130**	**1560**
RE16-10-3170	16-609290	5.5–6.0	Qbt 4	—	1.39 (U)	—	—	—	—	—	—	—	—	—	—
RE16-10-3201	16-609296	0.0–0.5	Fill	—	—	—	—	—	0.509 (U)	—	—	—	—	—	NA
RE16-10-3209	16-609296	5.5–6.0	Qbt 4	—	0.999 (U)	—	47.5	—	—	—	—	—	—	—	NA
RE16-10-3203	16-609297	0.0–0.5	Soil	—	0.919 (U)	—	885	—	0.627 (U)	—	—	—	—	—	NA
RE16-10-12614	16-609297	5.5–6.0	Qbt 4	9440	1.06 (U)	—	67.9	—	—	—	—	—	—	6.76	NA
RE16-10-3202	16-609300	0.0–0.5	Soil	—	—	—	—	—	0.716 (U)	—	—	—	—	—	NA
RE16-10-3210	16-609300	5.5–6.0	Qbt 4	—	1.07 (U)	—	—	—	—	—	—	—	—	—	NA
RE16-10-3566	16-609431	0.0–0.5	Fill	—	0.986 (U)	—	—	—	0.64 (U)	—	—	—	—	—	—
RE16-10-3567	16-609431	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3568	16-609432	0.0–0.5	Fill	—	—	—	—	—	0.57 (U)	—	—	—	—	—	—
RE16-10-3569	16-609432	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3570	16-609433	0.0–0.5	Soil	—	—	—	—	—	0.535 (U)	—	—	—	—	—	—
RE16-10-3571	16-609433	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3572	16-609434	0.0–0.5	Soil	—	1.3 (U)	—	—	—	0.709 (J)	—	—	—	—	—	—
RE16-10-3573	16-609434	5.5–6.0	Qbt 4	—	0.77 (U)	—	—	—	—	—	—	—	—	—	—
RE16-10-3875	16-609496	0.0–0.5	Soil	—	1.14 (U)	—	—	NA	0.549 (U)	—	—	—	—	16.1 (J)	NA
RE16-10-3876	16-609496	5.5–6.0	Qbt 4	7690 (J+)	1.03 (U)	31.6	82.5	NA	—	—	118	9.4	—	—	NA
RE16-10-3878	16-609497	0.0–0.5	Soil	—	1.07 (U)	—	—	NA	—	6890	—	—	—	—	NA
RE16-10-3877	16-609497	5.5–6.0	Qbt 4	—	1.03 (U)	—	—	NA	—	—	—	—	—	—	NA
RE16-10-3879	16-609498	0.0–0.5	Fill	—	—	—	—	NA	0.567 (U)	—	—	—	—	—	NA
RE16-10-3881	16-609499	0.0–0.5	Fill	—	1.66 (U)	—	—	NA	0.593 (U)	—	—	—	—	—	NA
RE16-10-3883	16-609500	0.0–0.5	Soil	—	1.52 (U)	—	—	NA	0.613 (U)	—	—	—	—	—	NA
RE16-10-3884	16-609500	5.5–6.0	Qbt 4	—	1.05 (U)	—	—	NA	—	—	—	—	—	—	NA
RE16-10-3204	16-611437	0.0–0.5	Soil	—	—	—	—	—	0.609 (U)	—	—	—	—	—	NA
RE16-10-12615	16-611437	5.5–6.0	Qbt 4	7840	1.01 (U)	—	75.2	—	—	3090 (J+)	—	—	—	—	NA
RE16-10-12620	16-611440	0.0–0.5	Soil	—	1.26 (U)	—	—	—	0.418 (J)	—	—	—	—	—	NA
RE16-10-12621	16-611440	5.5–6.0	Qbt 4	7520	1.06 (U)	—	77.1 (J+)	1.59 (J)	—	—	—	8.4	—	5.69 (J)	NA

Table 9.15-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoride	Iron	Lead	Nitrate	Perchlorate	Selenium	Silver	Sulfate	Thallium	Uranium	Zinc
Qbt 2,3,4 BV[a]				**na**	**14500**	**11.2**	**na**	**na**	**0.3**	**1**	**157**	**1.1**	**2.40**	**63.5**
Sediment BV[a]				**na**	**13800**	**19.7**	**na**	**na**	**0.3**	**1**	**58.2**	**0.73**	**2.22**	**60.2**
Soil BV[a]				**na**	**21500**	**22.3**	**na**	**na**	**1.52**	**1**	**293**	**0.73**	**1.82**	**48.8**
Industrial SSL[c]				**68100**	**795000**	**800**	**1820000**	**795**	**5680**	**5680**	**na**	**74.9**	**3410**	**341000**
Recreational SSL[f]				**47500**	**554000**	**560**	**1260000**	**555**	**3960**	**3960**	**na**	**52.3**	**2380**	**238000**
Residential SSL[c]				**4690**	**54800**	**400**	**125000**	**54.8**	**391**	**391**	**na**	**5.16**	**235**	**23500**
0316-97-0001	16-03008	0.0–0.5	Soil	NA	—	49	NA	NA	—	—	NA	0.84 (U)	3.21	58.2
0316-97-0002	16-03009	0.0–0.5	Sed	NA	—	36.6	NA	NA	0.69 (J)	—	NA	0.81 (U)	—	74
RE16-10-3031	16-609255	0.0–0.5	Soil	3.2 (J-)	—	27.5	—	0.000731 (J)	—	—	—	—	NA	—
RE16-10-3032	16-609255	5.5–6.0	Qbt 4	1.24	—	—	—	—	1.1 (UJ)	—	—	—	NA	—
RE16-10-3033	16-609256	0.0–0.5	Soil	3.74 (J-)	—	—	—	—	—	113 (J-)	—	—	NA	62.1 (J)
RE16-10-3034	16-609256	5.5–6.0	Soil	4.56	—	—	—	—	—	—	—	—	NA	—
RE16-10-3062	16-609266	0.0–0.5	Soil	1.81 (J-)	—	46.4 (J)	2.93	—	—	—	—	—	NA	56.2
RE16-10-3063	16-609266	5.5–6.0	Qbt 4	1.63 (J-)	—	—	—	—	1.11 (UJ)	1.05	—	—	NA	—
RE16-10-3064	16-609267	0.0–0.5	Soil	1.82 (J-)	—	48.4 (J)	—	—	—	—	—	—	NA	63.7
RE16-10-3065	16-609267	5.5–6.0	Qbt 4	1.33 (J-)	—	—	—	—	1.09 (UJ)	—	—	—	NA	—
RE16-10-3151	16-609281	0.0–0.5	Fill	1.53 (J-)	—	24.9	—	—	—	—	—	—	NA	—
RE16-10-3152	16-609281	5.5–6.0	Soil	3.02 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3153	16-609282	0.0–0.5	Fill	1.54 (J-)	—	33.9	—	—	—	—	—	—	NA	49
RE16-10-3154	16-609282	5.5–6.0	Soil	1.49 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3155	16-609283	0.0–0.5	Fill	1.28 (J-)	—	39.4	—	—	—	—	—	—	NA	—
RE16-10-3156	16-609283	5.5–6.0	Soil	2.79 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3157	16-609284	0.0–0.5	Fill	1.79 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3158	16-609284	5.5–6.0	Soil	2.38 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3159	16-609285	0.0–0.5	Fill	1.88 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3160	16-609285	5.5–6.0	Qbt 4	2.93 (J-)	—	—	—	—	1.03 (UJ)	—	—	—	NA	—
RE16-10-3162	16-609286	0.0–0.5	Soil	2.61 (J-)	—	24.5	—	—	—	—	—	—	NA	—
RE16-10-3161	16-609286	5.5–6.0	Qbt 4	2.04 (J-)	—	—	—	—	1.17 (UJ)	—	—	—	NA	—
RE16-10-3163	16-609287	0.0–0.5	Soil	1.99 (J-)	—	53.9	—	—	—	—	—	—	NA	54.7
RE16-10-3164	16-609287	5.5–6.0	Qbt 4	1.03 (J-)	—	14.6	—	—	1.11 (UJ)	—	—	—	NA	—
RE16-10-3165	16-609288	0.0–0.5	Soil	2.41 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3166	16-609288	5.5–6.0	Qbt 4	1.5 (J-)	—	—	—	—	1.1 (UJ)	—	—	—	NA	—
RE16-10-3167	16-609289	0.0–0.5	Soil	2.5 (J-)	—	34.9	—	—	—	11	—	—	NA	—
RE16-10-3168	16-609289	5.5–6.0	Qbt 4	2.35 (J-)	—	—	—	—	1.13 (UJ)	10.2	—	—	NA	—
RE16-10-3169	16-609290	0.0–0.5	Fill	2.63 (J-)	22800	—	—	—	—	—	—	—	NA	—
RE16-10-3170	16-609290	5.5–6.0	Qbt 4	2.34 (J-)	—	—	—	—	1.39 (U)	—	—	—	NA	—

Table 9.15-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoride	Iron	Lead	Nitrate	Perchlorate	Selenium	Silver	Sulfate	Thallium	Uranium	Zinc
Qbt 2,3,4 BV[a]				**na**	**14500**	**11.2**	**na**	**na**	**0.3**	**1**	**157**	**1.1**	**2.40**	**63.5**
Sediment BV[a]				**na**	**13800**	**19.7**	**na**	**na**	**0.3**	**1**	**58.2**	**0.73**	**2.22**	**60.2**
Soil BV[a]				**na**	**21500**	**22.3**	**na**	**na**	**1.52**	**1**	**293**	**0.73**	**1.82**	**48.8**
Industrial SSL[c]				**68100**	**795000**	**800**	**1820000**	**795**	**5680**	**5680**	**na**	**74.9**	**3410**	**341000**
Recreational SSL[f]				**47500**	**554000**	**560**	**1260000**	**555**	**3960**	**3960**	**na**	**52.3**	**2380**	**238000**
Residential SSL[c]				**4690**	**54800**	**400**	**125000**	**54.8**	**391**	**391**	**na**	**5.16**	**235**	**23500**
RE16-10-3201	16-609296	0.0–0.5	Fill	0.638 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3209	16-609296	5.5–6.0	Qbt 4	1.98	—	—	—	—	1.07 (UJ)	—	—	—	NA	—
RE16-10-3203	16-609297	0.0–0.5	Soil	0.662 (J-)	—	57.3 (J)	—	0.000866 (J)	—	—	—	—	NA	393
RE16-10-12614	16-609297	5.5–6.0	Qbt 4	1.77	—	—	—	—	1.03 (UJ)	—	—	—	NA	—
RE16-10-3202	16-609300	0.0–0.5	Soil	0.854 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3210	16-609300	5.5–6.0	Qbt 4	1.96	—	—	—	—	1.07 (UJ)	—	—	—	NA	—
RE16-10-3566	16-609431	0.0–0.5	Fill	2.74	—	—	—	—	—	—	—	—	NA	—
RE16-10-3567	16-609431	5.5–6.0	Qbt 4	4.29	—	—	—	—	1 (U)	—	—	—	NA	—
RE16-10-3568	16-609432	0.0–0.5	Fill	0.945 (J)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3569	16-609432	5.5–6.0	Qbt 4	2.76	—	—	—	—	1.07 (U)	—	—	—	NA	—
RE16-10-3570	16-609433	0.0–0.5	Soil	1.04 (J)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3571	16-609433	5.5–6.0	Qbt 4	2.4	—	—	—	0.000634 (J+)	1 (U)	—	—	—	NA	—
RE16-10-3572	16-609434	0.0–0.5	Soil	1.63	43000	—	—	—	—	—	—	—	NA	—
RE16-10-3573	16-609434	5.5–6.0	Qbt 4	1.68	14700	—	—	—	1.02 (U)	—	—	—	NA	—
RE16-10-3875	16-609496	0.0–0.5	Soil	1.76 (J-)	—	34.4	—	—	—	—	—	—	NA	—
RE16-10-3876	16-609496	5.5–6.0	Qbt 4	10.8 (J-)	—	85.6	—	—	1.02 (U)	—	—	2.8	NA	—
RE16-10-3878	16-609497	0.0–0.5	Soil	1.58 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3877	16-609497	5.5–6.0	Qbt 4	2 (J-)	—	—	—	—	1.03 (U)	—	—	—	NA	—
RE16-10-3879	16-609498	0.0–0.5	Fill	2.12 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3881	16-609499	0.0–0.5	Fill	2.69 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3883	16-609500	0.0–0.5	Soil	3.59 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-3884	16-609500	5.5–6.0	Qbt 4	1.73 (J-)	—	—	—	—	1.01 (UJ)	—	—	—	NA	—
RE16-10-3204	16-611437	0.0–0.5	Soil	0.705 (J-)	—	—	—	—	—	—	—	—	NA	—
RE16-10-12615	16-611437	5.5–6.0	Qbt 4	2.13	—	—	—	—	1.06 (UJ)	1.25	—	—	NA	—

Table 9.15-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoride	Iron	Lead	Nitrate	Perchlorate	Selenium	Silver	Sulfate	Thallium	Uranium	Zinc
Qbt 2,3,4 BV[a]				**na**	**14500**	**11.2**	**na**	**na**	**0.3**	**1**	**157**	**1.1**	**2.40**	**63.5**
Sediment BV[a]				**na**	**13800**	**19.7**	**na**	**na**	**0.3**	**1**	**58.2**	**0.73**	**2.22**	**60.2**
Soil BV[a]				**na**	**21500**	**22.3**	**na**	**na**	**1.52**	**1**	**293**	**0.73**	**1.82**	**48.8**
Industrial SSL[c]				**68100**	**795000**	**800**	**1820000**	**795**	**5680**	**5680**	**na**	**74.9**	**3410**	**341000**
Recreational SSL[f]				**47500**	**554000**	**560**	**1260000**	**555**	**3960**	**3960**	**na**	**52.3**	**2380**	**238000**
Residential SSL[c]				**4690**	**54800**	**400**	**125000**	**54.8**	**391**	**391**	**na**	**5.16**	**235**	**23500**
RE16-10-12620	16-611440	0.0–0.5	Soil	2.76 (J-)	—	23.5	—	—	—	—	—	—	NA	—
RE16-10-12621	16-611440	5.5–6.0	Qbt 4	4.74 (J-)	—	14.1	—	—	0.938 (UJ)	—	547	—	NA	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 9.15-3
Summary of Organic Chemicals Detected at the Courtyard Periphery Area

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenzofuran	Dichloroethene[1,1-]	Di-n-butylphthalate	Diphenylamine
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**1370**	**2340**	**1000**[c]	**42.8**	**68400**	**15000**[c]
Recreational SSL[d]				**20800**	**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**301**	**1830**	**3010**	**399**	**13800**[g]	**39900**	**na**[e]
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**347**	**621**	**78**[c]	**618**	**6110**	**1530**[c]
0316-97-0002	16-03009	0.0–0.5	Sed	—[f]	NA[g]	—	—	—	—	—	NA	—	—	—	NA	0.97 (J)	NA
RE16-10-3031	16-609255	0.0–0.5	Soil	—	0.0499	—	—	—	—	—	—	0.124 (J)	—	—	—	—	—
RE16-10-3032	16-609255	5.5–6.0	Qbt 4	—	0.0323	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3034	16-609256	5.5–6.0	Soil	—	0.00379 (J)	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3062	16-609266	0.0–0.5	Soil	—	—	—	—	0.011 (J)	0.041	0.0169 (J)	0.0148 (J)	0.123 (J)	0.0194 (J)	—	—	—	—
RE16-10-3063	16-609266	5.5–6.0	Qbt 4	—	0.0544	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3064	16-609267	0.0–0.5	Soil	—	—	—	—	0.0147 (J)	0.0316 (J)	0.0193 (J)	0.0173 (J)	0.228 (J)	0.024 (J)	—	—	—	—
RE16-10-3065	16-609267	5.5–6.0	Qbt 4	—	0.00446 (J)	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3151	16-609281	0.0–0.5	Fill	—	—	—	—	—	0.0154 (J)	—	—	0.386	—	—	—	—	—
RE16-10-3152	16-609281	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3153	16-609282	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.166 (J)	—	—	—	—	—
RE16-10-3154	16-609282	5.5–6.0	Soil	—	—	—	—	—	—	—	—	0.103 (J)	—	—	—	—	—
RE16-10-3155	16-609283	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.169 (J)	—	—	—	—	—
RE16-10-3156	16-609283	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3157	16-609284	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.1 (J)	—	—	0.000603 (J)	—	—
RE16-10-3159	16-609285	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.161 (J)	—	—	—	—	—
RE16-10-3162	16-609286	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.116 (J)	—	—	—	—	—
RE16-10-3163	16-609287	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.0968 (J)	—	—	0.000539 (J)	—	—
RE16-10-3165	16-609288	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.107 (J)	—	—	—	—	—
RE16-10-3167	16-609289	0.0–0.5	Soil	—	—	—	—	—	0.0231 (J)	—	—	0.315 (J)	—	—	—	—	—
RE16-10-3168	16-609289	5.5–6.0	Qbt 4	3.09	0.00608	6.33	5.46	3.66	7.28	2.4 (J)	—	0.0878 (J)	6.17	0.647	—	—	1.06
RE16-10-3169	16-609290	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.152 (J)	—	—	—	—	—
RE16-10-3170	16-609290	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3201	16-609296	0.0–0.5	Fill	—	—	—	—	0.0121 (J)	0.0207 (J)	—	—	0.0989 (J)	0.0207 (J)	—	—	—	—

Table 9.15-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenzofuran	Dichloroethene[1,1-]	Di-n-butylphthalate	Diphenylamine
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**2340**	**1000[c]**	**42.8**	**68400**	**15000[c]**
Recreational SSL[d]				**20800**	**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400[b]**	**301**	**1830**	**3010**	**399**	**13800**	**39900**	**na[e]**
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**621**	**78[c]**	**618**	**6110**	**1530[c]**
RE16-10-3209	16-609296	5.5–6.0	Qbt 4	0.0176 (J)	0.0058	0.0148 (J)	0.0162 (J)	0.0113 (J)	0.0216 (J)	—	—	—	0.0175 (J)	—	—	—	—
RE16-10-3202	16-609300	0.0–0.5	Soil	—	—	—	—	—	0.0447 (J)	—	0.0146 (J)	0.128 (J)	0.0516	—	0.000524 (J)	—	—
RE16-10-3210	16-609300	5.5–6.0	Qbt 4	—	0.00503 (J)	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3566	16-609431	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.151 (J)	—	—	—	—	—
RE16-10-3567	16-609431	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	0.0753 (J)	—	—	—	—	—
RE16-10-3568	16-609432	0.0–0.5	Fill	—	—	—	—	—	—	—	—	0.103 (J)	—	—	—	—	—
RE16-10-3569	16-609432	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	0.133 (J)	—	—	—	—	—
RE16-10-3570	16-609433	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.0984 (J)	—	—	—	—	—
RE16-10-3571	16-609433	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	0.0863 (J)	—	—	—	—	—
RE16-10-3572	16-609434	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.096 (J)	—	—	—	—	—
RE16-10-3573	16-609434	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	0.102 (J)	—	—	—	—	—
RE16-10-3875	16-609496	0.0–0.5	Soil	—	—	—	—	0.0243 (J)	0.127	0.026 (J)	—	—	0.0749	—	—	—	—
RE16-10-3878	16-609497	0.0–0.5	Soil	—	—	—	0.0416	0.0201 (J)	0.034 (J)	0.0139 (J)	0.0127 (J)	—	—	—	—	—	—
RE16-10-3877	16-609497	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3879	16-609498	0.0–0.5	Fill	—	—	—	—	—	0.025 (J)	—	—	—	0.0203 (J)	—	—	—	—
RE16-10-3881	16-609499	0.0–0.5	Fill	—	—	—	—	0.0479	0.223	0.0642	—	—	0.113	—	—	—	—
RE16-10-3883	16-609500	0.0–0.5	Soil	—	—	—	—	—	0.0699	0.0131 (J)	—	—	0.0464	—	—	—	—
RE16-10-3884	16-609500	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3204	16-611437	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.134 (J)	—	—	—	—	—
RE16-10-12615	16-611437	5.5–6.0	Qbt 4	—	0.0126	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-12620	16-611440	0.0–0.5	Soil	—	—	—	0.0159 (J)	—	—	—	—	0.104 (J)	—	—	—	—	—
RE16-10-12621	16-611440	5.5–6.0	Qbt 4	—	—	—	—	—	0.0116 (J)	—	—	—	—	—	—	—	—

Table 9.15-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Pentachlorophenol	Phenanthrene	Pyrene	RDX	Toluene
Industrial SSL[a]				**24400**	**24400**	**34200**	**23.4**	**14900**[h]	**1090**	**4100**[c]	**252**	**100**	**20500**	**18300**	**174**	**57900**
Recreational SSL[d]				**13900**	**13900**	**19900**	**30.1**	**52700**[h]	**4520**	**3170**	**1950**	**117**	**12000**	**10400**	**233**	**60800**
Residential SSL[a]				**2290**	**2290**	**3060**	**6.21**	**3210**[h]	**199**	**310**[c]	**45**	**29.8**	**1830**	**1720**	**44.2**	**5570**
0316-97-0002	16-03009	0.0–0.5	Sed	—	—	—	—	NA	NA	—	—	—	—	—	—	NA
RE16-10-3031	16-609255	0.0–0.5	Soil	—	—	—	—	0.0165	—	—	—	—	—	—	—	0.0124
RE16-10-3032	16-609255	5.5–6.0	Qbt 4	—	—	—	—	0.0177	0.00435 (J)	—	—	—	—	—	—	0.00118
RE16-10-3034	16-609256	5.5–6.0	Soil	—	—	—	—	—	0.00431 (J)	—	—	—	—	—	—	—
RE16-10-3062	16-609266	0.0–0.5	Soil	0.0201 (J)	—	—	0.114	—	—	—	—	—	—	0.0177 (J)	—	—
RE16-10-3063	16-609266	5.5–6.0	Qbt 4	—	—	—	—	0.0638	0.00403 (J)	—	—	—	—	—	—	0.00194
RE16-10-3064	16-609267	0.0–0.5	Soil	0.0332 (J)	—	—	0.14	—	—	—	—	—	—	0.0299 (J)	—	—
RE16-10-3065	16-609267	5.5–6.0	Qbt 4	—	—	—	—	—	0.00319 (J)	—	—	—	—	—	—	—
RE16-10-3151	16-609281	0.0–0.5	Fill	0.0201 (J)	—	—	—	—	—	—	—	—	0.0162 (J)	0.0206 (J)	—	—
RE16-10-3152	16-609281	5.5–6.0	Soil	—	—	0.254 (J)	—	0.000604 (J)	—	—	—	—	—	—	0.168 (J)	0.000737 (J)
RE16-10-3153	16-609282	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3154	16-609282	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3155	16-609283	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3156	16-609283	5.5–6.0	Soil	—	—	—	—	—	—	—	—	—	—	—	0.147 (J-)	—
RE16-10-3157	16-609284	0.0–0.5	Fill	—	—	—	—	0.00109 (J)	—	—	—	—	—	—	—	—
RE16-10-3159	16-609285	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3162	16-609286	0.0–0.5	Soil	0.0124 (J)	—	—	—	0.00211	—	—	—	0.114 (J)	—	0.0164 (J)	—	—
RE16-10-3163	16-609287	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3165	16-609288	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3167	16-609289	0.0–0.5	Soil	0.0171 (J)	—	—	—	—	—	—	—	—	—	0.0135 (J)	—	—
RE16-10-3168	16-609289	5.5–6.0	Qbt 4	23	1.49	—	2.07 (J)	0.00139	—	0.0471	0.0203 (J)	—	6.47	16	—	—
RE16-10-3169	16-609290	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3170	16-609290	5.5–6.0	Qbt 4	—	—	—	—	—	0.00422 (J)	—	—	—	—	—	—	—
RE16-10-3201	16-609296	0.0–0.5	Fill	0.0211 (J)	—	—	—	—	—	—	—	—	—	0.0217 (J)	—	—
RE16-10-3209	16-609296	5.5–6.0	Qbt 4	0.0504	—	—	—	—	—	—	—	—	0.0247 (J)	0.0396	—	—
RE16-10-3202	16-609300	0.0–0.5	Soil	0.15	—	—	—	—	—	—	—	—	0.107	0.0983	—	—
RE16-10-3210	16-609300	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3566	16-609431	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3567	16-609431	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3568	16-609432	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 9.15-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Pentachlorophenol	Phenanthrene	Pyrene	RDX	Toluene
Industrial SSL[a]				**24400**	**24400**	**34200**	**23.4**	**14900[h]**	**1090**	**4100[c]**	**252**	**100**	**20500**	**18300**	**174**	**57900**
Recreational SSL[d]				**13900**	**13900**	**19900**	**30.1**	**52700[h]**	**4520**	**3170**	**1950**	**117**	**12000**	**10400**	**233**	**60800**
Residential SSL[a]				**2290**	**2290**	**3060**	**6.21**	**3210[h]**	**199**	**310[c]**	**45**	**29.8**	**1830**	**1720**	**44.2**	**5570**
RE16-10-3569	16-609432	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3570	16-609433	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3571	16-609433	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3572	16-609434	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3573	16-609434	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-3875	16-609496	0.0–0.5	Soil	0.0588	—	—	0.0215 (J)	—	—	—	—	—	0.0411	0.0519	—	—
RE16-10-3878	16-609497	0.0–0.5	Soil	0.0874	—	—	—	—	—	—	—	—	0.0431	0.0606	—	—
RE16-10-3877	16-609497	5.5–6.0	Qbt 4	—	—	—	—	—	0.00215 (J)	—	—	—	—	—	—	—
RE16-10-3879	16-609498	0.0–0.5	Fill	—	—	1.66 (J)	—	—	—	—	—	—	—	0.012 (J)	8.67	—
RE16-10-3881	16-609499	0.0–0.5	Fill	0.0866	—	—	0.0504	—	—	—	—	—	0.0241 (J)	0.0852	—	—
RE16-10-3883	16-609500	0.0–0.5	Soil	0.0449	—	—	—	—	—	—	—	—	0.014 (J)	0.0365 (J)	—	—
RE16-10-3884	16-609500	5.5–6.0	Qbt 4	—	—	—	—	—	0.00328 (J)	—	—	—	—	—	—	—
RE16-10-3204	16-611437	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-12615	16-611437	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-12620	16-611440	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-12621	16-611440	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] na = Not available.

[f] — = Not detected or not detected above BV.

[g] NA = Not analyzed.

[h] Isopropylbenzene was used as a surrogate based on structural similarity.

Table 10.2-1
Summary of Samples Collected and Analyses Requested at the Fishladder Canyon Drainages

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-100	16-608448	0.0–0.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—*	—	10-697
RE16-10-101	16-608448	1.0–1.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
RE16-10-102	16-608449	0.0–0.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
RE16-10-103	16-608449	1.0–1.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
RE16-10-104	16-608450	0.0–0.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
RE16-10-106	16-608451	0.0–0.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
RE16-10-108	16-608452	0.0–0.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
RE16-10-109	16-608452	1.0–1.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
RE16-10-110	16-608453	0.0–0.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
RE16-10-111	16-608453	1.0–1.5	Soil	10-696	10-697	10-696	10-696	10-696	10-697	10-697	—	—	10-697
0316-95-0240	16-01538	0.0–0.5	Soil	—	—	298	—	—	299, 300	—	298	—	299
0316-95-0241	16-01539	0.0–0.5	Soil	—	—	298	—	—	299, 300	—	298	—	299
0316-95-0242	16-01540	0.0–0.5	Soil	—	—	298	—	—	299, 300	—	298	—	299
0316-95-0243	16-01541	0.0–0.5	Soil	—	—	298	—	—	299, 300	—	298	—	299
0316-95-0244	16-01542	0.0–0.5	Soil	—	—	298	—	—	299, 300	—	298	—	299
0316-95-0498	16-02023	0.0–0.5	Soil	—	—	298	—	—	299, 300	—	298	—	299
0316-95-0499	16-02024	0.0–0.5	Soil	—	—	298	—	—	299, 300	—	298	—	299
RE16-05-55823	16-23568	0.0–0.67	Soil	—	2764S	2763S	—	—	2764S	2763S	2763S	2763S	2764S
RE16-05-56150	16-23568	0.8—2.0	Qbt 4	—	2767S	2767S	—	—	2767S	2767S	2767S	2767S	2767S
RE16-05-55824	16-23569	0.0–0.67	Soil	—	2764S	2763S	—	—	2764S	2763S	2763S	2763S	2764S
RE16-05-56151	16-23569	1.7—3.7	Qbt 4	—	2767S	2767S	—	—	2767S	2767S	2767S	2767S	2767S
RE16-05-55923	16-23651	4.0–4.5	Qbt 4	—	3437S	3436S	—	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55924	16-23651	6.0–6.5	Qbt 4	—	3437S	3436S	—	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55925	16-23653	4.0–4.5	Qbt 4	—	3437S	3436S	—	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55926	16-23653	6.0–6.5	Qbt 4	—	3437S	3436S	—	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55927	16-23655	3.0–3.5	Qbt 4	—	3437S	3436S	—	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55928	16-23655	5.0–5.5	Qbt 4	—	3437S	3436S	—	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55929	16-23657	3.5–4.0	Qbt 4	—	3437S	3436S	—	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55930	16-23657	5.5–6.0	Qbt 4	—	3437S	3436S	—	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55983	16-23692	0.0–1.0	Soil	—	2592S	2591S	—	—	2592S	2591S	2591S	2591S	2592S
RE16-05-55963	16-23692	17.5–19.0	Qbt 4	—	2595S	2594S	—	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55964	16-23692	36.0–38.0	Qbt 4	—	2595S	2594S	—	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55965	16-23692	44.0–46.0	Qbt 4	—	2595S	2594S	—	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55966	16-23692	78.0–80.0	Qbt 4	—	2595S	2594S	—	—	2595S	2594S	2594S	2594S	2595S

Table 10.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-05-55960	16-23692	159.0–160.0	Qbt 4	—	2646S	2645S	—	—	2646S	2645S	—	—	2646S
RE16-05-55961	16-23692	192.0–194.0	Qbt 4	—	2646S	2645S	—	—	2646S	2645S	—	—	2646S
RE16-05-61929	16-24906	0.0–0.5	Soil	—	3655S	3654S	—	—	3655S	3654S	3654S	3654S	3655S
RE16-08-12384	16-24906	2.0–2.35	Qbt 4	—	—	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-05-61948	16-24906	2.0–2.5	Soil	—	3735S	3735S	—	—	3735S	3735S	3735S	3735S	3735S
RE16-08-12385	16-24906	2.35–2.75	Qbt 4	—	—	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12276	16-603403	0.0–0.5	Soil	—	08-1515	08-1514	—	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12277	16-603403	1.5–2.0	Soil	—	08-1515	08-1514	—	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12312	16-603406	0.0–0.5	Soil	—	—	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12313	16-603406	2.5–3.0	Qbt 4	—	—	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12314	16-603407	0.0–0.5	Soil	—	—	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12315	16-603407	2.0–2.5	Qbt 4	—	—	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12316	16-603408	0.0–0.5	Soil	—	—	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12317	16-603408	2.0–2.5	Qbt 4	—	—	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12318	16-603409	0.0–0.5	Soil	—	—	—	—	08-1511	08-1511	—	08-1511	—	—

*— = Analyses not requested.

Table 10.2-2
Summary of Inorganic Chemicals above BVs at Fishladder Canyon Drainages

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**
RE16-10-100	16-608448	0.0–0.5	Soil	—[g]	1.27 (U)	—	—	—	0.635 (U)	—	—	—	17.5	—	4.32	—
RE16-10-101	16-608448	1.0–1.5	Soil	—	1.15 (U)	—	—	—	0.576 (U)	—	—	—	—	—	2.44	—
RE16-10-102	16-608449	0.0–0.5	Soil	—	1.17 (U)	—	—	—	0.586 (U)	—	—	—	—	—	2.29	—
RE16-10-103	16-608449	1.0–1.5	Soil	—	1.15 (U)	—	—	—	0.577 (U)	—	—	—	—	—	7.11	—
RE16-10-104	16-608450	0.0–0.5	Soil	—	1.09 (U)	—	—	—	0.546 (U)	—	—	—	—	—	0.875 (J)	—
RE16-10-106	16-608451	0.0–0.5	Soil	—	1.35 (U)	8.18	—	—	—	—	25.7	—	41.5	—	3.04	—
RE16-10-108	16-608452	0.0–0.5	Soil	—	1.24 (U)	—	—	—	0.622 (U)	—	—	—	—	—	2.1	—
RE16-10-109	16-608452	1.0–1.5	Soil	—	1.07 (U)	—	—	—	0.536 (U)	—	—	—	—	—	2.13	—
RE16-10-110	16-608453	0.0–0.5	Soil	—	1.04 (U)	—	—	—	0.52 (U)	—	—	—	—	—	1.33	—
RE16-10-111	16-608453	1.0–1.5	Soil	—	1.08 (U)	—	—	—	0.541 (U)	—	—	—	—	—	7.68	—
0316-95-0240	16-01538	0.0–0.5	Soil	—	6.42 (U)	—	—	—	0.64 (U)	—	—	—	19.1	1.3 (U)	NA[h]	—
0316-95-0241	16-01539	0.0–0.5	Soil	—	6.7 (U)	—	—	—	0.67 (U)	—	—	—	—	1.4 (U)	NA	—
0316-95-0242	16-01540	0.0–0.5	Soil	—	12.8 (U)	—	—	—	1.3 (U)	—	—	—	32.6	2.6 (U)	NA	—
0316-95-0243	16-01541	0.0–0.5	Soil	—	10.2 (U)	9.2	—	—	1 (U)	—	53.1	—	125	2.1 (U)	NA	—
0316-95-0244	16-01542	0.0–0.5	Soil	—	16.8 (U)	18.4	336	—	1.7 (U)	—	68.3	—	146	3.4 (U)	NA	—
0316-95-0498	16-02023	0.0–0.5	Soil	—	5.1 (U)	—	—	—	0.51 (U)	—	—	—	—	1 (U)	NA	—
0316-95-0499	16-02024	0.0–0.5	Soil	—	11.5 (U)	65.6	370	—	1.2 (U)	—	167	—	329	2.3 (U)	NA	—
RE16-05-55823	16-23568	0.0–0.67	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—	2.34	NA
RE16-05-56150	16-23568	0.8—2.0	Qbt 4	—	—	3.42	—	—	—	—	—	94.2	—	NA	1.63	—
RE16-05-55824	16-23569	0.0–0.67	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.38	2.45	NA
RE16-05-56151	16-23569	1.7—3.7	Qbt 4	10200	—	3.34	106	1.27	—	—	7.44	275	8.25	—	1.16	—
RE16-05-55923	16-23651	4.0–4.5	Qbt 4	—	—	7.64	200	—	—	—	11.7	—	76.8 (J-)	—	—	—
RE16-05-55924	16-23651	6.0–6.5	Qbt 4	—	—	4.3	50.9	—	—	—	—	—	12.1 (J-)	—	—	—
RE16-05-55925	16-23653	4.0–4.5	Qbt 4	—	—	3.58	87.3	—	—	—	—	—	11.2 (J-)	—	—	—
RE16-05-55926	16-23653	6.0–6.5	Qbt 4	—	—	5.15	118	—	—	—	—	—	14.3 (J-)	—	—	—
RE16-05-55927	16-23655	3.0–3.5	Qbt 4	9210	—	4.18	149	—	—	—	—	—	11.9 (J-)	—	1.11 (J-)	—
RE16-05-55928	16-23655	5.0–5.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.643 (J-)	—

Table 10.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**
RE16-05-55929	16-23657	3.5–4.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55930	16-23657	5.5–6.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	Soil	—	—	—	—	—	—	—	19.6	—	34.9	—	—	—
RE16-05-55963	16-23692	17.5–19.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55965	16-23692	44.0–46.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55966	16-23692	78.0–80.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55960	16-23692	159.0–160.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55961	16-23692	192.0–194.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12384	16-24906	2.0–2.35	Qbt 4	9240	—	7.99 (U)	115 (J)	—	—	2340 (J-)	8.92	4.94 (J)	8.77	NA	NA	—
RE16-05-61948	16-24906	2.0–2.5	Soil	—	—	—	—	—	0.607 (U)	—	—	—	—	—	3.21 (J-)	—
RE16-08-12385	16-24906	2.35-2.75	Qbt 4	9530	—	—	62.7 (J)	—	—	—	8.21	3.83 (J)	8.93	NA	NA	14700
RE16-08-12276	16-603403	0.0–0.5	Soil	—	—	14.7 (U)	—	—	—	—	—	—	—	—	0.887 (J-)	—
RE16-08-12277	16-603403	1.5–2.0	Soil	—	—	15.5 (U)	—	—	—	—	—	—	—	—	2.24 (J-)	—
RE16-08-12312	16-603406	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	NA	—
RE16-08-12313	16-603406	2.5–3.0	Qbt 4	8610	—	7.88 (U)	211 (J)	—	—	—	—	5.51 (J)	5.85	NA	NA	—
RE16-08-12314	16-603407	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	NA	—
RE16-08-12315	16-603407	2.0–2.5	Qbt 4	15600	—	8.5 (U)	122 (J)	1.25	—	2270 (J-)	12.9	3.15 (J)	14.1	NA	NA	23200
RE16-08-12316	16-603408	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	NA	—
RE16-08-12317	16-603408	2.0–2.5	Qbt 4	—	—	7.84 (U)	79.2 (J)	—	—	—	—	4.47 (J)	4.71	NA	NA	—
RE16-08-12318	16-603409	0.0–0.5	Soil	—	—	18.1	—	—	—	—	—	—	19	NA	NA	—

Table 10.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**800**	**na**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Recreational SSL[f]				**560**	**na**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**na**	**52.3**	**2380**	**3960**	**238000**
Residential SSL[c]				**400**	**na**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
RE16-10-100	16-608448	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-101	16-608448	1.0–1.5	Soil	—	—	—	—	1.36	—	—	—	—	—	—	—	—
RE16-10-102	16-608449	0.0–0.5	Soil	—	—	—	—	—	0.000848 (J)	—	—	—	—	—	—	—
RE16-10-103	16-608449	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-104	16-608450	0.0–0.5	Soil	—	—	—	—	2.24	—	—	—	—	—	—	—	—
RE16-10-106	16-608451	0.0–0.5	Soil	30.8	—	—	—	6.86	—	—	—	—	—	4.36	52.2	93.7
RE16-10-108	16-608452	0.0–0.5	Soil	—	—	—	—	1.86	—	—	—	—	—	—	—	—
RE16-10-109	16-608452	1.0–1.5	Soil	—	—	—	—	1.47	—	—	—	—	—	—	—	—
RE16-10-110	16-608453	0.0–0.5	Soil	—	—	—	—	1.82	—	—	—	—	—	—	—	—
RE16-10-111	16-608453	1.0–1.5	Soil	—	—	—	—	6.98	0.00149 (J)	—	—	—	—	—	—	—
0316-95-0240	16-01538	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	2.36	—	—
0316-95-0241	16-01539	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	2.83	—	—
0316-95-0242	16-01540	0.0–0.5	Soil	—	—	0.11 (J)	—	NA	NA	—	1.3 (U)	—	—	5.24	75	104
0316-95-0243	16-01541	0.0–0.5	Soil	29	—	0.14 (J)	—	NA	NA	—	—	—	—	6.77	106	210
0316-95-0244	16-01542	0.0–0.5	Soil	33.7	—	0.2 (J)	—	NA	NA	1.6 (J)	1.7 (U)	1120 (J)	0.83 (U)	8.13	103	269
0316-95-0498	16-02023	0.0–0.5	Soil	—	—	—	—	NA	NA	—	—	—	—	2.32	41.5	—
0316-95-0499	16-02024	0.0–0.5	Soil	103	—	0.83 (J)	—	NA	NA	2	1.2 (U)	—	—	17.3	265	72.2
RE16-05-55823	16-23568	0.0–0.67	Soil	NA	NA	NA	NA	—	—	NA	NA	NA	NA	6.44	NA	NA
RE16-05-56150	16-23568	0.8—2.0	Qbt 4	—	—	—	—	—	—	0.558 (U)	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	Soil	NA	NA	NA	NA	12.8	—	NA	NA	NA	NA	4.6	NA	NA
RE16-05-56151	16-23569	1.7—3.7	Qbt 4	—	—	—	8.19	—	—	0.564 (U)	1.21	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	Qbt 4	14 (J)	—	—	—	2.24 (J+)	—	1.6 (U)	—	—	—	—	29	—
RE16-05-55924	16-23651	6.0–6.5	Qbt 4	—	—	—	—	1.66 (J+)	—	1.58 (U)	—	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	Qbt 4	—	—	—	—	1.67 (J+)	—	1.6 (U)	—	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	Qbt 4	—	—	—	—	1.8 (J+)	—	1.6 (U)	—	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	Qbt 4	—	—	—	—	—	—	1.16 (J)	—	—	—	—	25.6	—
RE16-05-55928	16-23655	5.0–5.5	Qbt 4	—	—	—	—	—	—	1.68 (U)	—	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	Qbt 4	—	—	—	—	—	—	1.64 (U)	—	—	—	—	—	—
RE16-05-55930	16-23657	5.5–6.0	Qbt 4	—	—	—	—	—	—	1.61 (U)	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	Soil	23.2	—	—	—	—	—	1.77	—	—	—	2.73	55.3	69.9
RE16-05-55963	16-23692	17.5–19.0	Qbt 4	—	—	—	—	—	0.000603 (J)	0.51 (U)	—	—	—	—	—	—

Table 10.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Industrial SSL[c]				**800**	**na**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Recreational SSL[f]				**560**	**na**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**na**	**52.3**	**2380**	**3960**	**238000**
Residential SSL[c]				**400**	**na**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
RE16-05-55964	16-23692	36.0–38.0	Qbt 4	—	—	—	—	—	—	0.509 (U)	—	—	—	—	—	—
RE16-05-55965	16-23692	44.0–46.0	Qbt 4	—	—	—	—	—	—	0.635	—	—	—	—	—	—
RE16-05-55966	16-23692	78.0–80.0	Qbt 4	—	—	—	—	—	—	0.512 (U)	—	—	—	—	—	—
RE16-05-55960	16-23692	159.0–160.0	Qbt 4	—	—	—	—	NA	—	0.507 (U)	—	—	—	—	—	—
RE16-05-55961	16-23692	192.0–194.0	Qbt 4	—	—	—	—	NA	—	0.615 (U)	—	—	—	—	—	—
RE16-08-12384	16-24906	2.0–2.35	Qbt 4	13.8	—	—	—	NA	NA	3.85	—	—	—	—	23.7	—
RE16-05-61948	16-24906	2.0–2.5	Soil	—	—	—	—	NA	—	1.82 (U)	—	—	—	—	—	—
RE16-08-12385	16-24906	2.35-2.75	Qbt 4	12.9	—	—	8.78 (J-)	NA	NA	5.8	—	—	—	—	21.7	—
RE16-08-12276	16-603403	0.0–0.5	Soil	—	—	—	—	0.958 (J-)	NA	1.95	—	—	—	—	—	—
RE16-08-12277	16-603403	1.5–2.0	Soil	—	—	—	—	—	NA	3.15	—	—	—	—	—	—
RE16-08-12312	16-603406	0.0–0.5	Soil	—	—	—	—	NA	NA	2.89	—	—	—	—	—	—
RE16-08-12313	16-603406	2.5–3.0	Qbt 4	—	—	—	—	NA	NA	5.13	—	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	Soil	—	—	—	—	NA	NA	3.52	—	—	—	1.9	—	—
RE16-08-12315	16-603407	2.0–2.5	Qbt 4	—	4280 (J-)	—	11 (J-)	NA	NA	4.56	—	—	—	—	20.4	—
RE16-08-12316	16-603408	0.0–0.5	Soil	—	—	—	—	NA	NA	3.46	—	—	—	—	—	—
RE16-08-12317	16-603408	2.0–2.5	Qbt 4	—	—	—	—	NA	NA	4.91	—	—	—	—	—	—
RE16-08-12318	16-603409	0.0–0.5	Soil	—	—	—	—	NA	NA	3.5	—	—	—	—	—	71.4

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 10.2-3
Summary of Organic Chemicals Detected at Fishladder Canyon Drainages

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2500000**[c]	**1370**	**369000**	**2340**	**2.34**	**1000**[c]	**42.8**
Recreational SSL[d]				**20800**	**702000**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[b]	**301**	**1590000**	**1830**	**446000**	**3010**	**3.01**	**399**	**13800**
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**240000**[c]	**347**	**39600**	**621**	**0.621**	**78**[c]	**618**
RE16-10-100	16-608448	0.0–0.5	Soil	NA[e]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-10-101	16-608448	1.0–1.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-10-102	16-608449	0.0–0.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-10-104	16-608450	0.0–0.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-10-106	16-608451	0.0–0.5	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0316-95-0241	16-01539	0.0–0.5	Soil	—[f]	NA	—	—	—	0.071 (J)	—	—	—	—	NA	—	—	—	NA
0316-95-0242	16-01540	0.0–0.5	Soil	—	NA	—	—	—	—	—	—	—	—	NA	—	—	—	NA
0316-95-0243	16-01541	0.0–0.5	Soil	—	NA	—	—	0.13 (J)	0.19 (J)	—	—	—	—	NA	0.14 (J)	—	—	NA
0316-95-0244	16-01542	0.0–0.5	Soil	—	NA	—	—	—	0.2 (J)	—	—	—	—	NA	—	—	—	NA
0316-95-0498	16-02023	0.0–0.5	Soil	—	NA	—	—	0.053 (J)	0.076 (J)	—	—	—	—	NA	0.057 (J)	—	—	NA
0316-95-0499	16-02024	0.0–0.5	Soil	0.22 (J)	NA	0.37 (J)	1	1.4	2	0.59 (J)	0.88	—	—	NA	1.4	0.16 (J)	0.082 (J)	NA
RE16-05-55823	16-23568	0.0–0.67	Soil	—	0.0812	—	—	—	—	—	—	—	0.511 (J)	—	—	—	—	—
RE16-05-56150	16-23568	0.8—2.0	Qbt 4	—	0.0102	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	Soil	—	0.109	—	—	—	—	—	—	—	3.49 (J)	—	—	—	—	—
RE16-05-56151	16-23569	1.7—3.7	Qbt 4	—	0.024	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	Qbt 4	—	—	0.016 (J)	—	0.0764	0.137	—	—	—	0.571	—	0.0892	—	—	—
RE16-05-55924	16-23651	6.0–6.5	Qbt 4	—	—	0.0071 (J)	—	—	—	—	—	—	0.257 (J)	—	0.0451	—	—	—
RE16-05-55925	16-23653	4.0–4.5	Qbt 4	—	—	—	—	—	—	—	—	—	0.114 (J)	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	0.373 (J)	—	—	—	—	0.0018
RE16-05-55928	16-23655	5.0–5.5	Qbt 4	—	—	—	—	—	—	—	—	—	0.312 (J-)	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.154 (J-)	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	Soil	—	—	—	—	—	—	—	—	—	0.174 (J)	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	Qbt 4	—	—	—	—	—	—	—	—	—	0.232 (J)	—	—	—	—	—
RE16-05-61948	16-24906	2.0–2.5	Soil	—	0.212 (J)	—	—	—	—	—	—	—	—	0.0053 (J)	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	Soil	—	—	0.00687 (J)	—	0.0862	0.09	—	—	0.419 (J)	—	—	—	—	—	—
RE16-08-12277	16-603403	1.5–2.0	Soil	—	—	—	—	—	—	—	—	0.432 (J)	—	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	Soil	—	NA	—	0.0234 (J)	0.0241 (J)	0.0276 (J)	—	—	NA	NA	NA	0.0248 (J)	—	NA	NA
RE16-08-12316	16-603408	0.0–0.5	Soil	—	NA	—	0.0158 (J)	—	—	—	—	NA	NA	NA	0.0116 (J)	—	NA	NA

Table 10.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Di-n-butylphthalate	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Toluene	Trinitrotoluene[2,4,6-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**68400**	**24400**	**24400**	**34200**	**23.4**	**14900**[g]	**3420**[h]	**252**	**20500**	**18300**	**174**	**na**[i]	**36.4**	**57900**	**469**	**3610**
Recreational SSL[d]				**39900**	**13900**	**13900**	**19900**	**30.1**	**52700**[g]	**na**	**1950**	**12000**	**10400**	**233**	**na**	**91.7**	**60800**[f]	**301**	**27800**
Residential SSL[a]				**6110**	**2290**	**2290**	**3060**	**6.21**	**3210**[g]	**310**[h]	**45**	**1830**	**1720**	**44.2**	**na**	**6.99**	**5570**	**35.9**	**1090**
RE16-10-100	16-608448	0.0–0.5	Soil	NA	NA	NA	0.3 (J)	NA	NA	NA	NA	NA	NA	0.248 (J)	6.62 (J+)	NA	NA	—	NA
RE16-10-101	16-608448	1.0–1.5	Soil	NA	NA	NA	0.205 (J)	NA	NA	NA	NA	NA	NA	0.295 (J)	15.5 (J+)	NA	NA	—	NA
RE16-10-102	16-608449	0.0–0.5	Soil	NA	NA	NA	—	NA	NA	NA	NA	NA	NA	—	5.67 (J+)	NA	NA	—	NA
RE16-10-104	16-608450	0.0–0.5	Soil	NA	NA	NA	—	NA	NA	NA	NA	NA	NA	—	5.37 (J+)	NA	NA	—	NA
RE16-10-106	16-608451	0.0–0.5	Soil	NA	NA	NA	0.611	NA	NA	NA	NA	NA	NA	0.565	26 (J+)	NA	NA	—	NA
0316-95-0241	16-01539	0.0–0.5	Soil	—	0.14 (J)	—	—	—	NA	—	—	0.11 (J)	0.11 (J)	—	NA	NA	NA	—	NA
0316-95-0242	16-01540	0.0–0.5	Soil	—	0.16 (J)	—	0.443	—	NA	—	—	0.1 (J)	0.12 (J)	—	NA	NA	NA	—	NA
0316-95-0243	16-01541	0.0–0.5	Soil	—	0.26 (J)	—	0.339	—	NA	—	—	0.13 (J)	0.2 (J)	—	NA	NA	NA	—	NA
0316-95-0244	16-01542	0.0–0.5	Soil	—	0.3 (J)	—	0.839	—	NA	0.12 (J)	—	0.19 (J)	0.24 (J)	—	NA	NA	NA	—	NA
0316-95-0498	16-02023	0.0–0.5	Soil	—	0.098 (J)	—	—	—	NA	—	—	0.054 (J)	0.099 (J)	—	NA	NA	NA	—	NA
0316-95-0499	16-02024	0.0–0.5	Soil	—	2.9	0.18 (J)	2.28	0.67 (J)	NA	—	0.1 (J)	1.6	2.3	3.92	NA	NA	NA	0.356	NA
RE16-05-55823	16-23568	0.0–0.67	Soil	—	0.0726	—	0.303 (J)	—	—	—	—	—	0.0774	0.581 (J)	NA	—	—	—	—
RE16-05-56150	16-23568	0.8—2.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	NA	0.0057	0.00037 (J)	—	—
RE16-05-55824	16-23569	0.0–0.67	Soil	—	—	—	0.474	—	—	—	—	0.0688	0.137	0.464 (J)	NA	—	—	—	—
RE16-05-56151	16-23569	1.7—3.7	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	NA	—	0.00039 (J)	—	—
RE16-05-55923	16-23651	4.0–4.5	Qbt 4	—	0.156	—	0.144 (J)	—	—	—	—	0.0893	0.135	0.273 (J)	4.48	—	—	—	—
RE16-05-55924	16-23651	6.0–6.5	Qbt 4	—	0.0673	—	—	—	—	—	—	0.0445	0.0988	0.149 (J)	4.99	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	Qbt 4	—	0.0196 (J)	—	—	—	—	—	—	0.0126 (J)	0.0267 (J)	0.112 (J)	5.16	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	Qbt 4	—	0.0273 (J)	—	—	—	—	—	—	0.0171 (J)	0.0362	0.189 (J)	4.73	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	Qbt 4	—	0.0136 (J)	—	0.351 (J)	—	—	—	—	—	—	0.882	0.936 (J)	—	—	—	—
RE16-05-55928	16-23655	5.0–5.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.237 (J)	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.106 (J+)	—	—	0.00045 (J)	—	0.00032 (J)
RE16-05-55983	16-23692	0.0–1.0	Soil	—	—	—	0.549	—	—	—	—	—	—	0.563	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	Qbt 4	0.0725 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61948	16-24906	2.0–2.5	Soil	—	—	—	—	—	0.0041 (J+)	—	—	—	—	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000755 (J)	—	—
RE16-08-12277	16-603403	1.5–2.0	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000432 (J)	—	—

Table 10.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Di-n-butylphthalate	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Toluene	Trinitrotoluene[2,4,6-]	Xylene[1,3-]+Xylene[1,4-]
Industrial SSL[a]				**68400**	**24400**	**24400**	**34200**	**23.4**	**14900**[g]	**3420**[h]	**252**	**20500**	**18300**	**174**	**na**[i]	**36.4**	**57900**	**469**	**3610**
Recreational SSL[d]				**39900**	**13900**	**13900**	**19900**	**30.1**	**52700**[g]	**na**	**1950**	**12000**	**10400**	**233**	**na**	**91.7**	**60800**[f]	**301**	**27800**
Residential SSL[a]				**6110**	**2290**	**2290**	**3060**	**6.21**	**3210**[g]	**310**[h]	**45**	**1830**	**1720**	**44.2**	**na**	**6.99**	**5570**	**35.9**	**1090**
RE16-08-12314	16-603407	0.0–0.5	Soil	NA	0.0483	—	NA	—	NA	NA	—	0.034 (J)	0.043	NA	NA	NA	NA	NA	NA
RE16-08-12316	16-603408	0.0–0.5	Soil	NA	0.0174 (J)	—	NA	—	NA	NA	—	0.0114 (J)	0.0139 (J)	NA	NA	NA	NA	NA	NA

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene was used as a surrogate based on structural similarity.

[c] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108613).

[e] NA = Not analyzed.

[f] — = Not detected or not detected above BV.

[g] Isopropylbenzene was used as a surrogate based on structural similarity.

[h] SSL from EPA (2007, 099314).

[i] na = Not available.

Table 10.2-4
Summary of Radionuclides Detected at Fishladder Canyon Drainages

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236
Qbt 2,3,4 BV[a]				**1.98**	**0.09**
Soil BV/FV[a]				**2.59**	**0.2**
Industrial SAL[b]				**1500**	**87**
Recreational SAL[b]				**3200**	**520**
Residential SAL[b]				**170**	**17**
RE16-10-106	16-608451	0.0–0.5	Soil	3.51 (J+)	0.208 (J+)
RE16-08-12385	16-24906	2.35–2.75	Qbt 4	—[c]	0.12
RE16-08-12313	16-603406	2.5–3.0	Qbt 4	—	0.121
RE16-08-12317	16-603408	2.0–2.5	Qbt 4	—	0.096

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g. Data qualifiers are defined in Appendix A.

[a] BVs/FVs from LANL (1998, 059730).

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 10.3-1
Summary of Samples Collected and Analyses Requested at Martin Spring Canyon Drainages

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-124	16-608458	0.0–0.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-126	16-608459	0.0–0.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-127	16-608459	1.0–1.5	Sed	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-128	16-608460	0.0–0.5	Soil	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971
RE16-10-130	16-608461	0.0–0.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-131	16-608461	1.0–1.5	Qbt 4	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-132	16-608462	0.0–0.5	Soil	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971
RE16-10-152	16-608462	0.0–0.5	Soil	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971
RE16-10-136	16-608464	0.0–0.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-153	16-608464	0.0–0.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-137	16-608464	1.0–1.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-138	16-608465	0.0–0.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-139	16-608465	1.0–1.5	Qbt 4	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-140	16-608466	0.0–0.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-141	16-608466	1.0–1.5	Qbt 4	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-142	16-608467	0.0–0.5	Soil	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-143	16-608467	1.0–1.5	Qbt 4	10-991	10-992	10-991	10-991	10-991	10-992	10-992	10-991	10-991	10-992
RE16-10-144	16-608468	0.0–0.5	Soil	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971
RE16-10-145	16-608468	1.0–1.5	Soil	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971	10-971
RE16-10-166	16-608472	0.0–0.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-167	16-608472	1.0–1.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-168	16-608473	0.0–0.5	Soil	—*	10-926	10-925	—	—	10-926	10-926	10-925	10-925	10-926
RE16-10-169	16-608473	1.0–1.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-170	16-608474	0.0–0.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-171	16-608474	1.0–1.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-172	16-608475	0.0–0.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-173	16-608475	1.0–1.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-174	16-608476	0.0–0.5	Soil	—	10-926	10-925	—	—	10-926	10-926	10-925	10-925	10-926
RE16-10-175	16-608476	1.0–1.5	Qbt 4	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-176	16-608477	0.0–0.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-177	16-608477	1.0–1.5	Qbt 4	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-178	16-608478	0.0–0.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-179	16-608478	1.0–1.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-180	16-608479	0.0–0.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926

Table 10.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-181	16-608479	1.0–1.5	Qbt 4	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-182	16-608480	0.0–0.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-183	16-608480	1.0–1.5	Qbt 4	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-184	16-608481	0.0–0.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-185	16-608481	1.0–1.5	Soil	10-927	10-926	10-925	10-927	10-927	10-926	10-926	10-925	10-925	10-926
RE16-10-186	16-608482	0.0–0.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-187	16-608482	1.0–1.5	Qbt 4	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-188	16-608483	0.0–0.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-189	16-608483	1.0–1.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-190	16-608484	0.0–0.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-191	16-608484	1.0–1.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-192	16-608485	0.0–0.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-194	16-608486	0.0–0.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-196	16-608487	0.0–0.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-197	16-608487	1.0–1.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-198	16-608488	0.0–0.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-199	16-608488	1.0–1.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-200	16-608489	0.0–0.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-201	16-608489	1.0–1.5	Soil	10-930	10-929	10-928	10-930	10-930	10-929	10-929	10-928	10-928	10-929
RE16-10-202	16-608490	0.0–0.5	Soil	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-203	16-608490	1.0–1.5	Qbt 4	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-204	16-608491	0.0–0.5	Soil	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-205	16-608491	1.0–1.5	Qbt 4	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-206	16-608492	0.0–0.5	Soil	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-207	16-608492	1.0–1.5	Qbt 4	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-208	16-608493	0.0–0.5	Soil	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-209	16-608493	1.0–1.5	Qbt 4	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-210	16-608494	0.0–0.5	Soil	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-211	16-608494	1.0–1.5	Qbt 4	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-212	16-608495	0.0–0.5	Soil	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-213	16-608495	1.0–1.5	Qbt 4	10-957	10-956	10-955	10-957	10-957	10-956	10-956	10-955	10-955	10-956
RE16-10-240	16-608522	0.0–0.5	Soil	10-703	10-704	10-703	10-703	10-703	10-704	10-704	10-703	10-703	10-704
RE16-10-241	16-608522	1.0–1.5	Soil	10-703	10-704	10-703	10-703	10-703	10-704	10-704	10-703	10-703	10-704
RE16-10-242	16-608523	0.0–0.5	Soil	10-703	10-704	10-703	10-703	10-703	10-704	10-704	10-703	10-703	10-704
RE16-10-243	16-608523	1.0–1.5	Soil	10-703	10-704	10-703	10-703	10-703	10-704	10-704	10-703	10-703	10-704

Table 10.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-244	16-608524	0.0–0.5	Soil	10-703	10-704	10-703	10-703	10-703	10-704	10-704	10-703	10-703	10-704
RE16-10-245	16-608524	1.0–1.5	Soil	10-703	10-704	10-703	10-703	10-703	10-704	10-704	10-703	10-703	10-704
RE16-10-246	16-608525	0.0–0.5	Soil	10-751	10-752	10-751	10-751	10-751	10-752	10-752	10-751	10-751	10-752
RE16-10-247	16-608525	1.0–1.5	Soil	10-751	10-752	10-751	10-751	10-751	10-752	10-752	10-751	10-751	10-752
RE16-10-248	16-608526	0.0–0.5	Soil	10-751	10-752	10-751	10-751	10-751	10-752	10-752	10-751	10-751	10-752
RE16-10-249	16-608526	1.0–1.5	Qbt 4	10-751	10-752	10-751	10-751	10-751	10-752	10-752	10-751	10-751	10-752
RE16-10-250	16-608527	0.0–0.5	Soil	10-751	10-752	10-751	10-751	10-751	10-752	10-752	10-751	10-751	10-752
RE16-10-251	16-608527	1.0–1.5	Qbt 4	10-751	10-752	10-751	10-751	10-751	10-752	10-752	10-751	10-751	10-752
RE16-10-252	16-608528	0.0–0.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-253	16-608528	1.0–1.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-254	16-608529	0.0–0.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-255	16-608529	1.0–1.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-256	16-608530	0.0–0.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-257	16-608530	1.0–1.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-258	16-608531	0.0–0.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-259	16-608531	1.0–1.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-260	16-608532	0.0–0.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-261	16-608532	1.0–1.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-262	16-608533	0.0–0.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-263	16-608533	1.0–1.5	Soil	10-788	10-789	10-788	10-788	10-788	10-789	10-789	10-788	10-788	10-789
RE16-10-264	16-608534	0.0–0.5	Soil	10-790	10-791	10-790	10-790	10-790	10-791	10-791	10-790	10-790	10-791
RE16-10-265	16-608534	1.0–1.5	Qbt 4	10-790	10-791	10-790	10-790	10-790	10-791	10-791	10-790	10-790	10-791
RE16-10-266	16-608535	0.0–0.5	Soil	10-790	10-791	10-790	10-790	10-790	10-791	10-791	10-790	10-790	10-791
RE16-10-267	16-608535	1.0–1.5	Soil	10-790	10-791	10-790	10-790	10-790	10-791	10-791	10-790	10-790	10-791
RE16-10-268	16-608536	0.0–0.5	Soil	10-790	10-791	10-790	10-790	10-790	10-791	10-791	10-790	10-790	10-791
RE16-10-269	16-608536	1.0–1.5	Soil	10-790	10-791	10-790	10-790	10-790	10-791	10-791	10-790	10-790	10-791
RE16-10-270	16-608537	0.0–0.5	Soil	10-814	10-815	10-814	10-814	10-814	10-815	10-815	10-814	10-814	10-815
RE16-10-271	16-608537	1.0–1.5	Soil	10-814	10-815	10-814	10-814	10-814	10-815	10-815	10-814	10-814	10-815
RE16-10-272	16-608538	0.0–0.5	Soil	10-814	10-815	10-814	10-814	10-814	10-815	10-815	10-814	10-814	10-815
RE16-10-273	16-608538	1.0–1.5	Qbt 4	10-814	10-815	10-814	10-814	10-814	10-815	10-815	10-814	10-814	10-815
RE16-10-274	16-608539	0.0–0.5	Soil	10-814	10-815	10-814	10-814	10-814	10-815	10-815	10-814	10-814	10-815
RE16-10-275	16-608539	1.0–1.5	Qbt 4	10-814	10-815	10-814	10-814	10-814	10-815	10-815	10-814	10-814	10-815
RE16-10-276	16-608540	0.0–0.5	Soil	10-814	10-815	10-814	10-814	10-814	10-815	10-815	10-814	10-814	10-815
RE16-10-277	16-608540	1.0–1.5	Qbt 4	10-814	10-815	10-814	10-814	10-814	10-815	10-815	10-814	10-814	10-815
RE16-10-278	16-608541	0.0–0.5	Soil	10-825	10-826	10-825	10-825	10-825	10-826	10-826	10-825	10-825	10-826

Table 10.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-279	16-608541	1.0–1.5	Soil	10-825	10-826	10-825	10-825	10-825	10-826	10-826	10-825	10-825	10-826
RE16-10-280	16-608542	0.0–0.5	Soil	10-825	10-826	10-825	10-825	10-825	10-826	10-826	10-825	10-825	10-826
RE16-10-281	16-608542	1.0–1.5	Qbt 4	10-825	10-826	10-825	10-825	10-825	10-826	10-826	10-825	10-825	10-826
RE16-10-282	16-608543	0.0–0.5	Soil	10-825	10-826	10-825	10-825	10-825	10-826	10-826	10-825	10-825	10-826
RE16-10-283	16-608543	1.0–1.5	Soil	10-825	10-826	10-825	10-825	10-825	10-826	10-826	10-825	10-825	10-826
RE16-10-284	16-608544	0.0–0.5	Soil	10-884	10-885	10-884	10-884	10-884	10-885	10-885	10-884	10-884	10-885
RE16-10-285	16-608544	1.0–1.5	Soil	10-884	10-885	10-884	10-884	10-884	10-885	10-885	10-884	10-884	10-885
RE16-10-286	16-608545	0.0–0.5	Soil	10-970	10-970	10-970	10-970	10-970	10-970	10-970	10-970	10-970	10-970
RE16-10-287	16-608545	1.0–1.5	Soil	10-970	10-970	10-970	10-970	10-970	10-970	10-970	10-970	10-970	10-970
RE16-10-316	16-608548	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-317	16-608548	1.0–1.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-318	16-608549	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-319	16-608549	1.0–1.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-321	16-608550	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-322	16-608551	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-324	16-608552	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-325	16-608552	1.0–1.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-326	16-608553	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-328	16-608554	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-329	16-608554	1.0–1.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-330	16-608555	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-331	16-608555	1.0–1.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-334	16-608557	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-335	16-608557	1.0–1.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-336	16-608558	0.0–0.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-337	16-608558	1.0–1.5	Soil	10-968	10-967	10-966	10-968	10-968	10-967	10-967	10-966	10-966	10-967
RE16-10-338	16-608559	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-339	16-608559	1.0–1.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-340	16-608560	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-341	16-608560	1.0–1.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-342	16-608561	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-344	16-608562	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-345	16-608562	1.0–1.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-346	16-608563	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-347	16-608563	1.0–1.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094

Table 10.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-348	16-608564	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-350	16-608565	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-351	16-608565	1.0–1.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-352	16-608566	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-354	16-608567	0.0–0.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-355	16-608567	1.0–1.5	Soil	10-1095	10-1094	10-1093	10-1095	10-1095	10-1094	10-1094	10-1093	10-1093	10-1094
RE16-10-356	16-608568	0.0–0.5	Soil	10-1152	10-1152	10-1151	10-1152	10-1152	10-1152	10-1152	10-1151	10-1151	10-1152
RE16-10-358	16-608569	0.0–0.5	Soil	10-1152	10-1152	10-1151	10-1152	10-1152	10-1152	10-1152	10-1151	10-1151	10-1152
RE16-10-359	16-608569	1.0–1.5	Soil	10-1152	10-1152	10-1151	10-1152	10-1152	10-1152	10-1152	10-1151	10-1151	10-1152
RE16-10-360	16-608570	0.0–0.5	Soil	10-1152	10-1152	10-1151	10-1152	10-1152	10-1152	10-1152	10-1151	10-1151	10-1152
RE16-10-388	16-611204	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-389	16-611204	1.0–1.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-390	16-611205	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-391	16-611205	1.0–1.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-392	16-611206	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-393	16-611206	1.0–1.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-394	16-611207	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-395	16-611207	1.0–1.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-396	16-611208	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-398	16-611209	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-400	16-611210	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-401	16-611210	1.0–1.5	Qbt 4	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-402	16-611211	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-403	16-611211	1.0–1.5	Qbt 4	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-404	16-611212	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-405	16-611212	1.0–1.5	Qbt 4	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-406	16-611213	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-408	16-611214	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-410	16-611215	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-414	16-611217	0.0–0.5	Soil	10-1157	10-1156	10-1155	10-1157	10-1157	10-1156	10-1156	10-1155	10-1155	10-1156
RE16-10-415	16-611217	0.5-1.5	Soil	10-1159	10-1159	10-1158	10-1159	10-1159	10-1159	10-1159	10-1158	10-1158	10-1159
RE16-10-416	16-611218	0.0–0.5	Soil	10-1159	10-1159	10-1158	10-1159	10-1159	10-1159	10-1159	10-1158	10-1158	10-1159
RE16-10-417	16-611218	1.0–1.5	Soil	10-1159	10-1159	10-1158	10-1159	10-1159	10-1159	10-1159	10-1158	10-1158	10-1159
RE16-10-418	16-611219	0.0–0.5	Soil	10-1183	10-1183	10-1182	10-1183	10-1183	10-1183	10-1183	10-1182	10-1182	10-1183
RE16-10-419	16-611219	1.0–1.5	Soil	10-1183	10-1183	10-1182	10-1183	10-1183	10-1183	10-1183	10-1182	10-1182	10-1183

Table 10.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Anions	High Explosives	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide (Total)
RE16-10-420	16-611220	0.0–0.5	Soil	10-1183	10-1183	10-1182	10-1183	10-1183	10-1183	10-1183	10-1182	10-1182	10-1183
RE16-10-422	16-611221	0.0–0.5	Soil	10-1183	10-1183	10-1182	10-1183	10-1183	10-1183	10-1183	—	10-1182	10-1183
RE16-10-423	16-611221	1.0–1.5	Soil	10-1183	10-1183	10-1182	10-1183	10-1183	10-1183	10-1183	10-1182	10-1182	10-1183
RE16-10-11734	16-611328	0.0–0.5	Fill	10-1872	10-1873	10-1872	10-1872	10-1872	10-1873	10-1873	10-1872	10-1872	10-1873
RE16-10-11735	16-611328	1.0–1.5	Fill	10-1872	10-1873	10-1872	10-1872	10-1872	10-1873	10-1873	10-1872	10-1872	10-1873
RE16-10-11736	16-611329	0.0–0.5	Soil	10-1872	10-1873	10-1872	10-1872	10-1872	10-1873	10-1873	10-1872	10-1872	10-1873
RE16-10-11737	16-611329	1.0–1.5	Soil	10-1872	10-1873	10-1872	10-1872	10-1872	10-1873	10-1873	10-1872	10-1872	10-1873
RE16-10-11738	16-611330	0.0–0.5	Soil	10-1872	10-1873	10-1872	10-1872	10-1872	10-1873	10-1873	10-1872	10-1872	10-1873
RE16-10-11739	16-611330	1.0–1.5	Soil	10-1872	10-1873	10-1872	10-1872	10-1872	10-1873	10-1873	10-1872	10-1872	10-1873
RE16-10-12061	16-611401	0.0–0.5	Soil	10-1507	10-1508	10-1507	10-1507	10-1507	10-1508	10-1508	10-1507	10-1507	10-1508
RE16-10-12062	16-611401	1.0–1.5	Soil	10-1507	10-1508	10-1507	10-1507	10-1507	10-1508	10-1508	10-1507	10-1507	10-1508
RE16-10-12063	16-611402	0.0–0.5	Soil	10-1507	10-1508	10-1507	10-1507	10-1507	10-1508	10-1508	10-1507	10-1507	10-1508
RE16-10-12064	16-611402	1.0–1.5	Soil	10-1507	10-1508	10-1507	10-1507	10-1507	10-1508	10-1508	10-1507	10-1507	10-1508
RE16-10-12066	16-611403	0.0–0.5	Soil	10-1507	10-1508	10-1507	10-1507	10-1507	10-1508	10-1508	10-1507	10-1507	10-1508
RE16-10-12065	16-611403	1.0–1.5	Soil	10-1507	10-1508	10-1507	10-1507	10-1507	10-1508	10-1508	10-1507	10-1507	10-1508
RE16-10-12069	16-611405	0.0–0.5	Soil	10-1507	10-1508	10-1507	10-1507	10-1507	10-1508	10-1508	10-1507	10-1507	10-1508
RE16-10-12070	16-611405	1.0–1.5	Soil	10-1507	10-1508	10-1507	10-1507	10-1507	10-1508	10-1508	10-1507	10-1507	10-1508

*— = Analyses not requested.

