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Investigation Work Plan for Cañon de Valle Aggregate Area

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Prepared by the Environmental Programs Directorate

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Responsible project leader:

John McCann		Project Leader	Environmental Programs	9-21-06
Printed Name	Signature	Title	Organization	Date

Responsible LANS representative:

Andrew Phelps		Associate Director	Environmental Programs	9/21/06
Printed Name	Signature	Title	Organization	Date

Responsible DOE representative:

David Gregory	for	Federal Project Director	DOE-LASO	27/09/06
Printed Name	Signature	Title	Organization	Date

EXECUTIVE SUMMARY

This investigation work plan presents the proposed investigation activities at solid waste management units (SWMUs) and areas of concern (AOCs) (also referred to as sites) located within the Cañon de Valle Aggregate Area to (1) determine the nature and extent of potential contamination at the sites included in this work plan, (2) obtain general site characterization data for the evaluation of remedial alternatives, and (3) conduct confirmatory sampling following removal actions at selected sites.

Corrective actions at Los Alamos National Laboratory are subject to the Compliance Order on Consent (the Consent Order), signed by the New Mexico Environment Department (NMED), the U.S. Department of Energy, the Regents of the University of California, and the State of New Mexico Attorney General on March 1, 2005. The Consent Order was issued pursuant to the New Mexico Hazardous Waste Act, New Mexico Statutes Annotated (NMSA) 1978, § 74-4-10, and the New Mexico Solid Waste Act, NMSA 1978, § 74-9-36(D). This work plan describes proposed work activities that will be executed and completed in accordance with the Consent Order.

This investigation work plan for the Cañon de Valle Aggregate Area contains all information specified in the Consent Order for aggregate areas and NMED-approved outline for this document. Details of site description and operations and historical investigations for each SWMU and AOC are included in a separate historical investigation report.

The Cañon de Valle Aggregate Area consists of 239 SWMUs and AOCs (also referred to as sites), many of which comprise consolidated units in Technical Areas (TAs) -14, -15, and -16. These sites are either located within the Cañon de Valle watershed, or they discharge directly to the Cañon de Valle watershed from the mesa tops. Of the 239 SWMUs and AOCs, 94 are not included in this work plan because (1) no further action (NFA) has been approved or is pending by either the NMED or the U.S. Environmental Protection Agency (53 sites); (2) the sites are included in other investigation work plans (33 sites); or (3) the sites are Resource Conservation and Recovery Act sites which will be closed under interim status (40 CFR Part 265) (8 sites).

The remaining 145 SWMUs and AOCs are included in this work plan for additional investigation and/or corrective action. Of these, 28 SWMUs and AOCs require no additional investigation; investigation of 6 SWMUs has been deferred under Table IV-2 of the Consent Order; 111 SWMUs and AOCs are proposed for investigative sampling and/or corrective action (95 sites are proposed for investigation only, and 16 sites are proposed for corrective action followed by confirmatory sampling). To facilitate the discussion of, and activities proposed for, the large number of SWMUs and AOCs comprising the Cañon de Valle Aggregate Area, the 145 sites included in this work plan are subdivided according to their locations and operational histories into 10 subaggregate areas.

- TA-16-220 Complex—Subaggregate 1 (7 SWMUs and AOCs)
- Material Disposal Area R—Subaggregate 2 (1 SWMU)
- TA-16 Burning Ground—Subaggregate 3 (11 SWMUs and AOCs)
- TA-16 Administrative Area—Subaggregate 4 (32 SWMUs and AOCs)
- TA-16 T-Site—Subaggregate 5 (13 SWMUs and AOCs)
- TA-16 WWII GMX-3 Area—Subaggregate 6 (20 SWMUs and AOCs)
- TA-16-280/260 Complexes—Subaggregate 7 (12 SWMUs and AOCs)
- TA-14 Firing Site Area—Subaggregate 8 (26 SWMUs and AOCs)

- TA-15 West—Subaggregate 9 (21 SWMUs and AOCs)
- TA-16-340 Complex—Subaggregate 10 (2 SWMUs and AOCs)

The main activities associated with the investigations are (1) conducting geodetic and geophysical surveys to locate SWMUs and AOCs and associated subsurface structures, historical sampling locations, and new sampling locations; (2) conducting radiological surveys of surface radiation (beta/gamma); (3) sampling surface and near-surface soil; (4) drilling boreholes and performing subsurface sampling; and (5) conducting confirmatory sampling following removal of structures, surface debris, or excavation of contaminated materials (as necessary).

CONTENTS

1.0 INTRODUCTION 1
1.1 General Site Information 1
1.1.1 Conceptual Site Model 4
1.2 Investigation Scope and Objectives 5

2.0 SUBAGGREGATE 1: TA-16-220 COMPLEX 5
2.1 Surface Conditions 6
2.2 Surface Water 7
2.3 Soil Types 8
2.4 Subsurface Conditions 8
2.4.1 Stratigraphy 8
2.4.2 Cliff Retreat and Fractures 12
2.4.3 Hydrogeology 12
2.5 X-Ray Buildings Drainlines and Outfalls: SWMUs 16-026(i), 16-026(j), and Consolidated Unit 16-026(l)-00 17
2.5.1 Site Description and Operational History 17
2.5.2 Historical Investigations 18
2.6 Building 16-222 Outfall: SWMU 16-020, the Silver Outfall 21
2.6.1 Site Description and Operational History 21
2.6.2 Historical Investigations 22
2.7 Surface Disposal Site: SWMU 16-016(d) 24
2.7.1 Site Description and Operational History 25
2.7.2 Historical Investigations 25
2.8 Oil Switch: AOC C-16-051 26
2.8.1 Site Description and Operational History 26
2.8.2 Historical Investigations 26
2.9 Scope of Investigation Activities 27
2.9.1 X-Ray Buildings Drainlines and Outfalls: SWMUs 16-026(i), 16-026(j), and Consolidated Unit 16-026(l)-00 27
2.9.2 Building 16-222 Outfall: SWMU 16-020, Silver Outfall 28
2.9.3 Surface Disposal Site: SWMU 16-016(d) 28
2.9.4 Oil Switch: AOC C-16-051 29

3.0 SUBAGGREGATE 2: MDA R, SWMU 16-019 29
3.1 Surface Conditions 29
3.2 Surface Water 30
3.3 Soil Types 30
3.4 Subsurface Conditions 30
3.4.1 Stratigraphy 30
3.4.2 Cliff Retreat and Fractures 30
3.4.3 Hydrogeology 30
3.5 MDA R, SWMU 16-019 31
3.5.1 Site Description and Operational History 31
3.5.2 Historical Investigations 31
3.6 Scope of Investigation Activities 35

4.0 SUBAGGREGATE 3: THE TA-16 BURNING GROUND 36
4.1 Surface Conditions 37

4.2 Surface Water 37
4.3 Soil Types 38
4.4 Subsurface Conditions 38
4.4.1 Stratigraphy 38
4.4.2 Cliff Retreat and Fractures 38
4.4.3 Hydrogeology 38
4.5 Filter Basket Wash and Filter Beds: Consolidated Unit 16-010(h)-99 39
4.5.1 Site Description and Operational History 39
4.5.2 Historical Investigations 41
4.6 Southern Drainage: SWMU 16-028(a) 44
4.6.1 Site Description and Operational History 44
4.6.2 Historical Investigations 44
4.7 Scope of Corrective Action and Investigation Activities 45
4.7.1 Filter Basket Wash and Filter Beds: Consolidated Unit 16-010(h)-99 45
4.7.2 Southern Drainage: SWMU 16-028(a) 49

5.0 SUBAGGREGATE 4: TA-16 ADMINISTRATIVE AREA 49
5.1 Surface Conditions 49
5.2 Surface Water 50
5.3 Soil Types 50
5.4 Subsurface Conditions 50
5.4.1 Stratigraphy 50
5.4.2 Cliff Retreat and Fractures 50
5.4.3 Hydrogeology 50
5.5 Steam Plant: Consolidated Unit 16-001(a)-99 50
5.5.1 Site Description and Operational History 51
5.5.2 Historical Investigations 51
5.6 Storage Buildings and Shops: Consolidated Unit 16-017(i)-99 [SWMU 16-017(i) and SWMUs C-16-025 and C-16-026], SWMUs 16-034(h), 16-034(i), 16-034(j), 16-034(k), AOCs C-16-008, C-16-010, C-16-011, C-16-012, C-16-013, C-16-014, C-16-016, C-16-017 52
5.6.1 Site Description and Operational History 52
5.6.2 Historical Investigations 54
5.7 Fuel Storage Tanks: AOCs 16-033(e) and 16-033(f) 56
5.7.1 Site Description and Operational History 56
5.7.2 Historical Investigations 56
5.8 Septic Tank and Systems: SWMU 16-006(a) 58
5.8.1 Site Description and Operational History 58
5.8.2 Historical Investigations 58
5.9 Burn Pit: SWMU 16-009(a) 59
5.9.1 Site Description and Operational History 59
5.9.2 Historical Investigations 59
5.10 Scope of Investigation Activities 60
5.10.1 Steam Plant: Consolidated Unit 16-001(a)-99 60
5.10.2 Storage Buildings and Shops: Consolidated Unit 16-017(i)-99 [SWMU 16-017i) and SWMUs C-16-025 and C-16-026], SWMUs 16-034(h), 16-034(i), 16-034(j), 16-034(k), AOCs C-16-008, C-16-010, C-16-011, C-16-012, C-16-013, C-16-014, C-16-016, C-16-017 61
5.10.3 Fuel Storage Tanks: AOCs 16-033(e) and 16-033(f) 63

5.10.4 Septic Tank and Systems: SWMU 16-006(a) 64
5.10.5 Burn Pit: SWMU 16-009(a) 65

6.0 SUBAGGREGATE 5: T-SITE, CONSOLIDATED UNIT 16-034(b)-99 65
6.1 Surface Conditions 66
6.2 Surface Water 66
6.3 Soil Types 66
6.4 Subsurface Conditions 66
6.4.1 Stratigraphy 66
6.4.2 Cliff Retreat and Fractures 66
6.4.3 Hydrogeology 66
6.5 Laboratories, Offices, and Warehouses: Consolidated Unit 16-034(b)-99 66
6.5.1 Site Description and Operational History 66
6.5.2 Historical Investigations 69
6.6 Scope of Investigation Activities 74

7.0 SUBAGGREGATE 6: WWII GMX-3 AREA 76
7.1 Surface Conditions 77
7.2 Surface Water 77
7.3 Soil Types 77
7.4 Subsurface Conditions 77
7.4.1 Stratigraphy 77
7.4.2 Cliff Retreat and Fractures 77
7.4.3 Hydrogeology 77
7.5 Septic Tank: SWMU 16-005(n) 78
7.5.1 Site Description and Operational History 78
7.5.2 Historical Investigations 78
7.6 HE Storage Magazines: SWMU 16-017(g)-99 and AOC 16-024(b) 79
7.6.1 Site Description and Operational History 79
7.6.2 Historical Investigations 79
7.7 Radiography Buildings: SWMUs 16-025(a) and 16-025(b) 80
7.7.1 Site Description and Operational History 80
7.7.2 Historical Investigations 80
7.8 HE Machining Buildings and Associated Structures: Consolidated Units 16-029(h2)-99 and 16-029(q)-99 82
7.8.1 Site Description and Operational History 82
7.8.2 Historical Investigations 84
7.9 Scope of Investigation Activities 92
7.9.1 Septic Tank: SWMU 16-005(n) 92
7.9.2 HE Storage Magazines: SWMU 16-017(g)-99 and AOC 16-024(b) 93
7.9.3 Radiography Buildings: SWMUs 16-025(a) and 16-025(b) 93
7.9.4 HE-Machining Buildings and Associated Structures: Consolidated Units 16-029(h2)-99, 16-029(q)-99 94

8.0 SUBAGGREGATE 7: TA-16-280/260 COMPLEXES 98
8.1 Surface Conditions 98
8.2 Surface Water 99
8.3 Soil Types 99
8.4 Subsurface Conditions 99
8.4.1 Stratigraphy 99

8.4.2 Cliff Retreat and Fractures 99
8.4.3 Hydrogeology 99
8.5 280 Outfalls: Consolidated Unit 16-003(h)-99 and SWMU 16-026(g) 99
8.5.1 Site Description and Operational History 99
8.5.2 Historical Investigations 101
8.6 260 Outfalls: Consolidated Unit 16-029(j)-99 [SWMUs 16-026(k2) and 16-029(j)], SWMUs 16-003(i) and 16-003(j) 102
8.6.1 Site Description and Operational History 102
8.6.2 Historical Investigations 103
8.7 Cooling Tower: SWMU 16-031(b) and AOC C-16-002 105
8.7.1 Site Description and Operational History 105
8.7.2 Historical Investigations 106
8.8 Underground Storage Tanks: AOCs 16-033(g) and 16-033(h) 106
8.8.1 Site Description and Operational History 106
8.8.2 Historical Investigations 107
8.9 Scope of Investigation Activities 108
8.9.1 280 Outfalls: Consolidated Unit 16-003(h)-99 and SWMU 16-026(g) 108
8.9.2 260 Outfalls: Consolidated Unit 16-029(j)-99 [SWMUs 16-026(k2), 16-029(j)], SWMUs 16-003(i), 16-003(j) 108
8.9.3 Scope of Investigation Activities, Cooling Tower: SWMU 16-031(b) and AOC C-16-002 109
8.9.4 Scope of Investigation Activities, Underground Storage Tanks: AOCs 16-033(g) and 16-033(h) 110

9.0 SUBAGGREGATE 8: TA-14 FIRING SITES 110
9.1 Surface Conditions 111
9.2 Surface Water 111
9.3 Soil Types 111
9.4 Subsurface Conditions 111
9.4.1 Stratigraphy 111
9.4.2 Cliff Retreat and Fractures 112
9.4.3 Hydrogeology 112
9.5 Active Firing Site: AOC 14-001(g) 112
9.5.1 Site Description and Operational History 112
9.5.2 Historical Investigations 112
9.6 Former Firing Sites: Consolidated Units 14-002(a)-99 and 14-002(c)-99 113
9.6.1 Site Description and Operational History 113
9.6.2 Historical Investigations 116
9.7 Former Magazine and Storage Area: AOC 14-004(a) 125
9.7.1 Site Description and Operational History 125
9.7.2 Historical Investigations 125
9.8 HE Sump and Drainline: SWMU 14-006 125
9.8.1 Site Description and Operational History 125
9.8.2 Historical Investigations 126
9.9 Septic System: SWMU 14-007 127
9.9.1 Site Description and Operational History 127
9.9.2 Historical Investigations 127
9.10 Buildings (Removed): AOCs C-14-003, C-14-004, C-14-005, and C-14-007 129
9.10.1 Site Description and Operational History 129

9.10.2 Historical Investigations 129
9.11 Scope of Investigation Activities 131
9.11.1 Active Firing Site: AOC 14-001(g) 131
9.11.2 Consolidated Units 14-002(a)-99 and 14-002(c)-99 133
9.11.3 Storage Magazine: AOC 14-004(a) 136
9.11.4 HE Sump and Drainline: SWMU 14-006 136
9.11.5 Septic System: SWMU 14-007 137
9.11.6 Buildings (Removed): AOCs C-14-003, C-14-004, C-14-005, C-14-007 137

10.0 SUBAGGREGATE 9: TA-15 WEST 139
10.1 Surface Conditions 139
10.2 Surface Water 140
10.3 Soil Types 140
10.4 Subsurface Conditions 140
10.4.1 Stratigraphy 140
10.4.2 Cliff Retreat and Fractures 140
10.4.3 Hydrogeology 140
10.5 Firing Site G: Consolidated Unit 15-004(g)-00 and AOC C-15-001 140
10.5.1 Site Description and Operational History 140
10.5.2 Historical Investigations 141
10.6 MDA Z Landfill: SWMU 15-007(b) 143
10.6.1 Site Description and Operational History 143
10.6.2 Historical Investigations 144
10.7 Debris Disposal Area: SWMU 15-008(d) 145
10.7.1 Site Description and Operational History 146
10.7.2 Historical Investigations 146
10.8 The Hollow: Consolidated Unit 15-009(a)-00, AOC 15-014(g), and AOCs C-15-007 and C-15-010 146
10.8.1 Site Description and Operational History 147
10.8.2 Historical Investigations 149
10.9 Septic Systems: Consolidated Unit 15-009(f)-00 and SWMU 15-009(i) 154
10.9.1 Site Description and Operational History 154
10.9.2 Historical Investigations 154
10.10 Outfalls, Building 15-183: Consolidated Unit 15-014(a)-00 156
10.10.1 Site Description and Operational History 156
10.10.2 Historical Investigations 157
10.11 Scope of Investigation Activities 158
10.11.1 Firing Site G: Consolidated Unit 15-004(g)-00 [SWMUs 15-004(g) and 15-008(c)] and AOC C-15-001 158
10.11.2 MDA Z Landfill: SWMU 15-007(b) 160
10.11.3 Debris Disposal Area: SWMU 15-008(d) 162
10.11.4 The Hollow: Consolidated Unit 15-009(a)-00, AOC 15-014(g), and AOCs C-15-007 and C-15-010 164
10.11.5 Septic Systems: Consolidated Unit 15-009(f)-00, SWMU 15-009(i) 168
10.11.6 Outfalls, Building 15-183: Consolidated Unit 15-014(a)-00 169

11.0 SUBAGGREGATE 10: TA-16-340 COMPLEX 170
11.1 Surface Conditions 170
11.2 Surface Water 171

11.3 Soil Types 171
11.4 Subsurface Conditions 171
11.4.1 Stratigraphy 171
11.4.2 Cliff Retreat and Fractures 171
11.4.3 Hydrogeology 171
11.5 Chemical Storage Outfall: SWMU 16-030(a) 172
11.5.1 Site Description and Operational History 172
11.5.2 Historical Investigations 172
11.6 Organic Chemical Spill: AOC C-16-075 173
11.6.1 Site Description and Operational History 173
11.6.2 Historical Investigations 173
11.7 Scope of Investigation Activities 174
11.7.1 Chemical Storage Outfall: SWMU 16-030(a) 174
11.7.2 Organic Chemical Spill: AOC C-16-075 175

12.0 INVESTIGATION METHODS 175
12.1 Field Surveys 175
12.1.1 Geodetic Surveys 175
12.1.2 Geophysical Surveys 175
12.1.3 Radiological Surveys 176
12.2 Subsurface Characterization 176
12.2.1 Drilling Methods for Boreholes 176
12.2.2 Excavation and Trenching 177
12.3 Collection of Subsurface Samples 178
12.3.1 Field Screening of Subsurface Samples 178
12.3.2 Fixed Laboratory Analytical Methods for Subsurface Samples 180
12.4 Collection of Surface and Shallow Subsurface Samples 180
12.4.1 Field Screening of Surface and Shallow Subsurface Samples 181
12.4.2 Fixed Laboratory Analytical Methods for Surface and Shallow Subsurface Samples 181
12.5 Collection of Geotechnical Data 181
12.6 Collection of Perched Water Samples 181
12.7 Borehole Abandonment 182
12.8 Equipment Decontamination 182

13.0 ONGOING MONITORING AND SAMPLING PROGRAM 183

14.0 SCHEDULE 183

15.0 REFERENCES AND MAP DATA SOURCES 183
15.1 References 183
15.2 Map Data Sources 190

Appendixes

Appendix A Acronyms and Abbreviations, Glossary, Metric Conversion Table, and Data Qualifier Definitions

Appendix B Descriptions of SWMUs and AOCs Recommended for No Further Investigation or Corrective Action

Appendix C Management Plan for Investigation-Derived Waste

Plates

Plate 1 Location of Cañon de Valle watershed, aggregate area, subaggregates, and corresponding SWMUs and AOCs

Plate B-1 Location of Cañon de Valle watershed, aggregate area, subaggregates, and SWMUs and AOCs proposed for no further investigation and/or corrective action

Figures

Figure 1.1-1 Location of Cañon de Valle Watershed and Aggregate Area with respect to the Laboratory TAs and surrounding land holdings 193

Figure 1.1-2 Detailed site map of Subaggregate 1 (TA-16-220 Complex), surrounding SWMUs and AOCs, and subsurface utility corridors 195

Figure 1.1-3 Detailed site map of Subaggregate 2 (MDA R), surrounding SWMUs and AOCs, and subsurface utility corridors 196

Figure 1.1-4 Detailed site map of Subaggregate 3 (Burning Ground), surrounding SWMUs and AOCs, and subsurface utility corridors..... 197

Figure 1.1-5 Detailed site map of Subaggregate 4 (TA-16 Administrative Area), surrounding SWMUs and AOCs, and subsurface utility corridors 198

Figure 1.1-6 Detailed site map of Subaggregate 5 (T-Site), surrounding SWMUs and AOCs, and subsurface utility corridors 199

Figure 1.1-7 Detailed site map of Subaggregate 6 (WWII GMX-3 Area), surrounding SWMUs and AOCs, and subsurface utility corridors 200

Figure 1.1-8 Detailed site map of Subaggregate 7 (TA-16-280/260 Complexes), surrounding SWMUs and AOCs, and subsurface utility corridors 201

Figure 1.1-9 Detailed site map of Subaggregate 8 (TA-14 Firing Site), surrounding SWMUs and AOCs, and subsurface utility corridors..... 202

Figure 1.1-10 Detailed site map of Subaggregate 9 (TA-15 West), surrounding SWMUs and AOCs, and subsurface utility corridors..... 203

Figure 1.1-11 Detailed site map of Subaggregate 10 (TA-16-340 Complex), surrounding SWMUs and AOCs, and subsurface utility corridors 204

Figure 2.4-1 Stratigraphy and geologic correlations at selected borings (west-northwest to east southeast) 205

Figure 2.4-2 Stratigraphy and geologic correlations at selected borings (north to south)..... 206

Figure 2.4-3 Hydrogeologic conceptual model for the Cañon de Valle Aggregate Area 207

Figure 2.4-4 Generalized east-west hydrostratigraphic cross section through the Pajarito Mesa 208
Figure 2.4-5 Elevation of top of regional aquifer for the Pajarito Plateau 209
Figure 2.5-1 Subaggregate 1 (TA-16-220 Complex) historical sampling locations and depths 211
Figure 2.5-2 Subaggregate 1 (TA-16-220 Complex) historical sampling locations with inorganic chemicals detected greater than background values 212
Figure 2.5-3 Subaggregate 1 (TA-16-220 Complex) historical sampling locations with detected organic chemicals 213
Figure 2.9-1 Subaggregate 1 (TA-16-220 Complex) proposed sampling locations and depths 214
Figure 3.5-1 Subaggregate 2 (MDA R) historical sampling locations and depths 215
Figure 3.5-2 Subaggregate 2 (MDA R) historical sampling locations with inorganic chemicals detected greater than background values 216
Figure 3.5-3 Subaggregate 2 (MDA R) historical sampling locations with detected organic chemicals 217
Figure 3.5-4 Subaggregate 2 (MDA R) historical sampling locations with radionuclides detected greater than fallout values 218
Figure 3.6-1 Subaggregate 2 (MDA R) proposed investigation and sampling locations and depths 219
Figure 4.5-1 Subaggregate 3 (Burning Ground) historical sampling locations and depths 220
Figure 4.5-2 Subaggregate 3 (Burning Ground) historical sampling locations with inorganic chemicals detected greater than background values 221
Figure 4.5-3 Subaggregate 3 (Burning Ground) historical sampling locations with detected organic chemicals 222
Figure 4.7-1 Subaggregate 3 (Burning Ground) proposed corrective action and sampling 223
Figure 5.6-1 Subaggregate 4 (TA-16 Administrative Area) historical sampling locations and depths 224
Figure 5.6-2 Subaggregate 4 (TA-16 Administrative Area) historical sampling locations with inorganic chemicals detected greater than background values 225
Figure 5.10-1 Subaggregate 4 (TA-16 Administrative Area) proposed sampling locations and depths: former steam plant 227
Figure 5.10-2 Subaggregate 4 (TA-16 Administrative Area) proposed sampling locations and depths: former storage buildings, shops, and underground storage tanks 228
Figure 5.10-3 Subaggregate 4 (TA-16 Administrative Area) proposed sampling locations and depths: former storage buildings, shops, steam plant, and underground storage tank 229
Figure 5.10-4 Subaggregate 4 (TA-16 Administrative Area) proposed sampling locations and depths: burn pit and septic system 230
Figure 6.5-1 Subaggregate 5 (T-Site) historical sampling locations and depths 231
Figure 6.5-2 Subaggregate 5 (T-Site) historical sampling locations with inorganic chemicals detected greater than background values 232
Figure 6.5-3 Subaggregate 5 (T-Site) historical sampling locations with detected organic chemicals 233
Figure 6.6-1 Subaggregate 5 (T-Site) proposed sampling locations and depths 234
Figure 7.7-1 Subaggregate 6 (WWII GMX-3 Area West) historical sampling locations and depths 235

Figure 7.7-2 Subaggregate 6 (WWII GMX-3 Area West) historical sampling locations with inorganic chemicals detected greater than background values 236
Figure 7.7-3 Subaggregate 6 (WWII GMX-3 Area West) historical sampling locations with detected organic chemicals 237
Figure 7.8-1 Subaggregate 6 (WWII GMX-3 Area East) historical sampling locations and depths 238
Figure 7.8-2 Subaggregate 6 (WWII GMX-3 Area East) historical sampling locations with inorganic chemicals detected greater than background values 239
Figure 7.8-3 Subaggregate 6 (WWII GMX-3 Area East) historical sampling locations with detected organic chemicals 240
Figure 7.9-1 Subaggregate 6 (WWII GMX-3 Area East) proposed sampling locations and depths: SWMU 16-005(n) 241
Figure 7.9-2 Subaggregate 6 (WWII GMX-3 Area West) proposed sampling locations and depths 242
Figure 7.9-3 Subaggregate 6 (WWII GMX-3 Area East) proposed sampling locations and depths 243
Figure 8.5-1 Subaggregate 7 (280/260 Complexes), 16-280 Outfalls, historical sampling locations and depths 245
Figure 8.5-2 Subaggregate 7 (280/260 Complexes), 16-280 Outfalls, historical sampling locations with inorganic chemicals detected greater than background values 246
Figure 8.5-3 Subaggregate 7 (280/260 Complexes), 16-280 Outfalls, historical sampling locations with detected organic chemicals 247
Figure 8.6-1 Subaggregate 7 (280/260 Complexes), 16-260 Outfalls, historical sampling locations and depths 248
Figure 8.6-2 Subaggregate 7 (280/260 Complexes), 16-260 Outfalls, historical sampling locations with inorganic chemicals detected greater than background values 249
Figure 8.6-3 Subaggregate 7 (280/260 Complexes), 16-260 Outfalls, historical sampling locations with detected organic chemicals 250
Figure 8.9-1 Subaggregate 7 (280/260 Complexes) proposed sampling locations and depths: 16-280 Outfalls 251
Figure 8.9-2 Subaggregate 7 (280/260 Complexes) proposed sampling locations and depths: 16-260 Outfalls 252
Figure 8.9-3 Subaggregate 7 (280/260 Complexes) proposed sampling locations and depths: Cooling Tower and Underground Storage Tanks 253
Figure 9.6-1 Subaggregate 8 (TA-14 Firing Site West) historical sampling locations and depths 254
Figure 9.6-2 Subaggregate 8 (TA-14 Firing Site West) historical sampling locations with inorganic chemicals detected greater than background values 255
Figure 9.6-3 Subaggregate 8 (TA-14 Firing Site West) historical sampling locations with detected organic chemicals 256
Figure 9.6-4 Subaggregate 8 (TA-14 Firing Site West) historical sampling locations with radionuclides detected, or detected greater than background values 257
Figure 9.6-5 Subaggregate 8 (TA-14 Firing Site East) historical sampling locations and depths 258
Figure 9.6-6 Subaggregate 8 (TA-14 Firing Site East) historical sampling locations with inorganic chemicals detected greater than background values 259
Figure 9.6-7 Subaggregate 8 (TA-14 Firing Site East) historical sampling locations with radionuclides detected, or detected greater than background values 260

Figure 9.11-1 Subaggregate 8 (TA-14 Firing Site West) proposed radial survey and sampling zones: AOC 14-001(g) 261
Figure 9.11-2 Subaggregate 8 (TA-14 Firing Site West) proposed sampling locations and depths 262
Figure 9.11-3 Subaggregate 8 (TA-14 Firing Site East) proposed sampling locations and depths 263
Figure 10.5-1 Subaggregate 9 (TA-15 West), Firing Site G, historical sampling locations and depths 264
Figure 10.5-2 Subaggregate 9 (TA-15 West), Firing Site G, historical sampling locations with inorganic chemicals detected greater than background values 265
Figure 10.5-3 Subaggregate 9 (TA-15 West), Firing Site G, historical sampling locations with radionuclides detected, or detected greater than background values 266
Figure 10.6-1 Subaggregate 9 (TA-15 West), MDA Z, historical sampling locations and depths 267
Figure 10.6-2 Subaggregate 9 (TA-15 West), MDA Z, historical sampling locations with inorganic chemicals detected greater than background values 268
Figure 10.6-3 Subaggregate 9 (TA-15 West), MDA Z, historical sampling locations with detected organic chemicals 269
Figure 10.6-4 Subaggregate 9 (TA-15 West), MDA Z, historical sampling location with gross gamma activity 270
Figure 10.8-1 Subaggregate 9 (TA-15 West), the Hollow, historical sampling locations and depths 271
Figure 10.8-2 Subaggregate 9 (TA-15 West), the Hollow, historical sampling locations with inorganic chemicals detected greater than background values 272
Figure 10.8-3 Subaggregate 9 (TA-15 West), the Hollow, historical sampling locations with detected organic chemicals 273
Figure 10.8-4 Subaggregate 9 (TA-15 West), AOC C-15-010, TPH-DRO concentrations with depth 274
Figure 10.9-1 Subaggregate 9 (TA-15 West), Septic Systems, historical sampling locations and depths 275
Figure 10.9-2 Subaggregate 9 (TA-15 West), Septic Systems, historical sampling locations with detected inorganic chemicals 276
Figure 10.9-3 Subaggregate 9 (TA-15 West), Septic Systems, historical sampling locations with detected organic chemicals 277
Figure 10.10-1 Subaggregate 9 (TA-15 West), Outfalls, historical sampling locations and depths 278
Figure 10.10-2 Subaggregate 9 (TA-15 West), Outfalls, historical sampling locations with inorganic chemicals detected greater than background values 279
Figure 10.10-3 Subaggregate 9 (TA-15 West), Outfalls, historical sampling locations with detected organic chemicals 280
Figure 10.11-1 Subaggregate 9 (TA-15 West) proposed sampling locations and depths: Firing Site G Surface Disposal and Septic Tank 281
Figure 10.11-2 Subaggregate 9 (TA-15 West) proposed sampling locations and depths: MDA Z 282
Figure 10.11-3 Subaggregate 9 (TA-15 West) proposed sampling locations and depths: SWMU 15-008(d) 283
Figure 10.11-4 Subaggregate 9 (TA-15 West) proposed sampling locations and depths: the Hollow 284
Figure 10.11-5 Subaggregate 9 (TA-15 West) proposed sampling locations and depths: Septic Systems and Outfalls 285

Figure 11.7-1 Subaggregate 10 (TA-16-340 Complex) proposed sampling locations and depths: SWMU 16-030(a) 286
Figure 11.7-2 Subaggregate 10 (TA-16-340 Complex) proposed sampling locations and depths: AOC C-16-075 287

Tables

Table 1.1-1 Cañon de Valle Aggregate Area List of Consolidated Units, SWMUs, and AOCs 289
Table 1.1-2 List of Consolidated Units, SWMUs, and AOCs and Planned Activities in the Cañon de Valle Aggregate Area Investigation Work Plan 301
Table 1.2-1 Human Health Industrial Soil Screening Levels 308
Table 2.2-1 Summary of Surface Water Assessment Results by Subaggregate, Cañon de Valle Aggregate Area 312
Table 2.4-3 Perched Zone Characteristics, Cañon de Valle Wells 314
Table 2.5-1 Subaggregate 1 Summary of Historical Samples Collected in Soil at the X-Ray Buildings: Decision-Level Data 314
Table 2.5-2 Subaggregate 1 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil at the X-Ray Buildings: Decision-Level Data 315
Table 2.5-3 Subaggregate 1 Historical Analytical Results of Organic Chemicals Detected in Soil at the X-Ray Buildings: Decision-Level Data 316
Table 2.6-1 Subaggregate 1 Summary of Historical Samples Collected in Soil, Sediment, and Tuff at the Silver Outfall: Screening- and Decision-Level Data 318
Table 2.6-2 Subaggregate 1 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Sediment, and Tuff at the Silver Outfall: Screening- and Decision-Level Data 320
Table 2.6-3 Subaggregate 1 Historical Analytical Results of Organic Chemicals Detected in Soil, Sediment, and Tuff at the Silver Outfall: Screening- and Decision-Level Data 326
Table 2.9-1 Sampling Strategy for Fixed Laboratory Analyses in the Cañon de Valle Aggregate Area Investigation Work Plan 338
Table 2.9-2 Subaggregate 1 Proposed Samples in Soil and Tuff at the TA-16-220 Complex 345
Table 3.5-1 Subaggregate 2 Summary of Historical Samples Collected in Soil, Fill, Sediment, and Tuff at MDA R: Decision-Level Data 349
Table 3.5-2 Subaggregate 2 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil, Fill, and Tuff at the Landfill at MDA R: Decision-Level Data 353
Table 3.5-3 Subaggregate 2 Historical Analytical Results of Organic Chemicals Detected in Soil, Fill, and Tuff at the Landfill at MDA R: Decision-Level Data 359
Table 3.5-4 Subaggregate 2 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, and Sediment at Downgradient Drainage Locations at MDA R: Decision-Level Data 363
Table 3.5-5 Subaggregate 2 Historical Analytical Results of Organic Chemicals Detected in Soil, Fill, and Sediment at Downgradient Drainage Locations at MDA R: Decision-Level Data 365

Table 3.5-6 Subaggregate 2 Historical Analytical Results of Radionuclides Detected Greater Than Fallout Values in Sediment at Downgradient Drainage Locations at MDA R: Decision-Level Data 366
Table 3.5-7 Subaggregate 2 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil and Sediment at Upgradient Drainage Locations at MDA R: Decision-Level Data 367
Table 3.5-8 Subaggregate 2 Historical Analytical Results of Organic Chemicals Detected in Soil at Upgradient Drainage Locations at MDA R: Decision-Level Data 367
Table 3.6-1 Subaggregate 2 Proposed Samples in Soil and Tuff at MDA R 368
Table 4.5-1 Subaggregate 3 Summary of Historical Samples Collected in Soil, Fill, Sediment, and Tuff at the TA-16 Burning Ground: Decision-Level Data 370
Table 4.5-2 Subaggregate 3 Summary of Historical Samples Collected in Soil at the TA-16 Burning Ground: Screening-Level Data 372
Table 4.5-3 Subaggregate 3 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, Sediment, and Tuff at the TA-16 Burning Ground: Decision-Level Data 373
Table 4.5-4 Subaggregate 3 Historical Analytical Results of Organic Chemicals Detected in Soil, Fill, Sediment, and Tuff at the TA-16 Burning Ground: Decision-Level Data 381
Table 4.5-5 Subaggregate 3 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil at the TA-16 Burning Ground: Screening-Level Data 393
Table 4.7-1 Subaggregate 3 Proposed Samples in Soil and Tuff at the TA-16 Burning Ground 394
Table 5.6-1 Subaggregate 4 Summary of Historical Samples Collected in Soil and Fill at TA-16 Administrative Area Storage Buildings: Decision-Level Data 396
Table 5.6-2 Subaggregate 4 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil and Fill at TA-16 Administrative Area Storage Buildings: Decision-Level Data 397
Table 5.10-1 Subaggregate 4 Proposed Samples in Soil and Tuff at the TA-16 Administrative Area 398
Table 6.5-1 Subaggregate 5 Summary of Historical Samples Collected in Soil at T-Site Laboratories, Offices, and Warehouses: Decision-Level Data 408
Table 6.5-2 Subaggregate 5 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil at T-Site Laboratories, Offices, and Warehouses: Decision-Level Data 409
Table 6.5-3 Subaggregate 5 Historical Analytical Results of Organic Chemicals Detected in Soil at T-Site Laboratories, Offices, and Warehouses: Decision-Level Data 410
Table 6.6-1 Subaggregate 5 Proposed Samples in Tuff at T-Site 411
Table 7.7-1 Subaggregate 6 Summary of Historical Samples Collected in Soil at Radiography Buildings: Decision-Level Data 414
Table 7.7-2 Subaggregate 6 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil at Radiography Buildings: Decision-Level Data 414
Table 7.7-3 Subaggregate 6 Historical Analytical Results of Organic Chemicals Detected in Soil at Radiography Buildings: Decision-Level Data 414
Table 7.8-1 Subaggregate 6 Summary of Historical Samples Collected in Soil, Fill, and Tuff at HE Machining Buildings and Associated Structures: Screening- and Decision-Level Data 415

Table 7.8-2 Subaggregate 6 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, and Tuff at HE Machining Buildings and Associated Structures: Screening- and Decision-Level Data 418
Table 7.8-3 Subaggregate 6 Historical Analytical Results of Organic Chemicals Detected in Soil, Fill, and Tuff at HE Machining Buildings and Associated Structures: Screening- and Decision-Level Data 427
Table 7.9-1 Subaggregate 6 Proposed Samples in Soil and Tuff at WWII GMX 3 Sites 436
Table 8.5-1 Subaggregate 7 Summary of Historical Samples Collected in Soil, Sediment, and Tuff at TA 16 280 Outfalls: Decision-Level Data 441
Table 8.5-2 Subaggregate 7 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Sediment, and Tuff at TA 16 280 Outfalls: Decision-Level Data 442
Table 8.5-3 Subaggregate 7 Historical Analytical Results of Organic Chemicals Detected in Soil, Sediment, and Tuff at TA-16-280 Outfalls: Decision-Level Data 444
Table 8.6-1 Subaggregate 7 Summary of Historical Samples Collected in Soil, Fill, Sediment, and Tuff at TA-16-260 Outfalls: Decision-Level Data 447
Table 8.6-2 Subaggregate 7 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, Sediment, and Tuff at TA-16-260 Outfalls: Decision-Level Data 448
Table 8.6-3 Subaggregate 7 Historical Analytical Results of Organic Chemicals Detected in Soil, Fill, Sediment, and Tuff at TA-16-260 Outfalls: Decision-Level Data 452
Table 8.9-1 Subaggregate 7 Proposed Samples in Soil and Tuff at TA-16-280/260 Outfalls 453
Table 9.6-1 Subaggregate 8 Summary of Historical Samples Collected in Soil and Sediment at Former Firing Sites: Screening- and Decision-Level Data 456
Table 9.6-2 Subaggregate 8 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil and Sediment at Former Firing Sites: Screening- and Decision-Level Data 459
Table 9.6-3 Subaggregate 8 Historical Analytical Results of Organic Chemicals Detected in Soil and Sediment at Former Firing Sites: Screening- and Decision-Level Data 463
Table 9.6-4 Subaggregate 8 Historical Analytical Results of Radionuclides Detected or Detected Greater Than Background Values in Soil and Sediment at Former Firing Sites: Screening- and Decision-Level Data 465
Table 9.8-1 Subaggregate 8 Summary of Historical Samples Collected in Soil and Sediment at HE Sump and Drainline: Screening-Level Data 467
Table 9.8-2 Subaggregate 8 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil and Sediment at HE Sump and Drainline: Screening-Level Data 467
Table 9.8-3 Subaggregate 8 Historical Analytical Results of Radionuclides Detected or Detected Greater Than Background Values in Soil and Sediment at HE Sump and Drainline: Screening-Level Data 468
Table 9.9-1 Subaggregate 8 Summary of Historical Samples Collected in Soil and Sludge from Septic System: Screening-Level Data 469
Table 9.9-2 Subaggregate 8 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil from Septic System: Screening-Level Data 469

Table 9.9-3 Subaggregate 8 Historical Analytical Results of Radionuclides Detected or Detected Greater Than Background Values in Soil from Septic System: Screening-Level Data 470
Table 9.10-1 Subaggregate 8 Summary of Historical Samples Collected in Soil at Removed Buildings: Screening-Level Data 470
Table 9.10-2 Subaggregate 8 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil at Removed Buildings: Screening-Level Data 471
Table 9.10-3 Subaggregate 8 Historical Analytical Results of Radionuclides Detected in Soil at Removed Buildings: Screening-Level Data 471
Table 9.11-1 Subaggregate 8 Proposed Samples in Soil and Tuff at TA-14 Firing Sites 472
Table 10.5-1 Subaggregate 9 Summary of Historical Samples Collected in Soil and Tuff at Firing Site G at TA-15 West: Screening- and Decision-Level Data 477
Table 10.5-2 Subaggregate 9 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil at Firing Site G at TA-15 West: Screening-Level Data 478
Table 10.5-3 Subaggregate 9 Historical Analytical Results of Radionuclides Detected Greater Than Background Values in Soil and Tuff at Firing Site G at TA-15 West: Decision-Level Data 479
Table 10.6-1 Subaggregate 9 Summary of Historical Samples Collected in Soil at MDA Z at TA-15 West: Screening-Level Data 480
Table 10.6-2 Subaggregate 9 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil at MDA Z at TA-15 West: Screening-Level Data 483
Table 10.6-3 Subaggregate 9 Historical Analytical Results of Organic Chemicals Detected in Soil at MDA Z at TA-15 West: Screening-Level Data 487
Table 10.6-4 Subaggregate 9 Historical Analytical Results of Radionuclides Detected in Soil at MDA Z at TA-15 West: Screening-Level Data 488
Table 10.8-1 Subaggregate 9 Summary of Historical Samples Collected in Soil, Fill, Tuff, and Sludge at the Hollow at TA-15 West: Screening- and Decision-Level Data 489
Table 10.8-2 Subaggregate 9 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, Tuff, and Sludge at the Hollow at TA-15 West: Screening- and Decision-Level Data 492
Table 10.8-3 Subaggregate 9 Historical Analytical Results of Organic Chemicals Detected in Soil, Fill, Tuff, and Sludge at the Hollow at TA-15 West: Screening- and Decision-Level Data 498
Table 10.9-1 Subaggregate 9 Summary of Historical Samples Collected in Sludge from Septic Systems at TA-15 West: Screening-Level Data 519
Table 10.9-2 Subaggregate 9 Historical Analytical Results of Inorganic Chemicals Detected in Sludge from Septic Systems at TA-15 West: Screening-Level Data 520
Table 10.9-3 Subaggregate 9 Historical Analytical Results of Organic Chemicals Detected in Sludge from Septic Systems at TA-15 West: Screening-Level Data 521
Table 10.10-1 Subaggregate 9 Summary of Historical Samples Collected in Soil at Outfalls at TA-15 West: Screening-Level Data 522
Table 10.10-2 Subaggregate 9 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil at Outfalls at TA-15 West: Screening-Level Data 523

Table 10.10-3 Subaggregate 9 Historical Analytical Results of Organic Chemicals Detected in Soil at Outfalls at TA-15 West: Screening-Level Data 524
Table 10.11-1 Subaggregate 9 Proposed Samples in Soil and Tuff at TA-15 West 526
Table 11.7-1 Subaggregate 10 Proposed Samples in Soil and Tuff at SWMU 16-030(a) 534
Table 11.7-2 Subaggregate 10 Proposed Samples in Soil and Tuff at AOC C-16-075 535
Table 12.0-1 Summary of Field SOPs and QPs 536
Table 12.3-1 Analytical Methods for Chemical Analyses 541

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 (LANS), 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 covers 40 mi^2 of the Pajarito Plateau, which consists of a series of finger-like mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation between 6200 and 7800 ft above mean sea level (amsl).

The Laboratory's Environmental Programs Directorate, formerly the Environmental Restoration (ER) Project, is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of the project is to ensure that past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, the project is currently investigating sites potentially contaminated by past Laboratory operations. The sites under investigation are designated as either consolidated units, solid waste management units (SWMUs) or areas of concern (AOCs).

The consolidated units, SWMUs, and AOCs addressed in this investigation work plan are potentially contaminated with both hazardous and radioactive components. The New Mexico Environment Department (NMED), pursuant to the New Mexico Hazardous Waste Act (HWA), regulates cleanup of hazardous wastes and hazardous constituents. The DOE regulates cleanup of radioactive contamination, pursuant to DOE Order 5400.5, "Radiation Protection of the Public and the Environment," and DOE Order 435.1, "Radioactive Waste Management." Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

Corrective actions at the Laboratory are subject to the Compliance Order on Consent (the Consent Order) signed by NMED, DOE, the Regents of the University of California, and the State of New Mexico Attorney General on March 1, 2005. The Consent Order was issued pursuant to the New Mexico HWA, New Mexico Statutes Annotated (NMSA) 1978, § 74-4-10, and the New Mexico Solid Waste Act, NMSA 1978, § 74-9-36(D). This work plan describes proposed work activities that will be executed and completed in accordance with the Consent Order.

This investigation work plan for the Cañon de Valle Aggregate Area contains all information specified in the Consent Order for aggregate areas and the approved outline for this document (NMED 2006, 93017). Details of site description and operations and historical investigations for each SWMU and AOC are included in a separate historical investigation report (HIR) (LANL 2006, 91697).

1.1 General Site Information

The Cañon de Valle Aggregate Area consists of 239 SWMUs and AOCs (also referred to as sites), many of which comprise consolidated units. The sites are either located within the Cañon de Valle watershed or they discharge directly to the Cañon de Valle watershed from the mesa tops (Figure 1.1-1, Plate 1, and Table 1.1-1).

Of the 239 SWMUs and AOCs, 94 are not included in this work plan (Table 1.1-1). The current regulatory status of these 94 sites is as follows:

- 22 SWMUs were removed from Module VIII of the Laboratory's Hazardous Waste Facility Permit by NMED, and no further action (NFA) is required (Kelley 1998, 63042; NMED 2001, 70010; Young 2001, 70236).
- 21 AOCs have NFA approval by the U.S. Environmental Protection Agency (EPA) (King 2005, 88464) and do not require additional action under the Consent Order.
- 10 SWMUs have requests for removal from Module VIII or NFA proposals pending action by NMED (LANL 2001, 71096; LANL 2002, 73664; and LANL 2005, 91544). The status of these sites is identified in Table 1.1-1 as "Pending."
- 33 SWMUs are addressed in other investigation work plans or by other Consent-Order-required decisions.
- 8 SWMUs are Resource Conservation and Recovery Act (RCRA) sites that will be closed under interim status (40 CFR Part 265) and are not subject to the Consent Order.

The remaining 145 SWMUs and AOCs are included in this work plan for additional investigation and/or corrective action (Table 1.1-2). Twenty-eight SWMUs and AOCs are recommended for no future investigation/corrective action and are listed in Appendix B of this work plan. Investigation of six of the SWMUs has been deferred under Table IV-2 of the Consent Order. Investigative sampling and/or corrective action is proposed for the remaining 111 SWMUs and AOCs; 95 sites are proposed for investigation only, and 16 sites are proposed for corrective action, followed by confirmatory sampling. To facilitate discussion of the large number of SWMUs and AOCs comprising this aggregate area, the 145 SWMUs and AOCs are subdivided into 10 subaggregate areas, based upon their location and operational history.

- Technical Area (TA) 16-220 Complex—Subaggregate 1 (7 SWMUs and AOCs): The 220 Complex is located in the northwest area of TA-16 (Figure 1.1-2) and was used for radiography of high explosives (HE) components of nuclear weapons for many years. The radiography area of TA-16 was built in 1952 and consisted of seven buildings. Three rest houses, three x-ray buildings, and a centrally located photoprocessing building were connected by enclosed walkways. The complex was removed by the decontamination and decommissioning (D&D) project in 2003. No HE processing was done in the complex.
- Material Disposal Area (MDA) R—Subaggregate 2 (1 SWMU): MDA R, SWMU 16-019, consists of the original World War II (WWII) S-Site burning ground and associated waste disposal site and is located north of building 16-260 and south of Cañon de Valle (Figure 1.1-3). MDA R was built in the mid-1940s and was used until the early 1950s as a burning ground for waste explosives.
- TA-16 Burning Ground—Subaggregate 3 (11 SWMUs and AOCs): The TA-16 Burning Ground is located in the northeastern corner of TA-16 (Figure 1.1-4) and was constructed in 1951 for HE treatment by burning. Until 1984, following treatment, residual material was placed in the MDA P landfill. After 1984, the treated material was taken to TA-54 for disposal.
- TA-16 Administrative Area—Subaggregate 4 (32 SWMUs and AOCs): The TA-16 Administrative Area is located in the western part of the Cañon de Valle watershed (Figure 1.1-5) and consists of sites not used for HE processing. These sites are associated with a steam plant, storage buildings, a dry well system, a septic system, a trash (non-HE) burning site, the outfall from the TA-16 fire station, underground storage tanks (USTs), and soil contamination areas. The majority of sites in the TA-16 Administrative Area have not been investigated.

- TA-16 T-Site—Subaggregate 5 (13 SWMUs and AOCs): T-Site (formerly TA-24) is located in the northwestern portion of TA-16 (Figure 1.1-6), northwest of the S-Site explosives manufacturing complex, and consists of sites associated with HE-related magazines, hutments, warehouses, shops, laboratories, and a septic system. TA-24, constructed between 1944 and 1950, was used primarily for radiography of HE charges. Intentional burning in 1960 destroyed most of the structures, and residual debris and subsurface structures were removed in 1966. No structures remain on the site, and it has become overgrown with trees.
- TA-16 WWII GMX-3 Area—Subaggregate 6 (20 SWMUs and AOCs): The WWII GMX-3 operations are located in the north-central portion of TA-16 (Figure 1.1-7) and were devoted to developing techniques to produce HE lenses, the explosives components of a nuclear weapon, with both high chemical purity and accurate shapes. SWMUs and AOCs include potential soil contamination at footprints of former HE-machining buildings, including the associated sumps and drainlines. All the buildings were built in 1948 and closed in 1959. Intentional burning in 1960 destroyed the buildings. Explosive residues were removed to TA-54, and noncombustibles were disposed of at MDA P (SWMU 16-018). The sumps and drainlines were removed in 1967.
- TA-16-280/260 Complexes—Subaggregate 7 (12 SWMUs and AOCs): The 280/260 Complexes are located south of MDA R in the central portion of TA-16 (Figure 1.1-8), and the sites consist of sumps, drainlines, outfalls, and associated contaminated soil for HE processing buildings 16-260 (exclusive of the main HE-machining outfall) and 16-280. Building 16-280, which was a physical inspection and metrology laboratory for HE and other weapons components, was also a staging facility for assembling test device components.
- TA-14 Firing Site Area—Subaggregate 8 (26 SWMUs and AOCs): The TA-14 Firing Site area is located north of Cañon de Valle and east of TA-16 (Figure 1.1-9) and includes sites associated with firing sites, burning areas, an incinerator, an HE sump and drainline, and a septic system. Known as Q-site, TA-14 has been used since 1944 for explosives development and testing, including testing that involves radioactive materials. In 1952, the firing site was renovated, the structures were removed, and a new firing site was constructed. Investigation of five SWMUs at TA-14 has been deferred under Table IV-2 of the Consent Order.
- TA-15 West—Subaggregate 9 (21 SWMUs and AOCs): TA-15 West is located on the western portion of the Cañon de Valle watershed (Figure 1.1-10) and includes sites associated with the area known as ”the Hollow” and areas associated with firing support buildings. It also includes small firing sites as well as a waste disposal area known as MDA Z. Investigation of SWMU 15-004(g) has been deferred under Table IV-2 of the Consent Order.
- TA-16-340 Complex—Subaggregate 10 (2 SWMUs and AOCs): The 340 Complex is located in the northeastern corner of TA-16 (Figure 1.1-11) and consists of two sites associated with the 340 Complex that have not been previously investigated. The 340 Complex operated from 1952 to 1999 and processed and produced large quantities of plastic-bonded explosives. The plastic-bonded explosives were produced by slurrying HE and solvents together with inert binders. HE- and solvent-contaminated wash water were routed as waste to six sumps associated with building 16-340 and to the single sump and outfall associated with building 16-342. Historically, discharges from buildings 16-340 and 16-342 sumps were routed to buildings 16-340 and 16-342 Outfalls, respectively. During the D&D activities, which occurred between October 2004 and April 2005, the buildings and man-made fixtures associated with the TA-16-340 Complex were removed.