Table 10.3-2
Summary of Inorganic Chemicals above BVs at Martin Spring Canyon Drainages

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**13800**	**19.7**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**
RE16-10-124	16-608458	0.0–0.5	Soil	—[g]	1.62 (U)	—	314 (J+)	—	0.809 (U)	—	—	—	—	—	6.31 (J-)	—	31.8
RE16-10-126	16-608459	0.0–0.5	Soil	—	1.55 (U)	—	357 (J+)	—	0.773 (U)	—	—	—	—	—	2.16 (J-)	—	—
RE16-10-127	16-608459	1.0–1.5	Sed	—	1.21 (U)	—	167 (J+)	—	0.605 (U)	—	—	—	—	—	2.88 (J-)	15600	—
RE16-10-128	16-608460	0.0–0.5	Soil	—	1.81 (U)	—	—	—	0.905 (U)	—	—	—	—	—	5.68	—	—
RE16-10-130	16-608461	0.0–0.5	Soil	—	1.1 (U)	—	—	—	0.552 (U)	—	—	—	—	—	0.898 (J-)	—	—
RE16-10-131	16-608461	1.0–1.5	Qbt 4	—	1.07 (U)	—	616 (J+)	—	—	—	—	17.4	—	—	4.86 (J-)	—	15.4
RE16-10-132	16-608462	0.0–0.5	Soil	—	1.01 (U)	—	—	—	0.506 (U)	—	—	—	—	—	0.708 (J)	—	—
RE16-10-136	16-608464	0.0–0.5	Soil	—	1.26 (U)	—	—	—	0.628 (U)	—	—	—	—	—	0.745 (J-)	—	29.5
RE16-10-137	16-608464	1.0–1.5	Soil	—	1.32 (U)	—	—	—	0.661 (U)	—	—	—	—	—	2.41 (J-)	—	—
RE16-10-138	16-608465	0.0–0.5	Soil	—	1.3 (U)	—	—	—	0.649 (U)	—	—	—	—	—	1.19 (J-)	—	—
RE16-10-139	16-608465	1.0–1.5	Qbt 4	—	1.17 (U)	—	78.6 (J+)	—	—	—	13.9	—	7.89	—	1.63 (J-)	—	—
RE16-10-140	16-608466	0.0–0.5	Soil	—	1.18 (U)	—	—	—	0.591 (U)	—	—	—	—	—	2.42 (J-)	—	—
RE16-10-141	16-608466	1.0–1.5	Qbt 4	8900	1.27 (U)	—	392 (J+)	—	—	—	11.6	4.1	17.7	—	3.03 (J-)	—	34.5
RE16-10-142	16-608467	0.0–0.5	Soil	—	1.09 (U)	—	410 (J+)	—	0.546 (U)	—	—	—	—	—	0.822 (J-)	—	26.8
RE16-10-143	16-608467	1.0–1.5	Qbt 4	—	1.03 (U)	—	148 (J+)	—	—	—	7.78	—	—	—	1.99 (J-)	15400	12.8
RE16-10-144	16-608468	0.0–0.5	Soil	—	1.07 (U)	—	—	—	0.536 (U)	—	—	—	—	—	0.719 (J)	—	—
RE16-10-145	16-608468	1.0–1.5	Soil	—	0.976 (U)	—	—	—	0.488 (U)	—	—	—	—	—	3.15	—	—
RE16-10-166	16-608472	0.0–0.5	Soil	—	4.03 (U)	—	—	—	0.456 (J)	—	—	—	21.3	1.37	1.82 (J-)	—	—
RE16-10-167	16-608472	1.0–1.5	Soil	—	3.58 (U)	—	—	—	0.606 (U)	—	—	—	—	—	2.2 (J-)	—	—
RE16-10-168	16-608473	0.0–0.5	Soil	—	3.22 (U)	—	—	—	0.624 (U)	—	—	—	—	0.544	1.35 (J-)	—	—
RE16-10-169	16-608473	1.0–1.5	Soil	—	4.34	—	—	—	0.558 (U)	—	—	—	—	—	3.01 (J-)	—	—
RE16-10-170	16-608474	0.0–0.5	Soil	—	3.35 (U)	—	—	—	0.623 (U)	—	—	—	—	—	1.25 (J-)	—	—
RE16-10-171	16-608474	1.0–1.5	Soil	—	3.11 (U)	—	—	—	0.65 (U)	—	—	—	—	—	1.59 (J-)	—	—
RE16-10-172	16-608475	0.0–0.5	Soil	—	2.29 (U)	—	—	—	0.612 (J)	—	—	—	20.6	0.906	1.16 (J-)	—	23.7
RE16-10-173	16-608475	1.0–1.5	Soil	—	4.01 (U)	—	—	—	0.532 (U)	—	—	—	—	—	3.14 (J-)	—	—
RE16-10-174	16-608476	0.0–0.5	Soil	—	3.88 (U)	—	—	—	0.644 (U)	—	—	—	—	—	1.33 (J-)	—	—
RE16-10-175	16-608476	1.0–1.5	Qbt 4	11300	3.99 (U)	—	251	—	2.71 (U)	2470	10.6	5.2	7.03	—	7.15 (J-)	15400	11.8 (J)
RE16-10-176	16-608477	0.0–0.5	Soil	—	3.88 (U)	—	—	—	0.584 (U)	—	—	—	—	—	0.94 (J-)	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**13800**	**19.7**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**
RE16-10-177	16-608477	1.0–1.5	Qbt 4	9490	3.89 (U)	4.89	158	—	2.72 (U)	—	9.63	6.52	6.05	—	6.77 (J-)	15400	11.7 (J)
RE16-10-178	16-608478	0.0–0.5	Soil	—	2.97 (U)	—	—	—	0.651	—	20.4	—	33.3	—	1.94 (J-)	—	32.7
RE16-10-179	16-608478	1.0–1.5	Soil	—	2.28 (U)	—	—	—	0.575 (U)	—	—	—	—	—	2.59 (J-)	—	—
RE16-10-180	16-608479	0.0–0.5	Soil	—	3.27 (U)	—	—	—	0.657 (U)	—	—	—	—	—	1.68 (J-)	—	—
RE16-10-181	16-608479	1.0–1.5	Qbt 4	9110	2.88 (U)	—	130	—	—	—	—	3.64	—	—	5.6 (J-)	—	—
RE16-10-182	16-608480	0.0–0.5	Soil	—	2.42 (U)	—	—	—	0.612 (U)	—	—	—	—	—	1.14 (J-)	—	—
RE16-10-183	16-608480	1.0–1.5	Qbt 4	13100	2.04 (U)	—	117	1.72	—	2350	7.92	—	5.71	—	4.86 (J-)	—	—
RE16-10-184	16-608481	0.0–0.5	Soil	—	2.86 (U)	—	—	—	—	—	—	—	15.5	—	4.51 (J-)	—	—
RE16-10-185	16-608481	1.0–1.5	Soil	—	3.28 (U)	—	—	—	0.556 (U)	—	—	—	—	—	3.94 (J-)	—	—
RE16-10-186	16-608482	0.0–0.5	Soil	—	1.17 (J)	—	—	—	—	—	—	—	—	—	1.48 (J-)	—	—
RE16-10-187	16-608482	1.0–1.5	Qbt 4	8850	1.71	—	78.4 (J+)	—	—	—	8.21	4.04	5.18	—	5.91 (J-)	—	—
RE16-10-188	16-608483	0.0–0.5	Soil	—	1.93	—	—	—	—	—	—	—	—	—	0.775 (J-)	—	—
RE16-10-189	16-608483	1.0–1.5	Soil	—	2.23	—	—	—	—	—	—	—	—	—	6.04 (J-)	—	—
RE16-10-190	16-608484	0.0–0.5	Soil	—	0.957 (J)	—	—	—	—	—	—	—	—	0.848 (J+)	1.65 (J-)	—	—
RE16-10-191	16-608484	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	2.09 (J-)	—	—
RE16-10-192	16-608485	0.0–0.5	Soil	—	1.46 (J)	—	—	—	—	—	—	—	—	—	0.862 (J-)	—	—
RE16-10-194	16-608486	0.0–0.5	Soil	—	2.7	—	—	—	0.683	—	—	—	18.7	0.658 (J+)	1.12 (J-)	—	23.8
RE16-10-196	16-608487	0.0–0.5	Soil	—	1.45	—	—	—	—	—	—	—	—	—	0.735 (J-)	—	—
RE16-10-197	16-608487	1.0–1.5	Soil	—	1.36	—	—	—	—	—	—	—	—	—	1.69 (J-)	—	—
RE16-10-198	16-608488	0.0–0.5	Soil	—	1.3	—	—	—	—	—	—	—	—	15.1 (J+)	0.772 (J-)	—	—
RE16-10-199	16-608488	1.0–1.5	Soil	—	3.27	—	—	—	0.435 (J)	9550 (J+)	—	—	—	—	3.6 (J-)	—	—
RE16-10-200	16-608489	0.0–0.5	Soil	—	1.47	—	—	—	—	—	—	—	—	0.989 (J+)	0.964 (J-)	—	—
RE16-10-201	16-608489	1.0–1.5	Soil	—	1.96	—	—	—	—	—	—	—	—	—	2.08 (J-)	—	—
RE16-10-202	16-608490	0.0–0.5	Soil	—	1.12 (UJ)	—	—	—	0.562 (U)	—	—	—	—	—	4.28 (J-)	—	—
RE16-10-203	16-608490	1.0–1.5	Qbt 4	—	1 (UJ)	—	—	—	—	—	11.3	—	—	—	1.97 (J-)	—	—
RE16-10-204	16-608491	0.0–0.5	Soil	—	1.09 (UJ)	—	—	—	0.547 (U)	—	—	—	—	—	1.16 (J-)	—	—
RE16-10-205	16-608491	1.0–1.5	Qbt 4	—	1.01 (UJ)	—	—	—	—	—	18.2	—	5.1	—	1.42 (J-)	—	—
RE16-10-206	16-608492	0.0–0.5	Soil	—	1.09 (UJ)	—	—	—	0.547 (U)	—	—	—	—	—	2.52 (J-)	—	—
RE16-10-207	16-608492	1.0–1.5	Qbt 4	—	0.998 (UJ)	—	74.4	—	—	—	13.3	—	6.45	—	3.87 (J-)	—	—
RE16-10-208	16-608493	0.0–0.5	Soil	—	1.28 (UJ)	—	—	—	0.68	—	—	—	16.5	—	2.43 (J-)	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**13800**	**19.7**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**
RE16-10-209	16-608493	1.0–1.5	Qbt 4	—	1.08 (UJ)	—	121	—	—	—	18.9	3.5	11	—	2.41 (J-)	—	11.4
RE16-10-210	16-608494	0.0–0.5	Soil	—	1.33 (UJ)	—	—	—	—	—	—	—	—	—	3 (J-)	—	—
RE16-10-211	16-608494	1.0–1.5	Qbt 4	—	1.11 (UJ)	3.37	154	—	—	2210	8.08	—	5.46	—	3.45 (J-)	—	—
RE16-10-212	16-608495	0.0–0.5	Soil	—	1.21 (UJ)	—	—	—	0.604 (U)	—	—	—	—	—	1.14 (J-)	—	—
RE16-10-213	16-608495	1.0–1.5	Qbt 4	—	1.01 (UJ)	—	64	—	—	—	13.3	—	5.45	—	1.26 (J-)	—	—
RE16-10-240	16-608522	0.0–0.5	Soil	—	1.14 (U)	—	—	—	0.575 (U)	—	—	—	—	—	1.01 (J-)	—	—
RE16-10-241	16-608522	1.0–1.5	Soil	—	1.02 (U)	—	—	—	0.532 (U)	—	—	—	—	—	2.45 (J-)	—	—
RE16-10-242	16-608523	0.0–0.5	Soil	—	1.1 (U)	—	—	—	0.563 (U)	—	—	—	—	0.79	1.24 (J-)	—	27.4
RE16-10-243	16-608523	1.0–1.5	Soil	—	1.1 (U)	—	—	—	0.554 (U)	—	—	—	—	—	3.47 (J-)	—	—
RE16-10-244	16-608524	0.0–0.5	Soil	—	1.09 (U)	—	—	—	0.545 (U)	—	—	—	—	0.752	1.38 (J-)	—	—
RE16-10-245	16-608524	1.0–1.5	Soil	—	1.06 (U)	—	—	—	0.531 (U)	—	—	—	—	—	4.72 (J-)	—	—
RE16-10-246	16-608525	0.0–0.5	Soil	—	1.18 (U)	—	—	—	—	—	—	—	—	0.816	1.19 (J-)	—	—
RE16-10-247	16-608525	1.0–1.5	Soil	—	1.05 (U)	—	—	—	—	—	—	—	—	—	1.53 (J-)	—	—
RE16-10-248	16-608526	0.0–0.5	Soil	—	1.23 (U)	—	—	—	0.616 (U)	—	—	—	—	—	—	—	—
RE16-10-249	16-608526	1.0–1.5	Qbt 4	—	1.08 (U)	—	75.6	—	—	—	—	—	—	—	1.34 (J-)	—	—
RE16-10-250	16-608527	0.0–0.5	Soil	—	1.05 (U)	—	—	—	—	—	—	—	—	—	1.25 (J-)	—	—
RE16-10-251	16-608527	1.0–1.5	Qbt 4	—	1.05 (U)	—	46.7	—	—	—	—	—	—	—	1.5 (J-)	—	—
RE16-10-252	16-608528	0.0–0.5	Soil	—	1.22	—	—	—	—	—	—	—	—	—	1.83 (J-)	—	—
RE16-10-253	16-608528	1.0–1.5	Soil	—	1.13 (J)	—	—	—	—	—	—	—	—	—	3.7 (J-)	—	—
RE16-10-254	16-608529	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	1.56 (J-)	—	—
RE16-10-255	16-608529	1.0–1.5	Soil	—	1.39	—	—	—	—	—	—	—	—	—	2.89 (J-)	—	—
RE16-10-256	16-608530	0.0–0.5	Soil	—	1.1 (U)	—	—	—	—	—	—	—	—	—	1.63 (J-)	—	—
RE16-10-257	16-608530	1.0–1.5	Soil	—	1.22	—	—	—	—	—	—	—	—	—	1.77 (J-)	—	—
RE16-10-258	16-608531	0.0–0.5	Soil	—	1.26	—	—	—	—	—	—	—	—	—	1.85 (J-)	—	—
RE16-10-259	16-608531	1.0–1.5	Soil	—	0.947 (J)	—	—	—	—	—	—	—	—	—	2.43 (J-)	—	—
RE16-10-260	16-608532	0.0–0.5	Soil	—	0.983 (J)	—	—	—	—	—	—	—	—	—	0.856 (J-)	—	—
RE16-10-261	16-608532	1.0–1.5	Soil	—	0.976 (J)	—	—	—	—	—	—	—	—	—	1.03 (J-)	—	—
RE16-10-262	16-608533	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	1.18 (J-)	—	—
RE16-10-263	16-608533	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	1.91 (J-)	—	—
RE16-10-264	16-608534	0.0–0.5	Soil	—	1.02 (U)	—	—	—	—	—	—	—	—	—	1.08 (J-)	25900	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**13800**	**19.7**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**
RE16-10-265	16-608534	1.0–1.5	Qbt 4	7640	1.05 (U)	—	51.6	—	—	—	—	—	—	—	4.21 (J-)	—	—
RE16-10-266	16-608535	0.0–0.5	Soil	—	1.06 (U)	—	—	—	0.528 (U)	—	—	—	—	—	0.922 (J-)	—	—
RE16-10-267	16-608535	1.0–1.5	Soil	—	1.05 (U)	—	—	—	0.523 (U)	—	—	—	—	—	3 (J-)	—	—
RE16-10-268	16-608536	0.0–0.5	Soil	—	1.06 (U)	—	—	—	0.531 (U)	—	—	—	—	—	0.873 (J-)	—	—
RE16-10-269	16-608536	1.0–1.5	Soil	—	1.03 (U)	—	—	—	0.515 (U)	—	—	—	—	—	1.27 (J-)	—	—
RE16-10-270	16-608537	0.0–0.5	Soil	—	1.48 (U)	—	—	—	—	8020	—	—	—	—	2.01 (J-)	—	—
RE16-10-271	16-608537	1.0–1.5	Soil	—	1.15 (U)	—	—	—	0.574 (U)	—	—	—	—	—	4.52 (J-)	—	—
RE16-10-272	16-608538	0.0–0.5	Soil	—	1.3 (U)	—	—	—	—	—	—	—	—	—	1.23 (J-)	—	—
RE16-10-273	16-608538	1.0–1.5	Qbt 4	—	1.05 (U)	—	54.2	—	—	—	—	3.78	—	—	1.34 (J-)	—	—
RE16-10-274	16-608539	0.0–0.5	Soil	—	1.24 (U)	—	—	—	0.618 (U)	—	—	—	—	—	1.21 (J-)	—	—
RE16-10-275	16-608539	1.0–1.5	Qbt 4	7850	1.07 (U)	—	110	—	—	2300	8.42	5.24	5.18	—	1.39 (J-)	15800	11.4
RE16-10-276	16-608540	0.0–0.5	Soil	—	1.21 (U)	—	—	—	—	—	—	—	—	—	1.01 (J-)	—	—
RE16-10-277	16-608540	1.0–1.5	Qbt 4	7810	1.06 (U)	—	119	—	—	2290	9.81	6.41	5.28	—	2.73 (J-)	16300	13.9
RE16-10-278	16-608541	0.0–0.5	Soil	—	1.19 (U)	—	—	—	—	—	—	—	—	—	1.04 (J-)	—	—
RE16-10-279	16-608541	1.0–1.5	Soil	—	1.06 (U)	—	—	—	0.532 (U)	—	—	—	—	—	2.46 (J-)	—	—
RE16-10-280	16-608542	0.0–0.5	Soil	—	1.12 (U)	—	—	—	—	—	—	—	—	—	1.02 (J-)	—	—
RE16-10-281	16-608542	1.0–1.5	Qbt 4	8530	1.06 (U)	—	137	—	—	—	7.92	4.86	4.75 (U)	—	2.26 (J-)	—	—
RE16-10-282	16-608543	0.0–0.5	Soil	—	1.14 (U)	—	—	—	—	—	—	—	—	0.684	1.41 (J-)	—	—
RE16-10-283	16-608543	1.0–1.5	Soil	—	1.03 (U)	—	—	—	0.517 (U)	—	—	—	—	—	1.38 (J-)	—	—
RE16-10-284	16-608544	0.0–0.5	Soil	—	1.04 (U)	—	—	—	0.518 (U)	—	—	—	—	1.65	1.29	—	—
RE16-10-285	16-608544	1.0–1.5	Soil	—	1.08 (U)	—	—	—	0.538 (U)	—	—	—	—	—	2.35	—	—
RE16-10-286	16-608545	0.0–0.5	Soil	—	0.972 (U)	—	—	—	0.486 (U)	—	—	—	—	—	0.711 (J)	—	—
RE16-10-287	16-608545	1.0–1.5	Soil	—	0.964 (U)	—	—	—	0.482 (U)	—	—	—	—	—	1.1	—	—
RE16-10-316	16-608548	0.0–0.5	Soil	—	2.43 (U)	—	851	—	0.64 (U)	—	—	—	16.2	0.541	1.17 (J-)	—	24.6
RE16-10-317	16-608548	1.0–1.5	Soil	—	3.44	—	793	—	0.616 (U)	—	21.2	—	20.3	—	3.62 (J-)	—	39.8
RE16-10-318	16-608549	0.0–0.5	Soil	—	3.46	—	530	—	0.702 (U)	—	—	—	—	—	1.27 (J-)	—	24.3
RE16-10-319	16-608549	1.0–1.5	Soil	—	3.31	—	—	—	0.704 (U)	—	—	—	—	—	4.73 (J-)	—	—
RE16-10-321	16-608550	0.0–0.5	Soil	—	1.32 (U)	—	—	—	0.589 (U)	—	—	—	—	—	2.91 (J-)	—	—
RE16-10-322	16-608551	0.0–0.5	Soil	—	1.95 (U)	—	378	—	0.625 (U)	6630	—	—	16	—	2.22 (J-)	—	—
RE16-10-324	16-608552	0.0–0.5	Soil	—	2.11 (U)	—	—	—	0.616 (U)	—	—	—	—	—	1.34 (J-)	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**13800**	**19.7**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**
RE16-10-325	16-608552	1.0–1.5	Soil	—	1.9 (U)	—	653	—	0.694 (U)	—	—	—	—	—	4.2 (J-)	—	23.8
RE16-10-326	16-608553	0.0–0.5	Soil	—	1.93 (U)	—	—	—	0.634 (U)	—	—	—	—	—	1.59 (J-)	—	—
RE16-10-328	16-608554	0.0–0.5	Soil	—	1.74 (U)	—	383	—	0.704 (U)	—	—	—	—	—	1.61 (J-)	—	—
RE16-10-329	16-608554	1.0–1.5	Soil	—	2.72	—	—	—	0.585 (U)	—	—	—	—	—	3.46 (J-)	—	—
RE16-10-330	16-608555	0.0–0.5	Soil	—	3.04	—	—	—	0.659 (U)	—	—	—	—	—	1.06 (J-)	—	—
RE16-10-331	16-608555	1.0–1.5	Soil	—	2.73	—	—	—	0.571 (U)	—	—	—	—	—	2.61 (J-)	—	—
RE16-10-334	16-608557	0.0–0.5	Soil	—	1.45 (U)	—	—	—	0.618 (U)	—	—	—	—	—	0.722 (J-)	—	—
RE16-10-335	16-608557	1.0–1.5	Soil	—	2.3 (U)	—	—	—	0.625 (U)	—	—	—	—	0.64	0.738 (J-)	—	—
RE16-10-336	16-608558	0.0–0.5	Soil	—	2.72 (U)	—	—	—	0.632 (U)	—	—	—	—	—	1.27 (J-)	—	—
RE16-10-337	16-608558	1.0–1.5	Soil	—	2.23 (U)	—	—	—	0.616 (U)	—	—	—	—	—	3.21 (J-)	—	—
RE16-10-338	16-608559	0.0–0.5	Soil	—	1.7 (U)	—	928	—	0.965 (U)	—	—	—	26.5 (J)	0.827	—	—	35.5
RE16-10-339	16-608559	1.0–1.5	Soil	—	1.42 (U)	—	443	—	0.843 (U)	—	—	—	—	—	—	—	—
RE16-10-340	16-608560	0.0–0.5	Soil	—	3.55 (U)	—	729	—	1.06 (U)	—	—	8.69	23.6 (J)	0.83	—	—	37.4
RE16-10-341	16-608560	1.0–1.5	Soil	—	2.47 (U)	—	—	—	0.745 (U)	—	—	—	—	—	—	—	—
RE16-10-342	16-608561	0.0–0.5	Soil	—	2.46 (U)	—	—	—	0.727 (U)	—	—	—	—	0.622	—	—	—
RE16-10-344	16-608562	0.0–0.5	Soil	—	2.03 (U)	—	490	—	0.785 (U)	—	—	—	19.7 (J)	0.756	—	—	24.8
RE16-10-345	16-608562	1.0–1.5	Soil	—	2.05 (U)	—	482	—	0.83 (U)	—	—	—	—	—	—	—	—
RE16-10-346	16-608563	0.0–0.5	Soil	—	2.77 (U)	—	—	—	0.75 (U)	—	—	—	—	1.38	—	—	22.8
RE16-10-347	16-608563	1.0–1.5	Soil	—	1.95 (U)	—	—	—	0.621 (U)	—	—	—	—	—	—	—	—
RE16-10-348	16-608564	0.0–0.5	Soil	—	1.68 (U)	—	—	—	0.589 (U)	—	—	—	—	—	—	—	—
RE16-10-350	16-608565	0.0–0.5	Soil	—	2.25 (U)	—	300	—	0.706 (U)	—	—	—	16.8 (J)	—	—	—	—
RE16-10-351	16-608565	1.0–1.5	Soil	—	3.05	—	—	—	0.624 (U)	—	—	—	—	—	—	—	—
RE16-10-352	16-608566	0.0–0.5	Soil	—	1.75 (U)	—	—	—	0.572 (U)	—	—	—	—	—	—	—	—
RE16-10-354	16-608567	0.0–0.5	Soil	—	2.19 (U)	—	—	—	0.718 (U)	—	—	—	—	0.514	—	—	—
RE16-10-355	16-608567	1.0–1.5	Soil	—	1.8 (U)	—	—	—	0.621 (U)	—	—	—	—	—	—	—	—
RE16-10-356	16-608568	0.0–0.5	Soil	—	1.33 (U)	—	306	—	0.665 (U)	—	—	8.75	—	—	1.43 (J-)	—	—
RE16-10-358	16-608569	0.0–0.5	Soil	—	1.52 (U)	—	402	—	0.761 (U)	—	—	—	—	—	1.23 (J-)	—	—
RE16-10-359	16-608569	1.0–1.5	Soil	—	1.43 (U)	—	—	—	0.713 (U)	—	—	—	—	—	1.25 (J-)	—	—
RE16-10-360	16-608570	0.0–0.5	Soil	—	1.34 (U)	—	—	—	—	—	—	—	—	—	0.71 (J-)	—	—
RE16-10-388	16-611204	0.0–0.5	Soil	—	1.22 (U)	—	NA[h]	—	0.611 (U)	—	—	—	—	—	1.71 (J-)	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**13800**	**19.7**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**
RE16-10-389	16-611204	1.0–1.5	Soil	—	1.24 (U)	—	NA	—	0.619 (U)	—	—	—	—	—	1.15 (J-)	—	—
RE16-10-390	16-611205	0.0–0.5	Soil	—	—	—	NA	—	—	—	—	—	—	—	0.747 (J-)	—	—
RE16-10-391	16-611205	1.0–1.5	Soil	—	1.2 (U)	—	NA	—	0.602 (U)	—	—	—	—	—	1.07 (J-)	—	—
RE16-10-392	16-611206	0.0–0.5	Soil	—	1.35 (U)	—	NA	—	0.674 (U)	—	—	—	14.9	—	1.47 (J-)	—	22.7
RE16-10-393	16-611206	1.0–1.5	Soil	—	—	—	NA	—	0.622 (U)	—	—	—	—	—	3.78 (J-)	—	—
RE16-10-394	16-611207	0.0–0.5	Soil	—	1.42 (U)	—	NA	—	0.709 (U)	—	—	—	—	—	2.28 (J-)	—	—
RE16-10-395	16-611207	1.0–1.5	Soil	—	1.27 (U)	—	NA	—	0.637 (U)	—	—	—	—	—	3.83 (J-)	—	—
RE16-10-396	16-611208	0.0–0.5	Soil	—	1.56 (U)	—	NA	—	—	—	—	—	16.1	—	3.85 (J-)	—	—
RE16-10-398	16-611209	0.0–0.5	Soil	—	1.25 (U)	—	NA	—	0.626 (U)	—	—	—	—	—	1.15 (J-)	—	—
RE16-10-400	16-611210	0.0–0.5	Soil	—	1.3 (U)	—	NA	—	0.648 (U)	—	—	—	—	—	1.67 (J-)	—	—
RE16-10-401	16-611210	1.0–1.5	Qbt 4	—	1.08 (U)	—	NA	—	—	—	—	—	—	—	3.05 (J-)	—	—
RE16-10-402	16-611211	0.0–0.5	Soil	—	1.17 (U)	—	NA	—	0.585 (U)	—	—	—	—	—	1.98 (J-)	—	—
RE16-10-403	16-611211	1.0–1.5	Qbt 4	—	1.1 (U)	—	NA	—	—	—	10.1	—	—	—	1.24 (J-)	—	—
RE16-10-404	16-611212	0.0–0.5	Soil	—	1.22 (U)	—	NA	—	0.61 (U)	—	—	—	—	—	2.3 (J-)	—	—
RE16-10-405	16-611212	1.0–1.5	Qbt 4	—	1.09 (U)	—	NA	—	—	—	—	—	—	—	1.63 (J-)	—	—
RE16-10-406	16-611213	0.0–0.5	Soil	—	—	—	NA	—	0.667 (U)	—	—	—	—	—	4.75 (J-)	—	—
RE16-10-408	16-611214	0.0–0.5	Soil	—	1.25 (U)	—	NA	—	0.626 (U)	—	—	—	—	—	2.18 (J-)	—	—
RE16-10-410	16-611215	0.0–0.5	Soil	—	1.28 (U)	—	NA	—	0.64 (U)	—	—	—	—	—	1.58 (J-)	—	—
RE16-10-414	16-611217	0.0–0.5	Soil	—	1.39 (U)	—	NA	—	0.697 (U)	—	—	—	—	—	—	—	—
RE16-10-415	16-611217	0.5-1.5	Soil	—	1.19 (U)	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-416	16-611218	0.0–0.5	Soil	—	1.32 (U)	—	—	—	0.66 (U)	—	—	—	—	—	—	—	—
RE16-10-417	16-611218	1.0–1.5	Soil	—	1.17 (U)	—	—	—	0.584 (U)	—	—	—	—	—	—	—	—
RE16-10-418	16-611219	0.0–0.5	Soil	—	1.4 (U)	—	—	—	0.702 (U)	—	—	—	—	—	2.74 (J-)	—	—
RE16-10-419	16-611219	1.0–1.5	Soil	—	1.45 (U)	—	—	—	0.725 (U)	—	—	—	—	—	2.92 (J-)	—	—
RE16-10-420	16-611220	0.0–0.5	Soil	—	1.54 (U)	—	—	—	0.771 (U)	—	—	—	—	—	1.83 (J-)	—	—
RE16-10-422	16-611221	0.0–0.5	Soil	—	1.45 (U)	—	—	—	—	—	—	—	—	—	1.67 (J-)	—	—
RE16-10-423	16-611221	1.0–1.5	Soil	—	1.34 (U)	—	—	—	0.672 (U)	—	—	—	—	—	3.68 (J-)	—	—
RE16-10-11734	16-611328	0.0–0.5	Fill	—	1.11 (U)	—	—	—	—	—	—	—	—	—	2.32 (J-)	—	—
RE16-10-11735	16-611328	1.0–1.5	Fill	—	1.2 (U)	—	—	—	—	—	—	—	—	—	2.09 (J-)	—	—
RE16-10-11736	16-611329	0.0–0.5	Soil	—	1.3 (U)	—	—	—	—	—	—	—	—	—	2.77 (J-)	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**na**	**13800**	**19.7**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[e]**	**45400**	**22700**	**68100**	**795000**	**800**
Recreational SSL[f]				**791000**	**317**	**27.7**	**158000**	**1580**	**784**	**na**	**1910[d]**	**238**	**31700**	**15800**	**47500**	**554000**	**560**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[e]**	**3130**	**1560**	**4690**	**54800**	**400**
RE16-10-11737	16-611329	1.0–1.5	Soil	—	1.19 (U)	—	—	—	—	—	—	—	—	—	2.98 (J-)	—	—
RE16-10-11738	16-611330	0.0–0.5	Soil	—	1.2 (U)	—	—	—	—	—	—	—	—	—	3 (J-)	—	—
RE16-10-11739	16-611330	1.0–1.5	Soil	—	1.14 (U)	—	—	—	—	—	—	—	—	—	1.67 (J-)	—	—
RE16-10-12061	16-611401	0.0–0.5	Soil	—	1.24 (U)	—	—	—	—	—	—	—	20.3	—	1.32 (J-)	—	24.6
RE16-10-12062	16-611401	1.0–1.5	Soil	—	—	—	—	—	0.528 (U)	—	—	—	—	—	1.85 (J-)	—	—
RE16-10-12063	16-611402	0.0–0.5	Soil	—	—	—	—	—	0.648 (U)	—	—	—	—	1.15	2.92 (J-)	—	—
RE16-10-12064	16-611402	1.0–1.5	Soil	—	—	—	—	—	0.572 (U)	—	—	—	—	—	2.32 (J-)	—	—
RE16-10-12066	16-611403	0.0–0.5	Soil	—	2.99 (J)	—	—	—	2.63	—	26.5	—	91.9	4.29	2.11 (J-)	—	74.7
RE16-10-12065	16-611403	1.0–1.5	Soil	—	—	—	—	—	0.517 (U)	—	—	—	—	—	2.25 (J-)	—	—
RE16-10-12069	16-611405	0.0–0.5	Soil	—	0.854 (U)	—	—	—	0.576 (U)	—	—	—	—	—	1.28 (J-)	—	—
RE16-10-12070	16-611405	1.0–1.5	Soil	—	—	—	—	—	0.557 (U)	—	—	—	—	—	1.68 (J-)	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**17**	**63.5**
Sediment BV[a]				**2370**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**19.7**	**60.2**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**39.6**	**48.8**
Industrial SSL[c]				**na**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**5680**	**341000**
Recreational SSL[f]				**na**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**3960**	**238000**
Residential SSL[c]				**na**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**391**	**23500**
RE16-10-124	16-608458	0.0–0.5	Soil	—	—	0.144	—	—	0.0011 (J)	1.68 (UJ)	—	—	—
RE16-10-126	16-608459	0.0–0.5	Soil	—	—	0.107	—	—	—	1.55 (UJ)	—	—	—
RE16-10-127	16-608459	1.0–1.5	Sed	—	—	—	—	1.4 (J-)	—	1.24 (UJ)	—	23.8	—
RE16-10-128	16-608460	0.0–0.5	Soil	—	—	0.163	—	—	—	1.75 (U)	—	—	—
RE16-10-130	16-608461	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-131	16-608461	1.0–1.5	Qbt 4	—	2550	—	—	—	—	1.05 (UJ)	—	20.9	—
RE16-10-132	16-608462	0.0–0.5	Soil	—	—	—	—	1.94	—	—	—	—	—
RE16-10-136	16-608464	0.0–0.5	Soil	—	—	0.101	—	—	—	—	—	—	—
RE16-10-137	16-608464	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-138	16-608465	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-139	16-608465	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.22 (UJ)	—	—	—
RE16-10-140	16-608466	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-141	16-608466	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.25 (UJ)	—	23.2	—
RE16-10-142	16-608467	0.0–0.5	Soil	—	—	0.139	—	—	0.00091 (J)	—	—	—	—
RE16-10-143	16-608467	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.04 (UJ)	—	25.5	—
RE16-10-144	16-608468	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-145	16-608468	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-166	16-608472	0.0–0.5	Soil	—	—	0.814	—	19	0.00089 (J)	—	—	—	66.9
RE16-10-167	16-608472	1.0–1.5	Soil	—	—	0.119	—	8.6	—	—	—	—	—
RE16-10-168	16-608473	0.0–0.5	Soil	—	—	—	—	2.09	—	—	—	—	—
RE16-10-169	16-608473	1.0–1.5	Soil	—	—	—	—	—	0.000688 (J)	—	—	—	—
RE16-10-170	16-608474	0.0–0.5	Soil	—	—	—	—	—	0.00072 (J)	—	—	—	—
RE16-10-171	16-608474	1.0–1.5	Soil	—	—	—	—	—	0.000977 (J)	—	—	—	—
RE16-10-172	16-608475	0.0–0.5	Soil	—	—	1.13	—	—	0.000802 (J)	—	—	—	74.5
RE16-10-173	16-608475	1.0–1.5	Soil	—	—	0.33	—	—	—	—	—	—	—
RE16-10-174	16-608476	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-175	16-608476	1.0–1.5	Qbt 4	2320 (J+)	—	—	8.26	—	0.000559 (J)	1.09 (U)	—	31	—
RE16-10-176	16-608477	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-177	16-608477	1.0–1.5	Qbt 4	1980 (J+)	—	—	7.38	—	—	1.07 (U)	—	33.6	—
RE16-10-178	16-608478	0.0–0.5	Soil	—	—	5.54	—	2.47	—	—	1.96	—	123

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**17**	**63.5**
Sediment BV[a]				**2370**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**19.7**	**60.2**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**39.6**	**48.8**
Industrial SSL[c]				**na**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**5680**	**341000**
Recreational SSL[f]				**na**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**3960**	**238000**
Residential SSL[c]				**na**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**391**	**23500**
RE16-10-179	16-608478	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-180	16-608479	0.0–0.5	Soil	—	—	—	—	4.06	0.000899 (J)	—	—	—	—
RE16-10-181	16-608479	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.11 (U)	—	—	—
RE16-10-182	16-608480	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-183	16-608480	1.0–1.5	Qbt 4	1730 (J+)	—	—	8.41	—	—	1.14 (U)	—	—	—
RE16-10-184	16-608481	0.0–0.5	Soil	—	—	1.28	—	1.85	—	—	—	—	71.7
RE16-10-185	16-608481	1.0–1.5	Soil	—	—	—	—	—	0.00282	—	—	—	—
RE16-10-186	16-608482	0.0–0.5	Soil	—	—	0.338	—	1.77	—	1.55 (U)	—	—	—
RE16-10-187	16-608482	1.0–1.5	Qbt 4	—	—	—	6.62 (J+)	—	—	1.1 (U)	—	21.5 (J)	—
RE16-10-188	16-608483	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-189	16-608483	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-190	16-608484	0.0–0.5	Soil	—	—	—	—	3.35	—	—	—	—	—
RE16-10-191	16-608484	1.0–1.5	Soil	—	—	—	—	1.29	—	—	—	—	—
RE16-10-192	16-608485	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-194	16-608486	0.0–0.5	Soil	—	—	—	—	2.9	—	—	—	—	106 (J+)
RE16-10-196	16-608487	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-197	16-608487	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-198	16-608488	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-199	16-608488	1.0–1.5	Soil	—	—	—	—	—	0.000663 (J)	—	—	—	—
RE16-10-200	16-608489	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-201	16-608489	1.0–1.5	Soil	—	—	—	—	—	0.00146 (J)	—	—	—	—
RE16-10-202	16-608490	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-203	16-608490	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.01 (UJ)	—	—	—
RE16-10-204	16-608491	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-205	16-608491	1.0–1.5	Qbt 4	—	—	—	—	—	—	0.984 (UJ)	—	—	—
RE16-10-206	16-608492	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-207	16-608492	1.0–1.5	Qbt 4	—	—	—	—	1.22	—	1.02 (UJ)	—	—	—
RE16-10-208	16-608493	0.0–0.5	Soil	—	1110	2.71	—	—	—	—	—	—	80.2
RE16-10-209	16-608493	1.0–1.5	Qbt 4	—	572	0.233	—	—	—	1.08 (UJ)	—	17.5	—
RE16-10-210	16-608494	0.0–0.5	Soil	—	—	0.655	—	1.55	0.0014 (J)	—	—	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**17**	**63.5**
Sediment BV[a]				**2370**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**19.7**	**60.2**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**39.6**	**48.8**
Industrial SSL[c]				**na**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**5680**	**341000**
Recreational SSL[f]				**na**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**3960**	**238000**
Residential SSL[c]				**na**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**391**	**23500**
RE16-10-211	16-608494	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.19 (UJ)	—	17.5	—
RE16-10-212	16-608495	0.0–0.5	Soil	—	710	—	—	1.35	—	—	—	—	—
RE16-10-213	16-608495	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.09 (UJ)	—	—	—
RE16-10-240	16-608522	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-241	16-608522	1.0–1.5	Soil	—	—	—	—	1.4	—	—	—	—	—
RE16-10-242	16-608523	0.0–0.5	Soil	—	—	—	—	2.86	—	—	—	—	—
RE16-10-243	16-608523	1.0–1.5	Soil	—	—	—	18.4	—	—	—	—	—	—
RE16-10-244	16-608524	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-245	16-608524	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-246	16-608525	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-247	16-608525	1.0–1.5	Soil	—	—	—	—	1.6	—	—	—	—	—
RE16-10-248	16-608526	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-249	16-608526	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.08 (U)	—	—	—
RE16-10-250	16-608527	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-251	16-608527	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.06 (U)	—	—	—
RE16-10-252	16-608528	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-253	16-608528	1.0–1.5	Soil	—	862	—	—	—	—	—	—	—	—
RE16-10-254	16-608529	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-255	16-608529	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-256	16-608530	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-257	16-608530	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-258	16-608531	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-259	16-608531	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-260	16-608532	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-261	16-608532	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-262	16-608533	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-263	16-608533	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-264	16-608534	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	54.2
RE16-10-265	16-608534	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.04 (U)	—	—	—
RE16-10-266	16-608535	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**17**	**63.5**
Sediment BV[a]				**2370**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**19.7**	**60.2**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**39.6**	**48.8**
Industrial SSL[c]				**na**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**5680**	**341000**
Recreational SSL[f]				**na**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**3960**	**238000**
Residential SSL[c]				**na**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**391**	**23500**
RE16-10-267	16-608535	1.0–1.5	Soil	—	—	—	—	—	0.000865 (J)	—	—	—	—
RE16-10-268	16-608536	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-269	16-608536	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-270	16-608537	0.0–0.5	Soil	—	742	0.257 (J-)	—	2.46	—	—	—	—	—
RE16-10-271	16-608537	1.0–1.5	Soil	—	—	—	—	1.28	—	—	—	—	—
RE16-10-272	16-608538	0.0–0.5	Soil	—	—	—	—	2.51	—	—	—	—	—
RE16-10-273	16-608538	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.04 (U)	—	17.3	—
RE16-10-274	16-608539	0.0–0.5	Soil	—	—	—	—	4.42	—	—	—	—	—
RE16-10-275	16-608539	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.07 (U)	—	26.1	—
RE16-10-276	16-608540	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-277	16-608540	1.0–1.5	Qbt 4	—	573	—	—	1.25	—	1.05 (U)	—	30.2	—
RE16-10-278	16-608541	0.0–0.5	Soil	—	—	—	—	1.38	—	—	—	—	—
RE16-10-279	16-608541	1.0–1.5	Soil	—	—	—	—	—	0.000769 (J)	—	—	—	—
RE16-10-280	16-608542	0.0–0.5	Soil	—	—	—	—	1.43	—	—	—	—	—
RE16-10-281	16-608542	1.0–1.5	Qbt 4	—	—	—	—	—	0.000678 (J)	1.08 (UJ)	—	23.7	—
RE16-10-282	16-608543	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-283	16-608543	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-284	16-608544	0.0–0.5	Soil	—	—	0.105	—	—	—	—	—	—	—
RE16-10-285	16-608544	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-286	16-608545	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-287	16-608545	1.0–1.5	Soil	—	—	—	—	—	0.00134 (J)	—	—	—	—
RE16-10-316	16-608548	0.0–0.5	Soil	—	1030	0.254	—	—	—	—	—	—	59.3
RE16-10-317	16-608548	1.0–1.5	Soil	—	—	0.167	—	—	—	—	—	—	86.4
RE16-10-318	16-608549	0.0–0.5	Soil	—	965	0.198	—	—	—	—	—	—	53.3
RE16-10-319	16-608549	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-321	16-608550	0.0–0.5	Soil	—	813	—	—	—	—	—	—	—	—
RE16-10-322	16-608551	0.0–0.5	Soil	—	—	0.142	—	—	—	—	—	—	—
RE16-10-324	16-608552	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-325	16-608552	1.0–1.5	Soil	—	—	0.107	—	—	—	—	—	—	—
RE16-10-326	16-608553	0.0–0.5	Soil	—	—	—	—	2.67	—	—	—	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**17**	**63.5**
Sediment BV[a]				**2370**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**19.7**	**60.2**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**39.6**	**48.8**
Industrial SSL[c]				**na**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**5680**	**341000**
Recreational SSL[f]				**na**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**3960**	**238000**
Residential SSL[c]				**na**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**391**	**23500**
RE16-10-328	16-608554	0.0–0.5	Soil	—	—	0.133	—	1.74	—	—	—	—	—
RE16-10-329	16-608554	1.0–1.5	Soil	—	—	—	—	1.83	—	—	—	—	—
RE16-10-330	16-608555	0.0–0.5	Soil	—	—	—	—	1.99	—	—	—	—	—
RE16-10-331	16-608555	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-334	16-608557	0.0–0.5	Soil	—	—	—	—	1.47	—	—	—	—	—
RE16-10-335	16-608557	1.0–1.5	Soil	—	—	—	—	2.57	—	—	—	—	—
RE16-10-336	16-608558	0.0–0.5	Soil	—	—	—	—	1.6	—	—	—	—	—
RE16-10-337	16-608558	1.0–1.5	Soil	—	—	—	—	1.86	—	—	—	—	—
RE16-10-338	16-608559	0.0–0.5	Soil	—	—	0.251	—	—	—	1.91 (UJ)	—	—	60
RE16-10-339	16-608559	1.0–1.5	Soil	—	—	—	—	—	—	1.65 (UJ)	—	—	—
RE16-10-340	16-608560	0.0–0.5	Soil	—	841	0.174	—	—	—	2.14 (UJ)	1.06 (U)	—	70.5
RE16-10-341	16-608560	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-342	16-608561	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-344	16-608562	0.0–0.5	Soil	—	—	0.12	—	1.59	—	—	—	—	55.9
RE16-10-345	16-608562	1.0–1.5	Soil	—	—	0.264	—	—	—	1.7 (UJ)	—	—	—
RE16-10-346	16-608563	0.0–0.5	Soil	—	—	—	—	15	—	—	—	—	—
RE16-10-347	16-608563	1.0–1.5	Soil	—	—	—	—	1.36	—	—	—	—	—
RE16-10-348	16-608564	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-350	16-608565	0.0–0.5	Soil	—	—	—	—	1.65	—	—	—	—	49.4
RE16-10-351	16-608565	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-352	16-608566	0.0–0.5	Soil	—	—	—	—	1.24	—	—	—	—	—
RE16-10-354	16-608567	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-355	16-608567	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-356	16-608568	0.0–0.5	Soil	—	1780	—	—	—	—	—	—	—	—
RE16-10-358	16-608569	0.0–0.5	Soil	—	949	0.122	—	—	—	—	—	—	—
RE16-10-359	16-608569	1.0–1.5	Soil	—	1370	—	—	—	—	—	—	—	—
RE16-10-360	16-608570	0.0–0.5	Soil	—	766	—	—	—	—	—	—	—	50.3
RE16-10-388	16-611204	0.0–0.5	Soil	—	—	—	—	2.02	—	—	—	—	—
RE16-10-389	16-611204	1.0–1.5	Soil	—	—	—	—	1.43	—	—	—	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**17**	**63.5**
Sediment BV[a]				**2370**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**19.7**	**60.2**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**39.6**	**48.8**
Industrial SSL[c]				**na**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**5680**	**341000**
Recreational SSL[f]				**na**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**3960**	**238000**
Residential SSL[c]				**na**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**391**	**23500**
RE16-10-390	16-611205	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-391	16-611205	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-392	16-611206	0.0–0.5	Soil	—	1140	—	—	—	—	—	—	—	51.5
RE16-10-393	16-611206	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-394	16-611207	0.0–0.5	Soil	—	—	—	—	1.75	—	—	—	—	—
RE16-10-395	16-611207	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-396	16-611208	0.0–0.5	Soil	—	957	0.171	—	—	—	1.58 (U)	—	—	50.5
RE16-10-398	16-611209	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-400	16-611210	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-401	16-611210	1.0–1.5	Qbt 4	—	—	—	—	—	0.000896 (J)	1.08 (U)	—	—	—
RE16-10-402	16-611211	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-403	16-611211	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.1 (U)	—	—	—
RE16-10-404	16-611212	0.0–0.5	Soil	—	—	—	—	2.42	—	—	—	—	—
RE16-10-405	16-611212	1.0–1.5	Qbt 4	—	—	—	—	—	—	1.1 (U)	—	—	—
RE16-10-406	16-611213	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-408	16-611214	0.0–0.5	Soil	—	—	—	—	1.82	—	—	—	—	—
RE16-10-410	16-611215	0.0–0.5	Soil	—	—	—	—	3.49	—	—	—	—	—
RE16-10-414	16-611217	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-415	16-611217	0.5-1.5	Soil	—	—	—	—	4.28	—	—	—	—	—
RE16-10-416	16-611218	0.0–0.5	Soil	—	—	—	—	—	0.000798 (J)	—	—	—	—
RE16-10-417	16-611218	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-418	16-611219	0.0–0.5	Soil	—	709	—	—	—	—	—	—	—	—
RE16-10-419	16-611219	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-420	16-611220	0.0–0.5	Soil	—	—	—	—	—	—	1.6 (U)	—	—	—
RE16-10-422	16-611221	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-423	16-611221	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—
RE16-10-11734	16-611328	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—
RE16-10-11735	16-611328	1.0–1.5	Fill	—	—	—	—	—	—	—	—	—	—
RE16-10-11736	16-611329	0.0–0.5	Soil	—	—	—	—	2.09	—	—	—	—	—
RE16-10-11737	16-611329	1.0–1.5	Soil	—	—	—	—	1.35	—	—	—	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**17**	**63.5**
Sediment BV[a]				**2370**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**19.7**	**60.2**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**39.6**	**48.8**
Industrial SSL[c]				**na**	**145000**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**5680**	**341000**
Recreational SSL[f]				**na**	**110000**	**238**	**15800**	**1260000**	**555**	**3960**	**3960**	**3960**	**238000**
Residential SSL[c]				**na**	**10700**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**391**	**23500**
RE16-10-11738	16-611330	0.0–0.5	Soil	—	—	—	—	1.71	—	—	—	—	—
RE16-10-11739	16-611330	1.0–1.5	Soil	—	—	—	—	1.37	—	—	—	—	—
RE16-10-12061	16-611401	0.0–0.5	Soil	—	—	6.64	—	3.31	—	—	1.16	—	83.4
RE16-10-12062	16-611401	1.0–1.5	Soil	—	—	0.248	—	1.44	—	—	—	—	—
RE16-10-12063	16-611402	0.0–0.5	Soil	—	—	0.269	—	2.85	—	—	—	—	—
RE16-10-12064	16-611402	1.0–1.5	Soil	—	—	—	—	1.6	—	—	—	—	—
RE16-10-12066	16-611403	0.0–0.5	Soil	—	—	3.52	—	15.6	0.00251 (J)	—	6.89	—	205
RE16-10-12065	16-611403	1.0–1.5	Soil	—	—	0.265	—	2.61	—	—	—	—	70.9
RE16-10-12069	16-611405	0.0–0.5	Soil	—	—	—	—	1.66	—	—	—	—	—
RE16-10-12070	16-611405	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—

Notes: Inorganic chemicals above background per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for chromium hexavalent ion.

[e] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010, 108613).

[g] — = Not detected or not detected above BV.

[h] NA = Not analyzed.

Table 10.3-3
Summary of Organic Chemicals Detected at Martin Spring Canyon Drainages

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]
Industrial SSL[a]				**36700**	**851000**	**2000**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2500000**[b]	**1370**	**369000**
Recreational SSL[d]				**20800**	**702000**	**1440**	**104000**	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1590000**	**1830**	**446000**
Residential SSL[a]				**3440**	**67500**	**150**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**240000**[b]	**347**	**39600**
RE16-10-124	16-608458	0.0–0.5	Soil	—[e]	0.0313 (J)	0.127 (J)	0.0115 (J)	—	—	0.0178 (J)	—	—	—	—	0.00806 (J)
RE16-10-126	16-608459	0.0–0.5	Soil	0.0534	—	—	0.122	0.23	0.213	0.301	0.106	0.0742	—	—	—
RE16-10-128	16-608460	0.0–0.5	Soil	—	0.0598 (J)	—	0.0128 (J)	0.0473 (J)	0.06 (J)	0.0332 (J)	0.0419 (J)	—	—	—	0.0154
RE16-10-132	16-608462	0.0–0.5	Soil	—	—	—	—	0.0209 (J)	0.0138 (J)	0.0166 (J)	—	—	—	—	—
RE16-10-136	16-608464	0.0–0.5	Soil	—	—	0.112 (J)	0.0257 (J)	0.0542	0.0205 (J)	0.0171 (J)	0.0397 (J)	0.0142 (J)	—	—	—
RE16-10-138	16-608465	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-139	16-608465	1.0–1.5	Qbt 4	—	—	—	—	—	0.0179 (J)	—	—	—	—	—	—
RE16-10-140	16-608466	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-141	16-608466	1.0–1.5	Qbt 4	—	—	—	0.0106 (J)	—	0.0552	0.0563	0.0423 (J)	0.0286 (J)	—	—	—
RE16-10-142	16-608467	0.0–0.5	Soil	—	—	—	0.0394	—	0.0568	0.029 (J)	0.0349 (J)	—	—	—	—
RE16-10-143	16-608467	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-168	16-608473	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-169	16-608473	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	0.718 (J)	—	—
RE16-10-172	16-608475	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-176	16-608477	0.0–0.5	Soil	—	—	—	—	—	—	0.0137 (J)	—	—	—	—	—
RE16-10-177	16-608477	1.0–1.5	Qbt 4	—	1.98 (J)	—	—	—	—	—	—	—	—	—	—
RE16-10-178	16-608478	0.0–0.5	Soil	—	—	—	—	0.0457	0.0543	0.081	0.0327 (J)	0.0314 (J)	—	0.0977 (J)	—
RE16-10-179	16-608478	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-182	16-608480	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-184	16-608481	0.0–0.5	Soil	—	—	—	—	0.0279 (J)	0.029 (J)	0.0412 (J)	—	0.0157 (J)	—	—	—
RE16-10-186	16-608482	0.0–0.5	Soil	—	—	—	—	0.0223 (J)	—	0.159	—	—	—	—	—
RE16-10-190	16-608484	0.0–0.5	Soil	—	—	—	—	0.0207 (J)	—	0.163	—	—	—	—	—
RE16-10-192	16-608485	0.0–0.5	Soil	—	—	—	—	0.0257 (J)	0.0164 (J)	0.176	—	—	—	—	—
RE16-10-194	16-608486	0.0–0.5	Soil	—	—	—	—	—	—	0.141	—	—	—	—	—
RE16-10-196	16-608487	0.0–0.5	Soil	—	—	—	—	—	—	0.112	—	—	—	—	—
RE16-10-204	16-608491	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-208	16-608493	0.0–0.5	Soil	—	—	—	—	0.0262 (J)	0.0279 (J)	0.0381 (J)	—	—	—	—	—
RE16-10-210	16-608494	0.0–0.5	Soil	—	—	—	—	0.0219 (J)	0.0207 (J)	0.028 (J)	0.0146 (J)	—	—	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]
Industrial SSL[a]				**36700**	**851000**	**2000**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2500000**[b]	**1370**	**369000**
Recreational SSL[d]				**20800**	**702000**	**1440**	**104000**[e]	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1590000**	**1830**	**446000**
Residential SSL[a]				**3440**	**67500**	**150**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**240000**[b]	**347**	**39600**
RE16-10-240	16-608522	0.0–0.5	Soil	—	—	—	—	—	—	0.123	—	—	—	—	—
RE16-10-242	16-608523	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-252	16-608528	0.0–0.5	Soil	—	—	—	—	0.0198 (J)	—	—	—	0.0309 (J)	—	—	—
RE16-10-253	16-608528	1.0–1.5	Soil	0.0288 (J)	—	—	0.0378 (J)	0.0681	0.0614	0.0376 (J)	0.04	—	—	—	—
RE16-10-258	16-608531	0.0–0.5	Soil	—	—	—	—	0.0227 (J)	0.0232 (J)	0.0328 (J)	0.0175 (J)	0.0142 (J)	—	—	—
RE16-10-259	16-608531	1.0–1.5	Soil	—	—	—	—	—	0.0114 (J)	0.016 (J)	—	—	—	—	—
RE16-10-260	16-608532	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-263	16-608533	1.0–1.5	Soil	—	—	—	0.00738 (J)	0.0156 (J)	0.0112 (J)	—	—	—	—	—	—
RE16-10-264	16-608534	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-270	16-608537	0.0–0.5	Soil	—	—	—	—	0.0396 (J)	0.0334 (J)	0.048 (J)	—	0.0255 (J)	—	—	—
RE16-10-271	16-608537	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-272	16-608538	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-273	16-608538	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-274	16-608539	0.0–0.5	Soil	—	—	—	—	0.0179 (J)	—	—	—	—	—	—	—
RE16-10-276	16-608540	0.0–0.5	Soil	—	—	—	—	0.0261 (J)	0.0247 (J)	0.0371 (J)	—	0.0156 (J)	—	—	—
RE16-10-277	16-608540	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-282	16-608543	0.0–0.5	Soil	—	—	—	0.00911 (J)	—	0.0639	0.0938	0.0613 (J)	—	—	—	—
RE16-10-283	16-608543	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-316	16-608548	0.0–0.5	Soil	—	—	—	0.0195 (J)	0.0679	0.0871	0.0824	0.0714	0.043 (J)	—	—	—
RE16-10-317	16-608548	1.0–1.5	Soil	—	—	—	0.0336 (J)	0.0703	0.137	0.219	0.113	0.0631	—	—	—
RE16-10-318	16-608549	0.0–0.5	Soil	—	—	—	—	0.0311 (J)	0.0423 (J)	0.0325 (J)	—	—	—	—	—
RE16-10-319	16-608549	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-321	16-608550	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-322	16-608551	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-324	16-608552	0.0–0.5	Soil	—	—	—	—	0.0132 (J)	0.0149 (J)	0.0143 (J)	0.0189 (J)	—	—	—	—
RE16-10-325	16-608552	1.0–1.5	Soil	—	—	0.129 (J)	0.0249 (J)	0.0979	0.114	0.147	0.086	0.0571	—	—	—
RE16-10-328	16-608554	0.0–0.5	Soil	—	—	—	0.0103 (J)	0.0299 (J)	—	0.0228 (J)	—	—	—	—	—
RE16-10-329	16-608554	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-330	16-608555	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.361 (J)	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]
Industrial SSL[a]				**36700**	**851000**	**2000**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2500000**[b]	**1370**	**369000**
Recreational SSL[d]				**20800**	**702000**	**1440**	**104000**[e]	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1590000**	**1830**	**446000**
Residential SSL[a]				**3440**	**67500**	**150**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**240000**[b]	**347**	**39600**
RE16-10-331	16-608555	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-335	16-608557	1.0–1.5	Soil	—	—	—	0.00916 (J)	—	0.0131 (J)	0.016 (J)	—	—	—	—	—
RE16-10-337	16-608558	1.0–1.5	Soil	0.0274 (J)	—	—	0.0506	0.0479	0.108	0.0855	0.0632	0.0559	—	—	—
RE16-10-338	16-608559	0.0–0.5	Soil	—	—	—	0.0471 (J)	0.114	0.105	0.376	0.0594 (J)	—	—	—	—
RE16-10-339	16-608559	1.0–1.5	Soil	—	—	—	—	0.0348 (J)	—	0.348	—	—	—	—	—
RE16-10-340	16-608560	0.0–0.5	Soil	—	—	—	—	—	—	0.43	—	—	—	—	—
RE16-10-341	16-608560	1.0–1.5	Soil	—	—	—	—	0.0167 (J)	—	0.157	—	—	—	—	—
RE16-10-342	16-608561	0.0–0.5	Soil	—	—	—	—	—	—	0.148	—	—	—	—	—
RE16-10-344	16-608562	0.0–0.5	Soil	—	—	—	—	0.0207 (J)	—	0.171	—	—	—	—	—
RE16-10-345	16-608562	1.0–1.5	Soil	—	—	—	0.0903 (J)	0.191	0.152	0.579	0.0975 (J)	—	—	—	—
RE16-10-346	16-608563	0.0–0.5	Soil	—	—	—	—	0.0172 (J)	—	0.162	—	—	—	—	—
RE16-10-347	16-608563	1.0–1.5	Soil	—	—	—	—	—	—	0.121	—	—	—	—	—
RE16-10-348	16-608564	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-351	16-608565	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-354	16-608567	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-355	16-608567	1.0–1.5	Soil	—	—	—	—	—	—	0.255	—	—	—	—	—
RE16-10-356	16-608568	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-358	16-608569	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-359	16-608569	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	0.538	—
RE16-10-388	16-611204	0.0–0.5	Soil	—	—	—	—	—	—	0.124	—	—	—	—	—
RE16-10-389	16-611204	1.0–1.5	Soil	—	—	—	—	—	—	0.117	—	—	—	—	—
RE16-10-390	16-611205	0.0–0.5	Soil	—	—	—	—	—	—	0.278	—	—	—	—	—
RE16-10-391	16-611205	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-392	16-611206	0.0–0.5	Soil	—	—	—	—	0.0374 (J)	—	0.3	—	—	—	—	—
RE16-10-393	16-611206	1.0–1.5	Soil	—	—	—	—	—	—	0.129	—	—	—	—	—
RE16-10-394	16-611207	0.0–0.5	Soil	—	—	—	—	—	—	0.29	—	—	—	—	—
RE16-10-395	16-611207	1.0–1.5	Soil	—	—	—	—	0.0181 (J)	—	0.141	—	—	—	—	—
RE16-10-396	16-611208	0.0–0.5	Soil	—	—	—	—	—	—	0.307	—	—	—	—	—
RE16-10-400	16-611210	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	9.94	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]
Industrial SSL[a]				**36700**	**851000**	**2000**[b]	**183000**	**23.4**	**2.34**	**23.4**	**18300**[c]	**234**	**2500000**[b]	**1370**	**369000**
Recreational SSL[d]				**20800**	**702000**	**1440**	**104000**[e]	**30.1**	**3.01**	**30.1**	**10400**[c]	**301**	**1590000**	**1830**	**446000**
Residential SSL[a]				**3440**	**67500**	**150**[b]	**17200**	**6.21**	**0.621**	**6.21**	**1720**[c]	**62.1**	**240000**[b]	**347**	**39600**
RE16-10-402	16-611211	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-404	16-611212	0.0–0.5	Soil	—	—	—	0.0149 (J)	0.049	0.0302 (J)	0.172	—	—	—	—	—
RE16-10-405	16-611212	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-406	16-611213	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-408	16-611214	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-410	16-611215	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-416	16-611218	0.0–0.5	Soil	—	0.0216 (J)	—	—	—	—	—	—	—	—	0.111 (J)	—
RE16-10-417	16-611218	1.0–1.5	Soil	—	—	—	0.01 (J)	0.0318 (J)	0.0233 (J)	0.0331 (J)	—	—	—	0.273 (J)	—
RE16-10-419	16-611219	1.0–1.5	Soil	—	—	—	—	—	—	0.154	—	—	—	—	—
RE16-10-420	16-611220	0.0–0.5	Soil	—	—	—	—	0.0536 (J)	0.0398 (J)	—	—	—	—	—	—
RE16-10-423	16-611221	1.0–1.5	Soil	—	—	—	0.0127 (J)	0.0254 (J)	0.0144 (J)	0.157	—	—	—	—	—
RE16-10-11734	16-611328	0.0–0.5	Fill	—	—	—	—	0.0391 (J)	0.0315 (J)	0.0466	0.0143 (J)	0.0194 (J)	—	0.174 (J)	—
RE16-10-11735	16-611328	1.0–1.5	Fill	—	—	—	—	0.0161 (J)	—	—	—	—	—	0.129 (J)	—
RE16-10-11736	16-611329	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	1.95 (J)	—
RE16-10-11737	16-611329	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-11738	16-611330	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	0.337 (J)	—
RE16-10-11739	16-611330	1.0–1.5	Soil	—	0.474	—	—	—	—	—	—	—	—	—	—
RE16-10-12061	16-611401	0.0–0.5	Soil	—	—	—	—	0.0588	0.0697	0.104	0.0516	0.0395 (J)	—	—	—
RE16-10-12066	16-611403	0.0–0.5	Soil	—	—	—	—	—	0.0172 (J)	0.0329 (J)	0.0156 (J)	—	—	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Butylbenzylphthalate	Chloromethane	Chrysene	Dichloroethene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene
Industrial SSL[a]				**9100**[b]	**198**	**2340**	**42.8**	**385**	**24400**	**24400**	**34200**	**23.4**	**14900**	**14900**[f]	**4100**[b]	**252**
Recreational SSL[d]				**13500**	**1200**	**3010**	**13800**	**2060**	**13900**	**13900**	**19900**	**30.1**	**52700**	**52700**[f]	**3170**	**1950**
Residential SSL[a]				**2600**[b]	**35.6**	**621**	**618**	**69.7**	**2290**	**2290**	**3060**	**6.21**	**3210**	**3210**[f]	**310**[b]	**45**
RE16-10-124	16-608458	0.0–0.5	Soil	—	—	0.0222 (J)	—	0.00215 (J+)	0.0538 (J)	—	—	0.187 (J)	—	—	—	—
RE16-10-126	16-608459	0.0–0.5	Soil	—	—	0.249	—	—	0.632	0.0615	—	0.257	—	—	0.011 (J)	0.028 (J)
RE16-10-128	16-608460	0.0–0.5	Soil	—	—	0.0526 (J)	—	—	0.115	—	—	0.221	—	0.00251	—	—
RE16-10-132	16-608462	0.0–0.5	Soil	—	—	0.0179 (J)	—	—	0.0422	—	—	0.13	—	—	—	—
RE16-10-136	16-608464	0.0–0.5	Soil	—	—	0.0608	—	—	0.13	—	0.189 (J)	0.166	—	—	—	—
RE16-10-138	16-608465	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-139	16-608465	1.0–1.5	Qbt 4	—	—	0.0189 (J)	—	—	0.0486	—	—	—	—	—	—	—
RE16-10-140	16-608466	0.0–0.5	Soil	—	—	—	—	—	0.0186 (J)	—	—	—	—	—	—	—
RE16-10-141	16-608466	1.0–1.5	Qbt 4	—	—	0.0545	—	—	0.134	—	—	0.163 (J)	—	—	—	—
RE16-10-142	16-608467	0.0–0.5	Soil	—	—	0.0493	—	—	0.127	—	—	0.144 (J)	—	—	—	—
RE16-10-143	16-608467	1.0–1.5	Qbt 4	—	—	—	—	—	0.0208 (J)	—	—	—	—	—	—	—
RE16-10-168	16-608473	0.0–0.5	Soil	—	0.00674	—	—	—	—	—	—	—	—	—	—	—
RE16-10-169	16-608473	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-172	16-608475	0.0–0.5	Soil	—	—	—	—	—	0.0144 (J)	—	—	—	—	0.000958 (J+)	—	—
RE16-10-176	16-608477	0.0–0.5	Soil	—	—	—	—	—	0.0137 (J)	—	—	—	—	—	—	—
RE16-10-177	16-608477	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-178	16-608478	0.0–0.5	Soil	—	—	0.0606	—	—	0.095	—	—	0.034 (J)	—	—	—	—
RE16-10-179	16-608478	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	0.000408 (J)	—	—
RE16-10-182	16-608480	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-184	16-608481	0.0–0.5	Soil	—	—	0.0307 (J)	—	—	0.0519	—	—	0.0168 (J)	—	—	—	—
RE16-10-186	16-608482	0.0–0.5	Soil	—	—	0.0219 (J)	—	—	0.0368 (J)	—	—	—	—	—	—	—
RE16-10-190	16-608484	0.0–0.5	Soil	—	—	0.0164 (J)	—	—	0.0343 (J)	—	—	—	—	—	—	—
RE16-10-192	16-608485	0.0–0.5	Soil	—	—	0.0266 (J)	—	—	0.0506 (J)	—	—	—	—	—	—	—
RE16-10-194	16-608486	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-196	16-608487	0.0–0.5	Soil	—	—	—	—	—	0.0132 (J)	—	—	—	—	—	—	—
RE16-10-204	16-608491	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-208	16-608493	0.0–0.5	Soil	—	—	0.0275 (J)	—	—	0.0408 (J)	—	—	0.0163 (J)	—	—	—	—
RE16-10-210	16-608494	0.0–0.5	Soil	—	—	0.0216 (J)	—	—	0.0361 (J)	—	—	—	—	—	—	—
RE16-10-240	16-608522	0.0–0.5	Soil	—	—	—	—	—	0.0178 (J)	—	—	—	—	—	—	—
RE16-10-242	16-608523	0.0–0.5	Soil	0.169 (J)	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-252	16-608528	0.0–0.5	Soil	—	—	0.0168 (J)	—	—	0.0311 (J)	—	—	—	—	—	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Butylbenzylphthalate	Chloromethane	Chrysene	Dichloroethene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene
Industrial SSL[a]				**9100**[b]	**198**	**2340**	**42.8**	**385**	**24400**	**24400**	**34200**	**23.4**	**14900**	**14900**[f]	**4100**[b]	**252**
Recreational SSL[d]				**13500**	**1200**	**3010**	**13800**	**2060**	**13900**	**13900**	**19900**	**30.1**	**52700**	**52700**[f]	**3170**	**1950**
Residential SSL[a]				**2600**[b]	**35.6**	**621**	**618**	**69.7**	**2290**	**2290**	**3060**	**6.21**	**3210**	**3210**[f]	**310**[b]	**45**
RE16-10-253	16-608528	1.0–1.5	Soil	—	—	0.064	—	—	0.182	0.0278 (J)	—	0.148	—	—	0.0111 (J)	0.0278 (J)
RE16-10-258	16-608531	0.0–0.5	Soil	—	—	0.0215 (J)	—	—	0.0414 (J)	—	—	0.0626	—	—	—	—
RE16-10-259	16-608531	1.0–1.5	Soil	—	—	—	—	—	0.0235 (J)	—	—	—	—	—	—	—
RE16-10-260	16-608532	0.0–0.5	Soil	—	—	—	—	—	0.0132 (J)	—	—	—	—	—	—	—
RE16-10-263	16-608533	1.0–1.5	Soil	—	—	0.0113 (J)	—	—	0.0273 (J)	—	—	—	—	—	—	—
RE16-10-264	16-608534	0.0–0.5	Soil	—	—	—	—	—	0.0141 (J)	—	—	—	—	—	—	—
RE16-10-270	16-608537	0.0–0.5	Soil	—	—	0.0325 (J)	—	—	0.0636	—	—	—	—	—	—	—
RE16-10-271	16-608537	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-272	16-608538	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-273	16-608538	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-274	16-608539	0.0–0.5	Soil	—	—	—	—	—	0.0269 (J)	—	—	—	—	—	—	—
RE16-10-276	16-608540	0.0–0.5	Soil	—	—	0.0256 (J)	—	—	0.0431	—	—	—	—	—	—	—
RE16-10-277	16-608540	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-282	16-608543	0.0–0.5	Soil	—	—	0.07	—	—	0.106	—	—	0.0655 (J)	—	—	—	—
RE16-10-283	16-608543	1.0–1.5	Soil	—	—	—	—	—	0.0147 (J)	—	—	—	—	—	—	—
RE16-10-316	16-608548	0.0–0.5	Soil	—	—	0.0957	—	—	0.173	—	—	0.188	—	—	—	—
RE16-10-317	16-608548	1.0–1.5	Soil	—	—	0.093	—	—	0.179	—	—	0.22	—	—	—	—
RE16-10-318	16-608549	0.0–0.5	Soil	—	—	0.0316 (J)	—	—	0.0771	—	—	—	—	—	—	—
RE16-10-319	16-608549	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-321	16-608550	0.0–0.5	Soil	—	—	—	—	—	0.0189 (J)	—	—	—	—	—	—	—
RE16-10-322	16-608551	0.0–0.5	Soil	—	—	0.0176 (J)	—	—	0.0365 (J)	—	—	—	—	—	—	—
RE16-10-324	16-608552	0.0–0.5	Soil	—	—	0.0164 (J)	—	—	0.0358 (J)	—	—	0.141	—	—	—	—
RE16-10-325	16-608552	1.0–1.5	Soil	—	—	0.126	—	—	0.224	—	—	0.213	—	0.0124	—	—
RE16-10-328	16-608554	0.0–0.5	Soil	—	—	0.0272 (J)	—	—	0.0615	—	—	—	—	—	—	—
RE16-10-329	16-608554	1.0–1.5	Soil	—	—	—	—	—	0.0161 (J)	—	—	—	—	—	—	—
RE16-10-330	16-608555	0.0–0.5	Soil	—	—	—	—	—	0.0207 (J)	—	—	—	—	—	—	—
RE16-10-331	16-608555	1.0–1.5	Soil	—	—	—	—	—	0.0208 (J)	—	—	—	—	—	—	—
RE16-10-335	16-608557	1.0–1.5	Soil	—	—	0.0175 (J)	—	—	0.0427	—	—	—	—	—	—	—
RE16-10-337	16-608558	1.0–1.5	Soil	—	—	0.0946	—	—	0.243	0.0255 (J)	—	0.174	—	—	—	—
RE16-10-338	16-608559	0.0–0.5	Soil	—	—	0.147	—	—	0.324	—	—	0.0209 (J)	—	—	—	—
RE16-10-339	16-608559	1.0–1.5	Soil	—	—	—	—	—	0.0657 (J)	—	—	—	—	—	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Butylbenzylphthalate	Chloromethane	Chrysene	Dichloroethene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene
Industrial SSL[a]				**9100**[b]	**198**	**2340**	**42.8**	**385**	**24400**	**24400**	**34200**	**23.4**	**14900**	**14900**[f]	**4100**[b]	**252**
Recreational SSL[d]				**13500**	**1200**	**3010**	**13800**	**2060**	**13900**	**13900**	**19900**	**30.1**	**52700**	**52700**[f]	**3170**	**1950**
Residential SSL[a]				**2600**[b]	**35.6**	**621**	**618**	**69.7**	**2290**	**2290**	**3060**	**6.21**	**3210**	**3210**[f]	**310**[b]	**45**
RE16-10-340	16-608560	0.0–0.5	Soil	—	—	—	0.00213 (J)	—	0.0862 (J)	—	—	—	—	—	—	—
RE16-10-341	16-608560	1.0–1.5	Soil	—	—	—	—	—	0.0313 (J)	—	—	—	—	—	—	—
RE16-10-342	16-608561	0.0–0.5	Soil	—	—	—	—	—	0.0205 (J)	—	—	—	—	—	—	—
RE16-10-344	16-608562	0.0–0.5	Soil	—	—	0.0226 (J)	0.000965 (J)	—	0.0443 (J)	—	—	—	—	—	—	—
RE16-10-345	16-608562	1.0–1.5	Soil	—	—	0.185	—	—	0.419	—	—	—	—	—	—	—
RE16-10-346	16-608563	0.0–0.5	Soil	—	—	0.0189 (J)	0.000758 (J)	—	0.0361 (J)	—	—	—	—	—	—	—
RE16-10-347	16-608563	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-348	16-608564	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.00636	0.000801 (J)	—	—
RE16-10-351	16-608565	1.0–1.5	Soil	—	—	—	—	—	0.0304 (J)	—	—	—	—	—	—	—
RE16-10-354	16-608567	0.0–0.5	Soil	—	—	—	0.000723 (J)	—	—	—	—	—	—	—	—	—
RE16-10-355	16-608567	1.0–1.5	Soil	—	—	—	—	—	0.0492 (J)	—	—	—	0.00777	0.0023 (J)	—	—
RE16-10-356	16-608568	0.0–0.5	Soil	—	—	—	—	—	—	—	16.7 (J)	—	—	—	—	—
RE16-10-358	16-608569	0.0–0.5	Soil	—	—	—	—	—	—	—	1.39 (J)	—	—	—	—	—
RE16-10-359	16-608569	1.0–1.5	Soil	—	—	—	—	—	—	—	17.1 (J)	—	—	—	—	—
RE16-10-388	16-611204	0.0–0.5	Soil	—	—	—	—	—	0.0183 (J)	—	0.235 (J)	—	—	—	—	—
RE16-10-389	16-611204	1.0–1.5	Soil	—	—	—	—	—	—	—	0.157 (J)	—	—	—	—	—
RE16-10-390	16-611205	0.0–0.5	Soil	—	—	—	—	—	—	—	0.371 (J)	—	—	—	—	—
RE16-10-391	16-611205	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-392	16-611206	0.0–0.5	Soil	—	—	0.0399 (J)	—	—	0.0763 (J)	—	—	—	—	—	—	—
RE16-10-393	16-611206	1.0–1.5	Soil	—	—	—	—	—	0.0187 (J)	—	—	—	—	—	—	—
RE16-10-394	16-611207	0.0–0.5	Soil	—	—	—	—	—	0.0436 (J)	—	—	—	—	—	—	—
RE16-10-395	16-611207	1.0–1.5	Soil	—	—	0.0191 (J)	—	—	0.0418 (J)	—	—	—	—	0.00857	—	—
RE16-10-396	16-611208	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-400	16-611210	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	0.00219	—	—
RE16-10-402	16-611211	0.0–0.5	Soil	—	—	—	—	—	—	—	12.1 (J)	—	—	—	—	—
RE16-10-404	16-611212	0.0–0.5	Soil	—	—	0.0514	—	—	0.145	—	12.2 (J)	—	—	—	—	—
RE16-10-405	16-611212	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	22.2 (J)	—	—	—	—	—
RE16-10-406	16-611213	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	0.0124	—	—
RE16-10-408	16-611214	0.0–0.5	Soil	—	—	—	—	—	—	—	0.356 (J)	—	—	—	—	—
RE16-10-410	16-611215	0.0–0.5	Soil	—	—	—	—	—	—	—	6.66 (J)	—	—	—	—	—
RE16-10-416	16-611218	0.0–0.5	Soil	—	—	—	—	—	0.0314 (J)	—	8.01 (J)	—	—	—	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Butylbenzylphthalate	Chloromethane	Chrysene	Dichloroethene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene
Industrial SSL[a]				**9100**[b]	**198**	**2340**	**42.8**	**385**	**24400**	**24400**	**34200**	**23.4**	**14900**	**14900**[f]	**4100**[b]	**252**
Recreational SSL[d]				**13500**	**1200**	**3010**	**13800**	**2060**	**13900**	**13900**	**19900**	**30.1**	**52700**	**52700**[f]	**3170**	**1950**
Residential SSL[a]				**2600**[b]	**35.6**	**621**	**618**	**69.7**	**2290**	**2290**	**3060**	**6.21**	**3210**	**3210**[f]	**310**[b]	**45**
RE16-10-417	16-611218	1.0–1.5	Soil	—	—	0.0248 (J)	—	—	0.0577	—	0.356 (J)	—	—	—	—	—
RE16-10-419	16-611219	1.0–1.5	Soil	—	—	—	—	—	0.0298 (J)	—	—	—	—	—	—	—
RE16-10-420	16-611220	0.0–0.5	Soil	—	—	0.0441 (J)	—	—	0.0829 (J)	—	—	—	—	—	—	—
RE16-10-423	16-611221	1.0–1.5	Soil	—	—	0.0256 (J)	—	—	0.0529	—	—	—	—	—	—	—
RE16-10-11734	16-611328	0.0–0.5	Fill	—	—	0.0361 (J)	—	—	0.0743	—	31.2 (J-)	0.0136 (J)	—	—	—	—
RE16-10-11735	16-611328	1.0–1.5	Fill	—	—	—	—	—	0.0277 (J)	—	23.6 (J-)	—	—	0.000427 (J)	—	—
RE16-10-11736	16-611329	0.0–0.5	Soil	—	—	—	—	—	0.0144 (J)	—	1.95 (J-)	—	—	—	—	—
RE16-10-11737	16-611329	1.0–1.5	Soil	—	—	—	—	—	—	—	0.925 (J-)	—	—	—	—	—
RE16-10-11738	16-611330	0.0–0.5	Soil	—	—	—	—	—	—	—	0.884 (J-)	—	—	—	—	—
RE16-10-11739	16-611330	1.0–1.5	Soil	—	—	—	—	—	0.0158 (J)	—	0.697 (J-)	—	—	0.664	—	—
RE16-10-12061	16-611401	0.0–0.5	Soil	—	—	0.0787	—	—	0.118	—	—	0.0476	—	—	—	—
RE16-10-12066	16-611403	0.0–0.5	Soil	—	—	0.0155 (J)	—	—	0.0212 (J)	—	—	0.0146 (J)	—	—	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitroaniline[4-]	Pentachlorophenol	Phenanthrene	Propylbenzene[1-]	Pyrene	RDX	Styrene	TATB	Tetrachloroethene	Toluene	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**860**[b]	**100**	**20500**	**21000**[b]	**18300**	**174**	**51200**	**na**[g]	**36.4**	**57900**	**10000**[b]	**469**
Recreational SSL[d]				**na**	**117**	**12000**	**69600**	**10400**	**233**	**126000**	**na**	**91.7**	**60800**	**7920**	**301**
Residential SSL[a]				**240**[b]	**29.8**	**1830**	**3400**[b]	**1720**	**44.2**	**8970**	**na**	**6.99**	**5570**	**780**[b]	**35.9**
RE16-10-124	16-608458	0.0–0.5	Soil	—	—	0.0349 (J)	—	0.0468 (J)	—	—	—	—	0.00753 (J+)	—	0.873 (J)
RE16-10-126	16-608459	0.0–0.5	Soil	0.376 (J)	—	0.555	—	0.549	—	—	—	—	—	—	0.159 (J)
RE16-10-128	16-608460	0.0–0.5	Soil	—	—	0.0504 (J)	—	0.0994	—	—	—	—	0.000605 (J)	—	0.189 (J)
RE16-10-132	16-608462	0.0–0.5	Soil	—	—	0.0208 (J)	—	0.036 (J)	—	—	—	—	—	—	—
RE16-10-136	16-608464	0.0–0.5	Soil	—	—	0.0941	—	0.133	—	—	—	—	—	—	0.156 (J)
RE16-10-138	16-608465	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.00108 (J+)	—	—
RE16-10-139	16-608465	1.0–1.5	Qbt 4	—	—	0.0301 (J)	—	0.0401 (J)	—	—	—	—	—	—	0.106 (J)
RE16-10-140	16-608466	0.0–0.5	Soil	—	—	—	—	0.0151 (J)	—	—	—	—	—	—	—
RE16-10-141	16-608466	1.0–1.5	Qbt 4	—	—	0.0685	—	0.12	—	—	—	—	—	—	—
RE16-10-142	16-608467	0.0–0.5	Soil	—	—	0.0694	—	0.114	—	—	—	—	—	—	0.483 (J)
RE16-10-143	16-608467	1.0–1.5	Qbt 4	—	—	0.0139 (J)	—	0.0186 (J)	—	—	—	—	0.00126	—	—
RE16-10-168	16-608473	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-169	16-608473	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-172	16-608475	0.0–0.5	Soil	—	—	—	—	0.0148 (J)	—	—	—	—	0.00472 (J+)	—	—
RE16-10-176	16-608477	0.0–0.5	Soil	—	—	—	—	0.0155 (J)	—	—	—	—	—	—	—
RE16-10-177	16-608477	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	—	0.0379	—	—
RE16-10-178	16-608478	0.0–0.5	Soil	—	—	0.0407 (J)	—	0.096	—	—	1.13 (J-)	—	—	—	—
RE16-10-179	16-608478	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-182	16-608480	0.0–0.5	Soil	—	0.397 (J)	—	—	—	—	—	—	—	—	—	—
RE16-10-184	16-608481	0.0–0.5	Soil	—	—	0.0332 (J)	—	0.0605	—	—	—	—	—	—	—
RE16-10-186	16-608482	0.0–0.5	Soil	—	—	0.017 (J)	—	0.0383 (J)	—	—	—	—	—	—	—
RE16-10-190	16-608484	0.0–0.5	Soil	—	—	0.0165 (J)	—	0.0336 (J)	—	—	—	—	—	—	—
RE16-10-192	16-608485	0.0–0.5	Soil	—	—	0.0282 (J)	—	0.0516	—	—	—	—	—	—	—
RE16-10-194	16-608486	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-196	16-608487	0.0–0.5	Soil	—	—	—	—	0.0147 (J)	—	—	—	—	—	—	—
RE16-10-204	16-608491	0.0–0.5	Soil	—	—	—	—	0.0126 (J)	—	—	—	—	—	—	—
RE16-10-208	16-608493	0.0–0.5	Soil	—	—	0.0266 (J)	—	0.0598	—	—	—	—	—	—	—
RE16-10-210	16-608494	0.0–0.5	Soil	—	—	0.0224 (J)	—	0.0437 (J)	—	—	—	—	—	—	—
RE16-10-240	16-608522	0.0–0.5	Soil	—	—	—	—	0.0183 (J)	—	—	—	—	—	—	—
RE16-10-242	16-608523	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitroaniline[4-]	Pentachlorophenol	Phenanthrene	Propylbenzene[1-]	Pyrene	RDX	Styrene	TATB	Tetrachloroethene	Toluene	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**860**[b]	**100**	**20500**	**21000**[b]	**18300**	**174**	**51200**	**na**[g]	**36.4**	**57900**	**10000**[b]	**469**
Recreational SSL[d]				**na**	**117**	**12000**	**69600**	**10400**	**233**	**126000**	**na**	**91.7**	**60800**	**7920**	**301**
Residential SSL[a]				**240**[b]	**29.8**	**1830**	**3400**[b]	**1720**	**44.2**	**8970**	**na**	**6.99**	**5570**	**780**[b]	**35.9**
RE16-10-252	16-608528	0.0–0.5	Soil	—	—	0.0185 (J)	—	0.0343 (J)	—	—	—	—	—	—	—
RE16-10-253	16-608528	1.0–1.5	Soil	—	—	0.17	—	0.161	—	—	—	—	—	—	—
RE16-10-258	16-608531	0.0–0.5	Soil	—	—	0.0175 (J)	—	0.0425	—	—	—	0.000378 (J)	—	—	—
RE16-10-259	16-608531	1.0–1.5	Soil	—	—	0.0135 (J)	—	0.0238 (J)	—	—	—	—	—	—	—
RE16-10-260	16-608532	0.0–0.5	Soil	—	—	—	—	0.0149 (J)	—	—	—	—	—	—	—
RE16-10-263	16-608533	1.0–1.5	Soil	—	—	0.0275 (J)	—	0.028 (J)	—	—	—	—	—	—	—
RE16-10-264	16-608534	0.0–0.5	Soil	—	—	—	—	0.0164 (J)	—	—	—	—	—	—	—
RE16-10-270	16-608537	0.0–0.5	Soil	—	—	0.0344 (J)	—	0.0631	—	—	—	0.00111 (J+)	—	—	—
RE16-10-271	16-608537	1.0–1.5	Soil	—	—	—	—	—	—	—	—	0.00221 (J+)	—	—	—
RE16-10-272	16-608538	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.0026 (J+)	—	0.000645 (J+)	—
RE16-10-273	16-608538	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	0.000926 (J)	—	—	—
RE16-10-274	16-608539	0.0–0.5	Soil	—	—	0.0186 (J)	—	0.0337 (J)	—	—	—	0.00177 (J+)	—	—	—
RE16-10-276	16-608540	0.0–0.5	Soil	—	—	0.0188 (J)	—	0.047	—	—	—	0.00328 (J+)	—	—	—
RE16-10-277	16-608540	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	—	0.000339 (J-)	—	—	—
RE16-10-282	16-608543	0.0–0.5	Soil	—	—	0.0579	—	0.119	—	—	—	—	—	—	—
RE16-10-283	16-608543	1.0–1.5	Soil	—	—	—	—	0.0159 (J)	—	—	—	—	—	—	—
RE16-10-316	16-608548	0.0–0.5	Soil	—	—	0.0942	—	0.194	—	—	—	—	—	—	—
RE16-10-317	16-608548	1.0–1.5	Soil	—	—	0.104	—	0.187	—	—	—	—	—	—	0.133 (J)
RE16-10-318	16-608549	0.0–0.5	Soil	—	—	0.0398 (J)	—	0.0786	—	—	—	—	—	—	0.117 (J)
RE16-10-319	16-608549	1.0–1.5	Soil	—	—	—	—	0.0159 (J)	—	—	—	—	—	—	—
RE16-10-321	16-608550	0.0–0.5	Soil	—	—	—	—	0.0155 (J)	—	—	—	—	—	—	—
RE16-10-322	16-608551	0.0–0.5	Soil	—	—	0.0224 (J)	—	0.0372 (J)	0.106 (J)	—	—	—	—	—	—
RE16-10-324	16-608552	0.0–0.5	Soil	—	—	0.0151 (J)	—	0.028 (J)	—	—	—	—	—	—	0.223 (J)
RE16-10-325	16-608552	1.0–1.5	Soil	—	—	0.146	—	0.279	—	—	—	—	0.000795 (J)	—	0.557
RE16-10-328	16-608554	0.0–0.5	Soil	—	—	0.0316 (J)	—	0.066	—	—	—	—	—	—	0.134 (J)
RE16-10-329	16-608554	1.0–1.5	Soil	—	—	—	—	0.0138 (J)	—	—	—	—	—	—	—
RE16-10-330	16-608555	0.0–0.5	Soil	—	—	—	—	0.0173 (J)	—	—	—	—	—	—	—
RE16-10-331	16-608555	1.0–1.5	Soil	—	—	—	—	0.0205 (J)	—	—	—	—	—	—	—
RE16-10-335	16-608557	1.0–1.5	Soil	—	—	0.0237 (J)	—	0.0438	—	—	—	—	—	—	—
RE16-10-337	16-608558	1.0–1.5	Soil	—	—	0.201	—	0.247	—	—	—	—	—	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitroaniline[4-]	Pentachlorophenol	Phenanthrene	Propylbenzene[1-]	Pyrene	RDX	Styrene	TATB	Tetrachloroethene	Toluene	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**860**[b]	**100**	**20500**	**21000**[b]	**18300**	**174**	**51200**	**na**[g]	**36.4**	**57900**	**10000**[b]	**469**
Recreational SSL[d]				**na**	**117**	**12000**	**69600**	**10400**	**233**	**126000**	**na**	**91.7**	**60800**	**7920**	**301**
Residential SSL[a]				**240**[b]	**29.8**	**1830**	**3400**[b]	**1720**	**44.2**	**8970**	**na**	**6.99**	**5570**	**780**[b]	**35.9**
RE16-10-338	16-608559	0.0–0.5	Soil	—	—	0.189	—	0.293	—	—	—	—	0.000743 (J)	—	0.264 (J)
RE16-10-339	16-608559	1.0–1.5	Soil	—	—	0.0439 (J)	—	0.06 (J)	—	—	—	—	—	—	—
RE16-10-340	16-608560	0.0–0.5	Soil	—	—	0.0444 (J)	—	0.0776 (J)	—	—	—	—	—	—	—
RE16-10-341	16-608560	1.0–1.5	Soil	—	—	0.0166 (J)	—	0.0282 (J)	—	—	—	—	—	—	—
RE16-10-342	16-608561	0.0–0.5	Soil	—	—	—	—	0.0202 (J)	—	—	—	—	—	—	—
RE16-10-344	16-608562	0.0–0.5	Soil	—	—	0.0252 (J)	—	0.0423 (J)	—	—	—	—	—	—	—
RE16-10-345	16-608562	1.0–1.5	Soil	—	—	0.256	—	0.423	—	—	—	—	—	—	0.612
RE16-10-346	16-608563	0.0–0.5	Soil	—	—	0.0179 (J)	—	0.0351 (J)	—	—	—	—	—	—	—
RE16-10-347	16-608563	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-348	16-608564	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-351	16-608565	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-354	16-608567	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-355	16-608567	1.0–1.5	Soil	—	—	—	—	0.0451 (J)	—	—	—	—	0.00146	—	0.334 (J)
RE16-10-356	16-608568	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-358	16-608569	0.0–0.5	Soil	—	—	—	—	—	—	0.000663 (J)	—	—	—	—	—
RE16-10-359	16-608569	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	0.000634 (J)	—	—
RE16-10-388	16-611204	0.0–0.5	Soil	—	—	—	—	0.0142 (J)	—	—	—	—	—	—	—
RE16-10-389	16-611204	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-390	16-611205	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-391	16-611205	1.0–1.5	Soil	—	—	—	—	—	—	—	—	—	0.000669 (J)	—	—
RE16-10-392	16-611206	0.0–0.5	Soil	—	—	0.031 (J)	—	0.0682 (J)	—	—	—	—	0.000722 (J)	—	—
RE16-10-393	16-611206	1.0–1.5	Soil	—	—	—	—	0.0167 (J)	—	—	—	—	—	—	—
RE16-10-394	16-611207	0.0–0.5	Soil	—	—	—	—	0.04 (J)	—	—	—	—	0.000624 (J)	—	—
RE16-10-395	16-611207	1.0–1.5	Soil	—	—	0.0203 (J)	—	0.0357 (J)	—	—	—	—	0.000619 (J)	—	—
RE16-10-396	16-611208	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-400	16-611210	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.000555 (J)	—	—
RE16-10-402	16-611211	0.0–0.5	Soil	—	—	—	—	—	—	—	2.32 (J+)	—	—	—	—
RE16-10-404	16-611212	0.0–0.5	Soil	—	—	0.0819	—	0.117	—	—	20.4 (J+)	—	—	—	—
RE16-10-405	16-611212	1.0–1.5	Qbt 4	—	—	—	—	—	—	—	2.56 (J+)	—	—	—	—
RE16-10-406	16-611213	0.0–0.5	Soil	—	—	—	—	—	—	0.00047 (J)	—	—	0.00536	—	—

Table 10.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitroaniline[4-]	Pentachlorophenol	Phenanthrene	Propylbenzene[1-]	Pyrene	RDX	Styrene	TATB	Tetrachloroethene	Toluene	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Industrial SSL[a]				**860[b]**	**100**	**20500**	**21000[b]**	**18300**	**174**	**51200**	**na[g]**	**36.4**	**57900**	**10000[b]**	**469**
Recreational SSL[d]				**na**	**117**	**12000**	**69600**	**10400**	**233**	**126000**	**na**	**91.7**	**60800**	**7920**	**301**
Residential SSL[a]				**240[b]**	**29.8**	**1830**	**3400[b]**	**1720**	**44.2**	**8970**	**na**	**6.99**	**5570**	**780[b]**	**35.9**
RE16-10-408	16-611214	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE16-10-410	16-611215	0.0–0.5	Soil	—	—	—	—	—	—	—	8.96 (J+)	—	—	—	—
RE16-10-416	16-611218	0.0–0.5	Soil	—	—	0.0159 (J)	0.000612 (J)	0.029 (J)	—	—	—	—	0.00438	—	—
RE16-10-417	16-611218	1.0–1.5	Soil	—	—	0.0405 (J)	—	0.051	—	—	—	—	0.00115 (J)	—	—
RE16-10-419	16-611219	1.0–1.5	Soil	—	—	0.0214 (J)	—	0.0254 (J)	—	—	—	—	—	—	—
RE16-10-420	16-611220	0.0–0.5	Soil	—	—	0.0472 (J)	—	0.083 (J)	—	—	—	—	—	—	—
RE16-10-423	16-611221	1.0–1.5	Soil	—	—	0.0423 (J)	—	0.0504	—	—	—	—	—	—	—
RE16-10-11734	16-611328	0.0–0.5	Fill	—	—	0.0204 (J)	—	0.0607	0.175 (J-)	—	NA[h]	—	—	—	—
RE16-10-11735	16-611328	1.0–1.5	Fill	—	—	—	—	0.0216 (J)	0.143 (J-)	—	NA	—	—	—	—
RE16-10-11736	16-611329	0.0–0.5	Soil	—	—	—	—	0.0153 (J)	0.107 (J-)	—	NA	—	—	—	—
RE16-10-11737	16-611329	1.0–1.5	Soil	—	—	—	—	—	0.105 (J-)	—	NA	—	—	—	—
RE16-10-11738	16-611330	0.0–0.5	Soil	—	—	—	—	—	0.12 (J-)	—	NA	—	—	—	—
RE16-10-11739	16-611330	1.0–1.5	Soil	—	—	—	—	0.0146 (J)	—	—	NA	—	0.00142	—	—
RE16-10-12061	16-611401	0.0–0.5	Soil	—	—	0.0391 (J)	—	0.0937	—	—	5.29	—	—	—	—
RE16-10-12066	16-611403	0.0–0.5	Soil	—	—	—	—	0.018 (J)	—	—	1.44	—	—	—	—

Notes: Organic chemical detects per sample. Standard unit of measure is mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL from EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene was used as a surrogate based on structural similarity.

[d] SSLs from LANL (2010, 108613).

[e] — = Not detected or not detected above BV.

[f] Isopropylbenzene was used as a surrogate based on structural similarity.

[g] na = Not available.

[h] NA = Not analyzed.

Table 10.3-4
Summary of Radionuclides Detected at Martin Spring Canyon Drainages

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239/240	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2,3,4 BV[a]				**0.05**	**0.05**	**na**[b]	**1.98**	**0.09**	**1.93**
Soil BV/FV[a]				**0.013**	**0.023**	**0.054**	**2.59**	**0.2**	**2.29**
Industrial SAL[c]				**180**	**240**	**210**	**1500**	**87**	**430**
Recreational SAL[c]				**280**	**330**	**300**	**3200**	**520**	**2100**
Residential SAL[c]				**30**	**37**	**33**	**170**	**17**	**87**
RE16-10-130	16-608461	0.0–0.5	Soil	—[d]	0.027	—	—	—	—
RE16-10-138	16-608465	0.0–0.5	Soil	0.0273	—	—	—	—	—
RE16-10-139	16-608465	1.0–1.5	Qbt 4	—	—	0.0236	—	—	—
RE16-10-141	16-608466	1.0–1.5	Qbt 4	—	—	0.0315	—	0.11	—
RE16-10-166	16-608472	0.0–0.5	Soil	—	—	—	2.97	—	2.37
RE16-10-172	16-608475	0.0–0.5	Soil	—	—	—	3.19	—	2.78
RE16-10-176	16-608477	0.0–0.5	Soil	—	—	0.0583	—	—	—
RE16-10-178	16-608478	0.0–0.5	Soil	—	—	—	2.85	—	2.33
RE16-10-190	16-608484	0.0–0.5	Soil	—	—	0.0611	—	—	—
RE16-10-192	16-608485	0.0–0.5	Soil	—	—	0.102	—	—	—
RE16-10-194	16-608486	0.0–0.5	Soil	—	—	0.0677	—	—	—
RE16-10-198	16-608488	0.0–0.5	Soil	—	—	0.0585	—	—	—
RE16-10-246	16-608525	0.0–0.5	Soil	—	—	0.0557	—	—	—
RE16-10-270	16-608537	0.0–0.5	Soil	—	—	0.0685	—	—	—
RE16-10-317	16-608548	1.0–1.5	Soil	—	—	0.0316	—	—	—
RE16-10-325	16-608552	1.0–1.5	Soil	—	—	0.0264	—	—	—
RE16-10-335	16-608557	1.0–1.5	Soil	—	—	0.0424	—	—	—
RE16-10-338	16-608559	0.0–0.5	Soil	—	—	0.0681	—	—	—
RE16-10-340	16-608560	0.0–0.5	Soil	—	—	0.0745	—	—	—
RE16-10-342	16-608561	0.0–0.5	Soil	—	—	0.0567	—	—	—
RE16-10-354	16-608567	0.0–0.5	Soil	—	—	0.0565	2.83	—	3.25
RE16-10-355	16-608567	1.0–1.5	Soil	—	—	0.0594	2.67	0.22	3.03
RE16-10-359	16-608569	1.0–1.5	Soil	—	—	0.0542	3.89	0.26	4.53
RE16-10-360	16-608570	0.0–0.5	Soil	—	—	—	—	—	2.92
RE16-10-388	16-611204	0.0–0.5	Soil	—	—	—	—	—	3.24
RE16-10-389	16-611204	1.0–1.5	Soil	—	—	0.0373	—	—	2.44
RE16-10-390	16-611205	0.0–0.5	Soil	—	—	—	—	—	3.2

Table 10.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239/240	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2,3,4 BV[a]				**0.05**	**0.05**	**na[b]**	**1.98**	**0.09**	**1.93**
Soil BV/FV[a]				**0.013**	**0.023**	**0.054**	**2.59**	**0.2**	**2.29**
Industrial SAL[c]				**180**	**240**	**210**	**1500**	**87**	**430**
Recreational SAL[c]				**280**	**330**	**300**	**3200**	**520**	**2100**
Residential SAL[c]				**30**	**37**	**33**	**170**	**17**	**87**
RE16-10-392	16-611206	0.0–0.5	Soil	0.028	—	0.0907	—	—	—
RE16-10-394	16-611207	0.0–0.5	Soil	0.0313	—	0.0619	—	—	2.38
RE16-10-396	16-611208	0.0–0.5	Soil	—	—	0.0634	—	—	3.09
RE16-10-400	16-611210	0.0–0.5	Soil	0.0227	—	0.0587	3.23	—	3.63
RE16-10-406	16-611213	0.0–0.5	Soil	—	—	—	3.19	0.213	3.41
RE16-10-410	16-611215	0.0–0.5	Soil	—	—	0.0541	—	—	2.39
RE16-10-414	16-611217	0.0–0.5	Soil	0.0283	—	0.0549	—	—	2.41
RE16-10-415	16-611217	0.5-1.5	Soil	0.0241	—	0.0812	—	—	3.18
RE16-10-416	16-611218	0.0–0.5	Soil	—	—	—	—	—	2.51
RE16-10-417	16-611218	1.0–1.5	Soil	—	—	0.0367	—	—	—
RE16-10-11734	16-611328	0.0–0.5	Fill	—	—	—	—	—	2.34
RE16-10-11736	16-611329	0.0–0.5	Soil	—	—	0.0607	—	—	2.67
RE16-10-11738	16-611330	0.0–0.5	Soil	—	—	0.0704	2.74	—	3.04
RE16-10-11739	16-611330	1.0–1.5	Soil	—	—	—	3.42	0.214	3.48
RE16-10-12061	16-611401	0.0–0.5	Soil	—	—	—	3.78	0.225	2.87
RE16-10-12066	16-611403	0.0–0.5	Soil	—	—	0.102	2.82	—	2.54

Notes: Radionuclides detected above background/fallout. Standard unit of measure is pCi/g.

[a] BVs/FVs from LANL (1998, 059730).

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

[d] — = Not detected or not detected above BV/FV.

Appendix A

Acronyms and Abbreviations,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS

amsl	above mean sea level
AOC	area of concern
ARS	American Radiation Services, Inc.
AUF	area use factor
BCA	bias-corrected accelerated bootstrap method
bgs	below ground surface
BV	background value
CCV	continuing calibration verification
CME	Central Mine Equipment
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
cpm	counts per minute
CSM	conceptual site model
D&D	decontamination and decommissioning
DAF	dilution attenuation factor
DB	Delta Base
DDE	dichlorophenyltrichloroethylene
DDT	dichlorophenyltrichloroethane
DOE	Department of Energy (U.S.)
DOT	Department of Transportation (U.S.)
dpm	disintegration(s) per minute
DU	depleted uranium
EC	exposure concentration
EDL	estimated detection limit
Eh	oxidation-reduction potential
EP	Environmental Programs (Directorate)
EPA	Environmental Protection Agency (U.S.)
EPC	exposure point concentration
EQL	estimated quantitation limit
ESL	ecological screening level
eV	electron volt
FFCA	Federal Facilities Compliance Act

FTB	field trip blank
FV	fallout value
GIS	geographic information system
GPS	global positioning system
GS/MS	gas chromatography–mass spectrometry
HE	high explosives
HI	hazard index
HIR	historical investigation report
HMX	1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HQ	hazard quotient
HR	home range
HSA	hollow-stem auger
HWFP	Hazardous Waste Facility Permit
ICS	interference check sample
ICV	initial calibration verification
IS	internal standard
K_d	soil-water partition coefficient
K_{oc}	organic carbon-water partition coefficient
K_{ow}	octanol/water partition coefficient
KM	Kaplan-Meier
LAL	lower acceptance level
LANL	Los Alamos National Laboratory
LASL	Los Alamos Scientific Laboratory (Laboratory's name before January 1, 1981)
LCS	laboratory control sample
LOAEL	lowest observed adverse effect level
LOEC	lowest observed effect concentration
MATC	maximum acceptable toxicity concentration
MDA	material disposal area
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
MVUE	minimum variance unbiased estimator
NFA	no further action
NHPA	National Historic Preservation Act

NMED	New Mexico Environment Department [before 1991: New Mexico Environmental Improvement (NMEID) Division]
NMHPD	New Mexico State Historic Preservation Division
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NPDES	National Pollutant Discharge Elimination System
O.D.	outside diameter
PAH	polycyclic aromatic hydrocarbon
PAUF	population area use factor
PCB	polychlorinated biphenyl
PCE	perchloroethylene
PID	photoionization detector
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RCT	radiation control technician
RDA	recommended daily allowance
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RfD	reference dose
RFI	RCRA facility investigation
RME	reasonable maximum exposure
RP	Radiation Protection
RPD	relative percent difference
RRF	relative response factor
SAL	screening action level
SCL	sample collection log
SD	standard deviation
SF	slope factor
SMO	Sample Management Office
SOP	standard operating procedure
SOW	statement of work
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit

T&E	threatened and endangered
TA	technical area
TAL	target analyte list (EPA)
TATB	triaminotrinitrobenzene
TCE	trichloroethylene
TCLP	toxicity characteristic leaching procedure
TD	total depth
TNT	2,4,6-trinitrotoluene
TPR	technical procedure (Portage)
TRV	toxicity reference value
UAL	upper acceptance level
UCL	upper confidence level
UTL	upper tolerance limit
VCM	voluntary corrective measure
VCP	vitrified clay pipe
VOC	volatile organic compound
WCSF	waste characterization strategy form
WWTP	waste water treatment plant
XRF	x-ray fluorescence

A-2.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.0000394	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

A-3.0 DATA QUALIFIER DEFINITIONS

Data Qualifier	Definition
U	The analyte was analyzed for but not detected.
J	The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control (QA/QC) parameters.

Appendix B

Box Plots and Statistical Results

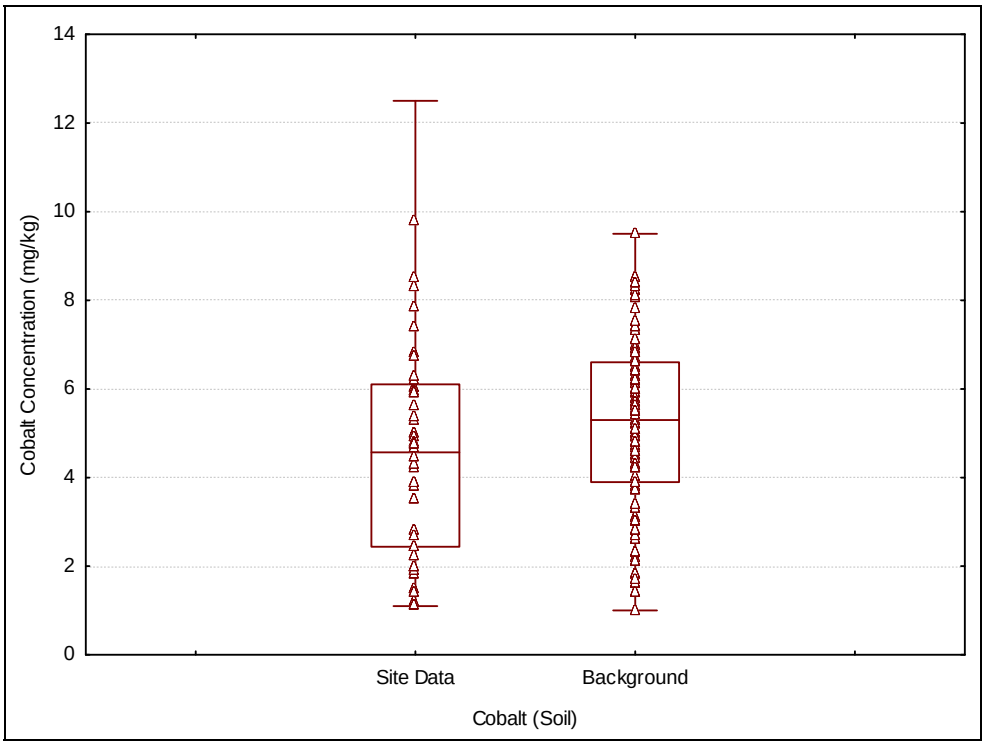


Figure B-1 Box plot for cobalt in soil at SWMU 16-029(x)

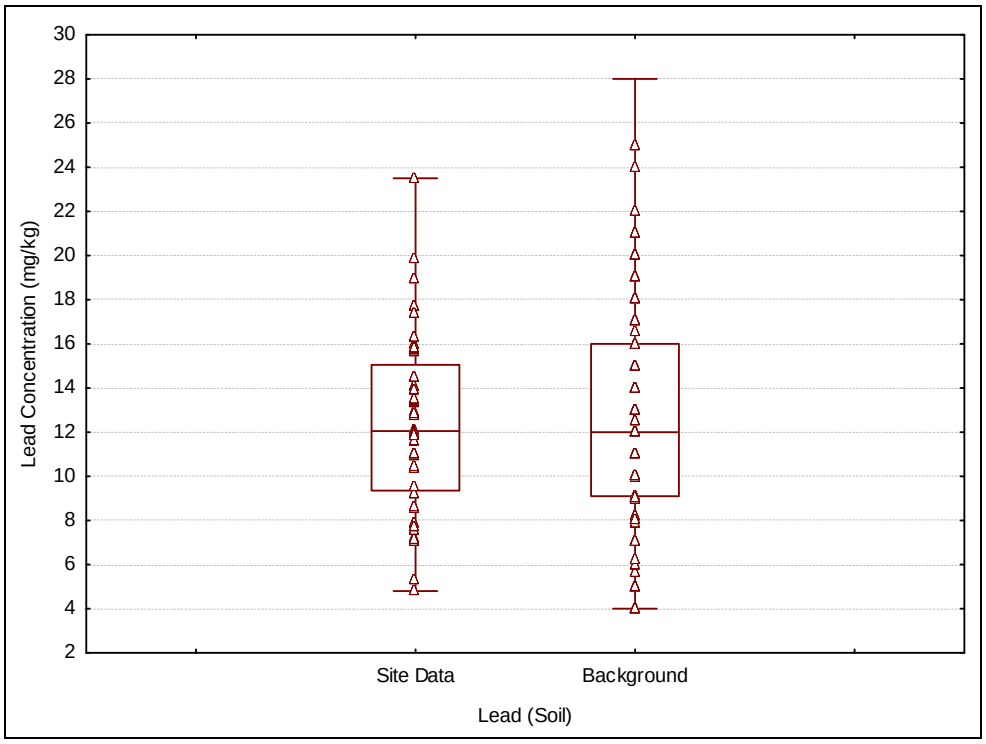


Figure B-2 Box plot for lead in soil at SWMU 16-029(x)

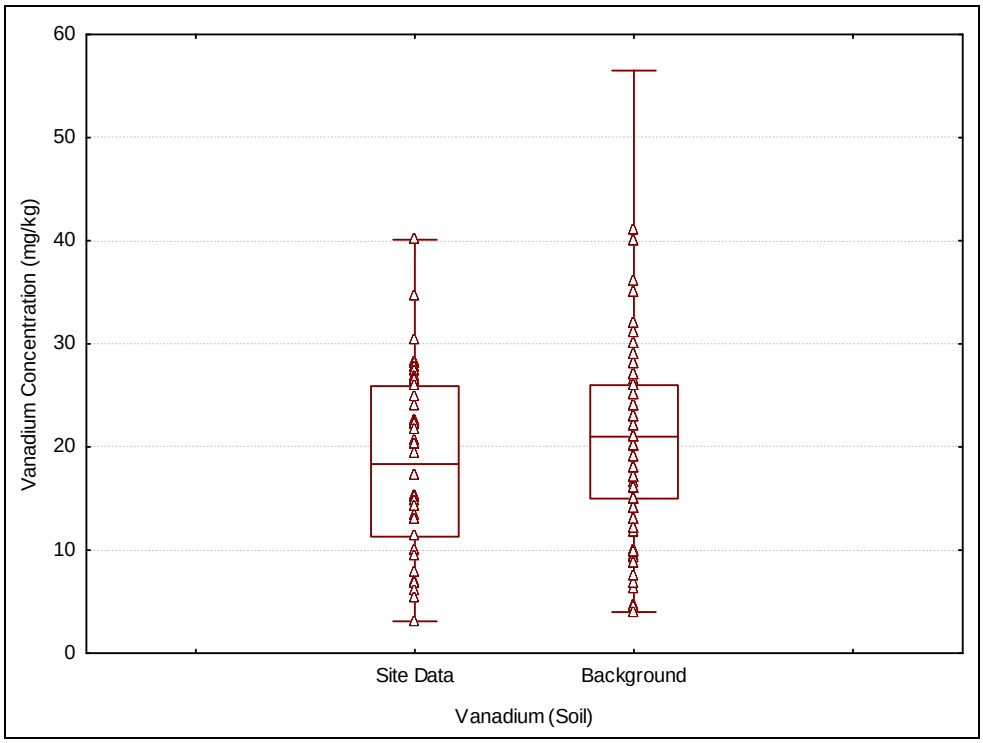


Figure B-3 Box plot for vanadium in soil at SWMU 16-029(x)

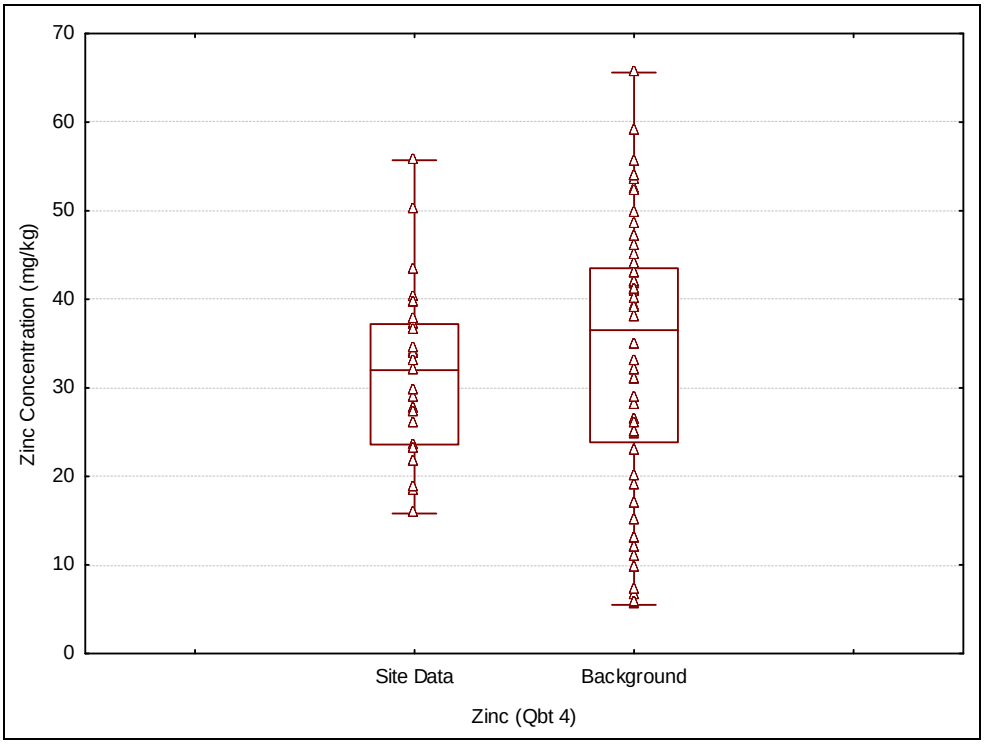


Figure B-4 Box plot for zinc in tuff at SWMU 16-029(x)