Additional data are needed to define the extent of potential contamination for all 111 remaining sites. Brief historical summaries and proposed investigation plans for each of the 10 subaggregates are presented in

sections 2.0 through 11.0. Details of historical investigations for each consolidated unit, SWMU, or AOC are included in the historical investigation report (HIR) for the Cañon de Valle Aggregate Area (LANL 2006, 91697).

1.1.1 Conceptual Site Model

A conceptual site model (CSM) is prepared based on the existing knowledge about a site and describes potential contaminants, environmental media to which individuals may be exposed, media through which chemicals may be transported to potential receptors, and any currently uncontaminated media that may become contaminated in the future resulting from contaminant migration (EPA 1989, 08021, p. 4-10). In general, while the source of contamination is specific to each site, the transport mechanisms and potential receptors for each CSM are similar for all subaggregates in the Cañon de Valle Aggregate Area and are summarized below.

Transport Mechanisms

The following current transport mechanisms (secondary transport if a site is inactive) may lead to the exposure of human and/or ecological receptors:

- Dissolution and/or particulate transport of surface contaminants during rainfall and snowmelt runoff events (surface soil only)
- Airborne transport of contaminated surface soil
- Continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in surface/subsurface soil
- Biotic perturbation and translocation of contaminants in subsurface soil

Potential Receptors

The current and potential human receptors reasonably expected to be present at the Cañon de Valle Aggregate Area are on-site workers.

The potential pathways for human exposure to surface soil and tuff are incidental soil ingestion, dermal contact, and inhalation of vapors and particulates. Pathways from subsurface contamination to potential human receptors would be complete only if contaminated subsurface soil or tuff were excavated and brought to the surface. The potential pathways would then be similar to those of a surface soil release (i.e., inhalation of vapors or fugitive dust, dermal contact, and incidental soil ingestion).

Terrestrial ecological receptors are expected to be present at the Cañon de Valle Aggregate Area. For ecological receptors, exposure pathways from potential contaminants in surface soil include inhalation of vapors or fugitive dust, incidental ingestion of soil, dermal contact, root uptake by plants, and food web transport. Exposure pathways from subsurface contamination to potential surface-dwelling animals would be complete only if contaminated subsurface soil or tuff were excavated and brought to the surface. Pathways from subsurface releases may be complete for plants and burrowing animals, including the uptake of contaminants by plant roots and the exposure of burrowing animals through inhalation of vapors or dust, incidental ingestion of soil, dermal contact, and food web transport.

Exposure to groundwater at the Cañon de Valle Aggregate Area is an incomplete pathway for both human and ecological receptors because the depth to regional alluvial groundwater. The depth to groundwater is discussed further in section 2.4.3. Although precipitation events may result in the short-

term intermittent presence of surface water, exposure to surface water at the Cañon de Valle Aggregate Area is an incomplete pathway for both human and ecological receptors because in general no perennial surface water bodies exist. If the CSM summarized for each of the SWMUs and AOCs associated with the Cañon de Valle Aggregate Area is different than the generic CSM summarized above, the site-specific CSM is included in the section describing historical investigations at each site. Surface water site assessments at each site have been conducted according to standard operating procedure (SOP) 02.01.

1.2 Investigation Scope and Objectives

The objectives of this investigation are to (1) determine the nature and extent of contamination at the sites included in this work plan, (2) obtain general site characterization data for the evaluation of remedial alternatives, and (3) conduct confirmatory sampling following removal actions at selected sites.

To help achieve these objectives, this investigation work plan

- identifies additional characterization data requirements based upon a review of SWMU and AOC historical data;
- establishes the rationale for characterization, data collection, and analysis;
- determines appropriate methods and protocols for sample collection and analysis to finalize the characterization of each SWMU and AOC; and
- describes protocols for removal actions at selected SWMUs and AOCs and subsequent confirmatory sampling.

Table 1.2-1 summarizes the industrial soil screening levels (SSLs) for the Cañon de Valle Aggregate Area chemicals. The industrial SSLs were obtained from NMED guidance (NMED 2006, 92513) and EPA Region 6 or Region 9 guidance (EPA 2005, 91002; http://www.epa.gov/region09/waste/sfund/prg/). The SSLs in NMED guidance (NMED 2006, 92513) were used when available. For chemicals without NMED SSLs, the EPA Region 6 screening levels (EPA 2005, 91002) or EPA Region 9 preliminary remediation goals (PRGs) were used. For radionuclides, Laboratory screening action levels (SALs) were used (LANL 2005, 88493).

Investigation field methods common to all subaggregates are presented in section 12. All procedures cited in this document are identified as either an SOP or a quality procedure (QP). Section 13.0 provides information on on-going monitoring and sampling programs in the aggregate area. Section 14.0 describes the schedule for submittal of investigation reports (IRs) for the Cañon de Valle Aggregate Area. References and map data sources are provided in section 15. Appendix A presents the list of acronyms and abbreviations used in this investigation work plan and provides a glossary, metric conversion table, and data qualifier definition table. Appendix B provides a summary of SWMUs and AOCs currently proposed for no additional investigation and/or corrective action. Appendix C contains the management plan for investigation-derived waste (IDW). The map data sources are provided in section 15.2.

2.0 SUBAGGREGATE 1: TA-16-220 COMPLEX

Subaggregate 1, the 220 Complex, consists of the following SWMUs and AOCs (Figure 1.1-2): SWMUs 16-026(i) and 16-026(j), Consolidated Unit 16-026(l)-00 [SWMUs 16-026(l) and 16-028(c)], SWMUs 16-020, and 16-016(d), and AOC C-16-051. These sites are further organized into the following areas: the x-ray buildings drainlines and outfalls, the Silver Outfall, the building 16-222 Outfall, surface disposal site, and oil switches.

The 220 Complex was used for radiography of HE parts for nuclear weapons for many years (LANL 1995, 57225, pp. 5-28-9 to 5-28-13). The radiography area of TA-16 was built in 1952 and consisted of seven buildings (LANL 1995, 57225, p. 5-28-9). Three rest houses, three x-ray buildings, and a centrally located photoprocessing building were connected by enclosed walkways. The complex was removed by D&D in 2003 (Border Demolition and Environmental, Inc., 2005, 92461). Several buildings in the complex (e.g., 16-226) were used for x-ray radiography of HE parts. No HE processing was performed in the complex (LANL 1995, 57225, pp. 5-28-9 to 5-28-13). Film developing for all of the radiography buildings was done in a central facility, building 16-222 (LANL 1995, 57225, pp. 6–8). Photoprocessing effluent from building 16-222 was discharged to an outfall [SWMU 16-030(c)] to the south of the building (LANL 1995, 57225, pp. 6–8).

2.1 Surface Conditions

The Cañon de Valle watershed consists of roughly east- to southeast-trending, flat-topped mesas that drain predominantly into Cañon de Valle. Fishladder Canyon, located in the eastern portion of the watershed, is a small tributary canyon that drains in a southeasterly direction into Cañon de Valle. At the southeastern end of the watershed, the Cañon de Valle watershed terminates in the confluence with Water Canyon. Source waters are predominantly from storm and snowmelt runoff that flows from the Sierra de Los Valles mountains (i.e., the eastern front of the Jemez mountains), located to the west of the Laboratory (LANL 2005, 92028, pp. 2-104 to 2-107) and flow from perennial springs. One site, SWMU 16-030(a), is located to the south of the Cañon de Valle watershed in the Martin Spring Canyon tributary, which drains in an east-southeasterly direction into Water Canyon (Plate 1).

The mesa tops range from 7700 ft amsl at the western Laboratory boundary to 7200 ft amsl at the southern tip of the watershed and overlook the confluence with Water Canyon. Cañon de Valle is fairly narrow and steep near its headwaters in the Sierra de Los Valles headlands, located west of the Laboratory boundary. The headlands transition into the mesa top at the western Laboratory boundary, and Cañon de Valle becomes broader with a gentler gradient for approximately 0.5 mi east of the western Laboratory boundary. At this point, the canyon steepens and narrows with up to 300-ft-tall cliffs at its terminus with Water Canyon (Plate 1).

The 200-ft-high mesa underlying TA-16 trends east to west and is bounded by Cañon de Valle to the north and Water Canyon to the south (Plate 1). The Cañon de Valle watershed is located in the northern third of the mesa. TA-09, TA-14, and TA-15 are located to the north of Cañon de Valle, adjacent to the TA-16 northern boundary.

Subaggregate 1 is located in the northwestern portion of TA-16 and straddles Cañon de Valle. In the western half of Subaggregate 1, Cañon de Valle flattens as it transitions between the mesa top and the Jemez mountains, located just to the west of the Laboratory boundary. The steep cliffs common to the mesa and Cañon de Valle occur in the eastern portion of Subaggregate 1 and to the west of the Laboratory boundary (Plate 1). Elevations at Subaggregate 1 range from 7600 to 7500 ft amsl. The canyon in the western portion of Subaggregate 1 has a gradient of about 2% to 5%, which increases to the east.

The majority of the SWMUs and AOCs in Subaggregate 1 are located on the mesa top, with the exception of SWMU 16-020, an outfall that drains along the axis of Cañon de Valle in the central to eastern portion of Subaggregate 1 (Plate 1).

In May 2000, the Cerro Grande fire caused no damage from the outfall to the first rock check dam located approximately 245 ft below the outfall. However, below the second rock check dam (385 ft below the

outfall), much of the ground cover and several of the ponderosa pine trees were damaged by the fire (LANL 2001, 71342, p. 30).

The surface vegetation community at TA-16 as a whole consists of species typical of the Rocky Mountain Montane Conifer forest, which contains several distinct habitat types (LANL 1998, 59891, pp. B-41 to B-43). The most prevalent habitat type on the mesa tops and in the area surrounding Subaggregate 1 is ponderosa pine/Gambel oak. Canyon bottoms, such as Fishladder Canyon, 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 RCRA facility investigation (RFI) report for Consolidated Unit16-021(c)-99 (LANL 1998, 59891, pp. B-32 to B-43).

2.2 Surface Water

Cañon de Valle has a drainage area of 4 mi^2, and surface water is perennial from Burning Ground Spring to stream gage E256 (Cañon de Valle below MDA P) (Plate 1). Intermittent surface water occurs from natural and anthropogenic sources to stream gage E262 (Cañon de Valle confluence with Water Canyon) (LANL 2005, 92028, p. 3-A-36). Permanant gaging stations located in the Cañon de Valle watershed consist of E253, located outside the western Laboratory boundary; E256, in the central portion of the watershed below MDA P; E257, in the headwaters of Fishladder Canyon at the Burning Ground; and E262, located at the confluence of Cañon de Valle and Water Canyon (Plate 1).

Metals, including of arsenic, lead, vanadium, and silver, were detected above the corresponding stormwater screening action level (wSAL) limits at gaging stations E256 and E262. Arsenic and vanadium were detected above the wSAL limits in gaging station E257 (LANL 2006, 92600, Attachment 2, Table A2). HE, including HMX (high-melting explosive [also 1,3,5,7-tetranitro-1,3,5,7-tetrazocine]) and RDX (research department explosive [hexahydro-1,3,5-trinitro-1,3,5-triazine]), were also detected at gaging stations E256, E257, and E262 (LANL 2006, 92600, Attachment 2, Table A9). RDX did not exceed the wSAL, no wSAL is available for the other HE (LANL 2006, 92600, Attachment 2, Table A9).

Several springs issue from the Bandelier Tuff in the upper reaches of Cañon de Valle (Plate 1). Peter Seep, SWSC [Sanitary Wastewater Systems Consolidation Plant] Spring, and Burning Ground Spring are located in Cañon de Valle. Fishladder Seep is located in Fishladder Canyon, a tributary to Cañon de Valle. Martin Spring is located in Martin Spring Canyon (Plate 1) but actually flows into Water Canyon (LANL 2005, 92028, p. 3-A-37). Hollow Spring is a seep located in the Hollow (TA-15 West subaggregate), near stormwater runoff monitoring sampling location CDV-SMA-8 (Plate 1).

The following inorganic chemicals were detected in the on-site springs: chloride, sodium, manganese, nitrate, barium, and boron. HE and solvents were also detected. The main chemicals of potential concern (COPCs) are HE and barium. Concentrations of high-melting explosives (HMX), RDX, and 2,4,6-trinitrotoluene (TNT) range to 32, 330, and 3 µg/L, respectively. Barium concentrations range up to 1310 µg/L. In addition, concentrations of RDX exceed 6.1 ppb in Martin and Fishladder Canyons (LANL 2005, 92028, p. 3-A-37).

Site-specific stormwater runoff monitoring is conducted by the Federal Facility Compliance Agreement/Administrative Order for sites at site-monitoring area (SMA) sampling locations. Site-specific monitoring is required for sites with a medium or high potential for constituents in surface water and/or sediment in stormwater runoff to migrate off the site and impact surface water quality. Sites with an erosion matrix score of between 40 and 60 are considered to have a medium potential. Sites with an

erosion matrix score of greater than 60 are considered to have a high potential. The specific sites (Plate 1) monitored in Subaggregate 1 are listed in Table 2.2-1.

Silver (maximum concentration of 127 µg/L) was detected above the wSAL at CDV-SMA-1.4. Arsenic (maximum concentration of 26.3 µg/L) and vanadium (maximum concentration of 145 µg/L) were detected above the wSALs at CDV-SMA-1.5. Vanadium (maximum concentration of 104 µg/L) was detected above the wSAL at CDV-SMA-2.4 (LANL 2006, 92600, Attachment 2, Table B2). Gross alpha (maximum activity of 23.5 pCi/L) was detected slightly above the wSAL at CDV-SMA-2 (LANL 2006, 92600, Attachment 2, Table B4). HE were detected at CDV-SMA-1.5 and CDV-SMA-2.4 (LANL 2006, 92600, Attachment 2, Table B9).

Surface water in TA-16 consists of stormwater, snowmelt runoff, and perennial spring flow in small drainages or by sheet flow into Cañon de Valle. Cañon de Valle also contains flowing water during snowmelt and storm events.

Surface water runoff and associated infiltration into soil are probably the most important hydrologic transport pathways at TA-16. HE and barium, the principal COPCs at TA-16, are moderately to strongly soluble and are transported in surface water. The following six aspects of the surface hydrology at TA-16 may be relevant to contaminant transport (LANL 1998, 59891, pp. B-16–B-17):

- the location of pathways of surface water runoff and associated sediment deposition
- rates of soil erosion, transport, and sedimentation
- the effects of operational or fire disturbances on surface hydrology
- the relative importance of surface runoff versus infiltration as transport pathways in different soil types
- the solubility and sorption behavior of the COPCs
- the ultimate fate of surface water at TA-16

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

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 at TA-16 is provided in Appendix B of the Phase II RFI report for Consolidated Unit 16-021(c)-99 (LANL 1998, 59891, 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), CdV-R-15-3 (TD of 1722 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) (TD of 1063 ft bgs), CdV-16-3(i) (TD of 1405 ft bgs) (LANL 2005, 92028, Table 1-2). 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 and rely heavily on the stratigraphy observed in wells R-25 (Broxton et al. 2002, 72640, pp. 20–30); CdV-16-1(i) (LANL 2004, 87844, pp. 12–13); CdV-16-2(i) (LANL 2004, 87843, pp. 11–12); and CdV-R-15-3 (LANL 2000, 73211, pp. 10–14). 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 (LANL 2005, 92028, pp. 2-10–2-29).

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) from 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.

Tshirege Member

The Pleistocene 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 as a result 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-25.

Tshirege Member Unit 4 (Qbt 4)

Unit 4 of the Tshirege Member of the Bandelier Tuff is made up of 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), and from 5 to 34 ft bgs in well CdV-R-15-3. Unit 4 is characterized by local 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 contaminant pathways.

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 comprises the mesa-top

unit at MDA R (Subaggregate 2). 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), and from 34 to 152 ft bgs in well CdV-R-15-3.

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), and from 152 to 236 ft bgs in well CdV-R-15-3.

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.

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 1 vu and 1 vc 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 was not broken out into subunits based on the cuttings from that borehole. Qbt 1v, also not broken out in subunits, extends from 195 to 223 ft bgs in well CdV-16-1(i), from 305 to 348 ft bgs in well CdV-16-2(i), and from 236 to 290 ft bgs in well CV-R-15-3.

Unit 1 vu: Unit 1 vu is the uppermost portion of unit 1v ("u" for upper). It is devitrified and consists of vapor-phase-altered ash-fall and ash-flow tuff. Unit 1 vu 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 1 vu, but these end in the less consolidated lower section of the unit.

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

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 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), and from 290 to 350 ft bgs in well CdV-R-15-3.

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), from 348 to 395 ft bgs in well CdV-16-2(i), and from 350 to 362 ft bgs in well CdV-R-15-3.

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 large 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), and from 362 to 582 ft bgs in well CdV-R-15-3.

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 570 to 802 ft bgs in well CdV-16-2(i), and from 582 to 750 ft bgs in well CdV-R-15-3.

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 Pumic 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 750 to 800 ft bgs in well CdV-R-15-3.

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.

The Puye Formation is more than 1090 ft in thickness in well R-25, extending from a depth of 852 ft bgs to below the TD of 1942 ft bgs. It is overlain by a 1.5-ft-thick, late-Miocene, paleosol deposit characterized by brown, massive, generally fine-grained sediment with highly scattered pebbles. Two subunits of the Puye Formation are recognized in well R-25 according to the provenance of their dominant clasts: (1) the upper Pajarito Mountain unit at depths from 852 to 1657 ft bgs, and (2) the Rendija Canyon unit at depths from 1657 to 1942 ft bgs. The upper Pajarito Mountain unit is the eastern part of a fan that was contemporaneous with eruption of the upper dacite of Pajarito Mountain. The Rendija Canyon unit represents the southern part of a fan that was contemporaneous with eruption of the rhyodacite of Rendija Canyon. Lithification at both units is poor and as such likely to sustain open fractures.

Based on cuttings and lithologic description, the Puye Formation exists in well CdV-16-2(i) from 818 ft bgs to below the TD of 1063 ft bgs.

In well CdV-R-15-3, an upper fanglomerate sequence present from 800 to 963 ft bgs consists of coarse volcaniclastic sediments dominated by rounded clasts of various lavas. A lower fanglomerate sequence is present from 1012 ft bgs to below the TD of 1722 ft bgs. Interfingered between the upper and lower fanglomerate is a Cerros del Rio basalt unit present in well CdV-R-15-3 from 963 to 990 ft bgs that consists of flow-top rubble from 963 to 970 ft bgs, massive flow material from 970 to 988 ft bgs, and a rubbly flow base from 988 to 990 ft bgs. Water within connected pores of the Cerros del Rio basalt was indicated by the neutron log for the interval from approximately 966 to 970 ft bgs, which correlated with a zone of flow-top rubble seen in the borehole video. An unassigned basaltic detritis unit was found from 990 to 1012 ft bgs, which consisted of cuttings primarily composed of basalt, although the borehole video showed coarse clastic sediments (LANL 2000, 73211, pp. 12–13).

Tschicoma Formation Dacite Lavas

Lava flows of the Tschicoma Formation occur in both wells CdV-R-37-2 and CdV-16-3(i), to the southeast of well R-25 but were not found in well R-25. Thus, the transition between subsurface deposits, including dacite lavas, probably occurs in the vicinity of Subaggregate 3. 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 900 ft bgs to TD (1405 ft bgs) in well CdV-16-3(i).

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 the surrounding canyons. SWMUs and AOCs within TA-16 are unlikely to be exposed by cliff retreat. Fracture studies completed at nearby MDA P 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, 91141; LANL 2005, 92251). Results of the MDA P fracture study indicates that the fracture flow system is unsaturated, with local infiltration of precipitation and downward percolation, but dominated by matrix absorption and evaporation. An accumulation zone of surface salts of nitrate, chloride, and sulfate is present at 30- to 90-ft depths below the mesa top and is attributed to evaporation. The zone is apparent in all boreholes at MDA P and is located entirely above the stream level of Cañon de Valle. The evaporation zone was interpreted in the study to represent the response of the fracture system to the semiarid climate and probably required thousands of years to develop. Additionally, the study interpreted the lack of water observed in any boreholes during, or after, drilling to indicate that the saturated conditions along the Cañon de Valle alluvial aquifer do not extend laterally to produce a perched water table beneath the MDA P footprint (LANL 2005, 91141; LANL 2005, 92251). Because of the similar geology across the TA-16 plateau, similar conclusions can be drawn for the rest of the subaggregates where shallow subsurface water is not present below the SWMUs and AOCs.

2.4.3 Hydrogeology

The hydrogeologic conceptual model for TA-16 is presented in Figure 2.4-3. The model postulates infiltration of water into the subsurface and subsequent transport of water, natural solutes, and COPCs at multiple recharge zones at TA-16. 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 TA-16.

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 on the order of 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 (LANL 2005, 92028, p. 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 temporarily increase 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 (LANL 2005, 92028, p. 2-89).

A thin (typically <10-ft-thick) alluvial system in Cañon de Valle near Peter Seep, SWSC Spring, and Burning Ground Spring has perennial saturation. However, the alluvial saturation does not extend to the confluence with Water Canyon. The downcanyon extent of saturation is highly variable and fluctuates depending on weather conditions. Saturation is also restricted by the limited extent of alluvium in the canyon. Six alluvial wells are used for water level monitoring and for water sampling (LANL 2005, 92028, p. 3-A-38) (Plate 1). Ephemeral perched water was encountered in well locations 02669 (immediately east of the 90s Line Ponds) and in 02665 (in Martin Spring Canyon) at less than 200 ft bgs (LANL 2003.77965)

Surface water infiltration recharges perched aquifers at TA-16 (LANL 1998, 59891, p. B-18; LANL 2003, 77965, 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 TA-16 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, 77965) 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.

Other recharge zones either identified or hypothesized at TA-16 include the Pajarito fault zone; the steam plant drainage; localized ponding areas, such as the 90s Line Pond on the mesa top; diffuse infiltration from the mesa top; and other intermittent zones of natural and anthropogenic surface water runoff (Figure 2.4-3) (LANL 2003, 77965, p. 5-2). The net percolation rates beneath the alluvial systems of wet canyons to the underlying unsaturated zone are expected to be among the highest across the Pajarito Plateau, approaching m/yr (100–1000 mm/yr) (LANL 2005, 92028, pp. 2-88–2-91).

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 Cañon de Valle with local infiltration rates up to 1000 mm/yr (LANL 2005, 92028, 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 (LANL 2005, 92028, p. 5-3).

Groundwater

Groundwater beneath the Laboratory occurs in the regional aquifer at depths ranging from 1286 ft bgs (well R-25) to 600 ft bgs (well R-26) (Figures 2.4-4 and 2.4-5) and in perched aquifers at both shallow (less than 200-ft) and deep (up to approximately 1000-ft) depths (LANL 2005, 92028, pp. 2-B-10–2-B-12). Canyon and mesa topography and the internal structures (surge beds, fracture zones, permeable units) of the Bandelier Tuff and other subsurface units control the hydrogeology of TA-16. 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.

Perched Intermediate Waters

Perched groundwater systems beneath the Pajarito Plateau are identified primarily from direct observation of saturation in boreholes, wells, piezometers, or from borehole geophysics (LANL 2005, 92028, p. 2-96). Perched water has been identified in the following Cañon de Valle wells: R-25, CdV-16-1(i), CdV-16-2(i), CdV-16-3(i), R-26, and CdV-R-15-3. The perched zone characteristics for each well are presented in Table 2.4-3.

A deep-sounding surface-based magnetotelluric survey was conducted in the Cañon de Valle/Water Canyon area. The survey results indicate that perched groundwater is discontinuous laterally, occurring instead as vertical, finger-like groundwater bodies (LANL 2005, 92028, pp. 2-96–2-97).

The following conditions are necessary to support perched groundwater (LANL 2005, 92028, 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 ground water flow conditions were categorized by the following conceptual site models (LANL 2005, 92028, p. 2-100):

1. *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.
2. *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 no confirmed instances of large-scale, lateral vadose zone pathways beneath the Pajarito Plateau at depths greater than the alluvial ground water. The case of lateral flow through the wet, mountain-front mesas at TA-16 indicates that this possibility exists at greater depths.

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, it is a major source of drinking water and agricultural water supply for northern New Mexico (LANL 2005, 92028, p. 2-103). The regional aquifer, extending throughout the Española Basin (an area of roughly 6000 km^2), consists of basin-fill sediments reaching a maximum thickness near the basin axis (>9800 ft in thickness; Cordell 1979, 76049, p. 61). The aquifer is predominantly composed of Santa Fe Group rocks, which are weakly consolidated basin-fill sediments more than 3000 m in thickness (LANL 2005, 92028, p. 2-103).

Depths to the regional aquifer range from approximately 1300 ft bgs (along the western edge of the plateau) to 600 ft bgs (to the east). The depths to the regional aquifer at TA-16 that have been determined by drilling are 1245 ft bgs (at well CdV-R-15-3 east of Cañon de Valle), 1197 ft bgs (at well CdV-R-37-2 southeast of TA-16), 1286 ft bgs (at well R-25) (LANL 2003, 77965, p. B-20), 604 ft bgs (at well R-26) (LANL 2005, 92028, p. 1-B-22), and 1350 ft bgs [at well CdV-16-3(i) (LANL 2004, 87845)]. The regional aquifer was not penetrated at a depth of 1400 ft bgs in the CdV-16-3(i) 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 2.4-6 depicts water table elevations in the regional aquifer across the Pajarito Plateau.

The regional aquifer at well R-25 also exhibits a downward hydraulic gradient, indicating that this may be a zone of recharge (Broxton et al. 2002, 72640, p. 46). The lateral component of gradients along the top of the aquifer beneath the Pajarito Plateau varies more than one order of magnitude, from a low of 0.0026 to a high of 0.04. Even higher gradients are evident west of well R-25 (0.162 from R-26 to R-25) (LANL 2005, 92028, p. 2-115)

Estimates of groundwater transport velocity were assessed as part of the hydrogeologic studies of the Pajarito Plateau (LANL 2005, 92028) and by using site-specific modeling in support of the deep groundwater CSM for Consolidated Unit 16-021(c)-99, the 260 Outfall. These calculations take into account the three-dimensionality of the groundwater flow paths, the spatial distribution of recharge along the canyons, media heterogeneity, and the time variation of pumping in water-supply wells.

The regional aquifer model proposed in the report of the hydrogeology of the Pajarito Plateau (LANL 2005, 92028, pp. 4-1–4-60) was used to produce a map of velocities at the water table, and the velocities, which are considered to be 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.
- 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.

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 water. 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, 77965, p. 4-58). In boreholes drilled at TA-16, saturated hydraulic conductivity ranges from 3.8×10^{-3} centimeters per second (cm/sec) in a surge unit to 9.8×10^{-9} cm/sec in a densely welded subunit.

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}–10^{-9} cm/sec. These units are also more fractured and can support fracture flow and transport when sufficient water is present (LANL 2005, 92028, 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, 77965, p. 4-55)

2.5 X-Ray Buildings Drainlines and Outfalls: SWMUs 16-026(i), 16-026(j), and Consolidated Unit 16-026(l)-00

The 220 Complex x-ray building consolidated unit and SWMUs consist of potentially contaminated soil associated with building drainlines and outfalls (Figure 1.1-2). SWMU 16-026(i) is the outfall from former x-ray building 16-224. SWMU 16-026(j) is the outfall from former x-ray building 16-226. Consolidated Unit 16-026(l)-00 [SWMUs 16-026(l) and 16-028(c)] is the outfall from former x-ray building 16-220.

2.5.1 Site Description and Operational History

SWMU 16-026(i) is soil contamination associated with an outfall and drainline from an x-ray building (16-224) located on the northern side of S-Site. Building 16-224 was removed in 2003 (Border Demolition and Environmental, Inc., 2005, 92461). It measured 58 ft long x 44 ft wide x 10 ft high (LANL 1995, 57225, p. 5-28-1). The rest houses stored finished packaged HE components before and after they were radiographed (LANL 1995, 57225, p. 5-28-9). The components were transported between the rest houses and the x-ray buildings on the enclosed walkways. When they arrived at the x-ray buildings, the components were removed from their packaging, x-rayed, and repackaged (LANL 1995, 57225, p. 5-28-9). Floor drains in 16-224 were connected to two drainlines that joined and formed one line, which discharged to the outfall. The two drainlines were located in the northeastern and northwestern corners of building 16-224; the outfall daylighted northeast of 16-224 (LANL 1995, 57225, p. 5-28-13). Small HE chips have historically been observed in the drains (LANL 1995, 57225 p. 5-28-13). Site workers stated that HE dust and small chips would break off during the x-ray process and could have entered the floor drains (LANL 1995, 57225, p. 5-28-13). Because SWMU 16-026(i) is associated with floor drains in the x-ray building, HE contamination could be present at the outfall (LANL 1995, 57225, p. 5-28-9). The floor drains were plugged in 1991 (LANL 1995, 57225, p. 5-28-13). The outfall was characterized by low flow onto a shallow, grassy slope.

SWMU 16-026(j) is soil contamination associated with the drainlines and an outfall from an inactive x-ray building (16-226), located on the northern side of S-Site (LANL 1995, 57225, p. 5-28-9). Building 16-226 was similar to 16-224 and measured 58 ft long x 44 ft wide x 10 ft high (LANL 1995, 57225, p. 5-28-1). Building 16-226 was removed in 2003 (Border Demolition and Environmental, Inc., 2005, 92461). Floor drains within the building were connected to two drainlines that discharged to SWMU 16-026(j); the drainlines were located in the southeastern and southwestern corners of building 16-226 (LANL 1995, 57225, p. 5-28-13). The two drainlines joined and formed a single 6-in. vitrified clay pipe (VCP) line out of the building, draining into a grassy, gradually sloping area (LANL 1995, 57225, p. 5-28-13). Although the location of the drain outfall from 16-226 could not be located during several site visits, an engineering drawing (ENG-C 15605) shows the drain flowing southeast (LANL 1995, 57225, p. 5-28-13). Small HE chips historically have been observed in the drains (LANL 1995, 57225, p. 5-28-13). Site workers stated that HE dust and small chips would break off during the x-ray process and could have entered the floor drains (LANL 1995, 57225, p. 5-28-13). Because SWMU 16-026(j) is associated with floor drains in the x-ray building, HE contamination could be present at the outfall (LANL 1995, 57225, p. 5-28-9). The floor drains were plugged in 1991 (LANL 1995, 57225, p. 5-28-13).

Consolidated Unit 16-026(l)-00 consists of SWMUs 16-026(l) and 16-028(c). The SWMUs are soil contamination associated with drainlines and outfalls connected to floor drains located throughout an x-ray building (16-220) (LANL 1995, 57225, pp. 5-28-13; 6-6). Waste was discharged from both outfalls to an area where the outfalls overlap; thus, potential contaminants associated with these outfalls are commingled. Building 16-220 (68 ft long x 41 ft wide x 20 ft high), the low-energy, x-ray facility for HE components, was located on the northern side of S-Site (LANL 1995, 57225, pp. 5-28-1; 5-28-13). Building 16-220 was removed in 2003 (Border Demolition and Environmental, Inc., 2005, 92461).

Because SWMUs 16-026(l) and 16-028(c) are associated with floor drains in the x-ray building, HE contamination could be present at the outfall (LANL 1995, 57225, p. 5-28-9).

SWMU 16-026(l) is potentially contaminated soil associated with outfalls from building 16-220 (LANL 1998, 59685, p. 6-6). SWMU 16-026(l) is listed as outfalls originating from roof drains; the outfalls could not be located during site visits (LANL 1998, 59685, p. 6-4). According to the 1998 replacement of Chapter 6 of Operable Unit (OU) 1082 RFI work plan, Addendum 2, SWMU 16-026(l) consists of drains from the east wall and the northeastern and southeastern corners of building 16-220 (LANL 1998, 59685, p. 6-3). Engineering drawing ENG-C 15660 shows that roof drainage is from the northeastern and southeastern corners of the building and that the east wall contains a steam pit drain (LANL 1998, 59685, p. 6-3). Chapter 6 of the OU 1082 RFI work plan, Addendum 2, recommended NFA for SWMU 16-026(l) (LANL 1995, 57225, p. 6-7). No potential contaminants are listed in either the 1995 OU 1082 RFI work plan or Chapter 6 of the RFI work plan, Addendum 2 (LANL 1995, 57225; LANL 1998, 59685).

SWMU 16-028(c) is a former National Pollutant Discharge Elimination System (NPDES)-permitted outfall (04A-070) and drainline that received discharges from eight floor drains in building 16-220 (LANL 1995, 57225, p. 5-28-13). The effluent contained noncontact cooling water, chiller condensate, periodic discharge from an HE vacuum pump, and floor washings (LANL 1995, 57225, p. 5-28-13). The 6-in. VCP daylighted in a rocky ditch near the building (LANL 1995, 57225, p. 5-28-13). The ditch flows to a relatively flat, grassy field. The floor drains at building 16-220 were plugged in 1991 (LANL 1995, 57225, p. 5-28-13). This outfall was removed from the Laboratory's NPDES permit, effective September 19, 1997. Potential contaminants identified in the OU 1082 RFI work plan include HE, metals, barium, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs) (LANL 1995, 57225, p. 5-28-20).

2.5.2 Historical Investigations

All the samples from the SWMUs and consolidated unit associated with the x-ray buildings were collected as D&D confirmatory samples from the former building footprints (Figure 2.5-1). Sample results discussed in this section therefore do not necessarily indicate contaminants that may be present in the building outfalls represented by the SMWU and consolidated unit boundaries. The analytical results for all subaggregates presented in the tables may have been rounded for presentational purposes; however, the analytical results presented in the figures may be displayed using full precision without rounding. Any differences in the tables and figures for any particular analytical result from this rounding does not affect the interpretation of the analytical data or any conclusions derived from the data.

SWMU 16-026(i)

Addendum 2 of the OU 1082 RFI work plan proposed sampling for metals, VOCs, SVOCs, and HE at SWMU 16-026(i) (LANL 1995, 57225, p. 5-28-27). Building 16-224 underwent D&D in 2003 (Border Demolition and Environmental, Inc., 2005, 92461). After the building was removed, four near-surface (0.5–1 ft) soil confirmatory samples were collected from within the building footprint but not in the area of potential soil contamination associated with the outfall (Figure 2.5-1). The samples were analyzed for inorganic chemicals, VOCs, SVOCs, and HE (Table 2.5-1). The analytical results of this sampling activity were not documented in any Laboratory report.

SWMU 16-026(j)

Addendum 2 of the OU 1082 RFI work plan proposed sampling at SWMU 16-026(j) for metals, VOCs, SVOCs, and HE (LANL 1995, 57225, p. 5-28-27). Building 16-226 underwent D&D in 2003 (Border Demolition and Environmental, Inc., 2005, 92461); the drainlines from floor drains in the building were

also removed. After the building was removed, four near-surface (0.5–1 ft) and subsurface (1.5–2 ft) soil confirmatory samples were collected from within the building footprint but not in the area of potential soil contamination associated with the outfall (Figure 2.5-1). Samples were analyzed for inorganic chemicals, VOCs, SVOCs, and HE (Table 2.5-1). The analytical results of this sampling activity were not documented in any Laboratory report.

SWMU 16-026(l)

No samples were collected or analyses proposed in Addendum 2 of the OU 1082 RFI work plan (replacement Chapter 6) because SWMU 16-026(l) could not be located and there were no documented releases of hazardous wastes and/or constituents to the roof of building 16-220 (LANL 1995, 57225, p. 6-8; LANL 1998, 59685, p. 6-6). Building 16-220 underwent D&D in 2003 (Border Demolition and Environmental, Inc., 2005, 92461). After the building was removed, four near-surface (0.5–1 ft) confirmatory soil samples were collected from within the 16-220 footprint and at the locations of the drainlines leading to the outfall but not in the area of potential soil contamination associated with the outfall (Figure 2.5-1). The samples were analyzed for target analyte list (TAL) metals, VOCs, SVOCs, and HE (Table 2.5-1). The analytical results of this sampling activity were not documented in any Laboratory report.

SWMU 16-028(c)

Addendum 2 of the OU 1082 RFI work plan proposed sampling at SWMU 16-028(c) to detect metals, VOCs, SVOCs, and HE (LANL 1995, 57225, p. 5-28-27). However, no historical samples have been collected from SWMU 16-028(c). Building 16-220 underwent D&D in 2003 (Border Demolition and Environmental, Inc., 2005, 92461). After the building was removed, four near-surface (0.5–1 ft) confirmatory soil samples were collected from within the 16-220 footprint and at the locations of the drainlines leading to the SWMU 16-026(l) outfall but not in the area of potential soil contamination associated with SWMU 16-028(c) (Figure 2.5-1). The samples were analyzed for TAL metals, VOCs, SVOCs, and HE. The analytical results of this sampling activity were not documented in any Laboratory report.

2.5.2.1 Analytical Results

SWMU 16-026(i)

The analytical results of inorganic chemicals in soil samples from the footprint of building 16-224, which discharged to SWMU 16-026(i), with concentrations greater than background values (BVs) (LANL 1998, 59730, pp. 43–44) are summarized in Table 2.5-2 and shown in Figure 2.5-2. Cadmium, calcium, iron, lead, and zinc were detected at concentrations greater than BVs.

The analytical results of organic chemicals in soil samples from the footprint of building 16-224 are summarized in Table 2.5-3 and shown in Figure 2.5-3. The predominant detected organic chemicals were aromatic hydrocarbons and polycyclic aromatic hydrocarbons (PAHs). HE-related compounds were not detected in samples from the footprint of building 16-224.

SWMU 16-026(j)

The analytical results of inorganic chemicals in soil samples from the footprint of building 16-226, which discharged to SWMU 16-026(j), with concentrations greater than BVs are summarized in Table 2.5-2 and shown in Figure 2.5-2. No inorganic chemicals were detected in near-surface (0.5–1 ft bgs) samples.

Samples collected from the 1.5-2 ft bgs interval, however, had detections greater than BVs for: aluminum, beryllium, calcium, chromium, copper, iron, magnesium, nickel, and zinc (Table 2.5-2).

The analytical results of organic chemicals in soil samples from the footprint of building 16-224 are summarized in Table 2.5-3 and shown in Figure 2.5-3. PAHs were the predominant organic chemicals detected in near-surface and subsurface samples. HE-related compounds were not detected in samples from the footprint of building 16-226.

Consolidated Unit 16-026(l)-00 [SWMUs 16-026(l) and 16-028(c)]

The analytical results of inorganic chemicals in soil samples from the footprint of building 16-220, which discharged to SWMUs 16-026(l) and 16-028(c), with concentrations greater than BVs are summarized in Table 2.5-2 and shown in Figure 2.5-2. As detailed in Table 2.5-2, aluminum, calcium, chromium, lead, and nickel were detected at concentrations greater than BVs.

The analytical results of organic chemicals in soil samples from the footprint of building 16-220, which discharged to SWMUs 16-026(l) and 16-028(c), are summarized in Table 2.5-3 and shown in Figure 2.5-3. The predominant detected organic chemicals were PAHs. HE-related compounds were not detected in samples from the footprint of building 16-220.

2.5.2.2 Nature and Extent of Contamination

SWMU 16-026(i)

The nature and extent of contamination at SWMU 16-026(i) are not known because no samples have been collected from the outfall area. Inorganic chemicals were detected at concentrations greater than BVs, and organic chemicals were detected in samples collected from within the footprint of building 16-224, which discharged to SWMU 16-026(i). All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1), except for benzo(b)fluoranthene in a single sample.

SWMU 16-026(j)

The nature and extent of contamination at SWMU 16-026(j) are not known because no samples have been collected from the outfall area. Inorganic chemicals were detected at concentrations greater than BVs, and organic chemicals were detected in samples collected from within the footprint of building 16-226, which discharged to SWMU 16-026(j). All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1).

Consolidated Unit 16-026(l)-00 [SWMUs 16-026(l) and 16-028(c)]

The nature and extent of contamination at Consolidated Unit 16-026(l)-00 are not known because no samples have been collected from outfall areas. Metals were detected at concentrations greater than BVs, and organic chemicals were detected in samples collected from within the footprint of building 16-220, which discharged to SWMUs 16-026(l) and 16-028(c). All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1).

2.5.2.3 Conceptual Site Model

The CSM for the outfalls at the 220 Complex [SWMUs 16-026(i), 16-026(j), and Consolidated Unit 16-026(l)-00] includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for the 220 Complex outfalls.

Source of Contamination

Contamination at the 220 Complex outfalls originated from effluents discharged from the x-ray buildings at the outfalls. Waste at SWMUs 16-026(i,j) would have consisted of HE dust and small chips that broke off during the x-ray process (LANL 1995, 57225, p. 5-28-13). No wastes associated with SWMU 16-026(l) were identified during review of the available documentation (LANL 1995, 57225, p. 6–7).

Wastes at SWMU 16-028(c) are associated with noncontact cooling water, chiller condensate, and periodic discharge from an HE vacuum pump and floor washings (LANL 1995, 57225, p. 5-28-13).

Potential contaminants at the 220 Complex outfalls include metals, SVOCs, and HE.

Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for the 220 Complex are summarized in section 1.1.1.

2.5.2.4 Summary of Additional Data/Corrective Action Requirements

Historical sampling performed at the 220 Complex outfalls [SWMUs 16-026(i), 16-026(j), and Consolidated Unit 16-026(l)-00] has been limited to within the footprints of former buildings following D&D activities. No samples have been collected in the vicinity of the outfalls where potential contamination may have been released. Sampling is proposed to investigate the nature and extent of potential contamination associated with the outfalls at the 220 Complex (section 2.9.1). Potential contaminants being targeted in the proposed sampling at the 220 Complex outfalls include metals, SVOCs, and HE.

2.6 Building 16-222 Outfall: SWMU 16-020, the Silver Outfall

SWMU 16-020, known as the Silver Outfall (Figure 1.1-2), is a former operational release area where untreated spent photo-fixing bath solutions were released to the soil and sediment (LANL 1993, 20948, p. 5-119).

2.6.1 Site Description and Operational History

Photoprocessing effluent from building 16-222 was discharged to the Silver Outfall (NPDES permit number 06A-037) to the south of the building (LANL 1993, 20948, p. 5-119). According to the 1990 SWMU report, before 1979, photoprocessing liquids were discharged directly to the environment without treatment; after 1979, the solutions were treated by a silver recovery unit before discharge (LANL 1990, 07512, 16-019 summary). Hazardous releases occurred before the silver recovery unit was put into service in 1979 (LANL 1990, 07512, 16-020 summary). For more than 20 yr, SWMU 16-020 received significant quantities of silver (>12 g/L) as silver thiosulfate complexes in untreated, spent x-ray fixing solutions (LANL 1993, 20948, p. 5-119). Soil downgradient of this outfall was contaminated with photoprocessing chemicals, including silver and chromium, as well as PAHs from asphalt roofing materials (IT Corporation 2001, 85511, p. 1). Sampling efforts conducted in 1995 showed high levels of silver, chromium, and PAHs (IT Corporation 2001, 85511, p. 1). In 2000, approximately 200 yd^3 of soil

were removed from SWMU 16-020 in an interim measure following the Cerro Grande fire (IT Corporation 2001, 85511, p. 5). The building was removed by D&D in 2003.

2.6.2 Historical Investigations

The outfall water from building 16-222 was analyzed in the late 1970s as part of the NPDES permit application process; silver concentrations ranged from 2.16 to 7.30 mg/L, and cyanide concentrations ranged from <0.004 to 2.08 mg/L (LANL 1993, 20948, p. 5-122).

A site transport study conducted in 1985 included an analysis of the vertical distribution of silver in the soil and the downstream distribution of silver in sediment, soil, and plants (LANL 1993, 20948, p. 5-122). Silver results for sediment and soil samples defined the vertical and horizontal extent of silver in the stream channel. The silver content of the sediment and the soil samples decreased with increasing distance from the mouth of the outfall (LANL 1993, 20948, p. 5-122). Silver concentrations in sediment samples ranged from 14,500 mg/kg at the outfall to 4 mg/kg at 1378 ft from the outfall (LANL 1993, 20948, p. 5-122). Sharp drops in the silver concentrations occurred at 295 ft, where the outfall drainage converges with Cañon de Valle, and at 984 ft, where a side canyon converges with Cañon de Valle (LANL 1993, 20948, p. 5-122). Silver concentrations in the soil followed a more erratic pattern and were always lower than those in the sediment (LANL 1993, 20948, p. 5-122). Subsurface soil analyses at 33 ft from the mouth of the outfall indicated that silver concentrations decreased with increasing depth from the surface: at 33 ft, silver concentrations ranged from 1400 mg/kg at the surface to 182 mg/kg at the 3-ft depth (LANL 1993, 20948, p. 5-122).

The following samples were collected in 1995 (Table 2.6-1, Figure 2.5-1):

16 surface soil and sediment samples for analysis of inorganic chemicals, SVOCs, and HE

16 subsurface soil and tuff samples for analysis of inorganic chemicals, VOCs, SVOCs, and HE

These samples were collected from sampling media that was subsequently excavated, and the sample results were not summarized in a written report. The analytical results for these samples are considered screening-level data because the sample results no longer represent current site conditions.

In fall 2000, an interim action at SWMU 16-020 was conducted (IT Corporation 2001, 85511, p. 1). Before the 2000 soil removal activities, field-screening surface-soil samples were collected transecting the outfall channel at 2.5-ft intervals to determine the lateral extent of the outfall channel based on contaminant levels (IT Corporation 2001, 85511, p. 4). The collected samples were field-screened for silver and total chromium using x-ray fluorescence (XRF) (IT Corporation 2001, 85511, p. 4; LANL 2006, 91697, Appendix D). The following numbers of samples were collected from each transect:

- 9 samples from 300 ft
- 11 samples from 425 ft
- 11 samples from 526 ft
- 7 samples from 738 ft

The XRF field-screening results indicated that all the samples contained elevated silver and chromium concentrations (IT Corporation 2001, 85511, Appendix 9). These results were used to guide the removal effort that took place in September 2000 (IT Corporation 2001, 85511, p. 4). Soil was removed from the outfall approximately 15 ft downgradient of the outfall. The maximum depth of excavation was

approximately 6 ft in the area surrounding the outfall discharge pipes (IT Corporation 2001, 85511, p. 5). The average excavation depth throughout the outfall channel was approximately 1 ft.

After the soil was removed, three samples transecting the outfall were collected at the source and downgradient of the source at 25, 50, 75, 100, 150, 200, 250, 300, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, and 738 ft for field screening of silver and total chromium by XRF (IT Corporation 2001, 85511, p. 6). Both silver and chromium were detected greater than soil BVs (LANL 2006, 91697, Appendix D).

The pre- and postsoil removal XRF field-screening results are presented in Appendix D of the Cañon de Valle Aggregate Area HIR (LANL 2006, 91697). Based on the field-screening results after soil was removed, 11 surface soil and sediment samples and 9 subsurface soil samples were collected in September 2000 after soil was removed from the outfall area (Table 2.6-1 and Figure 2.5-1) and submitted to an off-site analytical laboratory. Analyses performed on the samples included inorganic chemicals, VOCs, SVOCs, and HE. The analytical results for these samples are decision-level data.

2.6.2.1 Analytical Results

The 1995 investigation analytical results (screening-level data) for inorganic chemicals in soil, sediment, and tuff samples from the Silver Outfall with either concentrations or detection limits (DLs) greater than BVs are summarized in Table 2.6-2 and shown in Figure 2.5-2. As detailed in Table 2.6-2, a number of inorganic chemicals either were detected at concentrations greater than BVs or had DLs greater than BVs. The primary metal of concern is silver (maximum concentration of 672 mg/kg at location 16-01584).

The 1995 investigation analytical results (screening-level data) for organic chemicals in soil, sediment, and tuff samples from the Silver Outfall are summarized in Table 2.6-3 and shown in Figure 2.5-3. The predominant detected organic chemicals were PAHs.

The 2000 investigation analytical results (decision-level data) for inorganic chemicals in soil, sediment, and tuff samples from the Silver Outfall with either concentrations or DLs greater than BVs are summarized in Table 2.6-2 and shown in Figure 2.5-2. As detailed in Table 2.6-2, a number of inorganic chemicals either were detected at concentrations greater than BVs or had DLs greater than BVs. The primary metal of concern is silver (maximum concentration of 720 mg/kg at location 16-06562).

The 2000 investigation analytical results (decision-level data) for organic chemicals in soil, sediment, and tuff samples from the Silver Outfall are summarized in Table 2.6-3 and shown in Figure 2.5-3. PAHs were the predominant organic chemicals detected. VOCs (acetone, toluene, and trichlorofluoromethane) were detected infrequently and at trace or estimated concentrations.

2.6.2.2 Nature and Extent of Contamination

Based on the decision-level data at SWMU 16-020, the vertical and lateral nature and extent of metals and organic chemicals (primarily PAHs/SVOCs) have not been defined. Inorganic chemicals were detected at concentrations greater than BVs, and organic chemicals (SVOCs) were detected in a majority of the deepest samples from the site, indicating that the vertical extent of potential contamination is not defined. Because VOCs were detected infrequently and at trace or estimated concentrations, they are not considered potential contaminants for this site. All detections of organic chemicals and inorganic chemicals greater than BV were below the current SSLs (Table1.2-1). Because the 2000 sampling did not extend to the final 300 ft of the approximately 900 ft to the SWMU boundary (the farthest downgradient areas), the lateral downgradient extent of potential contamination has not been defined. Investigation of contamination beyond the SWMU boundary will be addressed in the South Canyons investigation work

plan. The outfall channel is well-defined, and historical lateral sampling across the SWMU boundary (generally south to north) adequately bound the lateral nature and extent of contamination along the width of the SWMU boundary. Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Additional sampling is proposed to define the nature and extent of inorganic chemicals and organic chemicals (SVOCs) at SWMU 16-020 (section 2.9.2).

2.6.2.3 Conceptual Site Model

The CSM for the Silver Outfall, SWMU 16-020, includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 16-020.

Source of Contamination

Contamination at the Silver Outfall originated from the building 16-222 effluents discharged to the outfall. COPCs at the outfall include those related to photoprocessing, specifically inorganic chemicals (particularly silver and chromium), VOCs, SVOCs, and HE.

Transport Mechanisms and Potential Receptors

In addition to the generic transport mechanisms and potential receptors for the Silver Outfall, summarized in section 1.1.1, SWMU 16-020 leads to a drainage channel that discharges directly to Cañon de Valle and may have contributed contaminants to Cañon de Valle.

2.6.2.4 Summary of Additional Data/Corrective Action Requirements

Previous site investigations at SWMU 16-020 have documented the presence of metals (particularly silver) and organic chemicals (primarily PAHs) in the surface and subsurface soil. The following additional data are required to determine the nature and extent of potential contamination at SWMU 16-020:

- Historical sampling was limited to surface and near-surface (2 ft or less) samples; thus, the vertical extent of potential contamination has not been defined. Additional sampling is proposed to address this data requirement.
- Historical sampling was limited to the upgradient areas of the Silver Outfall; thus, the lateral downgradient extent of potential contamination is not defined. Additional sampling is proposed to address this data requirement.