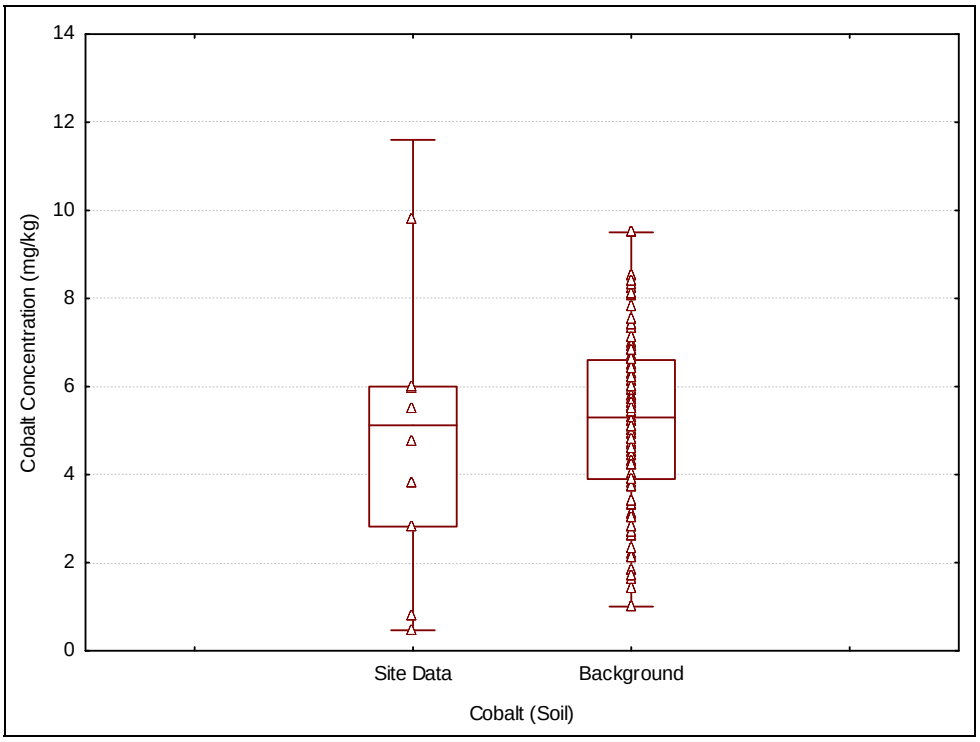


Figure B-5 Box plot for cobalt in soil at SWMU 16-017(p)-99

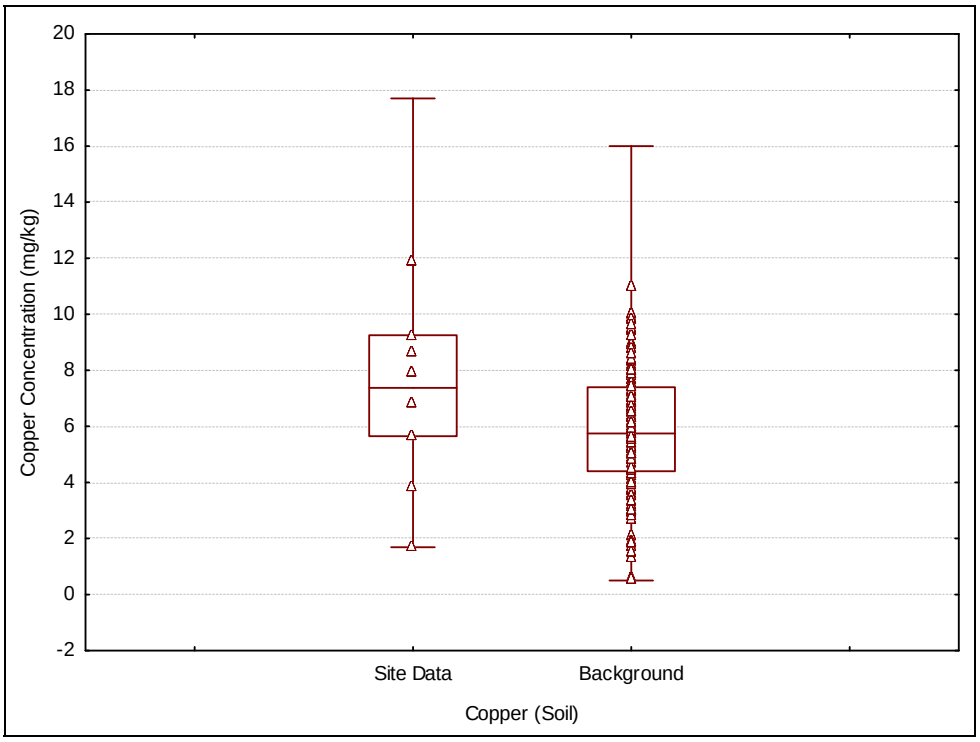


Figure B-6 Box plot for copper in soil at SWMU 16-017(p)-99

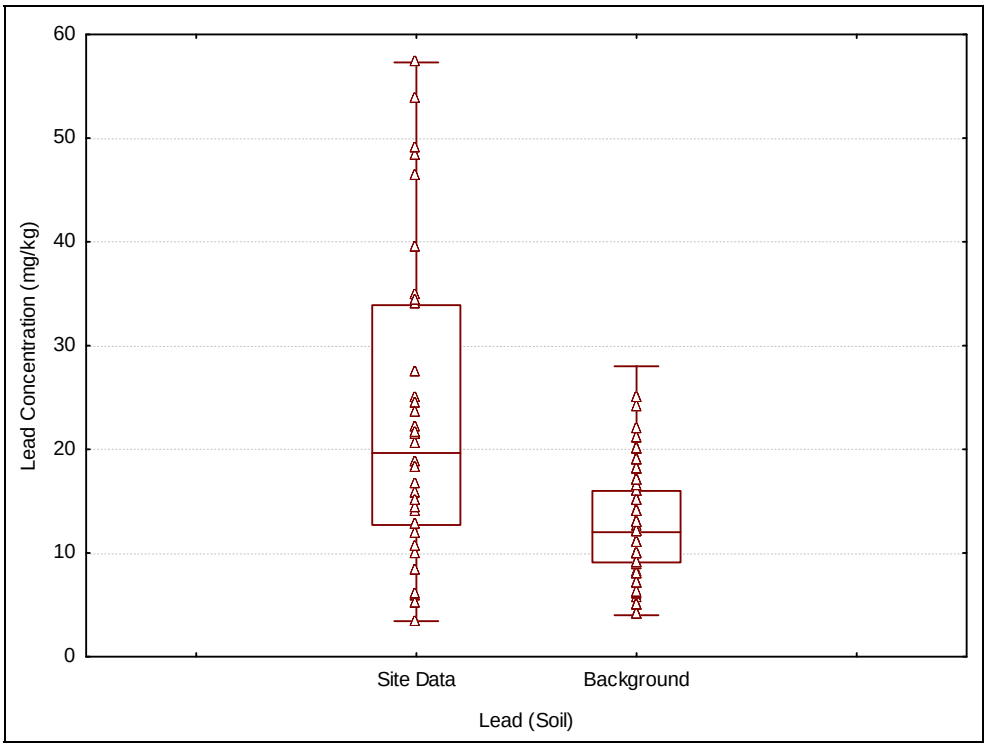


Figure B-7 Box plot for lead in soil at SWMU 16-017(p)-99

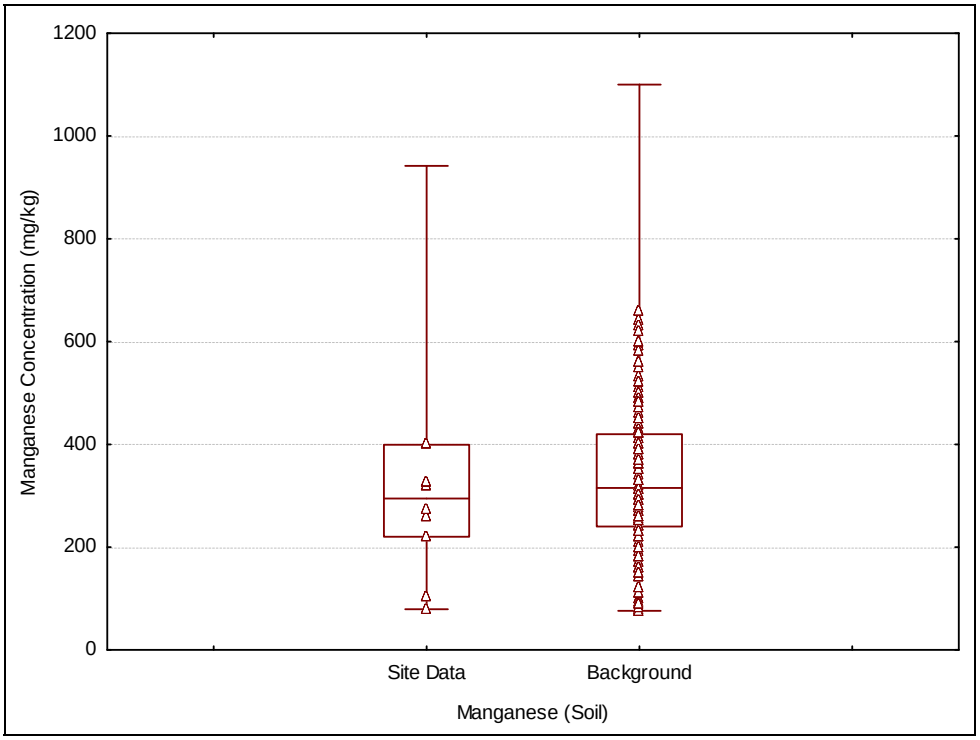


Figure B-8 Box plot for manganese in soil at SWMU 16-017(p)-99

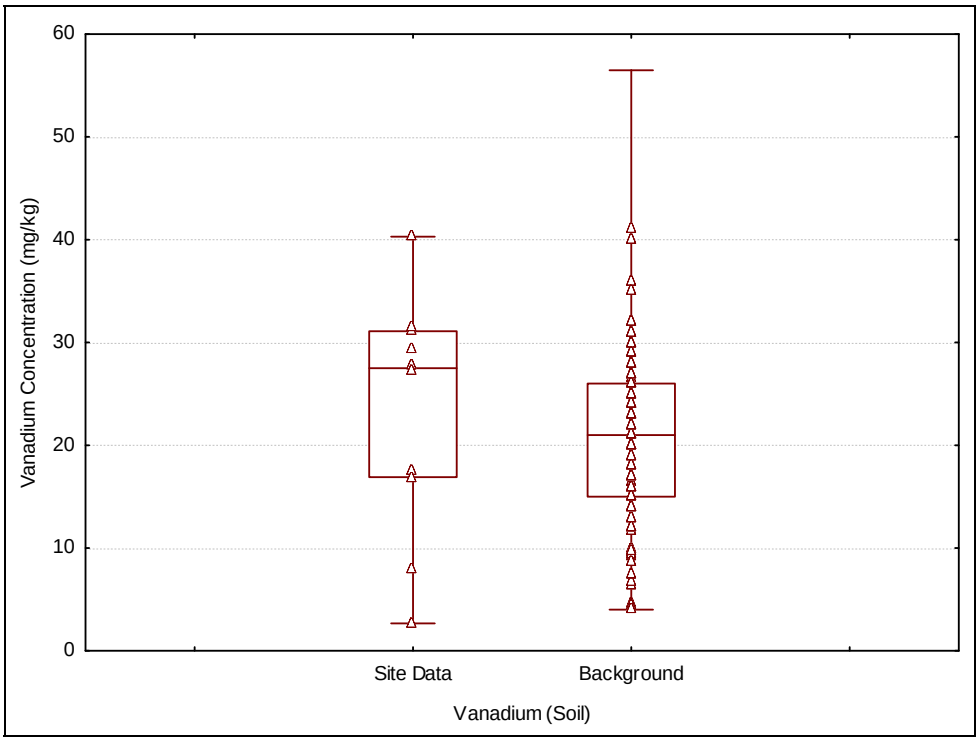


Figure B-9 Box plot for vanadium in soil at SWMU 16-017(p)-99

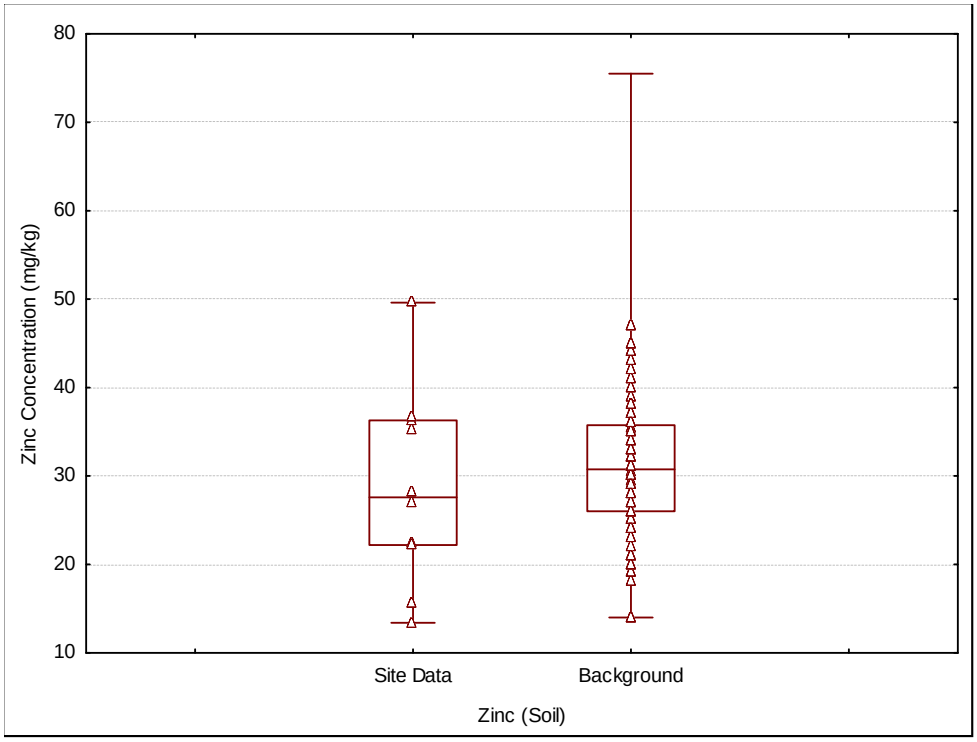


Figure B-10 Box plot for zinc in soil at SWMU 16-017(p)-99

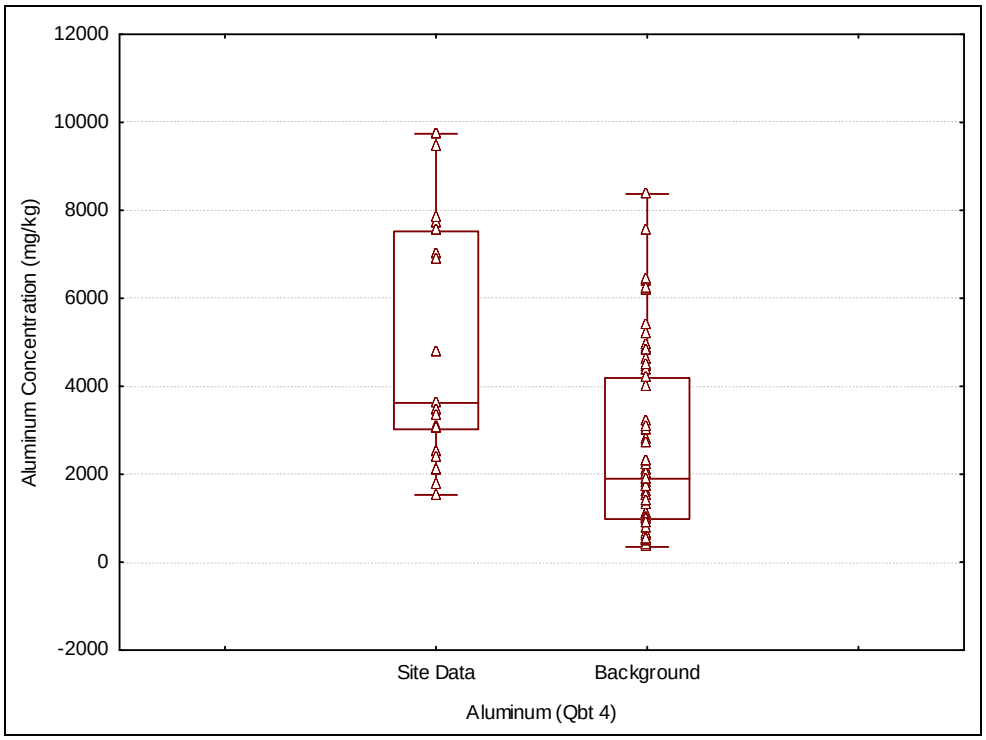


Figure B-11 Box plot for aluminum in tuff at the Courtyard Periphery Area

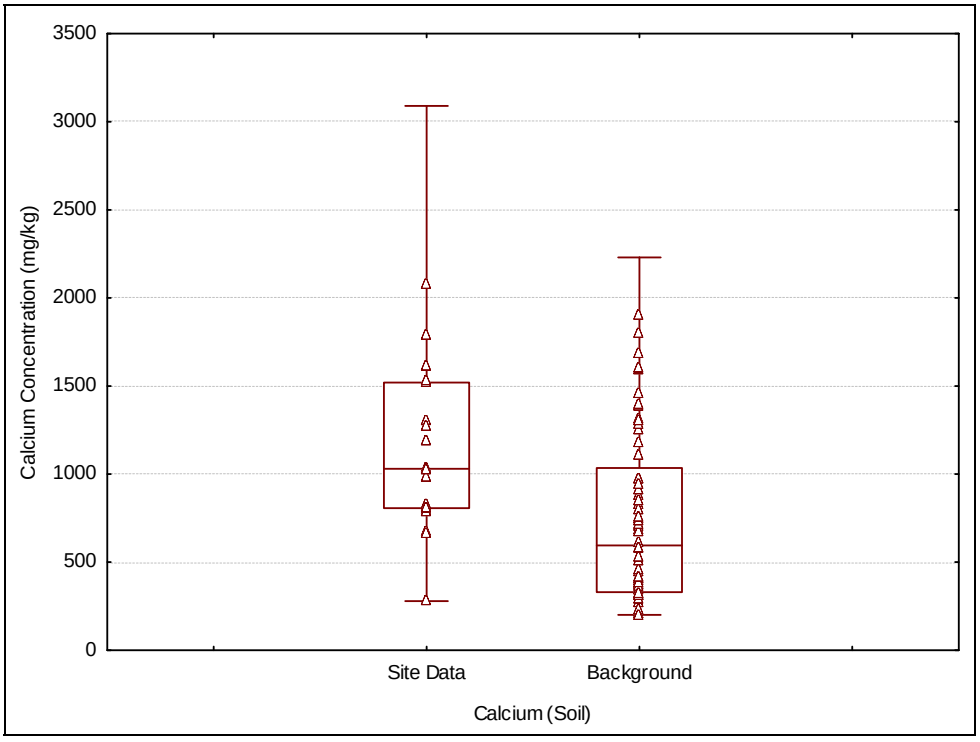


Figure B-12 Box plot for calcium in soil at the Courtyard Periphery Area

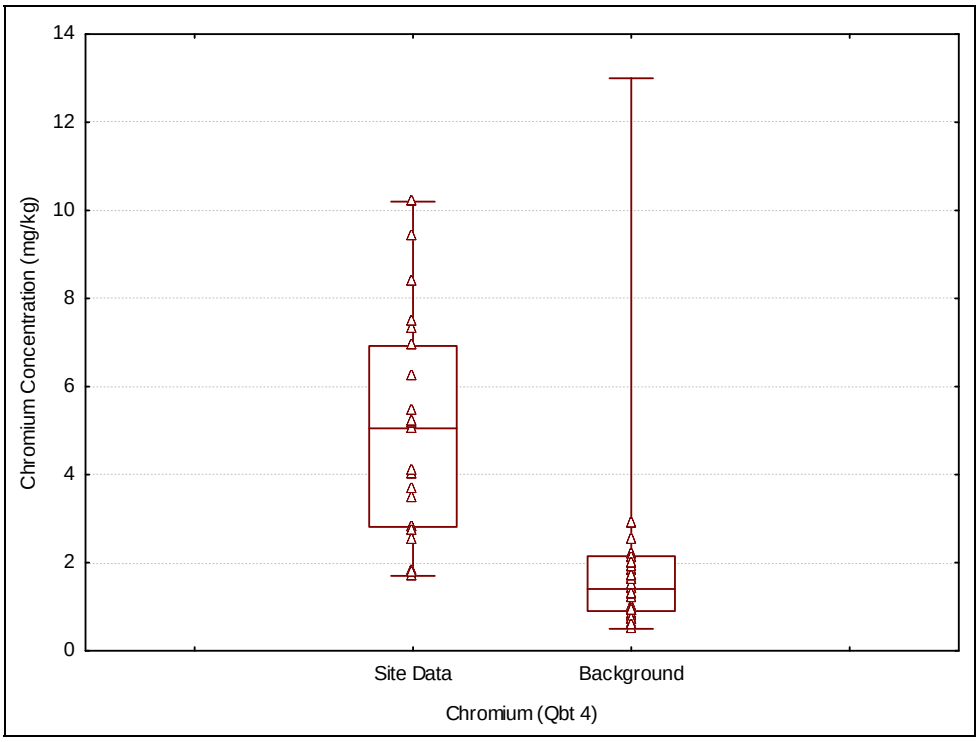


Figure B-13 Box plot for chromium in tuff at the Courtyard Periphery Area

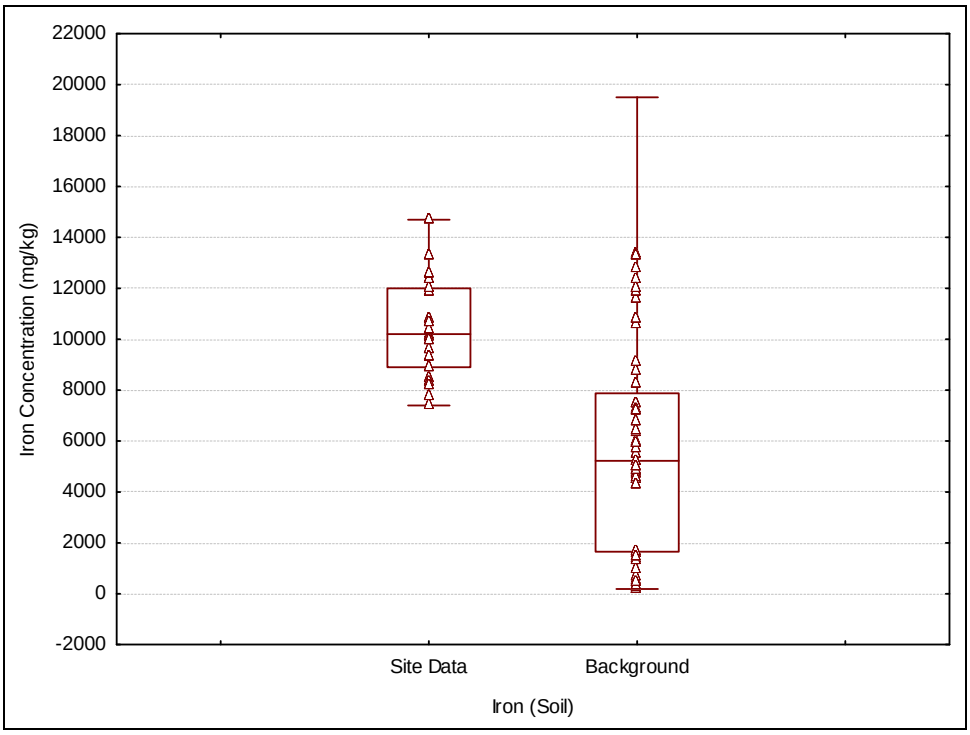


Figure B-14 Box plot for iron in soil at the Courtyard Periphery Area

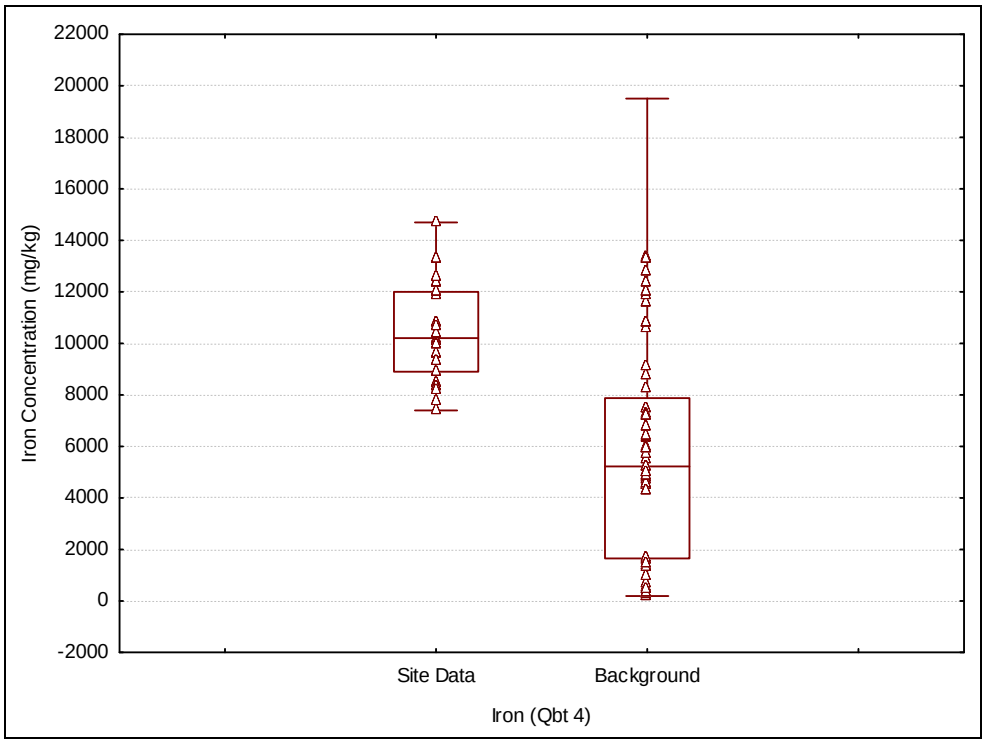


Figure B-15 Box plot for iron in tuff at the Courtyard Periphery Area

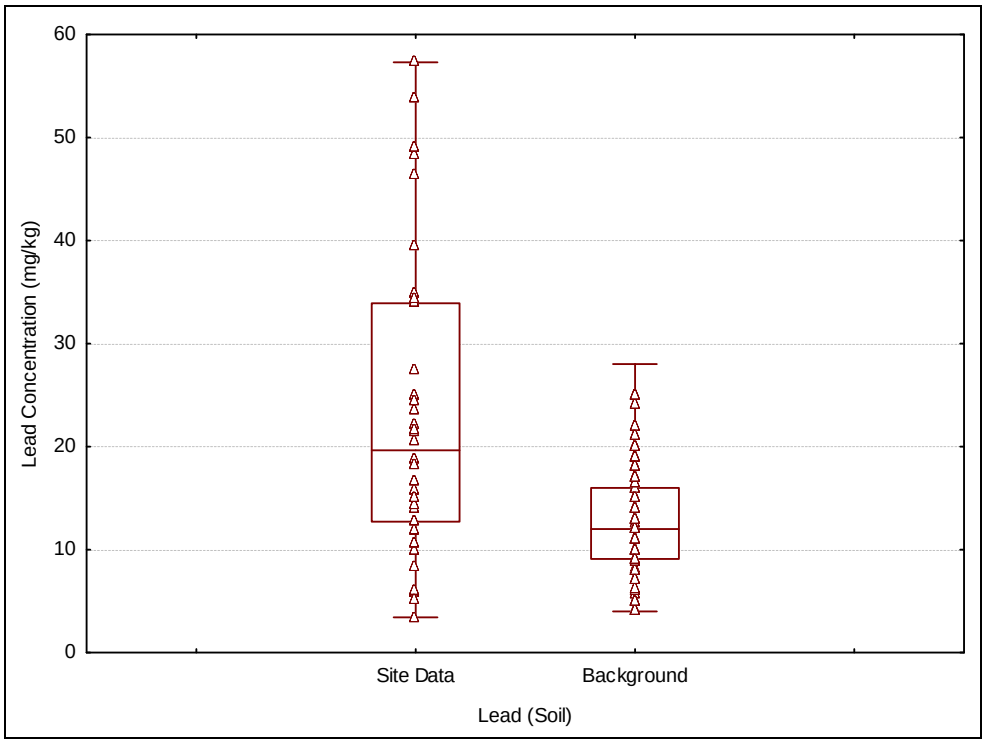


Figure B-16 Box plot for lead in soil at the Courtyard Periphery Area

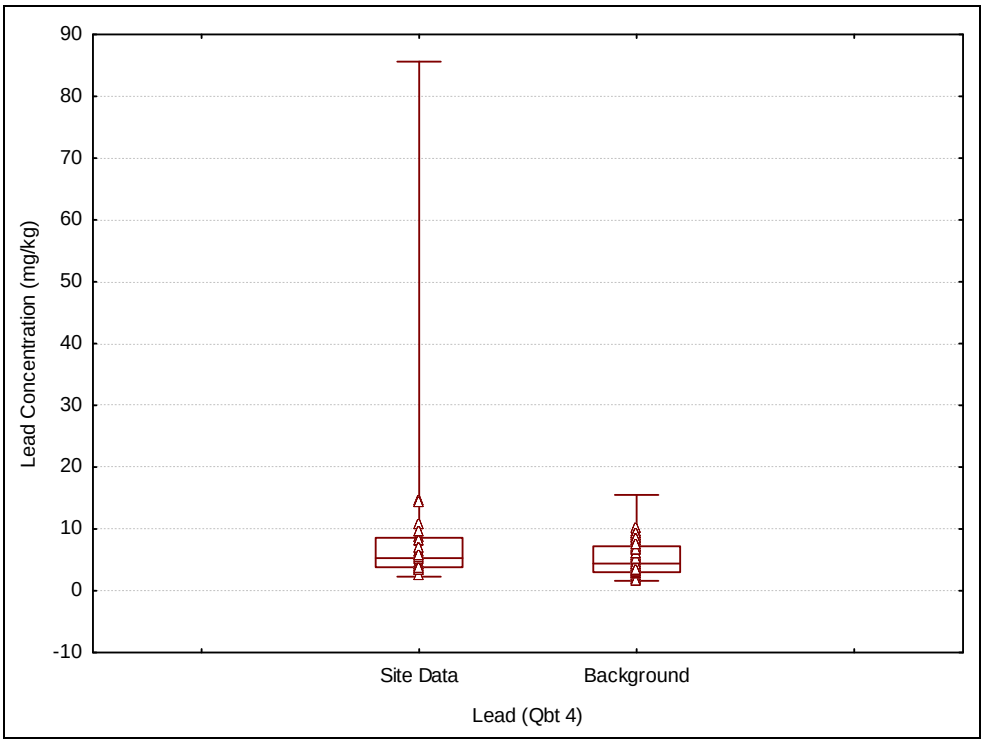


Figure B-17 Box plot for lead in tuff at the Courtyard Periphery Area

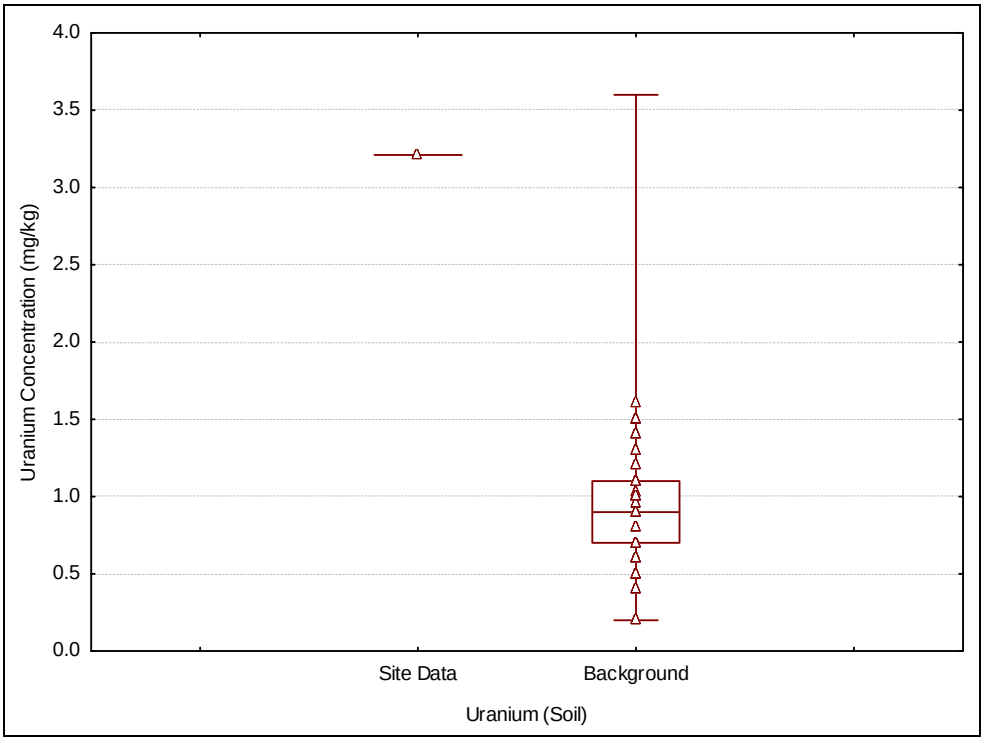


Figure B-18 Box plot for uranium in soil at the Courtyard Periphery Area

Table B-1
Results of Statistical Tests for Inorganic Chemicals in Soil and Tuff at SWMU 16-029(x)

Analyte	Soil Gehan Test (p-Value)	Soil Quantile Test (Alpha)	Soil Slippage Test (p-Value)	Qbt 4 Gehan Test (p-Value)	Qbt 4 Quantile Test (Alpha)	Qbt 4 Slippage Test (p-Value)	Retain as a COPC?
Aluminum	—[a]	—	—	<0.001	n/a[b]	n/a	Yes
Arsenic	1.0	n/a	1.0	<0.001	n/a	n/a	Yes
Barium	0.0138	n/a	n/a	<0.001	n/a	n/a	Yes
Calcium	—	—	—	<0.001	n/a	n/a	Yes
Chromium	—	—	—	<0.001	n/a	n/a	Yes
Cobalt	0.972	n/a	0.062	—	—	—	No
Copper	<0.001	n/a	n/a	<0.001	n/a	n/a	Yes
Lead	0.747	n/a	1.0	—	—	—	No
Manganese	0.0102	n/a	n/a	—	—	—	Yes
Nickel	0.997	n/a	0.202	<0.001	n/a	n/a	Yes
Silver	Background value exceeded, no background data			0.734	n/a	1.0	Yes
Uranium	<0.001	n/a	n/a	—	—	—	Yes
Vanadium	0.98	n/a	1.0	—	—	—	No
Zinc	1.0	n/a	1.0	0.833	0.05	n/a	No

[a] — = All values less than background values.

[b] n/a = Not applicable.

Table B-2
Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 16-017(p)-99

Analyte	Soil Gehan Test (p-Value)	Soil Quantile Test (Alpha)	Soil Slippage Test (p-Value)	Retain as a COPC?
Cobalt	0.691	1.0	n/a*	No
Copper	0.077	n/a	0.054	No
Lead	0.086	n/a	1.0	No
Manganese	0.675	n/a	1.0	No
Vanadium	0.143	n/a	1.0	No
Zinc	0.785	n/a	1.0	No

*n/a = Not applicable.

Table B-3
Results of Statistical Tests for Inorganic Chemicals in Soil and Tuff at Courtyard Periphery Area

Analyte	Soil Gehan Test (p-Value)	Soil Quantile Test (Alpha)	Soil Slippage Test (p-Value)	Qbt 4 Gehan Test (p-Value)	Qbt 4 Quantile Test (Alpha)	Qbt 4 Slippage Test (p-Value)	Retain as a COPC?
Aluminum	—[a]	—	—	<0.001	n/a[b]	n/a	Yes
Calcium	0.358	n/a	1.0	<0.001	n/a	n/a	Yes
Chromium	—	—	—	<0.001	n/a	n/a	Yes
Iron	0.224	n/a	0.163	<0.001	n/a	n/a	Yes
Lead	<0.001	n/a	n/a	0.053	0.0602	n/a	Yes

[a] — = All values less than background values.

[b] n/a = Not applicable.

Appendix C

Field Methods

C-1.0 INTRODUCTION

This appendix summarizes field methods used during investigations and excavations at the S-Site Aggregate Area, including the solid waste management units (SWMUs) and areas of concern (AOCs) located in the P-Site, V-Site, K-Site, and 300s Line subaggregates as well as the Extended Drainages sampled in the fall of 2009 and winter of 2010. All activities were conducted in accordance with the current versions of applicable Portage standard operating procedures (SOPs) and quality procedures. Work was performed in accordance with the Portage technical procedures (TPRs), which are equivalent to Los Alamos National Laboratory SOPs (http://www.lanl.gov/environment/all/qa/adep.shtml). The field activities conducted at the S-Site Aggregate Area are described in that plan and include

- conducting geodetic and geophysical surveys to locate SWMUs/AOCs and associated subsurface structures, historical sampling locations, excavations, stockpiles, and new sampling locations;
- drilling vertical boreholes to collect subsurface soil and tuff samples;
- collecting surface and subsurface samples;
- conducting field screening of surface and subsurface samples for hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), volatile organic compounds (VOCs), radiation, and metals and using the resulting data to guide further sample collection for off-site laboratory analysis; and
- documenting field activities on a daily basis.

The field investigation methods used at the S-Site are summarized in Table C-1.0-1.

C-2.0 FIELD-SCREENING METHODS

This section summarizes the field-screening methods used at all SWMUs, AOCs, and the Extended Drainages. All field screening was conducted as specified in TPR-5017, “Field Screening for S-Site Aggregate Area,” which is equivalent to SOP-06.33 for organic vapor screening and follows manufacturer’s instructions for RDX and x-ray fluorescence (XRF) field screening as discussed below.

C-2.1 RDX Field-Screening Method

For RDX analyses, 8–10 mL of the sample extract was slowly drawn up in a 10-cc syringe. Alumina A cartridges were used to filter nitrate/nitrite interferents, if present. In a waste container, the liquid was discarded until 5.5 mL of the sample remained in the syringe. The 5.5 mL was slowly dispensed into a 13-mL tube. An acetic acid bulb was added to the tube, and the tube was capped and shaken. The plunger from a zinc syringe was separated from the barrel, the sample was poured into the syringe, and the plunger was replaced immediately. The syringe was inverted twice and added to a 50-mL reaction vial containing water and a NitriVer pillow. The reaction vial was capped and shaken for 30 s. The sample was set to incubate for 15 min. After incubation, a 30-cc syringe was disassembled, and a syringe filter was attached to the tip. The sample was shaken vigorously and poured into the syringe. The syringe was assembled, and the sample was expelled into a HACH cuvette. The samples were analyzed utilizing the HACH DR/2010 spectrophotometer, the readings were recorded on a worksheet, and the results were calculated for each sample.

C-2.2 Field Screening for Organic Vapors

Organic vapor screening was conducted using MiniRAE 2000 portable VOC monitor model photoionization detectors (PIDs). Field screening for organic vapors was conducted during drilling, sampling, and remediation activities according to TPR-5017, "Field Screening for S-Site Aggregate Area" (equivalent to SOP-06.33). The PID was equipped with an 11.7-eV lamp with sensitivity to 1 ppm. All readings were recorded in parts per million and are provided in Appendix D of this investigation report. To screen sampling media, clean zip-closure poly bags were used. During collection of samples using the hand-auger, spade-and-scoop, or core-barrel method, screening was performed by removing sample material from the target depth, filling the zip-closure bag halfway, letting the bag sit for 5 min, and measuring organic vapors with the PID probe inserted through the bag. All of the subsurface samples collected were screened for organic vapors at each sample target depth.

C-2.3 Field Screening for Metals

Samples from all sites were field screened for metals with the Niton XL3t-600 XRF analyzer, a portable device widely used to identify and quantify the presence of metals in a given medium. Operation of the XRF analyzer was conducted according to the manufacturer specifications, including manuals and manufacturer-directed training. To obtain the most accurate data, and pursuant to manufacturer's recommendations, the ex situ sample-cup method was used consistently for all samples. This procedure involved homogenizing, sieving, and containerizing sample media. A calibration was performed daily according to manufacturer recommendations. Specific manufacturer-supplied standards were also used to ensure proper calibration.

The metals measured by XRF include molybdenum, zirconium, strontium, uranium, rubidium, thorium, lead, selenium, arsenic, mercury, zinc, tungsten, copper, nickel, cobalt, iron, manganese, chromium, vanadium, titanium, scandium, calcium, potassium, sulfur, barium, cesium, tellurium, antimony, tin, cadmium, silver, and palladium.

Because the XRF results are not directly comparable to analytical background values, site-specific criteria were developed to evaluate sites with limited numbers of samples. If the XRF result for a given process-related inorganic element (barium and uranium) lies within 3 standard deviations σ (sigma) of the mean XRF result for that analyte, it can be said that that the value is not an elevated concentration and no step-out sampling is warranted. The logic behind this contamination criteria is what in statistics is known as the empirical rule, which states that for a normal (or lognormal) distribution, nearly all values lie within 3 standard deviations of the mean (Gilbert and Simpson 1990, 055612). In other words, roughly 1% of the values fall beyond 3 standard deviations of the mean.

The mean concentrations and standard deviations were calculated using the first 976 screening results collected from sites throughout the S-Site Aggregate Area. Barium and uranium were screened for all sites. The samples with concentrations in excess of the contamination criterion (except as noted in the SWMU write-ups in sections 6.0 through 10.0 of the investigation report) resulted in the collection of step-out samples. Additional review of the other metals reported by the XRF unit was performed to identify whether other detections showed a pattern of release that required additional sample collection.

C-3.0 FIELD INSTRUMENT CALIBRATION PROCEDURES

C-3.1 Photoionization Detector

The PID was calibrated daily in the field, first to ambient air and then a standard manufacturer-supplied reference gas (100 ppm isobutylene). The ambient-air calibration determined the zero point of the instrument sensor calibration curve in ambient air. Calibration with the standard reference gas determined a second point of the sensor calibration curve. Each calibration was within 10% of 100 ppm isobutylene, qualifying the instrument for use. All daily calibration procedures for the MiniRAE 2000 PID met the manufacturer's specifications for standard reference gas calibration and the requirements of TPR-5017, "Field Screening for S-Site Aggregate Area" (equivalent to SOP-06.33).

C-3.2 X-Ray Fluorescence

A calibration of the XRF analyzer was performed according to manufacturer recommendations. The analyzer is programmed to calibrate for a specific, predetermined period to ensure proper operation. Specific manufacturer-supplied standards were also used to ensure proper calibration. This was accomplished once a day or every 20 samples by scanning the standard and comparing the resulting data with independently derived values supplied by the manufacturer. All calibration/quality assurance (QA) data were automatically saved and included in the field-screening XRF data files.

C-3.4 RDX Test

The HACH DR/2010 spectrophotometer contained preprogrammed settings for RDX field-screening analysis. Each RDX kit included controls run before each kit was used and/or daily to ensure settings remained unchanged.

C-4.0 SOIL, ROCK, AND SEDIMENT SAMPLING METHODS

All sampling was conducted according to TPR-5015, "Field Soil Sampling for S-Site Aggregate Area," and IWD-SST-5002, "S-Site Aggregate Area—Surface, Hand Auger and Mechanical Auger Sampling at Los Alamos National Laboratory, TA-16," which are equivalent to SOPs 06.09, 06.10, and 06.26, and FIP PLN-5021, "Field Implementation Plan for the Investigation Work Plan for the S-Site Aggregate Area."

C-4.1 Surface

Where practicable, surface samples were collected using the spade-and-scoop method, including excavation sampling from the bucket of an excavator. Generally, any samples with a bottom depth at or less than 0.5 ft were surface samples. At some locations, the surface soil was too compact, and soil was collected using other methods. All sample-collection methods were noted on the applicable sample collection log (SCL).

Sample media were collected using a stainless-steel scoop, placed in a 3- or 4-L stainless-steel bowl and submitted to the radiation control technician (RCT) for scanning. Along the Extended Drainages, the method varied in that the media were placed in an 8-oz polyethylene sealable bag for transportation in a backpack. As soon as possible, and always within the same work shift, the samples were taken back to the sample-collection trailer, and placed in the bowls for screening by an RCT.

C-4.2 Subsurface

Hand-auger collection was accomplished using a preengineered, stainless-steel hand auger to collect media from depths greater than 0.5 ft or where ground compaction did not allow samples to be collected using the spade-and-scoop method. The hand auger was measured, and the shaft was marked with tape to confirm the depth of the auger bucket. Media brought out of the sample hole that were not part of the sample target depth were placed next to the sample hole. Once the target depths for sampling were reached, the medium was poured from the auger bucket directly into a 3- or 4-L stainless-steel bowl, and screened by the RCT.

C-4.3 Quality Assurance/Quality Control Samples

For all organic vapor samples collected, a field trip blank (FTB) was present to collect any ambient VOCs or semivolatile organic compounds (SVOCs). FTBs consisted of a 40-mL septum glass bottle containing volatile blank sand. Wherever possible, samples were collected and bottled away from vehicle or generator exhaust, gasoline, or other possible sources of contamination. The FTB was placed in open air in the immediate area of sample collection and bottling. The FTB was collected, labeled, custody-sealed, and placed with the last representative sample in the same cooler. This was done every 10 field samples collected or once a day, whichever was more frequent.

Rinsate blanks were collected using deionized water to rinse all equipment that was in contact or possible contact with sample media. This was accomplished using 3- or 4-L bowls to pour deionized water over equipment and collect the resulting rinsate water. The water was then placed in the appropriate bottles, labeled, custody-sealed, and placed with the last representative sample in a cooler. This was done every 10 field samples collected or once a day, whichever was more frequent.

Field-duplicate samples were collected for a representative field sample. Media were taken from the same location as the media of the field sample, placed in a 3- or 4-L stainless-steel bowl, and submitted to the RCT for screening. This was done every 10 field samples or once a day, whichever was more frequent.

C-4.4 Sample Documentation and Handling

Sample bottle kits were prepared before field sample operations began in accordance with field SCLs. Every morning, leak-proof Blue Ice was taken out of a dedicated freezer at the Sample Management Office (SMO) and placed in coolers to facilitate cooling the samples once collected. Sample bottles were provided by the SMO, as were FTBs, SCLs, and custody seals.

Samples were bottled and documented in a tow-behind mobile sample collection trailer. Sample media collected in the field was bottled as close to the point of collection and as soon as possible. Samples were bottled using 3- and 4-L stainless steel bowls and scoops. The bottles were filled leaving no airspace in the bottle where practicable. In all instances, the order of the bottles filled was consistent with SOP TPR-5015, “Field Soil Sampling for S-Site Aggregate Area” (equivalent to SOP-06.09). The bottles were filled in the following order:

1. VOCs
2. SVOCs
3. other organic chemical suites (high explosives, etc.)
4. metals

5. other inorganic chemicals (cyanide, nitrate)
6. radionuclides

During RCT screening and sample bottling, the SCL was filled out for the sample collected. Information documented included the media collected, the sampling location, date and time, depth (both below ground surface [bgs] and below target feature), and field-screening information, including radiological activity. The SCLs were completed, reviewed, and signed before the samples were transported to the SMO. Also at the time of bottling, the sample bottle labels were filled out with the date and time and affixed to the appropriate bottles. The bottles were placed in a polyethylene sealable bag and stacked in a cooler. After they reached the SMO, the samples were organized, inspected, and submitted to SMO personnel for off-site shipping. The SCLs were photocopied, and the Blue Ice was replaced in the dedicated freezer after decontamination.

After screening by an RCT, samples for field screening were placed in polyethylene sealable bags labeled with the sampling location, SWMU/AOC, date, and collection time. The samples were then organized and submitted to the field-screening personnel at the end of the day.

C-4.5 Decontamination of Sampling Equipment

All decontamination was done per TPR-5015, “Field Soil Sampling for S-Site Aggregate Area,” which is equivalent to EP-ERSS-SOP-5061. Decontamination was completed between each sampling location to prevent cross-contamination. The agent used, called Alconox, is a volatile blank and engineered for laboratory decontamination of sampling equipment. The agent was mixed according to manufacturer recommendations printed on each package. For gross contamination, a small wire brush was used to remove clay or mud in the sample-collection trailer or at the location of collection. For detailed decontamination, Alconox mixed with deionized water was used in a small hand sprayer. No decontamination fluids were generated from sampling equipment decontamination.

For decontamination of large sample-collection equipment, such as the excavator bucket, a large wire brush, scraper, rubber mallet, paper towels, and a 5-gal. bucket were used as the decontamination equipment. Gross contamination was removed first using the scraper and mallet. The equipment was then sprayed with Alconox, wiped with paper towels, and visually inspected. If the equipment was required to be moved off-site or to another site, the RCT performed a scan and smeared the equipment before it was moved to verify it was contaminant free.

C-5.0 GEODETIC SURVEY METHODS

Geodetic survey methodology varied depending on application, site conditions, and required accuracy. Sampling locations and site features were surveyed using one or a combination of the following instruments or systems: (1) Trimble VX total station; (2) Trimble real-time kinematic global positioning system (GPS) consisting of a 5700 base station receiver, Zephyr base station antenna, HPB450 base station radio, and R8 rover unit; and (3) Trimble GeoXT submeter differential GPS.

All geodetic surveys were conducted in accordance with EP-ERSS-SOP-5028, “Coordinating and Evaluating Geodetic Surveys.”

C-6.0 INVESTIGATION-DERIVED WASTE STORAGE AND DISPOSAL

All waste-management activities were completed according to the waste characterization strategy form (see Appendix G). Nitrile gloves, polyethylene bags, aluminum foil, bottles, paper towels, and any other field equipment that came into contact with sample media and could not be adequately decontaminated was placed in polyethylene bags, labeled, and placed in labeled 30- or 55-gal. drums within the established less-than-90-day storage areas or in satellite accumulation areas. Equipment was visually inspected for gross contamination before it was placed in waste drums.

Field-screening laboratory waste was also labeled and placed into the appropriate poly 55-gal. drums within the area of contamination. No liquid decontamination fluids were generated from sampling activities. All materials (cardboard boxes, custody label backs, etc.) that did not come into contact with sample media were discarded in on-site municipal waste-collection dumpsters.

Characterization of the waste was conducted using acceptable knowledge of the waste material, the extent of contamination of the contact waste, the methods of generation, and analytical data available for the media that the waste may have come in contact with.

C-7.0 FIELD CONDITIONS RESULTING IN DEVIATIONS FROM THE APPROVED WORK PLAN

In certain instances, samples could not be collected when refusal was met when the sampling equipment could not be advanced to the desired depths in strongly welded tuff. Sampling-depth intervals may have been changed from those described in section 5.4 of the approved investigation work plan (LANL 2007, 102216; NMED 2008, 100115) when the proposed depths could not be reached. Samples were also not collected because rough terrain made the locations inaccessible or the locations of structures were or in and around historical sites.

C-7.1 K-Site Subaggregate

C-7.1.1 SWMU 11-005(a)

The original boundary location of SWMU 11-005(a) was found to be incorrect. After field verification, which involved removing soil until the septic tank and its associated drainlines were located, the boundary, proposed sampling points, septic tank, drainline, and outfall were resurveyed. Samples were collected at new sampling points.

Depths for all samples at SWMU 11-005(a) were adjusted according to the depth of the structure at locations 11-608725 through 11-608735; the depths remained as proposed at location 11-608724. Samples were not collected at the 5.5- to 6.0-ft-depth interval at location 16-608733 after refusal was met at approximately 3.5 ft. Two step-out samples (RE11-10-1609 and RE11-10-1610) were collected because field-screening results for chromium were elevated in sample RE11-10-1587 at location 16-608724.

C-7.1.2 SWMU 11-005(b)

The majority of sampling depths were changed from the original proposed depths after soil was removed to determine the exact location and depth of the septic tank and associated drainlines. Samples were collected next to the septic tank and beneath the drainlines. Two step-out samples (RE11-10-1771 and RE11-10-1772) were collected because field-screening results for RDX were elevated in RE11-10-1755

at location 11-608787. One location (two samples) near the south boundary in the outfall was not sampled because the location did not plot within the boundary as proposed.

C-7.1.3 SWMU 11-006(a)

During the investigation, the original boundary location of SWMU 11-006(a) was found to be incorrect. After field verification, which involved removing soil until the sump and asphalt apron were exposed, the proposed sampling points were relocated and surveyed around the sump and asphalt apron. Most of the sample depths were adjusted dependant on the location and depth of the asphalt and structures. Samples were not collected at the 10.0- to 10.5-ft-depth interval at locations 11-608781 and 11-608782; during the process of collecting the samples, media kept caving into the hole, making it impossible to collect the samples from the proposed depth.

C-7.1.4 SWMU 11-006(b)

The 5.5- to 6.0-ft-depth intervals were changed to 1.0–1.5 ft at location 11-608816; to 1.5–2.0 ft at locations 11-608818 and 11-608820; to 4.5–5.0 ft at locations 11-608821, 11-608822, 11-608823; and to 3.0–3.5 ft at location 11-608826 after refusal was met. The 0.0- to 0.5-ft-depth interval was changed to 1.0–1.5 ft, because the sample was collected beneath asphalt and gravel. The 5.5- to 6.0-ft-depth interval at location 11-608817 was not collected after refusal was met at 8 in.

C-7.1.5 SWMU 11-006(c)

The 5.5- to 6.0-ft-depth intervals were changed to 2.0–2.5 ft at locations 11-608744 and 11-608749, to 4.5–5.0 ft at location 11-608745, to 3.5–4.0 ft at location 11-608746, to 3.0–3.5 ft at location 11-608747, and to 1.0–1.5 ft at location 11-608748 after refusal was met. Four step-out samples (RE11-10-1649, RE11-10-1650, RE11-10-13789, and RE11-10-13790) were collected because field-screening results for RDX were elevated in sample RE11-10-1633 at location 11-608742 and in sample RE11-10-1625 at location 11-608738.

C-7.1.6 SWMU 11-006(d)

The 5.5- to 6.0-ft-depth intervals were changed to 4.5–5.0 ft at locations 11-608769 and 11-608773 after refusal was met.

C-7.1.7 SWMU 11-005(c)

Four step-out samples (RE11-10-1677, RE11-10-1678, RE11-10-13791, RE11-10-13792) were collected because field-screening results for RDX were elevated in sample RE11-10-1667 at location 16-608754. The 5.5- to 6.0-ft-depth intervals were changed to 2.5–3.0 ft at location 11-608758 and to 1.0–1.5 ft at location 11-608760 after refusal was met.

C-7.1.8 SWMU 11-011(a)

The 5.5- to 6.0-ft-depth intervals were changed to 1.0–1.5 ft at location 11-608802, to 3.0–3.5 ft at location 11-608797, to 3.5–4.0 ft at locations 11-608803 and 11-608804, to 4.5–5.0 ft at location 11-608799, and to 5.0–5.5 ft at location 11-608798 after refusal was met in tuff. Location 11-608802 was moved 5 ft south of the original staked location.

C-7.1.9 SWMU 11-011(b)

The 5.5- to 6.0-ft-depth intervals were changed to 1.0–1.5 ft at location 11-608812, to 2.0–2.5 ft at location 11-608813, and to 2.5–3.0 ft at location 11-608814.

C-7.1.10 SWMU 11-011(d)

The 5.5- to 6.0-ft-depth intervals were changed to 6.0–6.5 ft at locations 11-608761 and 11-608763 and to 7.5–8.0 ft at location 11-608765 to account for the depth of buried pipe. Samples were collected underneath pipe to detect any releases that may have occurred. The 0.0- to 0.5-ft-depth interval at location 11-608765 was adjusted to the pipe level of 2.0–2.5 ft bgs. Two step-out samples (RE11-10-1694 and RE11-10-1695) were collected because field-screening results for RDX were elevated in sample RE11-10-1692 at location 11-608763.

C-7.2 P-Site Subaggregate

C-7.2.1 SWMU 16-031(h)

Four step-out samples (RE16-10-15344, RE16-10-15345, RE16-10-15346, and RE16-10-15347) were collected because field-screening results for barium, cesium, manganese, and strontium were elevated in samples RE16-10-1502 and RE16-10-1510 at location 16-608695. Location 16-608697 was moved off the paved road.

C-7.2.2 AOC 16-050

Four step-out samples (RE16-10-1448, RE16-10-1449, RE16-10-1450, and RE16-10-1451) were collected because field-screening results for RDX were elevated in sample RE16-10-1447 at location 16 609518.

C-7.2.3 SWMU 13-001

The 5.5- to 6.0-ft-depth intervals were changed to 4.5–5.0 ft at locations 16-608620 and 16-608630, to 2.0–2.5 ft at location 16-608628, to 2.5–3.0 ft at location 16-608625, and to 3.5–4.0 ft at location 16-608629 after refusal was met. The 5.5- to 6.0-ft-depth interval was changed to 1.5–2.0 ft at location 16-608608 because of the possible presence of building material below ground.

The 5.5- to 6.0-ft-depth interval was not sampled at location 16-608621 because it was not part of the 30% sampling grid. The 0.0- to 0.5-ft-depth interval was sampled before crew members determined this, and the sample collected was analyzed.

C-7.2.4 SWMU 13-002

The 5.5- to 6.0-ft-depth interval was not collected at location 16-608660 after refusal was met at 1.0 ft. Seven locations were sampled at this site instead of the eight locations proposed in the approved investigation work plan (LANL 2007, 102216; NMED 2008, 100115). One location (two samples) was sampled and associated with SWMU 13-001. The 5.5- to 6.0-ft-depth interval was changed to 2.5–3.0 ft at location 16-608661 after refusal was met.

C-7.2.5 SWMU 16-029(h)

The 5.5- to 6.0-ft-depth intervals were changed to 3.0–3.5 ft at locations 16-608711 and 16-608713 after refusal was met. Location 16-608702 was moved 5 ft southwest of the original location. It was located in the center of the dirt road and was not sampled because the soil had been brought in to construct the road and was not the original soil present during site operations. Three step-out samples (RE16-10-13141, RE16-10-13142, and RE16-10-13143) were collected because field-screening results for RDX were elevated in sample RE16-10-1544 at location 16-608714. Location 16-608715 was moved away from the side of the sump because the sump was full of water. Location 16-608715 was moved approximately 5 ft south of the sump from the original plotted location.

C-7.2.6 AOC 16-003(p)

Locations 16-608667 and 16-608668 were moved slightly from the original plotted locations because they plotted on top of the sump, which was full of water. The 0.0- to 0.5-ft-depth interval was changed to 0.5–1.0 ft, and the 5.5- to 6.0-ft-depth interval was changed to 6.0–6.5 ft at location 16-608668 because the presence of a 0.5-ft asphalt layer at the surface.

Two step-out samples (RE16-10-15355 and RE16-10-15356) were collected because field-screening results for barium were elevated in sample RE16-10-1144 at location 16-608666.

C-7.2.7 SWMU 16-004(a)

The original five location points proposed were changed to four location points. All sampling locations were moved because of the presence of underground utility lines: location 16-608676 was moved 6 ft west of the original staked location, location 16-608673 was moved 15 ft 3 in. from the northwest corner of the concrete tank structure, location 16-608674 was moved 4 ft from the northeast corner of the concrete tank structure, and location 16-608675 was moved 29 ft 3 in. southeast of the southwest corner of the concrete tank structure. The original proposed depths of 0.0–0.5 and 5.5–6.0 ft were changed starting at 20 ft beneath the structure. One location (two samples) in the center and beneath the existing structure was not sampled because the location was not accessible.

C-7.2.8 SWMU 16-004(b)

The original proposed five location points proposed were changed to four location points. All sampling locations were moved because of the presence of underground utility lines: location 16-608684 was moved 3.0 ft northeast of its original staked location, location 16-608685 was moved 2 ft 5 in. southwest of its original staked location, location 16-608687 was moved 27 ft 5 in. southwest of its original staked location from the middle of the asphalt paved road, and location 16-608686 was moved 11 ft 4 in. west of its original staked location. Original proposed depth intervals of 0.0–0.5 and 5.5–6.0 ft bgs were adjusted starting at 20 ft bgs underneath structure.

One location (two samples) in the center and beneath the existing structure was not sampled because the location was not accessible. All other samples were collected at the edge and beneath the bottom of the trickling filter structure.

C-7.2.9 SWMU 16-004(c)

The original proposed five location points proposed were changed to four location points. All sampling locations were moved because of the presence of underground utility lines: location 16-608885 was

moved 2 ft 3 in. northwest of the northeast corner of the concrete tank structure, location 16-608886 was moved 3.0 ft east of the southeast corner of the concrete tank structure, location 16-608884 was moved 10 ft 7 in. northwest of the northwest corner of the concrete tank structure, and location 16-608887 was moved 5 ft 8 in. south of the southwest corner of the concrete tank structure. The original proposed depths of 0.0–0.5 and 5.5–6.0 ft were adjusted starting at 20 ft bgs underneath the structure.

One location (two samples) in the center and beneath the existing structure was not sampled because the location was not accessible. All other samples were collected at the edge and beneath the bottom of the final tank structure.

C-7.2.10 SWMU 16-004(d)

Sampling-depth intervals were adjusted depending on the depth of the sludge bed at each location.

C-7.2.11 SWMU 16-004(e)

Proposed sampling locations around the commuter box were relocated after removal of soil to find the true location of the commuter box. Sampling locations were resurveyed around the corners of the box because of the presence of utilities. One location (two samples) in the center and beneath the commuter box was not sampled because the location was not accessible. Depth intervals were adjusted (0.0–0.5 to 3.0–3.5 ft and 5.5–6.0 to 8.5–9.0 ft) to collect samples beneath the commuter box.

C-7.2.12 SWMU 16-004(f)

Sampling depths were adjusted according to the depth of the sludge bed at each location.

C-7.3 300s Line Subaggregate

C-7.3.1 SWMU 16-06(z)

The 5.5- to 6.0-ft-depth interval was changed to 4.5–5.0 ft at location 16-609207 after refusal was met.

C-7.3.2 SWMU 16-001(e)

Proposed sampling locations around the dry well were moved after it was discovered the dry well was located farther south. Sampling locations were relocated and surveyed around the well head, and sampling proceeded as planned. Sampling depths were adjusted depending on the depth of the structures.

C-7.3.3 SWMU 16-003(d)

Four step-out samples (RE16-10-14899, RE16-10-14902, RE16-10-14903, and RE16-10-14904) were collected because field-screening results for RDX were elevated in sample RE16-10-2798 at location 16-609176.

C-7.3.4 SWMU 16-003(e)

The depth interval 10.5–11.0 ft was changed to 9.0–9.5 ft at location 16-609179 after refusal was met. At location 16-609180, the 10.5- to 11.0-ft-depth interval could not be collected; refusal was met at 5.0 ft.

Location 16-609180 did not originally plot near the associated sump as proposed. After field verification, the sampling point was relocated to immediately outside the sump to be sampled and surveyed.

C-7.3.5 SWMU 16-003(f)

The 10.5- to 11.0-ft-depth interval was changed to 8.5–9.0 ft at location 16-609166 and to 9.0–9.5 ft at location 16-609167 after refusal was met. Location 16-609166 did not originally plot near the associated sump. After field verification, the sampling point was relocated to immediately outside the sump to be sampled and surveyed.

C-7.3.6 SWMU 16-003(g)

The 10.5- to 11.0-ft-depth interval was changed to 9.5–10.0 ft at location 16-609187 after refusal was met. Location 16-609186 did not originally plot near the associated sump. After field verification, the sampling point was relocated to immediately outside the sump to be sampled and surveyed.

C-7.3.7 SWMU 16-026(b)

Cyanide was mistakenly omitted from the sampling suite and was not analyzed for in four samples (RE16-10-2841, RE16-10-2842, RE16-10-2843, and RE16-10-2844) collected from location 16-609192.

C-7.3.8 SWMU 16-026(c)

Location 16-609194 was moved 5 ft 7 in. southeast of the original location because of the presence of underground utilities. Location 16-609193 was moved into the drainage.

C-7.3.9 SWMU 16-026(d)

Location 16-609184 was moved 4 ft 9 in. northwest and location 16-609183 was moved 25 ft 5 in. northwest because of the presence of underground utilities, and both were resurveyed. The 5.5- to 6.0-ft-depth interval was changed to 4.5–5.0 ft at location 16-609183 after refusal was met. Eight step-out samples (RE16-10-2821, RE16-10-2822, RE16-10-10118, RE16-10-10119, RE16-10-10120, RE16-10-10121, RE16-10-10122, and RE16-10-10123) were collected because field-screening results for RDX were elevated in sample RE16-10-2819; for arsenic, cobalt, lead, and silver in sample RE16-10-2820; and for cobalt and lead in sample RE16-10-2823 at location 16-609184.

C-7.3.10 SWMU 16-026(e)

Location 16-609202 was moved 4 ft 4 in. northwest and location 16-609201 was moved 14 ft 3 in. northwest because of the presence of underground utilities, and both were resurveyed. The 5.5- to 6.0-ft-depth interval was changed to 4.5–5.0 ft at location 16-609202 after refusal was met. A total of 23 step-out samples were collected at SWMU 16-026(e).

- Nine step-out samples (RE16-10-14202, RE16-10-14203, RE16-10-14204, RE16-10-14205, RE16-10-14206, RE16-10-14207, RE16-10-14222, RE16-10-14884, and RE16-10-14885) were collected because field-screening results for arsenic, cobalt, lead, and silver were elevated in sample RE16-10-2877 at location 16-609200.
- Seven step-out samples (RE16-10-14208, RE16-10-14209, RE16-10-14210, RE16-10-14211, RE16-10-14212, RE16-10-14213, and RE16-10-14220) were collected because field-screening

results for arsenic, cobalt, lead, and silver were elevated in sample RE16-10-2879 at location 16-609201.

- Seven step-out samples (RE16-10-14214, RE16-10-14215, RE16-10-14216, RE16-10-14217, RE16-10-14218, RE16-10-14219, and RE16-10-14221) were collected field-screening results for arsenic, cobalt, and lead were elevated in sample RE16-10-2881 at location 16-609202.

C-7.3.11 SWMU 16-029(a)

The 10.5- to 11.0-ft-depth interval was changed to 9.0–9.5 ft at locations 16-609209 and 16-609210 after refusal was met.

C-7.3.12 SWMU 16-029(b)

The 10.5- to 11.0-ft-depth interval was changed to 9.0–9.5 ft at locations 16-609198 and 16-609199 after refusal was met. Location 16-609199 did not originally plot near the associated sump. After field verification, the sampling point was relocated to immediately outside the sump to be sampled and surveyed.

C-7.3.13 SWMU 16-029(c)

The 10.5- to 11.0-ft-depth interval was changed to 9.5–10.0 ft at location 16-609213 and to 9.0–9.5 ft at location 16-609214 after refusal was met. Location 16-609214 did not originally plot near the associated sump. After field verification, the sampling point was relocated to immediately outside the sump to be sampled and surveyed.

C-7.3.14 SWMU 16-029(d)

The 10.5- to 11.0-ft-depth interval was changed to 9.0–9.5 ft after refusal was met at locations 16-609211 and 16-609212. Location 16-16-609212 did not originally plot near the associated sump. After field verification, the sampling point was relocated to immediately outside the sump to be sampled and surveyed.

C-7.3.15 Shared Drainages

The 5.5- to 6.0-ft-depth intervals were changed to 4.5–5.0 ft at location 16-609217 and to 1.5–2.0 ft at location 16-609218 after refusal was met. A second depth at location 16-609221 was not sampled after refusal was met at 0.5 ft

C-7.3.16 Liquid Waste Trunk Line

The 0.0- to 0.5-ft-depth interval at location 16-609232 was changed to 1.5–2.0 ft because of gravel fill in the upper 1.5 ft of surface material. The 5.5- to 6.0-ft-depth interval was changed to 1.5–2.0 ft at location 16-609235 and to 2.5–3.0 ft at location 16-609236 after refusal was met. A total of 26 step-out samples were collected because of elevated field-screening results.

- Seven step-out samples (RE16-10-2986, RE16-10-2987, RE16-10-2988, RE16-10-2989, RE16-10-2990, RE16-10-2991, and RE16-10-14801) were collected because field-screening results for barium were elevated in sample RE16-10-2973 at location 16-609235.

- Four step-out samples (RE16-10-14806, RE16-10-14807, RE16-10-14808, and RE16-10-14809) were collected because field-screening results for zinc were elevated in sample RE16-10-2966 at location 16-609232.
- Four step-out samples (RE16-10-14810, RE16-10-14811, RE16-10-14812, and RE16-10-14813) were collected because field-screening results for barium and strontium were elevated in sample RE16-10-2968 at location 16-609233.
- Four step-out samples (RE16-10-14814, RE16-10-14815, RE16-10-14816, and RE16-10-14817) were collected because field-screening results for iron were elevated in sample RE16-10-2993 at location 16-609236.
- Seven step-out samples (RE16-10-14802, RE16-10-14818, RE16-10-14819, RE16-10-14820, RE16-10-14821, RE16-10-14822, and RE16-10-14823) were collected because PID field-screening results were elevated in sample RE16-10-2976 at location 16-609237.

Locations 16-609232, 16-609233, 16-609234, 16-609235, 16-609236, and 16-609237 were resampled only for cyanide for a total of 12 samples (RE16-10-11752, RE16-10-11753, RE16-10-11754, RE16-10-11755, RE16-10-11756, RE16-10-11757, RE16-10-11758, RE16-10-11759, RE16-10-11760, RE16-10-11761, RE16-10-11762, and RE16-10-11763).

C-7.4 V-Site Subaggregate

All of the area within the V-Site fence is a protected national historical site. As a result, sampling locations were moved to the periphery of the V-Site Courtyard so sampling would not damage the historical structures and/or otherwise disrupt associated features. Other sites did not have the full number of samples proposed in the work plan collected because of concerns on the part of the cultural resources representative monitoring the sampling, that heavy equipment use could harm the unstabilized historical berm at the site. All samples moved or not collected are described below by site.

C-7.4.1 AOC C-16-068

Location 16-609298 moved 9 ft west after a sample at the 5.5- to 6.0-ft-depth interval met refusal in concrete pad 8 in. below the first depth. The new location identification was relabeled as 16-611140.

C-7.4.2 SWMU 16-017(q)-99

The only two sampling locations were located on a historical berm within the site. Sampling was prohibited to prevent disturbance of the berm. Therefore, no samples were collected at this site.

C-7.4.3 SWMU 16-017(v)-99

Two out of four locations were not sampled; the two locations were on a historical berm, and sampling was prohibited.

C-7.4.4 SWMU 16-029(w)

Sample depths were adjusted during drilling to ensure adequate amounts of sample media were recovered to fill all sample containers. One location was not sampled because it was inside the fenced area of historical structures.

C-7.4.5 SWMU 16-029(x)

Locations listed in the investigation work plan were located farther than the 5-ft distance from the pipe required by the approved investigation work plan (LANL 2007, 102216; NMED 2008, 100115). Sampling locations were realigned using locations along the pipeline that had been determined in previous sampling efforts. Location 16-609479 was moved 8 ft east of original location to avoid refusal in media. Sample depths were adjusted during drilling to ensure adequate amounts of sample media were recovered to fill jars. Twenty-three surface samples (RE16-10-13735 through RE16-10-13757) were collected again at the 0.0- to 0.5-ft-depth interval to analyze for pesticides only.

At locations 16-609469, 16-609470, 16-609471, and 16-609472, only samples from the 0.0- to 0.5-ft-depth interval were collected by hand auger. Subsurface samples required a drill rig, but when the field crew returned to collect the subsurface samples, access to the locations with a drill rig was denied by cultural-resources monitors. Therefore, the eight associated subsurface samples were not collected.

The 16.5- to 17.0-ft-depth interval at location 16-609477 was not collected because the drill rig met refusal at 13.5 ft. The 16.5- to 17.0-ft-depth intervals at locations 16-609485 and 16-609483 were not collected because of zero recovery with the drill rig.

Two step-out samples (RE16-10-14023 and RE16-10-14024) were collected because field-screening results for RDX were elevated in sample RE16-10-3764 at location 16-611771.

C-7.4.6 SWMU 16-017(w)-99

Three step-out samples (RE16-10-3610, RE16-10-3611, and RE16-10-13936) were collected because field-screening results for iron, rubidium, and thorium were elevated in sample RE16-10-3602 at location 16-609442.

C-7.4.7 AOC 16-034(m)

A total of eight step-out samples were collected because of elevated field-screening results.

- Four step-out samples (RE16-10-14304, RE16-10-14306, RE16-10-14307, and RE16-10-14308) were collected because field-screening results for zinc were elevated in samples RE16-10-3001 and RE16-10-3011 at location 16-609245.
- Four step-out samples (RE16-10-14305, RE16-10-14309, RE16-10-14310, and RE16-10-14311) were collected because field-screening results for strontium were elevated in sample RE16-10-3005 at location 16-609247.

C-7.4.8 AOC 16-024(m)

The 5.5- to 6.0-ft-depth interval at location 16-609250 was changed to 3.0–3.5 ft after refusal was met. Sixteen step-out samples were collected because of elevated field-screening levels.

- Four step-out samples (RE16-10-14280, RE16-10-14283, RE16-10-14284, and RE16-10-14285) were collected because field-screening results for barium, iron, and strontium were elevated in sample RE16-10-3019 at location 16-609250.
- Four step-out samples (RE16-10-14281, RE16-10-14286, RE16-10-14287, and RE16-10-14288) were collected because field-screening results for barium, iron, and strontium were elevated in sample RE16-10-3021 at location 16-609251.

- Four step-out samples (RE16-10-14282, RE16-10-14290, RE16-10-14291, and RE16-10-14292) were collected because field-screening results for barium, iron, and strontium were elevated in sample RE16-10-3023 at location 16-609252.
- Four step-out samples (RE16-10-14289, RE16-10-14293, RE16-10-14294, and RE16-10-14319) were because field-screening results for iron were elevated in sample RE16-10-3025 at location 16-609253.

C-7.4.9 SWMU 16-006(g)

Sampling at this site was prohibited because all sampling locations were inside a fenced historical site.

C-7.4.10 SWMU 16-031(c)

Sampling at this site was prohibited because all sampling locations were inside a fenced historical site.

C-7.4.11 SWMU 16-006(h)

Sampling at this site was prohibited because all sampling locations were inside a fenced historical site.

C-7.4.12 SWMU 16-017(t)-99

The 5.5- to 6.0-ft-depth intervals at locations 16-609498 and 16-609499 were not sampled because they were located within a historical site, and no further sampling was allowed.

C-7.4.14 SWMU 16-029(g)/AOC C-16-074

Based on historical preservation requirements, the sampling map was revised for this site. Only location 16-609456 was sampled with four depths, and three locations were omitted.

C-7.5 Extended Drainages

Samples could not be collected because of refusal at 21 locations: 16-608450, 16-608451, 16-608485, 16-608486, 16-608550, 16-608551, 16-608553, 16-608561, 16-608564, 16-608566, 16-608568, 16-608570, 16-611208, 16-611209, 16-611213, 16-611214, 16-611215, 16-611220, 16-608458, 16-608460, and 16-608462.

Ten samples were not collected because water was actively flowing over locations 16-608547, 16-608556, 16-611217, 16-608457, and 16-608463.

Bar graphs were used to evaluate a list of analytes selected based on historical site operations (silver, arsenic, barium, cadmium, cobalt, chromium, cesium, copper, mercury, manganese, nickel, lead, antimony, selenium, strontium, and thorium). From the bar charts, five analytes (arsenic, lead, mercury, silver, and selenium) were elevated primarily at the outfall from the P-Site watewater treatment plant. Out of the five, lead and selenium showed the highest detects at location 16-608472. Therefore, eight step-out samples (RE16-10-12061, RE16-10-12062, RE16-10-12063, RE16-10-12064, RE16-10-12065, RE16-10-12066, RE16-10-12069, and RE16-10-12070) were collected at locations 16-611401, 16-611402, 16-611403, and 16-611404.

Another six step-out samples (RE16-10-11734, RE16-10-11735, RE16-10-11736, RE16-10-11737, RE16-10-11738, and RE16-10-11739) were collected because field-screening results for RDX were elevated in samples RE16-10-404 and RE16-10-416 at locations 16-611212 and 16-611218, respectively.

C-8.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the New Mexico Environment Department Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

Gilbert, R.O., and J.C. Simpson, November 1990. "Statistical Sampling and Analysis Issues and Needs for Testing Attainment of Background-Based Cleanup Standards at Superfund Sites," Proceedings of The Workshop on Superfund Hazardous Waste: Statistical Issues in Characterizing a Site: Protocols, Tools, and Research Needs, U.S. Environmental Protection Agency, Arlington, Virginia. (Gilbert and Simpson 1990, 055612)

LANL (Los Alamos National Laboratory), December 2007. "Investigation Work Plan for S-Site Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-07-8366, Los Alamos, New Mexico. (LANL 2007, 102216)

NMED (New Mexico Environment Department), January 23, 2008. "Approval for the Investigation Work Plan for S-Site Aggregate Area, Revision 1," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2008, 100115)

Table C-1.0-1
Brief Description of Field Investigation Methods

Method	Summary
Spade and Scoop Collection of Soil Samples	This method is typically used to collect shallow (e.g., approximately 0–12 in.) soil or sediment samples. The "spade-and-scoop" method involved digging a hole to the desired depth, as prescribed in the sampling and analysis plan, and collecting a discrete grab sample. The sample was placed in a clean, stainless-steel bowl for transfer into various sample containers.
Hand-Auger Sampling	This method is typically used for sampling soil or sediment at depths of less than 10–15 ft but may in some cases be used for collecting samples of weathered or nonwelded tuff. The method involves hand-turning a stainless-steel bucket auger (typically 3–4 in.-I.D.), creating a vertical hole that can be advanced to the desired sample depth. For this investigation, when the desired depth was reached, the auger was decontaminated before advancing the hole through the sample depth. The sample material was transferred from the auger bucket to a stainless-steel sampling bowl before filling the various required sample containers.
Split-Spoon Core-Barrel Sampling	This method involves a stainless-steel core barrel (typically 4-in. I.D., 2.5-ft long), which is advanced using a powered drilling rig and extracts a continuous length of soil and/or rock to be examined as a unit. The split-spoon core barrel is a cylindrical barrel split lengthwise so that the two halves can be separated to expose the core sample. Once the core sample was extracted, the section of core was screened for radioactivity and organic vapors, photographed, and described in a geologic log. A portion of the core was collected as a discrete sample from the desired depth.
Headspace Vapor Screening	Individual soil, rock, or sediment samples were field screened for VOCs by placing a portion of the sample in a plastic sample bag or in a glass container with a foil-sealed cover. The container was sealed and gently shaken and allowed to equilibrate for 5 min. The sample was then screened by inserting a PID probe into the container and measuring and recording any detected vapors. PIDs used lamps with voltage of 11.7 eV.
Handling, Packaging, and Shipping of Samples	Field team members sealed and labeled samples before packing and ensured that the sample containers and the containers used for transport were free of external contamination. Field team members packaged all samples to minimize the possibility of breakage during transport. After all environmental samples were collected, packaged, and preserved, a field team member transported them to either the SMO or an SMO-approved radiation screening laboratory under chain of custody (COC). The SMO arranged for shipping of samples to analytical laboratories. The field team member informed the SMO and/or the radiation screening laboratory coordinator whenever levels of radioactivity were in the action-level or limited-quantity ranges.
Sample Control and Field Documentation	The collection, screening, and transport of samples were documented on standard forms generated by the SMO. These included sample collection logs, COC forms, and sample container labels. Collection logs were completed at the time of sample collection and were signed by the sampler and a reviewer who verified the logs for completeness and accuracy. Corresponding labels were initialed and applied to each sample container, and custody seals were placed around container lids or openings. The COC forms were completed and signed to verify that the samples were not left unattended. Site attributes (e.g., former and proposed soil-sampling locations, sediment-sampling locations) were located using GPS. Horizontal distances were measured to the nearest 0.5 ft and presented as part of the investigation report. Sample coordinates were uploaded into the Sample Management Database.

Table C-1.0-1 (continued)

Method	Summary
Field Quality Control Samples	Field quality control (QC) samples were collected as directed in the Compliance Order on Consent and SOP-5059 as follows: *Field Duplicates*: at a frequency of 10%; collected at the same time as a regular sample and submitted for the same analyses. *Equipment Rinsate Blank*: at a frequency of 10%; collected by rinsing sampling equipment with deionized water, which was collected in a sample container and submitted for laboratory analysis. *Trip Blanks*: required for all field events that include the collection of samples for VOC analysis. Trip blanks are containers of certified clean sand that are opened and kept with the other sample containers during the sampling process.
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination was the preferred method to minimize the generation of liquid waste. Dry decontamination may include the use of a wire brush or other tool for removing soil or other material adhering to the sampling equipment, followed by use of a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes.
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on U.S. Environmental Protection Agency guidance for environmental sampling, preservation, and QA. Specific requirements for each sample are printed on the SCLs provided by the SMO (size and type of container, e.g., glass, amber glass, and polyethylene). All samples were preserved by being placed in insulated containers with ice to maintain a temperature of 4°C. Other requirements, such as nitric acid or other preservatives, may apply to different media or analytical requests.
Management, Characterization, and Storage of Investigation-Derived Waste	Investigation-derived waste (IDW) was managed, characterized, and stored in accordance with an approved waste characterization strategy form that documents site history, field activities, and the characterization approach for each waste stream managed. Waste characterization was adequate to comply with on-site or off-site waste acceptance criteria. All stored IDW was marked with appropriate signage and labels. Drummed IDW was stored on pallets to prevent deterioration of containers. Generators were required to reduce the volume of waste generated by as much as was technically and economically feasible. The means to store, control, and transport each potential waste type and its classification was determined before the start of field operations that generated waste. A waste storage area was established before waste was generated. Waste storage areas located in controlled areas of the Laboratory were controlled as needed to prevent inadvertent addition or management of wastes by unauthorized personnel. Each container of waste generated was individually labeled with waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste was segregated by classification and compatibility to prevent cross-contamination. Management of IDW is presented in Appendix G of this investigation report.
Coordination and Evaluation of Geodetic Surveys	Geodetic surveys focused on obtaining survey data of acceptable quality for use during project investigations. Geodetic surveys were conducted with a Trimble 5700 DGPS. The survey data conformed to Laboratory Information Architecture (IA) project standards IA-CB02, GIS Horizontal Spatial Reference System, and IA-D802, Geospatial Positioning Accuracy Standard for A/E/C and Facility Management. All coordinates are expressed in New Mexico State Plain Coordinate System 1983, NM Central, U.S. ft coordinates. All elevation data were reported relative to the National Geodetic Vertical Datum of 1983.

Table C-1.0-1 (continued)

Method	Summary
Hollow-Stem Auger Drilling Methods	In this method, hollow-stem augers (sections of seamless pipe with auger flights welded to the pipe) act as a screw conveyor to bring cuttings of sediment, soil, and/or rock to the surface. Auger sections are typically 5 ft in length and have outside diameters of 4.25 to 14 in. Drill rods, split-spoon core barrels, Shelby tubes, and other samplers passed through the center of the hollow-stem auger sections to collect discrete samples from desired depths. Hollow-stem augers were used as temporary casings when setting wells to prevent cave-ins of the borehole walls.
Field-Portable XRF Instrumentation	This method involves using a portable XRF analyzer to screen for hazardous or potentially hazardous inorganic materials. The data generated allowed for rapid evaluation of the extent of contamination. Samples were analyzed for elements of atomic number 13 (aluminum) through 92 (uranium), with proper x-ray source selection and instrument calibration. Environmental applications included measuring elemental metals in soil and on filters and measuring lead in paint.
Gross-Gamma Radiation Scoping Surveys	This method is used to perform and document gross-gamma radiation scoping surveys in buildings and soil. Scoping surveys were conducted after an assessment of the site history was completed and consisted of judgmental measurements based on historical site information and data. If the scoping survey locates contamination, a characterization survey was performed.

Appendix D

Field-Screening Data
(on CD included with this document)

Appendix E

Analytical Program

E-1.0 INTRODUCTION

This appendix presents the analytical methods used, and a review of the data quality of the analytical results, for the S-Site Aggregate Area investigation at Los Alamos National Laboratory (the Laboratory).

The analytical program for this investigation includes submission of samples to approved contract laboratories, with specific requirements for analytical methods, data quality, and reporting. Quality assurance (QA), quality control (QC), and data validation procedures were implemented in accordance with the requirements of the "Quality Assurance Project Plan Requirements for Sampling and Analysis" (LANL 1996, 054609) and the analytical services statement of work (SOW) for contract laboratories (LANL 2008, 109962). The results of the QA/QC activities were used to estimate the accuracy, bias, and precision of the analytical measurements. The QC samples included preparation blanks, spikes, matrix spikes (MSs), and laboratory control samples (LCSs) to assess accuracy and bias. Internal standards (ISs), external standards, surrogates, and tracers were also used to assess accuracy.

The type and frequency of QC analyses and the applicable analytical methods are described in the analytical service SOW (LANL 2008, 109962). Other QC factors, such as sample preservation and holding times, were also assessed in accordance with the requirements outlined in Standard Operating Procedure (SOP) 5056, Sample Containers and Preservation. Evaluating these QC indicators allows estimates to be made of the accuracy, bias, and precision of the analytical suites. A focused data validation was also performed for all of the data packages (also referred to as request numbers).

The following SOPs were used for data validation:

- SOP-5161, "Routine Validation of Volatile Organic Compound (VOC) Analytical Data"
- SOP-5162, "Routine Validation of Semivolatile Organic Compound (SVOC) Analytical Data"
- SOP-5163, "Routine Validation of Organochlorine Pesticide (PEST) and Polychlorinated Biphenyl (PCB) Analytical Data"
- SOP-5165, "Routine Validation of Metals Analytical Data"
- SOP-5166, "Routine Validation of Gamma Spectroscopy, Chemical Separation Alpha Spectrometry, Gas Proportional Counting, and Liquid Scintillation Analytical Data"
- SOP-5168, "Routine Validation of LC/MS/MS High Explosive Analytical Data"
- SOP-5191, "Routine Validation of LC/MS/MS Perchlorate Analytical Data (SW-846 EPA Method 6850)"

The focused validation included a more detailed review of the data generated by the analytical laboratory. The analytical data and instrument printouts used during focused validation and the validation reports are provided in Appendix F.

Analytical data were reviewed and evaluated based on U.S. Environmental Protection Agency (EPA) National Functional Guidelines for inorganic and organic chemical data review where applicable (EPA 1994, 048639; EPA 1999, 066649). As a result of the data validation and assessment efforts, qualifiers may be assigned to the analytical records as appropriate. The data qualifiers used in the data validation procedures are defined in Appendix A.

E-2.0 ANALYTICAL DATA ORGANIZATION

The data sets evaluated for the S-Site Aggregate Area included analytical results for samples collected in the 2009–2010 investigation. Historical data collected during previous investigations from 1995–2005 included in this report were reviewed and revalidated to current data-quality standards. The historical data were evaluated in the historical investigation report (LANL 2007, 097685). Only analytical data for which complete data packages and sample documentation are available are appropriate for decision-making purposes and are included in the data set(s).

E-3.0 INORGANIC CHEMICAL ANALYSES

S-Site Aggregate Area samples collected during historical investigations as well as the 2009–2010 investigation were analyzed for one or more of the following inorganic chemicals: target analyte list (TAL) metals, perchlorate, anions, and total cyanide. Samples were analyzed for TAL metals using EPA SW-846 Methods 6010B, 6020, and 7471A. Samples were analyzed for anions using EPA Method 300.0. Other analytical methods included EPA SW-846 Method 9012A for total cyanide and EPA SW-846 Method 6850 for perchlorate. The analytical methods used for inorganic chemicals are listed in Table E-3.0-1.

A total of 1065 samples (plus 150 field duplicates) were submitted for analysis of TAL metals; 1065 samples (plus 150 field duplicates) were submitted for analysis of anions, 1065 samples (plus 150 field duplicates) were submitted for analysis of perchlorate, and 722 samples (plus 100 field duplicates) were submitted for analysis of total cyanide.

All decision-level analytical data are included in Appendix F (on CD).

E-3.1 Inorganic Chemical Analyses

The use of QA/QC samples is designed to produce quantitative measures of the reliability of specific parts of an analytical procedure. The results of the QA/QC analyses performed on a sample provide confidence about whether the analyte is present and whether the concentration reported is accurate. To assess the accuracy and precision of inorganic chemical analyses, LCSs, preparation blanks, MS samples, laboratory duplicate samples, interference check samples (ICSs), and serial dilution samples were analyzed as part of the S-Site Aggregate Area investigations. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233) and is described briefly in the sections below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For inorganic chemicals in soil/tuff, LCS percent recoveries should fall within the lower acceptance level (LAL) and upper acceptance level (UAL).

The preparation blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing and which is extracted and analyzed in the same manner as the corresponding environmental samples. Preparation blanks are used to measure bias and potential cross-contamination. All inorganic chemical results should be below the method detection limit (MDL).

MS samples assess the accuracy of inorganic chemical analyses. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS acceptance criterion is between the LAL and UAL, inclusive for all spiked analytes.

Laboratory duplicate samples assess the precision of inorganic chemical analyses. All relative percent differences (RPDs) between the sample and laboratory duplicate should be ±35% for soil (LANL 1995, 049738; LANL 2000, 071233).

The ICSs assess the accuracy of the analytical laboratory's interelement and background correction factors used for inductively coupled plasma emission spectroscopy. The ICS percent recovery should be between the LAL and UAL.

Serial dilution samples measure potential physical or chemical interferences and correspond to a sample dilution ratio of 1:5. The chemical concentration in the undiluted sample must be at least 50 times the MDL (100 times for inductively coupled plasma mass spectroscopy) for valid comparison. For sufficiently high concentrations, the RPD should be within 10%.

Details regarding the quality of the inorganic chemical analytical data included in the data set are summarized in the following sections.

E-3.2 Data Quality Results for Inorganic Chemicals

The majority of the analytical results are qualified as not detected (U) because the analytes were not detected by the respective analytical methods or were not qualified. These data do not have any quality issues associated with the values presented.

E-3.2.1 Chain of Custody

Chain-of-custody forms were maintained properly for all samples analyzed for inorganic chemicals (Appendix F).

E-3.2.2 Sample Documentation

All samples analyzed for inorganic chemicals were properly documented in the field in the sample collection logs (Appendix F).

E-3.2.3 Sample Dilutions

Some samples were diluted for inorganic chemical analyses. No qualifiers were applied to any inorganic chemical analytical results because of dilutions.

E-3.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for inorganic chemicals.

E-3.2.5 Holding Times

One result for total cyanide was qualified as estimated and biased low (J-) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

Three results for total cyanide were qualified as estimated not detected (UJ) because the extraction/ analytical holding times were exceeded by less than 2 times the published method for holding times.

E-3.2.6 Initial and Continuing Calibration Verifications

Eighteen results for beryllium, iron, and magnesium were qualified as estimated (J) because the associated initial calibration verification (ICV) or continuing calibration verification (CCV) were recovered outside the method-specific limits.

Eight results for selenium were qualified as estimated not detected (UJ) because the associated ICV/CCV was recovered outside the method-specific limits.

A total of 522 results for TAL metals were qualified as undetected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the instrument blank and continuing calibration blank.

Twenty-four results for total cyanide were qualified as undetected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the instrument blank and continuing calibration blank.

Eleven perchlorate results were estimated not detected (UJ) because the ICV and/or CCV were not analyzed at the appropriate method frequency.

E-3.2.7 Interference Check Sample and/or Serial Dilutions

Interference check sample and serial dilution results were within acceptable limits for all samples analyzed for inorganic chemicals.

E-3.2.8 Laboratory Duplicate Samples

A total of 376 TAL metal results were qualified as estimated (J) because the sample and duplicate sample results were greater than or equal to 5 times the reporting limit and the duplicate RPD was greater than 35%.

E-3.2.9 Preparation Blanks

A total of 426 TAL metal results were qualified as undetected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the preparation blank.

A total of 685 TAL metal results were qualified as estimated (J) because the analytes were detected but greater than 5 times the concentration in the preparation blank.

E-3.2.10 MS Samples

A total of 1295 TAL metal results were qualified as estimated and biased low (J-) because the associated MS recoveries were less than the LAL but greater than 10%.

One result for total cyanide was qualified as estimated and biased low (J-) because the associated MS recoveries were less than the LAL but greater than 10%.

A total of 555 TAL metal results were qualified as estimated not detected (UJ) because the associated MS recoveries were less than the LAL but greater than 10%.

Six results for total cyanide were qualified as estimated not detected (UJ) because the associated MS recoveries were less than the LAL but greater than 10%.

A total of 2473 results were qualified as estimated and biased high (J+) because the associated MS recoveries were greater than the UAL.

Ten results for total cyanide were qualified as estimated and biased high (J+) because the associated MS recoveries were greater than the UAL.

Twenty-six TAL metal results were qualified as estimated not detected (UJ) because the associated MS recoveries were greater than the UAL.

Four results for total cyanide were qualified as estimated not detected (UJ) because the associated MS recoveries were greater than the UAL.

One perchlorate result was qualified as estimated (J) because the MS/MS duplicate (MSD) percent recovery was greater than 10% but less than 75%.

Seven perchlorate results were qualified as estimated not detected (UJ) because the MS/MSD percent recoveries were greater than 10% but less than 75%.

Fifteen perchlorate results were qualified as estimated and biased high (J+) because the MS/MSD percent recoveries were less than 125%.

E-3.2.11 LCS Recoveries

Fifty results for antimony and silver were estimated not detected (UJ) because the LCS percent recoveries were less than the LAL but greater than 10%.

E-3.2.12 Detection Limit

A total of 2158 TAL metal results were qualified as estimated (J) because the sample results were reported as detected between the instrument detection limit (IDL) and the estimated detection limit (EDL).

Eighty-nine results for total cyanide were qualified as estimated (J) because the sample results were reported as detected between the IDL and the EDL.

E-3.2.13 Trip Blanks, Equipment Blanks, and Rinsate Blanks

A total of 1509 TAL metal results were qualified as undetected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the trip blank, equipment blank, or rinsate.

Four perchlorate results were qualified as undetected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the trip blank, equipment blank, or rinsate.

E-3.2.14 Rejected Results

Sixty-two TAL metal results were rejected (R) because the associated MS recoveries were less than 10%. Of these, 20 results were rejected for barium. Only the Extended Drainages downstream of Solid Waste Management Unit (SWMU) 11-006(c) was significantly affected.

Eleven total cyanide results were rejected (R) because the associated MS recoveries were less than 10%.

The rejected data were not used to characterize the extent of contamination. The results of other qualified data were used as reported and do not affect the usability of the sample results.

E-4.0 ORGANIC CHEMICAL ANALYSES

Soil, tuff, and sediment samples collected during the investigation were analyzed for one or more of the following organic chemicals: volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), explosive compounds, and pesticides. Samples were analyzed for VOCs using SW-846 Method 8260B, SVOCs using SW-846 Method 8270C, explosive compounds using SW-846 Method 8321A, and pesticides using SW-846 Method 8081A. All QC procedures were followed as required by the analytical laboratory SOWs (LANL 1995, 049738; LANL 2000, 071233). The analytical methods used for organic chemicals are listed in Table E-3.0-1.

A total of 1055 samples (plus 148 field duplicates) were submitted for analysis of VOCs; 1055 samples (plus 148 field duplicates) were submitted for analysis of SVOCs; 72 samples (plus 13 field duplicates) were submitted for analysis of pesticides; and 1066 samples (plus 150 field duplicates) were submitted for analysis of explosive compounds.

All organic chemical analytical results are included in Appendix F (on CD).

E-4.1 Organic Chemical QA/QC Samples

The use of QA/QC samples is designed to produce quantitative measures of the reliability of specific parts of an analytical procedure. The results of the QA/QC analyses performed on a sample provide confidence about whether the analyte is present and whether the concentration reported is accurate. Calibration verifications, LCSs, method blanks, MS samples, surrogates, and ISs were analyzed to assess the accuracy and precision of organic chemical analyses. Each of these QA/QC sample types is defined in the analytical services SOW (LANL 1995, 049738; LANL 2008, 109962) and described briefly below.

Calibration verification is the establishment of a quantitative relationship between the response of the analytical procedure and the concentration of the target analyte. There are two aspects of calibration verification: initial and continuing. The initial calibration verifies the accuracy of the calibration curve as well as the individual calibration standards used to perform the calibration. The continuing calibration ensures the initial calibration is still holding and is correct as the instrument is used to process samples. The continuing calibration also serves to determine that analyte identification criteria, such as retention times and spectral matching, are being met.

The LCS is a sample of a known matrix that has been spiked with compounds representative of the target analytes, and it serves as a monitor of overall performance on a “controlled” sample. The LCS is the primary demonstration, on a daily basis, of the ability to analyze samples with good qualitative and quantitative accuracy. The LCS recoveries should fall between the LAL and UAL.

A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing and which is extracted and analyzed in the same manner as the corresponding environmental samples. Method blanks are used to assess the potential for sample contamination during extraction and analysis. All target analytes should be below the contract-required detection limit in the method blank (LANL 1995, 049738; LANL 2008, 109962).

The MS samples are used to measure the ability to recover prescribed analytes from a native sample matrix and consist of aliquots of the submitted samples spiked with a known concentration of the target analyte(s). Spiking typically occurs before sample preparation and analysis. The spike sample recoveries should be between the LAL and UAL.

A surrogate compound (surrogate) is an organic compound used in the analyses of target analytes similar in composition and behavior to the target analytes but normally is not found in environmental samples. Surrogates are added to every blank, sample, and spike to evaluate the efficiency with which analytes are recovered during extraction and analysis. The recovery percentage of the surrogates must be within specified ranges, or the sample may be rejected or assigned a qualifier.

The ISs are chemical compounds added to every blank, sample, and standard extract at a known concentration. They are used to compensate for (1) analyte concentration changes that might occur during storage of the extract and (2) quantitation variations that can occur during analysis. Internal standards are used as the basis for quantitation of target analytes. The percent recovery for ISs should be within the range of 50% to 200%.

Details regarding the quality of the organic chemical analytical data included in the data sets are summarized in the following sections.

E-4.2 Data Quality Results for Organic Chemicals

The majority of the analytical results are qualified as not detected (U) because the analytes were not detected by the respective analytical methods or were not qualified. These data do not have any quality issues associated with the values presented.

E-4.2.1 Maintenance of Chain of Custody

Chain-of-custody forms were maintained properly for all samples analyzed for organic chemicals (Appendix F).

E-4.2.2 Sample Documentation

All samples analyzed for organic chemicals were properly documented in the sample collection logs in the field (Appendix F).

E-4.2.3 Sample Dilutions

Some samples were diluted for organic chemical analyses. No qualifiers were applied to any organic chemical sample results because of dilutions.

E-4.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for organic chemicals.

E-4.2.5 Holding Times

Eleven VOC results were qualified as estimated and biased low (J-) because the extraction/analytical holding times were exceeded by less than 2 times the published method holding times.

A total of 1854 VOC results were qualified as estimated not detected (UJ) because the extraction/analytical holding times were exceeded by less than 2 times the published method holding times.

Twenty-one SVOC results were qualified as estimated and biased low (J-) because the extraction/analytical holding times were exceeded by less than 2 times the published method holding times.

A total of 1276 SVOC results were qualified as estimated not detected (UJ) because the extraction/analytical holding times were exceeded by less than 2 times the published method holding times.

A total of 104 explosive compound results were qualified as estimated and biased low (J-) because the extraction/analytical holding times were exceeded by less than 2 times the published method holding times.

A total of 2708 explosive compound results were qualified as estimated not detected (UJ) because the extraction/analytical holding times were exceeded by less than 2 times the published method holding times.

One 1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) result was qualified as estimated and biased low (J-) because the extraction/analytical holding time was exceeded by more than 2 times the published method holding times.

E-4.2.6 ICVs and CCVs

Seventy-six VOC results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

A total of 2471 VOC results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

Ninety-three SVOC results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

A total of 5354 SVOC results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

Seventy-eight SVOC results were qualified as estimated (J) because the ICV and/or CCV were not analyzed at the appropriate method frequency.

A total of 895 SVOC results were qualified as estimated not detected (UJ) because the ICV and/or CCV were not analyzed at the appropriate method frequency.

Thirteen SVOC results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with an initial calibration curve that exceeded the percent relative standard deviation criteria and/or the associated multipoint calibration correlation coefficient was less than 0.995.

Eighty-six pesticide results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

A total of 615 explosive compound results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a relative response factor (RRF) of less than 0.05 in the ICV and/or CCV.

Seventy explosive compound results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

A total of 924 explosive compound results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

E-4.2.7 Surrogate Recoveries

Three VOC results were qualified as estimated and biased low (J-) because the surrogate was less than the LAL but greater than or equal to 10% recovery.

Fifty-four VOC results were qualified as estimated not detected (UJ) because the surrogate was less than the LAL but greater than or equal to 10% recovery.

Thirty-nine VOC results were qualified as estimated and biased high (J+) because the surrogate percent recoveries were greater than the UAL.

A total of 426 SVOC results were qualified as estimated not detected (UJ) because the surrogate was less than the LAL but greater than or equal to 10% recovery.

Four explosive compound results were qualified as estimated and biased high (J+) because the surrogate percent recovery values were greater than the UAL.

E-4.2.8 IS Responses

The IS responses were within acceptable limits for all samples analyzed for organic chemicals.

E-4.2.9 Method Blanks

A total of 129 VOC results were qualified as undetected (U) because the sample results were less than or equal to 5 times (10 times for acetone and methylene chloride) the concentration of the related analyte in the method blank.

One 1,2,4-trimethylbenzene result was qualified as estimated (J) because the analyte was identified in the method blank but was greater than 5 times.

Seven bis(2-ethylhexyl)phthalate results were qualified undetected (U) because the sample results were less than or equal to 10 times the concentration of the related analyte in the method blank.

E-4.2.10 Laboratory Duplicate Samples

Laboratory duplicates collected for organic chemical analyses indicated acceptable precision for all samples analyzed for organic chemicals.

E-4.2.11 Laboratory Control Sample Recoveries

Sixty-two VOC results were qualified as estimated not detected (UJ) because the LCS percent recoveries were less than the LAL but greater than 10%.

One acetone result was qualified as estimated and biased high (J+) because the LCS percent recovery was greater than the UAL.

A total of 108 SVOC results were qualified as estimated not detected (UJ) because the LCS percent recoveries were less than the LAL but greater than 10%.

Two results for hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) and triaminotrinitrobenzene (TATB) were qualified as estimated and biased low (J-) because the LCS percent recoveries were less than the LAL but greater than 10%.

A total of 274 explosive compound results were qualified as estimated not detected (UJ) because the LCS percent recoveries were less than the LAL but greater than 10%.

One TATB result was qualified as estimated and biased high (J+) because the LCS percent recoveries were greater than the UAL.

E-4.2.12 Quantitation and MDLs

Quantitation and MDLs were within acceptable ranges for all samples analyzed for organic chemicals.

E-4.2.13 MS Samples

Thirty-nine explosive compound results were qualified as estimated and biased high (J+) because the MS/MSD percent recoveries were greater than 130%.

Seventy-five explosive compound results were qualified as estimated not detected (UJ) because the MS/MSD percent recoveries were greater than 10% but less than 70%.

Seven explosive compound results were qualified as estimated (J) because the MS/MSD RPD was greater than 30%.

A total of 340 explosive compound results were qualified as estimated not detected (UJ) because the MS/MSD RPD was greater than 30%.

E-4.2.14 Trip Blanks, Equipment Blanks, and Rinsate Blanks

A total of 123 VOC results were qualified as undetected (U) because the sampling results were less than or equal to 5 or 10 times the concentration of the related analytes in the trip blank, rinse blank, or equipment blank.

E-4.2.15 Rejected Data

Sixteen VOC results were rejected (R) because the samples were analyzed with an RRF of less than 0.05 in the ICV and/or CCV. All of the rejected results were initially qualified as nondetects by the analytical laboratories.

Four VOC results were rejected (R) because the results were not analyzed with a valid five-point calibration curve and/or a standard at the reporting limit.

Fifteen SVOC results were rejected (R) because the surrogate was less than 10% recovery.

Twelve 4-nitrotoluene results were rejected (R) because the affected analytes were analyzed with an RRF of less than 0.05 in the initial calibration and/or CCV.

One RDX result was rejected (R) because the IS retention time shifted by greater than 30 seconds.

One hundred fifty-six results for tetryl were rejected (R) because the LCS percent recoveries were less than 10%.

Ninety-one explosive compound results were rejected (R) because the MS/MSD percent recoveries were less than 10%.

Two explosive compound results were rejected (R) because the results were not analyzed with a valid five-point calibration curve and/or a standard at the reporting limit.

Two hundred explosive compound results were rejected (R) because the extraction/analytical holding times were exceeded by more than 2 times the published method for holding times.

The rejected data were not used to characterize the extent of contamination. However, sufficient data of good quality are available to characterize the site(s) and conduct the risk assessments. The results of other qualified data were used as reported and do not affect the usability of the sampling results.

E-5.0 RADIONUCLIDE ANALYSES

Samples were analyzed for radionuclides by gamma spectroscopy using EPA Method 901.1 and by alpha spectroscopy (HASL-300 Methods) for americium-241, isotopic plutonium, and isotopic uranium. All QC procedures were followed as required by the analytical laboratories SOW (LANL 1995, 049738; LANL 2008, 109962). The methods used for analyzing radionuclides are listed in Table E-3.0-1.

A total of 184 samples (plus 27 field duplicates) were submitted for analyses by gamma spectroscopy; 982 samples (plus 139 field duplicates) were submitted for analysis of americium-241, 982 samples (plus 138 field duplicates) were submitted for analysis of isotopic plutonium, and 982 samples (plus 138 field duplicates) were submitted for analysis of isotopic uranium.

All radionuclide results are included in Appendix F (provided on CD).

E-5.1 Radionuclide QA/QC Samples

All procedures were followed as required by the analytical services SOWs (LANL 1995, 049738; LANL 2008, 109962). Some results were qualified as not detected (U) because the associated sample concentration was less than or equal to the minimum detectable concentration. Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to 3 times the total propagated uncertainty. This data qualification is related to detection status only, not to data quality issues.

To assess the accuracy and precision of radionuclide analyses, LCSs, method blanks, MS samples, laboratory duplicate samples, and tracers were analyzed. Each of these QA/QC sample types is defined

in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233) and is described briefly below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For radionuclides in soil/tuff, LCS percent recoveries should fall between the LAL and UAL.

Method blanks are an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing and which are analyzed in the same manner as the corresponding environmental samples. Method blanks are used to assess the potential for sample contamination during analysis. All radionuclide results should be below the minimum detectable concentration.

The MS samples assess the accuracy of inorganic chemical analyses. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS acceptance criterion is between the LAL and UAL.

Tracers are radioisotopes added to a sample for the purposes of monitoring losses of the target analyte. The tracer is assumed to behave in the same manner as the target analytes. The tracer recoveries should fall between the LAL and UAL.

Laboratory duplicate samples assess the precision of inorganic chemical analyses. All RPDs between the sample and laboratory duplicate should be ±35% for soil (LANL 1995, 049738; LANL 2000, 071233).

Details regarding the quality of the radionuclide analytical data included in the data set are summarized in the following sections.

E-5.2 Data Quality Results for Radionuclides

The majority of the analytical results are qualified as undetected (U) because the analytes were not detected by the respective analytical methods. These data do not have any quality issues associated with the values presented.

E-5.2.1 Chain of Custody

Chain-of-custody forms were maintained properly for all samples (Appendix F).

E-5.2.2 Sample Documentation

All samples were properly documented on the sample collection logs in the field (Appendix F).

E-5.2.3 Sample Dilutions

Some samples were diluted for radionuclide analyses. No qualifiers were applied to any radionuclide sample results because of dilutions.

E-5.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for radionuclides.

E-5.2.5 Holding Times

Holding-time criteria were met for all samples analyzed for radionuclides.

E-5.2.6 Method Blanks

Thirty-four isotopic uranium results were qualified undetected (U, because the sample results were less than or equal to 5 times the concentration of the related analyte in the method blank.

Two isotopic plutonium results were qualified undetected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the method blank.

Thirty-four isotopic uranium results were qualified as estimated (J) because the analyte was detected greater than 5 times the concentration in the method blank.

E-5.2.7 MS Samples

The MS criteria were met for all samples analyzed for radionuclides.

E-5.2.8 Tracer Recoveries

A total of 280 isotopic uranium and isotopic plutonium results were qualified as estimated and biased low (J-) because the tracer was less than the LAL but greater than or equal to 10% recovery.

A total of 118 isotopic uranium and isotopic plutonium results were qualified as estimated not detected (UJ) because the tracer was less than the LAL but greater than or equal to 10% recovery.

A total of 411 isotopic uranium results were qualified as estimated and biased high (J+) because the tracer percent recovery values were greater than the UAL.

E-5.2.9 LCS Recoveries

One plutonium-239/240 result was qualified as estimated and biased high (J+) because the LCS percent recovery was greater than the UAL.

E-5.2.10 Laboratory Duplicate Samples Recoveries

Nine radium-228 results were qualified as estimated (J) because the associated duplicate sample had a duplicate error ratio or relative error ratio greater than the analytical laboratory's acceptance limits.

Three americium-241 results were qualified as estimated not detected (UJ) because the duplicate samples were not prepared and/or analyzed with the samples for unspecified reasons.

E-5.2.11 Rejected Data

A total of 8457 radionuclide results in gamma spectroscopy analyses from P-Site and 300s Line Subaggregate Areas were rejected (R) because spectral interferences prevented positive identification of the analytes.

The rejected data were not used to characterize the extent of contamination. However, sufficient data of good quality are available to characterize the site(s) and conduct the risk assessments. The results of other qualified data were used as reported and do not affect the usability of the sampling results.

E-6.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the New Mexico Environment Department Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

EPA (U.S. Environmental Protection Agency), February 1994. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," EPA-540/R-94/013, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1994, 048639)

EPA (U.S. Environmental Protection Agency), October 1999. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," EPA540/R-99/008, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1999, 066649)

LANL (Los Alamos National Laboratory), July 1995. "Statement of Work (Formerly Called "Requirements Document") - Analytical Support, (RFP number 9-XS1-Q4257), (Revision 2 - July, 1995)," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1995, 049738)

LANL (Los Alamos National Laboratory), March 1996. "Quality Assurance Project Plan Requirements for Sampling and Analysis," Los Alamos National Laboratory document LA-UR-96-441, Los Alamos, New Mexico. (LANL 1996, 054609)

LANL (Los Alamos National Laboratory), December 2000. "University of California, Los Alamos National Laboratory (LANL), I8980SOW0-8S, Statement of Work for Analytical Laboratories," Rev. 1, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2000, 071233)

LANL (Los Alamos National Laboratory), September 2007. "Historical Investigation Report for S-Site Aggregate Area," Los Alamos National Laboratory document LA-UR-07-5620, Los Alamos, New Mexico. (LANL 2007, 097685)

LANL (Los Alamos National Laboratory), June 30, 2008. "Exhibit "D" Scope of Work and Technical Specifications, Analytical Laboratory Services for General Inorganic, Organic, Radiochemical, Asbestos, Low-Level Tritium, Particle Analysis, Bioassay, Dissolved Organic Carbon Fractionation, and PCB Congeners," Los Alamos National Laboratory document RFP No. 63639-RFP-08, Los Alamos, New Mexico. (LANL 2008, 109962)

Table E-3.0-1
Inorganic Chemical, Organic Chemical, and Radionuclide
Analytical Methods for Samples Collected from the S-Site Aggregate Area

Analytical Method	Analytical Description	Analytical Suite
EPA 300.0	Ion chromatography	Anions
EPA SW-846: 6010B	Inductively coupled plasma emission spectroscopy–atomic emission spectroscopy	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, uranium, vanadium, and zinc (TAL metals)
EPA SW-846:6020	Inductively coupled plasma mass spectrometry	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc (TAL metals)
EPA SW-846: 9012A	Automated colorimetric/off-line distillation	Total cyanide
EPA SW-846:6850	Liquid chromatography–mass spectrometry/mass spectrometry	Perchlorate
EPA SW-846:7471A	Cold-vapor atomic absorption analysis	Mercury
EPA SW-846: 8260B	Gas chromatography–mass spectrometry (GC/MS)	VOCs
EPA SW-846: 8270C	GC/MS	SVOCs
EPA SW-846: 8321A	High-performance liquid chromatography	Explosive compounds
EPA SW-846:8081A	Gas Chromatography	Pesticides
EPA 901.1	Gamma spectroscopy	Americium-241, cesium-137, cobalt-60, and uranium-235
HASL Method 300	Chemical separation alpha spectrometry	Isotopic uranium, isotopic plutonium, americium-241

Appendix F

Analytical Suites and Results and Analytical Reports
(on DVDs included with this document)

Appendix G

Management Plan for Investigation-Derived Waste

G-1.0 INTRODUCTION

This appendix describes the waste streams generated during the S-Site Aggregate Area investigation. All waste generated by this project is being managed in accordance with Standard Operating Procedure (SOP) 5238, Characterization and Management of Environmental Protection Waste, which incorporates the requirements of all applicable U.S. Environmental Protection Agency and New Mexico Environment Department (NMED) regulations, U.S. Department of Energy orders, and Los Alamos National Laboratory (the Laboratory) implementation requirements. In accordance with SOP-5238, a waste characterization strategy form (WCSF) was prepared for this investigation and is included in Attachment G-1 (on CD included with this document).

The waste streams generated during investigation activities at the K-Site, 300s Line, P-Site, and V-Site subaggregates were managed in corresponding less-than-90-day hazardous waste storage areas and two satellite accumulation areas.

The waste streams generated during this project are summarized in Table G-1.0-1 and are described below. The documentation available for waste shipped from the site is included in Attachment G-2 (on CD included with this document).

G-2.0 DRILL CUTTINGS

This waste stream consists of approximately 25 yd^3 of soil and rock cuttings generated from the drilling of boreholes. The drill cuttings were stored in 55-gal. drums and characterized using environmental samples. The results of the sampling are summarized in Table G-2.0-1. If analyses indicated the presence of listed constituents, a due diligence review was performed to identify whether the contaminants were from a known listed source. If no listed source was documented, the waste did not carry the listed hazardous waste number(s).

Documentation of a listed source occurred for seven drums originating from the 300s Line. The constituents included the solvents methylene chloride and 1,1,1-trichloroethane. The observed concentrations were less than Land Disposal Restriction treatment standards, and a “no-longer contained in” request was submitted to NMED. The subsequent approval of the request resulted in the hazardous listing for those constituents being dropped. A copy of the approval letter is included in Attachment G-3 (on CD included with this document).

The drill cuttings, which met the criteria in the ENV-RCRA Quality Procedure 011, Land Application of Drill Cuttings, were land-applied (Attachment G-4, on CD included with this document) in a manner pursuant to the procedure and approved by ENV-RCRA and project management.

G-3.0 CONTACT WASTE

The contact waste stream consists of approximately 2.7 yd^3 of nitrile gloves, paper towels, empty poly bags, glass and plastic sample jars, and disposable sampling supplies that were used during investigation activities.

Contact waste was characterized using acceptable knowledge based on the characterization of contaminants found in the media that the waste came in contact with. Nonhazardous contact waste that met the Laboratory waste acceptance criteria for the Green Is Clean Program was sent to Technical Area 54 (TA-54), where it was verified to be free of radioactive contamination and disposed of

properly. Contact waste not meeting the Green Is Clean criteria was treated or disposed of at an authorized off-site facility.

Table G-1.0-1
Generation and Management of the Investigation-Derived Waste for S-Site Aggregate Area

Waste Stream	Waste Type	Volume or Weight	Storage Method	Final Disposition
300s Line				
Drill cuttings	Land application, nonhazardous, low-level waste	7.6 yd^3	Steel and poly open-head drums	Land application and TA-54 for off-site shipment
Contact waste	Green Is Clean, nonhazardous, low-level waste	Less than 2 yd^3	Steel and poly open-head drums	TA-54 and Green Is Clean (municipal)
V-Site				
Drill cuttings	Land application, nonhazardous, low-level waste	10 yd^3	Steel and poly open-head drums	Land application and TA 54 for off-site shipment
Contact waste	Green Is Clean, nonhazardous, low-level waste	Less than 2 yd^3	Steel and poly open-head drums	TA-54 and Green Is Clean (municipal)
P-Site				
Drill cuttings	Land application, nonhazardous, low-level waste	10 yd^3	Steel and poly open-head drums	Land application and TA-54 for off-site shipment
Contact waste	Green Is Clean, nonhazardous, low-level waste	Less than 2 yd^3	Steel and poly open-head drums	TA-54 and Green Is Clean (municipal)
K-Site				
Drill cuttings	Land application, nonhazardous, low-level waste	Less than 2 yd^3	Steel and poly open-head drums	Land application and TA 54 for off-site shipment
Contact waste	Green Is Clean, nonhazardous, low-level waste	Less than 1 yd^3	Steel and poly open-head drums	TA-54 and Green Is Clean (municipal)
Satellite Accumulation Area				
Contact waste	Green Is Clean, nonhazardous, low-level waste	Less than 1 yd^3	Steel and poly open-head drums	TA-54 and Green Is Clean (municipal)

Table G-2.0-1
Summary of Analytical Data

Area	Number of Samples	Analytical Complete	Inorganic (exceeds SSL[a])	Organic (exceeds SSL)	Radionuclides (above background value)	PCBs[b] (>1 mg/kg)
300s Line	31	31	1 WST16-10-13910	0	7 WST16-10-12212, 13294, 13297, 13911, 15015, 15018, 15021, 15022, 15322, 15324, 15325, 9901, 9902, 9903, 9904, 9905, 9906, 9907, 9908, 9909	1 WST16-10-9907
V-Site	42	42	1 WST16-10-15024	0	7 WST16-10-12233, 12236, 13290, 13908, 13914, 13915, 13916, 13918, 15019, 15024, 15028, 15031, 15033, 15320, 15321, 15327, 15328, 15329	0
P-Site	36	36	0	0	4 WST16-10-12213, 12221, 12222, 12225, 12226, 12227, 12228, 12229, 12230, 13285, 13286, 13287, 13288, 13295, 13296, 13905, 15330, 15331, 9912, 9913, 9914, 9918	0
K-Site	7	7	0	0	5 WST16-10-13299, 13300, 13301, 13302, 13303, 13900, 13901	0
Total	**116**	**116**	**2**	**0**	**23**	**1**

[a] SSL = Soil screening level.

[b] PCB = Polychlorinated biphenyl.

Attachment G-1

Waste Characterization Strategy Form
(on CD included with this document)

Attachment G-2

Los Alamos National Laboratory
Waste Profile System Documentation
(on CD included with this document)

Attachment G-3

"No Longer Contained In" Approval Letter
(on CD included with this document)

Attachment G-4

Land Application Forms
(on CD included with this document)

Appendix H

Risk Assessments

CONTENTS

H-1.0 INTRODUCTION H-1

H-2.0 BACKGROUND H-1
H-2.1 Site Descriptions and Operational History H-1
H-2.1.1 SWMU 16-004(a) H-1
H-2.1.2 SWMU 16-004(e) H-1
H-2.1.3 SWMU 16-026(b) H-1
H-2.1.4 SWMU 16-029(d) H-2
H-2.1.5 SWMU 16-029(g2) H-2
H-2.1.6 SWMU 16-017(p)-99 ..... H-2
H-2.1.7 Courtyard Periphery Area H-2
H-2.2 Investigation Sampling H-3
H-2.3 Determination of COPCs H-3

H-3.0 CONCEPTUAL SITE MODEL H-3
H-3.1 Receptors and Exposure Pathways H-3
H-3.2 Environmental Fate and Transport H-4
H-3.2.1 Inorganic Chemicals H-6
H-3.2.2 Organic Chemicals H-7
H-3.3 Exposure Point Concentration Calculations H-8

H-4.0 HUMAN HEALTH RISK-SCREENING EVALUATIONS H-9
H-4.1 Soil Screening Levels H-9
H-4.2 Results of Human Health Screening Evaluation H-10
H-4.2.1 SWMU 16-004(a) H-10
H-4.2.2 SWMU 16-004(e) H-10
H-4.2.3 SWMU 16-026(b) H-10
H-4.2.4 SWMU 16-029(d) H-10
H-4.2.5 SWMU 16-029(g2) H-11
H-4.2.6 SWMU 16-017(p)-99 ..... H-11
H-4.2.7 Courtyard Periphery Area H-11
H-4.3 Uncertainty Analysis H-11
H-4.3.1 Data Evaluation and COPC Identification Process H-11
H-4.3.2 Exposure Assessment H-12
H-4.3.3 Toxicity Assessment H-12
H-4.3.4 Additive Approach H-13
H-4.4 Interpretation of Human Health Screening Results H-14
H-4.4.1 SWMU 16-004(e) H-14
H-4.4.2 SWMU 16-026(b) H-14
H-4.4.3 SWMU 16-029(d) H-14
H-4.4.4 SWMU 16-029(g2) H-14
H-4.4.5 SWMU 16-017(p)-99 ..... H-14
H-4.4.6 Courtyard Periphery Area H-14

H-5.0 ECOLOGICAL RISK-SCREENING EVALUATIONS H-14
H-5.1 Introduction H-14
H-5.2 Scoping Evaluation H-15
H-5.3 Assessment Endpoints H-15

H-5.4 Screening Evaluation H-16
H-5.4.1 SWMU 16-004(a) H-17
H-5.4.2 SWMU 16-004(e) H-17
H-5.4.3 SWMU 16-026(b) H-17
H-5.4.4 SWMU 16-029(d) H-17
H-5.4.5 SWMU 16-029(g2) H-17
H-5.4.6 SWMU 16-017(p)-99 ..... H-17
H-5.4.7 Courtyard Periphery Area H-18
H-5.5 Uncertainty Analysis H-18
H-5.5.1 Chemical Form H-18
H-5.5.2 Exposure Assumptions H-18
H-5.5.3 Toxicity Values H-19
H-5.5.4 Comparison of EPCs to Background Concentrations H-19
H-5.5.5 Area Use Factors H-20
H-5.5.6 Population Area Use Factors H-20
H-5.5.7 LOAEL Analysis H-20
H-5.5.8 Site Discussions H-21
H-5.5.9 Chemicals without ESLs H-21
H-5.6 Interpretation of Ecological Risk-Screening Results H-23
H-5.6.1 Receptor Lines of Evidence H-23
H-5.6.2 COPECs with No ESLs H-26
H-5.6.3 Summary H-26

H-6.0 CONCLUSIONS H-26
H-6.1 Human Health Risk-Screening Assessments H-26
H-6.2 Ecological Risk H-27

H-7.0 REFERENCES H-27

Figure

Figure H-3.1-1 Conceptual site model for the S-Site Aggregate Area H-31

Tables

Table H-2.3-1 EPCs at SWMU 16-004(e) for the Residential Scenario H-33
Table H-2.3-2 EPCs at SWMU 16-004(e) for Ecological Receptors H-33
Table H-2.3-3 EPCs at SWMU 16-026(b) for the Industrial Scenario H-34
Table H-2.3-4 EPCs at SWMU 16-026(b) for the Residential Scenario H-35
Table H-2.3-5 EPCs at SWMU 16-026(b) for the Ecological Receptors H-37
Table H-2.3-6 EPCs at SWMU 16-029(d) for the Residential Scenario H-39
Table H-2.3-7 EPCs at SWMU 16-029(g2) for the Residential Scenario H-40
Table H-2.3-8 EPCs at SWMU 16-017(p)-99 for the Industrial Scenario H-40
Table H-2.3-9 EPCs at SWMU 16-017(p)-99 for the Residential Scenario H-41
Table H-2.3-10 EPCs at SWMU 16-017(p)-99 for the Ecological Receptors H-41
Table H-2.3-11 EPCs at Courtyard Periphery Area for the Recreational Scenario and Ecological Receptors H-42

Table H-3.2-1 Physical and Chemical Properties of Inorganic COPCs H-44
Table H-3.2-2 Physical and Chemical Properties of Organic COPCs H-45
Table H-4.1-1 Exposure Parameters Used to Calculate Chemical SSLs for the Industrial, Residential, and Recreational Scenarios H-46
Table H-4.2-1 Residential Screening for Carcinogens for SWMU 16-004(e) H-47
Table H-4.2-2 Residential Screening for Noncarcinogens for SWMU 16-004(e) H-47
Table H-4.2-3 Industrial Screening for Carcinogens for SWMU 16-026(b) H-47
Table H-4.2-4 Industrial Screening for Noncarcinogens for SWMU 16-026(b) H-48
Table H-4.2-5 Residential Screening for Carcinogens for SWMU 16-026(b) H-49
Table H-4.2-6 Residential Screening for Noncarcinogens for SWMU 16-026(b) H-50
Table H-4.2-7 Residential Screening for Carcinogens for SWMU 16-029(d) H-51
Table H-4.2-8 Residential Screening for Noncarcinogens for SWMU 16-029(d) H-51
Table H-4.2-9 Residential Screening for Noncarcinogens for SWMU 16-029(g2) H-51
Table H-4.2-10 Industrial Screening for Carcinogens for SWMU 16-017(p)-99 ..... H-52
Table H-4.2-11 Industrial Screening for Noncarcinogens for SWMU 16-017(p)-99 ..... H-52
Table H-4.2-12 Residential Screening for Carcinogens for SWMU 16-017(p)-99 ..... H-52
Table H-4.2-13 Residential Screening for Noncarcinogens for SWMU 16-017(p)-99 ..... H-53
Table H-4.2-14 Recreational Screening for Carcinogens for Courtyard Periphery Area H-53
Table H-4.2-15 Recreational Screening for Noncarcinogens for Courtyard Periphery Area H-54
Table H-5.4-1 Ecological Screening Levels for Terrestrial Receptors H-55
Table H-5.4-2 Minimum ESL Comparison for SWMU 16-004(e) H-57
Table H-5.4-3 Minimum ESL Comparison for SWMU 16-026(b) H-58
Table H-5.4-4 HQ/HI Analysis for SWMU 16-026(b) H-59
Table H-5.4-5 Minimum ESL Comparison for SWMU 16-017(p)-99 ..... H-60
Table H-5.4-6 HQ/HI Analysis for SWMU 16-017(p)-99 ..... H-60
Table H-5.4-7 Minimum ESL Comparison for Courtyard Periphery Area H-61
Table H-5.4-8 HQ/HI Analysis for Courtyard Periphery Area H-62
Table H-5.5-1 Comparison of EPCs to Background Concentrations at SWMU 16-026(b) H-63
Table H-5.5-2 Comparison of EPCs to Background Concentrations at Courtyard Periphery Area H-63
Table H-5.5-3 PAUFs for Ecological Receptors H-64
Table H-5.5-4 Adjusted HIs for SWMU 16-026(b) H-65
Table H-5.5-5 Adjusted HIs for Courtyard Periphery Area H-66
Table H-5.5-6 Summary of LOAEL-Based ESLs for Terrestrial Receptors H-67
Table H-5.5-7 HI Analysis Using LOAEL-Based ESLs for SWMU 16-026(b) H-69
Table H-5.5-8 Adjusted HI Analysis for LOAEL-Based ESLs for tSWMU 16-026(b) H-69
Table H-5.5-9 HI Analysis Using LOAEL-Based ESLs for the Courtyard Periphery Area H-69
Table H-5.5-10 Adjusted HI Analysis for LOAEL-Based ESLs for the Courtyard Periphery Area H-70
Table H-6.1-1 Summary of Human Health Risk Screening Assessments Results H-70

H.

Attachments

Attachment H-1 ProUCL Files

Attachment H-2 Ecological Scoping Checklists

H-1.0 INTRODUCTION

This appendix presents the results of the human health and ecological risk-screening evaluations conducted in support of the environmental characterization of sites within the S-Site Aggregate Area, located in the western portion of Los Alamos National Laboratory (LANL or the Laboratory). The evaluations of potential risk at six sites are based on decision-level data from historical (1995, 1996, and 1998) and 2009–2010 investigations.

H-2.0 BACKGROUND

Brief descriptions of the S-Site Aggregate Area solid waste management units (SWMUs) and areas of concern (AOCs) assessed for potential risk are presented below.

H-2.1 Site Descriptions and Operational History

Technical Area 16 (TA-16) contains many of the Laboratory's high explosives (HE) facilities, a state-of-the-art tritium facility, and several administrative support buildings. HE activities conducted at TA-16 are fabricating and testing HE, plastics, and adhesives and conducting research in process development for manufacturing items that use these and other materials. Tritium activities are performed at TA-16 and are a critical function to the Laboratory's mission. The 78 HE-processing buildings at TA-16 provide 280,000 ft^2 of space. The research, development, and testing operations at these facilities include large-scale HE processing; manufacturing HE powders; casting, machining, and pressing HE components; and inspecting and radiographing HE components. Other operations include test device assembly and chemical analysis of HE. Some of these buildings are used for storing, treating, and disposing of HE (LANL 1993, 020948). In addition, the Cerro Grande fire required activities at TA-41 to be moved to TA-16, including administrative/technical activities, mechanical fabrication, assembly of prototype weapons components, and non-tritium research and development activities.

H-2.1.1 SWMU 16-004(a)

SWMU 16-004(a) is the inactive Imhoff tank (structure 16-530) used for sewage treatment at the TA-16 sanitary wastewater treatment plant (WWTP). Located southeast of the former TA-16-340 Complex and north of the communitor (a cutting device for sewage solids), the Imhoff tank received effluent that flowed over a weir into a dosing siphon. Any sludge that may have collected in the tank was digested before it was discharged to drying beds [SWMUs 16-004(d) and 16-004(f)] (LANL 1993, 020948).

H-2.1.2 SWMU 16-004(e)

SWMU 16-004(e) is an inactive bar screen (structure 16-534) associated with the TA-16 sanitary WWTP. Located southeast of the former TA-16-340 Complex, structure 16-534 was used to filter out large solids but was later replaced with the communitor and removed to the northwest corner of the site (LANL 1993, 020948).

H-2.1.3 SWMU 16-026(b)

SWMU 16-026(b) is an outfall located on the east side of a rest house (building 16-307). The outfall, which discharges to Water Canyon, formerly received discharges from two HE sumps [SWMU 16-029(a)] located near the exterior southeast wall of the rest house. The sumps were plugged in 1990 or 1991.

Used to store molds and materials for plastics development, building 16-307 also previously housed a solvent disassembly tank used to remove HE from test devices (LANL 1989, 068685).

H-2.1.4 SWMU 16-029(d)

SWMU 16-029(d) consists of two inactive HE sumps located on the exterior west wall of a mock-HE-processing operations building (building 16-301). The sumps formerly discharged to an outfall [SWMU 16-026(e)] located to the south of building 16-301. The sumps were plugged in 1990 (LANL 1993, 020948).

H-2.1.5 SWMU 16-029(g2)

SWMU 16-029(g2) was a concrete pit (structure 16-523) located east and toward the front of the doors to building 16-517 (LANL 1999, 063973, p. 32). Built in 1944 and originally used to house a shaker table for vibration tests of the Fat Man device, tests were controlled remotely from a bunker west of V-Site because of HE components in the device. By 1945, structure 16-523 was abandoned in place, filled with dirt and covered with a concrete slab (AOC C-16-074), which was later used for drum storage.

H-2.1.6 SWMU 16-017(p)-99

SWMU 16-017(p)-99 is an area of potential soil contamination associated with a former storage magazine (structure 16-061). Located approximately 600 ft south of the V-Site courtyard and building 16-515, the magazine measured 20 $\times$ 60 ft and was of wood-frame construction surrounded by an earthen berm on three sides. The magazine was removed during 1995 D&D activities (LANL 1994, 039440, p. 6-32). The site is relatively flat and drainage flows east to southeast toward Pressing Road.

H-2.1.7 Courtyard Periphery Area

The Courtyard Periphery Area consists of soil contamination from

- former buildings 16-519 and 16-520, which were used for varnishing and assembling Fat Man mockups [SWMUs 16-017(r)-99 and 16-017(s)-99];
- the historical High Bay (building 16-516) originally used to fit test the Trinity Device, pioneer work in plastic explosives, and store equipment [SWMU 16-017(t)-99];
- former building 16-517, which was constructed in 1944 and originally used as a laboratory [SWMU 16-017(q)-99];
- a 75-ft^2 waste storage area paved with asphalt and located in the courtyard surrounded by buildings 16-516, 16-517, 16-518, and former buildings 16-519 and 16-520, which contained used solvents, possible hydraulic fluid, and barium nitrate as well as empty cans, boxes, and drums containing radioactive material [SWMU 16-013];
- a former deep steam-heating distribution pump pit (structure 16-526) located against the berm retaining wall of former building 16-517 [SWMU 16-006(h)]; and
- the grassy drainage area north of SWMU 16-013 and west of K-Site Road.

Because of historical preservation restrictions during sampling, the SWMUs that make up the V-Site Courtyard Periphery Area could not be adequately sampled to characterize the nature and extent of contamination. Sampling results for the area are included to evaluate the potential for off-site migration of contamination from historical operations within the V-Site Courtyard. Potential exposure to visitors who

tour V-Site within the fenced-in area was evaluated under the recreational scenario, and potential risk was also evaluated for ecological receptors. The risk-screening assessments conducted for the V-Site Courtyard Periphery Area are for information purposes only and are not meant to indicate the final disposition of the SWMUs that make up this area.

H-2.2 Investigation Sampling

The final data sets used to identify chemicals of potential concern (COPCs) and evaluate potential risks to human health and the environment for the S-Site Aggregate Area sites consist of all validated data compiled from both historical sampling activities and the 2009–2010 investigations. Only data determined to be decision-level following the data-quality assessment (Appendix F) are included in the final data sets evaluated in this appendix.

H-2.3 Determination of COPCs

Section 5 of the investigation report summarizes the COPC selection process. Only COPCs detected above background (inorganic chemicals and radionuclides), had detection limits greater than background values (BVs) (inorganic chemicals), and were detected (organic chemicals, inorganic chemicals with no BVs, and radionuclides) were retained. The industrial and recreational scenarios utilize data from samples collected from 0.0–1.0 ft below ground surface (bgs). The ecological risk screening utilizes data from samples collected from 0.0–5.0 ft bgs. The residential scenario utilizes data from samples collected from 0.0–10.0 ft bgs. However, sampling depths often overlapped because of multiple investigations; therefore, all samples with a starting depth less than the lower bound of the interval for each scenario were included in the risk-screening assessments for a given scenario.

Tables H-2.3-1 to H-2.3-11 summarize the COPCs evaluated for potential risk for each site in the S-Site Aggregate Area where the extent of contamination is defined. Some of the COPCs identified by the data review may not be evaluated for potential risk under one or more scenarios because they were not COPCs within the specified depth intervals associated with a given scenario.

H-3.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is developed to identify likely source areas and mechanisms of transport as well as the exposure pathways, exposure assumptions, and potential receptors. The CSM also addresses the fate and transport of COPCs at the site. The primary mechanisms of release related to historical contaminant sources are described in detail in the historical investigation report (LANL 2007, 097685) and summarized in section 2.0 of the approved investigation work plan (LANL 2008, 103404; NMED 2008, 100115).

H-3.1 Receptors and Exposure Pathways

The current and reasonably foreseeable future land use for the SWMUs and AOCs in the S-Site Aggregate Area is industrial. Therefore, the receptor reasonably expected to be present at these sites is a Laboratory worker. The primary exposure pathways for human receptors are surface soil and subsurface soil/tuff, which may be brought to the surface through intrusive activities. Downward migration in the vadose zone is limited by the depth to groundwater (approximately 1300 ft bgs), dry conditions at the site, as well as the lack of a source for continued release of contamination. Human receptors may be exposed through direct contact with soil or suspended particulates by ingestion, inhalation, and dermal pathways. Direct-contact exposure pathways from subsurface contamination to human receptors are complete for a

hypothetical resident and are the same as those for surface soil. Sources, exposure pathways, and receptors are shown in the CSM (Figure H-3.1-1).

The sites within the S-Site Aggregate Area are on the mesa top. The sites provide potential habitat for ecological receptors, except where sites are covered with asphalt or structures. For unpaved sites or areas of sites, exposure pathways to ecological receptors are complete. Exposure is assessed at each site to a depth of 0.0–5.0 ft. Weathering of tuff is the only viable natural process that may result in the exposure of receptors to COPCs in tuff. However, because of the slow rate of weathering, exposure to COPCs in tuff is negligible, although it is included in the assessments. Exposure pathways to subsurface contamination below 5.0 ft are not complete unless contaminated soil or tuff were excavated and brought to the surface. The potential pathways are root uptake by plants, dust inhalation, dermal contact, incidental soil ingestion, and food web transport. Pathways from subsurface releases may be complete for plants. Surface water was not evaluated because of the lack of surface water features. Sources, exposure pathways, and ecological receptors are presented in the CSM (Figure H-3.1-1).

The Courtyard Periphery Area within V-Site is of historical importance, and the reasonably foreseeable future land use for the area is recreational because the likely receptor expected to be present are short-term visitors to the site and tour guides. The area that comprises the SWMUs could not be sampled adequately to characterize the nature and extent of contamination. The Courtyard Periphery Area was evaluated for potential exposure to future visitors of the historical area as well as ecological receptors in the vicinity of the courtyard.

H-3.2 Environmental Fate and Transport

The evaluation of environmental fate addresses the chemical processes affecting the persistence of a chemical in the environment; the evaluation of transport addresses the physical processes affecting mobility of a contaminant along a migration pathway. Migration through soil and tuff depends on properties such as soil pH, rate of precipitation or snowmelt, soil-moisture content, soil/tuff hydraulic properties, and COPC properties. Migration into and through tuff also depends on the unsaturated flow properties of the tuff and the presence of joints and fractures.

The most important factor with respect to the potential for COPCs to migrate to groundwater is the presence of saturated conditions. Downward migration in the vadose zone is also limited by a lack of hydrostatic pressure as well as the lack of a source for the continued release of contamination. Without sufficient moisture and a source, little or no migration of materials through the vadose zone to groundwater occurs.

Contamination at depth is addressed in the discussion of extent for each site (sections 6 through 10 of the investigation report). The limited extent of contamination is related to the absence of the key factors that facilitate migration, as mentioned above. The potential for contaminant migration to groundwater is very low, given how long the contamination has been present in the subsurface, the physical and chemicals properties of the COPCs, and the lack of saturated conditions.

The New Mexico Environment Department (NMED) guidance (NMED 2009, 108070) contains screening levels that consider the potential for contaminants in soil to result in groundwater contamination. These screening levels consider equilibrium partitioning of contaminants among solid, aqueous, and vapor phases and account for dilution and attenuation in groundwater using dilution attenuation factors (DAFs). These DAF soil screening levels (SSLs) can be used to identify chemical concentrations in soil that have the potential to contaminate groundwater (EPA 1996, 059902). However, screening contaminant concentrations in soil against the DAF SSLs does not provide an indication of the potential for contaminants to migrate to groundwater. The assumptions used in the development of these DAF SSLs

include an assumption of uniform contaminant concentrations from the contaminant source to the water table (i.e., it is assumed that migration to groundwater has already occurred). Furthermore, this assumption is inappropriate for cases such as the S-Site Aggregate Area, where sampling has shown that contamination is vertically bounded near the surface and the distance from the surface to the water table is large. For these reasons, screening of contaminant concentrations in soil against the DAF SSLs was not performed.

An indication of the potential for future contaminant migration to groundwater is the current vertical distribution of contaminants in the subsurface. Most releases within the S-Site Aggregate Area are historical (i.e., they occurred decades ago). The regional aquifer beneath the aggregate area is approximately 1300 ft bgs. Therefore, for migration of contaminants to occur from shallow soil to the regional aquifer in a meaningful time frame (e.g., 100–1000 yr), significant vertical migration should have occurred already. Sampling has shown that this migration has not occurred, indicating a very low potential for future contaminant migration to groundwater.

The best indication of the potential for surface water transport of contaminants carried by stormwater is the current distribution of contaminants within the Martin Spring Canyon and Fishladder Canyon drainages. Sections 10.2.4 and 10.3.4 of the investigation report describe the pattern of distribution of contaminants within the Martin Spring Canyon and Fishladder Canyon drainages, respectively. The distribution of COPCs indicated that contamination is migrating into the Martin Spring Canyon and Fishladder Canyon drainages in the proximity of the subaggregate sites but are not migrating very far down the main channel or off-site.

The relevant release and transport processes of the COPCs are a function of chemical-specific properties, which include the relationship between the physical form of the COPC and the nature of the transport processes in the environment. Specific properties include the degree of saturation, the potential for ion exchange or sorption and the potential for natural bioremediation. The physical and chemical properties of inorganic and organic COPCs S-Site Aggregate Area are presented in Tables H-3.2-1 and H-3.2-2, respectively.

The primary release and transport mechanisms that may lead to the potential exposure of receptors in the S-Site Aggregate Area include

- dissolution and/or particulate transport of surface contaminants from precipitation and runoff,
- airborne transport of contaminated surface soil or particulates,
- continued dissolution and advective/dispersive transport of chemical contaminants contained in subsurface soil and bedrock,
- biotic perturbation and/or translocation of contaminants in subsurface contaminated media, and
- uptake of contaminants from soil and water by biota.

Contaminant distributions at the sites indicate that after the initial deposition from operational activities and historical remediation efforts, elevated levels of COPCs tend to remain concentrated near the original release points. The primary potential release and transport mechanisms identified for the S-Site Aggregate Area include direct discharge; precipitation, sorption, and mechanical transport; dissolution and advective transport in water; and volatilization, diffusion, and dispersion. Less significant transport mechanisms include wind entrainment and, given the asphalt pavement covering most sites, dispersal of surface soil and uptake of contaminants from soil and water by biota.

Gas or vapor-phase contaminants such as volatile organic compounds (VOCs) are likely to volatilize to the atmosphere from near-surface soil and sediment and/or migrate by diffusion through air-filled pores in the vadose zone. Migration of vapor-phase contaminants from tuff into ambient air may occur by diffusion or advection driven by barometric pressure changes.

H-3.2.1 Inorganic Chemicals

In general, and particularly in a semiarid climate such as that found at the sites within the S-Site Aggregate Area, inorganic chemicals are not highly soluble or mobile in the environment. The primary physical and chemical factors that determine and describe the distribution of inorganic COPCs within the soil and tuff at S-Site Aggregate Area are the water solubility and the soil-water partition coefficient (K_d) of the inorganic chemicals. Other factors besides the K_d values such as pH, speciation in soil and oxidation/reduction potential (Eh) also play significant roles in the likelihood that inorganic chemicals will migrate. The interaction of these factors is complex, but the K_d values provide a general assessment of the potential for migration through the subsurface; chemicals with higher K_d values are less likely to be mobile than those with lower K_d values. Inorganic chemicals with K_d values greater than 40 are very unlikely to migrate through soil toward the water table (Kincaid et al. 1998, 093270). Table H-3.2-1 presents the K_d values for the inorganic COPCs identified at the S-Site Aggregate Area sites. Based on this criterion, aluminum, antimony, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, thallium, vanadium, and zinc have a low potential to mobilize and migrate through soil and the vadose zone. The K_d values for arsenic, copper, cyanide, iron, selenium and silver are less than 40 and may indicate these inorganic chemicals have a greater potential to mobilize and migrate through soil and the vadose zone.

COPCs with K_d values less than 40 are discussed below. Information about the fate and transport properties of inorganic chemicals was obtained from individual chemical profiles published by the Agency for Toxic Substances and Disease Registry (ATSDR 1997, 056531). Information for these inorganic chemicals is also available from the agency's website at http://www.atsdr.cdc.gov/toxprofiles/index.asp.

- Arsenic may undergo a variety of reactions, including oxidation-reduction reactions, ligand exchange, precipitation, and biotransformation. Arsenic forms insoluble complexes with iron, aluminum, and magnesium oxides found in soil, and in this form, arsenic is relatively immobile. However, under low pH and reducing conditions, arsenic can become soluble and may potentially leach into groundwater or result in runoff of arsenic into surface waters. Arsenic is expected to have low mobility under the environmental conditions (neutral to slightly alkaline soil pH and oxidizing near-surface conditions) present at the S-Site Aggregate Area.
- Copper movement in soil is determined by physical and chemical interactions with the soil components. Most copper deposited in soil is strongly adsorbed and remains in the upper few centimeters. Copper will adsorb to organic matter, carbonate minerals, clay minerals, hydrous iron, and manganese oxides. In most temperate soil, pH, organic matter, and ionic strength of the soil solutions are the key factors affecting adsorption. Soil in the area is neutral to slightly alkaline, so the leaching of copper is not a concern at this site. Copper is expected to be bound to the soil and to move in the system by way of transport of soil particles by water as opposed to move as dissolved species.
- Cyanide tends to adsorb onto various natural media, including clay and sediment; however, sorption is insignificant relative to the potential for cyanide to volatilize and/or biodegrade. At soil surfaces, volatilization of hydrogen cyanide is a significant mechanism for cyanide loss. Cyanide at low concentrations in subsurface soil is likely to biodegrade under both aerobic and anaerobic conditions. Cyanide is present at low levels and is not expected to be mobile.

- Iron is naturally occurring in soil and tuff and may be relatively mobile under reducing conditions. Iron is sensitive to soil pH conditions, occurring in two oxidation states, iron(III), the insoluble oxidized form, and iron(II), the reduced soluble form. Most iron in well-drained neutral to alkaline soil is present as precipitates of iron(III) hydroxides and oxides. With time, these precipitates are mineralized and form various iron minerals such as lepidcrocite, hematite, and goethite. Iron is not expected to be mobile in the neutral to slightly alkaline, well-drained soil at the S-Site Aggregate Area.
- Selenium is not often found in the environment in its elemental form but is usually combined with sulfide minerals or with silver, copper, lead, and nickel minerals. In soil, pH and Eh are determining factors in the transport and partitioning of selenium. In soil with a pH of greater than 7.5, selenates, which have high solubility and a low tendency to adsorb onto soil particles, are the major selenium species and are very mobile. The soil pH at the sites within the S-Site Aggregate Area is neutral to slightly alkaline, which indicates that selenium is not likely to migrate in this soil.
- Silver sorbs onto soil and sediment and tends to form complexes with inorganic chemicals and humic substances in soil. Organic matter complexes with silver and reduces its mobility. Silver compounds tend to leach from well-drained soil so it can potentially migrate into the subsurface. Site conditions are neutral to slightly alkaline, and silver is not expected to be mobile.

H-3.2.2 Organic Chemicals

Table H-3.2-2 presents the physical and chemical properties (organic carbon-water partition coefficient [K_{oc}], logarithm to the base 10 octanol/water partition coefficient [log K_{ow}], and solubility) of the organic COPCs identified for the S-Site Aggregate Area. Physical and chemical properties of organic chemicals are important when evaluating their fate and transport. The following physiochemical property information illustrates some aspects of the fate and transport of COPCs at the S-Site Aggregate Area. The information is summarized from Ney (1995, 058210).

Water solubility may be the most important chemical characteristic used to assess mobility of organic chemicals. The higher the water solubility of a chemical, the more likely it is to be mobile and the less likely it is to accumulate, bioaccumulate, volatilize, or persist in the environment. A highly soluble chemical (water solubility greater than 1000 mg/L) is prone to biodegradation and metabolism that may detoxify the parent chemical. Acetone, 4-amino-2,6,dinitrotoluene, 2-amino-4,6-dinitrotoluene, benzoic acid, 1,1-dichloroethene, methylene chloride, HMX (1,3,5,7-tetranitro-1,3,5,7-tetrazocine), tetrachloroethene, and toluene have water solubilities greater than 1000 mg/L.