The sampling proposed to define the nature and extent of potential contamination at SWMU 16-020 is detailed in section 2.9.2.

2.7 Surface Disposal Site: SWMU 16-016(d)

SWMU 16-016(d) is a small, former disposal area (Figure 1.1-2) consisting of construction-related debris located near former building 16-222 (LANL 1995, 57225, p. 6-4).

2.7.1 Site Description and Operational History

SWMU 16-016(d) is a small debris disposal area at a darkroom building (building 16-222) (LANL 1995, 57225, p. 6-4). The debris consisted of construction-related materials. Items observed in the debris disposal area included segments of corrugated metal pipe, cable, rebar, and a partially filled can used to mix cement (LANL 1995, 57225, p. 6-4). The debris pile was field-screened for HE and radioactivity and removed to the TA-16 Burning Ground in March 1995 by the operating group (LANL 1995, 57225, p. 6-4). The remnants within the disposal area did not appear to be hazardous material (LANL 1995, 57225, p. 6-6).

2.7.2 Historical Investigations

During the 1995 debris removal action, HE spot tests were conducted at three locations on various pieces of debris. Debris material in the disposal area was also field screened by XRF (LANL 1995, 57225, p. 6-6).

2.7.2.1 Analytical Results

Based on the HE spot tests, none of the debris material was found to be contaminated with HE (Watanabe 1994, 52964.653, p. 15-16-569). Additionally, the XRF results indicated that the debris material at SWMU 16-016(d) was nonhazardous, and it was removed (LANL 1995, 57225, p. 6-6).

2.7.2.2 Nature and Extent of Contamination

Because no laboratory analytical samples have been collected from SWMU 16-016(d), the nature and extent of potential contamination at this site are not known.

2.7.2.3 Conceptual Site Model

The CSM for the debris disposal area, SWMU 16-016(d), includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 16-016(d).

Source of Contamination

Contamination at SWMU 16-016(d) originated from the construction debris disposed of at the site. Although the debris has been removed, residual contamination may exist in the soil within the SWMU. COPCs include those that may have been present in the debris, specifically inorganic chemicals and HE.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 16-016(d) are summarized in section 1.1.1.

2.7.2.4 Summary and Additional Data/Corrective Action Requirements

No historical sampling other than field screening has been performed at SWMU 16-016(d). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining nature and extent of contamination relative to background for inorganic chemicals and radionuclides or nature and extent to DLs for organic

chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Sampling is proposed to determine the nature and extent of potential contamination (inorganic chemicals and explosive compounds) associated with the former debris disposal area (section 2.9.3).

2.8 Oil Switch: AOC C-16-051

AOC C-16-051 is one of a group of three decommissioned 200- to 400-gal. oil switches (Figure 1.1-2) used to control large amounts of electrical power for several clusters of buildings at S-Site (LANL 1995, 57225, p. 6-31).

2.8.1 Site Description and Operational History

AOC C-16-051, structure 16-1103, was installed in 1952 and used to control power to the 300 Line buildings at S-Site. It was removed in 1967 (LANL 1995, 57225, p. 6-31). The switch was mounted on a 7 ft x 7 ft concrete pad that was surrounded by a metal fence (LANL 1995, 57225, p. 6-31). A site inspection found no visible signs of staining in the area around the oil switches (LANL 1995, 57225, p. 6-31). Potential contaminants include total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs) (LANL 1995, 57225, p. 6-31).

2.8.2 Historical Investigations

No historical investigations have been conducted at AOC C-16-051.

2.8.2.1 Analytical Results

No historical sampling has been conducted at AOC C-16-051.

2.8.2.2 Nature and Extent of Contamination

Because no samples have been collected from AOC C-16-051, the nature and extent of potential contamination at this site are unknown.

2.8.2.3 Conceptual Site Model

The CSM for AOC C-16-051 includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for AOC C-16-051.

Source of Contamination

Contamination at AOC C-16-051 originated from the aboveground oil switches at the site. The primary COPCs at AOC C-16-051 are TPH and PCBs.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for AOC C-16-051 are summarized in section 1.1.1.

2.8.2.4 Summary of Additional Data/Corrective Action Requirements

No historical sampling has been performed at AOC C-16-051. Sampling is proposed to investigate the nature and extent of potential contamination of COPCs (TPH and PCBs) associated with this former aboveground oil switch (section 2.9.4).

2.9 Scope of Investigation Activities

Sampling is proposed at the 220 Complex outfalls, debris disposal area, and former oil switches to define the nature and extent of contamination at these sites. The analytical suites proposed for the 220 Complex outfalls follow a general laboratory analytical strategy for sites in the Cañon de Valle Aggregate Area, as presented in Table 2.9-1. This general strategy recommends analytical suites based on historical site operations and the waste streams anticipated from historical operations. Individual site sampling and analyses plans may vary slightly from the general strategy based on site-specific information available and identified data requirements. The proposed sampling locations at the 220 Complex are shown in Figure 2.9-1. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 2.9-2.

All investigation activities at the 220 Complex will be preceded by a surface radiological walkover survey in order to determine the presence of alpha, beta and/or gamma-emitting radionuclides. Radiological walkover survey results will be used to address potential worker safety and protection issues as well as be used to potentially relocate proposed sampling locations. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site radiological control technician (RCT) to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

2.9.1 X-Ray Buildings Drainlines and Outfalls: SWMUs 16-026(i), 16-026(j), and Consolidated Unit 16-026(l)-00

Sampling at the x-ray buildings drainlines and outfalls will include the following (Figure 2.9-1):

Sampling to define nature and extent of contamination at SWMU 16-026(i). Four locations (1 through 4) will be sampled to determine the nature and extent of potential contamination at SWMU 16-026(i). Four depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil-sampling-depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, explosive compounds, SVOCs, pH, and cyanide. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

- *Sampling to define nature and extent of contamination at SWMU 16-026(j)*. Four locations (5 through 8) will be sampled to determine the nature and extent of potential contamination at SWMU 16-026(j). Four depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, explosive compounds, SVOCs, pH, and cyanide. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening

indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

- *Sampling to define nature and extent of contamination at Consolidated Unit 16-026(l)-00 [SWMU 16-026(l) and AOC 16-028(c)]*. Five locations (9 through 13) will be sampled to determine the nature and extent of potential contamination at Consolidated Unit 16-026(l)-00. Four depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, explosive compounds, SVOCs, pH, and cyanide. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

2.9.2 Building 16-222 Outfall: SWMU 16-020, Silver Outfall

Sampling at the Silver Outfall will include the following (Figure 2.9-1):

- *Sampling to define vertical and lateral extent of potential metals and PAH contamination at SWMU 16-020.* One or more metals were detected at concentrations greater than BVs, and numerous PAHs were detected in all soil samples collected from the site in 2000. Additionally, sampling of the Silver Outfall in 2000 did not include the downgradient extent of the SWMU. Ten locations (14 through 23) will be sampled to define the vertical and/or lateral extent of inorganic chemicals and PAHs (i.e., SVOCs) at SWMU 16-020. Two samples will be located next to former building 16-222, where the effluent was discharged, and the remaining eight samples will be spaced at approximate 100-ft intervals to the downgradient extent of the SWMU boundary. Samples will be collected from two depths (1.5–2 ft into the tuff and 2.5–3 ft into the tuff) in locations 14 through 20 and analyzed for TAL metals and SVOCs. Samples will be collected from four depths (0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff) in locations 21 through 23 and analyzed for TAL metals and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

2.9.3 Surface Disposal Site: SWMU 16-016(d)

Sampling at the surface disposal site will include the following (Figure 2.9-1):

- *Confirmatory sampling to define nature and extent of potential contamination at SWMU 16-016(d).* Four locations (24 through 27) within, and adjacent to, the footprint of the former debris pile will be sampled to determine the nature and extent of potential residual contamination at SWMU 16-016(d). Four depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Because the disposal site contained construction debris, samples will be analyzed for TAL metals and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

2.9.4 Oil Switch: AOC C-16-051

Sampling at the location of the former aboveground oil switch will include the following (Figure 2.9-1):

- *Sampling to define nature and extent of potential contamination at AOC C-16-051*. Four locations (28 through 31) will be sampled to determine the nature and extent of potential contamination at AOC C-16-051. Four depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Because the oil switch may have contained mineral oil and PCBs, samples will be analyzed for TPH and PCBs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

3.0 SUBAGGREGATE 2: MDA R, SWMU 16-019

Subaggregate 2 consists of one site, MDA R, SWMU 16-019 (Figure 1.1-3). MDA R is the original WWII S-Site burning ground and associated waste disposal site. Located north of building 16-260 and south of Cañon de Valle, MDA R was built in the mid-1940s and used until the early 1950s as a burning ground for waste explosives.

3.1 Surface Conditions

MDA R is located in TA-16, which lies on a 200-ft-high mesa that trends east to west (Plate 1). The mesa is bounded on the north by Cañon de Valle (about 25 ft north of MDA R) and on the south by Water Canyon (approximately 4800 ft south of MDA R) (Plate 1). The elevation of the mesa ranges from 7700 to 7500 ft amsl; at MDA R it ranges from approximately 7560 to 7460 ft amsl in Cañon de Valle. The topography of the southern half of MDA R itself has a gentle, 5- to 10-degree slope to the northeast. The northern half drops steeply (more than 60 ft vertically over 100 ft laterally) into an east-trending segment of Cañon de Valle.

In May 2000, the Cerro Grande fire burned across the surface of MDA R and continued to burn underground for several weeks, causing moderate to severe damage over much of the area. Miscellaneous debris was exposed on the mesa and slope above the canyon channel. The ground and canopy cover were completely destroyed (LANL 2000, 70351, p. 22). Although MDA R covers 2.25 acres, field activities were focused on extinguishing a smoldering area along a steep slope measuring 60 by 600 ft that had been ignited by the fire (LANL 2001, 69971, p. 1).

Dead and burned trees were cut and placed parallel to Cañon de Valle, along the mid-slope, below the landfill. Straw wattles were placed and then packed along the trees to act as silt control, thus attenuating silt migration while allowing water to pass. Straw wattles were also placed at the top of the slope, near the mesa top, to attenuate silt migration (LANL 2001, 69971, p. 3). Trees were additionally contour-felled at the toe of the slope to provide sediment retention. The entire slope was hydromulched to enhance the vegetation process. A stormwater diversion trench was installed to prevent runoff from the area behind building 260 (LANL 2000, 70351, pp. 1–3).

The surface vegetation community within the Cañon de Valle Aggregate Area is described in section 2.1.

3.2 Surface Water

After the May 2000 Cerro Grande fire, sites that were subject to corrective action and/or located in floodplains were identified. MDA R was one of the fire-burned sites with the potential for contaminant migration through flooding and erosion. Because of the loss of vegetation and the charred soil at this site, the potential for accelerated erosion and runoff was high.

MDA R was given an erosion potential score of 82.5, indicating a high erosion potential. Site erosion control activities after the fire included the placement of straw wattles and site reseeding.

Specific sites (Plate 1) monitored in Subaggregate 2 are listed in Table 2.2-1.

During fire suppression activities after the 2000 Cerro Grande fire, a small drainage arroyo and dam south of MDA R (landfill) were constructed. The results of site inspections indicated a significant rainfall event could breach the small dam and water could flow across the landfill. To alleviate this problem, a drainage ditch was constructed west of the landfill leading to the canyon edge to prevent water from draining through the contaminated area. The new diversion consists of a simple unlined ditch, approximately 100 yd long, with local rock reinforcement. Straw wattles were placed along the ditch to capture silt and debris while allowing water to pass. This ditch replaces the former arroyo and now drains through an area on the western side of the landfill through a relatively clean area that does not exhibit any exposed landfill debris (LANL 2001, 69971, p. 3).

Section 2.2 presents a discussion of surface water of the Cañon de Valle Aggregate Area. A water sample was not collected from CDV-SMA-1.7 in 2005 (LANL 2006, 92600, Attachment 2, Table B-1).

3.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3.

3.4 Subsurface Conditions

3.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.1.

3.4.2 Cliff Retreat and Fractures

Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

3.4.3 Hydrogeology

The hydrogeology of the Cañon de Valle Aggregate Area is discussed in section 2.4.3. Well R-26 is located approximately 2910 ft west of Subaggregate 2. Wells R-25 and CdV-16-1(i) are located approximately 2323 and 2112 ft southeast, respectively, of this subaggregate (Plate 1). This subaggregate lies near these three wells, all of which contain a thick perched zone, which is located between 563 and 723 ft bgs. Well R-26 also contains a higher zone of perched water at 173 ft bgs that appears to be associated with low-angle platy fractures in the ash-flow tuff (LANL 2005, 92028, p. 2-B-11). The presence, location, and depth of a perched zone directly beneath this subaggregate remain unknown.

3.5 MDA R, SWMU 16-019

3.5.1 Site Description and Operational History

MDA R is located north of building 16-260 and south of Cañon de Valle. MDA R lies on relatively flat terrain with a moderate slope to the north, dropping off approximately 80 ft into Cañon de Valle (LANL 2001, 69971, p. 1). MDA R consists of the original WWII S-Site burning ground and associated waste-disposal site. MDA R was built in the mid-1940s and used as a burning ground for waste explosives until the early 1950s, probably 1951, when building 16-260 was constructed (LANL 1993, 20948, p. 5-186). Initially, the HE were burned in the open; later, three bermed U-shaped pits, each approximately 75 x 75 ft, were used for burning HE scrap. The three burn pits were placed roughly parallel to, and approximately 150 ft from, the edge of the canyon and constructed side-by-side such that adjacent sides were common. Thus, the total footprint of the burn pits was approximately 225 x 75 ft. A road encircled the burn pits and the area was fenced. The total area of MDA R was estimated as 2.25 acres (LANL 2001, 69971, p. 1). During the construction of the 260-line, the berms and surface soil were graded northward into Cañon de Valle (LANL 1993, 20948, p. 5-186). The area has not been used for any waste management activities since the early 1950s and is currently covered with grasses and small trees and shrubs, many planted following the May 2000 Cerro Grande fire.

3.5.2 Historical Investigations

As part of the emergency response efforts associated with the Cerro Grande fire, SWMU 16-019 underwent an accelerated cleanup action, including fire-suppression activities and soil stabilization. On June 1, 2000, the area was robotically excavated to suppress the smoldering underground fire. To suppress the fire, a flat bench was excavated along the top slope of the landfill on which materials from smoldering areas were placed. Fire suppression involved excavating and staging about 800 yd^3 of clean soil and 1500 yd^3 of contaminated soil and debris. Subsequently, these materials were moved to the mesa top and staged in piles south of the landfill (LANL 2000, 67089, p. 1). Approximately 600 yd^3 of soil was removed and field-screened for metals using XRF instrumentation. The removed soil was determined to be “clean,” because the metals concentrations were measured at background levels. This clean soil from the bench excavation was returned to the upper slopes and contoured to control erosion. Dead and burned trees were cut and placed parallel to Cañon de Valle, along the mid-slope, below the landfill. Straw wattles were placed and then packed, along the trees to act as silt control, attenuating silt migration while allowing water to pass. Straw wattles were also placed at the top of the slope, near the mesa top, to attenuate silt migration (LANL 2001, 69971, p. 3).

A total of 63 surface and subsurface samples (Table 3.5-1) of soil, fill, and tuff were collected from 39 locations within the landfill area (Figure 3.5-1) during various activities in 1997, 1998, and 2000. For the purposes of this evaluation, the landfill area is defined as the area within the SWMU 16-019 boundary shown in Figure 3.5-1. All samples were analyzed for metals and SVOCs; 62 samples were analyzed for HE, and 3 samples were also analyzed for cyanide and VOCs.

Surface water drains from the landfill to the west, north, and east. As part of the MDA R investigations, as well as investigations of SWMUs 16-018, 16-020, and 16-021(c), samples were collected in these drainage areas (Figure 3.5-1). Surface and subsurface samples from 12 drainage locations were collected (Table 3.5-1) from soil, fill, and sediment. The samples were analyzed for (number of samples for each analysis in parentheses) anions (7), metals (16), cyanide (8), HE (16), SVOCs (14), VOCs (1) and by gamma spectroscopy (7), Five samples at three of the west drainage locations (locations 16-02168, 16-02169, and 16-02170) upgradient of MDA R were sampled as part of the SWMU 16-020

investigation and removal activities; these samples are included in the tables but are not shown in the figures depicting the MDA R site.

Details of the samples collected from the MDA R landfill area and adjacent drainages are presented in section 3.1.1.5 of the HIR (LANL 2006, 91697).

3.5.2.1 Analytical Results

Landfill Area

The analytical results of inorganic chemicals in soil, sediment, fill, and tuff samples from the landfill with concentrations greater than BVs are summarized in Table 3.5-2 and shown in Figure 3.5-2. As detailed in Table 3.5-2, a number of inorganic chemicals were detected at concentrations greater than BVs or had DLs greater than BVs. The primary metal of concern is barium (maximum concentration of 110,000 mg/kg at location 16-05907).

The analytical results of organic chemicals in soil, sediment, fill, and tuff samples from the landfill are summarized in Table 3.5-3 and shown in Figure 3.5-3. The predominant detected organic chemicals were HE: 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, HMX, RDX, and TNT.

Drainage Areas

The analytical results of inorganic chemicals for downgradient samples from the drainages adjacent to MDA R with concentrations greater than BVs are summarized in Table 3.5-4 and shown in Figure 3.5-2. As detailed in Table 3.5-4, several metals were detected at concentrations greater than BVs or had DLs greater than BVs. The primary metal of concern is barium (maximum concentration of 29,800 mg/kg at location 16-05911).

Table 3.5-5 lists the organic chemical data results for downgradient samples from the drainages adjacent to MDA R (Figure 3.5-3). The detected organic chemicals were predominantly HE.

Table 3.5-6 lists the radionuclide analytical results for downgradient samples from the drainages adjacent to MDA R (Figure 3.5-4). Cesium-137 was detected once at location 16-02749 at an activity greater than the sediment FV in one sediment sample (1.06 pCi/g).

Upgradient Samples

Table 3.5-7 lists the inorganic data results for five upgradient samples collected from three locations that were excavated after sample collection and are not shown in Figure 3.5-2. Inorganic chemicals detected at concentrations greater than BVs or with DLs greater than BVs include copper, lead, nickel, and silver.

Table 3.5-8 lists the organic data results for three samples obtained from upgradient locations excavated after sample were collected and are not shown in Figure 3.5-3. Detected organic chemicals include benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene.

3.5.2.2 Nature and Extent of Contamination

Samples were collected in 1996, 1997, and 1998 and again in 2000, after the Cerro Grande fire. Some soil, landfill debris, and pieces of barium nitrate were removed during fire-suppression activities. Samples were collected primarily from within the SWMU/landfill boundary. As part of other investigations [MDA P, SWMU 16-018 and building 16-260, Consolidated Unit 16-021(c)-99)], samples were collected from areas

downgradient of MDA R that also drained MDA R. As part of the RFI investigation for the silver recovery unit (Subaggregate 1, 220 Complex, SWMU 16-020), samples were collected from three locations upgradient of MDA R in the western drainage. Field-screening analyses of barium (using XRF), HE (using spot tests) and gamma radioactivity (using a sodium iodide [NaI] detector) were conducted as part of the 2000 investigation (field-screening data are summarized in Appendix D of the HIR; LANL 2006, 91697). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining nature and extent of contamination relative to background for inorganic chemicals and radionuclides or nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan.

Barium was detected at concentrations greater than BVs in samples collected from soil, fill, and tuff within the landfill boundary and in sediment samples from the northern, eastern, and western drainages of MDA R. Solid barium nitrate was observed in the central and eastern portions of the landfill. These results indicate that barium from the landfill might contribute to barium in the canyon. While archival data indicate the 260 Outfall is the primary source of barium in the Cañon de Valle watershed, the existence of higher average concentrations of barium in the active channel upstream from the 260 Outfall indicate in the recent past, more barium was contributed from the area of MDA R than from the 260 Outfall drainage (LANL 2003, 77965, p. 3-121).The samples from within the landfill are representative only of the central and eastern portions of the landfill. Samples from within the landfill do not extend to the edge of the eastern boundary, nor have historical samples been collected from the western and southern portions of the landfill. Additionally, boreholes intended to evaluate the nature and extent of contamination in and around the three former burn pits were not located within the footprints of the former burn pits. Based on the historical samples collected at the site, (1) the lateral extent of metals contamination (especially barium) in the eastern, western, and southern portions of the MDA R landfill has not been defined, and (2) the vertical extent of metals contamination in the footprints of the former burn pits has not been defined.

In addition to barium, many samples from within the MDA R landfill boundary contained HE. Historical samples were not collected from locations near the eastern, western, and southern landfill boundaries, nor were samples collected at depth within the footprints of the former burn pits. All detections of organic chemicals and inorganic chemicals greater than BV were below the current SSLs (Table 1.2-1), with the exception of barium in one sample, cadmium in two samples, lead in two samples, RDX in one sample, and trinitrotoluene[2,4,6-] in one sample. Based on the historical samples collected at the site, (1) the lateral extent of HE contamination in the eastern, western, and southern portions of the MDA R landfill has not been defined, and (2) the vertical extent of HE contamination in the footprints of the former burn pits is not defined.

All the subsurface samples and most of the surface samples were not submitted for analyses of all potential contaminants associated with site activities, such as pH, nitrates, cyanide, perchlorate, VOCs, TPH, pesticides, PCBs and dioxins/furans, or alpha and gamma spectroscopy. The lateral and vertical extent of these analyte groups have not been defined at MDA R. As described above, the nature and extent of potential contaminants analyzed for in previous samples have not been defined at MDA R.

3.5.2.3 Conceptual Site Model

The CSM for SWMU 16-019 includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for MDA R, SWMU 16-019.

Source of Contamination

Contamination at MDA R, SWMU 16-019, primarily originated from HE residue and combustion byproducts resulting from the burning of the HE scrap in the three burn pits. Additional contamination may have resulted from HE scrap and other materials disposed of at the landfill, including asbestos, barium nitrate, and other debris (LANL 2001, 69971, p. 3).

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for MDA R are summarized in section 1.1.1. In addition, surface water may potentially be impacted by MDA R. However, no potential exposure pathways exist for an industrial receptor, nor are there on-site exposure pathways to ecological receptors.

3.5.2.4 Summary of Additional Data Requirements

Previous site investigations at MDA R have documented the presence in surface soil of HE and metals, especially barium, at concentrations of potential concern. The results indicate an area of contamination in the north-central portion of the site, which lies between the locations of the former burn pits and the surface expression of a debris field along the north-facing slope of the canyon. Anecdotal evidence indicates that the features of the former burn pits were pushed by a bulldozer over the edge of the canyon to the north during construction of building 16-260 (LANL 2001, 69971, p. 1). Descriptions of the debris on the slope include tree trunks, clay pipe, sheet metal, conduit, drums, pipes, insulated wire, concrete, and asbestos-containing construction materials; such material indicates the site was used for general disposal as well. Fire-suppression activities documented the presence of debris comingled with barium nitrate fragments along the slope. While much of the debris on the upper slope is no longer present, the amount and type of debris on the lower slope is not known.

The following additional data are required to determine the nature and extent of contamination at MDA R, SWMU 16-019:

- Locations of historical boreholes designed to evaluate HE and metals contamination from open burning activities do not fall within the footprints of the three former burn pits; thus, the vertical extent of potential contamination at the locations of the three burn pits has not been defined. Additional sampling is proposed to address this data requirement.
- Although barium and HE constituents have been detected in the soil within the central portion of the landfill, the extent of contamination to the east, west, and south is not known. Additional sampling is proposed to address this data requirement.
- Historical analyses did not include all potential contaminants associated with site activities. Laboratory analyses for samples collected from the site are designed to address these data requirements.
- The extent of the landfill debris is not known. Emergency excavation activities within the landfill occurred in June 2000, after the Cerro Grande fire ignited the contents of the landfill. The excavation was intended to be a fire-suppression action rather than a removal action, and summary reports document debris remaining in place at both the western and eastern extents of the landfill, as well as the debris area on the adjacent northern hill slope. Material excavated included pieces of barium nitrate, tree trunks and stumps, railroad ties, rusted and galvanized metal objects, asbestos-containing materials, insulated wire, wallboard, and concrete. Field notes from the postexcavation RFI confirm the presence of barium nitrate as well as metal and wooden

debris at the eastern side of the landfill. Site geophysical surveys, followed by exploratory trenching, are proposed to address this data requirement.

3.6 Scope of Investigation Activities

All investigation activities at MDA R will be preceded by a surface radiological walkover survey to determine the presence of alpha, beta and/or gamma-emitting radionuclides. Radiological walkover survey results will be used to address potential worker safety and protection issues as well as to possibly relocate proposed sampling locations. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

To address the data requirements listed in section 3.5.2.4 and to determine whether further corrective actions are necessary, the following investigation activities will be conducted at MDA R. The proposed sampling, geophysical survey, and excavation/trenching locations at MDA R are shown in Figure 3.6-1. The analytical suites proposed for MDA R follow the general laboratory analytical strategy for MDAs, as presented in Table 2.9-1. A summary of the purpose of the proposed samples, including sampling locations, depths, and laboratory analyses, is provided in Table 3.6-1.

Sampling activities at MDA R will include the following.

- *Sampling to evaluate nature and vertical and horizontal extent of potential contamination at the former burn pits*. The proposed borehole sampling will evaluate the presence of contamination in the soil and underlying tuff in the vicinity of the three former burn pits. A vertical borehole will be drilled at each of three locations within the footprint of each former burn pit (BH15 through BH23), with a target TD of 15 ft into the tuff. Five depths will be sampled at each location (15 through 23): 0–0.5 ft bgs (soil), 2–2.5 ft bgs (soil), 5–5.5 ft into the tuff, 10–10.5 ft into the tuff, and 15–15.5 ft into the tuff. Each sample will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, TPH compounds, pesticides and herbicides, PCBs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples from the TD of each borehole will be analyzed using quantitative field analytical methods for determining presence of: (1) barium exceeding the XRF DL, (2) RDX exceeding the field analytical DL, or (3) PCBs exceeding of the field analytical DL (details of field analytical methods are provided in section 12). If barium, RDX, or PCBs are detected at the TD in excess of field analytical DLs, drilling will continue to an additional 25 ft beyond the previous TD and field screening at the new TD will be repeated to determine whether additional drilling and sampling are required to define the vertical extent of contamination. If PCBs are detected by the field screening, samples collected for off-site laboratory analyses will be analyzed for PCBs and dioxins/furans. Samples will be collected using mechanical drilling methods.
- *Sampling to evaluate nature and vertical and horizontal extent of contamination across MDA R*. Sampling is proposed to evaluate the nature and extent of suspected contamination in the soil and tuff within the landfill boundary, including the previously unsampled areas in the eastern, western, and southern portions of the landfill. Four depths will be sampled at each location (1 through 14): 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Each sample will be analyzed for pH, nitrates, cyanide, perchlorate, TAL

metals, VOCs (subsurface samples only), SVOCs, TPH compounds, pesticides and herbicides, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power auger.

An investigation into the extent of landfill debris at MDA R will include the following.

- *Geophysical survey to locate metallic debris.* The proposed survey across the entire site will use magnetic and/or electromagnetic geophysical techniques to delineate areas containing metallic and other comingled debris. The survey will be linked with a real-time global-positioning system (GPS) to provide accurate width and breadth data to guide future actions.
- *Exploration trenches to establish depth and nature of debris.* The proposed exploratory trenching will evaluate areas identified by the geophysical survey to verify the presence of metallic objects, to allow description of the objects and comingled debris, to establish the depth of debris and proximity to bedrock, and to locate the original canyon slope if possible. Results of the trenching will be evaluated in conjunction with the results of the geophysical survey to support corrective action decisions. A minimum of five exploratory trenches will be excavated.
- *Sampling to evaluate nature and extent of potential contamination within the landfill debris*. Sampling within the exploratory trenches is proposed to evaluate the presence of contamination in the soil and underlying tuff in the debris area. A minimum of three samples will be collected from each trench at depths to be determined during the trenching activities; samples will be collected from soil underlying visible debris or areas that might have been burned in the Cerro Grande fire and from the bottom of each excavation (could be soil or tuff). Each sample will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs, SVOCs, TPH compounds, pesticides and herbicides, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Two samples from each trench will be analyzed using quantitative field analytical methods for determining the presence of PCBs (details of field analytical methods are provided in section 12). If PCBs are detected, then one sample collected from each trench for off-site laboratory analyses will be analyzed for PCBs and dioxins/furans.

4.0 SUBAGGREGATE 3: THE TA-16 BURNING GROUND

Subaggregate 3, the TA-16 Burning Ground, is located in the northeastern corner of TA-16 (Figure 1.1-4). The Burning Ground was constructed in 1951 for HE treatment. Following treatment, residual material was disposed of in the MDA P landfill until 1984. After 1984, treated material from the Burning Ground was taken to TA-54 for disposal.

The TA-16 Burning Ground consists of eight SWMUs and three AOCs, including Consolidated Unit 16-010(h)-99, SWMU 16-028(a), and AOCs C-16-001, C-16-061, and C-16-070 (Figure 1.1-4). Consolidated Unit 16-010(h)-99 consists of seven SWMUs called the “Burning Ground Structures” and hereafter is referred to as the filter basket wash and associated filter beds. Consolidated Unit 16-010(h)-99 consists of SWMUs 16-005(g), 16-010(h), 16-010(i), 16-010(k), 16-010(l), 16-010(m), and 16-010(n). The other SWMU in this subaggregate, SWMU 16-028(a), is referred to as the south drainage channel. The three AOCs in this subaggregate, including AOC C-16-001 (aboveground platform), C-16-061 (latrine), and C-16-070 (underground propane tank), are not proposed for additional investigation or corrective action and are discussed in Appendix B.

Structures 16-401 [SWMU 16-010(e)] and 16-406 [SWMU 16-010(f)] and SWMU 16-010(j) are not included in this work plan because they are RCRA-regulated units not subject to the Consent Order. However, these units are located within consolidated unit 16-010(h)-99, and any historical releases associated with these sites before they were regulated by RCRA will be investigated as part of the investigation of the consolidated unit.

4.1 Surface Conditions

The TA-16 Burning Ground is located on the east-trending mesa, which is bounded on the north by Cañon de Valle (between 4000 to 8000 ft north of the Burning Ground) and on the south by Water Canyon (approximately 500 ft south of the Burning Ground) (Plate 1). The elevation of the mesa ranges from 7700 to 7500 ft amsl; at the Burning Ground it ranges from approximately 7450 ft amsl on the mesa top to approximately 7350 ft amsl in Martin Spring Canyon, which bounds the southern edge of the mesa. The topography at the Burning Ground itself has a gentle 10- to 15-degree slope from north to south. Fishladder Canyon is located approximately 350 ft south of the Burning Ground (Plate 1). Because Fishladder Canyon heads just south of the Burning Ground and not in the Sierra de los Valles (Figure 2.4-5), the flooding events in this canyon are much less severe than in the larger canyons that head in the Sierra de los Valles.

This site had minimal Cerro Grande fire damage to the west and south, and only minor burning occurred within the area of the Burning Ground, consisting mostly of destroyed grasses (LANL 2001, 71342, p. 26). Any increases in erosion from effects of the fire have been minimal at the Burning Ground.

The surface vegetation community within the Cañon de Valle Aggregate Area is described in section 2.1.

4.2 Surface Water

Section 2.2 presents a discussion of Cañon de Valle Aggregate Area surface water. Surface water in the vicinity of the Burning Ground consists of storm and snowmelt runoff that may flow by small drainages or sheet flow into Fishladder Canyon. Fishladder Seep is located in a hanging valley approximately 800 ft southeast of the Burning Ground (Plate 1). Alluvial groundwater occasionally discharges at Fishladder Seep. The prevalence of surface flow in Fishladder Seep has decreased significantly during the past six years. Millions of gal./yr of process discharged during the operational period for the building 16-340 Outfall to the west helped sustain surface flow in Martin Spring Canyon located south of Fishladder Canyon. Before the current drought and the cessation in the mid-1990s of process discharge, surface water runoff in Martin Spring Canyon yielded flowing water at the confluence with Cañon de Valle. Such flows are not currently seen.

Three alluvial wells were installed in Fishladder Canyon in October 2005 in conjunction with the 340 Complex investigation (LANL 2006, 91450). These three wells are located downgradient of the Burning Ground at a distance of approximately 2500 ft. Two of the wells yielded samples in November 2005. The filtered alluvial groundwater samples collected at locations 16-25279 and 16-25278 were analyzed for TAL metals and anions. Aluminum, barium, beryllium, cadmium, cobalt, lead, manganese, nickel, uranium, vanadium, and zinc were identified as COPCs in filtered alluvial groundwater. The unfiltered alluvial groundwater samples collected at locations 16-25279 and 16-25278 were analyzed for anions, total cyanide, TAL metals, perchlorate, VOCs, SVOCs, and HE. Aluminum, arsenic, barium, beryllium, bromide, cadmium, chloride, chromium, cobalt, copper, fluoride, lead, manganese, nickel, sulfate, uranium, vanadium, and zinc were identified as COPCs in unfiltered alluvial groundwater. Organic chemicals detected and identified as COPCs are HMX and toluene. Alluvial groundwater has decreased in flow since the cessation of discharge from the NPDES outfall at building 16-340 in 1998.

Surface water runoff, alluvial water flow, and associated sediment transport represent key potential migration pathways by which contaminants may be transported to off-site receptors. Surface water at Fishladder Seep and at the confluence of Martin Spring Canyon and Cañon de Valle contained contaminants that may have originated at the Burning Ground; thus, these transport pathways are relevant to contamination at the Burning Ground.

Surface water assessments were conducted in the 1990s for most of the SWMUs associated with the TA-16 Burning Ground, including SWMUs 16-005(g), 16-010(h), 16-010(i), 16-010(k), 16-010(l), 16-010(m), 16-010(n), and 16-028(a). Of these, SWMU 16-005(g) received a score of 3.6; SWMU 16-010(h) a score of 8.8; SWMUs 16-010(i), 16-010(k), 16-010(l), 16-010(m), 16-010(n) each a score of 14.0; and SWMU 16-028(a) a score of 51.5. Thus, the site has a moderate-to-high erosion potential; best management practices (BMPs) consisting of a check dam, straw bale barriers, straw wattles, and reseeding have been placed around SWMU 16-028(a).

The specific sites monitored in Subaggregate 3 (Plate 1) are listed in Table 2.2-1.

A water sample was not collected from CDV-SMA-1.7 in 2005 (LANL 2006, 92600, Attachment 2, Table B-1). In 2005, gaging station E257, which is associated with SWMU 16-028(a), had wSAL exceedances for arsenic and vanadium (LANL 2006, 92600, Attachment 2, Table A-2).

4.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3.

4.4 Subsurface Conditions

4.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.

4.4.2 Cliff Retreat and Fractures

The fracture study from MDA P is located approximately 200 ft northwest of the TA-16 Burning Ground Site. Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

4.4.3 Hydrogeology

The hydrogeology of the Cañon de Valle Aggregate Area is discussed in section 2.4.3. The TA-16 Burning Ground is located on the mesa top, but it drains into the small intermittently saturated Fishladder Canyon. Alluvial groundwater is present in Fishladder Canyon at depths of less than 5 ft bgs and is free-flowing at Fishladder Seep during wet seasons. It is not known whether the alluvial groundwater is present only during high-flow seasons or whether such flow is perennial (LANL 2006, 91450). Alluvial groundwater has decreased in flow since the cessation of discharge from the NPDES outfall at former Building 16-340 in 1998 (LANL 1998, 59891, pp. B-16–B-17).

The Burning Ground lies in a transitional region between the well R-25, which contains a thick perched zone, and well CdV-16-2(i), which does not. The presence, location, and depth of a perched zone directly beneath the Burning Ground remain unknown.

4.5 Filter Basket Wash and Filter Beds: Consolidated Unit 16-010(h)-99

4.5.1 Site Description and Operational History

The filter basket wash facility was constructed in 1951 to clean HE sump filter baskets (LANL 1993, 20948, pp. 5-151–15-153) and was used until 1966. Modifications were made to the basket wash facility throughout its operational life. Residual wash-down water from this process was sent down elevated, open, steel, V-shaped troughs to filters beds. Later, metal pressure filter vessels replaced the filter pads. The supernatant liquid from the filter process was allowed to run off from the pads (or pressure filter vessels) to the ground surface. HE material was collected on the filter beds (or pressure filter vessels) and then burned on the beds or filter vessel. After burning, the filter pad material (sand) was removed for disposal (at MDA P in early operations and later at TA-54) and replaced by new material. Unless otherwise noted, all the structures related to the subject SWMUs were removed by D&D in 2003 (LANL 2003, 91865).

As originally constructed (LANL 1990, 07512, 16-010 summary), the filter basket wash facility consisted of the following buildings and structures (Figure 1.1-4):

- Building 16-390 [SWMU 16-010(h)]—basket wash house
- Structure 16-1134 [SWMU 16-010(l)]—trough feeding wash-down water from basket wash house (building 16-390) to filter bed 16-394
- Structure 16-394 [SWMU 16-010(j)]—filter bed receiving wash-down water from basket wash house (building 16-390) through trough 16-1134
- Structure 16-1135 [SWMU 16-010(m)]—trough feeding wash-down water from basket wash house (building 16-390) to filter bed 16-393
- Structure 16-393 [SWMU 16-005(g)]—filter bed receiving wash-down water from basket wash house (building 16-390) through trough 16-1135
- Structure 16-1136 [SWMU 16-010(n)]—trough feeding wash-down water from basket wash house (building 16-390) to filter bed 16-392
- Structure 16-392 [SWMU 16-010(i)]—filter bed receiving wash-down water from basket wash house (building 16-390) through trough 16-1136
- Structure 16-396 (AOC C-16-061)—latrine for the burning grounds
- Structure 16-398 (AOC C-16-070)—underground propane tank

In 1961, the following structures were added to the basket wash facility (LANL 1990, 07512, 16-010 summary):

- Structure 16-1129 [SWMU 16-010(k)]—trough feeding wash-down water from the basket wash house (building 16-390) to filter vessel structure 16-401 (RCRA unit closed under interim status). The 1961 date listed in the SWMU report (LANL 1990, 07512, 16-010 summary) for the addition of SWMU 16-010(k) conflicts with information in the OU 1082 work plan (LANL 1993, 20948, p. 5-152) that indicates SWMU 16-010(k) was added in 1951. An aerial photograph from 1958 (USAF 1958, 05855) clearly shows this structure was not present at the time of the photograph, indicating that the 1961 date provided in the SWMU report (LANL 1990, 07512, 16-010 summary) is likely correct.
- Structure 16-401 [RCRA unit closed under interim status, SWMU 16-010(e)]—filter vessel receiving wash-down water from the basket wash house (16-390) through trough 16-1129.

- Structure 16-384 (AOC C-16-001)—T-shaped, elevated, crossover platform that ran across the HE slurry drain troughs.

In 1965, the following additional modifications were made (LANL 1990, 07512, 16-010 summary):

- Structure 16-406—filter bed 16-393 was removed to TA-54 and in its place, this filter vessel [RCRA unit closed under interim status, SWMU 14-010(f)] was constructed to receive wash-down water from the basket wash house (building 16-390) via trough 16-1135.

The filter basket wash facility ceased to operate in 1966 (LANL 1993, 20948, p. 5-151). Before the RCRA interim status closure of structures 16-401 and 16-406 in 2005, sludge from site-wide HE sumps was trucked to the burning ground, filtered, and then dried and burned at the structures (Kieling 2005, 92226). The filter-bed sand was scraped up after burning and placed into drums for disposal at RCRA-permitted burn trays at TA-16. Since interim status closure of the units, the dried sludge is drummed without burning and transported for disposal to the RCRA permitted burn trays at TA-16. From 1986 to 1988, the wastewater from the pressure filter tanks drained into a hypalon-lined surface impoundment [AOC 16-008(b), a RCRA interim-status unit] located south of pressure filter vessel 16-401. This impoundment has since undergone RCRA interim status closure and was approved for NFA by EPA (King 2005, 88464). Before 1986, when the impoundment was lined, filtrate from the filter pads was allowed to drain into an area south of the filter tanks and eventually into a tributary of the Cañon de Valle. In 1988, a carbon filter/treatment unit, structure 16-228, was built to treat the filtrate from structure 16-401 and 16-406 before discharging into a tributary of Cañon de Valle under NPDES permit NM0028355. The filter/treatment unit has since been renumbered as structure 16-363 (LANL 1993, 20948, p. 5-151). The filter treatment unit is located southwest of pressure-filter vessel 16-401 (Figure 1.1-4) and adjacent to the northwestern corner of SWMU 16-028(a) (section 4.2).

In 1988, former filter bed 16-392 [SWMU 16-010(i)] was converted to a burn pad to burn HE-contaminated uranium objects (LANL 1993, 20948, p. 5-152); however, because of the historical testing conducted at TA-16, HE contaminated with uranium was probably processed and burned on filter pad structure 16-292 at the filter basket wash trough structure 16-1136 [SWMU 16-010(n)] throughout its operating period. The trough serving the former filter beds (structure 16-1136) was dismantled when the filter bed was modified.

Filter bed 16-394 [SWMU 16-010(j)] was converted to a burn tray in 1990 and operated as a hazardous waste treatment unit under RCRA interim status (LANL 1999, 65311, p. 1). The burn tray was used to burn HE-contaminated oils, solvents, and water mixed with oils and solvents. After materials were poured onto the tray, wood stacked beneath the tray was ignited remotely. Residues from burning were managed in accordance with state and federal regulations. The Laboratory submitted a RCRA interim status closure plan for the burn tray [SWMU 16-010(j)] (LANL 1999, 65311) after burn operations were relocated to another RCRA-permitted unit [structure 16-388, SWMU 16-010(c)]. This active RCRA-permitted unit [SWMU 16-010(c)] is not included in this work plan.

Descriptions of four SWMUs integral to the operations (historical and current) at the Burning Ground are provided below [SWMUs 16-010(e), 16-010(f), 16-010(g), and 16-008(b)]. These SWMUs are not included in this work plan (Table 1.1-1), but their operational history is relevant to the investigation activities proposed for the Burning Ground (section 4.7).

Pressure-Filter Vessels [SWMUs 16-010(e), 16-010(f)] and Manhole Tank 16-010(g)

The pressure filter vessels are ¼-in. steel funnel-shaped vessels that are 8.75 ft in diameter and approximately 4 ft high, containing sand filter beds (LANL 2003, 91448, p. 6). Approximately half of each

vessel is below ground level (LANL 2003, 91448, Figure 3). Currently, the base of each vessel is welded to underground pipes leading to structure 16-363 [SWMU 16-010(g)], a manhole tank at the High Explosive Water Treatment Facility (HEWTF). Historically, the vessels drained to the surface impoundment [AOC 16-008(b)] or into the drainage area defined by SWMU 16-028(a). The vessels are filled with gravel at the bottom, topped with sand, and lined with firebrick to protect the steel during open burn (OB) operations (OB operations are no longer conducted at the site) (LANL 2003, 91448, p. 6). Wastewater from HE operations is collected in sumps, pumped into a truck, and transported to the sand-filter vessels. The flow rate through the sand filters is typically several gal./min, and it generally takes a day to unload a full-tank truck into the filters (LANL 2003, 91448, p. 6).

Two types of wastewater are pretreated within the pressure-filter vessels. The first type is wastewater with low levels of HE, which was generated during HE processing (e.g., washing down of machining or pressing bays), cleanup activities of HE-contaminated materials (such as steam-cleaning contaminated equipment), and other processes (LANL 2003, 91448, p. 6). The second type was HE saturated with water (e.g., filters from the HE-machining facility). As the wastewater percolated through the sand and gravel, the solids were removed and the filtered wastewater was piped to the HEWTF's manhole tank (LANL 2003, 91448, p. 6). Large particles of wet HE remained on the surface of the sand filters and was dried before disposal. When OB operations were conducted at the pressure-filter vessels, a heavy steel lid was placed over the filter, and the HE were dried with heated, forced air for 4 or 5 days. After burning, any ash and the top layer of sand were removed, characterized, and disposed of per regulations (LANL 2003, 91448, p. 6).

Surface Impoundment [AOC 16-008(b)]

The surface impoundment [AOC 16-008(b)] is located directly south of and next to Consolidated Unit 16-010(h)-99 and is within SWMU 16-028(a) and the drainage channel to Cañon de Valle (Figure 1.1-4). The TA-16 surface impoundment received filtrate from pressure-filter-vessel structures 16-401 and 16-406, the only source of material placed in the impoundment (IT Corporation 1986, 91447, p. 2). The surface impoundment was equipped with a hypalon liner in 1986 and was unlined before 1986. Inflow to the impoundment occurred at two points, one in the northwest corner of the structure and one in the center of the east side. Periodically, fluids from the impoundment were discharged to an active NPDES-permitted outfall (05A-058/05A-055) within SWMU 16-028(a).

4.5.2 Historical Investigations

Samples were collected during Phase I RFI activities in 1995 based upon the OU 1082 work plan (LANL 1993, 20948) and during subsequent investigative sampling events in 1996 and 1997. The Phase I RFI report was never written. During these investigations, 60 samples were collected from 41 locations and submitted for laboratory analyses (Table 4.5-1 and Figure 4.5-1). Two of the samples were collected and sent to off-site laboratories but were not submitted through the Sample Management Office (SMO) and are deemed screening-level data (Table 4.5-2 and Figure 4.5-1). The exact sampling locations are not known for five samples (Table 4.5-1): two subsurface soil samples (locations 16-03-21917 and 16-03-21918) collected from the footprint of the filter basket wash house (building 16-390) during the 2003 D&D activities and three samples associated with SWMU 16-005(g) (location 16-01660); the sampling location coordinates were not recorded in the sample collection log (SCL) or the Environmental Restoration database (ERDB).

4.5.2.1 Analytical Results

The analytical results of inorganic chemicals in soil, sediment, fill, and tuff samples from Consolidated Unit 16-010(h)-99 with concentrations greater than BVs are summarized in Table 4.5-3 and shown in Figure 4.5-2. A number of inorganic chemicals were detected at concentrations greater than BVs or had DLs greater than BVs. The primary metal of concern for the consolidated unit is barium (maximum concentration of 1820 mg/kg at location 16-01282). Uranium was detected at concentrations greater than BVs predominantly at the filter basket wash house [SWMU 16-010(h)] and the burn pad that treated uranium-containing HE [SWMU 16-010(i)]. Other metals of concern include lead, mercury, and zinc.

The analytical results of organic chemicals detected in soil, sediment, fill, and tuff samples from Consolidated Unit 16-010(h)-99 are summarized in Table 4.5-4 and shown in Figure 4.5-3. The predominant detected organic chemicals were HE-related compounds, including HMX (maximum concentration of 18,700 mg/kg at location 16-01233), RDX (maximum concentration of 10,700 mg/kg at location 16-01278), and TNT (maximum concentration of 2060 mg/kg at location 16-01278).

Data from two screening-level samples analyzed for metals, SVOCs, and VOCs were also available (Table 4.5-2, Figure 4.5-2). Barium, cadmium, and lead were detected at concentrations greater than the BVs (Table 4.5-5). No organic chemicals were detected in these samples.

4.5.2.2 Nature and Extent of Contamination

Barium and HE (primarily HMX, RDX, and TNT) were detected in the majority of samples collected at Consolidated Unit 16-010(h)-99.

Samples were collected only from locations that were former structures (buildings, filter beds, burn pads, and trough lines). Numerous drainages bisect the hillside where the filter troughs were located. These drainages are potential transport pathways for contamination but have not been sampled. In addition, because of the nature of the operations, contamination could exist beyond the centerline of the troughs as a result of leaks, splashing, etc. While HE is likely present at locations proximal to former structures, its presence throughout the consolidated unit is not known. The lateral extent of contamination at Consolidated Unit 16-010(h)-99 has not been defined.

Although 60 samples from 41 locations were collected, only 17 were subsurface samples from 12 locations. Of these subsurface samples, only two were from the underlying tuff (QBT4), and all but six were within the upper 2 ft of soil. All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1), except for RDX in five samples.

The vertical extent of contamination Consolidated Unit 16-010(h)-99 has not been defined for most sampling locations. None of the samples collected were analyzed for radionuclides at an off-site laboratory.

Field-screening analyses of barium (using XRF), HE (using spot tests), and gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI. (The field-screening data are summarized in Appendix D of the HIR [LANL 2006, 91697].) Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining nature and extent of contamination relative to background for inorganic chemicals and radionuclides or nature and extent to DLs for organic chemicals.

Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan.

The investigation activities proposed in section 4.5.2.4 address the data requirements necessary to define nature and extent for this consolidated unit.

4.5.2.3 Conceptual Site Model

The CSM for Consolidated Unit 16-010(h)-99 includes both surface and subsurface sources of potential contamination, as summarized in the following sections.

Source of Contamination

Contamination at Consolidated Unit 16-010(h)-99 originated from the basket wash filter processing, including contamination from the filter beds from the infiltration of water-soluble components into the underlying sand filter media; deposition of nonsoluble materials on the ground surface; or leaks and spills from the troughs carrying the HE slurry to the filter beds and filter vessels 16-401 and 16-406 when they were used as part of the basket-wash facility. Additional sources of contamination may have resulted from using structure 16-394 [SWMU 16-010(j)] as a burning tray as well as from burning HE-contaminated uranium objects at former filter pad structure 16-392.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for Consolidated Unit 16-010(h)-99 are summarized in section 1.1.1. In addition, the discharge from the HE wastewater treatment facility (structure 16-363) may provide transport of contaminated soil particles downstream from the site and surface water may be impacted. However, no potential exposure pathways exist for an industrial receptor, nor are there on-site exposure pathways to ecological receptors.

4.5.2.4 Summary of Additional Data/Corrective Action Requirements

Previous site investigations at Consolidated Unit 16-010(h)-99 have documented the presence in surface soil of metals and HE, especially RDX, at concentrations exceeding industrial SSLs at locations proximal to the former structures (buildings, filter beds, burn pads, and trough lines). The following additional data are required to determine the nature and extent of contamination at the Burning Ground, Consolidated Unit 16-010(h)-99.

Historical sampling was limited to surface and near-surface samples; thus, the vertical extent of potential contamination has not been defined. Additional sampling is proposed to address this data requirement.

Historical sampling was limited to areas proximal to former structure locations. The lateral extent of contamination is unknown at areas between the trough lines and downgradient of the consolidated unit. Additional sampling is proposed to address this data requirement.

Historical sampling did not include the area beneath the former impoundment [AOC 16-008(b)] that may have been impacted by historical operations at the Burning Ground before the RCRA permit of the surface impoundment. Additional sampling is proposed to address this data requirement.

Historical sampling did not include the area beneath the pressure-filter vessels [SWMUs 16-010(e) and 16-010(f)] that may have been impacted by historical operations at the Burning Ground before the RCRA

permits of the vessels, nor were the vessels evaluated as a component of the closure certification of the units. Additional sampling is proposed to address this data requirement.

Historical analyses did not include all potential contaminants associated with site activities. Laboratory analyses for samples collected from the site are designed to address these data requirements.

Historical sampling has defined areas at the Burning Ground with RDX concentrations exceeding the industrial SSL of 174 mg/kg (NMED 2006, 92513). Soil excavation and removal will be performed for these areas. Following excavation, confirmatory sampling will be performed to verify that residual HE contamination poses no human or environmental risk at the site. Excavation, confirmatory sampling, and nature and extent sampling activities are described in section 4.7.1.