The lower the water solubility of a chemical, especially below 10 mg/L, the more likely it will be immobilized by adsorption. Chemicals with lower water solubilities are more likely to accumulate or bioaccumulate and persist in the environment, are slightly prone to biodegradation, and are metabolized in plants and animals. The COPCs identified as having water solubilities less than 10 mg/L are acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butyl phthalate, 2,4-dinitrotoluene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, 4-nitroaniline, pentachlorophenol, phenanthrene, pyrene, and 2,4,6-trinitrotoluene.

Vapor pressure is a chemical characteristic used to evaluate the tendency of organic chemicals to volatize. Chemicals with vapor pressure greater than 0.01 millimeters of mercury (mm Hg) are likely to volatilize. Therefore, concentrations at the site are reduced over time; vapors of these chemicals are

more likely to travel toward the atmosphere and not migrate toward groundwater. Acetone, 1,1-dichloroethene, isopropyltoluene(4-), methylene chloride, naphthalene, 2-methylnaphthalene, tetrachlroethene, and toluene have vapor pressures greater than 0.01 mm Hg.

Chemicals with vapor pressures less than 0.000001 mm Hg are less likely to volatilize and, therefore, tend to remain immobile. Benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, dibenzofuran, HMX, indeno(1,2,3-cd)pyrene, and RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), have vapor pressures less than 0.01 mm Hg.

The K_{ow} is an indicator of a chemical's potential to bioaccumulate or bioconcentrate in the fatty tissues of living organisms. The unitless K_{ow} value is an indicator of water solubility, mobility, sorption, and bioaccumulation. The higher the K_{ow} is above 1000, the greater the affinity the chemical has for bioaccumulation in the food chain, the greater its potential for sorption in the soil, and the lower its mobility (Ney 1995, 058210). The COPCs with a K_{ow} greater than 1000 include acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butyl phthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, 2-methylnaphthalene, 4-nitroaniline, phenanthrene, and pyrene. A K_{ow} of less than 500 indicates high water solubility, high mobility, little to no affinity for bioaccumulation, and degradability by microbes, plants, and animals. Acetone, 4-amino-2,6,dinitrotoluene, 2-amino-4,6-dinitrotoluene, benzoic acid, 1,1-dichloroethene, 2,4-dinitrotoluene, HMX, RDX, and 2,4,6-trinitrotoluene have a K_{ow} less than 500.

The K_{oc} measures the tendency of a chemical to adsorb to organic carbon in soil. K_{oc} values above 500 L/kg indicate a strong tendency to adsorb to soil, leading to low mobility (NMED 2006, 092513). Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butyl phthalate, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, 4-nitroaniline, phenanthrene, pyrene, and 2,4,6-trinitrotoluene have K_{oc} values above 500 L/kg, indicating a very low potential to migrate toward groundwater. The COPCs with K_{oc} values less than 500 L/kg are acetone, 4-amino-2,6,dinitrotoluene, 2-amino-4,6-dinitrotoluene, benzoic acid, 1,1-dichloroethene, 2,4-dinitrotoluene, methylene chloride, 4-nitroaniline, RDX, tetrachloroethene, and toluene.

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butyl phthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene are the least mobile and the most likely to bioaccumulate. Acetone, 4-amino-2,6,dinitrotoluene, 2-amino-4,6-dinitrotoluene, benzoic acid, 1,1-dichloroethene, methylene chloride, tetrachloroethene, and toluene are more soluble and volatile and are more likely to travel toward the atmosphere and not migrate toward groundwater. Because the organic COPCs were detected at low concentrations and extent is defined, they are not likely to migrate to groundwater.

H-3.3 Exposure Point Concentration Calculations

The upper confidence limit (UCL) of the arithmetic mean is used to represent the exposure point concentration (EPC) of a COPC (EPA 1989, 008021). If an appropriate UCL of the mean cannot be calculated or if the UCL exceeded the maximum concentration, the maximum detected concentration of the COPC was used as the EPC. The summary statistics, including the EPC for each COPC for the

human health and the ecological risk-screening assessments, are presented in Tables H-2.3-1 to H-2.3-11.

Calculation of the UCL of the mean concentration was done using the U.S. Environmental Protection Agency (EPA) ProUCL 4.00.05 software (EPA 2010, 109944), which is based on EPA guidance (EPA 2002, 085640). The ProUCL program calculates 95%, 97.5%, and 99% UCLs and recommends a distribution and UCL. The UCL for the recommended calculation method was used as the EPC. The ProUCL software performs distributional tests on the data set for each COPC and calculates the most appropriate UCL based on the distribution of the data set. Environmental data may have a normal, lognormal, or gamma distribution but are often nonparametric (no definable shape to the distribution). ProUCL tests data against an expanded range of distribution types, contains a larger suite of statistical tests, and can perform analyses on data sets with nondetected values. Calculating statistics on fewer than six detected results in a large data set may result in unreliable statistical estimates (EPA 2010, 109944). Therefore, the maximum detected concentration is used to represent the EPC for COPCs when there were too few detects to calculate a UCL or when the UCL is greater than the maximum detected concentration. ProUCL input and output data are provided in Attachment H-1.

H-4.0 HUMAN HEALTH RISK-SCREENING EVALUATIONS

The screening assessment process involves comparing site data to risk-based concentrations to determine if a potential unacceptable risk to human health exists at the site. The risk-based concentrations for chemicals used in this comparison are referred to as SSLs. The SSL represents the concentration of a chemical associated with either a total lifetime excess cancer risk of 1 in 100,000 (10^{-5}) for carcinogens or a hazard quotient (HQ) of 1.0 for noncarcinogens.

Human health risk-screening assessments were conducted for each site within the S-Site Aggregate Area where the nature and extent of contamination are defined. All sites, except the V-Site Courtyard Periphery Area, were screened using the residential scenario with data from 0.0–10.0 ft bgs. Sites were screened for the industrial scenario (0.0–1.0 ft bgs), when applicable, because these sites lie within the current operational area of TA-16. The Courtyard Periphery Area was assessed using the recreational scenario (0.0–1.0 ft bgs) only.

H-4.1 Soil Screening Levels

Human health risk-screening assessments were conducted using SSLs for the industrial and residential scenarios obtained from NMED guidance (NMED 2009, 108070). The NMED SSLs are based on a target HQ of 1.0 and a target cancer risk of 1×10^{-5} (NMED 2009, 108070). If SSLs were not available from NMED guidance, the EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) were used. The EPA regional screening levels for carcinogens were multiplied by 10 to adjust from a 10^{-6} cancer risk level to the NMED target cancer risk level of 10^{-5}. Recreational SSLs were obtained from Laboratory guidance (LANL 2007, 094496) and are based on the same target risk levels as the NMED SSLs. Surrogate chemicals were also used for some COPCs without an SSL based on structural similarity or because the COPC is a breakdown product (NMED 2003, 081172). Exposure parameters used to calculate the industrial, recreational, and residential SSLs are presented in Table H-4.1-1.

H-4.2 Results of Human Health Screening Evaluation

The EPC of each COPC was compared with the SSLs for the residential and industrial scenario for SWMUs 16-026(b) and 16-017(p)-99. The EPC of each COPC was compared with only the SSLs for the residential scenario for SWMUs 16-004(e), 16-029(d), and 16-029(g2). The industrial scenario was not evaluated for these SWMUs because no samples were collected from 0.0–1.0 ft bgs. The EPC of each COPC was compared with the SSLs for the recreational scenario for the Courtyard Periphery Area.

For carcinogenic chemicals, the EPCs were divided by the NMED, adjusted EPA, or Laboratory SSL and multiplied by 1×10^{-5}. The sum of the cancer risks was compared with the NMED target cancer risk level of 1×10^{-5}. For noncarcinogenic chemicals, an HQ was generated for each COPC by dividing the EPC by the NMED, EPA, or Laboratory SSL. The HQs were summed to generate a hazard index (HI). The HI was compared with the NMED target HI of 1.0. The results of the human health risk-screening evaluations for the S-Site Aggregate Area sites are presented in Tables H-4.2-1 through H-4.2-15.

H-4.2.1 SWMU 16-004(a)

The samples at SWMU 16-004(a) were collected from 20 ft bgs or deeper. Therefore, no complete exposure pathways to human receptors exist at this site, and a human health risk-screening assessment was not conducted.

H-4.2.2 SWMU 16-004(e)

The samples at SWMU 16-004(e) were collected from depths greater than 1 ft bgs; therefore, no complete exposure pathways exist for the industrial scenario. The total excess cancer risk for the residential scenario is 5×10^{-8} (Table H-4.2-1), which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI for the residential scenario is 0.00002 (Table H-4.2-2), which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.2.3 SWMU 16-026(b)

The total excess cancer risk for the industrial scenario is 2×10^{-5} (Table H-4.2-3), which is slightly above the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). Benzo(a)pyrene contributes 1.1×10^{-5} to the total risk. The HI for the industrial scenario is 0.03 (Table H-4.2-4), which is below the NMED target HI of 1.0 (NMED 2009, 108070).

The total excess cancer risk for the residential scenario is 4×10^{-5} (Table H-4.2-5), which is above the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). Benzo(a)pyrene contributes 2.98×10^{-5} to the total risk. The HI for the residential scenario is 0.4 (Table H-4.2-6), which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.2.4 SWMU 16-029(d)

The samples at SWMU 16-029(d) were collected from depths greater than 1 ft bgs; therefore, no complete exposure pathways for the industrial scenario. The total excess cancer risk for the residential scenario is 4×10^{-6} (Table H-4.2-7), which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI for the residential scenario is 0.004 (Table H-4.2-8), which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.2.5 SWMU 16-029(g2)

The samples at SWMU 16-029(g2) were collected from depths greater than 1 ft bgs; therefore, no complete exposure pathways exist for the industrial scenario. No carcinogenic COPCs were detected at SWMU 16-029(g2); therefore, no excess cancer risk exists for the residential scenario. The HI for the residential scenario is 0.01 (Table H-4.2-9), which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.2.6 SWMU 16-017(p)-99

The total excess cancer risk for the industrial scenario is 1×10^{-7} (Table H-4.2-10), which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI for the industrial scenario is 0.00002 (Table H-4.2-11), which is below the NMED target HI of 1.0 (NMED 2009, 108070).

The total excess cancer risk for the residential scenario is 4×10^{-7} (Table H-4.2-12), which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI for the residential scenario is 0.006 (Table H-4.2-13), which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.2.7 Courtyard Periphery Area

Calcium was retained as a COPC because it was detected above background in tuff; however, it does not have a published toxicity value. Calcium is among those elements identified in section 5.9.4 of EPA's Risk Assessment Guidance for Superfund (EPA 1989, 008021) as an essential macronutrient, which can be eliminated as a COPC on the basis of best professional judgment. As an essential nutrient, calcium may be compared with the recommended daily allowance (RDA) for adults and children. The RDA is 1200 mg/d of calcium for an adult, and 800 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at the Courtyard Periphery Area (6890 mg/kg) at the EPA default soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 0.98 mg calcium per day. At the intake level of 0.98 mg/d, the adult's ingestion of calcium is far less than the RDA for calcium of 1200 mg/d. If all of the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at the Courtyard Periphery Area at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 1.1 mg calcium per day. At the intake level of 1.1 mg/d, the child's ingestion of calcium is far less than the RDA for calcium of 800 mg/d. Therefore, no adverse health effects are expected from calcium at 6890 mg/kg, and calcium is eliminated as a COPC.

The total excess cancer risk for the recreational scenario at the Courtyard Periphery Area is 1×10^{-6} (Table H-4.2-14), which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI for the recreational scenario is 0.2 (Table H-4.2-15), which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.3 Uncertainty Analysis

H-4.3.1 Data Evaluation and COPC Identification Process

A primary uncertainty associated with the COPC identification process is the possibility that a chemical may be inappropriately identified as a COPC when it is actually not a COPC or that a chemical may not be identified as a COPC when it actually should be identified as a COPC. Inorganic chemicals are appropriately identified as COPCs because only the chemicals detected or that have detection limits above background are retained for further analysis. No established BVs for organic chemicals, and all

detected organic chemicals are identified as COPCs and are retained for further analysis. Other uncertainties may include errors in sampling, laboratory analysis, and data analysis. However, because concentrations used in the risk-screening evaluations include those detected below the estimated quantitation limits and nondetects above BVs, data evaluation uncertainties are expected to have little effect on the risk-screening results.

H-4.3.2 Exposure Assessment

A worker may be subject to exposures in a different manner than the exposure assumptions used to derive the industrial SSLs. The assumptions for the SSLs are that the potentially exposed individual is outside on-site for a full workday, for 225 d/yr, and 25 yr (NMED 2009, 108070). For the sites evaluated, workers are not on-site for that frequency and duration. As a result, the industrial scenario evaluated at these sites overestimates the exposure and risk/dose. The residential scenario is based on exposure of 24 h/d, 350 d/yr, and 30 yr (NMED 2009, 108070). This scenario overestimates the potential exposure and risk. The recreational scenario assumes 1 h/event, 200 events per year, for 30 yr and overestimates the exposure for a visitor to the Courtyard Periphery Area. In addition, the child extended backyard exposure assumed for this scenario is not likely because of the current and reasonably foreseeable future land use and the access restrictions in place at TA-16.

A number of assumptions are made relative to exposure pathways, including input parameters, the completeness of a given pathway, the contaminated media to which an individual may be exposed and the intake rates for different routes of exposure. In the absence of site-specific data, the exposure assumptions used were consistent with default values (NMED 2009, 108070). When several upper-bound values (NMED 2009, 108070) are combined to estimate exposure for any one pathway, the resulting risk can exceed the 99th percentile and, therefore, can exceed the range of risk that may be reasonably expected. In addition, the assumption that residual concentrations of chemicals in the tuff are available and result in exposure in the same manner as if they were in soil overestimates the potential exposure and risk to receptors.

Uncertainty is introduced in the concentration aggregation of data for estimating the EPCs at a site. The use of a UCL is intended to provide a protective, upper-bound estimate of the COPC concentration and is assumed to be representative of the average exposure across the site over time. The use of the maximum detected concentration for the EPC overestimates the exposure to contamination, because receptors are not consistently exposed to the maximum detected concentration across the site. Maximum detected concentrations were used as the EPCs for the industrial scenario for most COPCs. In addition, many of the organic COPCs were detected only once, and use of the maximum detected concentration as the EPC substantially overestimates the exposure at the site.

Acetone, 4-isopropyltoluene, and tetrachloroethene were the only VOCs detected in soil and tuff at the SWMUs where extent was defined. Each VOC was detected in one sample at a concentration below the estimated quantitation limits. Acetone, 1,1-dichloroethene, 4-isopropyltoluene, methylene chloride, and toluene were detected at the Courtyard Periphery Area in the surface and subsurface in three to seven samples at parts per billion levels. The data indicate no source terms for VOCs are present at the sites evaluated in this appendix, and the vapor intrusion pathway is incomplete.

H-4.3.3 Toxicity Assessment

The primary uncertainty associated with the screening values is related to the derivation of toxicity values used in their calculation. Toxicity values (slope factors [SFs] and reference doses RfDs]) were used to derive the risk-based screening values used in the screening evaluation (NMED 2009, 108070).

Uncertainties were identified in five areas with respect to the toxicity values: (1) extrapolation from other animals to humans, (2) interindividual variability in the human population, (3) the derivation of RfDs and SFs, (4) the chemical form of the COPC, and (5) the use of surrogate chemicals.

H-4.3.3.1 Extrapolation from Animals to Humans

The SFs and RfDs are often determined by extrapolation from animal data to humans. This method may result in uncertainties in toxicity values, because differences exist between animals and humans in chemical absorption, metabolism, excretion and toxic responses. Differences in body weight, surface area and pharmacokinetic relationships between animals and humans are taken into account to address these uncertainties in the dose-response relationship. However, conservatism is usually incorporated in each of these steps, resulting in the overestimation of potential risk.

H-4.3.3.2 Individual Variability in the Human Population

For noncancer effects, the degree of variability in human physical characteristics is important both in determining the risks that can be expected at low exposures and in defining the no observed adverse effect level (NOAEL). The NOAEL approach incorporates a 10-fold factor to reflect individual variability within the human population that can contribute to uncertainty in the risk assessment. These uncertainty factors are generally applied to reflect limitations of the data used; this factor of 10 is generally considered to result in a conservative estimate of risk from exposure to COPCs.

H-4.3.3.3 Derivation of RfDs and SFs

The SFs and RfDs are often determined by extrapolation from animal data to humans. This method may result in uncertainties in toxicity values because differences exist between other animals and humans in chemical absorption, metabolism, excretion, and toxic response. Differences in body weight, surface area, and pharmacokinetic relationships between animals and humans are taken into account to address these uncertainties in the dose-response relationship. However, conservatism is usually incorporated into each of these steps, resulting in the overestimation of potential risk.

H-4.3.3.4 Chemical Form of the COPC

COPCs may be bound to the environmental matrix and not available for absorption into the human body. However, the exposure scenarios default to the assumption that the COPCs are bioavailable. This assumption can lead to an overestimation of the total risk.

H-4.3.3.5 Use of Surrogate Chemicals

The use of surrogates for chemicals that do not have EPA-approved or provisional toxicity values also contributes to uncertainty in the risk assessment. Surrogates were used to provide SSLs for benzo(g,h,i)perylene and 4-isopropyltoluene based on structural similarity. The overall impact of surrogates on the risk assessment is minimal because these COPCs were generally detected at low concentrations (less than 1 mg/kg).

H-4.3.4 Additive Approach

For noncarcinogens, the effects of exposure to multiple chemicals are generally unknown, and possible interactions could be synergistic or antagonistic, resulting in either an overestimation or underestimation

of the potential risk. Additionally, RfDs used in the risk calculations typically are not based on the same endpoints with respect to severity, effects, or target organs. Therefore, the potential for noncarcinogenic effects may be overestimated for individual COPCs that act by different mechanisms or by different modes of action but are addressed additively.

H-4.4 Interpretation of Human Health Screening Results

H-4.4.1 SWMU 16-004(e)

The total excess cancer risk for the residential scenario is 5×10^{-8},which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.00002, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.4.2 SWMU 16-026(b)

The total excess cancer risks for the industrial and residential scenarios are 2×10^{-5} and 4×10^{-5}, respectively, which are above the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HIs are 0.03 and 0.4, respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.4.3 SWMU 16-029(d)

The total excess cancer risk for the residential scenarios is 4×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.004, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.4.4 SWMU 16-029(g2)

No carcinogenic COPCs were identified at SWMU 16-029(g2); therefore, no excess cancer risk exists for the residential scenario. The HI for the residential scenario is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.4.5 SWMU 16-017(p)-99

The total excess cancer risks for the industrial and residential scenarios are 1×10^{-7} and 4×10^{-7}, respectively, which are below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HIs are 0.00002 and 0.006, respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

H-4.4.6 Courtyard Periphery Area

The total excess cancer risk for the recreational scenario is 1×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

H-5.0 ECOLOGICAL RISK-SCREENING EVALUATIONS

H-5.1 Introduction

The approach for conducting ecological assessments is described in the “Screening Level Ecological Risk Assessment Methods, Revision 2” (LANL 2004, 087630). The assessment consists of the following four

parts: (1) a scoping evaluation, (2) a screening evaluation, (3) an uncertainty analysis, and (4) an interpretation of the results.

H-5.2 Scoping Evaluation

The scoping evaluation establishes the breadth and focus of the screening evaluation. The ecological scoping checklist (Attachment H-2) is a useful tool for organizing existing ecological information. The information was used to determine whether ecological receptors might be affected, identify the types of receptors that might be present, and develop the ecological CSM for the S-Site Aggregate Area sites (Figure H-3.1-1). The sites evaluated in this appendix were visited and ecological scoping checklists were prepared.

The sites in the S-Site Aggregate Area lie on the mesa top. The ecological setting varies somewhat between sites but is generally a vegetated field with scattered shrubs and/or ponderosa pines. The ephemeral surface water channels (the Extended Drainages) run near many of the sites but carry water only after intense summer storms and snowmelt. A paved road traverses the center of the canyon bottom; the road connects the various firing sites and operations areas. Because of their rural nature, the sites provide habitat for a large number of species, particularly birds. Larger mammals, such as bobcats, coyotes, elk, and deer, also visit the canyon. Much of the area is open vegetated ground or exposed soil or sediment (in the channel); therefore, direct exposure pathways from soil to receptors and indirect pathways through uptake into plants and animals are present at the S-Site Aggregate Area sites.

The potential risk was evaluated in the screening assessments for the following ecological receptors representing several trophic levels:

- plants
- soil-dwelling invertebrates (represented by the earthworm)
- deer mouse (mammalian omnivore)
- montane shrew (mammalian insectivore)
- desert cottontail (mammalian herbivore)
- red fox (mammalian carnivore)
- American robin (avian insectivore, avian omnivore, and avian herbivore)
- American kestrel (avian intermediate carnivore)
- American kestrel (avian carnivore), surrogate for threatened and endangered (T&E) species (primarily the Mexican spotted owl).

The rationale for these receptors is presented in “Screening Level Ecological Risk Assessment Methods, Revision 2” (LANL 2004, 087630). The Mexican spotted owl is the only T&E species known to frequent the area. The owl may use the S-Site Aggregate Area for foraging.

H-5.3 Assessment Endpoints

An assessment endpoint is an explicit expression of the environmental value to be protected. The endpoints are ecologically relevant and help sustain the natural structure, function, and biodiversity of an ecosystem or its components (EPA 1998, 062809). In a screening-level ecological evaluation, receptors represent the populations and/or communities, and assessment endpoints are any adverse effects on the chosen ecological receptors. The purpose of the ecological evaluation is to protect populations and

communities of biota rather than individual organisms, except for listed or candidate T&E species and treaty-protected species, when individuals must be protected (EPA 1999, 070086). Populations of protected species tend to be small, and the loss of an individual adversely affects the species as a whole (EPA 1997, 059370).

In accordance with this guidance, the Laboratory has developed generic assessment endpoints (LANL 1999, 064137) to ensure that values at all levels of ecological organization are considered in the ecological screening process. These general assessment endpoints can be measured using impacts on reproduction, growth, and survival to represent categories of effects that may adversely impact populations. In addition, specific receptor species were chosen to represent each functional group. The receptor species were chosen because of their presence at the site, their sensitivity to the COPCs, and their potential for exposure to those COPCs. These categories of effects and the chosen receptor species were used to select the types of effects seen in toxicity studies considered in the development of the toxicity reference values (TRVs). Toxicity studies used in the development of TRVs included only studies in which the adverse effect evaluated affected reproduction, survival, and/or growth.

The selection of receptors and assessment endpoints is designed to be protective of both the representative species used as screening receptors and the other species within their feeding guilds and the overall food web for the terrestrial and aquatic ecosystems. Focusing the assessment endpoints on the general characteristics of species that affect populations (rather than the biochemical and behavioral changes that may affect only the studied species) also ensures the applicability to the ecosystem of concern.

H-5.4 Screening Evaluation

Chemicals of potential ecological concern (COPECs) are identified based on the comparison of EPCs (UCLs or maximum detected concentrations) to ecological screening levels (ESLs) in accordance with Laboratory guidance (LANL 2004, 087630). Ecological risk-screening assessments were conducted for SWMUs 16-004(e), 16-026(b), and 16-017(p)-99 and the Courtyard Periphery Area but were not conducted for SWMUs 16-004(a), 16-029(d), and 16-029(g2) because samples were collected from below 5.0 ft bgs, and no complete pathways exist for exposure to receptors. The EPCs used in the ecological risk-screening assessments are presented in Tables H-2.3-2, H-2.3-5, H-2.3-10, and H-2.3-11. Input and output data files for the ProUCL calculations are provided in Attachment H-1. ESLs were obtained from the ECORISK Database, Version 2.4 (LANL 2009, 107524) and are presented in Table H-5.4-1. The ESLs are based on similar species and are derived from experimentally determined NOAELs, lowest observed adverse effect levels (LOAELs) or doses determined lethal to 50% of the test population. Information relevant to the calculation of ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and TRVs, is presented in the ECORISK Database, Version 2.4 (LANL 2009, 107524).

The HQ calculated for each COPEC and screening receptor is the ratio of the EPC to the ESL for each ecological receptor. The higher the contaminant levels relative to the ESLs, the higher the potential risk to receptors; conversely, the higher the ESLs relative to the contaminant levels, the lower the potential risk to receptors. The analysis begins with a comparison of the minimum ESL for each COPC with the EPC. HQs greater than 0.3 are used to identify COPECs (LANL 2004, 087630). Individual HQs for a receptor are summed to derive an HI; an HI greater than 1.0 is an indication that further assessment may be needed to ensure exposure to multiple COPECs at a site will not lead to potential adverse impacts to a given receptor population. COPCs without ESLs are retained as COPECs and evaluated further in the uncertainty analysis. HQ and HI analysis is a conservative approach towards indicating potential adverse effects and is designed to minimize the potential of overlooking possible COPECs at the site.

H-5.4.1 SWMU 16-004(a)

The samples at SWMU 16-004(a) were collected from depths greater than 20.0 ft bgs. Therefore, no complete exposure pathways to receptors are present at this site, and an ecological risk-screening assessment was not conducted.

H-5.4.2 SWMU 16-004(e)

The results of the minimum ESL comparisons are presented in Table H-5.4-2. Because no HQs were greater than 0.3, no COPCs were retained as COPECs at SWMU 16-004(e).

H-5.4.3 SWMU 16-026(b)

The results of the minimum ESL comparisons are presented in Table H-5.4-3. Antimony, 4-amino-2,6-dinitrotoluene, barium, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, chrysene, cyanide, di-n-butylphthalate, fluoranthene, HMX, phenanthrene, and pyrene were retained as COPECs because the HQs were greater than 0.3.

Nitroaniline(4-) does not have ESLs, is retained as a COPEC, and is discussed in the uncertainty section.

The HQs and HIs for each COPEC and receptor combination are presented in Table H-5.4-4. The HI analysis indicates all receptors, except the red fox, have HIs greater than 1.0. The COPECs and receptors are discussed in the uncertainty section.

H-5.4.4 SWMU 16-029(d)

The samples at SWMU 16-029(d) were collected from depths of 5.5 ft bgs or deeper. Therefore, no complete exposure pathways to receptors are present at this site, and an ecological risk-screening assessment was not conducted.

H-5.4.5 SWMU 16-029(g2)

SWMU 16-029(g2) is a concrete pit located in the subsurface. Because samples were collected from depths of 5.0 ft bgs and greater below the pit, no complete exposure pathways to ecological receptors exist. Therefore, an ecological risk-screening assessment was not conducted.

H-5.4.6 SWMU 16-017(p)-99

The results of the minimum ESL comparisons are presented in Table H-5.4-5. Acenaphthene was retained as a COPEC because the HQ was greater than 0.3.

Isopropyltoluene(4-) does not have ESLs, is retained as a COPEC, and is discussed in the uncertainty section.

The HQ and HI for each COPEC and receptor combination are presented in Table H-5.4-6. The HI analysis indicates the HIs were less than or equivalent to 1.0 for all receptors. Therefore, no COPECs were retained at SWMU 16-017(p)-99.

H-5.4.7 Courtyard Periphery Area

The results of the minimum ESL comparisons are presented in Table H-5.4-7. Antimony, arsenic, barium, copper, cyanide, lead, selenium, silver, thallium, zinc, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, pentachlorophenol, and RDX were retained as COPECs because the HQs were greater than 0.3.

Calcium, iron, perchlorate, and isopropyltoluene(4-) do not have ESLs, are retained as COPECs, and are discussed in the uncertainty section.

Potential ecological risks associated with aluminum are based on soil pH. Aluminum is retained only in soil with a pH lower than 5.5 in accordance with EPA guidance (EPA 2003, 085645). Aluminum was eliminated as a COPEC and was not evaluated further because the soil pH for the S-Site Aggregate Area is neutral to slightly alkaline.

The HQs and HIs for each COPEC and receptor combination are presented in Table H-5.4-8. The HI analysis indicates that all receptors, except the red fox, have HIs greater than 1.0. The COPECs and receptors are discussed in the uncertainty section.

H-5.5 Uncertainty Analysis

H-5.5.1 Chemical Form

The assumptions used in the ESL derivations are conservative and not necessarily representative of actual conditions. These assumptions include maximum chemical bioavailability, maximum receptor ingestion rates, minimum bodyweight, and additive effects of multiple COPECs. These factors tend to result in conservative ESL estimates, which may lead to an overestimation of the potential risk. The assumption of additive effects for multiple COPECs may result in an overestimation or underestimation of the potential risk to receptors.

The chemical form of the individual COPCs was not determined as part of the investigation. Toxicological data are typically based on the most toxic and bioavailable chemical species, which are not typically found in the environment. Inorganic, organic, and radionuclide COPECs are generally not 100% bioavailable to receptors in the natural environment because of interference from other natural processes, such as the adsorption of chemical constituents to matrix surfaces (e.g., soil), rapid oxidation, or reduction changes that render harmful chemical forms unavailable to biotic processes. The ESLs were calculated to ensure a conservative indication of potential risk (LANL 2004, 087630), and the values are biased toward overestimating the potential risk to receptors.

H-5.5.2 Exposure Assumptions

The EPCs used in the calculations of HQs are UCLs or the maximum detected concentration to a depth of 5 ft bgs. The sampling efforts focused on areas of known contamination, and receptors were assumed to ingest 100% of their food and spend 100% of their time at the site. At SWMUs 16-004(a), 16-029(d), and SWMU 16-029(g2), samples were collected only at depths below 5.0 ft bgs. In addition, the area surrounding SWMU 16-029(g2) is covered with concrete and asphalt. These sites are inaccessible to ecological receptors, and no complete exposure pathways to ecological receptors exist. Therefore, there is no exposure to COPECs at these sites, and ecological risk was not evaluated at these SWMUs. The assumptions regarding the exposure for terrestrial receptors in the S-Site Aggregate Area are likely to result in an overestimation of potential ecological exposure and risk.

H-5.5.3 Toxicity Values

The HQs were calculated using ESLs, which are based on NOAELs as threshold effect levels; actual risk for a given COPEC/receptor combination occurs at a higher level, possibly somewhere between the NOAEL-based threshold and the threshold based on the LOAEL. The use of NOAELs leads to an overestimation of potential risk to ecological receptors. ESLs are based on laboratory studies requiring extrapolation to wildlife receptors. Laboratory studies are typically based on "artificial" and maintained populations with genetically similar individuals and are limited to single chemical exposures in isolated and controlled conditions using a single-exposure pathway. Wild species are concomitantly exposed to a variety of chemical and environmental stressors, potentially rendering them more susceptible to chemical stress. On the other hand, wild populations are likely more genetically diverse than laboratory populations, making wild populations, as a whole, less sensitive to chemical exposure than laboratory populations. The uncertainties associated with the ESLs tend to lead to an overestimation of potential risk.

H-5.5.4 Comparison of EPCs to Background Concentrations

Although concentrations of inorganic COPECs were detected above background, the UCLs for some inorganic COPECs may be similar to the range of background concentrations indicating no potential risk from exposure across the site. This relationship is presented in Tables H-5.5-1 and H-5.5-2. The UCL is intended to represent the average concentration of a COPEC and the reasonable maximum exposure (RME) over time for a receptor at a site. The RME is the maximum exposure that is reasonably expected to occur at a site and represents the average concentration that is contacted over the exposure period. Although this concentration does not reflect the maximum concentration that could be contacted at any one time, it is regarded as a reasonable estimate of the concentration that could be contacted over time. This is because an assumption of long-term contact with the maximum concentration is generally not reasonable. If the EPC is similar to the range of background concentrations for an inorganic chemical, the receptor is exposed to an average concentration comparable to naturally occurring levels across the site. Whether some concentrations are elevated and reflect site releases is incorporated into the UCL calculations. If the EPC is similar to the range of background concentrations, the RME across the site is indistinguishable from background. For example, if the chromium EPC is 15 mg/kg and the ranges of background concentrations are 1.9 mg/kg to 36.5 mg/kg for soil and 0.25 mg/kg to 13 mg/kg for Qbt 2, 3, and 4, the EPC is not an accurate reflection of potential toxicity. It is also an indication that site concentrations are not substantially different from the reported background concentrations. As a result, a conclusion that inorganic COPECs with EPCs similar to the range of background concentrations are contributing risk overestimates the potential risk and does not reflect actual exposure and risk.

H-5.5.4.1 SWMU 16-004(e)

No inorganic COPCs were identified as COPECs.

H-5.5.4.2 SWMU 16-026(b)

The EPC for cyanide is similar to the background concentration for soil and tuff, indicating exposure of receptors to this inorganic chemical is similar to background (Table H-5.5-1). In addition, cyanide was not detected above background at this SWMU. Antimony and barium are retained as COPECs for further evaluation.

H-5.5.4.3 SWMU 16-017(p)-99

No inorganic COPCs were identified as COPECs at this site.

H-5.5.4.4 Courtyard Periphery Area

The EPCs for arsenic, barium, calcium, cyanide, iron, selenium, and thallium are similar to the range of background concentrations for soil and tuff, indicating exposure of receptors to these inorganic chemicals is similar to background (Table H-5.5-2). Antimony, copper, lead, silver, and zinc are retained as COPECs for further evaluation.

H-5.5.5 Area Use Factors

In addition to the direct comparison of the EPC with the ESLs, area use factors (AUF) are used to account for the amount of time a receptor is likely to spend within the contaminated areas based on the size of the receptor's home range (HR). The AUF for individual organisms is calculated by dividing the size of the site by the HR for that receptor. Because T&E species must be assessed on an individual basis (EPA 1999, 070086), the AUF is used for the Mexican spotted owl. The kestrel (top carnivore) is used as the surrogate receptor for the Mexican spotted owl.

The HR for the Mexican spotted owl is 366 ha, and the site areas are presented in Table H-5.5-3. The AUFs for the Mexican spotted owl range from 0.000037 to 0.001. Application of the AUF for the Mexican spotted owl to the HQs for the kestrel (top carnivore) results in a maximum adjusted HI of 0.0008 (Tables H-5.5-4 and H-5.5-5). Therefore, no potential ecological risks to the Mexican spotted owl exist.

H-5.5.6 Population Area Use Factors

EPA guidance is to manage the ecological risk to populations rather than to individuals, with the exception of T&E species (EPA 1999, 070086). One approach to address the potential effects on populations is to estimate the spatial extent of the area inhabited by the local population that overlaps with the contaminated area. The population area for a receptor is based on the individual receptor HR and its dispersal distance (Bowman et al. 2002, 073475). Bowman et al. (2002, 073475) estimate the median dispersal distance for mammals is 7 times the linear dimension of the HR, which is equivalent to the square root of the HR area. If only the dispersal distances for the mammals with HRs within the range of the screening receptors are used, the median dispersal distance becomes 3.6 times the square root of the HR ($R^2 = 0.91$) (Bowman et al. 2002, 073475). If it is assumed the receptors can disperse the same distance in any direction, the population area is circular and the dispersal distance is the radius of the circle. Therefore, the population area can be derived by $\pi(3.6\sqrt{HR})^2$ or approximately 40 HR.

Population area use factors (PAUFs) are estimated by dividing the area investigated by the population area of each receptor population. The HQs are recalculated minus the COPECs eliminated based on similarity to background and adjusted by multiplying by the PAUF. If the PAUF is greater than 1, the HQ is not adjusted. The HQs for the plant and earthworm are not adjusted by PAUF because these receptors do not have HRs. The adjusted HQs are summed for each receptor to calculate the adjusted HI. The PAUFs are presented in Table H-5.5-3.

H-5.5.7 LOAEL Analysis

Two sites have adjusted HIs greater than 1.0 for one or more receptors. To address these HIs and to reduce the associated uncertainty, a LOAEL analysis was conducted using ESLs calculated based on a

LOAEL rather than a NOAEL. The LOAEL-based ESLs were calculated based on toxicity information in the ECORISK Database, Version 2.4 and are presented in Table H-5.5-6, along with the basis for each LOAEL used in the ESL calculations. The analysis addresses some of the uncertainties and conservativeness of the ESLs used in the initial screening assessments. The HI analyses were conducted using the LOAEL-based ESLs. The HQs and HIs calculated for this subset of receptors and COPECs were also adjusted using the PAUFs (Table H-5.5-3), if the wildlife receptors HIs exceeded 1.0 using the LOAEL-based ESLs.

H-5.5.8 Site Discussions

H-5.5.8.1 SWMU 16-026(b)

The area of SWMU 16-026(b) is approximately 0.026 ha. The adjusted HIs (Table H-5.5-4) are less than 1.0 for the ecological receptors, except for the deer mouse, earthworm, and plant.

The LOAEL analysis results in an HI of approximately 1 for the earthworm and approximately 14 for the plant (Table H-5.5-7). The elevated HI for plant is primarily from antimony (HQ=11), which is based on an elevated detection limit of 5.6(U) mg/kg. Antimony was not detected above BV in any samples at this SWMU at lower detection limits so the maximum detection limit substantially overestimates the potential risk to the plant. In addition, field observations made during the site visit found no indication of adverse effects on the plant community and minimal vegetation in the disturbed areas (Attachment H-2). Because the plant community does not appear to be affected by COPECs, the earthworm population is also probably not affected. Therefore, the HIs for the earthworm and plant do not indicate potential risk.

The adjusted LOAEL HI for the deer mouse is less than 1 (Table H-5.5-8). Antimony and HMX are not retained as COPECs for the deer mouse. Therefore, the HI does not indicate potential risk to the deer mouse.

H-5.5.8.2 Courtyard Periphery Area

The Courtyard Periphery Area is approximately 0.37 ha. The adjusted HIs (Table H-5.5-5) are less than 1.0 for the ecological receptors, except for the American robin (insectivore and omnivore), earthworm, and plant.

The LOAEL analysis results in HIs approximately 1.0 for the earthworm and approximately 4 for the plant (Table H-5.5-9). The elevated HI for plant is primarily from antimony (HQ=3), which is based on an elevated detection limit of 1.66(U) mg/kg. Antimony was not detected above BV in any samples at this site at lower detection limits so the maximum detection limit substantially overestimates the potential risk to the plant. In addition, field observations made during the site visit found no indication of adverse effects on the plant community and minimal vegetation in the disturbed areas (Attachment H-2). Because the plant community does not appear to be affected by COPECs, the earthworm population is also probably not affected. Therefore, the HIs do not indicate potential risk to these receptors.

The adjusted LOAEL HIs for the American robin (insectivore and omnivore) are less than 1 (Table H-5.5-10). D-n-butyl phthalate and silver are not retained as COPECs for the American robin. Therefore, the HIs do not indicate potential risk to these receptors.

H-5.5.9 Chemicals without ESLs

Several COPECs do not have ESLs for any receptor in the ECORISK Database Version 2.4 (LANL 2009, 107524) because literature searches for relevant toxicity data for these chemicals have not been

completed. In an effort to address this uncertainty and to provide a quantitative assessment of potential ecological risk, several online toxicity databases have been searched to determine if any relevant toxicity information is available. Searched were conducted in the following online databases: EPA Ecotox Database, EPA Office of Pesticide Programs Aquatic Life Benchmarks, U.S. Army Corps of Engineers/EPA Environmental Residue-Effects, California Cal/Ecotox Database, Pesticide Action Network Pesticide Database, U.S. Army Wildlife Toxicity Assessment Program, U.S. Department of Agriculture Integrated Pesticide Management Database, American Bird Conservancy Pesticide Toxicity Database, and Oak Ridge National Laboratory Risk Assessment Information System. This online database search found no toxicity data for the COPECs. Although the COPECs listed did not have any relevant toxicity data in the online databases listed above, a search of the literature continues in an effort to determine if any relevant toxicity information exists.

In the absence of a chemical-specific ESL, COPEC concentrations can be compared to ESLs for a surrogate chemical. Comparison to surrogate ESLs provides an estimate of potential effects of a chemically related compound and a line of evidence to indicate the likelihood that ecological receptors are potentially impacted.

Some COPECs without ESLs do not have chemical-specific toxicity data or surrogate chemicals to be used in the screening assessments and cannot be assessed quantitatively for potential ecological risk. These COPECs are often infrequently detected across the site. In these cases, comparisons to residential human health SSLs are presented as part of a qualitative assessment. The comparison of COPEC concentrations to residential human health SSLs is a viable alternative for several reasons. Animal studies are used to infer effects on humans and is the basic premise of modern toxicology (EPA 1989, 008021). In addition, toxicity values derived for the calculation of human health SSLs are often based on potential effects that are more sensitive than the ones used to derive ESLs (e.g., cellular effects for humans versus survival or reproductive effects for terrestrial animals). The EPA also applies uncertainty factors or modifying factors to ensure that the toxicity values are protective (i.e., they are adjusted by uncertainty factors to values much lower than the study results). COPEC concentrations compared with these values are below the SSLs by an order of magnitude or more, which corresponds to uncertainty factors of 10 or more. Therefore, it is assumed the differences in toxicity would not be more than an order of magnitude for any given chemical. The relative difference between values provides a weight of evidence that the potential toxicity of the COPC is likely to be low or very low to the receptor(s). The COPECs without ESLs were common to many of the sites and are discussed below for each site.

SWMU 16-026(b)

Nitroaniline(4-) was detected in one sample at a concentration of 0.68 mg/kg. The EPA regional residential SSL for 4-nitroaniline is 240 mg/kg, which indicates the potential toxicity is low. Because of the infrequent detection and the potentially low toxicity, 4-nitroaniline is not retained as a COPEC.

SWMU 16-017(p)-99

Isopropyltoluene(4-) was detected in one sample at a maximum detected concentration of 0.036 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen 4-isopropyltoluene and resulted in a maximum HQ of 0.002. Because the HQ is less than 0.3, 4-isopropyltoluene is not retained as a COPEC.

Courtyard Periphery Area

Calcium was detected above the soil BV (6120 mg/kg) and above the Qbt 2, 3, and 4 BVs (2200 mg/kg) in one sample each, with a maximum detected concentration of 6890 mg/kg. The soil concentrations were similar to background. The EPC (2585 mg/kg) is similar to the range of background concentrations (Table H-5.5-2). Because of the infrequent detection above background and the similarity of the EPC to background concentrations, calcium is not retained as a COPEC.

Iron was detected above the soil BV (21500 mg/kg) in two samples, with a maximum detected concentration of 43,000 mg/kg. The EPC (15,512 mg/kg) is similar to the range of background concentrations (Table H-5.5-2). The NMED residential SSL for iron is 54,800 mg/kg, indicating the potential toxicity is low. Because of the infrequent detection above background, the similarity of the EPC to background concentrations, and the potentially low toxicity, iron is not retained as a COPEC.

Isopropyltoluene(4-) was detected in three samples from 0.0–5.0 ft bgs, with a maximum detected concentration of 0.0165 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen 4-isopropyltoluene and resulted in a maximum HQ of 0.0007. Because the HQ is less than 0.3, 4-isopropyltoluene is not retained as a COPEC.

Perchlorate was detected in two samples from 0.0–5.0 ft bgs, with a maximum detected concentration of 0.000866 mg/kg. The NMED residential SSL for perchlorate is 54.8 mg/kg, indicating the potential toxicity is low. Because of the infrequent detection and potentially low toxicity, perchlorate is not retained as a COPEC.

H-5.6 Interpretation of Ecological Risk-Screening Results

H-5.6.1 Receptor Lines of Evidence

Based on the ecological risk-screening assessments, several COPECs were identified at SWMUs 16-004(e), 16-026(b), and 16-017(p)-99 and the Courtyard Periphery Area. Receptors were evaluated using several lines of evidence: minimum ESL comparisons, HI analyses, comparison to background concentrations, potential effects to populations (individuals for T&E species), and LOAEL analyses.

H-5.6.1.1 American Kestrel (Avian Intermediate Carnivore)

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- The HI was less than 1.0 for the kestrel (intermediate carnivore) at SWMU 16-017(p)-99.
- Several COPECs were eliminated because their EPCs were similar to the range of background concentrations.
- HIs were adjusted by the PAUF. The adjusted HIs were less than 1.0 for the kestrel (intermediate carnivore) at all sites.

These lines of evidence support the conclusion that no potential ecological risk to the kestrel (intermediate carnivore) exists at the S-Site Aggregate Area sites.

H-5.6.1.2 Kestrel (Top Carnivore and Surrogate for the Mexican Spotted Owl)

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- The HI was less than 1.0 for the kestrel (top carnivore) at SWMU 16-017(p)-99.
- Several COPECs were eliminated because their EPCs were similar to the range of background concentrations.
- The HIs were adjusted by the PAUF for the kestrel (top carnivore) and the AUF for the Mexican spotted owl. The adjusted HIs were less than 1.0 for all sites.

These lines of evidence support the conclusion that no potential ecological risks to the kestrel (top carnivore) and the Mexican spotted owl exist at the S-Site Aggregate Area sites.

H-5.6.1.3 Robin (All Feeding Guilds)

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- The HIs were less than 1.0 for the robin (all feeding guilds) at SWMU 16-017(p)-99.
- Several COPECs were eliminated because their EPCs were similar to the range of background concentrations.
- HIs were adjusted by the PAUF. The adjusted HIs were less than 1.0 for the robin at SWMU 16-026(b) but not at the Courtyard Periphery Area.
- A LOAEL analysis was conducted for the Courtyard Periphery Area and the adjusted HIs for the robin were less than 1.

These lines of evidence support the conclusion that no potential ecological risk to the robin exists at the S-Site Aggregate Area sites.

H-5.6.1.4 Deer Mouse

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to the range of background concentrations.
- The HI was less than 1.0 for the deer mouse at SWMU 16-017(p)-99.
- The HIs were adjusted by the PAUF. The adjusted HIs were less than 1.0 for the deer mouse at the Courtyard Periphery Area but greater than 1.0 at SWMU 16-026(b).
- A LOAEL analysis was conducted for SWMU 16-026(b), and the adjusted HI for the deer mouse was less than 1.

These lines of evidence support the conclusion that no potential ecological risk to the deer mouse exists at the S-Site Aggregate Area sites.

H-5.6.1.5 Desert Cottontail

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- The HI was less than 1.0 for the cottontail at SWMU 16-017(p)-99.
- Several COPECs were eliminated because their EPCs were similar to the range of background concentrations.
- The HIs were adjusted by the PAUF. The adjusted HIs were less than or equivalent to 1.0 for the cottontail.

These lines of evidence support the conclusion that no potential ecological risk to the desert cottontail exists at the S-Site Aggregate Area sites.

H-5.6.1.6 Earthworm

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to the range of background concentrations.
- A LOAEL analysis was conducted at SWMU 16-026(b) and the Courtyard Periphery Area, which resulted in HIs less than or equivalent to 1.
- Because the plant community does not appear to be affected by the COPECs, the earthworm population is also likely not affected.

These lines of evidence support the conclusion that no potential ecological risk to the earthworm exists at the S-Site Aggregate Area sites.

H-5.6.1.7 Plant

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to the range of background concentrations.
- The HI was equivalent to 1.0 for the plant at SWMU 16-017(p)-99.
- A LOAEL analysis was conducted at SWMU 16-026(b) and the Courtyard Periphery Area. The HIs for the plant were greater than 1 at both sites, primarily because of antimony, which was not detected above background in any sample but had elevated detection limits above background. The antimony HQs for the plant are substantially overestimated by the screening assessment.
- No evidence of adverse impacts of contamination to the plant communities based on field observations was found during site visits; the plant community was typical of the surrounding area and appeared healthy.

These lines of evidence support the conclusion that no potential ecological risk to the plant exists at the S-Site Aggregate Area sites.

H-5.6.1.8 Montane Shrew

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to the range of background concentrations.
- The HI was less than 1.0 for the shrew at SWMU 16-017(p)-99.
- The HIs were adjusted by the PAUF. The adjusted HI was less than 1.0 for the montane shrew.

These lines of evidence support the conclusion that no potential ecological risk to the montane shrew exists at the S-Site Aggregate Area sites.

H-5.6.1.9 Red Fox

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs were less than 0.3.
- The HIs were less than 1.0 for the red fox at all sites.

These lines of evidence support the conclusion that no potential ecological risk to the red fox exists at the S-Site Aggregate Area sites.

H-5.6.2 COPECs with No ESLs

COPECs with no ESLs were not evaluated for each receptor. If a surrogate chemical could be identified, the minimum ESL was used to screen the COPEC. If a surrogate ESL was not available and a residential SSL was available, the residential SSL was used to estimate potential toxicity. In addition, the frequency of detection, the similarity of the EPC to background concentrations, and the concentrations detected were also evaluated. All COPECs without ESLs were eliminated based on these comparisons. The analysis of COPECs with no ESLs supports the conclusion that no potential ecological risk to receptors exists at the S-Site Aggregate Area.

H-5.6.3 Summary

Based on evaluations of the minimum ESLs, HI analyses, comparisons to background, potential effects to populations (individuals for T&E species), and LOAEL analyses, no potential ecological risk to the earthworm, plant, American robin, American kestrel, deer mouse, montane shrew, desert cottontail, red fox, and Mexican spotted owl exists at the sites evaluated within the S-Site Aggregate Area.

H-6.0 CONCLUSIONS

H-6.1 Human Health Risk-Screening Assessments

The human health risk-screening assessments indicated no potential unacceptable risks from COPCs at three of the four SWMUs evaluated and at the Courtyard Periphery Area. Because the samples at SWMUs 16-004(e), 16-029(d), and 16-029(g2) were collected from depths greater than 1.0 ft bgs, no complete exposure pathways exist for the industrial scenario. At SWMU 16-004(a), samples were collected from depths greater than 20 ft bgs, and no complete exposure pathways exist for the industrial and residential scenarios. SWMU 16-071(p)-99 did not pose a potential unacceptable risk under the

industrial scenario. SWMUs 16-004(e), 16-029(d), 16-029(g2), and 16-071(p)-99 did not pose a potential unacceptable risk under the residential scenario. In addition, the Courtyard Periphery Area did not pose a potential unacceptable risk under the recreational scenario. However, SWMU 16-026(b) had total excess cancer risks above the NMED target level for the industrial and residential scenarios at 2×10^{-5} and 4×10^{-5}, respectively. The elevated cancer risks are primarily from benzo(a)pyrene at one location. Table 6.1-1 summarizes the human health risk-screening assessment results for each site evaluated.

H-6.2 Ecological Risk

No potential ecological risk was found for any receptor following evaluations based on minimum ESLs, HI analyses, comparisons to background, potential effects to populations (individuals for T&E species), and LOAEL analyses. These lines of evidence, discussed for each receptor, support the conclusion that no potential ecological risk exists at the S-Site Aggregate Area sites evaluated during the 2009–1010 investigation.

H-7.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the New Mexico Environment Department Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

ATSDR (Agency for Toxic Substances and Disease Registry), 1997. ATSDR's Toxicology Profiles on CD-ROM. (ATSDR 1997, 056531)

Bowman, J., J.A.G. Jaeger, and L. Fahrig, 2002. "Dispersal Distance of Mammals is Proportional to Home Range Size," *Ecology,* Vol. 83, No. 7, pp. 2049-2055. (Bowman et al. 2002, 073475)

Calabrese, E.J., and L.A. Baldwin, 1993. "Uncertainty Factors for Ecological Risk Assessment," Chapter 4 from *Performing Ecological Risk Assessments*, Lewis Publishers, Boca Raton, Florida. (Calabrese and Baldwin 1993, 110405)

Dourson, M.L., and J.F. Stara, 1983. "Regulatory History and Experimental Support of Uncertainty (Safety) Factors," *Regulatory Toxicology and Pharmacology,* Vol. 3, pp. 224–238. (Dourson and Stara 1983, 073474)

EPA (U.S. Environmental Protection Agency), December 1989. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A), Interim Final," EPA/540/1-89/002, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1989, 008021)

EPA (U.S. Environmental Protection Agency), December 1993. "Wildlife Exposure Factors Handbook," Vol. I of II, EPA/600/R-93/187a, Office of Research and Development, Washington, D.C. (EPA 1993, 059384)

EPA (U.S. Environmental Protection Agency), May 1996. "Soil Screening Guidance: Technical Background Document," EPA/540/R-95/128, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 1996, 059902)

EPA (U.S. Environmental Protection Agency), June 5, 1997. "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final," Office of Emergency and Remedial Response, Washington, D.C. (EPA 1997, 059370)

EPA (U.S. Environmental Protection Agency), April 1998. "Guidelines for Ecological Risk Assessment," EPA/630/R-95/002F, Risk Assessment Forum, Washington, D.C. (EPA 1998, 062809)

EPA (U.S. Environmental Protection Agency), October 7, 1999. "Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites," OSWER Directive No. 9285.7-28 P, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 1999, 070086)

EPA (U.S. Environmental Protection Agency), December 2002. "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites," OSWER Directive No. 9285.6-10, Office of Emergency and Remedial Response, Washington, D.C. (EPA 2002, 085640)

EPA (U.S. Environmental Protection Agency), November 2003. "Ecological Soil Screening Level for Aluminum, Interim Final," OSWER Directive No. 9285.7-60, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 2003, 085645)

EPA (U.S. Environmental Protection Agency), May 2010. "ProUCL Version 4.00.05 User Guide (Draft)," EPA/600/R-07/038, Office of Research and Development, Washington, D.C. (EPA 2010, 109944)

Kincaid, C.T., M.P. Bergeron, C.R. Cole, M.D. Freshley, N. Hassig, V.G. Johnson, D.I. Kaplan, R.J. Serne, G.P. Steile, D.L. Strenge, P.D. Thorne, L.W. Vail, G.A. Whyatt, and S.K. Wurstner, March 1998. "Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site," Pacific Northwest Laboratory report PNNL-11800, Richland, Washington. (Kincaid et al. 1998, 093270)

LANL (Los Alamos National Laboratory), August 1989. "Release Site Database, Task 13, TA-11, 13, 16, 24, and 25," Preliminary Draft, Vol. I and II, prepared by Roy F. Weston, Inc., for Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1989, 068685)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1082," Los Alamos National Laboratory document LA-UR-93-1196, Los Alamos, New Mexico. (LANL 1993, 020948)

LANL (Los Alamos National Laboratory), July 1994. "RFI Work Plan for Operable Unit 1082, Addendum I," Los Alamos National Laboratory document LA-UR-94-1580, Los Alamos, New Mexico. (LANL 1994, 039440)

LANL (Los Alamos National Laboratory), June 1999. "General Assessment Endpoints for Ecological Risk Assessment at Los Alamos National Laboratory," report prepared for Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1999, 064137)

LANL (Los Alamos National Laboratory), July 1999. "Voluntary Corrective Measures Completion Report for Potential Release Sites 16-006(g), Drum Storage Area Aggregate–[16-029(g2) and C-16-074], 16-005(d), 16-034(p)," Los Alamos National Laboratory document LA-UR-99-3001, Los Alamos, New Mexico. (LANL 1999, 063973)

LANL (Los Alamos National Laboratory), December 2004. "Screening-Level Ecological Risk Assessment Methods, Revision 2," Los Alamos National Laboratory document LA-UR-04-8246, Los Alamos, New Mexico. (LANL 2004, 087630)

LANL (Los Alamos National Laboratory), January 2007. "Technical Approach for Calculating Recreational Soil Screening Levels for Chemicals," Los Alamos National Laboratory document LA-UR-06-8828, Los Alamos, New Mexico. (LANL 2007, 094496)

LANL (Los Alamos National Laboratory), September 2007. "Historical Investigation Report for S-Site Aggregate Area," Los Alamos National Laboratory document LA-UR-07-5620, Los Alamos, New Mexico. (LANL 2007, 097685)

LANL (Los Alamos National Laboratory), July 2008. "Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-4798, Los Alamos, New Mexico. (LANL 2008, 103404)

LANL (Los Alamos National Laboratory), December 2009. "Ecorisk Database (Release 2.4)," on CD, LA-UR-09-7834, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2009, 107524)

LANL (Los Alamos National Laboratory), February 2010. "Technical Approach for Calculating Recreational Soil Screening Levels for Chemicals, Revision 1," Los Alamos National Laboratory document LA-UR-09-07510, Los Alamos, New Mexico. (LANL 2010, 108613)

National Research Council, 1989. Excerpted pages from *Recommended Dietary Allowances*, 10th Ed., National Academy Press, Washington, D.C. (National Research Council 1989, 064000)

Ney, R.E., 1995. Excerpted pages from *Fate and Transport of Organic Chemicals in the Environment: A Practical Guide*, 2nd Ed., Government Institutes, Inc., Rockville, Maryland. (Ney 1995, 058210)

NMED (New Mexico Environment Department), November 24, 2003. "LANL's Risk Reduction and Environmental Stewardship (RRES) Remediation Services Project Use of Surrogate Chemicals in Risk Assessments," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and G.P. Nanos (LANL Director) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2003, 081172)

NMED (New Mexico Environment Department), June 2006. "Technical Background Document for Development of Soil Screening Levels, Revision 4.0, Volume 1, Tier 1: Soil Screening Guidance Technical Background Document," New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2006, 092513)

NMED (New Mexico Environment Department), January 23, 2008. "Approval for the Investigation Work Plan for S-Site Aggregate Area, Revision 1," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2008, 100115)

NMED (New Mexico Environment Department), December 2009. "Technical Background Document for Development of Soil Screening Levels, Revision 5.0," with revised Table A-1, New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2009, 108070)

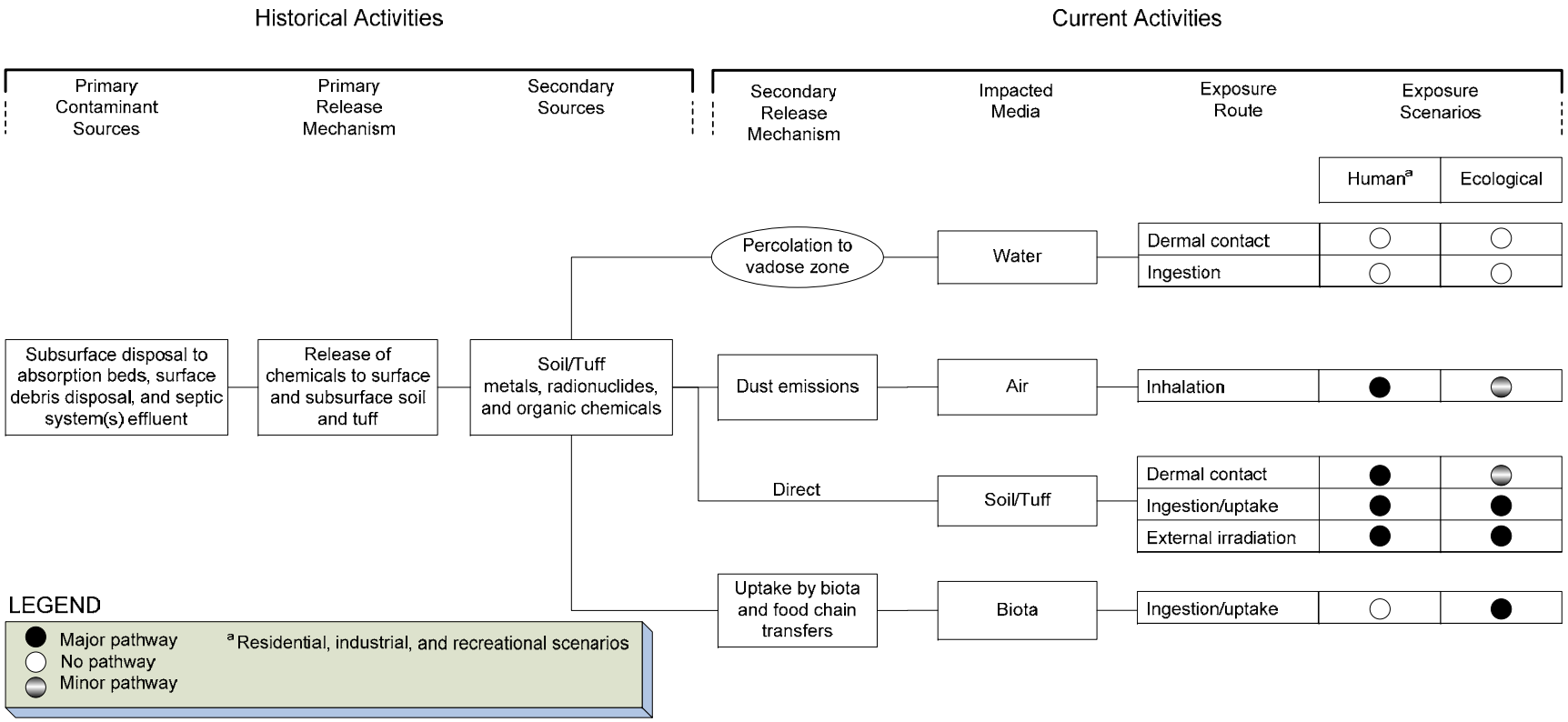


Figure H-3.1-1 Conceptual site model for the S-Site Aggregate Area

Table H-2.3-1
EPCs at SWMU 16-004(e) for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Organic Chemicals (mg/kg)						
Benzo(a)anthracene	9	1	0.011(U)	0.0147(J)	0.0147	Maximum detected concentration
Benzo(b)fluoranthene	9	2	0.011(U)	0.018(J)	0.018	Maximum detected concentration
Fluoranthene	9	1	0.011(U)	0.0163(J)	0.0163	Maximum detected concentration
Pyrene	9	1	0.011(U)	0.0146(J)	0.0146	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-2
EPCs at SWMU 16-004(e) for Ecological Receptors

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Organic Chemicals (mg/kg)						
Benzo(a)anthracene	5	1	0.011(U)	0.0147(J)	0.0147	Maximum detected concentration
Benzo(b)fluoranthene	5	2	0.011(U)	0.018(J)	0.018	Maximum detected concentration
Fluoranthene	5	1	0.011(U)	0.0163(J)	0.0163	Maximum detected concentration
Pyrene	5	1	0.011(U)	0.0146(J)	0.0146	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-3
EPCs at SWMU 16-026(b) for the Industrial Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Inorganic Chemicals (mg/kg)						
Antimony	8	0	1.09(U)	5.6(U)	5.6(U)	Maximum detection limit
Barium	8	8	60.8 (U)	1190	787	95% Approximate Gamma
Cyanide	7	0	0.075(U)	1.1(U)	1.1(U)	Maximum detection limit
Uranium	5	5	1.48	3.86	3.86	Maximum detected concentration
Organic Chemicals (mg/kg)						
Acenaphthene	8	3	0.026(U)	0.594	0.594	Maximum detected concentration
Acetone	4	1	0.0019(U)	0.011(J)	0.011	Maximum detected concentration
Amino-2,6-dinitrotoluene[4-]	7	3	0.1(U)	0.237	0.237	Maximum detected concentration
Amino-4,6-dinitrotoluene[2-]	7	4	0.102	0.286	0.286	Maximum detected concentration
Anthracene	8	6	0.041(U)	1.45	1.38	97.5% KM (Chebyshev)
Benzo(a)anthracene	8	6	0.13(J)	4.12	3.05	95% KM (Chebyshev)
Benzo(a)pyrene	8	7	0.064(J)	3.54	2.63	95% KM (Chebyshev)
Benzo(b)fluoranthene	8	8	0.059(J)	7.29	4.55	95% Approximate Gamma
Benzo(g,h,i)perylene	8	7	0.06(J)	1.83	1.37	95% KM (Chebyshev)
Benzo(k)fluoranthene	8	3	0.011(U)	0.86	0.86	Maximum detected concentration
Benzoic acid	8	1	0.14(J)	0.39(U)	0.14	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	8	2	0.072(J)	0.28(J)	0.28	Maximum detected concentration
Chrysene	8	7	0.12(U)	4.07	3.21	95% KM (Chebyshev)
Dibenz(a,h)anthracene	8	1	0.011(U)	0.19(J)	0.19	Maximum detected concentration
Dibenzofuran	8	2	0.011(U)	0.268(J)	0.268	Maximum detected concentration
Di-n-butyl phthalate	8	1	0.074(U)	0.08(J)	0.08	Maximum detected concentration
Dinitrotoluene[2,4-]	8	1	0.037(U)	0.12(J)	0.12	Maximum detected concentration
Fluoranthene	8	8	0.086	10.4	6.63	95% Approximate Gamma
Fluorene	8	3	0.023(U)	0.703	0.703	Maximum detected concentration
HMX	7	5	0.15	320	320	Maximum detected concentration

Table H-2.3-3 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Indeno(1,2,3-cd)pyrene	8	7	0.083	1.86	1.84	97.5% KM (Chebyshev)
Methylnaphthalene[2-]	8	1	0.0078(U)	0.0198(J)	0.0198	Maximum detected concentration
Naphthalene	8	1	0.012(U)	0.0337(J)	0.0337	Maximum detected concentration
Nitroaniline[4-]	8	1	0.11(U)	0.68	0.68	Maximum detected concentration
Phenanthrene	8	7	0.064(J)	7.37	5.25	95% KM (Chebyshev)
Pyrene	8	8	0.071(J)	8.23	5.13	95% Approximate Gamma
RDX	7	1	0.1(U)	0.512	0.512	Maximum detected concentration
Trinitrotoluene[2,4,6-]	7	1	0.1(U)	0.312	0.312	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-4
EPCs at SWMU 16-026(b) for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Inorganic Chemicals (mg/kg)						
Antimony	12	0	1.02(U)	5.6(U)	5.6(U)	Maximum detection limit
Barium	12	11?	34.9 (U)	1190	500.5	95% Approximate Gamma
Chromium	12	11?	1.4 (U)	23.6	12.87	95% Chebyshev (Mean, Sd)
Cyanide	10	1	0.073(U)	0.647	0.647	Maximum detected concentration
Uranium	6	6	0.987	3.86	3.86	Maximum detected concentration
Selenium	12	0	0.25(U)	1.08(U)	1.08(U)	Maximum detection limit
Organic Chemicals (mg/kg)						
Acenaphthene	12	5	0.012(U)	0.594	0.594	Maximum detected concentration
Acetone	8	1	0.0018(U)	0.011(J)	0.011	Maximum detected concentration
Amino-2,6-dinitrotoluene[4-]	11	4	0.1(U)	0.237	0.237	Maximum detected concentration
Amino-4,6-dinitrotoluene[2-]	11	6	0.102	0.286	0.239	95% KM(t)