4.6 Southern Drainage: SWMU 16-028(a)

SWMU 16-028(a) is the south drainage channel from the TA-16 Burning Ground. The drainage is associated with Consolidated Unit 16-101(h)-99, the filter basket wash facility. The site provides the only drainage for approximately half the Burning Ground, and it marks the southern edge of current and historical Burning Ground activities (LANL 1997, 62539, p. 106).

4.6.1 Site Description and Operational History

SWMU 16-028(a) is located near Fishladder Canyon, a tributary to Cañon de Valle. The site has minimal fire damage to the west and south from the 2000 Cerro Grande fire. Some minor grasses burned within the SWMU boundary (LANL 2001, 71342, p. 26). In 1997, straw-bale barriers were installed at this site to minimize contaminant migration from the site. In 2000, additional BMPs were installed in the form of straw wattles and permanent seeding.

4.6.2 Historical Investigations

An RFI was conducted at SWMU 16-028(a) in 1995; some of the 1995 sampling locations were resampled in 1997 (LANL 1997, 62539). Five surface fill samples were collected from five locations and analyzed for metals, cyanide, HE, and SVOCs during the 1995 RFI activities (Table 4.5-1, Figure 4.5-1). During the 1997 sampling activities, a total of four samples were collected: three soil samples and one tuff sample were collected from two locations and analyzed for metals, HE, SVOCs (in one of the two samples), and VOCs (Table 4.5-1).

4.6.2.1 Analytical Results

The analytical results of inorganic chemicals in soil, fill, and tuff samples from SWMU 16-028(a) with concentrations greater than BVs are summarized in Table 4.5-3 and shown in Figure 4.5-2. A number of inorganic chemicals were detected at concentrations greater than BVs or had DLs greater than BVs (barium, cobalt, copper, lead, nickel, uranium, and zinc). Three metals had DLs, but not detections, greater than BVs (antimony, cadmium, and selenium).

The analytical results of organic chemicals detected in soil, fill, and tuff samples from SWMU 16-028(a) are summarized in Table 4.5-4 and shown in Figure 4.5-3. A number of HE compounds were detected, including HMX, RDX, TNT 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, and 1,3,5-trinitrobenzene. Additionally, nine PAHs were detected in one sample, and the halogenated solvent tetrachloroethene was detected in the three subsurface samples.

4.6.2.2 Nature and Extent of Contamination

The vertical extent of contamination at SWMU 16-028(a) has not been defined for inorganic or organic chemicals because inorganic chemicals greater than BVs were detected and organic chemicals were detected in the deepest historical samples from the site. All detections of organic and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additionally, no samples were collected from the southern end of this drainage, nor were samples collected outside of the main drainage channel; thus, the lateral extent of contamination has not been defined at SWMU 16-028(a).

4.6.2.3 Conceptual Site Model

The CSM for SWMU 16-028(a) includes both surface and subsurface sources of potential contamination, as summarized in the following sections.

Source of Contamination

Contamination at SWMU 16-028(a) originated from Burning Ground operations at the filter beds, runoff of surface contamination within Consolidated Unit 16-101(h)-99, the use of structure 16-394 as a burning tray; the burning of HE-contaminated uranium objects at former filter pad structure 16-392, and discharge from the surface impoundment [AOC 16-008(b)].

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 16-028(a) are summarized in section 1.1.1. In addition, surface water may be impacted by COPCs at SWMU 16-028(a) as a result of discharge from the HE wastewater treatment facility (structure 16-363), which may transport contaminated soil particles downstream from the site and affect surface water. However, no potential exposure pathways for an industrial receptor exist, nor are there on-site exposure pathways to ecological receptors.

4.6.2.4 Summary of Additional Data/Corrective Action Requirements

Previous site investigations at SWMU 16-028(a) have documented the presence in surface soil of metals, HE, and other organic chemicals; however, historical analyses did not include all potential contaminants associated with site activities. Historical sampling did not include the southern extent (farthest downgradient area) of the drainage. Additional lateral and depth sampling is proposed to address these data requirements (section 4.7.2).

4.7 Scope of Corrective Action and Investigation Activities

As detailed in the following sections, corrective action is proposed to remove soils contaminated with HE, and sampling is proposed to complete definition of the nature and extent of contamination at the TA-16 Burning Ground.

4.7.1 Filter Basket Wash and Filter Beds: Consolidated Unit 16-010(h)-99

4.7.1.1 Field Surveys

The Burning Ground does not lie within any designated hazard zones from explosive testing operations. However, because of the nature of the historical operations, HE fragments and residues may be present

at the site. Additionally, radionuclides were included in the basket wash waste stream, so radiological surveys are required.

HE Survey and Removal

A ground survey will be performed by qualified HE/ordnance personnel to locate HE fragments in advance of any field activity. The purpose of the ground survey is to identify and remove potentially dangerous fragments of residual HE from the ground in advance of other investigation activities. The ground survey will include a visual survey augmented by a direct instrumentation survey, such as mobile ion spectroscopy. Specific instrumentation is not provided at this time because the technology for HE detection is changing rapidly in response to deployment of Department of Homeland Security technology.

The ground survey will be performed with 100% coverage at the Burning Ground and in all work zones, including areas of exclusion, support, and all immediate access roads to the site. All visual or detected HE locations will be flagged by the survey team, and any HE fragments will be removed at the same time for disposal at an appropriate RCRA-permitted facility. In conjunction with the geodetic survey conducted after HE fragments are removed, an HE location map will be produced to characterize the extent of HE contamination.

Radiological Survey

Following the HE ground survey and removal, work at the Burning Ground will be preceded by a surface radiological walkover survey capable of detecting the presence of beta and gamma radioactivity and of radiological anomalies associated with uranium or other radionuclides at or near the ground surface (0–0.5 ft bgs). The surveys will be conducted using NaI gamma scintillometers to identify anomalies. If the measurements exceed the scintillometer, a portable ion chamber may be used. Radiological survey results will be used to address potential worker safety and protection issues as well as to identify target sampling locations in each of the disposal areas.

All detected radiological anomaly locations will be flagged by the survey team. A radiological anomaly will be defined as any location with a beta or gamma reading greater than 2 times the instrument background level. A radiological anomaly map will be produced to determine the extent of radiological contamination. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

Geodetic Survey

A geodetic survey will be performed to locate all flagged HE locations (removal already has taken place) and flagged radiological anomalies. The geodetic survey will be used in support of HE and radiological mapping to define the extent of potential contamination on the surface disposal sites and the adjacent areas.

4.7.1.2 Field Screening and Field Analytical Activities

All screening samples will be screened for gross alpha, beta and gamma radioactivity. Excavation samples and confirmatory samples will be analyzed for HE (RDX) using HE spot test and the Strategic

Diagnostics, Inc., D-Tech RDX immunoassay test kits as described in section 12. Field analytical results will be used to select samples for off-site laboratory analyses.

4.7.1.3 Soil Excavation and Removal Activities

The proposed excavation areas at the Burning Ground are shown in Figure 4.7-1. Excavation of soil with elevated levels of RDX (concentrations exceeding both residential and industrial SSLs of 44.2 and 174 mg/kg, respectively), as determined from the historical sampling conducted at the Burning Ground, is proposed at the following four areas:

- Basket wash facility [SWMU 16-010(h)]
- HE/uranium filter bed [former structure 16-392, SWMU 16-010(i)]
- Trough from the basket wash facility to filter vessel 16-406 [SWMU 16-010(m)]
- Westernmost trough [SWMU 16-010(l)]

Soil excavation will focus on locations where historically the RDX industrial SSL of 174 mg/kg (NMED 2006, 92513) is exceeded. Field analytical methods will be used to guide the excavation activities in real time. RDX concentrations measured in the field of less than 90 mg/kg (approximately one-half the SSL of 174 mg/kg) will be used to guide the removal (details of field analytical methods are provided in section 12). Soil excavation will be followed by confirmatory sampling to characterize residual RDX at the site following removal (section 4.7.1.3) and to provide decision-level data to support future risk screening analysis.

4.7.1.4 Confirmatory and Nature and Extent Sampling

The proposed sampling locations at Consolidated Unit 16-010(h)-99 are shown in Figure 4.7-1. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 4.7-1. The analytical suites proposed for the Burning Ground follow the general laboratory analytical strategy for filter basket wash sites, as presented in Table 4.7-1. Sampling at the Burning Ground will include the following.

- *Confirmatory sampling following soil excavation and removal.* The proposed confirmatory sampling will be located near the center and at locations near the outer extent of each removal area to evaluate the extent of potential residual contamination in the tuff underlying the excavation area and to confirm that the lateral extent of contamination can be defined at the excavation areas (1 through 22, postexcavation confirmation). Assuming that the excavation will remove contaminated soil to the soil/tuff interface, samples from each location will be collected at two depths: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. Samples will be analyzed for TAL metals, VOCs, SVOCs, TPH, explosive compounds, nitrates, and perchlorate. Samples from the excavation areas where historical operations might have included HE-contaminated uranium materials (the basket wash facility, HE/uranium filter bed, and northernmost trough) will be analyzed for radionuclides using alpha spectroscopy to detect presence of isotopic uranium. Sampling locations may be added based on the results of the radiological walkover survey conducted before field work begins. All samples will be field screened by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Ten percent of the confirmatory samples from the HE/uranium filter bed will also be analyzed for dioxins/furans to detect contamination related to historical burning operations. Samples will be collected using a hand and/or power hand auger.

- *Sampling to define nature and extent of contamination between former trough lines*. Seventeen locations (1 through 17, nature and extent) between the former trough lines will be sampled to determine the nature and extent of potential contamination in areas not sampled during historical investigations at the site. Four depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, VOCs (subsurface samples only), SVOCs, TPH, explosive compounds, nitrates, and perchlorate. Sampling locations may be added based on the results of the radiological walkover survey conducted before field work begins. All samples will be field screened by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.
- *Sampling to define nature and extent of contamination at downgradient locations of the site*. Twelve downgradient locations (18 through 29, nature and extent) will be sampled to determine whether lateral migration of contaminants towards the canyon or outside of the SWMU boundaries has occurred. Four depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, VOCs (subsurface samples only), SVOCs, TPH, explosive compounds, pH, cyanide, nitrates, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.
- *Sampling to define nature and extent of contamination at surface impoundment*. Potential contamination of soil related to historical operations before the RCRA permit of the surface impoundment [AOC 16-008(b)] was not evaluated in previous investigations or as a component of the closure certification of the unit. Five locations (30 through 34, nature and extent) will be sampled to determine the nature and extent of contamination in the area of the surface impoundment. Five depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, 2.5–3 ft into the tuff, and 6–6.5 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, VOCs (subsurface samples only), SVOCs, TPH, explosive compounds, pH, cyanide, nitrates, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.
- *Sampling to define nature and extent of contamination at pressure filter vessels*. Potential contamination of soil related to historical operations before the RCRA permits of the pressure-filter vessels [SWMUs 16-010(e) and 16-010(f)] was not evaluated in previous investigations or as a component of the closure certification of the unit. Two samples will be collected from beneath each vessel by drilling angled holes to the area beneath the bottom of the vessels (BH35 and BH37, 5–5.5 vertical ft bgs and 10–10.5 vertical ft bgs). Three samples will be collected from vertical holes paired with the angled holes (BH36 and BH38, 5–5.5 ft bgs, 10–10.5 ft bgs, and 15–15.5 ft bgs). Samples will be analyzed for TAL metals, VOCs, SVOCs, TPH, explosive compounds, nitrates, and perchlorate. All samples will be field screened by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples from the TD of each borehole will be analyzed using quantitative field analytical

methods for determining presence of: RDX exceeding the field analytical DL (details of field analytical methods are provided in section 12). If RDX is detected at the TD in excess of the field analytical DL, drilling will continue to an additional 5 ft beyond the previous TD and field screening at the new TD will be repeated to determine whether additional drilling and sampling are required to define the vertical extent of contamination. Samples will be collected using mechanical drilling methods.

4.7.2 Southern Drainage: SWMU 16-028(a)

Sampling at SWMU 16-028(a) will include the following (Figure 4.7-1):

- *Sampling to define extent of contamination at the southern drainage channel*. Two locations downgradient of historical sampling locations within SWMU 16-028(a) will be sampled to determine whether lateral migration of contaminants towards the canyon has occurred. Another four locations (two each on the east and west side of the drainage near the southern extent of the SWMU) will be sampled to determine the lateral extent (i.e., width) of contamination within the SWMU. Four depths will be sampled at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for the same chemicals and compounds as might be present at the Burning Ground: TAL metals, VOCs (subsurface samples only), SVOCs, TPH, explosive compounds, pH, cyanide, nitrates, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

5.0 SUBAGGREGATE 4: TA-16 ADMINISTRATIVE AREA

The Subaggregate 4, the TA-16 Administrative Area consolidated units, SWMUs, and AOCs, includes 32 sites located in the western portion of the Cañon de Valle watershed and includes only sites not used for HE processing (Figure 1.1-5). Sites include the dry well system associated with building 16-540 [Consolidated Unit 16-001(a)-99, containing SWMUs 16-001(a), 16-001 (b), and 16-001(c)], storage buildings and shops [Consolidated Unit 16-017(i)-99 containing SWMU 16-017(i), SWMUs C-16-025 and C-16-026. SWMUs 16-034(h), 16-034(i), 16-034(j), 16-034(k), and AOCs C-16-008, C-16-010, C-16-012, C-16-013, C-16-014, C-16-016, C-16-017, and C-16-011], underground fuel storage tanks [AOCs 16-033(e) and 16-033(f)], septic tank systems for building 16-054 [SWMU 16-006(a)], and a trash (non-HE) burn pit [SWMU 16-009(a)].

Ten SWMUs and AOCs not proposed for additional investigation or corrective action are discussed in Appendix B and include former buildings (AOCs C-16-009, C-16-015, and C-16-041); aboveground storage tanks (AOCs 16-037 [never located] and C-16-018); a fuel storage tank (AOC C-16-072, never located); a former latrine (AOC C-16-036); a surface disposal area [SWMU 16-016(b)]; and miscellaneous structures [AOC C-16-044 and SWMU 16-027(b)] (Table 1.1-1).

5.1 Surface Conditions

Subaggregate 4 is located in TA-16 on a 200-ft-high mesa that trends east to west (Plate 1). The mesa is bounded on the north by Cañon de Valle (about 1000 ft north of MDA R), on the south by Water Canyon (approximately 4200 ft south of MDA R), and on the west by the east-facing Sierra de Los Valles

headlands (Plate 1). The elevation of the mesa ranges from 7700 to 7500 ft amsl; across Subaggregate 4, it ranges from approximately 7730 to 7590 ft amsl. The topography of the subaggregate itself has a gentle, 5- to 10-degree slope to the east.

The surface vegetation community within the Cañon de Valle Aggregate Area is described in section 2.1.

5.2 Surface Water

Section 2.2 presents a discussion of the Cañon de Valle Aggregate Area surface water. Specific sites (Plate 1) that are monitored in Subaggregate 4 are listed in Table 2.2-1.

Water samples were collected from CDV-SMA-1 in 2005. The analytical results showed no wSAL exceedances (LANL 2006, 92600, Attachment 2, Table B-1).

5.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3.

5.4 Subsurface Conditions

5.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.1.

5.4.2 Cliff Retreat and Fractures

Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

5.4.3 Hydrogeology

The hydrogeology of the Cañon de Valle Aggregate Area is discussed in section 2.4.3. Well R-26 is located approximately 800 ft north of Subaggregate 4. Wells R-25 and CdV-16-1(i) are located approximately 5000 ft east and east-northeast, respectively, of this subaggregate (Plate 1). This subaggregate lies between these three wells, all of which contain a thick perched zone which is located between 563 and 723 ft bgs. Well R-26 also contains a higher zone of perched water at 173 ft bgs that appears to be associated with low-angle platy fractures in the ash-flow tuff (LANL 2005, 92028, p. 2-B-11). The presence, location, and depth of a perched zone directly beneath this subaggregate remain unknown.

5.5 Steam Plant: Consolidated Unit 16-001(a)-99

Consolidated Unit 16-001(a)-99 consists of SWMUs 16-001(a), 16-001(b), and 16-001(c), which are associated with the TA-16 steam plant, building 16-540 (LANL 1993, 20948, p. 5-1). The steam plant provided steam to heat various buildings at TA-16. The SWMUs consist of two tanks [SWMUs 16-001(a) and 16-001(c)] and two dry wells [SWMU 16-001(b)] that received effluent from the steam plant.

5.5.1 Site Description and Operational History

SWMU 16-001(a) was a blowdown tank (structure 16-456) that served the steam plant boilers (LANL 1993, 20948, p. 5-4). The tank was installed in 1968 and replaced the previous tank, structure 16-54 [SWMU 16-001(c)] (LANL 1990, 07512, 16-001 summary). Structure 16-456 was located about 40 ft from the northeastern corner of the steam plant. It was a 7-ft-long, steel tube half-buried in the ground with an inside diameter of 6 ft and a capacity of 2000 gal. The tank received hot water blowdown from the steam boilers and was designed to cool the water. The blowdown water exited the tank and went through two dry wells [SWMU 16-001(b)] that discharged to former NPDES-permitted outfall 02A-007 (LANL 1990, 07512, 16-001 summary); a release stack allowed superheated water to vent to the atmosphere. The tank was replaced in 1988.

SWMU 16-001(b) consists of two connected dry wells, 4 ft in diameter (LANL 1993, 20948, p. 5-4). One is 6 ft deep, and the other is 7.5 ft deep. Both are constructed of concrete and covered with a manhole cover. The wells are located about 50 ft downslope and northeast of structure 16-456 [SMWU 16-001(a)]. The dry wells were designed to allow effluent to seep into the ground. A pipe equipped with a splash deflector enters each well near its bottom. The primary well has an outflow pipe leading to the secondary well. The dry wells previously received overflow from structure 16-456 but were bypassed after 1988 because their capacity was insufficient. The dry wells discharged to the former NPDES-permitted outfall, EPA 02A-007 (LANL 1990, 07512, 16-001 summary). The dry well system was refurbished after 1988 with new blowdown and settling tanks.

SWMU 16-001(c) is a tank (structure 16-541) that received steam-plant blowdown (LANL 1993, 20948, p. 5-4). It was installed in 1962 and operated until 1968, when blowdown was diverted to another tank [structure 16-456, SWMU 16-001(a)]. Structure 16-541 remained in place on level ground just south of structure 16-456 at the time the OU 1082 work plan was written (LANL 1993, 20948, 5-1–5-4). It was covered with a concrete pad and equipped with a wire-mesh vent. A standpipe vent is located about 8 ft east of the tank. About 100 ft farther downslope is a ditch that, according to the OU 1082 work plan, may have received outfall from the tank (LANL 1993, 20948, p. 5-5).

5.5.2 Historical Investigations

No samples have been collected from Consolidated Unit 16-001(a)-99.

5.5.2.1 Analytical Results

No samples have been collected from Consolidated Unit 16-001(a)-99.

5.5.2.2 Nature and Extent of Contamination

Because no samples have been collected from Consolidated Unit 16-001(a)-99, the nature and extent of potential contamination are not known. Additional sampling is proposed to define the nature and extent of potential contamination at Consolidated Unit 16-001(a)-99 (section 5.10.1).

5.5.2.3 Conceptual Site Model

The CSM for the steam plant includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for Consolidated Unit 16-001(a)-99.

Source of Contamination

Contamination at the steam plant would have originated from chemicals used as corrosion inhibitors, algaecides, descalers, water softeners, and other chemicals used for water treatment.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for Consolidated Unit 16-001(a)-99 are summarized in section 1.1.1.

5.5.2.4 Summary of Additional Data/Corrective Action Requirements

No historical sampling has been performed at Consolidated Unit 16-001(a)-99. Sampling is proposed to investigate the nature and extent of potential contamination associated with the former steam plant operations (section 5.10.1).

5.6 Storage Buildings and Shops: Consolidated Unit 16-017(i)-99 [SWMU 16-017(i) and SWMUs C-16-025 and C-16-026], SWMUs 16-034(h), 16-034(i), 16-034(j), 16-034(k), AOCs C-16-008, C-16-010, C-16-011, C-16-012, C-16-013, C-16-014, C-16-016, C-16-017

The storage buildings and shops at the TA-16 Administrative Area include the following.

- Former warehouse and associated storage buildings, Consolidated Unit 16-017(i)-99 [SWMU 16-017(i) and SWMUs C-16-025 and C-16-026]
- Former maintenance shops, SWMUs 16-034(h), 16-034(i), and 16-034(k) and AOCs C-16-011, C-16-012, and C-16-016
- Former storage areas, SWMU 16-034(j) and AOCs C-16-008, C-16-010, C-16-013, and C-16-014
- Former steam plant, AOC C-16-017

5.6.1 Site Description and Operational History

Consolidated Unit 16-017(i)-99 consists of SWMU 16-017(i) (associated with former building 16-10) and SWMUs C-16-025 and C-16-026, associated with former storage buildings 16-8 and 16-6, respectively. SWMU 16-017(i) is the location of a 200-ft-long x 40-ft-wide x 20-ft-high former warehouse at TA-16 (building 16-10). SWMU 16-017(i) operated from 1945 to 1998. HE-casting molds were washed out on the north end of building 16-10 (LANL 1994, 39440, p. 5-423). The D&D of building 16-10 occurred in 1998 (LANL 1998, 59602). SWMU C-16-025 was a cabinet shop (building 16-8) of wood-frame construction that was built in 1945 and removed in March 1956. It was located west of building 16-10 and south of building 16-9. The cabinet shop was used as a carpentry shop. SWMU C-16-026 was a repair shop (building 16-6) of wood-frame construction that was built in 1945 and removed in March 1956. It was located south of building 16-10. The repair shop was used for the storage of tools and supplies. No known hazardous materials were used at this location.

SWMU 16-034(h) is an area of potentially contaminated soil associated with the footprint of building 16-137, a plumbing and electrical shop that was part of a Zia Company satellite maintenance area used for upkeep of S-Site buildings (LANL 1995, 57225, pp. 5-26-11, 5-26-13). The maintenance area, which included the fire station, was built during 1944 and 1945 and removed by 1955. It was located west of West Road, which was the only entry to S-Site before 1951 and formed the boundary of the HE exclusion zone. HE were not allowed beyond the boundary of the exclusion zone (LANL 1995, 57225, p. 6-15).

According to the second addendum to the 1995 OU 1082 RFI work plan, building 16-137 was listed as having no association with hazardous materials (LANL 1995, 57225, p. 5-26-13).

SWMUs 16-034(i) and 16-034(k) are areas of potential soil contamination in the footprints of portable wooden structures 16-141 and 16-140, respectively; they were 16 ft square x 9 ft high and used for storage at the Zia Company satellite maintenance station at S-Site (LANL 1995, 57225, p. 6-16). Structures 16-141 and 16-140 were part of a Zia Company satellite maintenance area used for upkeep of S-Site buildings. The maintenance area was built during 1944 and 1945 and removed by 1955. It was located west of West Road, which was the only entry to S-Site before 1951 and formed the boundary of the HE exclusion zone. West Road was fenced on the east side, beyond which HE were not allowed. Thus, the maintenance station was protected from exposure to HE by administrative control. The area is now a field covered with grass and small trees. Structure 16-141 [SWMU 16-034(i)] was previously numbered S-146 and was later relocated to TA-35 for use as a construction shack (LANL 1998, 59685, p. 6-17). It is not known what was stored in the former structure 16-140 [SWMU 16-034(k)], previously numbered S-145, and its exact location has not been determined (LANL 1998, 59685, pp. 6-13–6-14). A former Zia Company maintenance manager stated that methods and policies ensured that no HE would enter the maintenance station and that any possible contamination would be insignificant (Miller 1994, 52964.598, p. 15-16-552). A former worker at the site during WWII also claims that the area was not contaminated (Martin 1993, 52964.268, p. 15-16-477; Martin and Hickmott 1994, 52964.594, p. 15-16-549). Conversations with two site workers indicate that both of these buildings were removed, not destroyed by burning, as documented by Blackwell in 1983 (Blackwell 1983, 05823, p. 15-16-076), further indicating that HE contamination was not present.

SWMU 16-034(j) is an area of potentially contaminated soil associated with a decommissioned container storage rack (structure 16-190) in the Zia Company satellite maintenance area at S-Site (LANL 1995, 57225, p. 5-26-11). Former structure 16-190 was located north of a wooden storage building (former building 16-139). The rack held fifteen 55-gal. containers that provided lubricants and solvents by gravity feed. It is possible that other chemicals were stored on the rack. The rack was in place by 1950 and removed by 1955. The storage rack may have been constructed in 1945 and was identified in aerial photographs from 1947 and 1950 (LANL 1995, 57225, p. 5-26-11). In these photographs, the structure is exposed, having no roof or walls. The maintenance area was located west of West Road, which was the only entry to S-Site before 1951 and formed the boundary of the HE exclusion zone.

AOC C-16-008 is a former implement shed, structure 16-136, that was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. Structure 16-136 was constructed in 1944 and removed in 1955. This building was 32 ft long x 18 ft wide x 9 ft high and located west of West Road, which was the only entrance to S-Site before 1951. This area is now a field covered with grass and small trees. No unpackaged HE were allowed west of West Road; therefore, this building did not handle unpackaged HE (LANL 1995, 57225, p. 6-30). A 1983 memorandum included this structure in a list of structures having no association with hazardous materials (Blackwell 1983, 05823).

AOC C-16-010 is a former storage building, structure 16-135, that was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. Structure 16-135 was constructed in 1944 and removed in 1955 (LANL 1995, 57225, p. 6-30). This building was 16 ft long x 16 ft wide and located west of West Road, which was the only entrance to S-Site before 1951. This area is now a field covered with grass and small trees. No unpackaged HE were allowed west of West Road; therefore, this building did not handle unpackaged HE. A 1983 memorandum included this structure in a list of structures having no association with hazardous materials (Blackwell 1983, 05823).

AOC C-16-011 is potentially contaminated soil associated with the footprint of a former paint shop (building 16-132). Building 16-132 was part of a Zia Company satellite maintenance area used for upkeep on S-Site buildings (LANL 1995, 57225, p. 5-26-11). The structural composition of building 16-132 is not

known. The maintenance area, which included the fire station, was built during 1944 and 1945 and removed by 1955. Building 16-132 was located west of West Road, which was the only entry to S-Site before 1951 and formed the boundary of the HE exclusion zone.

AOC C-16-012, a former blacksmith shop (building 16-138), was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. Building 16-138 was constructed in 1944 and removed in 1955 (LANL 1995, 57225, p. 6-30). This building was 10 ft long x 8 ft wide x 9 ft high and located west of West Road, which was the only entrance to S-Site before 1951. This area is now a field covered with grass and small trees. No unpackaged HE were allowed west of West Road; therefore, this building did not handle unpackaged HE. A 1983 memorandum included this building in a list of structures having no association with hazardous materials (Blackwell 1983, 05823).

AOC C-16-013 is a former lumber storage area, structure 16-133, that was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. Structure 16-133 was constructed in 1944 and removed in 1955. It was 69 ft long x 18 ft wide x 10 ft high and open along one long side (LANL 1995, 57225, p. 6-30). This structure was located west of West Road, which was the only entrance to S-Site before 1951. This area is now a field covered with grass and small trees. No unpackaged HE were allowed west of West Road; therefore, this structure did not handle unpackaged HE. A 1983 memorandum included this structure in a list of structures having no association with hazardous materials (Blackwell 1983, 05823).

AOC C-16-014 is a former equipment room, structure 16-144, that was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. Structure 16-144 was constructed in 1945 and removed in 1955 (LANL 1995, 57225, p. 6-30). This building was 45 ft long x 20 ft wide x 10 ft high and located west of West Road, which was the only entrance to S-Site before 1951. This area is now a field covered with grass and small trees. No unpackaged HE were allowed west of West Road; therefore, this building did not handle unpackaged HE. A 1983 memorandum included this structure in a list of structures having no association with hazardous materials (Blackwell 1983, 05823).

AOC C-16-016 is a former fire house, structure 16-142, that was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. Structure 16-142 was constructed in 1945 and removed in 1955 (LANL 1995, 57225, p. 6-30). This building was 74 ft long x 56 ft wide x 13 ft high and located west of West Road, which was the only entrance to S-Site before 1951. This area is now a field covered with grass and small trees. No unpackaged HE were allowed west of West Road; therefore, this building did not handle unpackaged HE. A 1983 memorandum included this structure in a list of structures having no association with hazardous materials (Blackwell 1983, 05823).

AOC C-16-017 is the site of a former steam plant, building 16-502 located at T-Site (LANL 1994, 39440, p. 5-484). The steam plant was built in 1945 and removed in 1960 (LANL 1990, 07512, Figure 16-13). It was 16 ft long x 16 ft wide x 9 ft high with a wooden floor. It is not known what chemicals were used in this facility, but chromates were suspected to have been used as additives. The building contained no sumps. Building 16-502 was intentionally burned in 1960.

5.6.2 Historical Investigations

An engineering structure list indicates that structure 16-198 (AOC C-16-041) was removed in 1958; however, in 1967, AOC C-16-041 was tested for radioactive contamination and none was found (LANL 1995, 57225, p. 6-25).

During 1997 RFI activities, two soil samples, one surface and one subsurface, were collected from AOC C-16-017 and analyzed for inorganic chemicals and SVOCs (Table 5.6-1, Figure 5.6-1). Neither sample was submitted for analysis of HE.

In 1998, four surface soil samples were collected from SWMU 16-017(i) and analyzed for inorganic chemicals, HE, SVOCs, and VOCs (Table 5.6-1, Figure 5.6-1) as part of confirmatory sampling after D&D of the structure (LANL 1998, 59602).

5.6.2.1 Analytical Results

AOC C-16-017

No inorganic chemicals were detected at concentrations greater than BVs in the samples collected from AOC C-16-017 (LANL 2006, 91697, Table 5.2-2). Thus, inorganic chemical analytical results from sampling at AOC C-16-017 are not provided in a figure or table in this work plan.

No organic chemicals were detected in any of the samples collected from AOC C-16-017 (LANL 2006, 91697, Table 5.2-3). Thus, organic chemical analytical results from sampling at AOC C-16-017 are not provided in a figure or table in this work plan.

SWMU 16-017(i)

Cobalt, copper, lead, and zinc were detected at concentrations greater than BVs in one of the surface soil samples from SWMU 16-017(i) (Table 5.6-2, Figure 5.6-2). In addition, the DLs for antimony, cadmium, mercury, silver, and uranium were greater than BVs in all four samples collected from SWMU 16-017(i).

No organic chemicals were detected in any of the samples collected from SWMU 16-017(i) (LANL 2006, 91697, Table 5.2-3). Thus, organic chemical analytical results from sampling at SWMU 16-017(i) are not provided in a figure or table in this work plan.

5.6.2.2 Nature and Extent of Contamination

Consolidated Unit 16-017(i)-99

Limited sampling has been performed at SWMU 16-017(i), and no sampling has been performed at the other AOCs in this consolidated unit. Metals were detected at concentrations greater than BVs in samples collected at SWMU 16-017(i). No organic chemicals were detected in any of the samples from SWMU 16-017(i). All detections of inorganic chemicals greater than BV were below the current SSLs (Table 1.2-1). Overall, the nature and extent of potential contamination have not been defined for Consolidated Unit 16-017(i)-99. Additional sampling is proposed to define the nature and extent of potential contamination at this site (section 5.10.2).

AOC C-16-017

No inorganic chemicals greater than BVs or organic chemicals were detected in the two surface and subsurface samples collected from within the footprint of AOC C-16-017, the former steam plant. Because the samples collected from AOC C-16-017 were not analyzed for potential COPCs associated with the steam plant operations at this site, the nature and extent of potential contamination has not been defined for AOC C-16-017. Additional sampling is proposed to define the nature and extent of potential contamination at this site (section 5.10.2).

SWMUs 16-034(h), 16-034(i), 16-034(j), and 16-034(k) and AOCs C-16-008, C-16-010, C-16-011, C-16-012, C-16-013, C-16-014, and C-16-016

No historical sampling has been performed at these sites within the TA-16 Administrative Area. Thus, the nature and extent of potential contamination at these sites are not known. Additional sampling is proposed to define the nature and extent of potential contamination at these SWMUs and AOCs (section 5.10.2).

5.6.2.3 Conceptual Site Model

The CSM for the storage buildings and shops at the TA-16 Administrative Area includes both surface and subsurface sources of potential contamination, as summarized in the following sections.

Source of Contamination

Potential contamination at the TA-16 Administrative Area storage buildings and shops may have originated from various release points, such as spills from paints, solvents, or cleaning fluids used or stored within the former buildings. No releases are documented for any of the SWMUs and AOCs in the TA-16 Administrative Area.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for the TA-16 Administrative Area are summarized in section 1.1.1.

5.6.2.4 Summary of Additional Data/Corrective Action Requirements

Limited historical sampling has been conducted at the SWMUs and AOCs at the TA-16 Administrative Area. Sampling is proposed to investigate the nature and extent of potential contamination within and adjacent to the footprints of the former buildings and structures (section 5.10.2).

5.7 Fuel Storage Tanks: AOCs 16-033(e) and 16-033(f)

5.7.1 Site Description and Operational History

AOC 16-033(e) consists of two underground fuel tanks, associated fuel lines, and pump base located northwest of former building 16-10 [see Consolidated Unit 16-017(i)-99, discussed in section 5.6], which served as a warehouse at TA-16 (LANL 1995, 57225, p. 5-27-1) that operated from 1945 to 1998. Because the tanks do not have structure numbers, no existing information is available about the installation, construction, capacity, or possible removal of the two underground fuel tanks.

AOC 16-033(f) is a 1000-gal. oil tank, structure 16-512, that served the T-Site steam plant, building 16-502 (AOC C-16-017, discussed in section 5.6). The underground storage tank (UST) was installed in 1944 and removed in 1968 (LANL 1995, 57225, p. 6-38). In 1960, the tank was found to be free of radioactivity and toxic contamination. According to a 1983 memorandum, no hazardous materials were associated with AOC 16-033(f) (Blackwell 1983, 05823).

5.7.2 Historical Investigations

No samples have been collected from AOCs 16-033(e) and 16-033(f).

5.7.2.1 Analytical Results

No samples have been collected from AOCs 16-033(e) and 16-033(f).

5.7.2.2 Nature and Extent of Contamination

Because no samples have been collected from AOCs 16-033(e) and 16-033(f), the nature and extent of potential contamination at these sites are not known. Additional sampling is proposed to determine nature and extent of potential contamination at AOCs 16-033(e) and 16-033(f) (section 5.10.3).

5.7.2.3 Conceptual Site Model

The CSM for these tanks includes subsurface sources of potential contamination. The following sections summarize the CSM for AOCs 16-033(e) and 16-033(f).

Source of Contamination

Any potential contamination at AOCs 16-033(e) and 16-033(f) consists of petroleum hydrocarbons and gasoline additives, such as benzene, toluene, ethylbenzene, xylenes, PAHs, and possibly lead. Contamination would have resulted from either leaks in the tanks or spills and overflow during refilling.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for AOCs 16-033(e) and 16-033(f) are summarized in section 1.1.1.

5.7.2.4 Summary of Additional Data/Corrective Action Requirements

AOC 16-033(e)

No historical sampling has been performed at AOC 16-033(e) and the nature and extent of potential contamination are not known. The current disposition of the tanks, including their precise location and their possible removal, is not known; confirmation of the tanks' location and configuration using a magnetic survey is proposed. If the tanks are located, removal, followed by confirmatory sampling, is proposed for AOC 16-033(e) (section 5.10.3). If the tanks cannot be located, sampling is proposed to investigate the nature and extent of potential contamination at AOC 16-033(e) in their assumed location, based on current geographic information system (GIS) data (section 5.10.3).

AOC 16-033(f)

No historical sampling has been performed at AOC 16-033(f), and the nature and extent of potential contamination are not known. Confirmation of the tank's removal using a magnetic survey is proposed. If the tank exists, removal followed by confirmatory sampling is proposed for AOC 16-033(f) (section 5.10.3). If the tank does not exist, sampling is proposed to investigate the nature and extent of potential contamination at AOC 16-033(f) (section 5.10.3).

5.8 Septic Tank and Systems: SWMU 16-006(a)

5.8.1 Site Description and Operational History

SWMU 16-006(a) is a septic tank (structure 16-175) (Figure 1.1-5) that consisted of a 10-ft x 5-ft, reinforced-concrete tank with a capacity of 500 gal. and a 4-in.-diameter VCP that ran from the instrumentation/test building (building 16-54) to the tank (LANL 1993, 20948, p. 5-99). The tank was installed in 1946 and replaced in 1988. The drainline was abandoned in place. Outfalls were associated with structure 16-175 (LANL 1990, 07512, 16-003 summary). The original septic tank served building 16-054, which was initially a barium nitrate grinding facility. The building was used as an environmental testing laboratory from the late 1950s to 1988. The laboratory contained physical testing machines that included a vibration table as well as shock-testing and drop-impact machines. Various weapon and nonweapon components, some of which may have contained hazardous materials, were tested in building 16-054 (LANL 1993, 20948, p. 5-99). Building 16-054 currently serves as an office building.

5.8.2 Historical Investigations

According to the 1990 SWMU report, potential contamination of structure 16-175 [SWMU 16-006(a)] was evaluated in November 1988 (LANL 1990, 07512, 16-006 summary). No samples have been collected from SWMU 16-006(a) for laboratory analysis

5.8.2.1 Analytical Results

The survey of SWMU 16-006(a) conducted in November 1988 detected VOCs, but no toxic chemicals (LANL 1993, 20948, p. 5-99).

5.8.2.2 Nature and Extent of Contamination

Because no samples have been collected from SWMU 16-006(a), the nature and extent of potential contamination at the site are not known. Sampling of the soil beneath the currently active septic tank serving building 16-054 is proposed to define the nature and extent of potential contamination at SWMU 16-006(a) (section 5.10.4).

5.8.2.3 Conceptual Site Model

The CSM for SWMU 16-006(a) includes subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 16-006(a).

Source of Contamination

At SWMU 16-006(a), the most likely source of contamination is from building 16-054 and may consist of barium and organic chemicals, such as those used for lubrication and cleaning (LANL 1993, 20948, p. 5-99).

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 16-006(a) are summarized in section 1.1.1.

5.8.2.4 Summary of Additional Data/Corrective Action Requirements

Because no historical sampling with laboratory analysis has been performed at SWMU 16-006(a), the nature and extent of potential contamination are not known. Sampling of the soil beneath the currently active septic tank serving building 16-054 is proposed to define the nature and extent of potential contamination at SWMU 16-006(a) (section 5.10.4).

5.9 Burn Pit: SWMU 16-009(a)

5.9.1 Site Description and Operational History

SWMU 16-009(a) was a burn pit located in a level field near the western end of TA-16 (Figure 1.1-5). The burn pit was about 254 ft northwest of the WWII barium nitrate grinding facility, structure 16-54. Aerial photographs indicated that the burn pit for SWMU 16-009(a) occupied about 16,800 ft^2. A 6-ft-high berm surrounded the area on three sides (LANL 1993, 20948, p. 5-200). The burn pit was established in 1945 as a trash-burning site and used until the 1960s. The site was decommissioned and the berm was leveled (date unknown) (LANL 1993, 20948, p. 5-200). Waste burned at the site consisted of trash potentially contaminated with HE, some of which may have contained barium (LANL 1990, 07512, 16-009 summary). Possible contaminants include barium, uranium, other metals, HE, and SVOCs (LANL 1993, 20948, 5-202). Currently, the site is an open vegetated field (LANL 1993, 20948, p. 5-200).

5.9.2 Historical Investigations

No samples have been collected from SWMU 16-009(a).

5.9.2.1 Analytical Results

No samples have been collected from SWMU 16-009(a).

5.9.2.2 Nature and Extent of Contamination

Because no samples have been collected from SWMU 16-009(a), the nature and extent of potential contamination at this site are not known. Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 16-009(a) (section 5.10.5).

5.9.2.3 Conceptual Site Model

The CSM for this burn area includes surface sources of potential contamination. The following sections summarize the CSM for SWMU 16-009(a).

Source of Contamination

Contamination at SWMU 16-009(a) would have originated from trash burning and may include HE, uranium, barium, metals, and SVOCs.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 16-009(a) are summarized in section 1.1.1.

5.9.2.4 Summary of Additional Data/Corrective Action Requirements

No historical sampling has been performed at SWMU 16-009(a). Sampling is proposed to investigate the nature and extent of contamination at SWMU 16-009(a) (section 5.10.5).

5.10 Scope of Investigation Activities

Radiological Survey

All work at Subaggregate 4 will be preceded by a surface radiological walkover survey capable of detecting the presence of alpha, beta, and gamma radioactivity. Radiological survey results will be used to address potential worker safety and protection issues as well as help to target sampling locations requiring focused laboratory analysis of radionuclides. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

5.10.1 Steam Plant: Consolidated Unit 16-001(a)-99

The proposed sampling locations at Consolidated Unit 16-001(a)-99 are shown in Figure 5.10-1. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 5.10-1. The analytical suites proposed for Consolidated Unit 16-001(a)-99 follow the general laboratory analytical strategy for steam plants and cooling towers, as presented in Table 2.9-1. Sampling at Consolidated Unit 16-001(a)-99 will include the following.

- *Sampling to define nature and extent of potential contamination at SWMU 16-001(a)*. Four locations (1 through 4) surrounding the upright circular tank will be sampled to determine the nature and extent of potential contamination. Three boreholes (BH1 through BH3) will be located in a triangle around the tank. If the tank has been removed, the fourth borehole (BH4) will be located in the approximate center of the former tank location. If the tank remains at the site, the fourth borehole (BH4) will be angled beneath the tank, collared next to one of the vertical borehole locations (BH2). Two depths will be sampled at each location: the assumed bottom of the blowdown tank at 3.5–4.0 ft bgs (tuff) and 5 ft deeper into the tuff at 8.5–9.0 ft bgs (tuff). All samples will be analyzed for TAL metals, pH, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.
- *Sampling to define nature and extent of potential contamination at SWMU 16-001(b)*. Eight locations (5 through 12) surrounding the two dry wells will be sampled to determine the nature and extent of potential contamination. Three boreholes will be located in a triangular pattern around each dry well (BH5 through BH7 at northern well and BH9 through BH11 at southern well). If the dry wells have been removed, one sampling location will be placed in the approximate center of each of the former dry well locations (BH8 at northern well and BH12 at southern well). If the dry wells remain at the site, an angled borehole will be advanced beneath the tanks, collared next to one of the vertical borehole locations (BH8 at northern well and BH12 at southern well). Additionally, one sample will be collected at the location of the former outfall (BH13). Two depths will be sampled at each location: for dry well samples, the assumed bottom of the dry wells at 7.5–8.0 ft bgs (tuff) and 5 ft deeper into the tuff at 12.5–13.0 ft bgs (tuff). All samples will

be analyzed for TAL metals, pH, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

- *Sampling to define nature and extent of potential contamination at SWMU 16-001(c)*. Five locations (BH14 through BH18) surrounding the tank will be sampled to determine the nature and extent of potential contamination. Four boreholes (BH14 through BH17) will be located at the center of each side of the tank. If the tank has been removed, the fifth borehole (BH18) will be located at the approximate center of the former tank location. If the tank remains at the site, the fifth borehole (BH18) will be angled beneath it, collared next to one of the vertical borehole locations. Two depths will be sampled at each location: the assumed bottom of the blowdown tank at 6–6.5 ft bgs (tuff) and 5 ft deeper into the tuff at 11–11.5 ft bgs (tuff). All samples will be analyzed for TAL metals, pH, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.
- *Sampling to define nature and extent of contamination in the outfall ditch*. Two locations (19 and 20) will be sampled along the course of the outfall ditch east of the former steam plant. Samples will be collected from each location at the following depths: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, pH, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

5.10.2 Storage Buildings and Shops: Consolidated Unit 16-017(i)-99 [SWMU 16-017i) and SWMUs C-16-025 and C-16-026], SWMUs 16-034(h), 16-034(i), 16-034(j), 16-034(k), AOCs C-16-008, C-16-010, C-16-011, C-16-012, C-16-013, C-16-014, C-16-016, C-16-017

The proposed sampling locations at the storage buildings and shops are shown in Figures 5.10-2 and 5.10-3. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 5.10-1. The analytical suites proposed for the storage buildings and shops follow the general laboratory analytical strategy, as presented in Table 2.9-1. Sampling of the storage buildings and shops will include the following.

- *Sampling to define nature and extent of potential contamination at Consolidated Unit 16-017(i)-99*. Six locations (1 through 6, Figure 5.10-2) will be sampled at SWMU 16-017(i) within and adjacent to the footprint of the former warehouse (building 16-010) to determine the nature and extent of potential contamination. Six locations (7 through 12, Figure 5.10-2) will be sampled at SWMU C-16-025 within and adjacent to the footprint of the former cabinet shop (building 16-008). Three locations (13 through 15, Figure 5.10-2) will be sampled at SWMU C-16-026 within and adjacent to the footprint of the former carpentry shop (building 16-006). Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, nitrates, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, PCBs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater

than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

- *Sampling to define nature and extent of potential contamination at SWMU 16-034(h)*. Four locations (1 through 4, Figure 5.10-3) will be sampled within and adjacent to the footprint of the former plumbing and electrical shop (building 16-137) to determine the nature and extent of potential contamination. Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1-1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, nitrates, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, PCBs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination at SWMU 16-034(i).* Two locations (5 and 6, Figure 5.10-3) will be sampled within the footprint of the former portable storage structure (building 16-141) to determine the nature and extent of potential contamination. Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, nitrates, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, PCBs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination at SWMU 16-034(j).* Two locations (7 and 8, Figure 5.10-3) will be sampled within the footprint of the former container storage rack (building 16-190) to determine the nature and extent of potential contamination. Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, TPH, PCBs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination at SWMU 16-034(k).* Two locations (9 and 10, Figure 5.10-3) will be sampled within the assumed footprint of the former portable storage structure (building 16-140) to determine the nature and extent of potential contamination. Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, nitrates, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, PCBs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

- *Sampling to define nature and extent of potential contamination at other TA-16 Administrative Area buildings*. A minimum of two locations will be sampled at each of the remaining AOCs in Subaggregate 4 included in this work plan that served as storage or maintenance buildings to determine the nature and extent of potential contamination within the footprints of the former structures: AOC C-16-008 (11 and 12, Figure 5.10-3); AOC C-16-010 (13 and 14, Figure 5.10-3); AOC C-16-011 (15 and 16, Figure 5.10-3); AOC C-16-012 (17 and 18, Figure 5.10-3); AOC C-16-013 (19 and 20, Figure 5.10-3); AOC C-16-014 (21 and 22, Figure 5.10-3); and AOC C-16-016 (23 through 27, Figure 5.10-3). Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, nitrates, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, PCBs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination at AOC C-16-017.* Two locations (28 and 29, Figure 5.10-3) will be sampled within the footprint of the former steam plant (building 16-030) to determine the nature and extent of potential contamination. Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. The analytical results for two historical samples collected at this AOC showed no detections of inorganic chemicals greater than the BVs, and no detections of organic chemicals were reported. However, TNT was detected in field-screening samples, though the samples submitted to the laboratory were not analyzed for HE. Samples will be analyzed for pH and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

5.10.3 Fuel Storage Tanks: AOCs 16-033(e) and 16-033(f)

The proposed sampling locations for AOCs 16-033(e) and 16-033(f) are shown in Figures 5.10-2 and 15.10-3, respectively. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 5.10-1. The analytical suites proposed for AOCs 16-033(e) and 16-033(f) follow the general laboratory analytical strategy for fuel storage tanks, as presented in Table 2.9-1. Corrective action and sampling at AOCs 16-033(e) and 16-033(f) will include the following.

- *Magnetic survey to locate AOC 16-033(e) underground tanks and confirmation of tank configuration.* The precise location of the two tanks has not been verified, despite previous attempts to locate them. Additionally, no information exists about the installation, construction, capacity, or removal of the tanks. Another attempt will be made to locate the tanks using a magnetic survey at their assumed location shown in Figure 5.10-2. If located, additional investigative activities will be performed to confirm the configuration of the tanks (e.g., combination of geophysical survey, magnetic survey, or other surveys, as appropriate).
- *Excavation of AOC 16-033(e)*. If the tanks are located, they will be removed and disposed of. The excavation will be backfilled with clean soil to facilitate placement of a drilling rig over the location.

- *Postexcavation confirmatory sampling at AOC 16-033(e).* Following excavation activities, confirmatory soil samples will be collected from two locations (16 and 17, Figure 5.10-2) from the bottom of the excavation, 5–5.5 ft into tuff, 10–10.5 ft into tuff, and 15–15.5 ft into the tuff. Samples will be analyzed for TAL metals, VOCs, SVOCs, and TPH. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods after the excavation has been backfilled.
- *Confirmation of AOC 16-033(f) tank configuration.* Investigative activities will be performed to confirm the presence and configuration of the underground tank (e.g., combination of geophysical survey, magnetic survey, or other surveys as appropriate).
- *Excavation of AOC 16-033(f)*. If the tank (structure 16-512) is located, it will be removed and disposed of. The excavation will be backfilled with clean soil to facilitate placing a drilling rig at the location.
- *Confirmatory sampling at AOC 16-033(f).* Following excavation activities, confirmatory soil samples will be collected from one location (30, Figure 5.10-3) from the bottom of the excavation, 5–5.5 ft into tuff, 10–10.5 ft into tuff, and 15–15.5 ft into the tuff. Samples will be analyzed for TAL metals, VOCs, SVOCs, and TPH. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods after the excavation has been backfilled.

5.10.4 Septic Tank and Systems: SWMU 16-006(a)

The proposed sampling locations for SWMU 16-006(a) are shown in Figure 5.10-4. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 5.10-1. The analytical suites proposed for SWMU 16-006(a) follow the general laboratory analytical strategy for septic tanks, as presented in Table 2.9-1. Sampling at SWMU 16-006(a) will include the following.

- *Confirmation of SWMU 16-006(a) tank configuration.* Investigative activities will be performed to confirm the configuration of the septic tank (e.g., combination of geophysical survey, magnetic survey, or other surveys as appropriate).
- *Confirmatory sampling at SWMU 16-006(a).* Confirmatory soil samples will be collected from two boreholes (BH1 and BH2) on either side of the tank at the following depths targeted to be deeper than the bottom of the tank: 10–10.5 ft bgs (into tuff), 15–15.5 ft bgs (into the tuff), and 20–20.5 ft bgs (into the tuff). Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, SVOCs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Sampling of the outfall associated with this SWMU [SWMU 16-026(i2)] is not required because it was removed from Module VIII of the Laboratory's Hazardous Waste Facility Permit on December 23, 1998 (Kelley 1998, 63042) (Table 1.1-1). Samples will be collected using mechanical drilling methods.

5.10.5 Burn Pit: SWMU 16-009(a)

The proposed sampling locations for SWMU 16-009(a) are shown in Figure 5.10-4. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 5.10-1. The analytical suites proposed for SWMU 16-009(a) follow the general laboratory analytical strategy for open burn sites, as presented in Table 2.9-1. Sampling at SWMU 16-009(a) will include the following.

- *Sampling to define nature and extent of potential contamination at SWMU 16-009(a).* Eight locations will be sampled within the footprint of the former burn pit (3 through 10) to determine the nature and extent of potential contamination. Samples will be collected outside of the burn pit footprint to determine lateral extent of contamination because the berms were leveled. A total of 27 lateral samples are proposed (11 through 37). Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, PCBs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Additionally, pesticides and herbicides will be analyzed in all depths of samples from seven locations (representing 20% of the total samples collected). Samples will be collected using either a hand auger and/or power hand auger.

6.0 SUBAGGREGATE 5: T-SITE, CONSOLIDATED UNIT 16-034(b)-99

Subaggregate 5, the TA-16 T-Site [Consolidated Unit 16-034(b)-99], consists of 10 SWMUs (Figure 1.1-6). Three SWMUs [16-005(j), 16-005(m), and 16-034(b)] are associated with the operations at the main laboratory and office building at the site (16-490). SWMU 16-034(b) is the footprint of former building 16-490, and SWMUs 16-005(j) and 16-005(m) are the associated septic system and sump, respectively. The remaining SWMUs in Consolidated Unit 16-034(b)-99 consist of the footprints of seven smaller buildings at the site [SWMUs 16-025(m), 16-025(n), 16-025(o), 16-034(c), 16-034(d), 16-034(e), and 16-034(f)].

Three AOCs in Subaggregate 5 [AOCs 16-024(f), 16-024(g), and 16-024(h)], all former HE magazines, are not proposed for additional investigation or corrective action and are discussed in Appendix B.

T-Site is located in the northwestern portion of TA-16, northwest of the S-Site explosives manufacturing complex (Figure 1.1-6). T-Site was used primarily for radiography of HE charges. Construction of T-Site structures began in 1944 and continued until the fall of 1950, when activities were transferred to the newly constructed GT-Site, located at the old Anchor East site (TA-9) (LANL 1994, 39440, p. 5-480). Demolition by intentional burning in 1960 destroyed most of the structures, and residual debris and subsurface structures were removed in 1966. Before they were demolished, all the structures were surveyed for radiation, HE, and toxic chemicals (LANL 1994, 39440, p. 5-481). Unless otherwise noted, the survey results were negative. HE were reported to have been removed to better than 3% weight. When the building debris and remaining subsurface structures were removed in 1966, the site was resurveyed and determined to be free of residual radioactivity (LANL 1994, 39440, p. 5-481). No structures remain on the site, and it has become overgrown with trees (LANL 1994, 39440, pp. 5-479–5-481).

6.1 Surface Conditions

Subaggregate 5 is located in TA-16 on a 200-ft-high mesa that trends east to west (Plate 1). The mesa is bounded on the north by Cañon de Valle (about 200 ft north of T-Site), and on the south by Water Canyon (approximately 4900 ft south of T-Site) (Plate 1). The elevation of the mesa ranges from 7700 to 7500 ft amsl; across Subaggregate 5, it ranges from approximately 7590 to 7580 ft amsl. The topography of the subaggregate itself has a gentle 1-degree slope to the northeast.

The surface vegetation community at Cañon de Valle Aggregate Area is described in section 2.1.

6.2 Surface Water

Section 2.2 presents a discussion of Cañon de Valle Aggregate Area surface water. Subaggregate 5 does not have any site-specific monitoring associated with it.

6.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3.

6.4 Subsurface Conditions

6.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.1.

6.4.2 Cliff Retreat and Fractures

Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

6.4.3 Hydrogeology

The hydrogeology of the Cañon de Valle Aggregate Area is discussed in section 2.4.3. Well R-26 is located approximately 1050 ft northwest of Subaggregate 5. Wells R-25 and CdV-16-1(i) are located approximately 4640 and 4600 ft east, respectively, of Subaggregate 5 (Plate 1). This subaggregate lies near these three wells, all of which contain a thick perched zone located between 563 ft and 723 ft bgs. Well R-26 also contains a higher zone of perched water at 173 ft bgs that appears to be associated with low-angle platy fractures in the ash-flow tuff (LANL 2005, 92028, p. 2-B-11). The presence, location, and depth of a perched zone directly beneath Subaggregate 5 remain unknown.

6.5 Laboratories, Offices, and Warehouses: Consolidated Unit 16-034(b)-99

Consolidated Unit 16-034(b)-99 consists of SWMUs 16-005(j) and 16-005(m), 16-025(m), 16-025(n), 16-025(o), 16-034(b), 16-034(c), 16-034(d), 16-034(e), and 16-034(f). Consolidated Unit 16-034(b)-99 encompasses an area that was the former location of the TA-16 T-Site HE-related magazines, hutments, warehouses, shops, laboratories, and septic system.

6.5.1 Site Description and Operational History

SWMU 16-005(j) is potentially contaminated subsurface soil associated with the footprint of a former septic tank (structure 16-504) that served the lavatories and darkrooms in building 16-490. It was located

about 75 ft east of the building and was connected by a 4-in. VCP (LANL 1994, 39440, p. 5-481). The dimensions of the septic tank were 5 ft long x 4 ft wide x 3 ft deep (LANL 1994, 39440, p. 5-477). The septic tank and the sump (former structure 16-507) were added to building 16-490 in late 1944 (LANL 1994, 39440, p. 5-479). According to the 1990 SWMU report, the tank received solvents and photographic solutions and was removed in 1963 (LANL 1990, 07512, 16-005 summary). The first addendum to the 1994 RFI work plan does not list a removal date (LANL 1994, 39440, p. 5-481).

SWMU 16-005(m) is potentially contaminated subsurface soil adjacent to a decommissioned concrete HE sump, (former structure 16-507). The sump, built in 1944, was located north of former building 16-490 and received effluent from the large room in the central section of the building. The sump drained east of building 16-490 through a 6-in. VCP and was found to be contaminated with HE before it was removed in 1960 (LANL 1994, 39440, p. 5-481). The dimensions of the sump were 8.5 ft long x 4.5 ft wide x 5 ft deep (LANL 1994, 39440, p. 5-477).

SWMU 16-025(m) is potentially contaminated surface soil associated with a former x-ray and gamma-ray facility (former building 16-495) constructed in 1945 (LANL 1994, 39440, p. 5-480) or 1947 (LANL 1997, 56660, p. 128). Building 16-495 was a 16-ft-square, 9-ft-tall, wood-frame structure with a concrete floor (LANL 1994, 39440, pp. 5-477, 5-482). Building 16-495 was a source building that contained either radium-226 or cobalt-60 gamma sources, even though it did not have a pit in the center of the building as did the other source buildings (LANL 1997, 56660, p. 148). The former building had no plumbing or sumps. Radiographic inspections at T-Site were expanded to include materials other than HE during the 5 yr following WWII. Sources containing radioactive lanthanum (half-life of 1.7 days) were used for radiography of steel and contained strontium-90 as an impurity (LANL 1994, 39440, p. 5-480). Examination of depleted and enriched uranium parts led to alpha contamination at building 16-495 (LANL 1994, 39440, p. 5-480). Before it was demolished by burning, the building was found to be contaminated with HE and uranium-238 (LANL 1994, 39440, p. 5-482).

SWMU 16-025(n) is potentially contaminated surface soil associated with a decommissioned source hutment (former structure 16-499) built in 1945 (LANL 1994, 39440, p. 5-479). It was of wood-frame construction with a concrete floor and measured 16 ft square x 9 ft high (LANL 1994, 39440 p. 5-477). The concrete floor had a pit in its center that was 2 ft long x 4 ft wide x 2.5 ft deep (LANL 1994, 39440, p. 5-482). The structure had no sumps or plumbing (LANL 1997, 56660, p. 154). Radium-226 was used in the hutment to produce gamma rays that could be used to examine the dense baratol charges and uranium-238 parts that were used in the implosion device (LANL 1994, 39440, p. 5-479). Radiographic inspections at T-Site were expanded to include materials other than HE during the 5 yr following WWII. Sources containing radioactive lanthanum (half-life of 1.7 days) were used for radiography of steel and contained strontium-90 as an impurity (LANL 1994, 39440, p. 5-480). Examination of depleted and enriched uranium parts led to alpha contamination at structure 16-499 (LANL 1994, 39440, p. 5-480). By 1950, the hutment contained a cobalt-60 source (LANL 1994, 39440, p. 5-480). Before it was demolished by burning in 1960, a shelf in structure 16-499 was found to be contaminated with alpha activity. The structure was also found to be contaminated with HE (LANL 1994, 39440, pp. 5-482–5-483).

SWMU 16-025(o) is potentially contaminated surface soil associated with a decommissioned source hutment (former structure 16-500) that was identical to former structure 16-499. Like structure 16-499, structure 16-500 was used for gamma-ray radiography of baratol lenses and other dense (e.g., uranium-238) weapon parts (LANL 1994, 39440, p. 5-482). Structure 16-500 was built in 1945 (LANL 1997, 56660, p. 162) or 1947 (LANL 1994, 39440, p. 5-480). The structure was of wood-frame construction with a concrete floor and measured 16 ft square x 9 ft high (LANL 1997, 56660, p. 162). The concrete floor had a pit in its center that was 2 ft long x 4 ft wide x 2.5 ft deep (LANL 1994, 39440, p. 5-482). The former structure had no sumps or plumbing (LANL 1997, 56660, p. 162). A radium-226

source and a cobalt-60 source were used in the structure (LANL 1994, 39440, pp. 5-477, 5-480). Radiographic inspections at T-Site were expanded to include materials other than HE during the 5 yr following WWII. Sources containing radioactive lanthanum (half-life of 1.7 days) were used for radiography of steel and contained strontium-90 as an impurity (LANL 1994, 39440, p. 5-480). It is highly probable that the lanthanum source was used in structure 16-500 (LANL 1994, 39440, p. 5-483). Examination of depleted and enriched uranium parts led to alpha contamination at structure 16-500 (LANL 1994, 39440, p. 5-480). Before it was demolished by burning in 1960, structure 16-500 was found to have HE and radioactive contamination; the concrete floor was sent to the landfill at TA-54 (LANL 1994, 39440, pp. 5-4825-483).

SWMU 16-034(b) is potentially contaminated surface soil associated with the footprint of a decommissioned laboratory and office building (former building 16-490) that was built in late summer of 1944 (LANL 1994, 39440, p. 5-479). Operations in building 16-490 consisted of x-ray radiography of HE charges and developing of the x-ray films (LANL 1994, 39440, p. 5-479). Building 16-490 was a wood-frame, L-shaped building with a transecting internal radiation/explosion barrier. Two drainage troughs exited from the south side of the building. The dimensions of the two wings of the building were 72 ft long x 18 ft wide x 12 ft high and 93 ft long x 18 ft wide x 12 ft high, respectively (LANL 1994, 39440, p. 5-477). The septic tank (structure 16-504 [SWMU 16-005(j)]) and sump (structure 16-507 [SWMU 16-005(m)]) were added to the building in late 1944, and two darkrooms and two x-ray rooms were added in early 1945 (LANL 1994, 39440, p. 5-479). In 1946, a fire destroyed a darkroom (LANL 1994, 39440, p. 5-480). Building 16-490 was rebuilt and modified in 1947 to include a concrete slab to stabilize an instrument, and the large west wing was added in 1948 to provide vault storage for developed x-ray films (LANL 1994, 39440, p. 5-480). The building was used for x-ray radiography of HE, photoprocessing, electron microscopy, office space, and storage. Before it was demolished by burning in 1960, the building was determined to be contaminated with HE (LANL 1994, 39440, p. 5-483). Chemicals associated with the operation of building 16-490 include silver and solvents, such as amyl acetate, ethylene dichloride, and dioxane (LANL 1994, 39440, p. 5-483).

SWMU 16-034(c) is potentially contaminated surface soil associated with the footprint of a decommissioned warehouse hut (structure 16-491) that was built in 1945 (LANL 1997, 56660, p. 176). The hut, a 24-ft-long x 6-ft-wide x 9-ft-high wood-frame structure with a wooden floor, was used to store tools during WWII (LANL 1994, 39440, pp. 5-477, 5-483). By 1950, structure 16-491 was the site of x-ray exposure experiments on rabbits and rats (LANL 1994, 39440, p. 5-483). The structure had no sumps or plumbing (LANL 1997, 56660, p. 176). Before it was demolished by burning in 1960, structure 16-491 was determined to be contaminated with HE (LANL 1994, 39440, p. 5-483).

SWMU 16-034(d) is potentially contaminated surface soil associated with the footprint of a decommissioned wood-frame machine shop (building 16-492) built in 1945 (LANL 1994, 39440, pp. 5-479, 5-484). It measured 16 ft long x 16 ft wide x 9 ft high and had a wooden floor (LANL 1994, 39440, pp. 5-477, 5-484). No HE machining was performed in the shop (LANL 1994, 39440, p. 5-484). The building had no sumps or plumbing, and operations ceased in December 1959 (LANL 1997, 56660, p. 183). Before it was demolished by burning in 1960, the shop was determined to be contaminated with HE (LANL 1994, 39440, pp. 5-484).

SWMU 16-034(e) is potentially contaminated surface soil associated with the footprint of a former storage building (building 16-496). The wood-frame building (32 ft long x 16 ft wide x 9 ft tall) included a wooden floor (LANL 1997, 56660, p. 189). The building was moved from Anchor Ranch Site to T-Site in 1948 (LANL 1994, 39440, p. 5-480). The building had no sumps or plumbing (LANL 1997, 56660, p. 189). Before it was demolished by burning in 1960, during the preburning inspection in 1959, the building was determined to be contaminated with HE (LANL 1994, 39440, p. 5-484).

SWMU 16-034(f) is the footprint of a decommissioned laboratory (building 16-498) built in 1945 (LANL 1994, 39440, pp. 5-480, 5-484). It measured 42 ft long x 16 ft wide x 9 ft high and was of wood-frame construction with wooden floors (LANL 1994, 39440, pp. 5-477–5-480). Initially, the laboratory was used for storage and as an eating area (LANL 1994, 39440, p. 5-480). By 1950, it was used by draftsmen in the western end, by site photographers in its center, and for plutonium autoradiography experiments in its eastern end (LANL 1997, 56660, p. 195). Small-scale photoprocessing was conducted in the building to support the plutonium autoradiography experiments (LANL 1997, 56660, p. 195). Building 16-498 had no sumps, and it was not used after December 1959 (LANL 1997, 56660, p. 195). Before it was demolished by burning in 1960, it was determined to be contaminated with HE (LANL 1994, 39440, p. 5-484).

6.5.2 Historical Investigations

In 1959, before they were demolished by burning in 1960, all the buildings in Consolidated Unit 16-034(b)-99 were surveyed for HE and/or radioactivity (LANL 1994, 39440, p. 5-481). The results of these surveys are provided in the following sections by the individual SWMUs. The residual debris and remaining subsurface structures were removed in 1966, at which time concrete pad and unburned structure debris were resurveyed and found to be free of residual radioactivity (LANL 1994, 39440, p. 5-481).

The footprints of most of the structures demolished and removed in 1960 and 1966 were investigated during RFI activities in 1997 (LANL 1997, 56660). Not included in the 1997 RFI report are SWMUs 16-005(j), 16-005(m), and 16-034(b). The sampling locations are shown in Figure 6.5-1. The results of this RFI are also presented by SWMU in the following sections.

6.5.2.1 Analytical Results

SMWU 16-005(j)

No details of the results are available for the SWMU 16-005(j) 1959 or 1966 HE and radiological surveys. SWMU 16-005(j) was not sampled during the 1997 RFI activities.

SWMU 16-005(m)

SWMU 16-005(m) was determined to be contaminated with HE before it was removed in 1960 (LANL 1994, 39440, p. 5-481); however, this sump (structure 16-507) was not sampled during the 1997 RFI activities.

SWMU 16-025(m)

The 1959 HE and radiological surveys found SWMU 16-025(m) to be contaminated with both HE and uranium-238 (500 counts per minute) (LANL 1994, 39440, p. 5-482). During the 1997 RFI activities, two surface soil samples were collected from within the former building footprint and analyzed for inorganic chemicals, SVOCs , HE, isotopic radium, isotopic uranium, strontium-90 and by gamma spectroscopy (Table 6.5-1, Figure 6.5-1).

Antimony, lead, silver, and zinc were detected at concentrations greater than the BVs (Table 6.5-2, Figure 6.5-2). The DL for cadmium was greater than the BV in one sample (Table 6.5-2).

No organic chemicals (SVOCs or HE) were detected in either sample.

No radionuclides were detected in either sample.

SWMU 16-025(n)

The 1959 HE and radiological surveys indicated that structure 16-499 was contaminated with HE (LANL 1994, 39440, p. 5-483). During the 1959 survey, a shelf in the structure was also found to be contaminated with alpha radiation (LANL 1994, 39440, p. 5-483).

During the 1997 RFI activities, two surface soil samples were collected from within the former building footprint and analyzed for inorganic chemicals, SVOCs, HE, isotopic radium, isotopic uranium, strontium-90, and by gamma spectroscopy (Table 6.5-1, Figure 6.5-1).

Antimony, lead, and zinc were each detected at concentrations greater than the BVs in the sample collected from location 16-04174 (Table 6.5-2, Figure 6.5-2). Cadmium had a DL greater than the BV in the sample collected from location 16-04174. No inorganic chemicals were detected at concentrations greater than BVs in the second sample, but both antimony and cadmium had DLs greater than the BVs (Table 6.5-2).

No organic chemicals were detected in either sample.

No radionuclides were detected in either sample.

SWMU 16-025(o)

The 1959 HE and radiological surveys indicated that structure 16-500 was contaminated with HE, but no radioactive contamination was detected (LANL 1994, 39440, p. 5-483). The 1959 surveys recommended that the concrete floor be sent to the landfill at TA-54 (LANL 1994, 39440, p. 5-483).

During the 1997 RFI activities, two surface soil samples were collected from within the former building footprint and analyzed for inorganic chemicals, SVOCs, HE, isotopic radium, isotopic uranium, and strontium-90, and by gamma spectroscopy (Table 6.5-1, Figure 6.5-1).

Copper was detected at a concentration greater than the BV in the sample collected from location 16-04186 (Table 6.5-2, Figure 6.5-2). The DLs for antimony and cadmium were greater than the BVs in both samples (Table 6.5-2).

No organic chemicals were detected in either sample.

No radionuclides were detected in either sample.

SWMU 16-034(b)

The 1959 HE and radiological surveys indicated that building 16-490 was contaminated with HE (LANL 1994, 39440, p. 5-483). No samples were collected during the 1997 RFI activities (LANL 1997, 56660).

SWMU 16-034(c)

The 1959 HE and radiological surveys indicated that structure 16-491 was contaminated with HE (LANL 1994, 39440, p. 5-483).

During the 1997 RFI activities, two surface soil samples were collected from within the former building footprint and analyzed for inorganic chemicals, SVOCs, and HE (Table 6.5-1, Figure 6.5-1).

Copper and lead were detected at concentrations greater than the BVs in the sample collected from location 16-04147, and silver was detected at a concentration greater than the BV in the sample from location 16-04151. Zinc was detected at concentrations greater than the BV in both samples (Table 6.5-2, Figure 6.5-2). The DLs were greater than the BVs for cadmium and mercury in both samples, and for silver the DL was greater than the BV in the sample collected from location 16-04147 (Table 6.5-2).

Three SVOCs (benzoic acid, 2-methylnaphthalene, and naphthalene) were detected in the sample collected from location 16-04147 (Table 6.5-3, Figure 6.5-3).

SWMU 16-034(d)

The 1959 HE and radiological surveys indicated that building 16-492 was contaminated with HE (LANL 1994, 39440, p. 5-484).

During the 1997 RFI activities, two surface soil samples were collected within the former building footprint and analyzed for inorganic chemicals, SVOCs, and HE (Table 6.5-1, Figure 6.5-1).

Copper was detected at a concentration greater than the BV in one sample (location 16-04161); lead and zinc were detected at concentrations greater than the BVs in both samples (Table 6.5-2, Figure 6.5-2). The DLs for cadmium and silver were greater than the BVs in both samples (Table 6.5-2).

No organic chemicals (SVOCs or HE) were detected in either sample.

SWMU 16-034(e)

The 1959 HE and radiological surveys indicated that building 16-496 was contaminated with HE (LANL 1994, 39440, p. 5-484).

During the 1997 RFI activities, two surface soil samples were collected from within the former building footprint and analyzed for inorganic chemicals, SVOCs, HE, and uranium (Table 6.5-1, Figure 6.5-1).

Copper, lead, and zinc were detected at concentrations greater than the BVs in the sample collected from location 16-04145 (Table 6.5-2, Figure 6.5-2). The DLs for cadmium, mercury, silver, and uranium were greater than the BVs in both samples (Table 6.5-2).

Bis(2-ethylhexyl)phthalate was detected in both samples (Table 6.5-3, Figure 6.5-3).

SWMU 16-034(f)

The 1959 HE and radiological surveys indicated that building 16-498 was contaminated with HE (LANL 1994, 39440, p. 5-484).

During the 1997 RFI activities, two surface soil samples were collected from within the former building footprint and analyzed for inorganic chemicals, cyanide, SVOCs, HE, isotopic plutonium, and isotopic uranium (Table 6.5-1, Figure 6.5-1).

Lead and zinc were detected at concentrations greater than the BVs in both samples (Table 6.5-2, Figure 6.5-2). The DLs for cadmium, total cyanide, and silver were greater than the BVs in both samples (Table 6.5-2).

Bis(2-ethylhexyl)phthalate was detected in the sample collected from location 16-04156 (Table 6.5-3, Figure 6.5-3).

No radionuclides were detected.

6.5.2.2 Nature and Extent of Contamination

The nature and extent of lateral and vertical contamination at each of the 10 TA-16 T-Site SWMUs are summarized as follows.

SWMUs 16-005(j), 16-005(m), and 16-034(b). No historical samples have been collected at the three SWMUs directly associated with operations at former building 16-490 [SWMUs 16-005(j), 16-005(m), and 16-034(b)]. Therefore, the nature and extent of potential contamination have not been defined for these SWMUs. Sampling is proposed to define the vertical extent of potential contamination at SWMUs 16 005(j), 16-005(m), and 16-034(b) (section 6.6).

SWMU 16-025(m). Two surface soil samples within the footprint of former building 16-495 were collected and analyzed for metals, HE, SVOCs, and radionuclides. Antimony, lead, silver, and zinc were detected at concentrations greater than the BVs. No SVOCs, HE, or radionuclides were detected. All detections of inorganic chemicals greater than BV were below the current SSLs (Table 1.2-1). The lateral extent of contamination appears to be defined. The vertical extent of inorganic chemicals has not been defined for SWMU 16-025(m). Additional sampling is proposed to define the vertical extent of inorganic chemicals at SWMU 16-025(m) (section 6.6).

SWMU 16-025(n). Two surface soil samples within the footprint of former building 16-499 were collected and analyzed for metals, SVOCs, HE, and radionuclides. Antimony, lead, and zinc were detected at concentrations greater than the BVs. No SVOCs, HE, or radionuclides were detected. All detections of inorganic chemicals greater than BV were below the current SSLs (Table 1.2-1). The vertical extent of inorganic chemicals has not been defined for SWMU 16-025(n). Additional sampling is proposed to define the vertical extent of inorganic chemicals at SWMU 16-025(n) (section 6.6).

SWMU 16-025(o). Two surface soil samples within the footprint of former building 16-500 were collected and analyzed for metals, SVOCs, HE, and radionuclides. Copper was detected at a concentration greater than the BV. No SVOCs, HE, or radionuclides were detected. All detections of inorganic chemicals greater than BV were below the current SSLs (Table 1.2-1). The lateral extent of contamination appears to be defined. However, as no subsurface samples were collected, the vertical extent of inorganic chemicals has not been defined for SWMU 16-025(o). Additional sampling is proposed to define the vertical extent of inorganic chemicals at SWMU 16-025(o) (section 6.6).

SWMU 16-034(c). Two surface soil samples within the footprint of former building 16-491 were collected and analyzed for metals, SVOCs, and HE. Copper, lead, silver, and zinc were detected at concentrations greater than the BVs. Benzoic acid, methylnaphthalene, and naphthalene were detected. No HE were detected. All detections of organic chemicals and inorganic chemicals greater than BV were below the current SSLs (Table 1.2-1). The lateral extent of contamination appears to be defined. The vertical extent of inorganic chemicals and SVOCs has not been defined for SWMU 16-034(c). Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-034(c) (section 6.6).

SWMU 16-034(d). Two surface soil samples within the footprint of former building 16-492 were collected and analyzed for metals, SVOCs, and HE. Copper, lead, and zinc were detected at concentrations greater than the BVs. All detections of inorganic chemicals greater than BV were below the current SSLs (Table 1.2-1). No HE or SVOCs were detected. The lateral extent of contamination appears to be defined. The vertical extent of inorganic chemicals has not been defined for SWMU 16-034(d). Additional sampling is proposed to define the vertical extent of inorganic chemicals at SWMU 16-034(c) (section 6.6).

SWMU 16-034(e). Two surface soil samples within the footprint of former building 16-496 were collected and analyzed for metals, SVOCs, and HE. Copper, lead, and zinc were detected at concentrations greater than the BVs. Bis(2-ethylhexyl)phthalate was detected at both sampling locations. HE were not detected. The lateral extent of contamination appears to be defined. The vertical extent of inorganic chemicals and SVOCs has not been defined for SWMU 16-034(e). Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-034(e) (section 6.6).

SWMU 16-034(f). Two surface soil samples within the footprint of former building 16-498 were collected and analyzed for metals, SVOCs, HE, and radionuclides. Lead and zinc were detected at concentrations greater than the BVs. Bis(2-ethylhexyl)phthalate was detected at one sampling location. No HE or radionuclides were detected. The lateral extent of contamination appears to be defined. The vertical extent of inorganic chemicals and SVOCs has not been defined for SWMU 16-034(f). Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-034(f) (section 6.6).

Field-screening analyses of HE (using a spot test) and gamma radioactivity (using an NaI detector) were conducted as part of the 1997 RFI at the T-Site SWMUs (field-screening data are summarized in Appendix D of the HIR [LANL 2006, 91697]). Historical screening-level data have not been used to augment the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining nature and extent of contamination relative to background for inorganic chemicals and radionuclides or nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan.

6.5.2.3 Conceptual Site Model

The CSM for Consolidated Unit 16-034(b)-99 includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for the TA-16 T-Site.

Source of Contamination

Potential contamination at Consolidated Unit 16-034(b)-99 originated from HE or radionuclide residues detected in the structures before they were demolished by burning. The operational history also indicates that inorganic and organic chemicals contributed to potential contamination at Consolidated Unit 16-034(b)-99. Additionally, potential liquid releases to the subsurface may have occurred from the septic system (drainlines, sumps, and tank) associated with the main laboratory at building 16-490.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for Consolidated Unit 16-034(b)-99 are summarized in section 1.1.1.

6.5.2.4 Summary of Additional Data/Corrective Action Requirements

The majority of SWMUs associated with the TA-16 T-Site Consolidated Unit 16-034(b)-99 were sampled during 1997 RFI activities (LANL 1997, 56660); limited additional sampling is proposed at all previously sampled building locations to define the vertical extent of inorganic chemicals and, for three former buildings, organic chemicals.

No historical sampling has been performed at the main laboratory and office building at the site, former building 16-490 [SWMU 16-034(b)]. Additionally, no historical sampling has been performed at the septic system and sump associated with former building 16-490 [SWMUs 16-005(j) and 16-005(m), respectively]. Sampling is proposed to investigate the nature and extent of potential contamination at the SWMUs associated with operations at former building 16-490.

6.6 Scope of Investigation Activities

All investigation activities at T-Site will be preceded by a surface radiological walkover survey to determine the presence of alpha, beta and/or gamma-emitting radionuclides. Radiological walkover survey results will be used to address potential worker safety and protection issues as well as be used to potentially relocate proposed sampling locations. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

The proposed sampling locations at T-Site are shown in Figure 6.6-1. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 6.6-1. The analytical suites proposed for T-Site follow the general laboratory analytical strategy for septic tanks, sumps, storage buildings, and radiography buildings, as presented in Table 2.9-1. Sampling at the TA-16 T-Site SWMUs will include the following.

- *Sampling to define nature and extent of potential contamination associated with former building 16-490 septic system, SWMU 16-005(j).* A total of seven locations (1 through 7) will be sampled along the drainline and at the former septic tank location from two depths at each location: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. All samples will be analyzed for TAL metals, VOCs, SVOCs, explosive compounds, pH, nitrates, cyanide, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination associated with former building 16-490 sump, SWMU 16-005(m).* Three locations (8 through 10) will be sampled at the former sump location from two depths at each location: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. All samples will be analyzed for TAL metals, VOCs, SVOCs, explosive compounds, pH, nitrates, cyanide, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define vertical extent of potential metals contamination associated with former building 16-495, SWMU 16-025(m).* One historical sampling location (16-04181) will be resampled to define the vertical extent of inorganic chemicals at SWMU 16-025(m); one or more metals were detected at concentrations greater than the BVs in the historical sample collected from this location. Samples will be collected from two depths: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. The samples will be analyzed for TAL metals. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

- *Sampling to define vertical extent of potential metals contamination associated with former building 16-499, SWMU 16-025(n).* One historical sampling location (16-04174) will be resampled to define the vertical extent of inorganic chemicals at SWMU 16-025(n); one or more metals were detected at concentrations greater than the BVs in the historical sample collected from this location. Samples will be collected from two depths: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. The samples will be analyzed for TAL metals. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define vertical extent of potential metals contamination associated with former building 16-500, SWMU 16-025(o).* One historical sampling location (16-04186) will be resampled to define the vertical extent of inorganic chemicals at SWMU 16-025(o); one or more metals were detected at concentrations greater than the BVs in the historical sample collected from this location. Samples will be collected from two depths: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. The samples will be analyzed for TAL metals. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination associated with former building 16-490, SWMU 16-034(b).* A total of five locations (11 through 15) will be sampled within the footprint of former building 16-490. Additionally, three samples will be collected from each of the southern drainage troughs associated with the building (16 through 21). Samples will be collected from two depths at each location: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. All samples will be analyzed for TAL metals, VOCs, SVOCs, explosive compounds, pH, nitrates, cyanide, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define vertical extent of potential metals and organic chemical contamination associated with former building 16-491, SWMU 16-034(c).* Two historical sampling locations (16-04147 and 16-04151) will be resampled to define the vertical extent of inorganic and organic chemicals at SWMU 16-034(d); one or more metals were detected at concentrations greater than the BVs, and one organic chemical was detected in the historical samples collected from these locations. Samples will be collected from two depths at each location: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. The samples will be analyzed for TAL metals and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define vertical extent of potential metals contamination associated with former building 16-492, SWMU 16-034(d).* Two historical sampling locations (16-04158 and 16-04161) will be resampled to define the vertical extent of inorganic chemicals at SWMU 16-034(d); one or more metals were detected at concentrations greater than the BVs in the historical samples collected from these locations. Samples will be collected from two depths at each location: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. The samples will be analyzed for TAL metals. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of

2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

- *Sampling to define vertical extent of potential metals and organic chemical contamination associated with former building 16-496, SWMU 16-034(e).* Two historical sampling locations (16-04143 and 16-04145) will be resampled to define the vertical extent of inorganic and organic chemicals at SWMU 16-034(e); one or more metals were detected at concentrations greater than the BVs, and one or more organic chemicals were detected in the historical samples collected from these locations. Samples will be collected from two depths at each location: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. The samples will be analyzed for TAL metals and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define vertical extent of potential metals and organic chemical contamination associated with former building 16-498, SWMU 16-034(f).* Two historical sampling locations (16-04152 and 16-04156) will be resampled to define the vertical extent of inorganic and organic chemicals at SWMU 16-034(f); one or more metals were detected at concentrations greater than the BVs, and one or more organic chemicals were detected in the historical samples collected from these locations. Samples will be collected from two depths at each location: 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. The samples will be analyzed for TAL metals and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

7.0 SUBAGGREGATE 6: WWII GMX-3 AREA

Subaggregate 6, the WWII GMX-3 area, includes the following SWMUs and AOCs (Figure 1.1-7): SWMU 16-005(n), SWMU 16-017(g)-99, AOCs 16-024(b) and 16-024(c), SWMUs 16-025(a), and 16-025(b), Consolidated Unit 16-029(h2)-99) [SWMUs 16-025(d), 16-025(g), 16-025(h), 16-025(i), 16-025(j), 16-029(h2), 16-029(m), 16-029(n), 16-029(o), 16-029(p)], and Consolidated Unit 16-029(q)-99 [SWMUs 16-017(f)-99, 16-017(u)-99, 16-029(q), and AOC C-16-064)]. These sites are grouped into the following areas: septic tank, HE magazines, radiography buildings, and HE-machining buildings and associated structures.

AOC 16-024(c) is a former magazine used to store HE or HE components during intermediate-processing stages in producing HE lenses for weapons. This AOC is not recommended for additional investigation or corrective action and is discussed in Appendix B.

Subaggregate 6 consists of sites associated with activities conducted in WWII-era S-Site buildings primarily occupied by the production explosives groups, such as GMX-3 and its predecessors, Groups X-3, Explosives Development and Production, and E-10, Ordnance Division, S-Site plant (LANL 1994, 39440, p. 5-305). “S-Site” and “WWII-era S-Site” refer to the portion of TA-16 used for HE processing from 1944 to the early 1950s. The HE were subjected to disruptive processes, such as casting or machining, in most of these structures. Large quantities, up to 100,000 lb of HE per month, were processed through the area during the waning stages of WWII (LANL 1994, 39440, p. 5-311). The machining buildings had HE sumps or associated drainlines and outfalls; therefore, possible subsurface contamination is an issue at these sites (LANL 1994, 39440, p. 5-305). Most of the buildings were

decommissioned and demolished by intentional burning, and the debris was removed to the MDA P landfill in the early 1960s. Sumps, drainlines, and HE-contaminated soil were removed in the late 1960s (LANL 1994, 39440, p. 5-305). None of the buildings or structures remains at the former WWII GMX-3 area. In addition, the 90s Line and the associated processing buildings north of the WWII GMX-3 east area, underwent D&D in 1996.

7.1 Surface Conditions

Subaggregate 6 is located in TA-16 on a 200-ft-high mesa that trends east to west (Plate 1). The mesa is bounded on the north by Cañon de Valle (about 500 ft north of the WWII GMX-3 area), on the south by Water Canyon (approximately 3700 ft south of the WWII GMX-3 area) (Plate 1). The elevation of the mesa ranges from 7700 to 7500 ft amsl across Subaggregate 6; it ranges from approximately 7620 ft to 7580 ft amsl. The topography of the subaggregate has a gentle 1.36-degree slope to the northeast.

The surface vegetation community at Cañon de Valle Aggregate Area is described in section 2.1.

7.2 Surface Water

Section 2.2 presents a discussion of surface water in the Cañon de Valle Aggregate Area. Two sites within the boundary of Subaggregate 6, but not included in this work plan [16-029(s) and 16-029(t)], are monitored for surface water pollution (Table 2.2-1).

The location of CDV-SMA-0.5 is such that it could evaluate surface water runoff from SWMU 16-029(h2)-99. A water sample was not collected from CDV-SMA-0.5 in 2005 (LANL 2006, 92600, Attachment 2, Table B-1).

7.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3.

7.4 Subsurface Conditions

7.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.1.

7.4.2 Cliff Retreat and Fractures

Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

7.4.3 Hydrogeology

The hydrogeology of the Cañon de Valle Aggregate Area is discussed in section 2.4.3. Well R-26 is located approximately 1740 ft northwest of Subaggregate 6. Wells R-25 and CdV-16-1(i) are located approximately 4050 and 4065 ft northeast, respectively, of this subaggregate (Plate 1). This subaggregate lies near these 3 wells, all of which contain a thick perched zone located between 563 and 723 ft bgs. Well R-26 also contains a higher zone of perched water at 173 ft bgs that appears to be associated with low-angle platy fractures in the ash-flow tuff (LANL 2005, 92028, p. 2-B-11). The presence, location, and depth of a perched zone directly beneath Subaggregate 6 remain unknown. However, ephemeral perched water was encountered in well location 02669 (immediately east of the 90s

Line Ponds) and in well location 02665 (located in Martin Spring Canyon) at less than 200 ft bgs (LANL 2003, 77965)

7.5 Septic Tank: SWMU 16-005(n)

7.5.1 Site Description and Operational History

SWMU 16-005(n) was a 600-gal. septic tank (structure 16-173) associated with a latrine (structure 16-162) that was put into service in 1949 (LANL 1993, 20948, p. 6-16). The latrine was removed in 1971. The latrine and septic tank were located north of the 90s Line HE-machining buildings, and it is not known whether a leach field or outfall was associated with this septic tank. The septic tank was removed from service in 1971.

7.5.2 Historical Investigations

A contamination survey conducted in 1971 indicated that gross-alpha and -beta activities in the tank's water were below DLs that were used at the time of the survey (LANL 1993, 20948, p. 6-16). No other historical investigations have been conducted at SWMU 16-005(n).

7.5.2.1 Analytical Results

No historical sampling has been conducted at SWMU 16-005(n).

7.5.2.2 Nature and Extent of Contamination

Because no samples have been collected at SWMU 16-005(n), the nature and extent of potential contamination at this site are unknown.

7.5.2.3 Conceptual Site Model

The CSM for SWMU 16-005(n) includes subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 16-005(n).

Source of Contamination

Potential contamination at SWMU 16-005(n) originated from leaks from the septic tank. The COPCs related to sanitary effluent from the latrine include nitrates, VOCs, and SVOCs.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 16-005(n) are summarized in section 1.1.1.

7.5.2.4 Summary of Additional Data/Corrective Action Requirements

Removal of the septic tank, followed by confirmatory sampling, is proposed for SWMU 16-005(n) (section 7.9.1):

- The locations of the septic tank within the former latrine footprint and the drainline are not known. Whether the drainline ultimately discharges to either a surface outfall or subsurface leach field/seepage pit is also not known. Therefore, the location and orientation of the septic system must be determined.

- The septic tank system will be excavated and removed to facilitate subsurface sampling and characterization.

7.6 HE Storage Magazines: SWMU 16-017(g)-99 and AOC 16-024(b)

SWMU 16-017(g)-99 and AOC 16-024(b) are former magazines used to store HE or HE components during intermediate-processing stages in producing HE lenses for weapons.

7.6.1 Site Description and Operational History

SWMU 16-017(g)-99 (structure 16-80) is a former HE storage magazine (24 ft long x 12 ft wide x 7 ft high) built before 1950. Its use was discontinued in 1951. No other details were found in the available documents reviewed.

AOC 16-024(b) is the location of potentially contaminated surface soil associated with a former HE magazine (former structures 16-74), which was located in the historical GMX-3 area (LANL 1994, 39440, pp. 5-356–5-357). Operations at GMX-3 were devoted to developing techniques to produce HE lenses, the explosives component of a nuclear weapon, with high chemical purity and accurate shapes. HE were subjected to disruptive processes such as casting and machining. HE normally was held in magazines and rest houses between operations. Spillage occasionally occurred in the magazines and rest houses. The potential contaminants at these sites are HE.

Structure 16-74 [AOC 16-024(b)] was composed of wood with a concrete floor. It measured 11 ft long x 9 ft wide x 7 ft high, was bermed on three sides and on top, and had no plumbing. It was located north of the casting rest house (structure 16-88). Structure 16-74 was built in 1946 to store HE in transit to the machining buildings (16-31, -32, and -33), but it was later used with the 20s Line casting operation and held cast HE after (and perhaps before) sawing of risers. Structure 16-74 had no sumps or drainlines; it was removed in 1949 (LANL 1994, 39440, pp. 5-356–5-357). No information is available to confirm that raw HE powder was stored in this magazine at any time.

7.6.2 Historical Investigations

No historical investigations have been conducted at SWMU 16-017(g)-99 or AOC 16-024(b).

7.6.2.1 Analytical Results

No historical sampling has been conducted at SWMU 16-017(g)-99 or AOC 16-024(b).

7.6.2.2 Nature and Extent of Contamination

Because no samples have been collected at SWMU 16-017(g)-99 or AOC 16-024(b), the nature and extent of potential contamination at this SWMU and AOC are not known.

7.6.2.3 Conceptual Site Model

The CSM for SWMU 16-017(g)-99 and AOC 16-024(b) includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 16-017(g)-99 and AOC 16-024(b).

Source of Contamination

Potential contamination at SWMU 16-017(g)-99 and AOC 16-024(b) primarily originated from spills of particulate HE stored in the structures before their removal. The COPCs include inorganic chemicals and HE.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 16-017(g)-99 and AOC 16-024(b) are summarized in section 1.1.1.

7.6.2.4 Summary of Additional Data/Corrective Action Requirements

No historical sampling has been performed at SWMU 16-017(g)-99 and AOC 16-024(b). Sampling is proposed to investigate the nature and extent of contamination associated with these former HE storage areas (section 7.9.2).

7.7 Radiography Buildings: SWMUs 16-025(a) and 16-025(b)

SWMUs 16-025(a) and 16-025(b) were former radiography buildings located in the former GMX-3 area that were used to image HE lenses for quality control (QC) purposes. The operations at the GMX-3 area were devoted to developing techniques to produce HE lenses, the explosives component of a nuclear weapon, with high chemical purity and accurate shapes.

7.7.1 Site Description and Operational History

SWMU 16-025(a) is the location of potentially contaminated surface soil associated with a former radiography building (16-39) south of T-Site in the former GMX-3 area (LANL 1994, 39440, pp. 5-356–5-357). T-Site was formerly part of TA-24. Building 16-39 was built in early 1945 west of the 30s Line machining buildings. It was 16 ft long x 16 ft wide x 9 ft high and had no sumps or drains to the external environment. Building 16-39 was a radiography building where source radiography and x-ray radiography were used to determine the quality of HE lenses during the 1940s (LANL 1994, 39440, pp. 5-356–5-357). It is unclear from historical documents whether building 16-39 was used for radiography or for storing sources or both. Most GMX-3 buildings, including building 16-39, were decommissioned and demolished by intentional burning, and the debris was removed to MDA P (SWMU 16-018) during the early 1960s (LANL 1994, 39440, pp. 5-356–5-357).

SWMU 16-025(b) is the location of potentially contaminated surface soil associated with a radiography building (former building 16-40) at T-Site in the former GMX-3 area. Building 16-40 was constructed west of building 16-39 [SWMU 16-025(a)] in 1950 to provide gamma radiography within the GMX-3 area. It measured approximately 20 ft long x 20 ft wide with earthen barricades on two sides (LANL 1994, 39440, pp. 5-356–5-357). Building 16-40 contained a lead-lined pit in the floor for radioactive sources and had no sumps or drains to the external environment.

7.7.2 Historical Investigations

SMWU 16-025(a)

All decommissioned buildings were surveyed for radiation, HE, and toxic chemicals before they were demolished. Surveys conducted in the 1950s indicated that building 16-39 was contaminated with HE, cobalt-60, radium 226, and uranium-238. The building was burned in 1960. In 1966, the debris of building

16-39 was surveyed for radioactivity before cleanup. No radioactivity was detected (LANL 1994, 39440, pp. 5-356–5-357). No other historical investigations have been conducted at SWMU 16-025(a).

SWMU 16-025(b)

Surveys conducted in the 1950s indicated that building 16-40 was contaminated with HE, cobalt-60, radium-226, and uranium-238 (LANL 1994, 39440, pp. 5-356–5-357). A survey conducted in 1957 showed building 16-40 was contaminated with cobalt-60 at a spot on the floor and on a source plug. The Zia Company was directed to remove the radioactively contaminated materials. Most GMX-3 buildings, including building 16-40, were decommissioned and demolished by intentional burning, and the debris was removed to MDA P (SWMU 16-018) in the early 1960s (LANL 1994, 39440, pp. 5-356–5-357). All decommissioned buildings were surveyed for radiation, HE, and toxic chemicals before demolition. In 1966, the debris of building 16-40 was surveyed for radioactivity before cleanup. No radioactivity was detected (LANL 1994, 39440, pp. 5-356–5-357).

An RFI at SWMU 16-025(b) was conducted in 1997. One surface soil sample was submitted to an off-site analytical laboratory and analyzed for inorganic chemicals, SVOCs, HE, isotopic radium, isotopic uranium, strontium-90, and by gamma spectroscopy (Table 7.7-1, Figure 7.7-1).

7.7.2.1 Analytical Results

SMWU 16-025(a)

No laboratory analytical samples have been collected in historical investigations at SWMU 16-025(a).

SWMU 16-025(b)

No inorganic chemicals were detected at concentrations greater than BVs. The DLs for antimony and cadmium were greater than BVs (Table 7.7-2).

Fluoranthene and pyrene were the only organic chemicals detected (Table 7.7-3, Figure 7.7-3).

No radionuclides were detected at activities greater than BVs/FVs.

7.7.2.2 Nature and Extent of Contamination

SMWU 16-025(a)

No historical investigations involved collecting laboratory analytical samples at SWMU 16-025(a). The nature and extent of potential contamination at this site are not known. Sampling is proposed to define the nature and extent of potential contamination at SWMU 16-025(a) (section 7.9.3).

SWMU 16-025(b)

Based on the historical sampling performed at SWMU 16-025(b), the nature and extent of surface and subsurface contamination of metals and radionuclides have been defined; no metals or radionuclides were detected in surface soil samples at concentrations/activities greater than BVs/FVs. However, the DLs for antimony and cadmium were greater than the BVs the sample (Table 7.7-2). The vertical extent of potential contamination of organic chemicals has not been defined, because organic chemicals were detected in surface soil samples. All detections of organic chemicals and inorganic chemicals greater

than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the nature and extent of organic chemicals at SWMU 16-025(b) (section 7.9.3).

7.7.2.3 Conceptual Site Model

The CSM for the radiography buildings, SWMUs 16-025(a) and 16-025(b), includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for SWMUs 16-025(a) and 16-025(b).

Source of Contamination

Potential contamination at the radiography buildings originated from accidental releases of HE (and analytes included in the HE, such as barium) from the lenses being imaged or from releases of radioactivity from the imaging sources themselves. COPCs include inorganic chemicals, HE, organic chemicals, radionuclides.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMUs 16-025(a) and 16-025(b) are summarized in section 1.1.1.

7.7.2.4 Summary of Additional Data/Corrective Action Requirements

No historical sampling has been performed at SWMU 16-025(a). Sampling is proposed to investigate the nature and extent of contamination associated with former radiography building 16-39.

Previous site investigations at SWMU 16-025(b) have documented the presence in surface soil samples of organic chemicals. As the historical sampling was limited to surface soil, the vertical extent of potential contamination has not been defined. Additional sampling is proposed to address this data requirement.

The sampling proposed to define the nature and extent of potential contamination at SWMUs 16-025(a) and 16-025(b) is detailed in section 7.9.3.

7.8 HE Machining Buildings and Associated Structures: Consolidated Units 16-029(h2)-99 and 16-029(q)-99

The structures associated with these two consolidated units were used for HE-machining operations related to the production of lenses for nuclear devices.

7.8.1 Site Description and Operational History

The two consolidated units, 16-029(h2)-99 and 16-029(q)-99, consist of various buildings and structures associated with the former GMX-3 HE production area.

Consolidated Unit 16-029(h2)-99

Consolidated Unit 16-029(h2)-99 consists of potential soil contamination at SWMUs 16-025(d), 16-025(g), 16-025(h), 16-025(i), 16-025(j), 16-029(h2), 16-029(m), 16-029(n), 16-029(o), and 16-029(p). The consolidated unit includes the footprints of former HE-machining buildings (16-95, -96, -97, and –98), including their sumps and drainlines, at the GMX-3 area (LANL 1994, 39440, pp. 5-322–5-323). The

operations within the GMX-3 area were devoted to developing techniques to produce HE lenses, the explosives components of a nuclear weapon, with both high-chemical purity and accurate shapes. The HE-machining buildings in this consolidated unit are respectively known as West, North, East, and South and were located east of the 30s Line (LANL 1994, 39440, pp. 5-322–5-323). The buildings were of wood-frame construction on a concrete slab. Each building measured 20 ft long x 12 ft wide with a 20-ft x 6-ft porch, and each was equipped with garbage cans to collect HE pieces for disposal at the burning ground. The buildings were all constructed in 1948 and were closed in 1959 (LANL 1994, 39440, pp. 5-322–5-323). They were demolished by burning in 1960. Residues from the burning of explosive-contaminated buildings were removed to TA-54, and noncombustibles were disposed of at MDA P (SWMU 16-018). The sumps and drainlines were removed in 1967 (LANL 1994, 39440, pp. 5-322–5-323).

SWMU 16-025(d) is former building 16-94, the footprint of the decommissioned equipment control building situated in the center of the west-north-east-south configuration. Wooden-walled earthen barricades separated the other buildings from building 16-94. The 30 ft^2 building with a 10 ft^2 extension was almost identical in structure to the other structures in this consolidated unit and was removed at the same time. The former building had no sump or plumbing (LANL 1994, 39440, p. 5-360).

SWMU 16-025(g) is the footprint of a former HE-machining building (16-95), the western building in the consolidated unit configuration (LANL 1997, 56660, p. 118).

SWMU 16-025(h) is the footprint of a former HE-machining building (16-96). Building 16-96 was the northern building in the consolidated unit configuration and was used for HE machining until building 16-260, another machining building, was completed in the early 1950s (LANL 1994, 39440, p. 5-323).

SWMU 16-025(i) is the footprint of a former HE-machining building (16-97), the eastern building in the consolidated unit configuration (LANL 1994, 39440, p. 5-323; LANL 1997, 56660, p. 125).

SWMU 16-025(j) is the footprint of a former HE-machining building (16-98). Building 16-98 was the southern building in the consolidated unit configuration and stored containers for disposal of pieces of HE at the burning ground. The building was decommissioned as a machining building and converted to a coffee and smoking room (LANL 1994, 39440, p. 5-323; LANL 1997, 56660, p. 125).

SWMU 16-029(m) is the footprint of the sump, drainline, and outfall that served building 16-95 (LANL 1994, 39440, p. 5-323).

SWMU 16-029(n) is the footprint of the sump, drainline, and outfall that served building 16-96 (LANL 1994, 39440, p. 5-323).

SWMU 16-029(o) is the footprint of the sump, drainline, and outfall that served building 16-97 (LANL 1994, 39440, p. 5-323).

SWMU 16-029(p) is the footprint of the sump, drainline, and outfall that served building 16-98 (LANL 1994, 39440, p. 5-323).

SWMU 16-029(h2) is the footprint of the drainage system that connected many of the drainlines described above. A drainline flowed from the building 16-98 sump to the sump for building 16-97, then to the sump for building 16-96, and finally to a manhole (structure 16-801). A second drainline exited the sump for building 16-95, flowed into the manhole (structure 16-801), and trended north beneath the 90s Line. The drainlines eventually discharged north of the site (LANL 1994, 39440, p. 5-323).

Consolidated Unit 16-029(q)-99

Consolidated Unit 16-029(q)-99 consists of SWMUs 16-017(f)-99, 16-029(q), 16-017(u)-99, and AOC C-16-064. Initially, the operations in the buildings at this site were part of HE-processing operations in the post-WWII-era S-Site complex that involved large quantities of HE.

SWMU 16-017(f)-99 is a former HE-machining building (16-99). The 892 ft^2 building was constructed of wood on a concrete slab and surrounded on three sides by an earthen berm that was packed against steel pilings. The building was completed in 1948, and riser-cutting activities were at maximum levels until mid-1951 when the modern HE-machining building (16-260) was finished. Sometime during the late 1950s or early 1960s, building 16-99 was converted to a storage facility. It was taken out of service by 1991 and removed in 1996.

SWMU 16-017(u)-99 is former storage building 16-164. No detailed information can be found for this SWMU.

SWMU 16-029(q) consists of the location of an HE sump, drainlines, and an outfall associated with former building 16-99. The sump was approximately 15 ft long x 5 ft wide x 5 ft deep. The drainlines were buried VCPs leading from the sumps to the road, to depressions next to the road where the pipes daylighted, and to an open-air drainage channel. In the mid- to late 1960s, the sump was filled with gravel. Building 16-99, the sump, drainlines, and berms around building 16-99 were removed during D&D operations in 1996.