Table H-2.3-4 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Anthracene	12	8	0.007(U)	1.45	0.944	97.5% KM (Chebyshev)
Benzo(a)anthracene	12	8	0.011(U)	4.12	1.30	95% KM (BCA)
Benzo(a)pyrene	12	9	0.011(U)	3.54	1.85	95% KM (Chebyshev)
Benzo(b)fluoranthene	12	11	0.011(U)	7.29	3.69	95% KM (Chebyshev)
Benzo(g,h,i)perylene	12	9	0.011(U)	1.83	1.25	97.5% KM (Chebyshev)
Benzo(k)fluoranthene	12	5	0.011(U)	0.86	0.86	Maximum detected concentration
Benzoic acid	12	1	0.14(J)	0.39(U)	0.14	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	12	2	0.072(J)	0.28(J)	0.28	Maximum detected concentration
Chrysene	12	9	0.011(U)	4.07	2.28	95% KM (Chebyshev)
Dibenz(a,h)anthracene	12	3	0.011(U)	0.19	0.19	Maximum detected concentration
Dibenzofuran	12	2	0.011(U)	0.268(J)	0.268	Maximum detected concentration
Di-n-butyl phthalate	12	1	0.074(U)	0.08	0.08	Maximum detected concentration
Dinitrotoluene[2,4-]	11	1	0.035	0.12(J)	0.12	Maximum detected concentration
Fluoranthene	12	10	0.011(U)	10.4	5.29	95% KM (Chebyshev)
Fluorene	12	4	0.011(U)	0.703	0.703	Maximum detected concentration
HMX	11	8	0.15(U)	320	188	95% KM (Chebyshev)
Indeno(1,2,3-cd)pyrene	12	9	0.011(U)	1.86	1.29	97.5% KM (Chebyshev)
Methylnaphthalene[2-]	12	1	0.0071(U)	0.0198(J)	0.0198	Maximum detected concentration
Naphthalene	12	1	0.011(U)	0.0337(J)	0.0337	Maximum detected concentration
Nitroaniline[4-]	8?	1	0.11(U)	0.68	0.68	Maximum detected concentration
Phenanthrene	12	9	0.011(U)	7.37	4.78	97.5% KM (Chebyshev)
Pyrene	12	10	0.011(U)	8.23	4.13	95% KM (Chebyshev)
RDX	11	1	0.1(U)	0.512	0.512	Maximum detected concentration
Trinitrotoluene[2,4,6-]	11	1	0.1(U)	0.312	0.312	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-5
EPCs at SWMU 16-026(b) for the Ecological Receptors

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Inorganic Chemicals (mg/kg)						
Antimony	8	0	1.09(U)	5.6(U)	5.6(U)	Maximum detection limit
Barium	8	8	60.8 (U)	1190	787	95% Approximate Gamma
Cyanide	7	0	0.075(U)	1.1(U)	1.1(U)	Maximum detection limit
Uranium	5	5	1.48	3.86	3.86	Maximum detected concentration
Organic Chemicals (mg/kg)						
Acenaphthene	8	3	0.026	0.594	0.594	Maximum detected concentration
Acetone	4	1	0.0019(U)	0.011(J)	0.011	Maximum detected concentration
Amino-2,6-dinitrotoluene[4-]	7	3	0.1(U)	0.237	0.237	Maximum detected concentration
Amino-4,6-dinitrotoluene[2-]	7	4	0.102	0.286	0.286	Maximum detected concentration
Anthracene	8	6	0.041(U)	1.45	1.38	97.5% KM (Chebyshev)
Benzo(a)anthracene	8	6	0.13(J)	4.12	3.05	95% KM (Chebyshev)
Benzo(a)pyrene	8	7	0.064(J)	3.54	2.63	95% KM (Chebyshev)
Benzo(b)fluoranthene	8	8	0.059(U)	7.29	4.55	95% Approximate Gamma
Benzo(g,h,i)perylene	8	7	0.06(U)	1.83	1.37	95% KM (Chebyshev)
Benzo(k)fluoranthene	8	3	0.011(U)	0.86	0.502	Maximum detected concentration
Benzoic acid	8	1	0.14(J)	0.39(U)	0.14	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	8	2	0.072	0.28	0.28	Maximum detected concentration
Chrysene	8	7	0.12(U)	4.07	3.21	95% KM (Chebyshev)
Dibenz(a,h)anthracene	8	1	0.011(U)	0.19(J)	0.19	Maximum detected concentration
Dinitrotoluene[2,4-]	8	1	0.037(U)	0.12(J)	0.12	Maximum detected concentration
Dibenzofuran	8	2	0.011(U)	0.268(J)	0.268	Maximum detected concentration
Di-n-butyl phthalate	8	1	0.074(U)	0.08(J)	0.08	Maximum detected concentration
Fluoranthene	8	8	0.086(J)	10.4	6.63	95% Approximate Gamma
Fluorene	8	3	0.023(U)	0.703	0.703	Maximum detected concentration
HMX	7	5	0.15	320	320	Maximum detected concentration

Table H-2.3-5 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Indeno(1,2,3-cd)pyrene	8	7	0.083(J)	1.86	1.84	97.5% KM (Chebyshev)
Methylnaphthalene[2-]	8	1	0.0078(U)	0.0198(J)	0.0198	Maximum detected concentration
Naphthalene	8	1	0.012(U)	0.0337(J)	0.0337	Maximum detected concentration
Nitroaniline[4-]	8	1	0.11(U)	0.68	0.68	Maximum detected concentration
Phenanthrene	8	7	0.064(J)	7.37	5.25	95% KM (Chebyshev)
Pyrene	8	8	0.071(J)	8.23	5.13	95% Approximate Gamma
RDX	7	1	0.1(U)	0.512	0.512	Maximum detected concentration
Trinitrotoluene[2,4,6-]	7	1	0.1(U)	0.312	0.312	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-6
EPCs at SWMU 16-029(d) for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Inorganic Chemicals (mg/kg)						
Selenium	4	0	0.54(U)	1.15(U)	1.15(U)	Maximum detection limit
Organic Chemicals (mg/kg)						
Acenaphthene	4	2	0.013(U)	0.0662	0.0662	Maximum detected concentration
Anthracene	4	2	0.0076(U)	0.0896	0.0896	Maximum detected concentration
Benzo(a)anthracene	4	2	0.011(U)	0.181	0.181	Maximum detected concentration
Benzo(a)pyrene	4	2	0.011(U)	0.176	0.176	Maximum detected concentration
Benzo(b)fluoranthene	4	2	0.011(U)	0.262	0.262	Maximum detected concentration
Benzo(g,h,i)perylene	4	2	0.011(U)	0.181(J)	0.181	Maximum detected concentration
Chrysene	4	2	0.011(U)	0.2	0.2	Maximum detected concentration
Fluoranthene	4	2	0.011(U)	0.483	0.483	Maximum detected concentration
Fluorene	4	2	0.011(U)	0.0557	0.0557	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	4	2	0.011(U)	0.15(J)	0.15	Maximum detected concentration
Methylnaphthalene[2-]	4	1	0.0076(U)	0.0183(J)	0.0183	Maximum detected concentration
Naphthalene	4	1	0.011(U)	0.0485	0.0485	Maximum detected concentration
Phenanthrene	4	2	0.011(U)	0.411	0.411	Maximum detected concentration
Pyrene	4	2	0.011(U)	0.378	0.378	Maximum detected concentration
Tetrachloroethene	4	1	0.00034(U)	0.00062(J)	0.00062	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-7
EPCs at SWMU 16-029(g2) for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Inorganic Chemicals (mg/kg)						
Selenium	1	1	5.7	5.7	5.7	Maximum detected concentration
Organic Chemicals (mg/kg)						
Trinitrotoluene[2,4,6-]	1	1	0.0065(J+)	0.0065(J+)	0.0065	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-8
EPCs at SWMU 16-017(p)-99 for the Industrial Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Organic Chemicals (mg/kg)						
Acenaphthene	5	1	0.014(U)	0.291	0.291	Maximum detected concentration
Benzo(a)pyrene	5	1	0.012(U)	0.0223(J)	0.0223	Maximum detected concentration
Benzo(b)fluoranthene	5	1	0.012(U)	0.0156(J)	0.0156	Maximum detected concentration
Chrysene	5	1	0.012(U)	0.016(J)	0.016	Maximum detected concentration
Isopropyltoluene[4-]	5	1	0.00037(U)	0.036	0.036	Maximum detected concentration
Methylnaphthalene[2-]	5	1	0.0083(U)	0.0091	0.0091	Maximum detected concentration
Phenanthrene	5	1	0.012(U)	0.0154(J)	0.0154	Maximum detected concentration
Pyrene	5	1	0.012(U)	0.0243(J)	0.0243	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-9
EPCs at SWMU 16-017(p)-99 for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Inorganic Chemicals (mg/kg)						
Selenium	10	0	0.5(U)	2.12(U)	2.12(U)	Maximum detection limit
Organic Chemicals (mg/kg)						
Acenaphthene	10	1	0.014(U)	0.291	0.291	Maximum detected concentration
Benzo(a)pyrene	10	1	0.012(U)	0.0223(J)	0.0223	Maximum detected concentration
Benzo(b)fluoranthene	10	1	0.012(U)	0.0156(J)	0.0156	Maximum detected concentration
Chrysene	10	1	0.012(U)	0.016(J)	0.016	Maximum detected concentration
Isopropyltoluene[4-]	10	1	0.00037(U)	0.036	0.036	Maximum detected concentration
Methylnaphthalene[2-]	10	1	0.0083(U)	0.0091	0.0091	Maximum detected concentration
Phenanthrene	10	1	0.012(U)	0.0154(J)	0.0154	Maximum detected concentration
Pyrene	10	1	0.012(U)	0.0243(J)	0.0243	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-10
EPCs at SWMU 16-017(p)-99 for the Ecological Receptors

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Organic Chemicals (mg/kg)						
Acenaphthene	5	1	0.014(U)	0.291	0.291	Maximum detected concentration
Benzo(a)pyrene	5	1	0.012(U)	0.0223(J)	0.0223	Maximum detected concentration
Benzo(b)fluoranthene	5	1	0.012(U)	0.0156(J)	0.0156	Maximum detected concentration
Chrysene	5	1	0.012(U)	0.016(J)	0.016	Maximum detected concentration
Isopropyltoluene[4-]	5	1	0.00037(U)	0.036	0.036	Maximum detected concentration
Methylnaphthalene[2-]	5	1	0.0083(U)	0.0091	0.0091	Maximum detected concentration
Phenanthrene	5	1	0.012(U)	0.0154(J)	0.0154	Maximum detected concentration
Pyrene	5	1	0.012(U)	0.0243(J)	0.0243	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-2.3-11
EPCs at Courtyard Periphery Area for the Recreational Scenario and Ecological Receptors

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Inorganic Chemicals (mg/kg)						
Aluminum	30	30	3600(U)	21700	7796	95% Approximate Gamma
Antimony	30	0	0.34(U)	1.66(U)	1.66(U)	Maximum detection limit
Arsenic	30	29	1.12	4.3	2.64	95% Student's-t
Barium	30	25	44.9(U)	885	188	95% Student's-t
Copper	30	29	4.05(U)	347(J)	82.7	95% Chebyshev (Mean, Sd)
Cyanide	30	5	0.068(U)	0.534	0.534	Maximum detected concentration
Iron	30	27	8660(U)	43000	15512	95% Student's-t
Lead	30	29	8.27(U)	57.3(J)	31.2	95% Approximate Gamma
Perchlorate	28	2	0.001(U)	0.000866(J)	0.000866	Maximum detected concentration
Selenium	29	1	0.51(U)	1.39(U)	0.69	Maximum detected concentration
Silver	28	11	0.1(U)	113(J-)	43	99% KM (Chebyshev)
Thallium	28	16	0.063(U)	0.84(U)	0.203	95% KM(t)
Zinc	30	29	17.9(U)	393	105	95% Chebyshev (Mean, Sd)
Organic Chemicals (mg/kg)						
Acetone	28	1	0.0017(U)	0.0499	0.0499	Maximum detected concentration
Benzo(a)anthracene	30	1	0.01(U)	0.0416	0.0416	Maximum detected concentration
Benzo(a)pyrene	30	6	0.011(U)	0.0479	0.0222	95% KM(t)
Benzo(b)fluoranthene	30	11	0.012(U)	0.223	0.0532	95% KM(t)
Benzo(g,h,i)perylene	30	6	0.011(U)	0.0642	0.0243	95% KM(t)
Benzo(k)fluoranthene	30	4	0.011(U)	0.0173(J)	0.0173	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	30	21	0.077(U)	0.386	0.165	95% KM (BCA)
Chrysene	30	8	0.011(U)	0.113	0.0354	95% KM(t)
Dichloroethene[1,1-]	28	3	0.0003(U)	0.000613(J)	0.000613	Maximum detected concentration
Di-n-butyl phthalate	29	1	0.067(U)	0.97(J)	0.97	Maximum detected concentration

Table H-2.3-11 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	EPC	EPC Method
Fluoranthene	30	11	0.012(U)	0.15	0.0428	95% KM(t)
HMX	30	1	0.15(U)	1.66(J)	1.66	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	30	4	0.011(U)	0.14	0.14	Maximum detected concentration
Isopropyltoluene[4-]	28	3	0.0003(U)	0.0165	0.0165	Maximum detected concentration
Pentachlorophenol	30	1	0.083(U)	0.114(J)	0.114	Maximum detected concentration
Phenanthrene	30	6	0.01(U)	0.107	0.0312	95% KM(t)
Pyrene	30	12	0.01(U)	0.0983	0.0365	95% KM(t)
RDX	30	1	0.1(U)	8.67	8.67	Maximum detected concentration
Toluene	28	1	0.0003(U)	0.0124	0.0124	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

Table H-3.2-1
Physical and Chemical Properties of Inorganic COPCs

COPC	K_d[a] (cm^3/g)	Water Solubility[a,b] (g/L)
Aluminum	1500	Insoluble
Antimony	45	Insoluble
Arsenic	29	Insoluble
Barium	41	Insoluble
Beryllium	790	Insoluble
Cadmium	75	Insoluble
Chromium	850	Insoluble
Cobalt	45	Insoluble
Copper	35	Insoluble
Cyanide (total)	9.9	na[c]
Iron	25	Insoluble
Lead	900	Insoluble
Manganese	65	Insoluble
Mercury	52	Insoluble
Nickel	65[d]	Insoluble
Selenium	5	Insoluble
Silver	8.3	Insoluble
Thallium	71[e]	Insoluble
Vanadium	1000	Insoluble
Zinc	62	Insoluble

[a] Information from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=nrad.

[b] Information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

[c] na = Not available.

[d] As nickel salts.

[e] As thallium salts.

Table H-3.2-2
Physical and Chemical Properties of Organic COPCs

COPC	Organic Carbon Partition Coefficient, K_{oc}[a] (L/kg)	Log Octanol-Water Partition Coefficient, K_{ow}[a]	Water Solubility[a] (mg/L)	Vapor Pressure[a] (mm Hg at 25°C)
Acenaphthene	6.12 × 103	3.92b	3.6b	2.5 × 10^{-3} [b]
Acetone	1.98	-0.240 [b]	1.00 × 10+06[b]	2.31 × 102[b]
Amino-2,6-dinitrotoluene [4-]	1.01 × 102	1.84	1.22 × 103	3.65 × 10^{-6}
Amino-4,6-dinitrotoluene [2-]	1.01 × 102	1.84	1.22 × 103	3.65 × 10^{-6}
Anthracene	2.04 × 104	4.45[b]	4.34 × 10^{-2} [b]	2.67 × 10^{-6} [b]
Benzo(a)anthracene	2.31 × 105	5.76[b]	9.40 × 10^{-3} [b]	1.90 × 10^{-6} [b]
Benzo(a)pyrene	7.87 × 105	6.13[b]	1.62 × 10^{-3} [b]	5.49 × 10^{-9} [b]
Benzo(b)fluoranthene	8.03 × 105	5.78[b]	1.50 × 10^{-3} [b]	5.00 × 10^{-7} [b]
Benzo(g,h,i)perylene	2.68 × 106	6.63[b]	2.60 × 10^{-4} [b]	1.00 × 10^{-10} [b]
Benzo(k)fluoranthene	7.87 × 105	6.11[b]	8.00 × 10^{-4} [b]	9.65 × 10^{-10} [b]
Benzoic acid	1.45 × 101	1.87[b]	3.40 × 103[b]	7.00 × 10^{-4} [b]
Bis(2-ethylhexyl)phthalate	1.65 × 105	7.60[b]	2.70 × 10^{-1} [b]	1.42 × 10^{-7} [b]
Chrysene	2.36E+05	5.81[b]	6.30E-03[b]	6.23 × 10^{-9} [b]
Dibenz(a,h)anthracene	2.62 × 106	6.54	1.03 × 10^{-3}	1.39 × 10^{-11}
Dibenzofuran	1.13E+04	4.12	3.10E+00	2.48 × 10^{-3}
Dichloroethene[1,1-]	5.26E-02[c]	2.13	2.42E+03[c]	6.34 × 102
Di-n-butyl phthalate	1.46E+03	4.50	1.12E+01	2.01 × 10^{-5}
Dinitrotoluene [2,4]	3.64 × 102[c]	1.98	2.70 × 102[c]	1.47 × 10^{-4}
Fluoranthene	7.09 × 104[c]	5.16[c]	2.60 × 10^{-1} [c]	9.22 × 10^{-6} [c]
Fluorene	1.13 × 104	4.18[b]	1.89[b]	8.42 × 10^{-3} [b]
HMX	1.85 × 103[c]	0.160	9440[c]	3.30 × 10^{-14}
Indeno(1,2,3-cd)pyrene	2.68 × 106	6.70[b]	0.0019[b]	1.25 × 10^{-10} [b]
Isopropyltoluene[4-]	Not available	4.10[b]	2.34E+01[b]	1.64[b]
Methylene chloride	2.37E+01	1.30[b]	1.30E+04[b]	4.30 × 102[b]
Methylnaphthalene[2-]	2.98 × 103	3.86	2.46	5.50 × 10^{-2}
Naphthalene	1.84 × 103	3.3	3.1	8.5 × 10^{-2}
Nitroaniline[4-]	1.09E+02[d]	1.39	7.28E+02[d]	3.20E-06
Pentachlorophenol	3.38E+03[c]	5.12	1.40E+01[c]	1.10E+04
Phenanthrene	2.08 × 104	4.46[b]	1.15E[b]	1.12 × 10^{-4} [b]
Pyrene	6.94 × 104	4.88[b]	0.135[b]	4.50 × 10^{-6} [b]
RDX	1.95 × 102[c]	0.870	5.97[c]	4.10 × 10^{-9}
Tetrachloroethene	9.49E+01	3.40	2.06E+02	1.85E+01
Toluene	2.68E+02	2.73	5.26E+02	2.84E+01
Trinitrotoluene [2,4,6-]	1.85 × 103	1.60	138	8.02 × 10^{-6}

[a] Information from http://rais.ornl.gov/cgi-bin/tox/TOX_search, unless noted otherwise.

[b] Information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

[c] Information from NMED (2009, 108070).

[d] EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table H-4.1-1
Exposure Parameters Used to Calculate Chemical SSLs
for the Industrial, Residential, and Recreational Scenarios

Parameters	Industrial Values	Residential Values	Recreational Values
Target HQ	1		
Target cancer risk	10^{-5}		
Averaging time (carcinogen)	70 yr × 365 d		
Averaging time (noncarcinogen)	Exposure duration × 365 d		
Skin absorption factor	SVOC = 0.1, Chemical-specific for others		
Adherence factor–child	n/a[a]	0.2 mg/cm^2	0.2 mg/cm^2
Body weight–child	n/a	15 kg (0–6 yr of age)	15 kg (0–6 yr of age)
Cancer slope factor–oral (chemical-specific)	(mg/kg-d)$^{-1}$	(mg/kg-d)$^{-1}$	(mg/kg-d)$^{-1}$
Inhalation unit risk (chemical-specific)	(µg/m^3)	(µg/m^3)	(µg/m^3)
Exposure frequency	225 d/yr	350 d/yr	200 events/yr
Exposure time	8 h/d	24 h/d	1 h/event
Exposure duration–child	n/a	6 yr	6 yr
Age-adjusted ingestion factor	n/a	114 mg-yr/kg-d	n/a
Age-adjusted inhalation factor	n/a	11 m^3-yr/kg-d	n/a
Inhalation rate–child	n/a	10 m^3/d	10 m^3/d
Soil ingestion rate–child	n/a	200 mg/d	200 mg/d
Particulate emission factor	6.61×10^9 m^3/kg	6.61×10^9 m^3/kg	6.61×10^9 m^3/kg
Reference dose–oral (chemical-specific)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)
Reference dose–inhalation (chemical-specific)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)
Exposed surface area–child	n/a	2800 cm^2/d	2800 cm^2/d
Age-adjusted skin contact factor for carcinogens	n/a	361 mg-yr/kg-d	273.3 mg-yr/kg-d
Volatilization factor for soil (chemical-specific)	(m^3/kg)	(m^3/kg)	(m^3/kg)
Body weight–adult	70 kg	70 kg	70 kg
Exposure duration[b]	25 yr	30 yr	30 yr
Adherence factor–adult	0.2 mg/cm^2	0.07 mg/cm^2	0.07 mg/cm^2
Soil ingestion rate–adult	100 mg/d	100 mg/d	100 mg/d
Exposed surface area–adult	3300 cm^2/d	5700 cm^2/d	5700 cm^2/d
Inhalation rate–adult	20 m^3/d	20 m^3/d	20 m^3/d

Note: Parameter values from NMED (2009, 108070) for industrial and residential and from LANL (2010, 108613) for recreational.

[a] n/a = Not applicable.

[b] Exposure duration for lifetime resident is 30 yr. For carcinogens, the exposures are combined for child (6 yr) and adult (24 yr).

Table H-4.2-1
Residential Screening for Carcinogens for SWMU 16-004(e)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	Cancer Risk
Benzo(a)anthracene	0.0147	6.21	2×10^{-8}
Benzo(b)fluoranthene	0.018	6.21	3×10^{-8}
		Total Excess Cancer Risk	**5×10^{-8}**

[a] Maximum detected concentration.

[b] SSLs from NMED (2009, 108070).

Table H-4.2-2
Residential Screening for Noncarcinogens for SWMU 16-004(e)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQ
Fluoranthene	0.0163	2290	7.12×10^{-6}
Pyrene	0.0146	1720	8.49×10^{-6}
		HI	**0.00002**

[a] Maximum detected concentration.

[b] SSLs from NMED (2009, 108070).

Table H-4.2-3
Industrial Screening for Carcinogens for SWMU 16-026(b)

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	Cancer Risk
Benzo(a)anthracene	3.05	23.4	1.30×10^{-6}
Benzo(a)pyrene	2.63	2.34	1.13×10^{-5}
Benzo(b)fluoranthene	4.55	23.4	1.94×10^{-6}
Benzo(k)fluoranthene	0.86[c]	234	3.68×10^{-8}
Bis(2-ethylhexyl)phthalate	0.28[c]	1370	2.04×10^{-9}
Chrysene	3.21	2340	1.37×10^{-8}
Dibenz(a,h)anthracene	0.19[c]	2.34	8.12×10^{-7}
Indeno(1,2,3-cd)pyrene	1.84	23.4	7.86×10^{-7}
Naphthalene	0.0337[c]	252	1.34×10^{-9}
Nitroaniline[4-]	0.68[c]	860[d]	7.91×10^{-9}
RDX	0.512[c]	174	2.94×10^{-8}
		Total Excess Cancer Risk	**2×10^{-5}**

[a] UCL used unless otherwise noted.

[b] SSLs from NMED (2009, 108070).

[c] Maximum detected concentration.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table H-4.2-4
Industrial Screening for Noncarcinogens for SWMU 16-026(b)

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	HQ
Antimony	5.6(U)[c]	454	1.2×10^{-2}
Barium	787	224,000	3.5×10^{-3}
Cyanide	1.1(U)[c]	22,700	4.8×10^{-5}
Uranium	3.86	3410	1.1×10^{-3}
Acenaphthene	0.594[d]	36,700	1.6×10^{-5}
Acetone	0.011[d]	851,000	1.3×10^{-8}
Amino-2,6-dinitrotoluene[4-]	0.237[d]	2000[e]	1.2×10^{-4}
Amino-4,6-dinitrotoluene[2-]	0.286[d]	1900[e]	1.5×10^{-4}
Anthracene	1.38	183,000	7.5×10^{-6}
Benzo(g,h,i)perylene	1.37	18,300[f]	7.5×10^{-5}
Benzoic acid	0.14[d]	2,500,000[e]	5.6×10^{-8}
Dibenzofuran	0.268[d]	1000[e]	2.7×10^{-4}
D-n-butyl phthalate	0.08[d]	68,400	1.1×10^{-6}
Dinitrotoluene[2,4-]	0.12[d]	103	1.2×10^{-3}
Fluoranthene	6.63	24,400	2.7×10^{-4}
Fluorene	0.703[d]	24,400	2.9×10^{-5}
HMX	320[d]	34,200	9.4×10^{-3}
Methylnaphthalene[2-]	0.0198[d]	4100[e]	4.8×10^{-6}
Phenanthrene	5.25	20,500	2.6×10^{-4}
Pyrene	5.13	18,300	2.8×10^{-4}
Trinitrotoluene[2,4,6-]	0.312[d]	469	6.7×10^{-4}
		HI	**0.03**

[a] UCL used unless otherwise noted.

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] Maximum detection limit.

[d] Maximum detected concentration.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Pyrene used as a surrogate based on structural similarity.

Table H-4.2-5
Residential Screening for Carcinogens for SWMU 16-026(b)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	Cancer Risk
Benzo(a)anthracene	1.30	6.21	2.1×10^{-6}
Benzo(a)pyrene	1.85	0.621	2.98×10^{-5}
Benzo(b)fluoranthene	3.69	6.21	5.9×10^{-6}
Benzo(k)fluoranthene	0.86[c]	62.1	1.4×10^{-7}
Bis(2-ethylhexyl)phthalate	0.28[c]	347	8.1×10^{-9}
Chrysene	2.28	621	3.7×10^{-8}
Dibenz(a,h)anthracene	0.092	0.621	1.5×10^{-6}
Indeno(1,2,3-cd)pyrene	1.29	6.21	2.1×10^{-6}
Naphthalene	0.0337[c]	45	7.5×10^{-9}
Nitroaniline[4-]	0.68[c]	240[d]	2.8×10^{-8}
RDX	0.512[c]	44.2	1.2×10^{-7}
Total Excess Cancer Risk			**4×10^{-5}**

[a] UCL used unless otherwise noted.

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] Maximum detected concentration.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table H-4.2-6
Residential Screening for Noncarcinogens for SWMU 16-026(b)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQ
Antimony	5.6(U)[c]	31.3	0.18
Barium	500.5	15,600	0.03
Chromium	12.87	219[d]	0.059
Cyanide	1.1(U)[c]	1560	0.00071
Selenium	1.08(U)[c]	391	0.0028
Uranium	3.86[e]	235	0.016
Acenaphthene	0.594	3440	0.00017
Acetone	0.011[e]	67,500	0.0000001
Amino-2,6-dinitrotoluene[4-]	0.237[e]	150[f]	0.0015
Amino-4,6-dinitrotoluene[2-]	0.239[e]	150[f]	0.0016
Anthracene	0.944	17,200	0.000055
Benzo(g,h,i)perylene	1.25	1720[g]	0.00073
Benzoic acid	0.14[e]	240,000[f]	0.0000005
Dibenzofuran	0.268[e]	78[f]	0.0034
D-n-butyl phthalate	0.08[e]	6110	0.000013
Dinitrotoluene[2,4-]	0.12[e]	15.7	0.0076
Fluoranthene	5.29	2290	0.0023
Fluorene	0.703[e]	2290	0.00031
HMX	188	3060	0.0614
Methylnaphthalene[2-]	0.0198[e]	310[f]	0.0001
Phenanthrene	4.78	1830	0.0026
Pyrene	4.13	1720	0.0024
Trinitrotoluene[2,4,6-]	0.312[e]	35.9	0.0087
		HI	**0.4**

Note: Data qualifiers are defined in Appendix A.

[a] UCL used unless otherwise noted.

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] Maximum detection limit.

[d] Chromium VI SSL used.

[e] Maximum detected concentration.

[f] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[g] Pyrene used as a surrogate based on structural similarity.

Table H-4.2-7
Residential Screening for Carcinogens for SWMU 16-029(d)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	Cancer Risk
Benzo(a)anthracene	0.181	6.21	2.91×10^{-7}
Benzo(a)pyrene	0.176	0.621	2.83×10^{-6}
Benzo(b)fluoranthene	0.262	6.21	4.22×10^{-7}
Chrysene	0.2	621	3.22×10^{-9}
Indeno(1,2,3-cd)pyrene	0.15	6.21	2.42×10^{-7}
Naphthalene	0.0485	45	1.08×10^{-8}
Tetrachloroethene	0.00062	6.99	8.87×10^{-10}
		Total Excess Cancer Risk	**4×10^{-6}**

[a] Maximum detected concentration.
[b] SSLs from NMED (2009, 108070).

Table H-4.2-8
Residential Screening for Noncarcinogens for SWMU 16-029(d)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQ
Selenium	1.15(U)	391	2.94×10^{-3}
Acenaphthene	0.0662	3440	1.92×10^{-5}
Anthracene	0.0896	17,200	5.21×10^{-6}
Benzo(g,h,i)perylene	0.181	1720[c]	1.05×10^{-4}
Fluoranthene	0.483	2290	2.11×10^{-4}
Fluorene	0.0557	2290	2.43×10^{-5}
Methylnaphthalene[2-]	0.0183	310[d]	5.90×10^{-5}
Phenanthrene	0.411	1830	2.25×10^{-4}
Pyrene	0.378	1720	2.20×10^{-4}
		HI	**0.004**

Note: Data qualifiers are defined in Appendix A.
[a] Maximum detected concentration.
[b] SSLs from NMED (2009, 108070) unless otherwise noted.
[c] Pyrene used as a surrogate based on structural similarity.
[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table H-4.2-9
Residential Screening for Noncarcinogens for SWMU 16-029(g2)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQ
Selenium	5.7	391	0.0146
Trinitrotoluene[2,4,6-]	0.0065	35.9	0.0002
		HI	**0.01**

[a] Maximum detected concentration.
[b] SSLs from NMED (2009, 108070).

Table H-4.2-10
Industrial Screening for Carcinogens for SWMU 16-017(p)-99

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	Cancer Risk
Benzo(a)pyrene	0.0223	2.34	9.53×10^{-8}
Benzo(b)fluoranthene	0.0156	23.4	6.67×10^{-9}
Chrysene	0.016	2340	6.84×10^{-11}
Total Excess Cancer Risk			**1×10^{-7}**

[a] Maximum detected concentration.

[b] SSLs from NMED (2009, 108070).

Table H-4.2-11
Industrial Screening for Noncarcinogens for SWMU 16-017(p)-99

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQ
Acenaphthene	0.291	36,700	7.9×10^{-6}
Isopropyltoluene[4-]	0.036	14,900[c]	2.4×10^{-6}
Methylnaphthalene[2-]	0.0091	4100[d]	2.2×10^{-6}
Phenanthrene	0.0154	20,500	7.5×10^{-7}
Pyrene	0.0243	18,300	1.3×10^{-6}
HI			**0.00002**

[a] Maximum detected concentration.

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] Isopropylbenzene used as a surrogate based on structural similarity.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table H-4.2-12
Residential Screening for Carcinogens for SWMU 16-017(p)-99

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	Cancer Risk
Benzo(a)pyrene	0.0223	0.621	3.59×10^{-7}
Benzo(b)fluoranthene	0.0156	6.21	2.51×10^{-8}
Chrysene	0.016	621	2.58×10^{-10}
Total Excess Cancer Risk			**4×10^{-7}**

[a] Maximum detected concentration.

[b] SSLs from NMED (2009, 108070).

Table H-4.2-13
Residential Screening for Noncarcinogens for SWMU 16-017(p)-99

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQ
Selenium	2.12(U)[c]	391	0.0056
Acenaphthene	0.291[d]	3440	8.46×10^{-5}
Isopropyltoluene[4-]	0.036[d]	3210[e]	1.12×10^{-5}
Methylnaphthalene[2-]	0.0091[d]	310[f]	2.94×10^{-5}
Phenanthrene	0.0154[d]	1830	8.42×10^{-6}
Pyrene	0.0243[d]	1720	1.41×10^{-5}
Trinitrotoluene[2,4,6-]	0.0065[d]	35.9	0.000181
		HI	**0.006**

Note: Data qualifiers are defined in Appendix A.

[a] UCL used unless otherwise noted.

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] Maximum detection limit.

[d] Maximum detected concentration.

[e] Pyrene used as a surrogate based on structural similarity.

[f] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table H-4.2-14
Recreational Screening for Carcinogens for Courtyard Periphery Area

COPC	EPC[a] (mg/kg)	Recreational SSL[b] (mg/kg)	Cancer Risk
Arsenic	2.64	27.7	9.5×10^{-7}
Benzo(a)anthracene	0.0416[c]	30.1	1.4×10^{-8}
Benzo(a)pyrene	0.0222	3.01	7.4×10^{-8}
Benzo(b)fluoranthene	0.0532	30.1	1.8×10^{-8}
Benzo(k)fluoranthene	0.0173[c]	301	5.7×10^{-10}
Bis(2-ethylhexyl)phthalate	0.165	1830	9.0×10^{-10}
Chrysene	0.0354	3010	1.2×10^{-10}
Indeno(1,2,3-cd)pyrene	0.14[c]	30.1	4.7×10^{-8}
Pentachlorophenol	0.114[c]	117	9.7×10^{-9}
RDX	8.67[c]	233	3.7×10^{-7}
		Total Excess Cancer Risk	**1×10^{-6}**

[a] UCL used unless otherwise noted.

[b] SSLs from LANL (2010, 108613).

[c] Maximum detected concentration.

Table H-4.2-15
Recreational Screening for Noncarcinogens for Courtyard Periphery Area

COPC	EPC[a] (mg/kg)	Recreational SSL[b] (mg/kg)	HQ
Aluminum	7796	79,100	0.099
Antimony	1.66(U)[c]	317	0.0052
Barium	188	158,000	0.0012
Copper	82.7	31,700	0.0026
Cyanide	0.534[d]	15,800	0.000034
Iron	15512	554,000	0.028
Lead	31.2	560	0.056
Perchlorate	0.000866	555	0.0000015
Selenium	0.69[d]	3960	0.00017
Silver	43	3960	0.011
Thallium	0.203	52.3	0.0039
Zinc	105	238,000	0.0000045
Acetone	0.0499	702,000	0.00000007
Benzo(g,h,i)perylene	0.0243	10,400[e]	0.0000023
Dichloroethene[1,1-]	0.000613[d]	13,800	0.000000036
Di-n-butyl phthalate	0.97[d]	39,900	0.000024
Fluoranthene	0.0428	13,900	0.0000031
HMX	1.66[d]	19,900	0.000083
Isopropyltoluene[4-]	0.0165[d]	52,700	0.0000003
Phenanthrene	0.0312	12,000	0.0000026
Pyrene	0.0365	10,400	0.0000035
Toluene	0.0124[d]	60,800	0.0000002
		HI	**0.2**

[a] UCL used unless otherwise noted.

[b] SSLs from LANL (2010, 108613)

[c] Maximum detection limit.

[d] Maximum detected concentration.

[e] Pyrene used as a surrogate based on structural similarity.

Table H-5.4-1
Ecological Screening Levels for Terrestrial Receptors

COPC	American Kestrel (intermediate carnivore)	American Kestrel (top carnivore)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Desert Cottontail	Earthworm	Plant	Montane Shrew	Red Fox
Inorganic Chemicals (mg/kg)											
Antimony	na*	na	na	na	na	0.48	2.9	78	0.05	0.26	45
Arsenic	160	1100	42	18	26	32	160	6.8	18	15	810
Barium	11,000	37,000	820	1000	930	1800	3300	330	110	1300	41,000
Copper	110	1600	38	15	22	64	270	80	70	38	3800
Cyanide	0.47	0.58	0.1	0.1	0.1	340	740	na	na	310	2200
Lead	120	810	21	14	16	120	370	1700	120	72	3700
Selenium	5.6	97	1	0.75	0.87	0.83	2.1	4.1	0.52	0.66	84
Silver	19	840	11	2.6	4.3	24	150	na	560	14	4100
Thallium	6.6	75	9.2	0.9	1.6	0.068	2.8	na	0.1	0.032	2.8
Uranium	21,000	39,000	1900	1600	1700	750	2000	na	25	220	4800
Zinc	320	2400	350	48	85	170	1800	120	160	98	6000
Organic Chemicals (mg/kg)											
Acetone	1200	30,000	7.5	170	14	1.2	1.4	na	na	15	2900
Acenaphthene	na	na	na	na	na	na	160	490	0.25	120	6200
Anthracene	na	na	na	na	na	310	1100	na	6.8	210	5800
Benzo(a)anthracene	na	na	na	na	na	3.4	6.2	na	18	3	32
Benzo(a)pyrene	na	na	na	na	na	85	280	na	na	53	380
Benzo(b)fluoranthene	na	na	na	na	na	52	130	na	18	38	250
Benzo(g,h,i)perylene	na	na	na	na	na	47	540	na	na	24	94
Benzo(k)fluoranthene	na	na	na	na	na	100	350	na	na	62	400
Benzoic acid	na	na	na	na	na	1.3	4.2	na	na	1	350
Bis(2-ethylhexyl)phthalate	0.045	0.033	20	0.02	0.04	1.1	2700	na	na	0.59	1.2

Table H-5.4-1 (continued)

COPC	American Kestrel (intermediate carnivore)	American Kestrel (top carnivore)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Desert Cottontail	Earthworm	Plant	Montane Shrew	Red Fox
Chrysene	na	na	na	na	na	3.1	6.5	na	na	2.4	25
Dibenz(a,h)anthracene	na	na	na	na	na	22	95	na	na	12	54
Dibenzofuran	na	na	na	na	na	na	na	na	6.1	na	na
Dichloroethene[1,1-]	na	na	na	na	na	14	40	na	na	11	2900
Di-n-butyl phthalate	0.068	0.24	0.39	0.011	0.021	370	16,000	na	160	180	5000
Fluoranthene	na	na	na	na	na	38	260	10	na	22	360
Fluorene	na	na	na	na	na	340	1100	3.7	na	250	9300
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	110	590	na	na	62	270
Methylnaphthalene[2-]	na	na	na	na	na	3.8	16	na	na	2.5	130
Naphthalene	100	590	3.4	16	5.7	9.7	12	na	1	27	1200
Phenanthrene	na	na	na	na	na	15	59	5.5	na	10	290
Pentachlorophenol	2	5	31	0.36	0.72	1.6	170	31	5	0.81	13
Pyrene	na	na	na	na	na	32	110	10	na	22	360
Toluene	na	na	na	na	na	25	61	na	200	23	3100
High Explosives (mg/kg)											
Amino-2,6-dinitrotoluene[4-]	na	na	na	na	na	0.73	1	na	80	1.5	330
Amino-4,6-dinitrotoluene[2-]	na	na	na	na	na	2.1	2.8	na	80	5.4	760
Dinitrotoluene[2,4-]	na	na	na	na	na	0.52	0.62	na	na	2.7	150
HMX	na	na	na	na	na	27	29	140	2700	3100	29,000
RDX	200	1100	12	22	16	130	210	7.5	100	150	6800
Trinitrotoluene[2,4,6-]	1400	2700	6.4	140	12	80	90	32	62	920	17,000

*na = Not available.

Table H-5.4-2
Minimum ESL Comparison for SWMU 16-004(e)

COPC	EPC (mg/kg)	ESL (mg/kg)	Receptor	HQ
Benzo(a)anthracene	0.0147	3	Montane shrew	0.0049
Benzo(b)fluoranthene	0.018	18	Plant	0.001
Fluoranthene	0.0163	10	Earthworm	0.0016
Pyrene	0.0146	10	Earthworm	0.0015

Table H-5.4-3
Minimum ESL Comparison for SWMU 16-026(b)

COPC	EPC (mg/kg)	ESL (mg/kg)	Receptor	HQ
Antimony	5.6(U)	0.05	Plant	**112**
Barium	787	110	Plant	**7.15**
Cyanide	1.1(U)	0.1	American robin	**11**
Uranium	3.86	25	Plant	0.15
Acenaphthene	0.594	0.25	Plant	**2.38**
Acetone	0.011	1.2	Deer mouse	0.0092
Amino-2,6-dinitrotoluene[4-]	0.237	0.73	Deer mouse	**0.32**
Amino-4,6-dinitrotoluene[2-]	0.286	2.1	Deer mouse	0.14
Anthracene	1.38	6.8	Plant	0.2
Benzo(a)anthracene	3.05	3	Montane shrew	**1.02**
Benzo(a)pyrene	2.63	53	Montane shrew	0.05
Benzo(b)fluoranthene	4.55	18	Plant	0.25
Benzo(g,h,i)perylene	1.37	24	Montane shrew	0.057
Benzo(k)fluoranthene	0.502	62	Montane shrew	0.0081
Benzoic acid	0.14	1	Montane shrew	0.14
Bis(2-ethylhexyl)phthalate	0.28	0.02	American robin	**14**
Chrysene	3.21	2.4	Montane shrew	**1.34**
Dibenz(a,h)anthracene	0.19	12	Montane shrew	0.016
Dibenzofuran	0.268	6.1	Plant	0.044
Di-n-butyl phthalate	0.08	0.011	American robin	**7.27**
Dinitrotoluene[2,4-]	0.12	0.52	Deer mouse	0.23
Fluoranthene	6.63	10	Earthworm	**0.66**
Fluorene	0.703	3.7	Earthworm	0.19
HMX	320	27	Deer mouse	**11.9**
Indeno(1,2,3-cd)pyrene	1.84	62	Montane shrew	0.023
Methylnaphthalene[2-]	0.0198	2.5	Montane shrew	0.0079
Naphthalene	0.0337	1	Plant	0.0337
Phenanthrene	5.25	5.5	Earthworm	**0.95**
Pyrene	5.13	10	Earthworm	**0.51**
RDX	0.512	7.5	Earthworm	0.068
Trinitrotoluene[2,4,6-]	0.312	6.4	American robin	0.049

Note: Bolded values indicate HQs greater than 0.3.

Table H-5.4-4
HQ/HI Analysis for SWMU 16-026(b)

COPEC	EPC (mg/kg)	American Kestrel (intermediate carnivore)	American Kestrel (top carnivore)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Desert Cottontail	Earthworm	Plant	Montane Shrew	Red Fox
Antimony	5.6(U)	na*	na	na	na	na	**11.7**	**1.93**	0.072	**112**	**21.5**	0.12
Barium	787	0.072	0.021	**0.96**	**0.72**	**0.85**	**0.44**	0.24	**2.39**	**7.16**	**0.61**	0.019
Cyanide	1.1(U)	**2.34**	**1.9**	**11**	**11**	**11**	0.0032	0.0015	na	na	0.0035	0.0005
Acenaphthene	0.594	na	na	na	na	na	0.0037	0.0012	na	**2.38**	0.005	0.000096
Amino-2,6-dinitrotoluene[4-]	0.237	na	na	na	na	na	**0.32**	0.24	na	0.003	0.16	0.00072
Benzo(a)anthracene	3.05	na	na	na	na	na	**0.9**	**0.49**	na	0.17	**1.02**	0.095
Bis(2-ethylhexyl)phthalate	0.28	**6.22**	**8.48**	0.014	**14**	**7**	0.25	0.0001	na	na	**0.47**	0.23
Chrysene	3.21	na	na	na	na	na	**1.03**	**0.49**	na	na	**1.34**	0.13
Di-n-butyl phthalate	0.08	**1.18**	**0.33**	0.21	**7.27**	**3.81**	0.00022	0.000005	na	0.0005	0.00044	0.000016
Fluoranthene	6.63	na	na	na	na	na	0.17	0.026	**0.66**	na	0.30	0.018
HMX	320	na	na	na	na	na	**11.9**	**11**	**2.28**	0.12	0.1	0.011
Phenanthrene	5.25	na	na	na	na	na	**0.38**	0.097	**1.04**	na	**0.57**	0.02
Pyrene	5.13	na	na	na	na	na	0.16	0.047	**0.51**	na	0.23	0.014
HI		**10**	**21**	**12**	**45**	**23**	**27**	**15**	**7**	**119**	**26**	0.7

Note: Bolded values indicate HQs greater than 0.3 or HI greater than 1.0.
*na = Not available.

Table H-5.4-5
Minimum ESL Comparison for SWMU 16-017(p)-99

COPC	EPC (mg/kg)	ESL (mg/kg)	Receptor	HQ
Acenaphthene	0.291	0.25	Plant	**1.16**
Benzo(a)pyrene	0.0223	53	Montane shrew	0.0004
Benzo(b)fluoranthene	0.0156	18	Plant	0.0009
Chrysene	0.016	2.4	Montane shrew	0.0067
Methylnaphthalene[2-]	0.0091	2.5	Montane shrew	0.0036
Phenanthrene	0.0154	5.5	Earthworm	0.0028
Pyrene	0.0243	10	Earthworm	0.0024

Note: Bolded values indicate HQs greater than 0.3.

Table H-5.4-6
HQ/HI Analysis for SWMU 16-017(p)-99

COPEC	EPC (mg/kg)	American Kestrel (intermediate carnivore)	American Kestrel (top carnivore)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Desert Cottontail	Earthworm	Plant	Montane Shrew	Red Fox
Acenaphthene	0.291	na*	na	na	na	na	0.002	0.001	na	**1.16**	0.002	0.000005
HI		na	na	na	na	na	0.002	0.001	na	1	0.002	0.000005

Note: Bolded values indicate HQs greater than 0.3.
*na = Not available.

Table H-5.4-7
Minimum ESL Comparison for Courtyard Periphery Area

COPC	EPC (mg/kg)	ESL (mg/kg)	Receptor	HQ
Antimony	1.66(U)	0.05	Plant	**33.2**
Arsenic	2.64	6.8	Earthworm	**0.39**
Barium	188	110	Plant	**1.71**
Copper	82.7	15	American robin	**5.51**
Cyanide	0.534	0.1	American robin	**5.34**
Lead	31.2	14	American robin	**2.23**
Selenium	0.69	0.52	Plant	**1.33**
Silver	43	2.6	American robin	**16.5**
Thallium	0.203	0.032	Montane shrew	**6.34**
Zinc	105	48	American robin	**2.19**
Acetone	0.0499	1.2	Deer mouse	0.042
Benzo(a)anthracene	0.0416	3	Montane shrew	0.014
Benzo(a)pyrene	0.0222	53	Montane shrew	0.0004
Benzo(b)fluoranthene	0.0523	18	Plant	0.003
Benzo(g,h,i)perylene	0.0243	24	Montane shrew	0.001
Benzo(k)fluoranthene	0.0173	62	Montane shrew	0.00028
Bis(2-ethylhexyl)phthalate	0.165	0.026	American robin	**6.35**
Chrysene	0.0354	2.4	Montane shrew	0.015
Dichloroethene[1,1-]	0.000613	11	Montane shrew	0.000046
Di-n-butyl phthalate	0.97	0.011	American robin	**88**
Fluoranthene	0.0428	10	Montane shrew	0.004
HMX	1.66	27	Deer mouse	0.061
Indeno(1,2,3-cd)pyrene	0.14	62	Montane shrew	0.0023
Pentachlorophenol	0.114	0.36	American robin	**0.33**
Phenanthrene	0.0312	5.5	Earthworm	0.006
Pyrene	0.0365	10	Earthworm	0.004
RDX	8.67	7.5	Earthworm	**1.16**
Toluene	0.0124	23	Montane shrew	0.00054

Note: Bolded values indicate HQs greater than 0.3.
*na = Not available.

Table H-5.4-8
HQ/HI Analysis for Courtyard Periphery Area

COPEC	EPC (mg/kg)	American Kestrel (intermediate carnivore)	American Kestrel (top carnivore)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Desert Cottontail	Earthworm	Plant	Montane Shrew	Red Fox
Antimony	1.66(U)	na*	na	na	na	na	**3.46**	**0.57**	0.021	**33.2**	**6.38**	0.037
Arsenic	2.64	0.0165	0.0024	0.063	0.15	0.1	0.083	0.017	**0.39**	0.15	0.18	0.0033
Barium	188	0.017	0.005	0.23	0.188	0.202	0.105	0.057	**0.57**	**1.71**	0.145	0.005
Copper	82.7	**0.75**	0.052	**2.18**	**5.51**	**3.76**	**1.29**	**0.31**	**1.03**	**1.18**	**2.18**	0.022
Cyanide	0.534	**1.14**	**0.92**	**5.34**	**5.34**	**5.34**	0.0016	0.07225	na	na	0.0017	0.000034
Lead	31.2	0.26	0.039	**1.49**	**2.23**	**1.95**	0.26	0.084	0.018	0.26	**0.433**	0.008
Selenium	0.69	0.123	0.007	**0.69**	**0.92**	**0.793**	**0.831**	**0.329**	0.168	**1.33**	**1.05**	0.008
Silver	43	**2.26**	0.051	**3.91**	**16.5**	**10**	**1.79**	0.29	na	0.077	**3.07**	0.01
Thallium	0.203	0.031	0.0027	0.022	0.23	0.13	**2.99**	0.073	na	**2.03**	**6.34**	0.073
Zinc	105	**0.328**	0.044	0.3	**2.19**	**1.24**	**0.618**	0.058	**0.875**	**0.656**	**1.07**	0.018
Bis(2-ethylhexyl)phthalate	0.165	**3.67**	**5.0**	0.0083	**8.25**	**4.13**	0.15	0.00006	na	na	0.28	0.14
Di-n-butyl phthalate	0.97	**14.3**	**4.04**	**2.49**	**88**	**46**	0.0026	0.00006	na	0.0061	0.0054	0.00019
Pentachlorophenol	0.114	0.06	0.024	0.004	**0.333**	0.167	0.075	0.001	0.004	0.024	0.148	0.009
RDX	8.67	0.043	0.0079	**0.72**	**0.39**	**0.54**	0.067	0.041	**1.16**	0.087	0.058	0.0013
HI		**23**	**10**	**17**	**130**	**65**	**12**	**2**	**4**	**39**	**21**	0.3

Note: Bolded values indicate HQs greater than 0.3 or HI greater than 1.0.
*na = Not available.

Table H-5.5-1
Comparison of EPCs to Background Concentrations at SWMU 16-026(b)

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)
Antimony	**5.6(U)**	0.1–1.0
Barium	**787**	21–410
Cyanide	1.1(U)	0.5

Notes: Bolded value indicates COPEC is greater than maximum background concentrations. Data qualifiers are defined in Appendix A.

Table H-5.5-2
Comparison of EPCs to Background Concentrations at Courtyard Periphery Area

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)	Tuff Background Concentrations (mg/kg)
Antimony	**1.66(U**)	0.1–1.0	0.5
Arsenic	2.64	0.3–9.3	0.25–5
Barium	188	21–410	1.4–51.6
Calcium	2585	500–14,000	595–2230
Copper	**82.7**	0.25–16	0.25–6.2
Cyanide	0.534	0.5	0.5
Iron	15512	3300–36,000	190–19,500
Lead	**31.2**	2–28	1.6–15.5
Selenium	0.69	0.1–1.7	0.1–0.105
Silver	**43**	1.0	0.2–1.9
Thallium	0.203	0.063–1	0.05–1.7
Zinc	**105**	14–75.5	5.5–65.6

Notes: Bolded value indicates COPEC is greater than maximum background concentrations. Data qualifiers are defined in Appendix A.

Table H-5.5-3
PAUFs for Ecological Receptors

Receptor	Home Range (ha)	Population Area (ha)[a]	SWMU 16-026(b) PAUF[b]	Courtyard Periphery Area PAUF[c]
American Kestrel	106	4240	0.0000061	0.000087
American Robin	0.42	16.8	0.0015	0.022
Deer Mouse	0.077	3	0.078	0.12
Desert Cottontail	3.1	124	0.00021	0.003
Montane Shrew	0.39	15.6	0.0017	0.024
Red Fox	1038	41,520	0.0000006	0.0000089
Mexican spotted owl	366	n/a[d]	0.000071	0.001

[a] Values from EPA (1993, 059384).

[b] PAUF is calculated as the area of the site (0.026 ha) divided by the population area. If a PAUF is greater than1, no adjustment is made.

[c] PAUF is calculated as the area of the site (0.37 ha) divided by the population area. If a PAUF is greater than1, no adjustment is made.

[d] n/a = Not applicable.

Table H-5.5-4
Adjusted HIs for SWMU 16-026(b)

COPEC	EPC (mg/kg)	American Kestrel (intermediate carnivore)	American Kestrel (top carnivore)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Desert Cottontail	Earthworm	Plant	Montane Shrew	Red Fox
Antimony	5.6(U)	na*	na	na	na	na	**0.91**	0.0004	0.072	**112**	0.037	0.000007
Barium	787	0.0000004	0.0000001	0.0014	0.0012	0.0013	0.034	0.00005	**2.39**	**7.16**	0.001	0.00000001
Acenaphthene	0.594	na	na	na	na	na	0.00029	0.0000003	na	**2.38**	0.000009	0.00000000006
Amino-2,6-dinitrotoluene[4-]	0.237	na	na	na	na	na	0.025	0.00005	na	0.003	0.00027	0.000000000004
Benzo(a)anthracene	3.05	na	na	na	na	na	0.07	0.0001	na	0.17	0.0017	0.00000006
Bis(2-ethylhexyl)phthalate	0.28	0.000038	0.000052	0.000021	0.021	0.011	0.02	0.000000002	na	na	0.0008	0.0000001
Chrysene	3.21	na	na	na	na	na	0.08	0.0001	na	na	0.0023	0.00000008
Di-n-butyl phthalate	0.08	0.0000071	0.000002	0.00032	0.011	0.0057	0.000017	0.000000001	na	0.0005	0.0000007	0.00000000001
Fluoranthene	6.63	na	na	na	na	na	0.013	0.0000054	**0.66**	na	0.00051	0.00000001
HMX	320	na	na	na	na	na	**0.93**	0.0023	**2.28**	0.12	0.00017	0.00000007
Phenanthrene	5.25	na	na	na	na	na	0.03	0.00002	**1.04**	na	0.00097	0.00000001
Pyrene	5.13	na	na	na	na	na	0.012	0.00001	**0.51**	na	0.00039	0.000000008
Adjusted HI		0.00005	0.00005	0.002	0.03	0.02	**2**	0.003	**7**	**122**	0.04	0.000008

Note: Bolded values indicate HQs greater than 0.3 or HI greater than 1.0.
*na = Not available.

Table H-5.5-5
Adjusted HIs for Courtyard Periphery Area

COPEC	EPC (mg/kg)	American Kestrel (intermediate carnivore)	American Kestrel (top carnivore)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Desert Cottontail	Earthworm	Plant	Montane Shrew	Red Fox
Antimony	1.66(U)	na*	na	na	na	na	**0.41**	0.0017	0.021	**33.2**	0.15	0.00000033
Copper	82.7	0.000065	0.0000045	0.048	0.12	0.083	0.15	0.00093	**1.03**	**1.18**	0.052	0.0000002
Lead	31.2	0.000023	0.0000033	0.033	0.049	0.043	0.031	0.00025	0.018	0.260	0.01	0.00000007
Silver	43	0.0002	0.00000044	0.086	**0.36**	0.22	0.21	0.00087	na	0.077	0.074	0.00000009
Zinc	105	0.000029	0.0000038	0.0066	0.048	0.027	0.074	0.00017	**0.88**	**0.66**	0.026	0.00000002
Bis(2-ethylhexyl)phthalate	0.165	0.00032	0.00044	0.00018	0.18	0.091	0.018	0.0000018	na	na	0.007	0.0000012
Di-n-butyl phthalate	0.97	0.0012	0.00035	0.055	**1.94**	**1.02**	0.00031	0.0000001	na	0.0061	0.00013	0.00000002
Pentachlorophenol	0.114	0.0000052	0.0000017	0.000088	0.0073	0.0037	0.009	0.000003	0.004	0.024	0.0036	0.00000008
RDX	8.67	0.0000037	0.0000006	0.016	0.0087	0.012	0.008	0.00012	**1.16**	0.087	0.0014	0.00000001
Adjusted HI		0.002	0.0008	0.2	**3**	**2**	0.9	0.004	**3**	**35**	0.3	0.000001

Note: Bolded values indicate HQs greater than 0.3 or HI greater than 1.0.
*na = Not available.

Table H-5.5-6
Summary of LOAEL-Based ESLs for Terrestrial Receptors

COPECs	Receptors	LOAEL-Based TRVs	TRV Units	LOAEL-Based ESLs (mg/kg soil)	Approach to Deriving the LOAELs/LOECs*
Antimony	Deer mouse	0.59	mg/kg/d	4.80E+00	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is 0.1 of the LOAEL.
	Plant	0.5	mg/kg soil	5.00E-01	Lowest observed effect concentration (LOEC) is derived from a LOEC with an unspecified exposure duration by applying a uncertainty factor of 0.1. The no observed effect concentration (NOEC) was derived from the same LOEC, except an uncertainty factor of 0.01 was applied.
Barium	Earthworm	3300	mg/kg soil	3.30E+03	LOEC is extrapolated from EPA geometric mean NOEC dataset (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_barium.pdf). Applied an uncertainty factor of 10 for exposure concentration (EC) 20s and calculated the geometric mean.
	Plant	261	mg/kg soil	2.60E+02	LOAEL is the geometric mean calculated from the same data set as the geometric mean NOAEL.
Copper	Earthworm	530	mg/kg soil	5.30E+02	LOEC is extrapolated from the EPA geometric mean NOEC data set (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf). Applied an uncertainty factor of 5 to the maximum acceptable toxicity concentrations (MATCs) and an uncertainty factor of 10 to the EC10s in the data set and calculated the geometric mean.
	Plant	497	mg/kg soil	4.90E+02	LOEC is extrapolated from the EPA geometric mean NOEC dataset (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf). Applied an uncertainty factor of 5 to the MATCs and an uncertainty factor of 10 to the EC10s in the data set and calculated the geometric mean.
Silver	Robin (insectivore)	20.2	mg/kg/d	2.60E+01	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_silver.pdf). NOAEL is equal to the lowest LOAEL divided by 10.
Zinc	Earthworm	939	mg/kg soil	9.30E+02	LOEC is extrapolated from EPA geometric mean NOEC data set (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_zinc.pdf). Applied an uncertainty factor of 5 for MATCs and an uncertainty factor of 10 for EC10s and calculated the geometric mean.
	Plant	812	mg/kg soil	8.10E+02	LOEC is extrapolated from EPA geometric mean NOEC dataset (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_zinc.pdf). Applied an uncertainty factor of 5 for MATCs and calculated the geometric mean.

Table H-5.5-6 (continued)

COPECs	Receptors	LOAEL-Based TRVs	TRV Units	LOAEL-Based ESLs (mg/kg soil)	Approach to Deriving the LOAELs/LOECs*
HMX	Deer mouse	200	mg/kg/d	7.20E+01	LOAEL is from the literature. LOAEL is the paired value of the NOAEL.
	Earthworm	290	mg/kg soil	2.90E+02	LOAEL is the geometric mean calculated from the same data set as the geometric mean NOAEL.
RDX	Earthworm	8.6	mg/kg soil	8.60E+00	LOAEL is from the literature. LOAEL is the paired value of the NOAEL.
Acenaphthene	Plant	2.5	mg/kg soil	2.50E+00	LOEC is extrapolated from an EC50 by applying an uncertainty factor of 0.1. The NOEC is extrapolated from the same EC50, except an uncertainty factor of 0.01 was applied.
Di-n-butyl phthalate	Robin (insectivore)	1.4	mg/kg/d	1.10E-01	LOAEL is from the literature. The NOAEL was derived by applying an uncertainty factor 0.1.
Fluoranthene	Earthworm	23.5	mg/kg soil	2.30E+01	LOEC is the geometric mean calculated from the same data set as the geometric mean NOEC.
Phenanthrene	Earthworm	12.7	mg/kg soil	1.20E+01	LOEC is the geometric mean calculated from the same data set as the geometric mean NOEC.
Pyrene	Earthworm	20.2	mg/kg soil	2.00E+01	LOEC is the geometric mean calculated from the same data set as the geometric mean NOEC.

Notes: Some COPECs (e.g., inorganic chemicals from EPA Eco-SSL documents) do not have LOAELs or LOECs. In these cases, an uncertainty factor of 10 was applied to the NOAEL/NOEC (i.e., EC10 and EC20) data in accordance with the acknowledged uncertainty between the LOAEL/LOEC and NOAEL/NOEC in Dourson and Stara (1983, 073474); (Calabrese and Baldwin 1993, 110405); and EPA (http://www.epa.gov/epawaste/hazard/tsd/td/combust/ecorisk.htm). In the cases where EPA used MATCs for the NOAEL/NOEC data, an uncertainty factor of 5 was used to adjust to the LOAEL/LOEC because the MATC is between the NOAEL/NOEC and the LOAEL/LOEC.

Table H-5.5-7
HI Analysis Using LOAEL-Based ESLs for SWMU 16-026(b)

COPECs	EPC (mg/kg)	Deer Mouse	Earthworm	Plant
Antimony	5.6(U)	**1.2**	n/a*	**11.2**
Barium	787	n/a	0.25	**3.0**
Acenaphthene	0.594	n/a	n/a	0.24
HMX	320	**4.4**	0.1	n/a
Fluoranthene	6.63	n/a	0.29	n/a
Phenanthrene	5.25	n/a	0.44	n/a
Pyrene	5.13	n/a	0.26	n/a
HI		**6**	1	**14**

Notes: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0. Data qualifiers are defined in Appendix A.

*n/a = Not applicable.

Table H-5.5-8
Adjusted HI Analysis for LOAEL-Based ESLs for tSWMU 16-026(b)

COPECs	EPC (mg/kg)	Deer Mouse
Antimony	5.6(U)	0.094
HMX	320	0.34
	Adjusted HI	0.4

Note: Data qualifiers are defined in Appendix A.

Table H-5.5-9
HI Analysis Using LOAEL-Based ESLs for the Courtyard Periphery Area

COPECs	EPC (mg/kg)	American Robin (insectivore)	American Robin (omnivore)	Earthworm	Plant
Antimony	1.66(U)	n/a	n/a	n/a	**3.3**
Copper	82.7	n/a	n/a	0.16	0.17
Silver	43	**1.7**	n/a	n/a	n/a
Zinc	105	n/a	n/a	0.11	0.13
Di-n-butyl phthalate	0.97	**8.8**	**4.6**	n/a	n/a
RDX	8.67	n/a	n/a	**1.01**	n/a
HI		**11**	**5**	1	**4**

Notes: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0. Data qualifiers are defined in Appendix A.

*n/a = Not applicable.

Table H-5.5-10
Adjusted HI Analysis for LOAEL-Based ESLs for the Courtyard Periphery Area

COPECs	EPC (mg/kg)	American Robin (insectivore)	American Robin (omnivore)
Di-n-butyl phthalate	0.97	0.18	0.1
Silver	43	0.037	n/a*
	Adjusted HI	0.2	0.1

*n/a = Not applicable.

Table H-6.1-1
Summary of Human Health Risk Screening Assessments Results

Site	HI	Cancer Risk
Industrial Scenario		
SWMU 16-026(b)	0.03	2×10^{-5}
SWMU 16-017(p)-99	0.00002	1×10^{-7}
Residential Scenario		
SWMU 16-004(e)	0.00002	5×10^{-8}
SWMU 16-026(b)	0.4	4×10^{-5}
SWMU 16-029(d)	0.004	4×10^{-6}
SWMU 16-029(g2)	0.01	n/a*
SWMU 16-017(p)-99	0.006	4×10^{-7}
Recreational Scenario		
Courtyard Periphery Area	0.2	1×10^{-6}

*n/a = Not applicable.

Attachment H-1

ProUCL Files
(on CD included with this document)

Attachment H-2

Ecological Scoping Checklists

H2-1.0 SOLID WASTE MANAGEMENT UNIT 16-004(e)

H2-1.1 Part A—Scoping Meeting Documentation

Site ID	Solid Waste Management Unit (SWMU) 16-004(e)
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.), and describe potential areas of release. Reference locations on a map as appropriate.	SWMU 16-004(e) is a comminutor box designed to shred incoming solid matter at the former Technical Area (TA-16) sanitary wastewater treatment plant (WWTP). Prior to installation of the comminutor box, a metal screen was used to filter out large solids. Potential release mechanisms include inadvertent release of liquid waste, soil, and ground disturbance during removal of the screen, and installation of the comminutor box, as well as vertical migration of liquid below the structure and surface runoff from the immediate area to the local drainage channel.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** X **Surface water/sediment –** **Subsurface –** X **Groundwater –** **Other, explain –**
Vegetation Class based on Geographic Information System (GIS) Vegetation Coverage **(Indicate all that apply.)**	**Water** – **Bare ground/unvegetated** – **Spruce/fir/aspen/mixed conifer** – **Ponderosa pine –** **Piñon juniper/juniper savannah** – X **Grassland/shrubland** – **Developed** – **Burned –**
Is threatened and endangered (T&E) habitat present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	P-Site lies to the north of the mapped T&E species habitat (Los Alamos National Laboratory's [LANL's] Integrated Natural and Cultural Resources Management Plan) and known Mexican spotted owl nest in Cañon de Valle. However, the area is within the foraging range of the Mexican spotted owl.
Provide a list of neighboring/ contiguous/upgradient sites, including a brief summary of COPCs and the form of releases for relevant sites, and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	SWMU 16-004(e), along with SWMUs 16-004(a), 16-004(b), 16-004(c), 16-004(d), and 16-004(f), were components of the former TA-16 sanitary WWTP and are located southeast of the former TA-16-340 Complex. Due to the upgradient location of SWMU 16-004(e) in relation to the other components of the WWTP, it is unlikely that COPCs have migrated into the area of SWMU 16-004(e) from the other structures. Potential releases from SWMU 16-004(e) could impact downgradient drainages to the southeast in Martin Spring Canyon.
Surface Water Erosion Potential Information Surface water erosion potential is based on site observations.	The disturbed area near the SWMU is relatively level, and no runoff pathways were observed. The functional assumption is that releases migrated vertically into the subsurface; therefore, lateral surface migration of chemicals of potential concern (COPCs) is not a transport mechanism.

H2-1.2 Part B—Site Visit Documentation

Site ID	SWMU 16-004(e)
Date of Site Visit	06/15/2010
Site Visit Conducted by	Kirby Olson and Linsey Hurst

Receptor Information:

Estimate cover.	**Relative vegetative cover (high, medium, low, none)** = Medium to low **Relative wetland cover (high, medium, low, none)** = None **Relative structures/asphalt, etc., cover (high, medium, low, none)** = Medium
Field Notes on the GIS vegetation class to assist in Verifying the Arcview Information	The disturbed area immediately above and surrounding the structure is relatively bare. To the south and west, outside of the disturbed area, the vegetative cover includes grasses, forbs (fringe sage, mullein, golden banner, thistle), and shrubs (including chamisa and Gambel oak). Down and standing large, long-dead, ponderosa pines are scattered throughout the site. Large, standing, live ponderosa pines are present at the edge of the site. Three small (<5 ft) ponderosa pines were observed adjacent to the structure.
Are ecological receptors present at the site (yes/ no/uncertain)? **Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.**	Terrestrial receptors, including mammals and birds, could use this site for both foraging and nesting. Several species of birds were observed during the site visit. Rabbit, mule deer, and elk scat was observed in the immediate SWMU area. A herd of elk and deer was observed during the site visit. Sampling field crews observed a bobcat, numerous elk, and mule deer. The area contains numerous burrows (1–5 in. in diameter). Large downed ponderosa pines found within the vegetated area provide additional habitat. The area is located within a remote, no-longer-operational site, increasing attractiveness to ecological receptors.