AOC C-16-064 is the former location of a drum storage platform 50 ft southwest of a former HE-machining building (16-99). The platform (structure 16-183), built in April 1945, was an 8-ft-square wooden structure elevated on steel legs a few feet above the ground surface. The platform was used to store containers of HE scrap generated from the riser-cutting operations in building 16-99. It was decommissioned and flashed at the Burning Ground in 1968.

7.8.2 Historical Investigations

Consolidated Unit 16-029(h2)-99

SWMU 16-025(d)

An RFI at SWMU 16-025(d) was conducted in 1997. Eight surface and near-surface soil samples were screened for HE and radiation from four locations (Figure 7.8-1) within the footprint of building 16-94 (LANL 1997, 56660, p. 114). One surface soil sample from the southwestern corner of the building footprint screened positive for HE, and all samples contained only background radiation activity. The sample with the highest concentration of HE were submitted for laboratory analysis of inorganic chemicals, SVOCs, and HE (Table 7.8-1).

SWMU 16-025(g)

An RFI at SWMU 16-025(g) was conducted in 1997. Twelve surface and near-surface soil samples were screened for HE and radioactivity from six locations (Figure 7.8-1) within, and adjacent to, the building footprint (LANL 1997, 56660, p. 119). One sample screened positive for HE, and all samples contained only background radiation activity. Three surface soil samples, including the sample that screened positive for HE, were submitted for laboratory analysis of inorganic chemicals, SVOCs, and HE (Table 7.8-1).

SWMU 16-025(h)

An RFI at SWMU 16-025(h) was conducted in 1997. Eleven surface and near-surface soil samples from six locations (Figure 7.8-1) within and next to the building footprint (LANL 1997, 56660, p. 128) were screened. One sample screened positive for HE, and all samples contained only background radiation activity. One surface soil, one subsurface soil, and two surface fill samples, including the surface fill sample that screened positive for HE, were submitted for laboratory analysis of inorganic chemicals, SVOCs, VOCs (subsurface only), and HE (Table 7.8-1).

SWMU 16-025(i)

Two subsurface tuff samples were collected in May 1998 and analyzed for HE, inorganic chemicals, SVOCs, and VOCs (Table 7.8-1, Figure 7.8-1). Both samples were flagged as excavated in the ERDB records, indicating that the tuff from which the samples were collected was subsequently removed at some point after sampling. Soil was removed at these sites as part of the V-Site cleanup. No documents were located that discussed the collection of these May 1998 samples.

SWMU 16-025(j)

An RFI at SWMU 16-025(j) was conducted in 1997. Ten surface and near-surface soil samples from five locations within the building footprint were screened for HE and radiation (LANL 1997, 56660, p. 136). All samples screened negative for HE and contained background radioactivity. Three soil samples were submitted for laboratory analysis of inorganic chemicals, SVOCs, and HE (Table 7.8-1, Figure 7.8-1). Data from these three samples are decision-level data.

In May 1998, one subsurface soil (decision-level data) and two tuff samples (screening-level data) were collected and submitted to an off-site laboratory (Table 7.8-1, Figure 7.8-1). The subsurface soil sample was analyzed for inorganic chemicals, VOCs, SVOCs, and HE (Table 7.8-1). Both tuff samples were analyzed for inorganic chemicals, SVOCs, and HE. One of the tuff samples was also analyzed for VOCs. Both tuff samples were flagged as “excavated” in the ERDB. Soil was removed at these sites as part of the V-Site cleanup. No documents were located that discussed the collection of these May 1998 samples.

SWMU 16-029(h2)

In 1997, one surface soil sample was collected and analyzed for inorganic chemicals, nine subsurface soil samples were collected and analyzed for inorganic chemicals, VOCs, SVOCs, and HE, and one subsurface soil sample was collected (flagged as “excavated” in the ERDB, indicating that the soil from which the sample was collected was removed some time after sampling) and analyzed for metals (Table 7.8-1, Figure 7.8-1). In addition, two subsurface soil samples were collected in 1998 and analyzed for inorganic chemicals, VOCs, SVOCs, and HE (Table 7.8-1, Figure 7.8-1). No documents were located that discussed the collection of any of these samples or the subsequent excavation of the sampled media.

Consolidated Unit 16-029(q)-99

SWMU 16-017(f)-99

In 1996, two subsurface soil samples were collected and analyzed for inorganic chemicals, cyanide, VOCs, SVOCs, and HE (Table 7.8-1, Figure 7.7-1).

SWMU 16-017(u)-99

No samples have been collected from SWMU 16-017(u)-99.

SWMU 16-029(q)

In April 1996, following removal of surface and subsurface structures and contaminated soil within 2 ft of the sumps and drainlines by D&D (using HE spot testing to guide soil removal), 35 samples were collected within the building and drainage area footprint (LANL 1996, 62537, p. 50) associated with SWMU 16-029(q). All samples were field screened for inorganic and organic chemicals, HE, and radionuclides. The following samples were collected and submitted for off-site laboratory analysis of inorganic chemicals, cyanide, VOCs, SVOCs, and HE: 2 surface soil samples and 12 subsurface soil, fill, and tuff samples (Table 7.8-1, Figure 7.7-1). One surface soil sample was collected and analyzed for metals, cyanide, VOCs, SVOCs, and HE (flagged as "excavated" in the ERDB, indicating that the soil from which the sample was collected was removed some time after sampling). After the sampling results were received, trenches from the excavated drainlines and sumps as well as the cleanup sites were backfilled with clean soil, compacted, and contoured to blend with the surrounding topography. The area was reseeded with native grasses.

AOC C-16-064

A voluntary corrective action (VCA) was conducted at AOC C-16-064 in August 1996. Eight samples were collected and screened for organic chemicals, RDX/TNT, HE, and radionuclides. Because elevated concentrations of HE were detected, two samples were collected and submitted for laboratory analysis. The samples were analyzed for inorganic chemicals, organic chemicals, and HE. RDX was detected at elevated concentrations, and the contaminated soil was excavated. Two confirmatory samples were collected following the VCA and analyzed for inorganic chemicals, cyanide, SVOCs, VOCs, and HE (Table 7.8-1, Figure 7.7-1). The site was backfilled with clean soil, compacted, and contoured to blend with surrounding topography. The area was reseeded with native grasses.

7.8.2.1 Analytical Results

Consolidated Unit 16-029(h2)-99

SWMU 16-025(d)

Zinc was detected at a concentration greater than the BV (Table 7.8-2, Figure 7.8-2). No organic chemicals were detected.

SWMU 16-025(g)

Copper was detected at a concentration greater than the BV (Table 7.8-2, Figure 7.8-2). No organic chemicals were detected.

SWMU 16-025(h)

Lead and zinc in surface samples and uranium one in the subsurface sample were detected at concentrations greater than BVs (Table 7.8-2, Figure 7.8-2). The DLs for three inorganic chemicals in surface samples (cadmium, mercury, and silver) and DLs for two inorganic chemicals in the subsurface sample (antimony and cadmium) exceeded BVs (Table 7.8-2).

A number of organic chemicals (primarily PAHs) were detected in surface samples (Table 7.8-3, Figure 7.8-3). The analyte RDX was detected in the subsurface sample (Table 7.8-3, Figure 7.8-3).

SWMU 16-025(i)

The following inorganic analytes (Table 7.8-2) were detected above BVs (the number of detects above BVs in parentheses after the chemical name): aluminum (1), arsenic (1), barium (2), calcium (1), copper (1), and magnesium (1). The DLs for the following analytes in both samples were above BVs: selenium, thallium, and uranium.

The following organic chemicals (Table 7.8-3) were detected (number of detects in parentheses after the chemical name): RDX (1); 1,3,5-trinitrobenzene (2); and TNT (2).

SWMU 16-025(j)

Cobalt, lead, and zinc in surface samples and barium in a subsurface sample were detected at concentrations greater than BVs (Table 7.8-2, Figure 7.8-2). The DLs for four inorganic chemicals (antimony, selenium, thallium, and uranium) exceeded BVs in subsurface samples (Table 7.8-2).

No organic chemicals were detected in surface samples. Bis(2-ethylhexyl)phthalate was detected in the subsurface samples that were excavated, and 2,4-dinitrotoluene (2,4-DNT), HMX, RDX, TNT were detected in one subsurface sample (Table 7.8-3, Figure 7.8-3).

The following inorganic chemicals were detected at concentrations greater than BVs in the 1998 samples: arsenic, barium, calcium, copper, and magnesium (Table 7.8-2, Figure 7.8-2). The DLs for three inorganic chemicals (selenium, thallium, and uranium) exceeded BVs in the 1998 samples (Table 7.8-2).

HE (RDX, 1,3,5-trinitrobenzene, and TNT) were the only organic chemicals detected in the 1998 samples (Table 7.8-3, Figure 7.8-3).

SWMU 16-029(h2)

Three inorganic chemicals (cobalt, thallium, and uranium) were detected at concentrations greater than BVs in surface samples (Table 7.8-2, Figure 7.8-2). The following inorganic chemicals were detected at concentrations greater than BVs in subsurface samples: aluminum, barium, beryllium, cobalt, lead, manganese, selenium, sodium, thallium, uranium, and zinc (Table 7.8-2, Figure 7.8-2). DLs for four inorganic chemicals (antimony, cadmium, mercury, and silver) exceeded BVs in subsurface samples (Table 7.8-2).

A number of HE and PAHs were detected in subsurface samples (Table 7.8-3, Figure 7.8-3).

Consolidated Unit 16-029(q)-99

SWMU 16-017(f)-99

Three inorganic chemicals (cobalt, lead, and manganese) were detected at concentrations greater than the BVs in the near-surface samples (Table 7.8-2, Figure 7.7-2). The DLs for four inorganic chemicals (antimony, cadmium, cyanide, and silver) exceeded BVs in near-surface samples (Table 7.8-2).

Two VOCs were detected in the near-surface samples (Table 7.8-3, Figure 7.7-3).

SWMU 16-017(u)-99

No samples have been collected from SWMU 16-017(u)-99.

SWMU 16-029(q)

Four inorganic chemicals in surface samples (antimony, barium, copper, and zinc) and nine inorganic chemicals in subsurface samples (aluminum, antimony, barium, cadmium, calcium, chromium, copper, iron, manganese, nickel, and thallium) were detected at concentrations greater than BVs (Table 7.8-2, Figure 7.7-2). The DLs for four inorganic chemicals (antimony, cadmium, cyanide, and silver) in surface samples and five (antimony, cadmium, cyanide, selenium, and silver) in the subsurface samples exceeded BVs (Table 7.8-2).

Arsenic, barium, and copper were detected at concentrations greater than BVs in the excavated surface samples, and the DLs exceeded BVs for four inorganic chemicals (antimony, cadmium, cyanide, and silver) in the same samples (Table 7.8-2).

Numerous organic chemicals (primarily HE and a few PAHs) were detected in surface and subsurface samples (Table 7.8-3, Figure 7.7-3).

AOC C-16-064

Two inorganic chemicals (manganese and zinc) were detected at concentrations greater than BVs in surface samples (Table 7.8-2, Figure 7.7-2). The DLs for six inorganic chemicals (antimony, cadmium, cyanide, mercury, silver, and thallium) exceeded BVs in surface samples (Table 7.6-2).

Before the VCA, barium, lead, and zinc were detected at concentrations greater than BVs in the excavated surface samples, and the DLs exceeded BVs for four inorganic chemicals (antimony, cadmium, selenium, and silver) in the same samples (Table 7.8-2).

Numerous organic chemicals (primarily HE) were detected in surface samples before the VCA (Table 7.8-3, Figure 7.7-3).

7.8.2.2 Nature and Extent of Contamination

Consolidated Unit 16-029(h2)-99

SWMU 16-025(d)

Based on the historical sampling performed at SWMU 16-025(d), the lateral extent of potential contamination has not been defined in the SWMU. The vertical extent of potential contamination of inorganic chemicals has not been defined because zinc was detected above the BV in surface soil samples. The nature and extent of organic chemicals at the site have been defined because no organic chemicals (including HE) were detected in surface soil samples. All detections of inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the vertical extent of inorganic chemicals at SWMU 16-025(d) (section 7.9.4).

SWMU 16-025(g)

Based on the historical sampling performed at SWMU 16-025(g), the lateral extent of potential contamination has not been defined in the SWMU. The vertical extent of potential contamination of

inorganic chemicals has not been defined because copper was detected above the BV in surface soil samples. All detections of inorganic chemicals greater than BV were below the current SSLs (Table1.2-1). The nature and extent of organic chemicals at the site has been defined because no organic chemicals (including HE) were detected in surface soil samples. Additional sampling is proposed to define the vertical extent of inorganic chemicals at SWMU 16-025(g) (section 7.9.4).

SWMU 16-025(h)

Based on the historical sampling performed at SWMU 16-025(h), the lateral extent of potential contamination has not been defined in the SWMU. The vertical extent of potential contamination of inorganic chemicals and organic chemicals (including HE) has not been defined because a number of metals were detected at concentrations greater than BVs, and a number of organic chemicals were detected in surface and subsurface samples associated with this SWMU. All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-025(h) (section 7.9.4).

SWMU 16-025(i)

The nature and extent of potential contamination at SWMU 16-025(i) is not known; no decision-level data have been collected from this site. Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-025(i) (section 7.9.4).

SWMU 16-025(j)

Based on the historical sampling performed at SWMU 16-025(j), the lateral extent of potential contamination has not been defined in the SWMU. The vertical extent of potential contamination of inorganic chemicals and organic chemicals (including HE) has not been defined because metals were detected at concentrations greater than BVs and a number of organic chemicals were detected in surface and subsurface samples associated with this SWMU. All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1), with the exception of RDX in one sample and TNT in one sample. Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-025(j) (section 7.9.4).

SWMU 16-029(h2)

Based on the historical sampling performed at SWMU 16-025(h2), the lateral extent of potential contamination has not been defined in the SWMU. The vertical extent of potential contamination of inorganic and organic chemicals (including HE) at the drainline and outfall has not been defined because metals were detected at concentrations greater than BVs and a number of organic chemicals were detected in surface and subsurface samples associated with this SWMU. All detections of organic and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-025(h2) (section 7.9.4).

Consolidated Unit 16-029(h2)-99 Sumps [SWMUs 16-029(m), 16-029(n), 16-029(o), and 16-029(p)]

Because no historical sampling has been conducted at the sumps associated with the GMX-3 area [SWMUs 16-029(m), 16-029(n), 16-029(o), and 16-029(p)], the nature and extent of potential

contamination at these sites are not known. Additional sampling is proposed to define the nature and extent of potential contamination at SWMUs 16-029(m), 16-029(n), 16-029(o), and 16-029(p) (section 7.9.4).

Consolidated Unit 16-029(q)-99

SWMU 16-017(f)-99

Based on the historical sampling performed at SWMU 16-017(f)-99, the lateral extent of potential contamination has not been defined in this SWMU. The vertical extent of potential contamination of inorganic and organic chemicals has not been defined because metals were detected at concentrations greater than BVs, and a number of organic chemicals were detected in subsurface samples associated with this site. All detections of organic and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-017(f)-99 (section 7.9.4).

SWMU 16-017(u)-99

Because no samples have been collected from SWMU 16-017(u)-99, the nature and extent of potential contamination at this SMWU are not known.

SWMU 16-029(q)

Based on the historical sampling performed at SWMU 16-029(q), the lateral extent of potential contamination has not been defined in the SWMU. The vertical extent of potential contamination of inorganic and organic chemicals has not been defined because a number of metals were detected at concentrations greater than BVs, and a number of organic chemicals were detected in surface and subsurface samples associated with this site. All detections of organic and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the vertical extent of inorganic and organic chemicals at SWMU 16-029(q) (section 7.9.4).

SWMU 16-017(u)-99

Because no historical sampling has been conducted at SWMU 16-017(u)-99, the nature and extent of potential contamination at this site are unknown. Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 16-017(u)-99 (section 7.9.4).

AOC C-16-064

One confirmation sample was collected from AOC C-16-064 after the soil removal. The sample had detections of inorganic chemicals greater than BVs in the surface sample, and none exceeded BVs in the subsurface depth. No organic chemicals were detected, nor were radionuclides detected greater than BVs of FVs in either depth interval. However, the AOC area is approximately 2500 ft^2 and the lateral and vertical extent of potential contamination at this site are not known. All detections of inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional samples are proposed to define the nature and extent of potential contamination at AOC C-16-064 (section 7.9.4).

7.8.2.3 Conceptual Site Model

The CSM for the GMX-3 HE-machining facilities, Consolidated Units 16-029(h2)-99 and 16-029(q)-99, includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for Consolidated Units 16-029(h2)-99 and 16-029(q)-99.

Source of Contamination

Potential contamination at the HE-machining facilities, Consolidated Units 16-029(h2)-99 and 16-029(q)-99, originated from releases of HE (and analytes included in the HE, such as barium) that occurred during machining operations, building washout, sump overflow, or accidental releases. The COPCs include inorganic chemicals (especially barium), SVOCs, and HE.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for Consolidated Units 16-029(h2)-99 and 16-029(q)-99 are summarized in section 1.1.1.

7.8.2.4 Summary and Additional Data/Corrective Action Requirements

Previous site investigations at Consolidated Unit 16-029(h2)-99 have documented the presence in surface and subsurface soil of inorganic and organic chemicals at some of the former machining buildings, drainline, and outfall. No historical sampling has been conducted at the locations of the former sumps serving the machining buildings. The following additional data are required to determine the nature and extent of contamination at Consolidated Unit 16-029(h2)-99:

- Vertical extent of potential contamination of inorganic and organic chemicals has not been defined in the consolidated unit. Additional sampling is proposed to address this data requirement.
- The nature and extent of potential contamination of inorganic and organic chemicals have not been defined at the locations of the former sumps. Additional sampling is proposed to address this data requirement.

Previous site investigations at Consolidated Unit 16-029(q)-99 have documented the presence in surface and subsurface soil of inorganic and organic chemicals at some of the former machining building and drainline. No historical sampling has been conducted at the location of the former storage building adjacent to the machining building or the former drum storage area. The following additional data are required to determine the nature and extent of contamination at Consolidated Unit 16-029(h2)-99:

- The vertical extent of potential contamination of inorganic and organic chemicals has not been defined in the consolidated unit. Additional sampling is proposed to address this data requirement.
- The nature and extent of potential contamination have not been defined at the location of the former storage building. Additional sampling is proposed to address this data requirement.
- The nature and extent of potential contamination have not been defined at the location of the former drum storage area. Additional sampling is proposed to address this data requirement.

The sampling proposed to define the nature and extent of potential contamination at Consolidated Units 16-029(h2)-99 and 16-029(q)-99 is detailed in section 7.9.4.

7.9 Scope of Investigation Activities

Radiological Survey

All work at Subaggregate 6 will be preceded by a surface radiological walkover survey capable of detecting the presence of beta and gamma radioactivity. Radiological survey results will be used to address potential worker safety and protection issues as well as target sampling locations requiring focused laboratory analysis of radionuclides. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

7.9.1 Septic Tank: SWMU 16-005(n)

The proposed sampling locations at SWMU 16-005(n) are shown in Figure 7.9-1. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 7.9-1. The analytical suites proposed for SWMU 16-005(n) follow the general laboratory analytical strategy for septic tanks, as presented in Table 2.9-1. Corrective action and sampling at SWMU 16-005(n) will include the following.

Excavation

The inactive septic tank at SWMU 16-005(n) probably measures 5 ft long x 4 ft wide x 4 ft deep with a capacity of 600 gal. The inactive septic tank and drainline will be excavated to determine its configuration and whether it discharged to an outfall or leach field/seepage pit. Given the location and topography in the vicinity of the site, no obvious drainage channel for the discharge was observed (Figure 7.8-1), and a leach field or seepage pit may be present. Once they are located, the septic tank will be removed and disposed of. The drainline will be abandoned in place.

Confirmatory and Nature and Extent Sampling

Sampling at SWMU 16-005(n) will include the following.

- *Confirmatory sampling.* Following excavation activities, confirmatory soil samples will be collected from one location at the bottom of the excavation (1), at depths of 5–5.5 ft into the tuff,10–10.5 ft into the tuff and 15–15.5 ft into the tuff (Figure 7.9-1). Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. And screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods after the excavation has been backfilled.
- *Sampling to define nature and extent in possible leach field or seepage pit.* Surface and shallow subsurface soil and tuff samples will be collected at one location within the center of the leach field, if identified. Samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff (Figure 7.9-1). Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. If a seepage pit is identified, one borehole will be drilled adjacent to the seepage pit. The borehole will be drilled 5 ft beyond the bottom of the seepage pit (if it can be determined). Tuff samples will be collected and screened for radioactivity and VOCs (see section 12) every 5 ft bgs to the TD of the borehole. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive

compounds, VOCs, and SVOCs and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

7.9.2 HE Storage Magazines: SWMU 16-017(g)-99 and AOC 16-024(b)

The proposed sampling locations at SWMU 16-017(g)-99 and AOC 16-024(b) are shown in Figure 7.9-2. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 7.9-1. The analytical suites proposed for SWMU 16-017(g)-99 and AOC 16-024(b) follow the general laboratory analytical strategy for HE storage magazines, as presented in Table 2.9-1. Sampling at SWMU 16-017(g)-99 and AOC 16-024(b) will include the following.

SWMU 16-017(g)-99

- *Nature and extent sampling within the footprint of the former magazine building [SWMU 16-017(g)-99].* Surface and shallow subsurface soil and tuff samples will be collected at five locations (1 through 5) surrounding and within the footprint of the former magazine structure 16-80 (Figure 7.9-2). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for nitrates, perchlorate, TAL metals, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger

AOC 16-024(b)

- *Nature and extent sampling within the footprint of the former magazine building [AOC 16-024(b)].* Surface and shallow subsurface soil and tuff samples will be collected at five locations (6 through and 10) surrounding, and within, the footprint of the former magazine structure 16-74 (Figure 7.9-2). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for nitrates, perchlorate, TAL metals, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

7.9.3 Radiography Buildings: SWMUs 16-025(a) and 16-025(b)

The proposed sampling locations at SWMUs 16-025(a) and 16-025(b) are shown in Figure 7.9-2. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 7.9-1. The analytical suites proposed for SWMUs 16-025(a) and 16-025(b) follow the general laboratory analytical strategy for radiography buildings, as presented in Table 2.9-1. Sampling at SWMUs 16-025(a) and 16-025(b) will include the following.

- *Nature and extent sampling within the footprint of the former radiography building [SWMU 16-025(a)].* Surface and shallow subsurface soil and tuff samples will be collected at

five locations (11 through 15) surrounding and within the footprint of the former radiography building 16-39 (Figure 7.9-2). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, cyanide, perchlorate, TAL metals, SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

- *Nature and extent sampling within the footprint of the former radiography building [SWMU 16-025(b)].* Surface and shallow subsurface soil and tuff samples will be collected at five locations (16 through 20) surrounding and within the footprint of the former radiography building 16-40 (Figure 7.9-2). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for pH, cyanide, perchlorate, TAL metals, SVOCs, and explosive compounds and will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

7.9.4 HE-Machining Buildings and Associated Structures: Consolidated Units 16-029(h2)-99, 16-029(q)-99

The proposed sampling locations at Consolidated Units 16-029(h2)-99 and 16-029(q)-99 are shown in Figure 7.9-3. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 7.9-1. The analytical suites proposed for Consolidated Units 16-029(h2)-99 and 16-029(q)-99 follow the general laboratory analytical strategy for HE-machining buildings, as presented in Table 2.9-1. Sampling at Consolidated Units 16-029(h2)-99 and 16-029(q)-99 is described in this section.

Consolidated Unit 16-029(h2)-99

SWMU 16-025(d)

- *Nature and extent sampling within the footprint of the former building [SWMU 16-025(d)].* Surface and shallow subsurface soil and tuff samples will be collected at one location within the footprint of the former building 16-94 (1) to determine the extent of metals contamination (Figure 7.9-3). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 16-025(g)

- *Nature and extent sampling within the footprint of the former HE-machining building [SWMU 16-025(g)].* Shallow subsurface tuff samples will be collected at historical sampling

location 16-04124 within the footprint of the former building 16-95 to determine the extent of metals contamination (Figure 7.9-3). The samples will be collected from depths of 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Samples will be analyzed for TAL metals and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 16-025(h)

- *Nature and extent sampling within the footprint of the former HE-machining building [SWMU 16-025(h)].* Shallow subsurface tuff samples will be collected from the historical sampling location 16-04132 within the footprint of the former building 16-96 (Figure 7.9-3). The samples will be collected from depths of 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Samples will be analyzed for TAL metals, SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 16-029(h2)

- *Sampling to define nature and extent along the outfall drainage [SWMU 16-029(h2)].* Surface and shallow subsurface soil and tuff samples will be collected at one location in the northern drainage channel (3) and from four locations in the eastern drainage channel (4 through 7) from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff (Figure 7.9-3). Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Shallow subsurface tuff samples will be collected at historical sampling locations 16-03381, 16-03386, 16-03388, 16-03393, and 16-03396 from depths of 1.5–2 ft into the tuff and 2.5–3 ft into the tuff. Samples will be analyzed for TAL metals, SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 16-025(i)

- *Nature and extent sampling within the footprint of the former HE-machining building [SWMU 16-025(i)].* Surface and shallow subsurface soil and tuff samples will be collected at one location (2) within the footprint of the former building (Figure 7.9-3). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 16-025(j)

- *Nature and extent sampling within the footprint of the former HE-machining building [SWMU 16-025(j)].* Shallow subsurface tuff samples will be collected at the historical sampling location 16-04115 within the footprint of the former building (Figure 7.9-3). The samples will be collected from depths of 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Samples will be analyzed for TAL metals, SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 16-029(m)

- *Nature and extent sampling at the former sump [SWMU 16-029(m)].* Surface and shallow subsurface soil and tuff samples will be collected at one borehole location (8) in the former sump location (Figure 7.9-3). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, 5–5.5 ft into the tuff, and 10–10.5 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (except surface sample), SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods

SWMU 16-029(n)

- *Nature and extent sampling at the former sump [SWMU 16-029(n)].* Surface and shallow subsurface soil and tuff samples will be collected at one borehole location (9) in the former sump location (Figure 7.9-3). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, 5–5.5 ft into the tuff, and 10–10.5 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (except surface sample), SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods

SWMU 16-029(o)

- *Nature and extent sampling at the former sump [SWMU 16-029(o)].* Surface and shallow subsurface soil and tuff samples will be collected at one borehole location (10) in the former sump location (Figure 7.9-3). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, 5–5.5 ft into the tuff, and 10–10.5 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (except surface sample), SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

SWMU 16-029(p)

- *Nature and extent sampling at the former sump [SWMU 16-029(p)].* Surface and shallow subsurface soil and tuff samples will be collected at one borehole location (11) in the former sump location (Figure 7.9-3). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, 5–5.5 ft into the tuff, and 10–10.5 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (except surface sample), SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

Consolidated Unit 16-029(q)-99

SWMU 16-017(f)-99

- *Nature and extent sampling within the footprint of the former HE-processing building [SWMU 16-017(f)-99].* Surface and shallow subsurface soil and tuff samples will be collected at four locations (26 through 29) within the footprint of the former building 16-99 (Figure 7.9-2) from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (except surface sample), SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 16-017(u)-99

- *Nature and extent sampling within the footprint of the former storage building [SWMU 16-017(u)-99].* Surface and shallow subsurface soil and tuff samples will be collected at five locations (21 through 25) within the footprint of the former storage building (Figure 7.9-2). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for pH, nitrates, perchlorate, TAL metals, VOCs (except surface sample), SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 16-029(q)

- *Nature and extent sampling at the former sump [SWMU 16-029(q)].* Surface and shallow subsurface soil and tuff samples will be collected at seven borehole locations (30 through 36) in the former sump location, subsurface drainline, and drainage channel (Figure 7.9-2). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, 5–5.5 ft into the tuff, and 10–10.5 ft into the tuff. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (except surface sample), SVOCs, and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma

spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

AOC C-16-064

- *Nature and extent sampling within the footprint of the former HE-scrap drum storage area (AOC C-16-064).* Surface and shallow subsurface soil and tuff samples will be collected at four locations (37 through 40) within the footprint of the drum storage area (Figure 7.9-2). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals and explosive compounds and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

8.0 SUBAGGREGATE 7: TA-16-280/260 COMPLEXES

Subaggregate 7, the TA-16-280/260 Complexes, consists of two consolidated units, five SWMUs, and five AOCs, including sumps, drainlines, outfalls, and potentially contaminated soil for HE processing buildings 16-260 (exclusive of the main HE-machining outfall) and 16-280 (Figure 1.1-8). Building 16-280 is a physical inspection and metrology laboratory for HE and other weapons components. Building 16-280 also serves as a staging facility for assembling test device components. Building 16-260 is an HE-machining facility that processes large amounts of explosives. This subaggregate includes the 16-280 outfalls [SWMU 16-026(g) and Consolidated Unit 16-003(h)-99, which contains SWMU 16-003(h) and AOC 16-030(d)], the 16-260 outfalls [Consolidated Unit 16-029(j)-99, which contains SWMUs 16-003(i) and 16-003(j)], the Cooling Tower [SWMU 16-031(b) and AOC C-16-002], USTs [AOCs 16-033(g) and 16-033(h)], and a transformer [AOC 16-027(a)] (Figure 1.1-8).

AOC 16-027(a) is a PCB leak from a transformer located in equipment room 110 within building 16-260, which is proposed for no further investigation or corrective action. Information regarding this AOC is provided in Appendix B.

8.1 Surface Conditions

The TA-16-280/260 Complexes are located in the central portion of TA-16, approximately 600 ft south of Cañon de Valle and approximately 4400 ft north of Water Canyon. Elevations at Subaggregate 7 range from 7600 to 7500 ft amsl. The topography of the subaggregate itself has a gentle, 2- to 5-degree slope to the northeast toward a tributary to Cañon de Valle. SWMU 16-021(c) is an outfall that terminates in this tributary.

A small area of the southeastern corner of Subaggregate 7 burned at a moderate level in the 2000 Cerro Grande fire, but the adjacent area was affected only slightly, if at all.

The surface vegetation community of the Cañon de Valle Aggregate Area is described in section 2.1.

8.2 Surface Water

Section 2.2 presents a TA-16-wide discussion of surface water. A monitoring station, located northeast of Subaggregate 7 to evaluate TA-16-021(c), is listed in Table 2.2-1 (CDV-SMA-2).

Monitoring station CDV-SMA-2 is not located where its results could represent those SWMUs in Subaggregate 7 addressed in this work plan. No water sample was collected from CDV-SMA-2 in 2005 (LANL 2006, 92600, Attachment 2, Table B-1).

8.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3.

8.4 Subsurface Conditions

8.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.1.

8.4.2 Cliff Retreat and Fractures

Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

8.4.3 Hydrogeology

The hydrogeology of the Cañon de Valle Aggregate Area is discussed in section 2.4.3. Well R-26 is located approximately 2910 ft northwest of Subaggregate 7. Wells R-25 and CdV-16-1(i) are located approximately 2323 ft east and northeast, respectively, of this subaggregate (Plate 1). Subaggregate 7 lies near these three wells, all of which contain a thick perched zone located between 563 ft and 723 ft bgs. Well R-26 also contains a higher zone of perched water at 173 ft bgs that appears to be associated with low-angle platy fractures in the ash-flow tuff (LANL 2005, 92028, pp. 2-B-11). The presence, location, and depth of a perched zone directly beneath the TA-16-280/260 Complexes remain unknown. However, ephemeral perched water was encountered in well location 02712 near the 21-016(c)-99 outfall (the 260 Outfall) (LANL 2003, 77965).

8.5 280 Outfalls: Consolidated Unit 16-003(h)-99 and SWMU 16-026(g)

Building 16-280 is active physical inspection and metrology laboratory for HE and other weapons components as well as a staging facility for assembling test device components (LANL 1993, 20948, p. 5-30). The 16-280 outfalls consist of Consolidated Unit 16-003(h)-99 [SWMU 16-003(h) and AOC 16-030(d)] and SWMU 16-026(g).

8.5.1 Site Description and Operational History

Consolidated Unit 16-003(h)-99 includes one inactive HE sumps and drainlines [SWMU 16-003(h)], and outfall [AOC 16-030(d)] associated with building 16-280, which served as a physical inspection and metrology laboratory and staging facility for HE and other weapons components associated with the S-Site complex (LANL 1993, 20948, p. 5-30). Both natural and depleted uranium were handled and inspected on the first floor of building 16-280, which was built in 1951 (LANL 1995, 57225, p. 6-15). No

mechanical processing (e.g., machining) were performed, and no explosive or radioactive scrap was produced (LANL 1993, 20948, p. 5-30).

Each building in the S-Site complex was designed with a specific role in the HE-component fabricating process. In general, operations have not changed materially since the early 1950s. However, the nature and quantity of explosives used in each building has changed. The principal change in HE formulation is a decreased emphasis on cast explosives, such as Composition B, and since the 1950s, an increased reliance on plastic-bonded explosives. Volumes of HE processed have also decreased significantly since the 1950s (LANL 1993, 20948, p. 5-18).

SWMU 16-003(h) was a single sump located at building 16-280 that has been plugged. At the time the 1993 RFI work plan was prepared, the sump had not been plugged (LANL 1993, 20948, p. 5-17). The sump was constructed in the early 1950s and modified in 1966 (engineering drawing ENG-C 34240, LANL 1993, 20948, p. 5-18). The HE sumps remove suspended solids from process wastewater before it discharged to an outfall [the outfall for this sump is AOC 16-030(d)]. Process water is used as a coolant-lubricant in the machining of HE to clean contaminated parts and equipment and to wash down processing bays. The HE-contaminated water is routed to the sumps through drain troughs in the floor of the process bay. Scraps produced are collected from the sumps and treated at the S-Site burning ground; the water is filtered and tested before it is discharged to an outfall. The HE sumps are rectangular concrete tanks with removable 0.25-in. aluminum lids. Typically, a sump is approximately 12 ft long, 4 ft wide, and 5 ft high. The walls and bottom are 8-in.-thick steel-reinforced concrete. When the sump was initially constructed, HE scraps were collected in a cloth filter bag secured inside a metal filter basket. The baskets and filter bags were periodically collected and cleaned at the basket filter wash facility (building 16-390), located at the TA-16 Burning Ground. HE scraps too small to be collected by the filter bags settled to the bottom of the sump. To facilitate separation of the suspended solids, the water flowed under an aluminum baffle and over a concrete weir before it discharged to the outfall. The HE scraps that collected in the bottom of the sump were periodically removed and burned (LANL 1993, 20948, p. 5-18). In the mid-1960s, water-tight aluminum tanks were installed in the sumps, eliminating the filter baskets and cloth bags. Each tank has 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 (SWMU 16-010) at the TA-16 Burning Ground (LANL 1993, 20948, p. 5-19).

The sump [SWMU 16-003(h)] received effluent from both a room, in which HE testing (density measurements) was conducted, and two roof drains (LANL 1993, 20948, p. 5-28). Solvents may have been discharged to the sump (LANL 1993, 20948, p. 5-20). SWMU 16-003(h) connected to the outfall [AOC 16-030(d)] by a 117-in.-long, 15-in.-diameter VCP (engineering drawing 13Y-192113 ENG-R870, LANL 1993, 20948, p. 5-20). The 1990 SWMU report lists the dimensions of SWMU 16-003(h) as 117 in. by 41 in. by 31 in. (LANL 1990, 07512, 16-003 summary).

AOC 16-030(d) was NPDES-permitted, number 05A-061, and was removed from the Laboratory NPDES permit effective July 31, 1996. Solvents historically may have been discharged to the sump, but at the time the OU 1082 work plan was prepared, solvents were containerized for off-site disposal. No other effluent sources were discharged to the outfall (LANL 1993, 20948, p. 5-30).

SWMU 16-026(g) is potentially contaminated soil associated with an outfall from building 16-280, with a 6-in. VCP drainline that daylights 300 ft northeast of building 16-280. According to engineering drawing ENG-C 4115, the outfall received effluent from four equipment room drains and five floor drains in the basement (LANL 1995, 57225, p. 6-15). The floor drains are plugged. The basement has always been used as a utility room for pumps and compressors and was also designated as an emergency fallout shelter (LANL 1995, 57225, p. 6-16). The first floor and the basement are not connected to each other and have separate entrances. No hazardous materials are stored in the basement (LANL 1995, 57225,

p. 6-15). According to the 1995 RFI work plan, the only potential contaminant that could enter the drain was pump oil, typically mineral oil containing no hazardous constituents (LANL 1995, 57225, p. 6-15). There are no records of oil spills or releases to the drains leading to SWMU 16-026(g).

8.5.2 Historical Investigations

During the 1995 RFI activities, 24 samples from 16 locations were collected from the surface to a depth of 5.5 ft bgs and field screened for gross gamma radiation using an NaI detector (ICF Kaiser 1995, 91135, p. 66). Details of the field calibration and background gamma radiation levels are not available. The field-screening results are presented in Appendix D of the HIR (LANL 2006, 91697).

Based upon the screening samples, a total of 11 samples from 7 locations (9 surface and 2 subsurface samples) were collected from the 280 outfalls during the 1995 RFI activities (ICF Kaiser 1995, 91135, p. 66). Laboratory analyses included inorganic chemicals, cyanide (total), HE, SVOCs, and VOCs (Table 8.5-1, Figure 8.5-1).

8.5.2.1 Analytical Results

The results of the 1995 RFI sampling are presented in Table 8.5-2 and Figure 8.5-2 for inorganic chemicals and Table 8.5-3 and Figure 8.5-3 for organic chemicals.

A number of inorganic chemicals were detected at concentrations greater than BVs in the surface and subsurface samples from the 16-280 outfalls, most widely, uranium and zinc (Table 8.5-2, Figure 8.5-2). The DLs for antimony, cadmium, cyanide (total), mercury, and silver were greater than the BVs in some or all of the samples.

A number of organic chemicals, most notably PAHs, were detected in surface and subsurface samples from the 280 outfalls (Table 8.5-3, Figure 8.5-3). Five HE were detected in surface and subsurface samples from the 280 outfalls (Table 8.5-3, Figure 8.5-3).

8.5.2.2 Nature and Extent of Contamination

Inorganic chemicals were detected at most sampling locations at decreasing concentrations with increasing depth and increasing distance from building 16-280, the nature and extent of inorganic chemicals is not defined . HE contamination has been defined for the 280 outfalls (Figures 8.5-2 and 8.5-3). Concentrations of PAHs did not decrease with depth, although the concentrations decrease with increasing distance from building 16-280 (Figure 8.5-3). The nature and extent of organic chemicals, primarily PAHs, have not been defined for the 280 outfalls. All detections of organic and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1), with the exception of benzo(a)anthracene in three samples; benzo(a)pyrene in three samples; benzo(b)fluoranthene in three samples; benzo(k)fluoranthene in one sample; dibenz(a,h)anthracene in three samples; and indeno(1,2,3-cd)pyrene in three samples. Additional sampling is proposed to determine extent of inorganic chemicals and PAH contamination at the 280 outfalls (section 8.9.1). No historical samples have been analyzed for pH, perchlorate, or nitrates. Field-screening analyses of gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI (field-screening data are summarized in Appendix D of the HIR [LANL 2006, 91697]). Historical screening-level data have not been used to augment the proposed sampling locations in this work plan. Samples were previously only screened using the HE spot test. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan.

8.5.2.3 Conceptual Site Model

The CSM for the 280 outfalls includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for these outfalls.

Source of Contamination

Contamination at the outfalls results directly from effluents released from the building 16-280 processes. The COPCs included inorganic chemicals, HE, uranium, perchlorate, and organic solvents (SVOCs).

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for the 16-280 outfalls are summarized in section 1.1.1.

8.5.2.4 Summary of Additional Data/Corrective Action Requirements

The lateral and vertical extent of inorganic chemicals and PAHs and possibly other SVOCs have not been defined by the historical sampling performed at the 280 outfalls. No data have been collected for pH, perchlorate, or nitrates. The lateral and vertical extent of other potential contaminants related to operations conducted at building 16-280 (HE, organic solvents [VOCs], and uranium) was defined in the historical sampling conducted at the site. No operations-related chemicals were detected in the deepest samples collected at the site (5.5 ft bgs). Additional sampling is proposed to define the lateral and vertical extent of inorganic chemicals and PAHs at the 280 outfalls (section 8.9.1).

8.6 260 Outfalls: Consolidated Unit 16-029(j)-99 [SWMUs 16-026(k2) and 16-029(j)], SWMUs 16-003(i) and 16-003(j)

Building 16-260 is an HE-machining building, constructed in the early 1950s and located in the northeastern quadrant of historical S-Site. S-Site was used for HE processing from 1944 to the early 1950s.

8.6.1 Site Description and Operational History

Consolidated Unit 16-029(j)-99 consists of SWMUs 16-026(k2) and 16-029(j). The SWMUs are areas of potentially contaminated soil associated with outfalls from inactive sumps and drainlines that serviced Bay 25 at building 16-260.

SWMU 16-026(k2) was an outfall that received wash-down water contaminated with HE from a floor drain and associated drainline in the hallway between the machining room in Bay 25 and the control room for Bay 25 in the southern portion of building 16-260. The floor drain is located directly below a water hose that is used to wash down the bays. No other drains are located near bays in building 16-260. The drain has not been plugged. The drainline, composed of 4-in. VCP, daylights in a drainage ditch about 15 ft south of building 16-260. The drainage ditch is connected by two culverts to the drainage ditches on the north side of a walkway (structure 16-271) and to the drainage ditch on the east side of the road. The ditches drain rainwater away from building 16-260, but the drainage ditch is heavily silted and the corrugated metal culvert is barely visible.

SWMU 16-029(j) was an outfall that received wash-down water from cleaning activities in the control cubicle of machining Bay 25. The wash-down water was discharged from a concrete sump that was

added to building 16-260 in 1961. The sump measured 4 ft^3 and contained a 1 ft^3 filter basket for collecting HE. The drain from the sump is a 2-in. cast-iron pipe. The drainline extends about 10 ft south from building 16-260 and daylights into a grassy ditch 15 ft south of building 16-260, the same ditch into which the drainline from SWMU 16-026(k2) discharges. Use of the sump was discontinued in 1970 and plugged. Although the drainline is not plugged, the cubicle is no longer used for HE patching operations.

SWMUs 16-003(i) and 16-003(j) are inactive sumps with attached concrete trenches and outfalls associated with buildings 16-265 and 16-267, respectively (LANL 1993, 20948, pp. 5-17, 5-30). Buildings 16-265 and 16-267 are used to assemble HE products machined in building 16-260, including activities such as gluing together components and building small subassemblies. The buildings were originally used as rest houses but were converted for in-line assembly work (date of conversion unknown). In 1966, according to engineering drawing ENG-C34241, concrete drainlines (76 in. long, 16 in. wide, and 6 in. deep) were added to the sumps (LANL 1993, 20948, pp. 5-30–5-31). The outfalls drained to the gutter adjacent to the road in front of the buildings. The sumps are now plugged. Potential wastes discharged to the sumps include HE and solvents. The 1993 RFI work plan indicates that small-to-moderate amounts of hazardous materials may have been released to the environment but provides no specifics on the materials, volume, or time period of such releases (LANL 1993, 20948, p. 5-30).

SWMU 16-003(i) is an inactive plugged HE sump associated with building 16-265 (LANL 1993, 20948, pp. 5-17, 5-31). The sump received effluent from a sink and drinking fountain (LANL 1993, 20948, p. 5-31). It discharged to a NPDES-permitted outfall, numbered 05A-057 (LANL 1993, 20948, Table 5-4), which was removed from the Laboratory's NPDES permit sometime before 1994. According to a 1955 report, two chemicals (1,1,1-trichloroethane and chloromaleic anhydride) were used in building 16-265 (LANL 1993, 20948, p. 5-31).

SWMU 16-003(j) is an inactive plugged HE sump associated with building 16-267 (LANL 1993, 20948, pp. 5-17, 5-31). The sump received effluent from a janitorial sink and discharged to a NPDES-permitted outfall, numbered 05A-149 (LANL 1993, 20948, Table 5-4), which was removed from the Laboratory's NPDES permit sometime before 1994. Uranium particulate matter may have been discharged from this sump (LANL 1993, 20948, p. 5-30).

8.6.2 Historical Investigations

During the 1995 RFI activities, 21 samples from 12 locations were collected from the surface to a depth of 16 ft bgs and field screened for gross gamma radiation using an NaI detector (ICF Kaiser 1995, 91135, pp. 68–70). Details of the field calibration and background gamma radiation levels are not available. The field-screening results are presented in Appendix D of the HIR (LANL 2006, 91697).

Based on the field-screening results, samples were collected from SWMUs 16-003(i) and 16-003(j), associated with the 260 outfalls (Table 8.6-1 and Figure 8.6-1).

A total of 11 surface and subsurface samples from 7 locations were collected from SWMU 16-003(i) and analyzed for inorganic chemicals, cyanide (total), HE, SVOCs, and VOCs (Table 8.6-1 and Figure 8.6-1).

A total of 11 surface and subsurface samples from 7 locations were collected at SWMU 16-003(j) and analyzed for inorganic chemicals, cyanide (total), HE, SVOCs, and VOCs (Table 8.6-1 and Figure 8.6-1).

8.6.2.1 Analytical Results

The results of the RFI sampling of the 16-260 outfalls are presented in Table 8.6-2 and Figure 8.6-2 for inorganic chemicals and Table 8.6-3 and Figure 8.6-3 for organic chemicals.

SWMU 16-003(i)

A number of inorganic chemicals were detected at concentrations greater than BVs in the surface and subsurface samples from SWMU 16-003(i), but the most prevalent were uranium and zinc (Table 8.6-2, Figure 8.6-2). The DLs for antimony, cadmium, cyanide (total), and selenium were greater than the BVs in some or all of the samples.

A number of organic chemicals, most notably PAHs, were detected in surface and subsurface samples from SWMU 16-003(i) (Table 8.6-3, Figure 8.6-3).

SWMU 16-003(j)

A number of inorganic chemicals were detected at concentrations greater than BVs in the surface and subsurface samples from SWMU 16-003(j), but the most prevalent were uranium and zinc (Table 8.6-2, Figure 8.6-2). The DLs for antimony, cadmium, cyanide (total), and selenium were greater than the BVs in some or all of the samples.

A number of organic chemicals, most notably PAHs, were detected in surface and subsurface samples from SWMU 16-003(j) (Table 8.6-3, Figure 8.6-3). HE were not detected in these samples.

8.6.2.2 Nature and Extent of Contamination

SWMUs 16-003(i) and 16-003(j)

Inorganic chemicals including uranium were generally detected at decreasing concentrations with increasing depth and increasing distance from buildings 16-265 and 16-267. However, because the trend was not observed at all locations, the vertical extent of inorganic chemical contamination has not been defined for these outfalls (Figures 8.5-2 and 8.5-3). The lateral and vertical extent of HE contamination have been defined in these SWMUs. Concentrations of PAHs decreased with depth but did not decrease with increasing distance from buildings 16-265 and 16-267 (Figure 8.5-3), indicating that nature and extent of PAHs have not been defined for these outfalls. All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). No historical samples have been analyzed for pH, perchlorate, or nitrates. Additional sampling is proposed to determine extent of inorganic chemicals (including uranium and, perchlorate) and PAH contamination at SWMUs 16-003(i) and 16-003(j) (section 8.9.2). Field-screening analyses of gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI (the field-screening data are summarized in Appendix D of the HIR [LANL 2006, 91697]). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. Samples were previously screened only using the HE spot test. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan.

Consolidated Unit 16-029(j)-99 [SWMUs 16-026(k2) and 16-029(j)]

Because no samples have been collected from Consolidated Unit 16-029(j)-99, the nature and extent of potential contamination at this site are not known. Additional sampling is proposed to determine nature and extent of potential contamination at Consolidated Unit 16-029(j)-99 (section 8.9.2).

8.6.2.3 Conceptual Site Model

The CSM for the 260 outfalls includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for these outfalls.

Source of Contamination

Contamination at these outfalls results directly from the effluents released from the processes at building 16-260. Potential contaminants include HE, uranium, inorganic chemicals (including perchlorate) VOCs, and SVOCs.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for the 260 outfalls are summarized in section 1.1.1.

8.6.2.4 Summary of Additional Data/Corrective Action Requirements

The lateral extent of inorganic chemicals (including uranium) and PAHs has not been defined by the historical sampling performed at the 260 outfalls associated with the sumps [SWMUs 16-003(i) and 16-003(j)]. The lateral and vertical extent of COPCs related to operations at buildings 16-265 and 16-267 (HE and non-PAH organic chemicals) were defined in the historical sampling conducted at the site (detections are limited in surface and near-surface soil samples); notably, no HE were detected in the historical samples collected at the site. Additional sampling is proposed to define the lateral and vertical extent of inorganic chemicals (including uranium and perchlorate) and PAHs.

No historical sampling has been conducted at the outfalls associated with Bay 25, Consolidated Unit 16-029(j)-99 [SWMUs 16-026(j) and 16-026(k2)]. Additional sampling is proposed to define the nature and extent of contamination at these SWMUs.

8.7 Cooling Tower: SWMU 16-031(b) and AOC C-16-002

SWMU 16-031(b) and AOC C-16-002 are sites associated with a demolished cooling tower, structure 16-262 (LANL 1995, 57225, p. 5-28-1). The cooling tower was built in 1946 at building 16-42 and relocated to building 16-260 in 1951. The cooling tower, associated with building 16-260 (LANL 1995, 57225, p. 5-28-17), contained closed-cycle water lines and may have provided coolant for equipment. The cooling tower was located about 50 ft north of a walkway (structure 16-269) and 12 ft west of building 16-260. Removed in 1957, it was made of wood and was situated on a 3-ft-high concrete base. Chemicals commonly associated with cooling towers are algae growth inhibitors, such as chromates; however, no documentation verifies that such chemicals had been used (LANL 1995, 57225, p. 5-28-15). Remains of the tower include a pile of rubble and two 2-in. cast-iron pipes that discharge into a drainage ditch. The use of the cooling tower, period of operation, and chemicals used are not specified.

8.7.1 Site Description and Operational History

SWMU 16-031(b) is an area of potentially contaminated soil associated with the structure 16-262 outfall (LANL 1995, 57225, p. 5-28-1).

AOC C-16-002 is potentially contaminated soil and rubble in the footprint of a demolished cooling tower (structure 16-262) that served an HE-machining building (building 16-260) (LANL 1995, 57225, p. 5-28-1).

8.7.2 Historical Investigations

No samples have been collected from SWMU 16-031(b) or AOC C-16-002.

8.7.2.1 Analytical Results

No samples have been collected from SWMU 16-031(b) or AOC C-16-002.

8.7.2.2 Nature and Extent of Contamination

Because no samples have been collected from SWMU 16-031(b) or AOC C-16-002, the nature and extent of potential contamination at these sites are not known. Sampling is proposed to determine the nature and extent of potential contamination of SWMU 16-031(b) and AOC C-16-002 (section 8.9.3).

8.7.2.3 Conceptual Site Model

The CSM for SWMU 16-031(b) and AOC C-16-002 includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for the former cooling tower site.

Source of Contamination

No known hazardous materials have been documented at SWMU 16-031(b) and AOC C-16-002. However, chromates used to treat the water contained in the cooling towers may have spilled at the site.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 16-031(b) and AOC C-16-002 are summarized in section 1.1.1.

8.7.2.4 Summary of Additional Data/Corrective Action Requirements

Sampling is proposed to investigate the nature and extent of contamination within the footprint of structure 16-262 (AOC C-16-002), the former cooling tower, and the outfall location of the cooling tower effluent [SWMU 16-031(b)]. No historical sampling has been conducted at either SWMU 16-031(b) or AOC C-16-002.

8.8 Underground Storage Tanks: AOCs 16-033(g) and 16-033(h)

8.8.1 Site Description and Operational History

AOC 16-033(g) is an oil tank of unknown capacity, structure 16-1138, that served building 16-260. The UST was installed in February 1951 and removed at an unknown date, possibly in 1967 (LANL 1995, 57225, p. 5-38). The tank was used for only a short period and abandoned in place in July 1951 when building 16-260 was connected to the main TA-16 steam line (LANL 1995, 57225, p. 5-39). Presumably, the tank was used temporarily for heating during the construction of building 16-260. The tank was found to be free of radioactivity and toxic contamination before removal (Buckland 1967, 05342). No visible evidence of the UST was found when the second addendum to the RFI work plan for OU 1082 was being prepared, and preliminary site screening with a metal detector did not indicate the presence of a tank (LANL 1995, 57225, p. 5-39).

AOC 16-033(h) is an oil tank of unknown capacity, structure 16-1139, that served building 16-260. The UST was installed in February 1951 and removed at an unknown date, possibly in 1967. The tank was used for only a short period and abandoned in place in July 1951 when building 16-260 was connected to the main steam line (LANL 1995, 57225, p. 5-39). Presumably, the tank was used temporarily for heating during the construction of building 16-260. It was found to be free of radioactivity and toxic contamination before removal (Buckland 1967, 05342). No visible evidence of the UST was found when the second addendum to the RFI work plan for OU 1082 was being prepared, and preliminary site screening with a metal detector did not indicate the presence of a tank (LANL 1995, 57225, p. 5-39).

8.8.2 Historical Investigations

No samples have been collected from AOCs 16-033(g) and 16-033(h).

8.8.2.1 Analytical Results

No samples have been collected from AOCs 16-033(g) and 16-033(h).

8.8.2.2 Nature and Extent of Contamination

Because no samples have been collected from AOCs 16-033(g) and 16-033(h), the nature and extent of potential contamination at these AOCs are not known.

8.8.2.3 Conceptual Site Model

The CSM for AOCs 16-033(g) and 16-033(h) includes subsurface sources of potential contamination. The following sections summarize the CSM for AOCs 16-033(g) and 16-033(h).

Source of Contamination

Contamination at AOCs 16-033(g) and 16-033(h) resulted from either leaks or overflows from filling the tanks and would consist of petroleum-related hydrocarbons.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for AOCs 16-033(g) and 16-033(h) are summarized in section 1.1.1.

8.8.2.4 Summary of Additional Data/Corrective Action Requirements

Sampling is proposed to investigate the nature and extent of contamination at the location of the former USTs, AOCs 16-033(g) and 16-033(h). No historical sampling has been conducted at these AOCs. The current disposition of the tanks, including their precise location and whether they have been removed, is not known; confirmation of the tanks' location and configuration using a magnetic survey is proposed. If the tanks are located, removal, followed by confirmatory sampling is proposed for AOCs 16-033(g) and 16-033(h) (section 8.9.4). If the tanks cannot be located, sampling is proposed to investigate the nature and extent of potential contamination at AOCs 16-033(g) and 16-033(h) in their assumed location, based on current GIS data (section 8.9.4).

8.9 Scope of Investigation Activities

All investigation activities at the 280/260 outfalls will be preceded by a surface radiological walkover survey to determine the presence of alpha, beta, and/or gamma-emitting radionuclides. Radiological walkover survey results will be used to address potential worker safety and protection issues as well as be used to potentially relocate proposed sampling locations. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

8.9.1 280 Outfalls: Consolidated Unit 16-003(h)-99 and SWMU 16-026(g)

The proposed sampling locations at the 280 outfalls are shown in Figure 8.9-1. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 8.9-1. The analytical suites proposed for the 280 outfalls follow the general laboratory analytical strategy for outfalls, as presented in Table 2.9-1. Sampling at the 280 outfalls will include the following.

- *Sampling to define lateral and vertical extent of inorganic chemicals and SVOCs at the 280 outfalls*. A total of eight locations (BH1 through BH8) will be sampled to determine the lateral and vertical extent of PAHs at the site; two samples will be collected from each of the individual SWMUs and AOCs [16-003(h), 16-030(d), and 16-026(g)] for a total of six (BH1 through BH6), and two samples will be collected downgradient of the outfall where the outfalls converge (BH7 and BH8). Because the deepest sample collected historically was at 5–5.5 ft bgs, the following two depths will be sampled at each location: 7.5–8 ft bgs (tuff) and 5 ft deeper into the tuff at 12.5–13 ft bgs (tuff). All samples will be analyzed for pH, nitrates, perchlorate, TAL metals and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

8.9.2 260 Outfalls: Consolidated Unit 16-029(j)-99 [SWMUs 16-026(k2), 16-029(j)], SWMUs 16-003(i), 16-003(j)

The proposed sampling locations at the 260 outfalls are shown in Figure 8.9-2. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 8.9-1. The analytical suites proposed for the 260 outfalls follow the general laboratory analytical strategy for outfalls, as presented in Table 2.9-1. Sampling at the 260 outfalls will include the following.

- *Sampling to define lateral and vertical extent of inorganic chemicals and SVOCs at the 260 Outfalls associated with the sumps.* A total of eight locations (BH1 through BH8) will be sampled to determine the lateral and vertical extent of PAHs at the outfalls associated with the 16-260 sumps; four samples will be collected from each of the individual SWMUs [16-003(i) and 16-003(j)]. Because the deepest samples collected historically were at 3.5–5.5 ft bgs, the following two depths will be sampled at each location: 7.5–8 ft bgs (tuff) and 5 ft deeper into the tuff at 12.5–13 ft bgs (tuff). All samples will be analyzed for pH, nitrates, perchlorate, TAL metals and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as

measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

- *Sampling to define nature and extent of potential contamination at the 260 Outfalls associated with Bay 25 of building* 16-*260*. A total of four locations (9 through 12) will be sampled to determine the nature and extent of contamination associated with the outfalls at Bay 25; two samples will be collected from each of the individuals SWMUs [16-026(j) and 16-026(k2)]. Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, nitrates, perchlorate, TAL metals, VOCs, SVOCs, and HE. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

8.9.3 Scope of Investigation Activities, Cooling Tower: SWMU 16-031(b) and AOC C-16-002

The proposed sampling locations at the former cooling tower are shown in Figure 8.9-3. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 8.9-1. The analytical suites proposed for SWMU 16-031(b) and AOC C-16-002 follow the general laboratory analytical strategy for cooling towers, as presented in Table 2.9-1. Sampling at the cooling tower will include the following.

- *Sampling to define nature and extent of potential contamination at AOC C-16-002*. Two locations (1 and 2) will be sampled within the footprint of the former cooling tower (building 16-262) to determine the nature and extent of potential contamination. Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed for pH, TAL metals, and SVOCs (indicators of potential contamination associated with the cooling tower operations) and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

- *Sampling to define nature and extent of contamination at SWMU 16-031(b)*. Four locations (3 through 6) will be sampled within the outfall of the former cooling tower (building 16-262) to determine the nature and extent of potential contamination. Samples will be collected from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Locations may be adjusted during sampling, based on the observed location of the outfall (as identified by the presence of two 2-in. cast-iron pipes that discharge to a ditch). All samples will be analyzed for pH, TAL metals, and SVOCs (indicators of potential contamination associated with the cooling tower operations) and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

8.9.4 Scope of Investigation Activities, Underground Storage Tanks: AOCs 16-033(g) and 16-033(h)

The proposed sampling locations at AOCs 16-033(g) and 16-033(h) are shown in Figure 8.9-3. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 8.9-1. The analytical suites proposed for AOCs 16-033(g) and 16-033(h) follow the general laboratory analytical strategy for fuel storage tanks, as presented in Table 2.9-1. Corrective action and sampling of the USTs will include the following.

- *Magnetic survey to locate AOCs 16-033(g) and 16-033(h) underground tanks and confirmation of tank configuration.* The precise location of the two tanks has not been verified, despite previous attempts to locate them. In addition, no information exists about the installation, construction, capacity, or removal of the tanks. Another attempt will be made to locate the tanks using a magnetic survey at their assumed location, shown in Figure 8.9-3. If the tanks are located, additional investigative activities will be performed to confirm the configuration of the tanks (e.g., combination of geophysical survey, magnetic survey, or other surveys as appropriate). If the tanks cannot be located, the boreholes will be advanced in the center of the location designated by the AOC boundary.
- *Excavation of AOCs 16-033(g) and 16-033(h)*. If the tanks are located, they will be removed and disposed of. The excavation will be backfilled with clean soil to facilitate placement of a drilling rig over the location.
- *Confirmatory sampling at AOCs 16-033(g) and 16-033(h).* Following excavation activities, confirmatory soil samples will be collected from two locations (BH7 and BH8, Figure 8.9-3) from the bottom of the excavation, 5–5.5 ft into tuff, 10–10.5 ft into tuff, and 15–15.5 ft into the tuff. Samples will be analyzed for TAL metals, VOCs, SVOCs, and TPH and screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods after the excavation has been backfilled.

9.0 SUBAGGREGATE 8: TA-14 FIRING SITES

Subaggregate 8, the TA-14 Firing Sites, consists of those SWMUs and AOCs located at TA-14 that drain into the Cañon de Valle watershed. This subaggregate includes 2 consolidated units consisting of 8 SWMUs and 2 AOCs, 2 individual SWMUs, and 14 individual AOCs (Figure 1.1-9).

- Active firing site: AOC 14-001(g)
- Former firing sites: Consolidated Unit 14-002(a)-99 [SWMUs 14-002(a), 14-002(b), 14-002(f), 14-009, 14-010 and AOCs C-14-008 and 14-001(f)] and Consolidated Unit 14-002(c)-99 [SWMUs 14-002(c), 14-002(d), and 14-002(e)]
- Former magazine and storage area: AOC 14-004(a)
- HE sump and drainline: SWMU 14-006
- Septic system: SWMU 14-007
- Buildings (removed): AOCs C-14-003, C-14-004, C-14-005, and C-14-007

These sites are further divided into areas or related sites, such as active firing site, former firing sites, HE sump and drainline, septic system, removed buildings, and former HE magazine. Known as Q-Site, TA-14

has been used since 1944 for explosives development and testing, including testing that involves radioactive materials. In 1952, the firing site was renovated, the structures were removed, and a new firing site was constructed (LANL 1996, 54086, p. i).

Investigations of AOC 14-001(f) and SWMUs 14-002(a), 14-002(b), 14-002(d), and 14-002(e) are deferred under Table IV-2 of the Consent Order because the sites are located within the hazard zones of active firing sites. Therefore, while background information is provided in this investigation work plan for those AOC and SWMUs, actual investigation activities are deferred.

AOCs 14-001(a), 14-001(b), 14-001(c), 14-001(d), and 14-001(e) are small steel "pull boxes" located in the ground and covered with metal lids; they are currently active and used in TA-14 Firing Site operations. AOCs C-14-008, C-14-001, and C-14-009 are former storage magazines. AOC C-14-002 is a control building whose exact location has not been identified. These eight sites are proposed for no further investigation or corrective action (Table 1.1-2). Information regarding these AOCs is provided in Appendix B.

9.1 Surface Conditions

The TA-14 Firing Sites are located in the southeastern portion of TA-14, adjacent to the northern side of Cañon de Valle and approximately 1000 ft south of Three-Mile Canyon; however, all the TA-14 Firing Sites drain into Cañon de Valle. Elevations at Subaggregate 8 range from 7410 to 7280 ft amsl. The topography of the subaggregate has a gentle 2- to 5-degree slope to the south toward Cañon de Valle.

The eastern and central portions of Subaggregate 8 were moderately burned in the 2000 Cerro Grande fire with substantial damage to groundcover. The western portion of Subaggregate 8 was moderately to severely burned in the 2000 Cerro Grande fire, with substantial damage to the canopy and groundcover (LANL 2000, 70351, pp. 11–14). The entire south-facing slope located to the south of the TA-14 structures was moderately burned, with substantial damage to the groundcover (LANL 2001, 71342, p. 19).

The surface vegetation community of the Cañon de Valle Aggregate Area is described in section 2.1.

9.2 Surface Water

Section 2.2 presents a discussion of the Cañon de Valle Aggregate Area surface water. Specific sites (Plate 1) monitored in Subaggregate 8 are listed in Table 2.2-1.

Water samples were not collected from any SMAs at this subaggregate in 2005 because of a lack of water at the subaggregate (LANL 2006, 92600, Attachment 2, Table B-1)

9.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3.

9.4 Subsurface Conditions

9.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.1.

9.4.2 Cliff Retreat and Fractures

Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

9.4.3 Hydrogeology

The hydrogeology of the Cañon de Valle Aggregate Area is discussed in section 2.4.3. Well CdV-R-15-3 is located approximately 4065 ft southeast of Subaggregate 8. Wells R-25 and CdV-16-1(i) are located approximately 4660 and 4910 ft west, respectively, of this subaggregate (Plate 1). Subaggregate 8 lies near these three wells. During the first three rounds of sampling (through July 2001) in Well CdV-R-15-3, groundwater was not detected in the three uppermost screens (screen 1 at 617.7–624.5 ft bgs, screen 2 at 800.8–807.8 ft bgs, or screen 3 at 964.8–980.9 ft bgs) (LANL 2002, 73179, p. 27). The presence, location, and depth of a perched zone directly beneath Subaggregate 8 remain unknown.

9.5 Active Firing Site: AOC 14-001(g)

9.5.1 Site Description and Operational History

The active firing site, AOC 14-001(g), consists of a 5-ft-square x 2-ft-thick reinforced concrete firing pad (structure 14-35) surrounded on three sides with a blast shield. The shield directs the force of detonation away from the nearby control building (14-23) (LANL 1990, 07512, 14-001 summary; LANL 1994, 34755, p. 5.4-16). At the base, the shield is a 2-ft-thick x 6-ft concrete pad overlaid by a neoprene shock pad, a 4.5 in. steel plate, and several inches of sand. Wastes were placed on the pad and detonated from the control building (LANL 1994, 34755, p. 5.4-16). According to the 1990 SWMU report, AOC 14-001(g) was completed in 1964 and scrap HE were detonated on the pad (LANL 1990, 07512, 14-001 summary). AOC 14-001(g) is no longer used for the open detonation of scrap HE. When the 1994 OU 1085 RFI work plan was prepared, AOC 14-001(g) was recommended for deferred action (LANL 1994, 34755). In the 1996 RFI report, corrective action was recommended to be deferred until the site is decommissioned (LANL 1996, 54086, p. 5-37).

9.5.2 Historical Investigations

An RFI report was written in 1996 that included AOC 14-001(g), although AOC 14-001(g) was not sampled during the RFI (LANL 1996, 54086). No samples have been collected from this AOC. The RFI report stated that any corrective action at this AOC will be deferred until the site is decommissioned (LANL 1996, 54086, p. 5-37).

9.5.2.1 Analytical Results

No samples have been collected from AOC 14-001(g).

9.5.2.2 Nature and Extent of Contamination

Because no samples have been collected from AOC 14-001(g), the nature and extent of contamination at this site are not known. Sampling is proposed to define nature and extent of potential contamination at AOC 14-001(g) (section 9.11.1). The sampling plan for AOC 14-001(g) will not be conducted until testing operations in the area cease.

9.5.2.3 Conceptual Site Model

The CSM for AOC 14-001(g) includes only surface sources of potential contamination. The following sections summarize the CSM for AOC 14-001(g).

Source of Contamination

The source of surface contamination at the site is the HE explosions at the site conducted since 1944.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for AOC 14-001(g) are summarized in section 1.1.1.

9.5.2.4 Summary of Additional Data/Corrective Action Requirements

No samples have been collected at AOC 14-001(g) and the nature and extent of potential contamination are not known. COPCs may include explosives, metals, and radionuclides. Details of the proposed investigation sampling activities are discussed in section 9.11.1. The sampling plan for AOC 14-001(g) will not be executed until testing operations in the area cease.

9.6 Former Firing Sites: Consolidated Units 14-002(a)-99 and 14-002(c)-99

Consolidated Unit 14-002(a)-99, former firing sites, consists of SWMUs 14-002(a), 14-002(b), 14-002(f), 14-009, 14-010, and AOCs 14-001(f) and C-14-008 (see Appendix B). Consolidated Unit 14-002(c)-99, also former firing sites, consists of SWMUs 14-002(c), 14-002(d), and 14-002(e).

AOC 14-001(f) and SWMUs 14-002(a), 14-002(b), 14-002(d), and 14-002(e) are deferred under Table IV-2 of the Consent Order.

9.6.1 Site Description and Operational History

9.6.1.1 Consolidated Unit 14-002(a)-99

Consolidated Unit 14-002(a)-99 is referred to as the "western area at TA-14" (hereafter referred to as "TA-14 Firing Site West") in the 1994 OU 1085 RFI work plan (LANL 1994, 34755, p. 5-3-1).

Investigation of AOC 14-001(f) is deferred under Table IV-2 of the Consent Order. AOC 14-001(f) is described as the bullet test facility and is associated with structure 14-34 in both the 1990 SWMU report (LANL 1990, 07512, 14-001 summary) and the 1994 OU 1085 work plan (LANL 1994, 34755, p. 5-3-3). However, in the 1996 VCA sampling plan (LANL 1996, 53825, p. 2, Figure 3) and the 1996 VCA completion report (LANL 1996, 55049, p. 1, Figure 2), AOC 14-001(f) is described as the bullet test facility but is associated with building 14-39. To resolve this discrepancy, a telephone interview was conducted with a former worker at the site (Brenner 2006, 92459). The following description of operations is based on this interview.

AOC 14-001(f), the bullet test facility, was constructed in 1957 and is located in the center of the western portion of Q-Site on level ground that drains to the southwest (LANL 1994, 34755, p. 5-3-1). The following buildings are associated with AOC 14-001(f):

- Building 14-30: Firearms storage—all firearms used to fire projectiles were stored here.
- Building 14-34: Control room and reloading room—this structure was the control room and also housed a room used to load projectiles (i.e., add propellant to a case and affix projectile) according to the requirements of the test being conducted. Building 14-34 is a reinforced concrete structure that is 13.3 ft x 13.6 ft x 8 ft tall.

- Building 14-39: Target tube—targets were typically placed on a table within the tube. The tube was used to contain the debris from the explosive force of the projectile hitting a target— typically metal and/or explosives. The tube is 10 ft in diameter and approximately 15 ft long.
- Building 14-40: Radiography/photography—this building, adjacent to the target tube (building 14-39), housed the flash radiography and high-speed photography equipment used to record tests.
- Building 14-43: Gas gun building—this site was constructed to house a gas gun, but the project was terminated before the gas gun was installed. Subsequently, it housed equipment (band saw, drill press, machining tools) used to construct non-HE components required for tests. The building was also used to store non-HE materials.

A gun stand was present on a pad immediately outside building 14-34 at the southeastern end of the building, where all weapons were set up and oriented to the southeast towards the target tube (building 14-39). During the 1970s, small handguns were fired from within building 14-34 towards targets in building 14-39, but any weapon larger than a handgun was always fired from the pad outside the building. After the late 1970s, all tests were conducted from the pad outside building 14-34. Sand was placed inside the target tube so personnel could walk on a flat surface. A table upon which targets were placed was typically set up in the tube. The targets were typically explosives or explosive devices. Depleted uranium was used as both a projectile and as a target. Projectile weapons ranged from a 0.22-caliber, pellet gun to a 30-mm smooth-bore gun.

The firing at the bullet test facility, AOC 14-001(f), was done from the firing pad outside building 14-34 into targets in building 14-39 so the test material was usually contained in the tube, was vaporized, or was contained in the underlying sump (LANL 1994, 34755, p. 5-3-3; LANL 1996, 55049, p. 1). If these residuals were suspected to be contaminated with uranium, they were placed in 55-gal. drums for disposal (LANL 1994, 34755, p. 5-3-3). According to the 1990 SWMU report, some uranium-238 from the test shots flew into the nearby woods (LANL 1990, 07512, 14-001 summary). Any HE-contaminated scrap or fragments was also placed in 55-gal. drums for pickup and treatment as HE-contaminated waste (LANL 1994, 34755, p. 5-3-3). Scrap that was neither HE- nor uranium-contaminated was sent to the sanitary landfill (LANL 1994, 34755, p. 5-3-3). Sandbags were used for shielding from the blast pressure; when removed, the bags were used to control erosion at the site (LANL 1994, 34755, p. 5-3-3). The underlying sump is made of reinforced concrete and is 13 ft^2 $\times$ 4.5 ft deep (LANL 1996, 55049, p. 1).

Investigation of SWMU 14-002(a) is deferred under Table IV-2 of the Consent Order. SWMU 14-002(a) is the site of a former HE firing chamber (structure 14-2) located on the west end of Q-Site; the chamber was removed in 1973 (LANL 1994, 34755, pp. 5-3-1, 5-3-3). Completed in 1944, it was constructed of heavily reinforced concrete lined with steel plating; it measured 21.6 ft long x 16 ft wide x 13 ft high (LANL 1994, 34755, p. 5-3-3). According to the 1994 OU 1085 RFI work plan, sometime in the 1940s, the chamber failed structurally after several charges had been fired within it (LANL 1994, 34755, p. 5-3-1). Later, structure 14-2 was used as a bullet-impact firing chamber; low-order detonations were common and frequently involved radioactive materials (LANL 1994, 34755, p. 5-3-1). In the early 1970s, structure 14-2 was removed because a new HE-test facility was to be built in the same area. A radiation survey showed that structure 14-2 was contaminated with alpha radiation (LANL 1994, 34755, p. 5-3-3). Radioactively contaminated materials were removed and disposed of at TA-54, and the building was burned on the site in 1973 (LANL 1994, 34755, p. 5-3-3). The remaining noncombustible building materials that were contaminated with HE and radionuclides were disposed of at MDA P (SWMU 16-018). HE-contaminated debris was disposed of at MDA J (SWMU 54-005), and radioactive pieces were disposed of at MDA G [Consolidated Unit 54-013(b)-99)].

At the time structure 14-2 was burned, an HE sump (structure 14-10) associated with the building was removed (LANL 1994, 34755, p. 5-3-3). Uranium-contaminated asphalt in the surrounding area also was removed and disposed of at MDA G [Consolidated Unit 54-013(b)-99)]. A water line installed in 1960 may have been used when the new firing chamber was built (LANL 1994, 34755, p. 5-3-3). An HE-test facility (building 14-39) and an instrumentation building (building 14-40) were constructed on the site formerly occupied by the chamber [structure 14-2, SWMU 14-002(a)] in the 1970s (LANL 1994, 34755, p. 5-3-3).

Investigation of SWMU 14-002(b) is deferred under Table IV-2 of the Consent Order. The site is of a former HE-firing pedestal (structure 14-17). Built in 1945, it was made of reinforced concrete and measured 4 ft long x 4 ft wide x 2 ft thick with a steel-plate top and an 8-ft-high earthen barricade (LANL 1994, 34755, p. 5-3-4). Structure 14-17 was located in the west-central portion of the western TA-14 firing site. The open, horseshoe-shaped steel firing chamber was 10 ft in diameter x 30 ft long with a 40-in.-thick wall (LANL 1994, 34755, p. 5-3-4). The firing chamber faced south (away from surrounding structures). The targets were planar cross-sections of weapons that contained HE (LANL 1996, 54086, p. 5-30). Bullets from small caliber up to 150 caliber were fired into the HE targets and detonated, burned, or shattered the target (LANL 1994, 34755, p. 5-3-4). Occasionally, natural or depleted uranium was used in the target, small-shape charge tests were performed, linear-shape charge tests were routinely performed, line-cutter shape charges were fired into weapon cross-section targets containing lithium hydride, and light armor weapons were demilitarized and the warheads fired into reactive armor targets containing explosives (LANL 1994, 34755, p. 5-3-4). These activities probably resulted in low-order detonations. Sandbags were used to protect x-ray film and equipment from the blast and shrapnel. When the bags were torn, the sand and shot debris were shoveled into a wheelbarrow and dumped over the edge of the canyon (LANL 1994, 34755, p. 5-3-4). The RFI work plan stated that the area was contaminated with uranium, lead, copper, and explosives (LANL 1994, 34755, p. 5-3-4). After a series of shots, the area was swept and HE, shrapnel, and debris were picked up; the surface soil was not removed. Former structure 14-17 was removed in 1952 (LANL 1994, 34755, p. 5-3-4).

SWMU 14-002(f), former structure 14-12, is the site of a junction box shelter associated with SWMU 14-002(b) (LANL 1996, 54086, p. 5-30). Built in 1945, it was of wood-frame construction and measured 6 ft x 6 ft x 6 ft tall with an earthen berm on three sides. Structure 14-12 was removed in 1952 (LANL 1994, 34755, p. 5-3-4).

SWMU 14-009 is a 45 ft x 50 ft x 1-ft-deep surface disposal area on the southwestern slope of the western firing area (LANL 1994, 34755, p. 5-3-4). It is a waste pile of ruptured sandbags. When explosives were tested, sandbags were placed around a firing site to contain the detonation (LANL 1994, 34755, p. 5-3-4). When the pressure of a blast ruptured the sandbags, the sand was used to control erosion around the firing site. Sandbags used at firing sites could be contaminated with uranium, lead, beryllium, and HE. Uranium has been noted in the soil in some areas at TA-14 (LANL 1994, 34755, p. 5-3-4). Whether the source of the uranium was the surface disposal of sandbags, storage, and/or firing activities is not known (LANL 1994, 34755, p. 5-3-5). The waste pile was included in the 1987 DOE environmental survey, which found radioactivity levels above background at the site (LANL 1994, 34755, p. 5-3-5). During the 1996 RFI, depleted uranium was visible at the surface, and HE spot tests were positive (LANL 1996, 54086, p. 5-31).

SWMU 14-010 was a decommissioned explosive waste sump located south of, and adjacent to, building 14-2 (LANL 1994, 34755, p. 5-3-5). A drain extended from the sump across the road (LANL 1994, 34755, p. 5-3-5). After the sump's contents were removed and disposed of in 1973 by Group WX-2, the sump and drainline around the base of the floor slab at building 14-2 were excavated by hand and removed (LANL 1994, 34755, p. 5-3-5). The remainder of the building was then burned (LANL 1990, 07512, 14-010 summary). The area was paved over or replaced by the bullet test facility. The sump may

have contained HE and toxic chemicals (LANL 1994, 34755, p. 5-3-5). During the 1995 RFI, the existing drainline was sampled, and uranium and HE were detected (LANL 1996, 54086, p. 5-29).

9.6.1.2 Consolidated Unit 14-002(c)-99

Consolidated Unit 14-002(c)-99 consists of SWMUs 14-002(c), 14-002(d), and 14-002(e) (hereafter referred to as part of "TA-14 Firing Site East"). Investigation of SWMUs 14-002(d), and 14-002(e) is deferred under Table IV-2 of the Consent Order. SWMU 14-002(c) was a control building (14-5) built in 1944 and used for small-scale explosive tests. It measures 11 ft long x 18 ft wide x 10-ft high and originally had a concrete bunker faced with 0.5-in. steel plate. The building was converted from a control building to a storage site in 1961 and then to toxic gas (cyanogen) storage in 1965 until the 1970s. In the mid-1950s, the concrete blocks were removed from the southern side of the building and pushed about 50 ft south to the side of the small drainage that drops to the south. Debris is scattered on this slope to the drainage channel. In 1980, a 5-ft-diameter metal sphere was placed on the southern side of building 14-5 in the position previously occupied by the concrete blocks. Slow combustion experiments were conducted inside the sphere. These tests continued until 1985. Building 14-5 had not been used since then and was to be destroyed, but the demolition was delayed while a discussion was held about putting the building on the Laboratory's historical buildings list. It was decided not to list building 14-5 but by that time funds for the demolition were no longer available and, as a result, it still stands (LANL 1994, 34755, p. 5.6-2).

SWMUs 14-002(d) and 14-002(e) are the former sites of two firing pads located on a gravel area adjacent to the southern end of building 14-5 (LANL 1994, 34755, p. 5.6-2). These sites are associated with former structures 14-14 and 14-15, respectively. The pads were used from 1944 to the mid-1950s for small-scale explosives tests. The pads were checked for radiation in 1957 and none was found. The firing pads are no longer at the site.

9.6.2 Historical Investigations

The results of the historical RFI sampling are presented in the following sections for each individual SWMU or consolidated unit, as appropriate. The samples collected are summarized in Table 9.6-1. Historical data are available for all sites except SWMU 14-002(b) and consists of both screening-level data and decision-level data. The analytical results for inorganic and organic chemicals and radionuclides are presented in Tables 9.6-2, 9.6-3, and 9.6-4, respectively.

9.6.2.1 Analytical Results

Consolidated Unit 14-002(a)-99

One surface sediment sample was collected and analyzed for inorganic chemicals, HE, isotopic uranium, and by gamma spectroscopy (Table 9.6-1, Figure 9.6-1). The resulting data are screening-level data. The minimum detectable activity for uranium-235 was greater than the BV (Table 9.6-4). No other analyte was detected greater than BV (LANL 2006, 91697).

AOC 14-001(f)

On June 25, 1993, HE spot-test kits were used to survey for explosives near of the bullet test facility. The data were inconclusive; the results were described as false positives (LANL 1994, 34755, p. 5.3-6). An RFI was conducted at AOC 14-001(f) in 1995. Three samples were collected: two from within the bullet test facility and one from the underlying sump. Analytical results showed uranium and the RDX, at

concentrations above their respective 1996 SALs, and manganese above its BV (LANL 1996, 55049, p. 1).

A VCA was conducted at AOC 14-001(f) in 1996 based on the COPCs determined during the Phase I and the presence of pieces of HE visible in the sand on the site (LANL 1996, 55049, p. 1). During the VCA, all sand contained in the bullet test facility and beneath the sump was removed. After the sand was removed, a radiological survey of the interior surfaces of the steel tube and the sump was conducted. Readings above background were found on both structures. Uranium was removed from the surfaces of the sump and some areas of the steel tube; however, uranium was incompletely removed from the steel tube interior (LANL 1996, 55049, p. 4). The radioactivity in the steel tube was determined to be fixed radioactivity and those areas were painted in accordance with the Laboratory's Environment, Safety, and Health Division requirements (LANL 1996, 55049, pp. 4–5). A sign was placed in the bullet test facility indicating fixed radioactivity. Pieces of depleted uranium were found, segregated, and disposed of (LANL 1996, 55049, p. 4). No pieces of HE were found during the VCA (LANL 1996, 55049, p. 4). Following the VCA, at the request of the operating group, the sump drain was plugged using quick-dry cement (LANL 1996, 55049, p. 5). Confirmatory sampling was not conducted because all the sand had been removed, and sealing the drain eliminated any potential for environmental release (LANL 1996, 55049, p. 5).

In 1997, three samples were collected from the RFI sampling locations. No additional information is available on these three samples.

The samples collected are summarized in Table 9.6-1. The analytical results for inorganic chemicals are presented in Table 9.6-2 and Figure 9.6-2. Analytical results for organic chemicals are presented in Table 9.6-3 and Figure 9.6-3. Analytical results for radionuclides are presented in Table 9.6-4 and Figure 9.6-4.

Two surface and one subsurface soil samples were collected during 1995 RFI activities and analyzed by gamma spectroscopy and for HE (subsurface sample only), isotopic uranium, inorganic chemicals (subsurface sample only), SVOCs, uranium, and VOCs (subsurface sample only). These samples are all designated AN95, screening-level data, because the samples were submitted directly to the off-site laboratory without first going through the SMO. After the 1996 VCA, three subsurface soil samples were collected in 1997 and analyzed for HE, inorganic chemicals, and uranium (Table 9.6-1, Figure 9.6-1). The 1997 samples are all decision-level data.

Antimony, cadmium, copper, lead, manganese, nickel, uranium, and zinc were detected at concentrations greater than the BVs in one or more of the screening-level samples (Table 9.6-2, Figure 9.6-2). The DLs for thallium was greater than the BVs in one or more of the screening-level samples (Table 9.6-2). Eight inorganic chemicals were detected at concentrations greater than the BVs in one or more of the decision-level samples (aluminum, barium, cobalt thallium, uranium, and zinc) (Table 9.6-2, Figure 9.6-2). The DLs for antimony, cadmium, mercury, and silver were greater than the BVs in one or more of the decision-level samples (Table 9.6-2).

Acetone, bis(2-ethylhexyl)phthalate, HMX, methylene chloride, RDX, trichlorofluoromethane, and TNT were detected in the 1995 RFI subsurface soil screening samples (Table 9.6-3, Figure 9.6-3). The two 1995 RFI surface soil screening samples were submitted for VOC analyses, but none were detected. The three 1997 surface soil samples were submitted for HE analyses, but none were detected.

Uranium-235 and uranium-238 were detected at activities greater than the BVs in one or more of the screening-level samples. Protactinium-231, protactinium-234M, and thorium-234 were detected but have no BVs for comparison (Table 9.6-4, Figure 9.6-4). None of the 1997 samples were submitted for radionuclide analyses.

SWMU 14-002(a)

The notice of deficiency (NOD) response (October 31, 1994) to the RFI work plan (LANL 1994, 43545) describes ruptured sandbags southeast of building 14-38. In response to the NOD, the sandbags, which are all that remain of SWMU 14-002(a), were sampled. During the 1995 RFI at SWMU 14-002(a), one ruptured sandbag, presumably associated with the firing chamber was sampled (LANL 1996, 54086, p. 5-30). Sample results indicated that uranium was present at the site in concentrations exceeding the SAL. The RFI report recommended that the Laboratory develop a VCA plan (LANL 1996, 54086, p. 5-30). RFI results, conclusions, and recommendations were included in the VCA plan that was submitted to DOE in 1997 (LANL 1997, 55678). The results of the Phase I sampling, as presented in the VCA plan (LANL 1997, 55678, Table 4.2.2-1), indicated that depleted uranium was present at concentrations above the 1997 SAL.

The samples collected are summarized in Table 9.6-1 and Figure 9.6-1. The analytical results for inorganic chemicals are presented in Table 9.6-2 and Figure 9.6-2. Analytical results for organic chemicals are presented in Table 9.6-3 and Figure 9.6-3. Analytical results for radionuclides are presented in Table 9.6-4 and Figure 9.6-4.

Two surface soil samples were collected during 1995 RFI activities and analyzed by gamma spectroscopy and for isotopic uranium, and uranium. These samples are all designated AN95, screening-level data, because the samples were submitted directly to the off-site laboratory without first going through the SMO. One of these samples was collected from a location that was subsequently excavated during the 1997 VCA (LANL 1997, 55678) (the sample ID is marked with an asterisk in Table 9.6-1 and with a strikethrough in Figure 9.6-1). The samples collected are summarized in Table 9.6-1 and the sampling locations shown in Figure 9.6-1. As part of the 1997 VCA, two sediment and three surface soil confirmatory samples were collected (Table 9.6-1, Figure 9.6-1). One of the soil samples and the sediment sample were analyzed for HE and isotopic uranium. The second surface soil sample was analyzed for HE, inorganic chemicals, and uranium.

Uranium was detected at concentrations greater than the BVs in both of the 1995 RFI screening-level sample surface soil (Table 9.6-2, Figure 9.6-2). Aluminum, barium, beryllium, chromium, iron, nickel, potassium, thallium, uranium, and zinc were detected at concentrations greater than BVs in one of the 1997 VCA confirmatory decision-level surface soil samples (Table 9.6-2, Figure 9.6-2). The DLs for antimony, cadmium, mercury, and silver were greater than the BVs in one decision-level sample (Table 9.6-2).

Both HMX and TNT were detected in one soil screening-level sample (Table 9.6-3, Figure 9.6-3), and HMX was detected in one soil and one sediment decision-level VCA confirmatory samples (Table 9.6-3, Figure 9.6-3).

Uranium-235 and uranium-238 were detected at activities greater than the BVs in one or both of the two 1995 RFI screening-level surface soil samples. Protactinium-231, protactinium-234, protactinium-234M, thorium-231, and thorium-234 were detected but have no BVs for comparison (Table 9.6-4, Figure 9.6-4). Samples collected from soil that was subsequently removed as part of the 1997 VCA no longer represent current site conditions. Uranium-234, uranium-235, and uranium-238 were detected at activities greater than the BVs in one or more of the decision-level samples (Table 9.6-4, Figure 9.6-4).

SWMU 14-002(b)

SWMU 14-002(b) was not sampled during the 1995 RFI (LANL 1996, 54086, p. 5-30). The RFI report recommended NFA because efforts to locate the site of the former HE firing pedestal were unsuccessful

(LANL 1996, 54086, p. 5-30). The assumed location of the pedestal, based on a 1946 photograph, was checked with an NaI beta/gamma meter, and no radioactivity was detected. HE spot-test results were negative (LANL 1996, 54086, p. 5-30). Discussions with a contractor who built TA-14 indicated the chamber was located where the current fire road is now and the firing chamber was removed in 1952, mounded next to the assembly and storage building (building 14-43), and paved over with asphalt (LANL 1996, 54086, p. 5-30).

SWMU 14-002(f)

SWMU 14-002(f) was not sampled during the 1995 RFI; the RFI report recommended NFA for the site because efforts to locate the site of the structure were unsuccessful (LANL 1996, 54086, pp. 5-30–5-31). The assumed location of the shelter, based on a 1946 photograph, was checked with an NaI beta/gamma meter and no radioactivity was detected (LANL 1996, 54086, p. 5-31). HE spot-test results were negative (LANL 1996, 54086, p. 5-31). Discussions with a contractor indicated the shelter was located where the current fire road is now. No evidence of the shelter exists at this location (LANL 1996, 54086, p. 5-31).

SWMU 14-009

During the 1995 RFI at SWMU 14-009, depleted uranium was observed and samples tested positive for HE using the HE spot test. The RFI report's recommended a VCA be conducted at this site (LANL 1996, 54086, p. 5-31). The report stated that all specific results, conclusions, and recommendations would be included in the VCA plan.

The samples collected are summarized in Table 9.6-1 and Figure 9.6-1. The analytical results for inorganic chemicals are presented in Table 9.6-2 and Figure 9.6-2. Analytical results for organic chemicals are presented in Table 9.6-3 and Figure 9.6-3. Analytical results for radionuclides are presented in Table 9.6-4 and Figure 9.6-4.

As part of the 1995 RFI activities seven surface and two subsurface soil samples were collected (Table 9.6-1, Figure 9.6-1). These samples are all designated AN95, screening-level data, because the samples were submitted directly to the off-site laboratory without first going through the SMO. The surface soil samples were analyzed by gamma spectroscopy, and for HE, isotopic uranium, inorganic chemicals, SVOCs, and uranium. The two subsurface soil samples were analyzed for HE, inorganic chemicals, and SVOCs (not all samples included all analyses). As part of the 1997 VCA confirmatory sampling, four surface soil samples were collected and analyzed for HE, inorganic chemicals, and uranium (Table 9.6-1, Figure 9.6-1). However, it does not appear that a VCA plan was ever published.

The following inorganic chemicals were detected at concentrations greater than the BVs in one or more of the 1995 RFI screening-level soil samples: copper, lead, mercury, nickel, and uranium (Table 9.6-2, Figure 9.6-2). The following inorganic chemicals were detected at concentrations greater than the BVs in one or more of the 1997 VCA confirmatory decision-level surface soil samples: barium, silver, and uranium (Table 9.6-2, Figure 9.6-2). The DLs for antimony and cadmium were greater than the BVs in one or more decision-level samples (Table 9.6-2). Bis(2-ethylhexyl)phthalate was detected in one 1995 RFI surface soil screening sample and HMX was detected in 6 surface and 1 subsurface 1995 RFI screening-level soil samples (Table 9.6-3, Figure 9.6-3). The analyte 2-amino-4,6-dinitrotoluene was detected in one of the 1997 VCA decision-level surface soil confirmatory samples (Table 9.6-3, Figure 9.6-3).

Uranium-235 and uranium-238 were detected at activities greater than the BVs in one or more of the 1995 RFI screening-level surface soil samples. Protactinium-231, protactinium-234, protactinium-234M,

thorium-231, thorium-234 were detected but have no BVs for comparison (Table 9.6-4, Figure 9.6-4). In addition, the DLs for uranium-235 were greater than the BVs in three of the 1995 RFI screening-level surface soil samples (Table 9.6-4). None of the 1997 VCA surface soil confirmatory samples were submitted for analyses of radionuclides (Table 9.6-1).

SWMU 14-010

During the 1995 RFI at SWMU 14-010, surface soil, subsurface soil and sediment samples were collected. Analytical results indicated that uranium and HE were present in concentrations above the 1995 SALs (LANL 1996, 54086, p. 5-29). The RFI report recommended development of a VCA plan for SWMU 14-010 (LANL 1996, 54086, p. 5-29). RFI conclusions and recommendations were included in the VCA plan submitted to DOE in 1997 (LANL 1997, 56611), which included a corrective action for SWMU 14-010 (i.e., excavation and removal of contaminated surface soil from the drainage area).

The samples collected are summarized in Table 9.6-1 and Figure 9.6-1. The analytical results for inorganic chemicals are presented in Table 9.6-2 and Figure 9.6-2. Analytical results for organic chemicals are presented in Table 9.6-3 and Figure 9.6-3. Analytical results for radionuclides are presented in Table 9.6-4 and Figure 9.6-4.

As part of the 1995 RFI activities one surface soil, one subsurface soil, and two sediment samples were collected and analyzed by gamma spectroscopy and for isotopic uranium, and uranium (Table 9.6-1, Figure 9.6-1). These samples are all designated AN95, screening-level data, because the samples were submitted directly to the off-site laboratory without first going through the SMO. The surface soil and sediment from which these samples were collected was subsequently removed as part of the 1997 VCA, and thus these sample results no longer represent current site conditions. During the 1997 VCA, 12 sediment samples from 6 locations were collected and analyzed for HE in 6 samples and isotopic uranium in 6 samples; in addition, one surface soil sample was collected and analyzed for HE, inorganic chemicals, and uranium (Table 9.6-1, Figure 9.6-1).

Uranium was detected at concentrations greater than the BVs in the four 1995 RFI screening-level samples (Table 9.6-2, Figure 9.6-2). Barium, thallium, and uranium were detected greater than BVs in one of the 1997 VCA decision-level confirmatory surface soil samples (Table 9.6-2, Figure 9.6-2). In addition, the DLs for antimony, cadmium, mercury, and silver were greater than the BVs in one of the 1997 VCA surface soil confirmatory sample (Table 9.6-2).

Uranium-234, uranium-235, and uranium-238 were detected at activities greater than the BVs in one or more of the 1995 RFI screening-level surface samples. Protactinium-231, protactinium-234M, thorium-231, thorium-234 were detected but have no BVs for comparison (Table 9.6-4, Figure 9.6-4). In addition, the DL for uranium-235 was greater than the BV in one subsurface soil sample (Table 9.6-4). Uranium-235 and uranium-238 were detected at activities greater than the BVs in one or more 1997 VCA decision-level confirmatory sediment samples (Table 9.6-4, Figure 9.6-4).

None of the 1995 RFI samples were analyzed for HE, SVOCs, or VOCs. HMX was detected in six 1997 VCA decision-level confirmatory sediment samples and TNT was detected in three 1997 VCA decision-level confirmatory sediment samples (Table 9.6-3, Figure 9.6-3).

Consolidated Unit 14-002(c)-99

This consolidated unit consists of two firing pads [SWMUs 14-002(d) and 14-002(e)] and a control building [SWMU 14-002(c)] (Figure 9.6-5). During the 1995 RFI, four surface soil samples were collected from the soil covering the sides of the control building that faced the firing sites (Figure 9.6-5; LANL 1996,

54086, p. 5-84). These samples were analyzed by gamma spectroscopy and for isotopic uranium, and uranium (Table 9.6-1; Figure 9.6-5). In addition, two surface soil samples were collected from the drainage area immediately to the south of the two firing sites (Figure 9.6-5). These two samples were analyzed by gamma spectroscopy, and for HE, isotopic uranium, inorganic chemicals, and uranium (Table 9.6-1). All six 1995 RFI samples are designated AN95, screening-level data, because the samples were submitted directly to the off-site laboratory without first going through the SMO.

Uranium was detected at concentrations greater than the BVs in the four surface soil samples collected from the soil on the sides of the control building (Table 9.6-2, Figure 9.6-6). The following inorganic chemicals were detected at concentrations greater than the BVs in one or both of the 1995 RFI screening-level samples collected in the drainage south of the firing sites: copper, lead, mercury, uranium, and zinc.

Uranium-235 and uranium-238 were detected at activities greater than the BVs in one or more of the 1995 RFI screening-level surface soil samples collected from the soil on the sides of the control building. Protactinium-234M, thorium-231, and thorium-234 were detected but have no BVs for comparison (Table 9.6-4, Figure 9.6-7). The minimum detectable activity for uranium-235 in one of these samples was greater than the BVs (Table 9.6-4). Uranium-238 was detected at concentrations greater than the BV in one or more of the 1995 RFI screening-level surface soil samples collected from the drainage to the south of the firing sites. Protactinium-231and thorium-234 were detected but have no BVs for comparison (Table 9.6-4, Figure 9.6-7). The minimum detectable activities for uranium-235 and uranium-238 were greater than the BVs in one sample (Table 9.6-8).

9.6.2.2 Nature and Extent of Contamination

Consolidated Unit 14-002(a)-99

AOC 14-001(f)

Based on the historical sampling at AOC 14-00(f), the vertical extent of inorganic chemicals, organic chemicals (including HE), and radionuclides has not been defined. Field-screening analyses of lead and uranium (using XRF) and gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI (field-screening data are summarized in Appendix D of the HIR; LANL 2006, 91697). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Because AOC 14-001(f) is located within the testing hazard zone of an active firing site and therefore may receive additional potential contamination from other activities, investigation and/or corrective action at AOC 14-00(f) has been deferred under Table IV-2 of the Consent Order.

SWMU 14-002(a)

Based on the historical sampling at SWMU 14-002(a), the vertical extent of inorganic chemicals, HE, and radionuclides has not been defined. Field-screening analyses of lead and uranium (using XRF) and gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI (field-screening data are summarized in Appendix D of the HIR; LANL 2006, 91697). Historical screening-level data have not

been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present, and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Because SWMU 14-002(a) is located within the testing hazard zone of an active firing site and therefore may receive additional potential contamination from other activities, investigation and/or corrective action at SWMU 14-002(a), has been deferred under Table IV-2 of the Consent Order.

SWMU 14-002(b)

Because no historical sampling has been performed at SWMU 14-002(b), the nature and extent of potential contamination is not known. Because SWMU 14-002(b) is located within the testing hazard zone of an active firing site and therefore may receive additional potential contamination from other activities, investigation and/or corrective action at SWMU 14-002(b), has been deferred under Table IV-2 of the Consent Order.

SWMU 14-002(f)

Because no historical sampling has been performed at SWMU 14-002(f), the nature and extent of potential contamination is not known. Sampling is proposed to define the nature and extent of potential contamination at SWMU 14-002(f) (section 9.11.2).

SWMU 14-009

Field-screening analyses for lead and uranium (using XRF) and gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI (field-screening data are summarized in Appendix D of the HIR; LANL 2006, 91697). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Because the majority of the analytical results for SWMU 14-009 are screening-level data, nature and extent are not defined by the historical sampling performed at the site. However, the screening-level and decision-level analytical results indicate the presence of inorganic chemicals, organic chemicals (including HE), and radionuclides in the surface at SWMU 14-009. All detections of organic chemicals, inorganic chemicals greater than BV, and radionuclides greater than BVs were below the current SSLs (Table 1.2-1). The lateral and vertical extent of potential contamination is not defined. Additional sampling is proposed to define nature and extent of potential contamination at SWMU 14-009 (section 9.11.2).

SWMU 14-010

Field-screening analyses of lead and uranium (using XRF) and gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI (field-screening data are summarized in Appendix D of the HIR; LANL 2006, 91697). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to

ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or the nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. All detections of organic chemicals, inorganic chemicals greater than BV, and radionuclides greater than BV were below the current SSLs (Table 1.2-1), with the exception of uranium in two samples. Based on the historical sampling at SWMU 14-010, the lateral and vertical extent of inorganic and organic chemicals and radionuclides have not been defined. Additional sampling is proposed to define nature and extent of potential contamination at SWMU 14-010 (section 9.11.2).

Consolidated Unit 14-002(c)-99

SWMU 14-002(c)

Field-screening analyses of lead and uranium (using XRF) and gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI (field-screening data are summarized in Appendix D of the HIR; LANL 2006, 91697). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or the nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Because the laboratory analytical results for SWMU 14-002(c) are screening-level data, nature and extent have not been defined by the historical sampling performed at the site. However, the screening-level and decision-level analytical results indicate the presence of inorganic chemicals and radionuclides in the surface at SWMU 14-002(c). All detections of inorganic chemicals greater than BV and radionuclides greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 14-002(c) (section 9.11.2).

SWMU 14-002(d)

Because no historical sampling has been performed at SWMU 14-002(d), the nature and extent of potential contamination have not been defined. However, investigation of SWMU 14-002(d) has been deferred under Table IV-2 of the Consent Order.

SWMU 14-002(e)

Because no historical sampling has been performed at SWMU 14-002(e), the nature and extent of potential contamination have not been defined. However, investigation of SWMU 14-002(e) has been deferred under Table IV-2 of the Consent Order.

9.6.2.3 Conceptual Site Model

The CSM for Consolidated Units 14-002(a)-99 and 14-002(c)-99 includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for Consolidated Units 14-002(a)-99 and 14-002(c)-99.

Source of Contamination

Contamination at Consolidated Units 14-002(a)-99 and 14-002(c)-99 primarily originated from residues from the test explosions performed at these firing sites.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for Consolidated Units 14-002(a)-99 and 14-002(c)-99 are summarized in section 1.1.1.

9.6.2.4 Summary of Additional Data/Corrective Action Requirements

The following sections summarize the additional data requirements and/or corrective action requirements for Consolidated Units 14-002(a)-99 and 14-002(c)-99. Details of the investigation sampling activities are discussed in section 9.11.2. While SWMUs 14-001(f), 14-002(a), and 14-002(b) [in Consolidated Unit 14-002(a)-99] and SWMUs 14-002(d) and 14-002(e) [in Consolidated Unit 14-002(c)-99] will require additional investigation and/or corrective action in the future, the investigation is currently deferred under Table IV-2 of the Consent Order.

Consolidated Unit 14-002(a)-99

SWMU 14-002(f)

No samples were collected at SWMU 14-002(f) in previous RFI activities. Sampling is proposed to define nature and extent of potential contamination at SWMU 14-002(f) (section 9.11.2).

SWMU 14-009

No samples have been collected to characterize the soil and debris contained in this surface disposal area during previous RFI activities. Based on the small quantity of soil and debris at this site (approximately 83 yd^3), removal followed by confirmatory sampling is proposed for SWMU 14-009. Additional sampling of the drainage is proposed to define nature and extent of potential contamination downgradient of the disposal area. Corrective action and sampling for SWMU 14-009 are presented in section 9.11.2.

SWMU 14-010

Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 14-010 (section 9.11.2).

Consolidated Unit 14-002(c)-99

SWMU 14-002(c)

Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 14-002(c). Samples will be collected from the footprint of building 14-5 after D&D activities are completed at this site. Additional sampling of the earthen berm surrounding three sides of building 14-5 is proposed for characterizing the soils that comprise the berm. Details of the investigation sampling activities are discussed in section 9.11.2.

9.7 Former Magazine and Storage Area: AOC 14-004(a)

9.7.1 Site Description and Operational History

AOC 14-004(a) is a storage magazine, structure 14-22, that was converted for use as a satellite accumulation area (LANL 1996, 54086, p. 5-81). This structure is constructed of reinforced concrete with an earthen floor and is 12 ft long x 8 ft wide x 10 ft high. It is surrounded by earthen berms on three sides (LANL 1996, 54086, p. 5-81).