Contaminant Transport Information:

Surface Water Transport/ Field Notes on the Erosion Potential, Including a Discussion of the Terminal Point of Surface Water Transport (if applicable)	The disturbed area near the SWMU is relatively level, and no runoff pathways were observed. The assumption is that releases migrated vertically into the subsurface; therefore, lateral surface migration of COPCs is not a transport mechanism.
Are there any off-site transport pathways (surface water, air, or groundwater) (yes/no/uncertain)? Provide explanation.	The assumption is that releases from the communitor box migrated vertically into the subsurface; therefore, lateral surface migration of COPCs is not a transport mechanism. The COPCs are in the subsurface so air dispersion is not a transport pathway. A pathway to groundwater is unlikely, because groundwater is approximately 1300 ft below ground surface (bgs) to the aquifer (1286 ft bgs at well R-25 [LANL 2003, 077965, p. B-20]).

Ecological Effects Information:

Physical Disturbance **(Provide a list of major types of disturbances, including erosion and construction activities; review historical aerial photos where appropriate.)**	The entire area is disturbed from past use as a WWTP. In addition, there are unpaved and paved roads along with evidence of decontamination and decommissioning (D&D) activities in the immediate area of the SWMU. Evidence of D&D activities at the site include pieces of water pipe strewn about, disturbed ground, and gravel/fill material in the bare area.
Are there obvious ecological effects (yes/ no/uncertain)? **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	The physical disturbance of the area, as described above, resulted in an area of bare ground and a general lack of quality habitat.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors on-site and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.

The functional assumption is that releases from the communitor box migrated vertically into the subsurface. Therefore, lateral surface migration of COPCs is not a transport mechanism.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination (yes/ no/uncertain)? **Provide explanation** **(consider whether the maximum value was captured by existing sample data).**	The investigation approach in the approved work plan (LANL 2007, 102216) included biased sampling to determine whether COPCs are present and if a release has occurred in the vicinity and/or downgradient of the structures. The results indicate that nature and extent of contamination at this site have been defined.
Do existing or proposed data for the site address potential transport pathways of site contamination (yes/no/uncertain)? **Provide explanation (consider whether other sites should be aggregated to characterize potential ecological risk).**	Samples were collected surrounding the WWTP structure, drainages leading from the structures, and the Extended Drainages to address potential transport pathways.

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.

Relevant field notes are included in the previous sections.

H2-1.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's law constant >10–5 atm-m3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: No volatile organic compounds (VOCs) were detected in the samples.

Question B:

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: No surface samples were collected. COPCs were detected in the subsurface.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the Standard Operating Procedure (SOP) 2.01 run-off score* for each SWMU and/or area of concern (AOC) included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (*Note that the runoff score is not the entire erosion potential score; rather, it is a subtotal of this score with a maximum value of 46 points.)**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: There are no aquatic communities present at the site or in close proximity. No surface samples were collected. COPCs were detected in the subsurface.

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The depth to regional groundwater is approximately 1300 ft. There are no seeps, springs, or shallow groundwater in the area.

Question E:

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

- **The potential exists for contaminants to migrate to groundwater.**
- **The potential exists for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The depth to regional groundwater is approximately 1300 ft. There are no seeps, springs, or shallow groundwater in the area.

Question F:

Might erosion or mass wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?

- **This question is only applicable to release sites located on or near the mesa edge.**
- **Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The site is not located near the mesa edge, so mass wasting is not relevant. There is minimal evidence of erosion at the site. COPCs were detected only in the subsurface.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: No VOCs were detected in the samples from SWMU 16-004(e).

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: No surface samples were collected. COPCs were detected only in the subsurface.

Question I:

Could contaminants interact with plants through root uptake or rain splash from surficial soils?

- **Contaminants in bulk soil may partition into soil solution, making them available to roots.**
- **Exposure of terrestrial plants to contaminants is present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash).**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 1

Provide explanation: No surface samples were collected. COPCs were detected only in the subsurface.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bioaccumulate in animals.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No surface samples were collected. COPCs were detected only in the subsurface.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or groom themselves clean of soil.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No surface samples collected. COPCs were detected only in the subsurface.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No surface samples were collected. COPCs were detected only in the subsurface.

Question M:

Could contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: No radionuclides were detected or detected above the background values (BVs)/fallout values (FVs) at SWMU 16-004(e).

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Provide explanation: No water or sediment is present at the site.

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No water or sediment is present at the site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No water or sediment is present at the site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No water or sediment is present at the site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: No water or sediment is present at the site.

Question S:

Could contaminants bioconcentrate in free-floating aquatic plants, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There is no aquatic habitat at the site.

Question T:

Could contaminants bioconcentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.

Question U:

Could contaminants bioaccumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

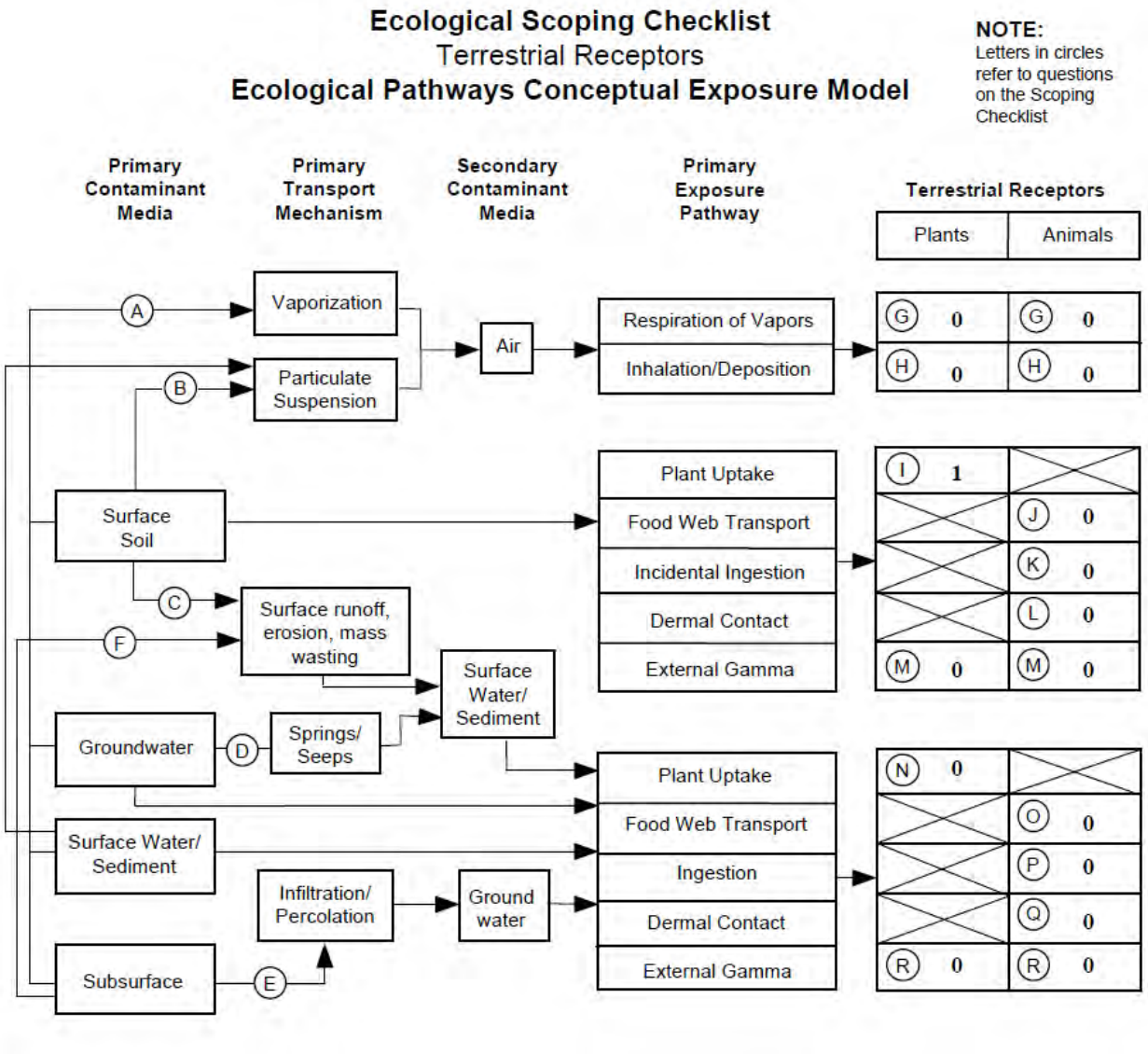
- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment-dwelling organisms.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

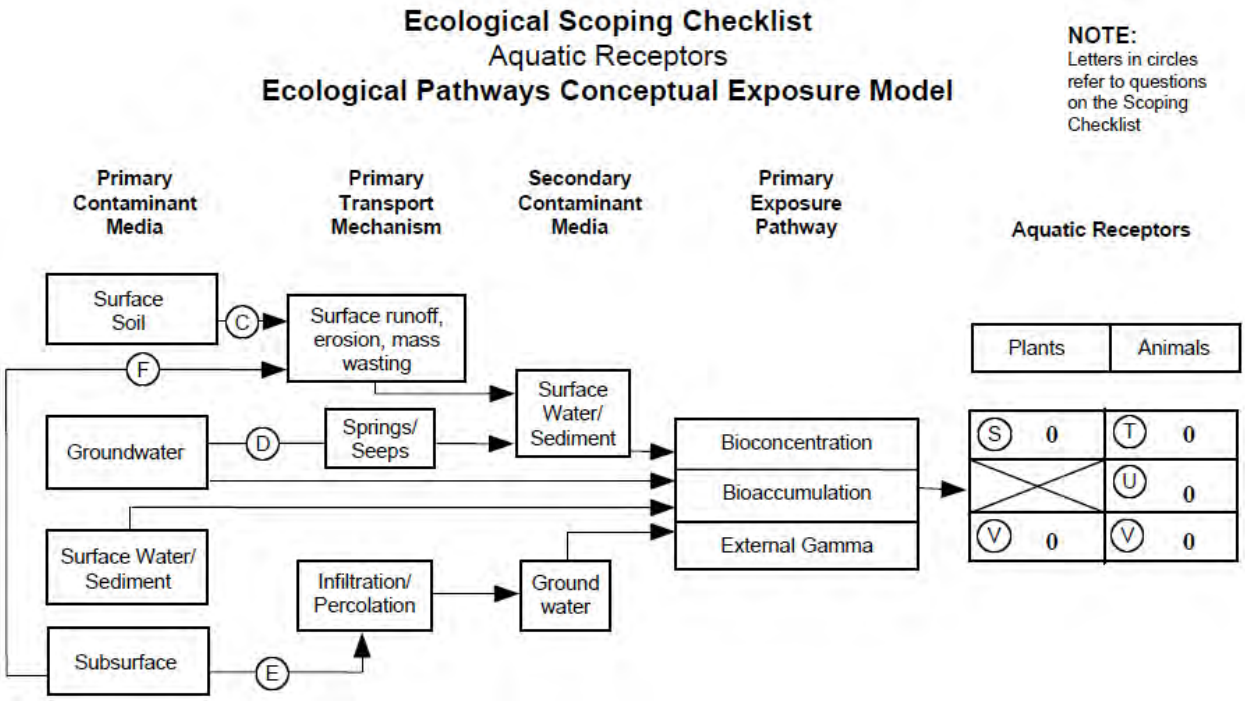
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.



Exposure Pathway Key: 0 = No pathway, **1** = Unlikely pathway, **2** = Minor pathway, **3** = Major pathway



Exposure Pathway Key: 0 = No pathway, **1** = Unlikely pathway, **2** = Minor pathway, **3** = Major pathway

Signatures and certifications:

Checklist completed by (provide name, organization, and phone number):

Name (printed): Linsey Hurst
Name (signature): L Hurst
Organization: Portage Inc.
Phone number: 505-662-7600
Date completed: 06/15/2010

Verification by another party (provide name, organization, and phone number):

Name (printed): Richard Mirenda, Ph.D.
Name (signature): Richard Mirenda
Organization: Los Alamos National Laboratory, ADEP, ET-ER
Phone number: 505-665-6953

H2-2.0 SWMU 16-026(b)

H2-2.1 Part A—Scoping Meeting Documentation

Site ID	SWMU 16-026 (b)
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.), and describe potential areas of release. Reference locations on a map as appropriate.	SWMU 16-026(b) is the outfall that received discharges from the two inactive high explosive (HE) sumps at building 16-307, SWMU 16-029(a). SWMU 16-026(b) is located on the east side of building 16-307. Building 16-307 was a rest house built between 1951 and 1953 that stored molds and other materials used in the plastics development at building 16-306. In addition, the building housed a solvent disassembly tank that chemically stripped HE from test devices.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** X **Surface water/sediment –** X (Sediment) **Subsurface –** X **Groundwater –** **Other, explain –**
Vegetation Class Based on GIS Vegetation Coverage **(Indicate all that apply.)**	**Water** – **Bare ground/unvegetated** – X **Spruce/fir/aspen/mixed conifer** – **Ponderosa pine –** **Piñon juniper/juniper savannah** – **Grassland/shrubland** – **Developed** – X **Burned –**
Is T&E habitat present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	The 300s Line lies to the west of the mapped T&E species habitat (LANL's Integrated Natural and Cultural Resources Management Plan) and known Mexican spotted owl nest in Cañon de Valle. However, the area is within the foraging range of the Mexican spotted owl.
Provide list of neighboring/ contiguous/upgradient sites, include a brief summary of COPCs and the form of releases for relevant sites, and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	Upgradient, SWMU 16-029(a) includes the two HE sumps that released discharge to the SWMU 16-026(b) outfall. COPCs based on previous investigations at SWMU 16-029(a) include radionuclides, metals, VOCs, polycyclic aromatic hydrocarbons (PAHs), and HE. Surface runoff flows across SWMU 16-026(b) into the Shared Drainages area.
Surface Water Erosion Potential Information Surface water erosion potential is based on site observations	Run-on pathways from SWMU 16-029(a) and runoff pathways to the Shared Drainages were observed crossing the area of SWMU 16-026(b). Surface water erosion is not apparent at this site.

H2-2.2 Part B—Site Visit Documentation

Site ID	SWMU 16-026(b)
Date of Site Visit	06/15/2010
Site Visit Conducted by	Kirby Olson and Linsey Hurst

Receptor Information:

Estimate cover.	**Relative vegetative cover (high, medium, low, none)** = Medium **Relative wetland cover (high, medium, low, none)** = None **Relative structures/asphalt, etc., cover (high, medium, low, none)** = Low
Field Notes on the GIS Vegetation Class to Assist in Verifying the Arcview Information	The disturbed area immediately northwest of the SWMU is a relatively bare area with some sandy soil over the ground surface. Southwest of SWMU 16-026(b) is the mound of elevated fill material associated with the SWMU 16-029(a) HE sumps. The vegetative cover in the area of the SWMU includes grasses, forbs (mullein, golden pea, thistle), and shrubs (including wood rose and Gambel oak). Large ponderosa pines were present around the edge of the site.
Are ecological receptors present at the site (yes/ no/uncertain)? **Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.**	Terrestrial receptors, including mammals and birds, could use this site for both foraging and nesting. Several species of birds were observed during the site visit. Mule deer and coyote scat along with hoof tracks were observed in the immediate SWMU area. A herd of elk and deer was observed during the site visit. The area did not contain any burrows. Sampling field crews observed a bobcat, numerous elk, and mule deer throughout the sampling area.

Contaminant Transport Information:

Surface Water Transport/Field Notes on the Erosion Potential, Including a Discussion of the Terminal Point of Surface Water Transport (if applicable)	Run-on from SWMU 16-029(a) and runoff to the Shared Drainages cross the area of SWMU 16-026(b). Surface water erosion is not apparent at this site.
Are there any off-site transport pathways (surface water, air, or groundwater) **(yes/no/uncertain)?** **Provide explanation.**	Yes. Surface water run-on to the site and runoff leaving the site enter the Shared Drainages area. The runoff pathways located to the north of the SWMU flow past the manhole structures entering the Shared Drainages downgradient to the northeast. There may be some air dispersion when the area is dry, but it is a minor transport pathway. A pathway to groundwater is unlikely, because groundwater is approximately 1300 ft below ground surface (bgs) to the aquifer (1286 ft bgs at well R-25 [LANL 2003, 077965, p. B-20]).

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities; review historical aerial photos where appropriate.)**	To the northwest of the SWMU is a large mound of soil/fill with a relatively bare area at the base with some sandy soil over the ground surface. Southwest of SWMU 16-026(b) is the mound of elevated fill material associated with the SWMU 16-029(a) HE sumps. To the northeast and slightly downgradient of the SWMU is a manhole with another associated concrete structure. HE Road runs to the south and east of SWMU 16-026(b).
Are there obvious ecological effects (yes/ no/uncertain)? **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	The disturbed area immediately northwest of the SWMU is a relatively bare area with some sandy soil over the ground surface. There are also multiple smaller bare areas throughout the site, with larger bare depressed areas associated with runoff.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors on-site and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here, and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport. Not applicable

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination (yes/ no/uncertain)? **Provide explanation (consider whether the maximum value was captured by existing sample data).**	Yes. The sampling approach in the approved work plan (LANL 2007, 102216) included biased sampling to determine the nature and extent of contamination within the SWMU and in the downgradient Shared Drainages.
Do existing or proposed data for the site address potential transport pathways of site contamination (yes/ no/uncertain)? **Provide explanation (consider whether other sites should be aggregated to characterize potential ecological risk).**	Data from samples collected within the SWMU and the Shared Drainages can address potential transport pathways and characterize the potential ecological risk at this site.

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors. Relevant field notes are included in the previous sections.

H2-2.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's law constant >10^{-5} atm-m^3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Only one VOC (acetone) was detected at a concentration below the estimated quantitation limit (EQL) in one sample collected at the site.

Question B:

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain): Likely

Provide explanation: COPCs are present in the surface soil and areas of bare ground within and surrounding the SWMU.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (*Note that the runoff score is not the entire erosion potential score; rather, it is a subtotal of this score with a maximum value of 46 points.)**
- **If erosion is a transport pathway, evaluate the terminal point to see whether aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: No aquatic communities are present at the site or in close proximity.

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps, springs, or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential exists for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The depth to regional groundwater is approximately 1300 ft. There are no seeps, springs, or shallow groundwater in the area.

Question E:

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

- **The potential exists for contaminants to migrate to groundwater.**
- **The potential exists for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The depth to regional groundwater is approximately 1300 ft. There are no seeps, springs, or shallow groundwater in the area.

Question F:

Might erosion or mass wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?

- **This question is only applicable to release sites located on or near the mesa edge.**
- **Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The site is not located near the mesa edge, so mass wasting is not relevant. There is minimal evidence of erosion at the site.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 1

Terrestrial Animals: 1

Provide explanation: Only one VOC (acetone) was detected below the EQL in one sample.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 3

Terrestrial Animals: 3

Provide explanation: COPCs are present in the surface soil and areas of bare ground within and surrounding the SWMU.

Question I:

Could contaminants interact with plants through root uptake or rain splash from surficial soils?

- **Contaminants in bulk soil may partition into soil solution, making them available to roots.**
- **Exposure of terrestrial plants to contaminants is present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash).**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 3

Provide explanation: COPCs are present in the surface soil and areas of bare ground within and surrounding the SWMU.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bioaccumulate in animals.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 3

Provide explanation: Surface soil contamination is present at the site.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or groom themselves clean of soil.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 3

Provide explanation: Surface soil contamination is present at the site.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 2

Provide explanation: Lipophilic chemicals are present in surface soils.

Question M:

Could contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Radionuclides were not detected or not detected above BVs/FVs at any location.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 3 (sediment only)

Provide explanation: Surface contamination is present at the site. No perennial surface water or aquatic communities are present at the site.

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 3 (sediment only)

Provide explanation: Surface contamination is present at the site. No perennial surface water or aquatic communities are present at the site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 3

Provide explanation: Surface contamination is present at the site. No perennial surface water or aquatic communities are present at the site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 3 (sediment only)

Provide explanation: Surface contamination is present at the site. No perennial surface water channels or aquatic communities are present at the site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Radionuclides were not detected or not detected above BVs/FVs at any location.

Question S:

Could contaminants bioconcentrate in free-floating aquatic plants, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There is no aquatic habitat at the site.

Question T:

Could contaminants bioconcentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.

Question U:

Could contaminants bioaccumulate in sedimentary or water-column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

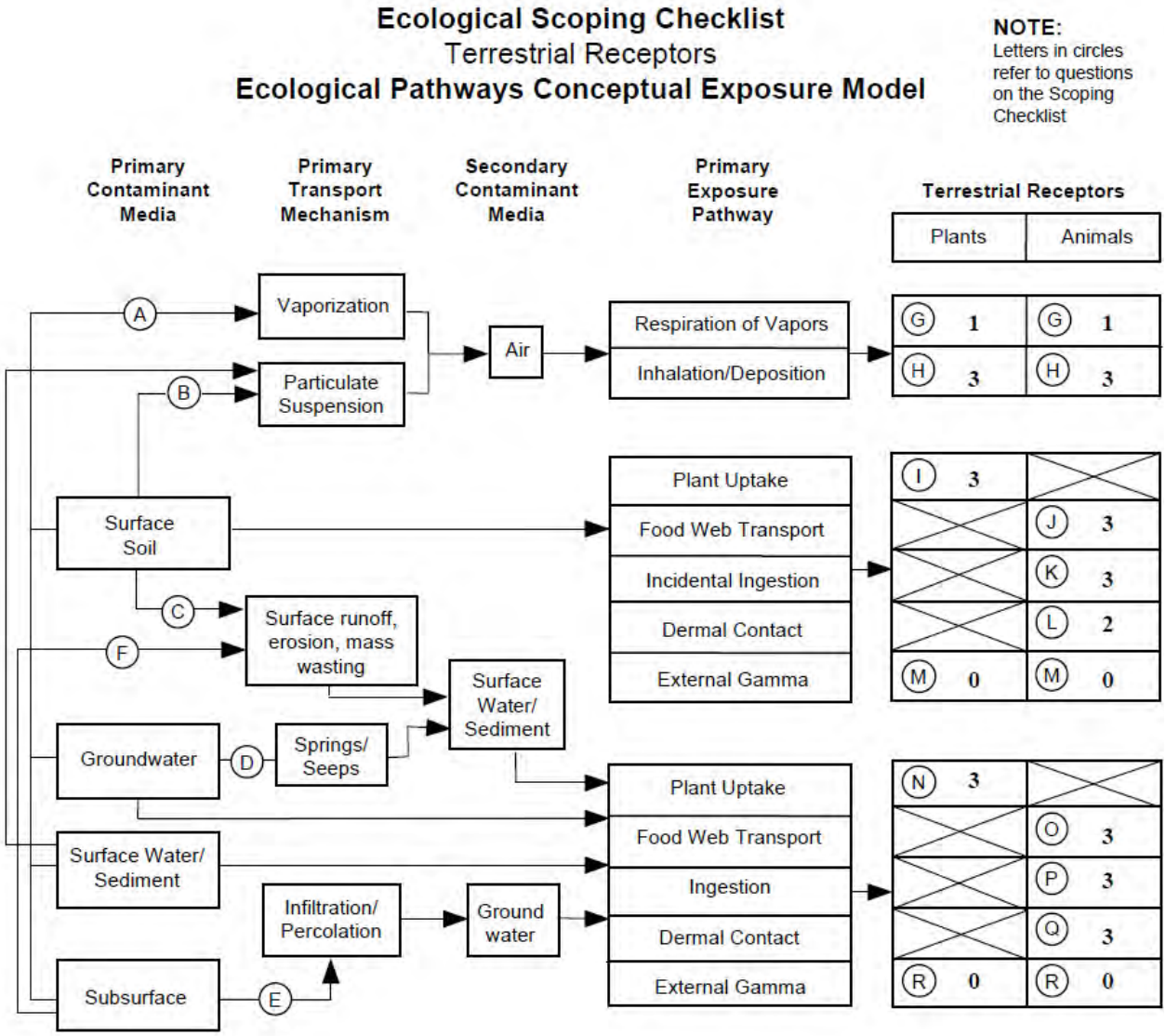
- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment-dwelling organisms.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

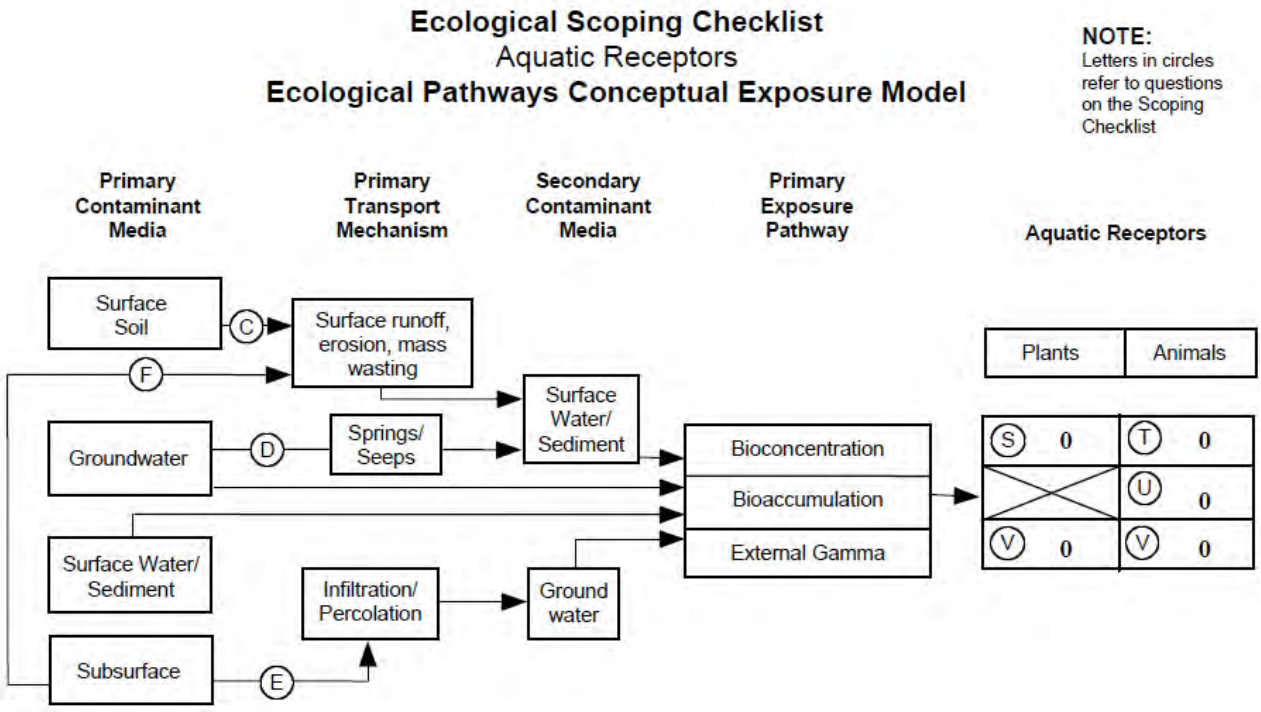
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.



Exposure Pathway Key: 0 = No pathway, **1** = Unlikely pathway, **2** = Minor pathway, **3** = Major pathway



Exposure Pathway Key: 0 = No pathway, **1** = Unlikely pathway, **2** = Minor pathway, **3** = Major pathway

Signatures and certifications:

Checklist completed by (provide name, organization, and phone number):

Name (printed): Linsey Hurst
Name (signature): L Hurst
Organization: Portage Inc.
Phone number: 505-662-7600
Date completed: 06/15/2010

Verification by another party (provide name, organization, and phone number):

Name (printed): Richard Mirenda, Ph.D.
Name (signature): Richard Mirenda
Organization: Los Alamos National Laboratory, ADEP, ET-ER
Phone number: 505-665-6953

H2-3.0 SWMU 16-029(d)

H2-3.1 Part A—Scoping Meeting Documentation

Site ID	SWMU 16-029(d)
Form of Site Releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.), and describe potential areas of release. Reference locations on a map as appropriate.	SWMU 16-029(d) consists of two inactive sumps located outside of building 16-301, a rest house. Building 16-301 was used to store the raw materials for the HE-casting facility and the mock HE-processing operation (buildings 16-302 and 16-300, respectively). In 1995, the operations at building 16-301 changed to an environmental testing laboratory where weapons and other components were subjected to extreme temperatures, pressures, and humidity (LANL 1993, 020948, p. 5-28; LANL 1995, 057225). The functional assumption is that releases from the HE sumps migrated vertically into the subsurface; therefore lateral migration is not a transport mechanism.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** **Surface water/sediment –** **Subsurface –** X **Groundwater –** **Other, explain –**
Vegetation Class Based on GIS Vegetation Coverage **(Indicate all that apply.)**	**Water** – **Bare Ground/Unvegetated** – **Spruce/fir/aspen/mixed conifer** – **Ponderosa pine –** **Piñon juniper/juniper savannah** – **Grassland/shrubland** – **Developed** – X **Burned –**
Is T&E habitat present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	The 300s Line lies to the west of the mapped T&E species habitat (LANL's Integrated Natural and Cultural Resources Management Plan) and known Mexican spotted owl nest in Cañon de Valle. However, the area is within the foraging range of the Mexican spotted owl.
Provide a list of neighboring/ contiguous/upgradient sites, includes a brief summary of COPCs and the form of releases for relevant sites, and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	SWMU 16-029(d) discharged to SWMU 16-026(e), the outfall and drainage channel located southwest of building 16-301.
Surface Water Erosion Potential Information Surface water erosion potential is based on site observations.	Because the site is covered with concrete in front of the building leading to Rest House Road, surface water erosion potential is minimal.

H2-3.2 Part B—Site Visit Documentation

Site ID	SWMU 16-029(d)
Date of Site Visit	06/25/2010
Site Visit Conducted by	Linsey Hurst

Receptor Information:

Estimate Cover	**Relative vegetative cover (high, medium, low, none)** = Low to none **Relative wetland cover (high, medium, low, none)** = None **Relative structures/asphalt, etc., cover (high, medium, low, none)** = High
Field Notes on the GIS Vegetation Class to Assist in Verifying the Arcview Information	The area of the HE sumps encompasses structures adjacent to a concrete pad loading dock area for building 16-301. The concrete is generally intact. Small forbs and grasses are emerging along the seams and edges of the concrete and paved areas. Surrounding the building is an area of medium-to-low vegetative cover with some bare spots. The vegetation observed includes small forbs (including thistle, mint, and mullein) and grasses. In the drainage to the north of the building, there is one small (<10 ft) ponderosa pine.
Are ecological receptors present at the site (yes/ no/uncertain)? **Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.**	Terrestrial receptors, including mammals and birds, could use the areas adjacent to SWMU 16-029(d) for both foraging and nesting. Large foraging animals are less likely to occupy the immediate area due to the present structures, concrete/paved areas, and sporadic human activity. Sampling field crews observed a bobcat and numerous elk and mule deer throughout the greater S-Site sampling area. A herd of elk was observed nearby during the site visit. Multiple burrows (1–5 in. in diameter) were observed south of the concrete/paved area near the entrance to the drainage. Several species of birds were observed throughout the greater S-Site area.

Contaminant Transport Information:

Surface Water Transport/ **Field Notes on the Erosion Potential, Including a Discussion of the Terminal Point Of Surface Water Transport (if applicable)**	Because the site is developed and covered with concrete and paved areas, surface water erosion potential is minimal. In addition, contamination is in the subsurface so there is no potential surface water transport at this SWMU.
Are there any off-site transport pathways (surface water, air, or groundwater) (yes/no/uncertain)? **Provide explanation.**	The HE sumps are subsurface but discharged to the outfall [SWMU 16-026(e)]. The functional assumption is that releases from the HE sumps migrated vertically into the subsurface beneath the sumps; therefore, lateral surface migration of COPCs is not a transport mechanism. Contamination is in the subsurface so air dispersion is not a potential transport pathway. Transport of COPCs to groundwater is unlikely, because the aquifer is approximately 1300 ft bgs (1286 ft bgs at well R-25 [LANL 2003, 077965, p. B-20]).

Ecological Effects Information:

Physical Disturbance **(Provide a list of major types of disturbances, including erosion and construction activities, and review historical aerial photos where appropriate.)**	The area is disturbed from past and present use. The 300s Line contains buildings, associated utilities, structures, concrete, and paved areas.
Are there obvious ecological effects (yes/no/uncertain)? **Provide an explanation and apparent cause (e.g., contamination, physical disturbance, other).**	The immediate area of SWMU 16-029(d) is covered by associated structures, a concrete loading dock for building 16-301, and paved areas. Due to the developed nature of the site, there is a lack of quality habitat.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors on-site and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.

The functional assumption is that releases from the HE sumps migrated vertically into the subsurface; therefore, lateral surface migration of COPCs is not a transport mechanism. In addition, the site is developed and the associated structures, concrete, and pavement are generally intact. Samples collected at this SWMU were deeper than 5 ft bgs so there are no complete exposure pathways to ecological receptors at this site. Transport of COPCs to groundwater is unlikely, because the aquifer is approximately 1300 ft bgs (1286 ft bgs at well R-25 [LANL 2003, 077965, p. B-20]). At this time, no future construction or D&D activities are planned for this area.

Signatures and certifications:

Checklist completed by (provide name, organization, and phone number):

Name (printed): Linsey Hurst
Name (signature): L Hurst
Organization: Portage Inc.
Phone number: 505-662-7600
Date completed: 06/25/2010

Verification by another party (provide name, organization, and phone number):

Name (printed): Richard Mirenda, Ph.D.
Name (signature): Richard Mirenda
Organization: Los Alamos National Laboratory, ADEP, ET-ER
Phone number: 505-665-6953

H2-4.0 SWMU 16-029(g2)

H2-4.1 Part A—Scoping Meeting Documentation

Site ID	SWMU 16-029 (g2)
Form of Site Releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.), and describe potential areas of release. Reference locations on a map as appropriate.	SWMU 16-029(g2) was the concrete pit (structure 16-523) below the concrete pad located east of building 16-517 (LANL 1999, 063973, p. 32). The pit housed a shaker table used in vibration tests on a Fat Man device prototype. The pit was filled with dirt and covered with a concrete pad (AOC C-16-074). The pad is level, empty, and surrounded by the asphalt paving of the adjacent courtyard. Drums containing HE-contaminated hydraulic oil were stored at this location (LANL 1990, 007512). The functional assumption is that releases within the concrete pit migrated vertically into the subsurface; therefore, lateral migration is not a transport mechanism.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** **Surface water/sediment –** **Subsurface –** X **Groundwater –** **Other, explain –**
Vegetation Class Based on GIS Vegetation Coverage **(Indicate all that apply.)**	**Water** – **Bare ground/unvegetated** – **Spruce/fir/aspen/mixed conifer** – **Ponderosa pine –** **Piñon juniper/juniper savannah** – **Grassland/shrubland** – **Developed** – X **Burned –**
Is T&E habitat present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	The V-Site lies to the west of the mapped T&E species habitat (LANL's Integrated Natural and Cultural Resources Management Plan) and known Mexican spotted owl nest in Cañon de Valle. However, the SWMU lies within the foraging area of the Mexican spotted owl.
Provide a list of neighboring/ contiguous/upgradient sites, include a brief summary of COPCs and the form of releases for relevant sites, and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	SWMU 16-029(g2) and AOC C-16-074 are located within the V-Site Courtyard adjacent to building 16-517, within the area of the Courtyard Peripheral Locations [SWMU 16-017(r)-99, SWMU 16-017(s)-99, SWMU 16-017(t)-99, SWMU 16-013, SWMU 16-017(q)-99, SWMU 16-006(h) and the drainage north of the courtyard]. AOC C-16-074, designated as the concrete pad above SWMU 16-029(g2), was used for drum storage. Potential surface releases could infiltrate the concrete and/or be dispersed to the edge of the concrete pad into the surrounding area. COPCs for AOC C-16-074 include HE-contaminated hydraulic oil.
Surface Water Erosion Potential Information* * Based on site observations.	Because the site is covered with a concrete pad and surrounded by a paved flat area, surface water erosion potential is minimal.

H2-4.2 Part B—Site Visit Documentation

Site ID	SWMU 16-029(g2)
Date of Site Visit	06/24/2010
Site Visit Conducted by	Linsey Hurst, Anthony Fristachi, John McCann

Receptor Information:

Estimate Cover	**Relative vegetative cover (high, medium, low, none)** = Low to none **Relative wetland cover (high, medium, low, none)** = None **Relative structures/asphalt, etc., cover (high, medium, low, none)** = High
Field Notes on the GIS Vegetation Class to Assist in Verifying the Arcview Information	The concrete pad (AOC C-16-074) directly above SWMU16-029(g2) is intact. Grasses and small forbs are emerging from a crack in the concrete around the edge of AOC C-16-074. The pavement within the greater courtyard area is breached in many places by small forbs and grasses. Surrounding the developed V-Site Courtyard area is an area containing large ponderosa pines, Gambel oaks, grasses, and small forbs, including lupine, thistle, clover, fleabane, and mullein.
Are ecological receptors present at the site (yes/ no/uncertain)? **Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.**	Terrestrial receptors, including mammals and birds, could use the areas adjacent to the V-Site Courtyard buildings and paved areas for both foraging and nesting. Large foraging animals are less likely to enter the fenced V-Site courtyard area; however, the area is easily accessed through the main entrance, which is only barricaded with a waist-high chain. Sampling field crews observed a bobcat and numerous elk and mule deer throughout the greater S-Site sampling area. A herd of elk was observed nearby during the site visit. Multiple burrows (1–5 in. in diameter) were observed within 10 ft of the paved area directly south of the concrete pad. No birds were observed within the immediate courtyard area; however, several species of birds were heard and observed throughout the greater S-Site area. The V-Site Courtyard is located within a remote, no-longer-operational site, increasing the attractiveness to ecological receptors.

Contaminant Transport Information:

Surface Water Transport/ **Field Notes on the Erosion Potential, Including a Discussion of the Terminal Point of Surface Water Transport (if applicable)**	Because the site is covered with a concrete pad and surrounded by a paved flat area, surface water erosion potential is minimal. If enough surface water collects in the concrete/paved area to migrate, run-off will likely flow south from the pad to a relatively flat undeveloped area.
Are there any off-site transport pathways (surface water, air, or groundwater) (yes/no/uncertain)? **Provide explanation.**	The functional assumption is that releases from within the shaker table pit migrated vertically into the subsurface; therefore, lateral surface migration of COPCs is not a transport mechanism. Transport of COPCs to groundwater is unlikely, because the aquifer is approximately 1300 ft bgs (1286 ft bgs at well R-25 [LANL 2003, 077965, p. B-20]).

Ecological Effects Information:

Physical Disturbance **(Provide a list of major types of disturbances, including erosion and construction activities, and review historical aerial photos where appropriate.)**	The area is a developed historical area containing buildings with associated concrete and paved areas. The immediate area of SWMU 16-029(g2) is subsurface and currently covered with the concrete pad discussed as AOC C-16-074. The entire V-Site Courtyard area is disturbed by past use.
Are there obvious ecological effects **(yes/no/uncertain)?** **Provide and explanation and apparent cause (e.g., contamination, physical disturbance, other).**	Subsurface SWMU 16-029(g2), as described above, is inaccessible to the ecological receptors present at the site.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors on-site and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.

The assumption is that releases from the shaker table migrated vertically into the subsurface; therefore, lateral surface migration of COPCs is not a transport mechanism. In addition, the site is developed and the associated structures, concrete, and pavement are generally intact. Due to the subsurface location of SWMU16-029(g2) samples were collected deeper than 5 ft bgs, below the concrete pad, so there are no complete exposure pathways to ecological receptors or transport pathways to off-site areas. Transport of COPCs to groundwater is unlikely, because the aquifer is approximately 1300 ft bgs (1286 ft bgs at well R-25 [LANL 2003, 077965, p. B-20]). At this time, no future construction or D&D activities are planned for this area. The area is currently being preserved and maintained by the historic preservation society.

Signatures and certifications:

Checklist completed by (provide name, organization, and phone number):

Name (printed): Linsey Hurst
Name (signature): L Hurst
Organization: Portage Inc.
Phone number: 505-662-7600
Date completed: 06/24/2010

Verification by another party (provide name, organization, and phone number):

Name (printed): Richard Mirenda, Ph.D.
Name (signature): Richard Mirenda
Organization: Los Alamos National Laboratory, ADEP, ET-ER
Phone number: 505-665-6953

H2-5.0 SWMU 16-017(p)-99

H2-5.1 Part A—Scoping Meeting Documentation

Site ID	SWMU 16-017(p)-99
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.), and describe potential areas of release. Reference locations on a map as appropriate.	SWMU 16-017(p)-99 is a former HE storage magazine (structure 16-61) that underwent D&D in 1995 (LANL 1994, 039440, pp. 6-32). No sampling has been conducted at this SWMU (LANL 2007, 097685). Potential mechanisms of release include spills and potential release from building materials during D&D.
List of Primary Impacted Media (Indicate all that apply.)	**Surface soil –** X **Surface water/sediment –** **Subsurface –** X **Groundwater –** **Other, explain –**
Vegetation class based on GIS* vegetation coverage **(Indicate all that apply.)** ***Vegetation class based on site observations.**	**Water –** **Bare Ground/Unvegetated –** **Spruce/fir/aspen/mixed conifer –** **Ponderosa pine –** X (Area outside SWMU boundary) **Piñon juniper/juniper savannah –** **Grassland/shrubland –** X (SWMU area) **Developed –** X (near paved road) **Burned –**
Is T&E habitat present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	V-Site lies to the west of the mapped T&E species habitat (LANL's Integrated Natural and Cultural Resources Management Plan) and known Mexican spotted owl nest in Cañon de Valle. However, the site lies within the foraging area of the Mexican spotted owl.
Provide list of neighboring/ contiguous/upgradient sites, include a brief summary of COPCs and the form of releases for relevant sites, and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	This site lies to the south of the main V-Site facilities in a flat area. There is no indication of COPC migration between sites.
Surface Water Erosion Potential Information Surface water erosion potential is based on site observations.	The site lies within a flat vegetated field. There is no evidence of run-on or runoff at this site. The potential for surface water transport and erosion is low.

H2-5.2 Part B—Site Visit Documentation

Site ID	SWMU 16-017(p)-99
Date of Site Visit	06/15/2010
Site Visit Conducted by	Kirby Olson and Linsey Hurst

Receptor Information:

Estimate cover.	**Relative vegetative cover (high, medium, low, none) =** High **Relative wetland cover (high, medium, low, none) =** None **Relative structures/asphalt, etc., cover (high, medium, low, none) =** None
Field Notes on the GIS Vegetation Class to Assist in Verifying the Arcview Information	The immediate area of the former HE storage magazine is a flat field of grasses and forbs. At the edge of the field, there are large ponderosa pines.
Are ecological receptors present at the site **(yes/no/uncertain)?** **Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.**	Terrestrial receptors, including mammals and birds, could use this site for both foraging and nesting. Several species of birds were heard and observed during the site visit. Mule deer and elk tracks were observed in the immediate SWMU area. A herd of elk and deer was observed during the site visit. Sampling field crews observed a bobcat, numerous elk, and mule deer throughout the sampling area. The area contains numerous burrows (1–5 in. in diameter). The burrow occupants were not seen during the visit but are likely to be small animals based on the size of the burrow openings. The SWMU area is located within a remote, no longer operational site, increasing attractiveness to ecological receptors.

Contaminant Transport Information:

Surface Water Transport **Field Notes on the Erosion Potential, Including a Discussion of the Terminal Point of Surface Water Transport (if applicable)**	The site lies within a flat vegetated field. There is no evidence of run-on or runoff at this site. The potential for surface water transport and erosion is low.
Are there any off-site transport pathways (surface water, air, or groundwater) (yes/no/uncertain)? **Provide explanation.**	The site lies within a flat vegetated field. There is no evidence of run-on or runoff at this site.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities; review historical aerial photos where appropriate.)**	An unpaved road crosses a section of the SWMU to the north. Just east of the SWMU boundary is a pile of asphalt. The magazine foundation is no longer present, and no evidence of other physical disturbance is evident.
Are there obvious ecological effects (yes/no/uncertain)? **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	There is very little vegetation where the road crosses the SWMU. The remaining area is vegetated with small forbs and grasses.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here, and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport. Not applicable.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination (yes/no/uncertain)? **Provide explanation (consider whether the maximum value was captured by existing sample data).**	The investigation approach in the approved work plan (LANL 2007, 102216) included biased sampling to determine if COPCs are present and if a release has occurred in the vicinity of the former structures. The results indicate that the nature and extent of contamination at this site has been defined.
Do existing or proposed data for the site address potential transport pathways of site contamination (yes/no/uncertain)? **Provide explanation (consider whether other sites should be aggregated to characterize potential ecological risk).**	The samples were collected from the surface and at a depth of 5.5–6.0 ft bgs at the center and four corners of the SWMU to address the potential migration of COPCs.

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors. All relevant field notes are included in the previous sections.

H2-5.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10^{-5} atm-m^3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: No VOCs were detected.

Question B:

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain): Likely

Provide explanation: Surface soil contamination is present in the northernmost sampling point within the area of the unpaved road.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (*Note that the runoff score is not the entire erosion potential score; rather, it is a subtotal of this score with a maximum value of 46 points.)**
- **If erosion is a transport pathway, evaluate the terminal point to see whether aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: There is no aquatic habitat present at the site.

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential exists for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The depth to regional groundwater is approximately 1300 ft. There are no seeps, springs, or shallow groundwater in the area.

Question E:

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

- **The potential exists for contaminants to migrate to groundwater.**
- **The potential exists for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The depth to regional groundwater is approximately 1300 ft. There are no seeps, springs, or shallow groundwater in the area.

Question F:

Might erosion or mass wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?

- **This question is only applicable to release sites located on or near the mesa edge.**
- **Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The site is located in a large, flat, vegetated area and not near the mesa edge.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: No VOCs were detected.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 3

Terrestrial Animals: 3

Provide explanation: Surface soil contamination is present in the northernmost sampling point within the area of the unpaved road.

Question I:

Could contaminants interact with plants through root uptake or rain splash from surficial soils?

- **Contaminants in bulk soil may partition into soil solution, making them available to roots.**
- **Exposure of terrestrial plants to contaminants is present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash).**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 3

Provide explanation: Surface soil contamination is present at the site.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bioaccumulate in animals.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 3

Provide explanation: COPCs are present in the surface soil.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or groom themselves clean of soil.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 3

Provide explanation: COPCs are present in the surface soil.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 2

Provide explanation: Low concentrations of lipophilic COPCs were detected in surface soil.

Question M:

Could contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: No radionuclides were detected or detected above BVs/FVs.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Provide explanation: No water or sediment is present at the site.

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: No water or sediment is present at the site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0=no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No water or sediment is present at the site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to waterborne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: No water or sediment is present at the site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: No water or sediment is present at the site.

Question S:

Could contaminants bioconcentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There is no aquatic habitat at the site.

Question T:

Could contaminants bioconcentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.

Question U:

Could contaminants bioaccumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

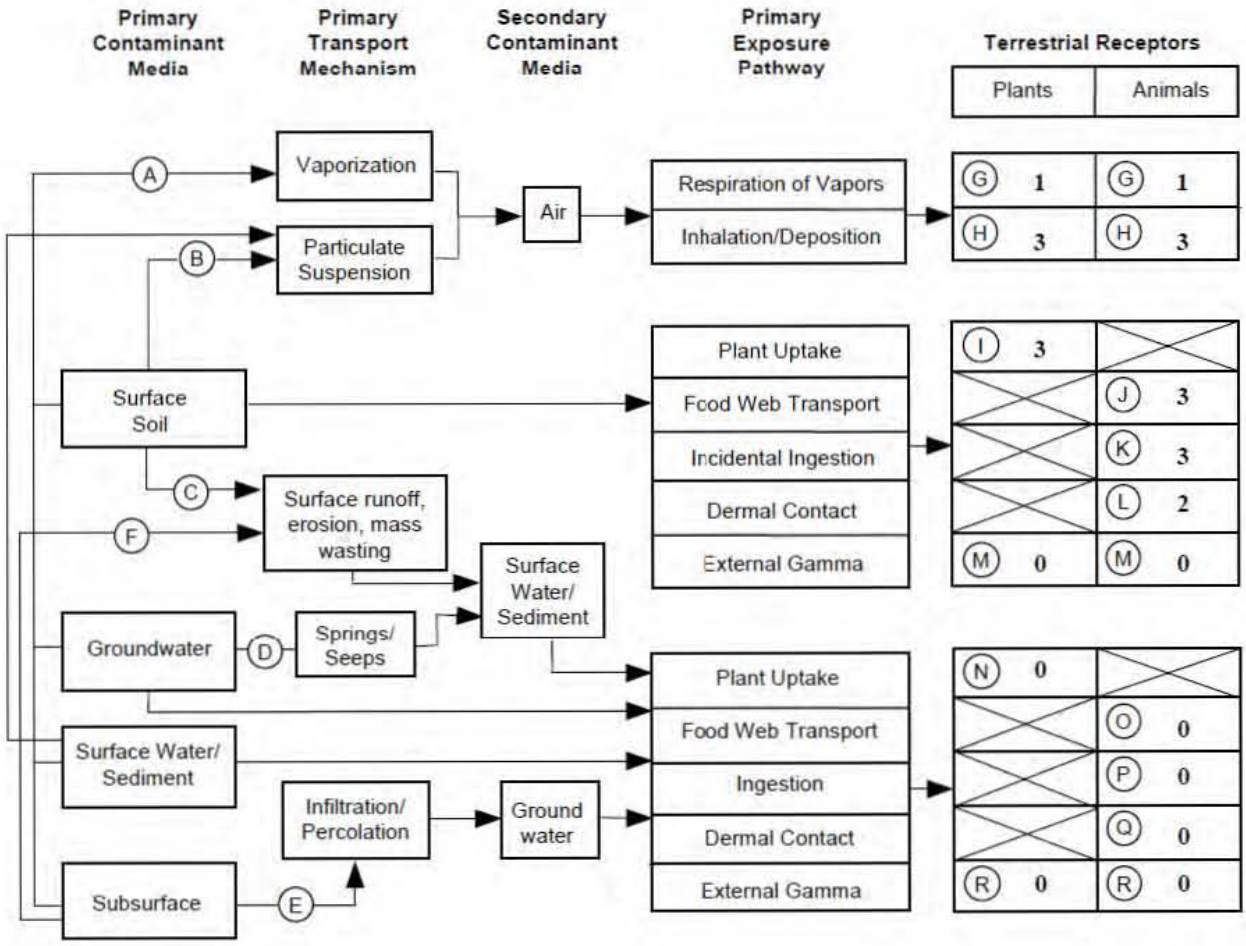
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There is no aquatic habitat at the site.

Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

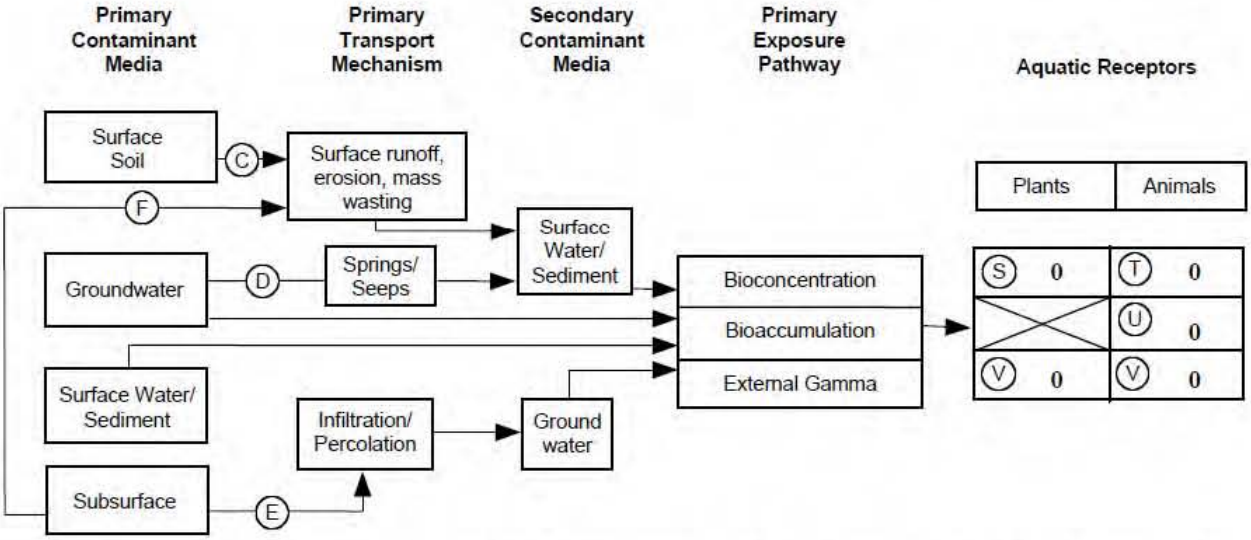
NOTE:
Letters in circles refer to questions on the Scoping Checklist



Quantification of Exposure Pathway Key: 0 = No pathway, 1 = Unlikely pathway, 2 = Minor pathway, 3 = Major pathway

Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Quantification of Exposure Pathway Key: **0** = No pathway, **1** = Unlikely pathway, **2** = Minor pathway, **3** = Major pathway

Signatures and certifications:

Checklist completed by (provide name, organization, and phone number):

Name (printed): Linsey Hurst
Name (signature): L Hurst
Organization: Portage Inc.
Phone number: 505-662-7600
Date completed: 6/15/2010

Verification by another party (provide name, organization, and phone number):

Name (printed): Richard Mirenda, Ph.D.
Name (signature): Richard Mirenda
Organization: Los Alamos National Laboratory, ADEP, ET-ER
Phone number: 505-665-6953

H2-6.0 REFERENCES

The following list includes all documents cited in this attachment. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. II of IV (TA-10 through TA-25), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007512)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1082," Los Alamos National Laboratory document LA-UR-93-1196, Los Alamos, New Mexico. (LANL 1993, 020948)

LANL (Los Alamos National Laboratory), July 1994. "RFI Work Plan for Operable Unit 1082, Addendum I," Los Alamos National Laboratory document LA-UR-94-1580, Los Alamos, New Mexico. (LANL 1994, 039440)

LANL (Los Alamos National Laboratory), July 1995. "RFI Work Plan for Operable Unit 1082, Addendum 2," Los Alamos National Laboratory document LA-UR-95-1038, Los Alamos, New Mexico. (LANL 1995, 057225)

LANL (Los Alamos National Laboratory), July 1999. "Voluntary Corrective Measures Completion Report for Potential Release Sites 16-006(g), Drum Storage Area Aggregate–[16-029(g2) and C-16-074], 16-005(d), 16-034(p)," Los Alamos National Laboratory document LA-UR-99-3001, Los Alamos, New Mexico. (LANL 1999, 063973)

LANL (Los Alamos National Laboratory), September 2003. "Phase III RFI Report for Solid Waste Management Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-03-5248, Los Alamos, New Mexico. (LANL 2003, 077965)

LANL (Los Alamos National Laboratory), September 2007. "Historical Investigation Report for S-Site Aggregate Area," Los Alamos National Laboratory document LA-UR-07-5620, Los Alamos, New Mexico. (LANL 2007, 097685)

LANL (Los Alamos National Laboratory), December 2007. "Investigation Work Plan for S-Site Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-07-8366, Los Alamos, New Mexico. (LANL 2007, 102216)

Appendix I

Site Photographs

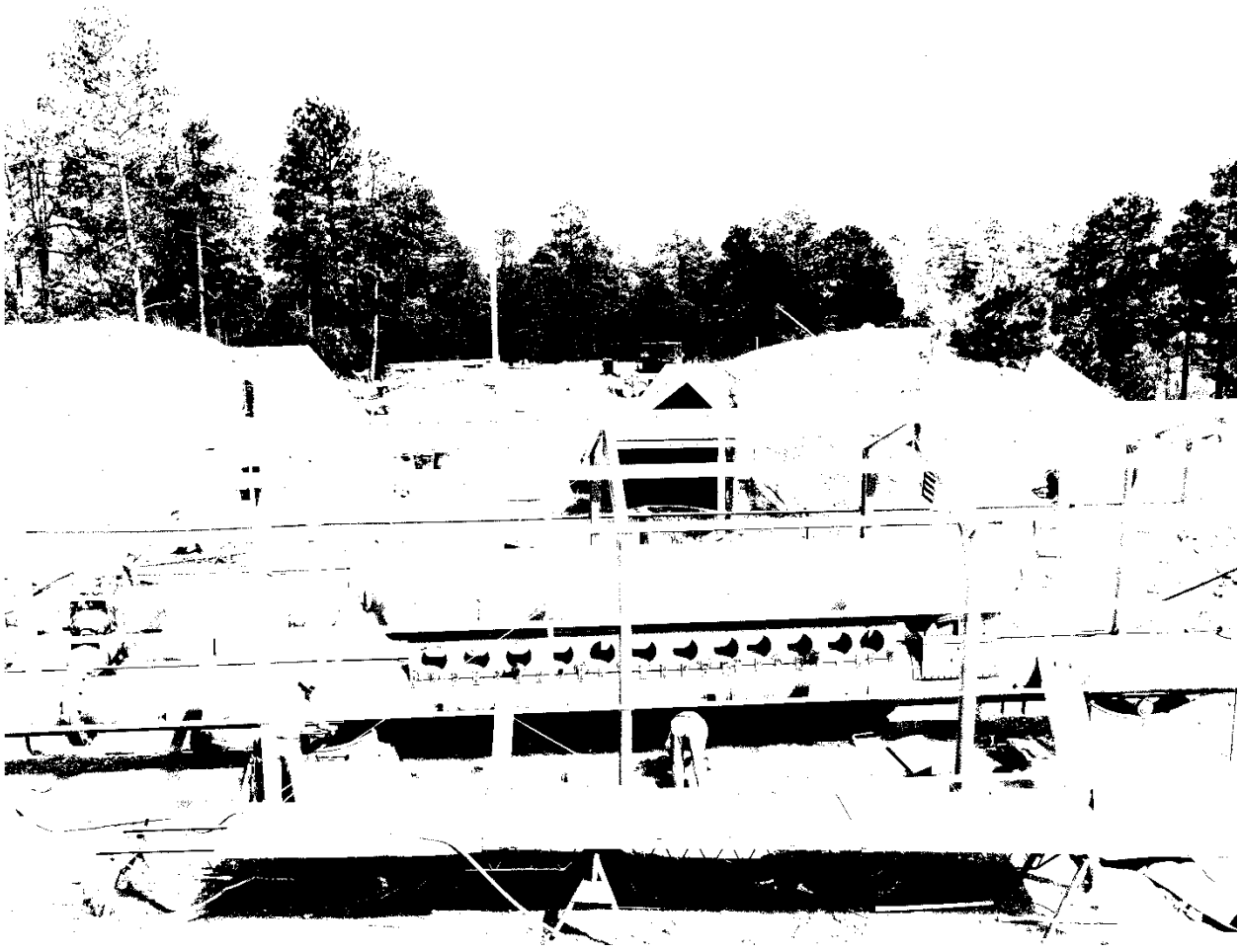


Figure I-1 K-Site airgun at Technical Area 11 (TA-11) in 1956



Figure I-2 K-Site droptower at TA-11 circa 1995



Figure I-3 Aerial view of P-Site circa 1946

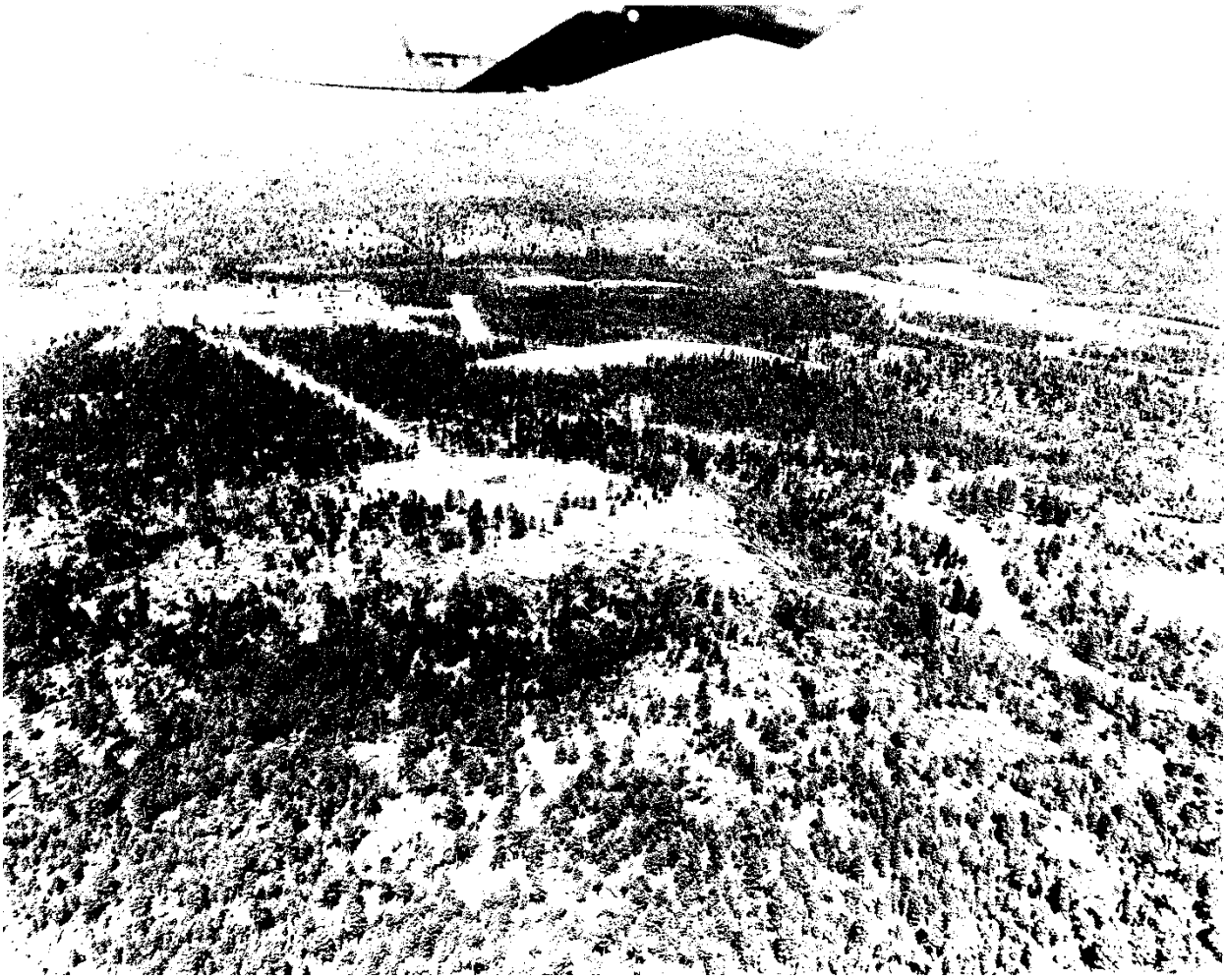


Figure I-4 Aerial view of P-Site circa 1950



Figure I-5 P-Site bunkers 16-477 and 16-478 circa 2000

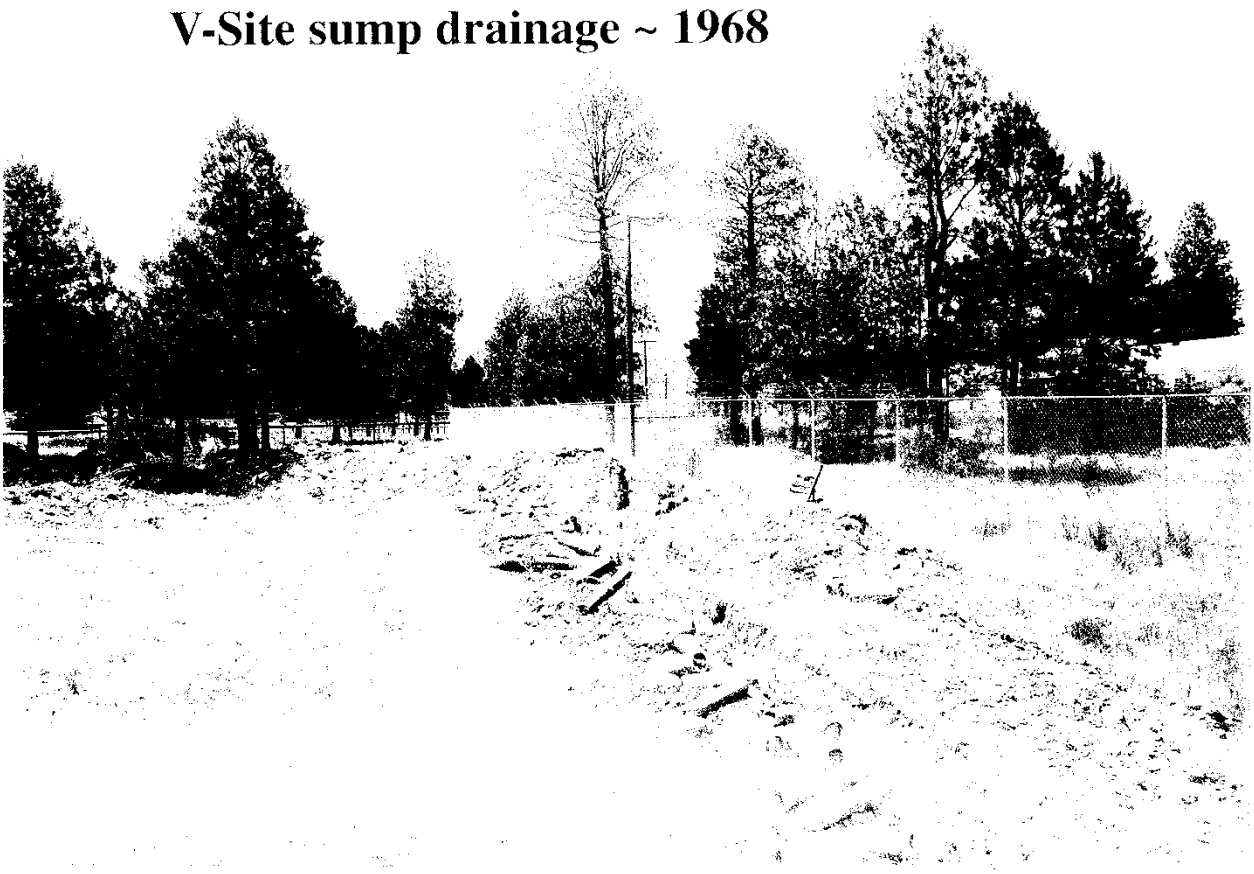


Figure I-6 V-Site drainline removal circa 1968



Figure I-7 V-Site view west of buildings 16-516 and 16-517 circa 2000



Figure I-8 View to south of 300s Line subaggregate circa 1987

Appendix J

Borehole Logs
(on CD included with this document)