9.7.2 Historical Investigations

No historical investigations have been conducted at AOC 14-004(a).

9.7.2.1 Analytical Results

No samples have been collected from AOC 14-004(a).

9.7.2.2 Nature and Extent of Contamination

Because no samples have been collected from AOC 14-004(a), the nature and extent of potential contamination at this AOC are not known. Sampling is proposed to define the nature and extent of potential contamination at AOC 14-004(a) (section 9.11.3).

9.7.2.3 Conceptual Site Model

The CSM for AOC 14-004(a) includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for AOC 14-004(a).

Source of Contamination

Contamination at AOC 14-004(a) primarily originated from either spillage of particulate HE stored in the magazines or liquids spilling/leaking when the magazine was converted to a hazardous waste satellite storage facility.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for AOC 14-004(a) are summarized in section 1.1.1.

9.7.2.4 Summary of Additional Data/Corrective Action Requirements

Sampling of the footprint of the magazine is proposed to define the nature and extent of potential contamination at AOC 14-004(a) (section 9.11.3).

9.8 HE Sump and Drainline: SWMU 14-006

9.8.1 Site Description and Operational History

SWMU 14-006 consists of an HE sump (structure 14-31), associated drainline, and outfall for a control building (14-23) that was constructed in late 1944 or 1945. The sump, constructed of steel and concrete, measures 8.3 ft long x 4.5 ft wide x 4.8 ft deep, and the sump outlet is plugged. Two floor drains and an

asphalt roof drain bypass the sump in a metal-covered concrete culvert and discharge to the outfall. Sludge in the sump was collected for burning (LANL 1994, 34755, p. 5.4-3).

9.8.2 Historical Investigations

An RFI was conducted at SWMU 14-006 in 1995 to determine whether contamination was present. Six surface and three subsurface samples from seven locations were collected from SWMU 14-006 during the 1995 RFI (Table 9.8-1, Figure 9.6-5). The samples were field-screened for radiation and HE; radiation levels were within background screening values, and no HE were detected. All samples were analyzed in an off-site laboratory for total uranium and isotopic uranium, and by gamma spectroscopy. Six samples were also analyzed for SVOCs.

These samples are all designated AN95, screening-level data, because the samples were submitted directly to the off-site laboratory without first going through the SMO.

9.8.2.1 Analytical Results

The analytical results for inorganic chemicals are presented in Table 9.8-2 and Figure 9.6-6. Analytical results for radionuclides are presented in Table 9.8-3 and Figure 9.6-7.

Uranium was detected in all of the samples at concentrations greater than the BV (Table 9-8-2, Figure 9.6-6).

No SVOCs were detected in any of the samples collected (LANL 2006, 91697, Table 9.3-3).

Uranium-235 and uranium-238 were detected at activities greater than the BVs one or more sample. Protactinium-231, thorium-231, and thorium-234 were detected but have no BVs for comparison (Table 9.8-3, Figure 9.6-7). The minimum detectable activities for uranium-235 and uranium-238 were greater than the BV in one or more of the samples (Table 9.8-3).

9.8.2.2 Nature and Extent of Contamination

Field-screening analyses of HE (using HE spot tests), lead and uranium (using XRF), and gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI (field-screening data are summarized in Appendix D of the HIR; LANL 2006, 91697). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or the nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Because the laboratory analytical results for SWMU 14-006 are screening-level data, the nature and extent are not defined by the historical sampling performed at the site. However, the screening-level analytical results indicate the presence of uranium and radionuclides at SWMU 14-006. None of the samples collected were analyzed for HE or TAL metals. All detections of uranium and radionuclides greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 14-006 (section 9.11.4).

9.8.2.3 Conceptual Site Model

The CSM for SWMU 14-006 includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 14-006.

Source of Contamination

Any contamination present in this sump, drainline, and outfall originated from effluent from building 14-23, which was served by this sump and drainline.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 14-006 are summarized in section 1.1.1.

9.8.2.4 Summary of Additional Data/Corrective Action Requirements

SWMU 14-006 consists of an inactive HE sump, a drainline, and an unpermitted outfall. The sump and associated drainline will be removed. Confirmatory sampling from the excavation will follow their removal. Additional sampling is proposed to define the nature and extent of potential contamination downgradient of the sump and outfall. The corrective action and sampling activities for SWMU 14-009 are described in section 9.11.4.

9.9 Septic System: SWMU 14-007

SWMU 14-007 is an inactive septic tank (structure 14-19) and its associated drain field.

9.9.1 Site Description and Operational History

The septic tank (structure 14-19) at SWMU 14-007 was built in 1944 to serve the restrooms in a shop building (14-6). Building 14-6 was later used as a darkroom where photoprocessing chemicals were used. It was converted to a storage facility in 1965. Constructed of reinforced concrete, the tank measured 7 ft long x 4 ft wide x 6 ft deep, with a capacity of 640 gal. Structure 14-19 was connected to an overflow drainline that ran northeast for 130 ft before daylighting into an outfall about 1 ft wide (LANL 1994, 34755, p. 5-5-1). A leach field was installed in 1988, replacing the drainline from the septic tank. The septic tank was disconnected in 1992 when building 14-6 was connected to the SWSC.

9.9.2 Historical Investigations

An RFI was conducted at SWMU 14-007 in 1995 to determine whether contamination was present (LANL 1996, 54086). Six soil samples were collected from the drain field and field-screened for radiation and HE; no HE were detected, and radiation levels were below background.

During the 1995 RFI activities, three surface and three subsurface soil samples were collected and analyzed for cyanide, SVOCs , isotopic uranium, and by gamma spectroscopy (Table 9.9-1, Figure 9.6-5). One sample was also collected during the 1995 RFI activities from the sludge within the septic tank and analyzed for cyanide , SVOCs, HE, isotopic uranium, and by gamma spectroscopy (Table 9.9-1, Figure 9.6-5).

These samples are all designated AN95, screening-level data, because the samples were submitted directly to the off-site laboratory without first going through the SMO.

9.9.2.1 Analytical Results

The analytical results for inorganic chemicals are presented in Table 9.9-2 and Figure 9.6-6. The analytical results for radionuclides are presented in Table 9.9-3 and Figure 9.6-7.

Cyanide was not detected at concentrations greater than the BV in any sample (Table 9.9-2). The DLs for cyanide were greater than the BV in two of the subsurface soil samples (Table 9.9-2).

Uranium-235 and uranium-238 were detected at activities greater than the BVs in one or more sample. Protactinium-231, thorium-231, and thorium-234 were detected but have no BVs for comparison (Table 9.9-3, Figure 9.6-7). The DL for uranium-235 was greater than the BV in one surface soil sample (Table 9.9-3). All of the radionuclide analysis results for the sludge sample were rejected (LANL 2006, 91697, section 9.4.3.1).

No SVOCs were detected in any of the soil samples (LANL 2006, 91697, Table 9.4-3). SVOCs and HE were not detected in the sludge sample from the septic tank (LANL 2006, 91697, Table 9.4-3).

9.9.2.2 Nature and Extent of Contamination

Field-screening analyses of lead and uranium (using XRF) were conducted as part of the 1995 RFI (field-screening data are summarized in Appendix D of the HIR; LANL 2006, 91697). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or the nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DL for the screening sampling are sufficient for worker protection and for determining locations where elevated concentrations/activities relative to other locations are present, and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or the nature and extent to DLs for organic chemicals. Because the laboratory analytical results for SWMU 14-007 are screening-level data, nature and extent have not been defined by the historical sampling performed at the site. However, the screening-level analytical results indicate the presence of radionuclides in surface and subsurface soil at SWMU 14-007. All detections of radionuclides greater than BVs were below the current SALs (Table 1.2-1). No metals, radionuclides, HE, or SVOCs were detected in the sludge sample collected from the septic tank. Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 14-007 (section 9.11.5).

9.9.2.3 Conceptual Site Model

The CSM for SWMU 14-007 includes subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 14-007.

Source of Contamination

Contamination in this septic system originated from effluent from the building 14-6. SWMU 14-007 received only sanitary waste from the restrooms in building 14-6.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 14-007 are summarized in section 1.1.1.

9.9.2.4 Summary of Additional Data/Corrective Action Requirements

SWMU 14-007 consists of an inactive septic tank (640-gal. capacity) and associated drainline. The septic tank and associated drainline will be removed and disposed of. Confirmatory samples will be collected from the bottom of the tank excavation. Additional subsurface samples will be collected from the drainline outfall and leach field to define nature and extent of contamination at the site. The corrective action and investigation sampling activities are discussed in section 9.11.5.

9.10 Buildings (Removed): AOCs C-14-003, C-14-004, C-14-005, and C-14-007

9.10.1 Site Description and Operational History

AOC C-14-003 is the site of a former decommissioned HE-preparation building (structure 14-4) (LANL 1996, 54086, p. 5-50). Constructed of wood, it measured 25 ft long x 12 ft wide x 8 ft high. It was built in 1944 and removed in 1952 (LANL 1996, 54086, p. 5-50). AOC C-14-003 is north of the current magazine (structure 14-22) in the central part of TA-14, within the loop made by the paved road that circles the magazine (LANL 1996, 54086, p. 5-50).

AOC C-14-004 is the site of a former electronics shop (building 14-7) built in 1945 and removed in 1952 (LANL 1996, 54086, p. 5-53). The wood structure was located 75 ft west of a control building (14-23), in the central part of TA-14. It measured 24 ft long x 15 ft wide x 9 ft high. The concrete foundation for building 14-7 still exists (LANL 1996, 54086, p. 5-54).

AOC C-14-005 is the site of a former decommissioned storage building (14-8) constructed in 1944 and removed in 1952 (LANL 1996, 54086, p. 5-57). The wood structure was located on the east side of the TA-14 access road and about 80 ft north of building 14-6, in the central part of TA-14 (LANL 1996, 54086, p. 5-57). It measured 16 ft long x 6 ft wide x 9 ft high. No visible signs remain of the former building (LANL 1996, 54086, p. 5-57).

AOC C-14-007 is the former site of a decommissioned storage building (14-10) constructed in 1945 and removed in 1952 (LANL 1996, 54086, p. 5-65). The wood structure was located in 160 ft west of a control building (14-23) in the central part of TA-14 (LANL 1996, 54086, p. 5-65). Former building 14-10 was 10 ft long x 10 ft wide x 8 ft high. All that remains of this structure is a small pile of bricks and mortar (LANL 1996, 54086, p. 5-65).

9.10.2 Historical Investigations

Samples collected at the removed buildings are summarized in Table 9.10-1 and shown in Figure 9.6-5. Analytical results for inorganic chemicals are presented in Table 9.10-2 and Figure 9.6-6. No SVOCs were detected in the samples analyzed. Analytical results for radionuclides are presented in Table 9.10-3 and shown in Figure 9.6-7.

These samples are all designated AN95, screening-level data because the samples were submitted directly to the off-site laboratory without first going through the SMO.

9.10.2.1 Analytical Results

AOC C-14-003

Two surface soil samples were collected from the building footprint of AOC C-14-003. Both samples were analyzed by gamma spectroscopy and for isotopic uranium (Table 9.10-1, Figure 9.6-5). One sample was analyzed for total uranium (Table 9.10-1).

Total uranium was not detected above the BV in the surface soil sample for which it was analyzed (LANL 2006, 91697, Table 9.5-2).

Thorium-234 was detected in both samples but has no BV for comparison (Table 9.10-3, Figure 9.6-7). The minimum detectable activity for uranium-238 was greater than the BV in one sample (Table 9.10-3).

AOC C-14-004

Two surface soil samples were collected from the building footprint of AOC C-14-004 and analyzed for SVOCs (Table 9.10-1, Figure 9.6-5). No SVOCs were detected in either sample (LANL 2006, 91697, Table 9.5-3).

AOC C-14-005

Two surface soil samples were collected from the building footprint of AOC C-14-005 and analyzed for total uranium (Table 9.10-1, Figure 9.6-5). Uranium was detected at concentrations greater than the BV in both samples (Table 9.10-2, Figure 9.6-6).

AOC C-14-007

Two surface soil samples were collected from the building footprint of AOC C-14-007 and analyzed for SVOCs and total uranium (Table 9.10-1, Figure 9.6-5). Uranium was detected at concentrations greater than the BV in both samples (Table 9.10-2, Figure 9.6-6). No SVOCs were detected in either sample (LANL 2006, 91697, Table 9.5-3).

9.10.2.2 Nature and Extent of Contamination

Field-screening analyses of lead and uranium (using XRF) and gamma radioactivity (using an NaI detector) were conducted as part of the 1995 RFI at the former buildings (AOCs C-14-003, C-14-004, C-14-005, and C-14-007) (the field-screening data are summarized in Appendix D of the HIR [LANL 2006, 91697]). Historical screening-level data have not been used to determine the proposed sampling locations in this work plan. The DLs for the screening sampling are sufficient to ensure worker protection and to determine the locations where elevated concentrations/activities relative to other locations are present and thus are useful for biasing sampling locations. However, they are inadequate for defining the nature and extent of contamination relative to background for inorganic chemicals and radionuclides or the nature and extent to DLs for organic chemicals. Thus, the proposed sampling is based on laboratory analytical results available for the sites included in this work plan. Because the laboratory analytical results for the former buildings are screening-level data, nature and extent have not been defined by the historical sampling performed at these sites. However, the screening-level results indicate the presence of uranium in the surface soil in the footprint of AOCs C-14-005 and C-14-007 and thorium-234 in the surface soil in the footprint of C-14-003. No samples were submitted for analysis of HE or TAL metals. All detections of uranium and radionuclides greater than BVs were below the current SSLs/SALs

(Table 1.2-1). Additional sampling is proposed to define nature and extent of potential contamination at AOCs C-14-003, C-14-004, C-14-005, and C-14-007 (section 9.11.6).

9.10.2.3 Conceptual Site Model

The CSM for AOCs C-14-003, C-14-004, C-14-005, and C-14-007 includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for AOCs C-14-003, C-14-004, C-14-005, and C-14-007.

Source of Contamination

Any contamination present may have resulted from spills or leaks of the materials used or stored in the buildings.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for AOCs C-14-003, C-14-004, C-14-005, and C-14-007 are summarized in section 1.1.1.

9.10.2.4 Summary of Additional Data/Corrective Action Requirements

Additional sampling from the footprints of the former buildings is proposed to define fully the nature and extent of contamination at AOCs C-14-003, C-14-004, C-14-005, and C-14-007. Details of the investigation sampling activities are discussed in section 9.11.6.

9.11 Scope of Investigation Activities

The following sections discuss the scope of the proposed investigation activities for the consolidated units, SWMUs, and AOCs associated with the TA-14 Firing Sites.

9.11.1 Active Firing Site: AOC 14-001(g)

AOC 14-001(g) was used to detonate scrap HE. Probably only small quantities of scrap HE were detonated at the site; the historical hazard zones are shown in Figure 9.11-1 for the radii of 250, 500, 1000, and 2000 ft. These historical hazard zones align with the current hazard zones for this area of the Laboratory. As a result of current Laboratory HE testing operations, the proposed investigation activities will not be implemented until testing operations impacting this AOC have ceased.

HE Survey and Removal

A ground survey will be performed by qualified HE/ordnance personnel to locate HE fragments in advance of any field activity. The purpose of the ground survey is to identify and remove potentially dangerous fragments of residual HE from the ground in advance of other investigation activities. The ground survey will include a visual survey augmented by a direct instrumentation survey such as mobile ion spectroscopy. Specific instrumentation is not provided at this time because the technology for HE detection is changing rapidly in response to deployment of Department of Homeland Security technology.

The ground survey will be performed with 100% coverage in the 250-ft-radius and 500-ft-radius zones. The ground survey will be performed with 75% coverage in the 1000-ft-radius zone. If residual HE is

detected in the 1000-ft-radius zone, the ground survey will be performed in the 2000-ft-radius zone with 75% coverage.

Beginning with the 250-ft-radius hazard zone, all visual or detected HE locations will be flagged by the survey team and removed at the same time for disposal at an appropriate RCRA-permitted facility. Each of the radial zones will be surveyed and cleared as the team progresses outward. In conjunction with the postremoval geodetic survey, an HE location map will be produced to characterize the extent of HE contamination and to determine the appropriate number of confirmatory soil sampling locations required.

Radiological Survey

Following the HE ground survey and removal, a surface radiological walkover survey will be performed by the on-site RCT before any other field work begins at the site. The survey will be capable of detecting the presence of radiological anomalies associated with uranium fragments, depleted uranium fragments, and soil areas containing disseminated oxidized uranium at or near the ground surface (0–0.5 ft bgs). The surveys will be conducted using NaI gamma scintillometers to identify either point-source anomalies (isolated metallic fragments or areas that decrease uniformly away from a discrete point) or area anomalies (disseminated oxidized uranium or other large area anomalies sometimes associated with disturbed areas such as roads, berms etc.). If the measurements exceed the scintillometer, a portable ion chamber may be utilized. Radiological survey results will be used to address potential worker safety and protection issues as well as identify target sampling locations requiring removal and subsequent confirmatory soil sampling for radionuclides. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

Beginning with the 250-ft-radius hazard zone, all detected radiological anomaly locations will be flagged by the survey team. A radiological anomaly will be defined as any location with a beta or gamma reading greater than 2 times the instrument background level. Each of the radial zones will be surveyed as the team progresses outward. In conjunction with the geodetic survey, a radiological anomaly map will be produced to determine the extent of radiological contamination and to assist with the appropriate strategy for removal actions and the determination of the number of confirmatory soil sampling locations required.

Geodetic Survey

A geodetic survey will be performed to locate all flagged HE locations (removal has already taken place) and flagged radiological anomalies. The geodetic survey will be used in support of HE and radiological mapping to define the extent of potential contamination.

Radiological Anomaly Removal

Point Source Anomalies

A corrective action will be performed to remove and dispose of all point-source anomalies identified in the survey. These anomalies are probably radioactive metallic fragments. Teams will progress outward from the 250-ft radial zone.

Area Source Anomalies

Soil samples will be collected from area source anomalies to identify the radiological isotopes present. Area source anomalies with radionuclides exceeding the industrial SALs (LANL 2005, 88493) will be excavated and removed for disposal.

Confirmatory Soil Sampling

Confirmatory soil samples will be collected from selected locations where HE removal and/or radiological anomaly removal has been conducted. In some cases, HE may be colocated with radiological anomalies. Because of the uniformity of test detonations within the hazard zones, the similar waste characteristics, and predominantly surface contamination waste distribution, field-screening and field analytical methods will be used to reduce the number of confirmatory samples required for off-site laboratory analyses.

For locations where scrap HE fragments has been removed, all locations will be sampled and analyzed using field analytical methods for RDX and HMX. Based upon the field analytical results, 20% of all field analytical samples (both detections and nondetections) will be sent to an off-site laboratory for analysis of explosive compounds, TAL metals, and perchlorate. If no HE fragments are found during the ground survey, all sampling locations for explosive compounds, TAL metals, and perchlorate will be based upon the location of radiological anomalies.

Following radiological anomaly removal actions, all locations will be sampled and field screened by alpha and gamma spectroscopy. Based on the field analytical results, 20% of all field-screened samples will be sent to an off-site laboratory for radionuclides by gamma and alpha spectroscopy, and TAL metals. A summary of the proposed off-site laboratory analyses is provided in Table 9.11-1. The analytical suites proposed for AOC 14-001(g) follow the general laboratory analytical strategy for firing sites, as presented in Table 2.9-1.

9.11.2 Consolidated Units 14-002(a)-99 and 14-002(c)-99

The proposed sampling locations for Consolidated Units 14-002(a)-99 and 14-002(c)-99 are shown in Figures 9.11-2 and 9.11-3, respectively. The analytical suites proposed for Consolidated Units 14-002(a)-99 and 14-002(c)-99 follow the general laboratory analytical strategy, as presented in Table 2.9-1.The proposed laboratory analyses are provided in Table 9.11-1.

SWMU 14-002(f)

- *Sampling to define nature and extent of potential contamination at footprint of former structure 14-12.* Samples will be collected from two locations (1 and 2) at the corners of the location of former structure 14-12 (Figure 9.11-2) from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. One angled borehole (BH3) will be advanced below the footprint of the former structure 14-12 (Figure 9.11-2), and samples will be collected at 1.5–2 ft into tuff and 2.5–3 ft into tuff. The samples will be analyzed for explosive compounds, perchlorate, TAL metals and for radionuclides by alpha and gamma spectroscopy. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

SWMU 14-009

Soil and debris from the surface disposal area within the footprint of SWMU 14-009 will be removed, followed by confirmatory sampling. Investigation samples will also be collected in the adjacent drainage channel.

Radiological Survey

All work at SWMU 14-009 will be preceded by a surface radiological walkover survey capable of detecting the presence of beta and gamma radioactivity. Radiological survey results will be used to address potential worker safety and protection issues as well as help target sampling locations requiring focused laboratory analysis of radionuclides. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

Excavation

According to historical records, the surface disposal area at SWMU 14-009 measures approximately 45 ft x 50 ft x 1 ft deep. Soil and debris will be removed based on visual observation down to the tuff interface.

Characterization, Confirmatory, and Nature and Extent Sampling

- *Sampling to characterize the soil and debris (SWMU 14-009).* A minimum of two characterization samples will be collected from the excavated soil and debris to determine appropriate disposal options. The waste characterization samples will be analyzed for toxicity characteristic leaching procedure (TCLP) metals, TAL metals, SVOCs, TCLP SVOCs, HE, and for radionuclides by alpha and gamma spectroscopy. Characterization sampling will be performed to determine if residual soil may be left on-site or must be removed and disposed of as waste. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels.
- *Confirmatory sampling to confirm removal of contaminated material (SWMU 14-009).* Postexcavation surface and shallow subsurface samples (4 through 9) will be collected at six locations from depths of 1.5–2 ft into tuff and 2.5–3 ft into tuff (Figure 9.11-2). Samples will be collected using a hand auger and/or power hand auger and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, SVOCs, and for radionuclides by alpha and gamma spectroscopy. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels.
- *Sampling to define nature and extent of contamination within the drainage channel (SWMU 14-009).* SWMU 14-009 is located adjacent to a southwesterly trending drainage. Surface and shallow subsurface samples (10 through 14) will be collected at five locations from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff (Figure 9.11-2). Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. The proposed sampling locations may be moved based upon field conditions; sampling locations will be targeted towards soil-accumulation areas located within the drainage channel. The samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL

metals, HE, VOCs, SVOCs, and for radionuclides by alpha and gamma spectroscopy. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 14-010

- *Sampling to define nature and extent of contamination at the former sump and drainline location (SWMU 14-010).* One borehole will be advanced at historical location 14-01038 to a target TD of 15 ft bgs. Subsurface samples will be collected at 1–1.5 ft bgs, 5–5.5 ft bgs, 10–10.5 ft bgs, and at the target TD of 14.5–15 ft bgs (Figure 9.11-2). Samples 15 and 16 will be collected at 20 ft intervals along the former drainline from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff (Figure 9.11-2). Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, SVOCs, and for radionuclides by alpha and gamma spectroscopy. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Borehole samples will be collected using mechanical drilling methods. Other samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent within the drainage (SWMU 14-010).* One sample will be collected at historical location 14-01043 near the drainline outfall along with three locations (17 through 19) downgradient and within the drainage channel from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff (Figure 9.11-2). Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. The proposed sampling locations may be moved based upon field conditions; sampling locations will be targeted towards soil accumulation areas located within the drainage channel. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, SVOCs, and radionuclides using alpha and gamma spectroscopy. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

SWMU 14-002(c)

SWMU 14-002(c) consists of a control building (structure 14-5) covered by a dirt berm on the east and west sides. Structure 14-5 is currently scheduled for D&D in 2006. Sampling at SWMU 14-002(c) will include the following.

- *Samples to characterize the earthen berm and to define nature and extent of contamination below the berm.* Samples will be collected from four historical locations (14-01089 through 14-01092) from depths of 1.5–2 ft into the berm, 1.5–2 ft into tuff, and 2.5–3 ft into tuff (Figure 9.11-3). All samples will be field screened and analyzed for cyanide, perchlorate, TAL metals, explosive compounds, and radionuclides using alpha and gamma spectroscopy. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

- *Nature and extent* samples *within the former structure footprint.* Surface and shallow subsurface samples (1 and 2) will be collected from within the footprint of the structure after D&D activities are completed (Figure 9.11-3). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff (Figure 9.11-3). Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field screened and analyzed for cyanide, perchlorate, TAL metals, explosive compounds, and radionuclides using alpha and gamma spectroscopy. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

9.11.3 Storage Magazine: AOC 14-004(a)

- *Nature and extent sampling within the magazine earthen floor [AOC 14-004(a)]*. Shallow subsurface samples will be collected at two locations (3 and 4) within the earthen floor of the magazine structure 14-22 (Figure 9.11-3). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. The analytical suites proposed for AOC 14-004(a) follow the general laboratory analytical strategy for HE storage magazines, as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

9.11.4 HE Sump and Drainline: SWMU 14-006

Excavation

SWMU 14-006 consists of a sump that measures 4.5 ft long by 8.3 ft wide by 4.8 ft deep and an associated drainline. The sump and associated drainline will be removed and disposed of.

Postexcavation and Nature and Extent Sampling

- *Confirmatory sampling (SWMU 14-006).* Samples will be collected at two locations (5 and 6) from the bottom of the excavation (approximately 5 ft bgs), 1.5–2 ft into tuff and 2.5–3 ft into tuff (Figure 9.11-3). All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. The analytical suites proposed for SWMU 14-006 follow the general laboratory analytical strategy for sumps and drainlines, as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Nature and extent sampling at the drainline outfall and drainage (SWMU 14-006).* Surface and shallow subsurface samples will be collected from two new locations (7 and 8) and two historical locations (14-01077 through 14-01079 and 14-01054 through 14-01056) to define the vertical and lateral extent of contamination (Figure 9.11-3). Samples from new locations will be collected at

depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Samples from the historical locations will be collected at depths of 1–1.5 ft bgs, 1.5–2 ft into tuff and 2.5–3 ft into tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. The analytical suites proposed for the SWMU 14-006 drainage follow the general laboratory analytical strategy for outfalls and drainages, as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

9.11.5 Septic System: SWMU 14-007

Excavation

The inactive septic tank at SWMU 14-007 measures 4 ft x 7 ft x 6 ft deep. The inactive septic tank and associated drainline will be removed and disposed of.

Confirmatory and Nature and Extent Sampling

- *Confirmatory sampling (SWMU 14-007).* Following excavation activities, confirmatory soil samples will be collected from two locations (9 and 10) from the bottom of the excavation (approximately 7 ft bgs), 1.5–2 ft into tuff and 2.5–3 ft into tuff (Figure 9.11-3). All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. The analytical suites proposed for SWMU 14-007 follow the general laboratory analytical strategy for septic tanks, as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods after the excavation has been backfilled.
- *Nature and extent sampling at the drainline outfall (SWMU 14-007).* Two boreholes will be advanced at two historical locations (14-01081 and 14-01086) to define the lateral and vertical extent of contamination at the drainline outfall. The boreholes will be advanced to 15 ft bgs, with samples collected at 10–10.5 ft bgs and target TD of 15–15.5 ft bgs. All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. The analytical suites proposed for the SWMU 14-007 outfall follow the general laboratory analytical strategy for outfalls, as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods.

9.11.6 Buildings (Removed): AOCs C-14-003, C-14-004, C-14-005, C-14-007

AOC C-14-003

- *Nature and extent sampling within the former building footprint (AOC C-14-003).* Shallow subsurface samples will be collected at two historical locations (14-01066 and 14-01067) within the footprint of the former building 14-4 (Figure 9.11-3). The samples will be collected from depths of 1–1.5 ft bgs, 1.5–2 ft into tuff, and 2.5–3 ft into tuff. The soil sampling depth interval may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field

screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs The analytical suites proposed for AOC C-14-003 follow the general laboratory analytical strategy for storage buildings and shops as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

AOC C-14-004

- *Nature and extent sampling within the former building footprint (AOC C-14-004).* Shallow subsurface samples will be collected at two historical locations (14-01068 and 14-01069) within the footprint of the former building 14-7 (Figure 9.11-3). The samples will be collected from depths of 1–1.5 ft bgs, 1.5–2 ft into tuff, and 2.5–3 ft into tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. The analytical suites proposed for AOC C-14-004 follow the general laboratory analytical strategy for storage buildings and shops, as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

AOC C-14-005

- *Nature and extent sampling within the former building footprint (AOC C-14-005).* Shallow subsurface samples will be collected at two historical locations (14-01070 and 14-01071) within the footprint of the former building 14-8 (Figure 9.11-3). The samples will be collected from depths of 1–1.5 ft bgs, 1.5–2 ft into tuff, and 2.5–3 ft into tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. The analytical suites proposed for AOC C-14-005 follow the general laboratory analytical strategy for storage buildings and shops, as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

AOC C-14-007

- *Nature and extent sampling within the former building footprint (AOC C-14-007).* Shallow subsurface samples will be collected at two historical locations (14-01074 and 14-01075) within the footprint of the former building 14-10 (Figure 9.11-3). The samples will be collected from depths of 1–1.5 ft bgs, 1.5–2 ft into tuff, and 2.5–3 ft into tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, explosive compounds, VOCs, and SVOCs. The analytical suites proposed for AOC C-14-007 follow the general laboratory analytical strategy for storage buildings and shops, as presented in Table 2.9-1. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of

2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

10.0 SUBAGGREGATE 9: TA-15 WEST

Subaggregate 9, TA-15 West, consists of 4 consolidated units (13 SWMUs), 5 individual SWMUs, and 3 AOCs (Figure 1.1-10). These sites are further divided into areas or related sites:

- Firing Site G, Consolidated Unit 15-004(g)-00 [SWMUs 15-004(g) and 15-008(c)] and AOC C-15-001
- MDA Z, SWMU 15-007(b)
- Debris disposal area, SWMU 15-008(d)
- "The Hollow," Consolidated Unit 15-009(a)-00 [SWMUs 15-009(a), 15-011(a), 15-011(b), and 15-011(c), 15-014(i), 15-014(j), and 15-014(k)], AOC 15-014(g), and AOCs C-15-007 and C-15-010
- Septic systems, Consolidated Unit 15-009(f)-00 [SWMUs 15-009(f) and 15-009(k)] and SWMU 15-009(i)
- Outfalls, Consolidated Unit 15-014(a)-00 [SWMUs 15-014(a) and 15-014(b)]
- Gulch Firing Site, SWMU 15-004(i).

Investigation of Firing Site G [SWMU 15-004(g)] is deferred under Table IV-2 of the Consent Order. Therefore, while all background information for SWMU 15-004(g) is provided in this investigation work plan, the investigation activities are deferred.

The Gulch Firing Site [SWMU 15-004(i)] is proposed for no additional investigation and/or corrective action, because the site has never been located by the Laboratory. Information regarding SWMU 15-004(i) is provided in Appendix B.

10.1 Surface Conditions

TA-15 West is located on a small, gently rounded mesa bounded on the west by Cañon de Valle where the normally easterly trending drainage takes an abrupt turn to the south, then southwest, before turning easterly again; it is bounded on the east by the southeast-trending Potrillo Canyon (Plate 1). The elevation of the mesa ranges from 7280 to 7150 ft amsl. The topography of the mesa top has a gentle, 5- to 10-degree slope to the east, except where the mesa slopes to the west at the point at which Cañon de Valle becomes a steep cliff (approximately 250 ft vertically over 400 ft horizontally).

The Hollow site was moderately to severely burned in the 2000 Cerro Grande fire, with substantial damage to several structures. The groundcover and canopy surrounding the site was also substantially damaged. MDA Z [SWMU 15-007(b)] received minor burn damage, primarily to the ground cover (LANL 2001, 71342, pp. 24-25).

The surface vegetation community of the Cañon de Valle Aggregate Area is described in section 2.1.

10.2 Surface Water

Section 2.2 presents a discussion of the Cañon de Valle Aggregate Area surface water, which is representative of TA-15 West. Specific sites (Plate 1) monitored in Subaggregate 9 are listed in Table 2.2-1.

In 2005, no water samples were collected from any SMAs in Subaggregate 9 (LANL 2006, 92600, Attachment 2, Table B-1).

10.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3

10.4 Subsurface Conditions

10.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.1.

10.4.2 Cliff Retreat and Fractures

Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

10.4.3 Hydrogeology

The hydrogeology of the Cañon de Valle Aggregate Area is discussed in section 2.4.3. Well CdV-R-15-3 is located within this subaggregate, approximately 500 ft southeast of AOC C-15-010. During the first three rounds of sampling (through July 2001) in well CdV-R-15-3, water was not detected in the uppermost three screens: screen #1 (617.7–624.5 ft), screen #2 (800.8–807.8 ft), and screen #3 (964.8–980.9 ft) (LANL 2002, 73179, p. 27). The presence, location, and depth of a perched zone directly beneath this subaggregate remain unknown.

10.5 Firing Site G: Consolidated Unit 15-004(g)-00 and AOC C-15-001

Firing Site G, or Consolidated Unit 15-004(g)-00, consists of SWMUs 15-004(g) and 15-008(c), an inactive firing site and a surface disposal site, respectively. This consolidated unit is located on the southern side of TA-15. Investigation of Firing Site G, SWMU 15-004(g), is deferred under Table IV-2 of the Consent Order. AOC C-15-001 consists of a pile of soil near Consolidated Unit 15-004(g)-00 on the south side of TA-15 (LANL 1993, 20946, p. 8-17).

10.5.1 Site Description and Operational History

SWMU 15-004(g) is part of inactive Firing Site G and is deferred under Table IV-2 of the Consent Order because it lies within active hazard zones and is surrounded by testing operations. This firing site operated from 1949 to 1953 (LANL 1993, 20946, p. 8-17) and was used for somewhat larger tests than the 10–20 lb of HE used in the explosive tests conducted at nearby Consolidated Unit 15-004(b)-99, Firing Sites A and B (LANL 1993, 20946, p. 8-5, 8-17). These tests included detonating explosives devices containing HE and metallic components, including natural and depleted uranium. The structures at Firing Site G consisted of 15-9, a control chamber, 15-28, and a barricade known as structure 15-16 to the south of the control chamber. Structure 15-28 and the barricade were removed in 1967, and only the

control chamber remains. The exact nature of the materials used during explosives tests at this site is not known but may have included natural or depleted uranium, other inorganic chemicals, and HE (LANL 1993, 20946, p. 8-17). Firing Site E-F operated during the same time period as Firing Site G (DOE 1987, 08663, p. TA-15-3). The following materials are listed as being used at Firing Site E-F: steel, aluminum, lithium hydride, mercury, lead, beryllium, boron, cadmium, gold, tritium, HMX, RDX, TNT, pentaerythritol tetranitrate (PETN), cycotol, and baratol (DOE 1987, 08663, p. TA-15-3). While not documented, these same materials were probably used, although in lesser quantities, in the explosive-related tests conducted at Firing Site G. The firing site has a hazard radius of approximately 2000 ft.

SWMU 15-008(c) consists of several small surface disposal areas used to dispose of residues from tests conducted at SWMU 15-004(g). These areas are located in the vicinity of structure 15-233, a carpenter shop south of structure 15-9. The exact nature of the materials disposed of at this site and its period of operation are not known (LANL 1993, 20946, p. 8-17).

AOC C-15-001 is a pile of soil near Consolidated Unit 15-004(g)-00, which is located on the south side of TA-15. This AOC is located south of the firing site, northwest of the carpenter shop (building 15-233). Previous investigations have not addressed AOC C-15-001 specifically, although they have addressed the general area that could have been impacted by SWMU 15-004(g), including the area occupied by AOC C-15-001. Radionuclides were detected at AOC C-15-001 during a 1988 field survey (LANL 1993, 20946, p. 8-17).

10.5.2 Historical Investigations

An aerial radiological survey of SWMU 15-004(g) performed in 1982 did not identify radiation levels above background at the firing site or in nearby disposal areas. However, small pieces of metallic uranium were observed on top of structure 15-9 during a 1986 field survey (LANL 1993, 20946, p. 8-17).

A radiological survey and soil sampling were performed near SWMU 15-008(c) in 1987 as part of the Comprehensive Environmental Assessment and Response Program (CEARP) field survey (DOE 1989, 15365, p. 5-26-7) and elevated radiation, including elevated levels of uranium, were detected in the soil. No HE were detected in this area. Also, in 1988, a pile of soil at AOC C-15-001 that was contaminated with radionuclides was documented during a field survey (LANL 1993, 20946, p. 8-17). The source of the soil comprising this AOC is not known, nor is the date the soil pile was created.

Several areas of radiological surface contamination at the firing site were identified during surface surveys conducted in 1991 and 1996. In 1995, an RFI was performed and included surface soil sampling.

SWMU 15-004(g)

Four surface and four subsurface soil samples were collected from six locations during 1995 RFI activities and analyzed for inorganic chemicals and uranium (Table 10.5-1, Figure 10.5-1). None of the samples were submitted through the SMO and are designated AN95 and are screening-level data.

SWMU 15-008(c)

Two surface soil samples from two locations were collected during 1995 RFI activities and analyzed for uranium (Table 10.5-1, Figure 10.5-1). None of the samples were submitted through the SMO and are designated AN95 and are screening-level data.

AOC C-15-001

Two surface soil samples from two locations were collected in 1995 and analyzed for isotopic uranium (Table 10.5-1, Figure 10.5-1). Neither of these samples was submitted through the SMO; both are designated AN95 and are screening-level data. In 1997, two surface soil samples and two subsurface tuff samples from two locations were collected and analyzed for isotopic uranium (Table 10.5-1, Figure 10.5-1).

10.5.2.1 Analytical Results

SWMU 15-004(g)

The following inorganic chemicals were detected at concentrations greater than BVs in one or more samples from SWMU 15-004(g) (Table 10.5-2, Figure 10.5-2): barium, cadmium, copper, lead, sodium, uranium, and zinc. The data are all screening-level data.

SWMU 15-008(c)

Uranium was detected at concentrations greater than the BV in all soil samples collected from SWMU 15-008(c) (Table 10.5-2, Figure 10.5-2). The data are all screening-level data.

AOC C-15-001

Total uranium (screening-level data) was also detected at concentrations greater than the BV in the soil samples collected from AOC C-15-001 (Table 10.5-2, Figure 10.5-2). Radionuclide analytical results are provided in Table 10.5-3 and shown in Figure 10.5-3. Uranium-234, uranium-235, and uranium-238 were detected at activities greater than BVs in one or more samples from AOC C-15-001.These radionuclide results are decision-level data (Table 10.5-3 and Figure 10.5-3).

10.5.2.2 Nature and Extent of Contamination

SWMU 15-004(g)

Several inorganic chemicals were detected at concentration greater than BVs in samples collected from Firing Site G, SWMU 15-004(g) (Table 10.5-2, Figure 10.5-2). In particular, uranium (fragments and oxidized uranium) was detected at concentrations exceeding the Region 9 industrial PRG of 200 mg/kg (http://www.epa.gov/region09/waste/sfund/prg/). During the 1995 RFI, samples were collected within 250 ft of the actual firing area, and no data are currently available from the remaining historical hazard zones for the site. Additionally, because Firing Site G is located within an active hazard zone for other test areas at the Laboratory and may receive additional metal residues/potential contamination from other testing activities, investigation and/or corrective action at SWMU 15-004(g) has been deferred under Table IV-2 of the Consent Order.

SWMU 15-008(c)

Uranium (probably from uranium fragments and oxidized uranium) was detected at concentrations greater than the BV in samples collected from SWMU 15-008(c) (Table 10.5-2, Figure 10.5-2). In particular, uranium was detected at concentrations exceeding the Region 9 industrial PRG of 200 mg/kg. The nature and extent of inorganic chemicals and organic chemicals have not been defined because no samples

have been analyzed for these suites. Total uranium has not been defined for SWMU 15-008(c). Removal and confirmatory sampling are proposed for SWMU 15-008(c) (section 10.11.1).

AOC C-15-001

Total uranium and isotopic uranium (probably from uranium fragments and oxidized uranium) were detected at concentrations/activities greater than the BVs in samples collected from AOC C-15-001 (Tables 10.5-2 and 10.5-3, Figures 10.5-2 and 10.5-3). The nature and extent of inorganic and organic chemicals have not been defined because no samples have been analyzed for these suites. The nature and extent of uranium and isotopic uranium, the primary COPCs at this site, have not been defined for AOC C-15-001. All detections of uranium and radionuclides greater than BVs were below the current SSLs (Table 1.2-1). Removal and confirmatory sampling are proposed for AOC C-15-001 (section 10.11.1).

10.5.2.3 Conceptual Site Model

The CSM for Firing Site G includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for Firing Site G.

Source of Contamination

Contamination at SWMU 15-004(g) primarily originated from HE residues, uranium metal, and uranium metal fragments resulting from the test explosions. Contamination at SWMU 15-008(c) and AOC C-15-001 may have come from materials disposed of at these two sites and also includes contaminants from the test explosions.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for Firing Site G are summarized in section 1.1.1.

10.5.2.4 Summary of Additional Data/Corrective Action Requirements

Firing Site G, SWMU 15-004(g), requires additional investigation and/or corrective action but is currently deferred under Table IV-2 of the Consent Order. The material contained in soil/debris mounds associated with SWMU 15-008(c) and AOC C-15-001 has not been completely characterized; however, the mounds probably contain uranium metal fragments and oxidized uranium from the activities at SWMU 15-004(g). The total volume of material at these sites has not been measured, but based on historical documentation, it is estimated to be less than 10 yd^3. Because the volume of material at these sites is relatively small, removal and confirmatory sampling beneath the mounds are proposed (section 10.11.1).

10.6 MDA Z Landfill: SWMU 15-007(b)

MDA Z [SWMU 15-007(b)] is an inactive disposal area located south of the side road leading to building 15-233 (LANL 1993, 20946, p. 9-7).

10.6.1 Site Description and Operational History

SWMU 15-007(b) consists of a disposal area known as MDA Z, located northwest of inactive Firing Site G in the south central portion of TA-15, that operated from 1965 to 1981 (Figure 1.1-10). MDA Z is roughly

triangular, is approximately 200 × 50 ft, and appears to have been constructed in a natural depression (LANL 1995, 50294, p. 4-58). Thus, one face grades to native soil, and one face is approximately 15 ft high and easily visible (LANL 1995, 50294, p. 4-58).

The MDA Z landfill received construction debris, consisting of used sandbags filled with concrete and steel blast matting, from the Pulse High Energy Radiographic Machine Emitting X-Rays (PHERMEX) (LANL 1993, 20946, p. 9-7). The PHERMEX facility is used to x-ray photograph test explosions. Partially burned wood was visible during the 1995 RFI activities (LANL 1995, 50294, p. 4-58). When the site was surveyed after the 2000 Cerro Grande fire, only minor burning of ground cover was noted (LANL 2000, 70351, p. 17).

During the 1995 RFI activities, a geophysical survey was conducted to estimate the volume of the disposal area. The survey results indicated a roughly triangular surface area, with a wedge shape grading from about 10 ft deep at the face to the surface level landward edge. The triangle is roughly 225 ft long x 50 ft wide and yields a surface area of 11,250 ft^2 (the area of a triangle is one-half the base times the height). If the depth were a uniform 10 ft, then the volume would be about 4000 yd^3. However, because the shape tapers from the face to the opposite boundary, it probably measures no more than half this size or approximately 2000 yd^3 (LANL 1995, 50294, p. 4-60).

10.6.2 Historical Investigations

Previous investigations at MDA Z included an aerial radiological survey in 1982 that identified no radiation greater than background. The 1987 CEARP field reconnaissance indicated the presence of uranium contamination (DOE 1987, 08664, p. MDA Z-1).

A DOE environmental study in 1989 included sampling of MDA Z and analysis for metals (LANL 1993, 20946, p. 9-7).

A Phase I RFI for MDA Z was conducted in 1994 to determine whether potential contaminants were present at concentrations above SALs in surface and near-surface soil at the site and, if so, to what extent (LANL 1995, 50294). A total 11 locations were samples (for surface and/or shallow subsurface depth intervals) and analyzed for inorganic chemicals, radionuclides, VOCs, and/or SVOCs (not all samples were analyzed for all analytes) (Table 10.6-1, Figure 10.6-1). Samples collected for inorganic chemical analysis were analyzed by either or both the Laboratory's Chemical Science and Technology (CST) ChemVan and off-site laboratories. Samples collected for radiochemical analysis were analyzed by the CST RADVan. VOCs and SVOCs were analyzed by an off-site laboratory. The off-site analytical results are screening-level data because the data validation packages were not available. Also, both the CST ChemVan and CST RADVan results are screening-level data.

10.6.2.1 Analytical Results

Inorganic chemicals (CST Off-site). The following inorganic chemicals were detected at concentrations greater than BVs in one or more samples from MDA Z: beryllium, cadmium, calcium, copper, lead, mercury, silver, and uranium (Table 10.6-2, Figure 10.6-2). Half the locations sampled contain total uranium exceeding the Region 9 industrial PRG of 200 mg/L (maximum concentration of 1378 mg/L total uranium) to maximum depths sampled of 1.5 ft bgs. Additionally, antimony, cadmium, mercury, and silver had DLs for one or more sample greater than BVs (Table 10.6-2).

Inorganic chemicals (CST ChemVan). The following inorganic chemicals were detected at concentrations greater than BVs in one or more samples from MDA Z: antimony, barium, cadmium, chromium, copper, manganese, lead, mercury, nickel, thorium, titanium, uranium, and zinc (Table 10.6-2, Figure 10.6-2).

Additionally, antimony, mercury, selenium, and uranium had DLs for one or more sample greater than BVs (Table 10.6-2).

A total of 10 PAHs and 2 SVOCs were detected in 1 or more of the 7 surface and 6 subsurface samples collected from MDA Z. The detected organic chemicals are presented in Table 10.6-3 and shown in Figure 10.6-3.

One surface sample had detectable levels of gross gamma radiation (Table 10.6-4, Figure 10.6-4).

10.6.2.2 Nature and Extent of Contamination

Because all analytical results for MDA Z are screening-level data, they have not been used to define nature and extent. Based on the screening data collected, however, half the locations sampled contain total uranium exceeding the Region 9 industrial PRG of 200 mg/L (maximum concentration of 1378 mg/L total uranium) to maximum depths sampled of 1.5 ft bgs. Low concentrations of PAHs were detected in several samples, although none exceed SALs (NMED 2006, 92513). The extent of inorganic and organic chemicals and radionuclides is not known throughout the MDA. All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1), with the exception of uranium in five samples. Because of the large quantity of debris throughout the MDA and the high levels of total uranium, characterization of the MDA requires significant trenching and sorting of material. Therefore, on-site segregation, characterization, and removal of hazardous and/or radioactive waste are proposed, followed by confirmatory sampling (section 10.11.2).

10.6.2.3 Conceptual Site Model

The CSM for MDA Z includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for MDA Z.

Source of Contamination

Contamination at MDA Z primarily originated from construction and explosives testing debris disposed of at the MDA. Additionally, the MDA lies within the hazard test zones of active sites.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for MDA Z are summarized in section 1.1.1.

10.6.2.4 Summary of Additional Data/Corrective Action Requirements

MDA Z is an inactive, unlined disposal area. Most of the debris on the exposed face is not covered with soil and is therefore exposed to rain and snowmelt (LANL 1993, 20946, p. 4-58). Removal of the contaminated soil and debris from this disposal area is proposed. Migration of COPCs into the drainage downgradient of the debris area and directly below the debris area has not been documented. Additional work proposed for MDA Z, including removal activities followed by confirmatory sampling beneath the removed debris area and investigative sampling in the drainage area, is described in section 10.11.2.

10.7 Debris Disposal Area: SWMU 15-008(d)

SWMU 15-008(d) consists of building debris located south of building 15-22 (LANL 1993, 20946, p. 6-10).

10.7.1 Site Description and Operational History

Building 15-22 is located on the west side of TA-15 in an area known as the Hollow (Figure 10.8-1). SWMU 15-008(d) is a debris pile located south of building 15-22. This building was originally constructed in the 1970s as a control center for an experimental accelerator in nearby building 15-203. This control center was not needed to operate the accelerator, and the building was never used for this purpose (LANL 1993, 20946, p. 6-10).

10.7.2 Historical Investigations

No previous environmental investigations have been conducted for SWMU 15-008(d) (LANL 1993, 20946, p. 6-10).

10.7.2.1 Analytical Results

No samples have been collected from SWMU 15-008(d).

10.7.2.2 Nature and Extent of Contamination

Because no samples have been collected from SWMU 15-008(d), the nature and extent of contamination have not been defined. Additional sampling is proposed to define the nature and extent of contamination at SWMU 15-008(d) (section 10.11.3).

10.7.2.3 Conceptual Site Model

The CSM for SWMU 15-008(d) includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 15-008(d).

Source of Contamination

Contamination at SWMU 15-008(d) primarily originated from construction debris and other materials disposed of at the site.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 15-008(d) are summarized in section 1.1.1.

10.7.2.4 Summary of Additional Data/Corrective Action Requirements

The site contains debris from undocumented sources, and the nature and extent of potential contamination within the disposal area are not known. Removal of the disposal area and confirmatory sampling in the footprint of the former debris area are proposed. A discussion of corrective action and the investigation activities is provided in section 10.11.3.

10.8 The Hollow: Consolidated Unit 15-009(a)-00, AOC 15-014(g), and AOCs C-15-007 and C-15-010

Consolidated Unit 15-009(a)-00 consists of SWMUs 15-009(a), 15-011(a), 15-011(b), and 15-011(c), 15-014(i), 15-014(j), and 15-014(k), which includes a septic tank, concrete trench drains, an unlined drainage channel/dry well used as a seepage pit, outfalls to Cañon de Valle, and a roof drain,

respectively. The SWMUs in this consolidated unit are associated with liquid waste disposal from a set of buildings in the northwestern corner of TA-15 known as the Hollow (LANL 1996, 54977, pp. 5-24, 5-28, 5-31, 5-35, 5-45).

AOC 15-014(g) is a former outfall located east of the northeastern corner of a laboratory building (15-203) (LANL 1993, 20946, p. 5-3).

AOC C-15-007 consists of stained soil from an accidental release(s) outside the western corner of a pulsed-power laboratory in building 15-19 (LANL 1993, 20946, p. 10-4). AOC C-15-010 is the former site of an underground fuel tank (structure 15-52) that was removed in 1989. This tank was located 15 ft south of the southeastern corner of building 15-20 (LANL 1993, 20946, p. 10-8). All aboveground structures at the Hollow were removed by D&D in 2005.

10.8.1 Site Description and Operational History

The Hollow was a series of buildings (15-20, 15-194, and 15-203) connected by a common roof structure (LANL 1993, 20946, p. 10-2) that had been assembled over the years beginning in 1949. These buildings had various uses, including assembly buildings, laboratories, and shops (LANL 1993, 20946, p. 10-2). Although documentation of what was assembled is not available, it was probably devices tested elsewhere at TA-15. In the 1960s, building 15-194 had a vapor degreaser (the solvent is not specified but probably was halogenated hydrocarbons such as trichloroethene, tetrachloroethene, or 1,1,1-trichlorethane). The vapor degreaser was removed in 1987 (LANL 1993, 20946, p. 10-2). Building 15-194 also contained stripping tanks that employed sulfuric, chromic, and/or hydrochloric acids (LANL 1993, 20946, p. 10-2).

The Hollow was moderately to severely damaged in the 2000 Cerro Grande fire, and several structures were destroyed. The ground cover and the canopy surrounding the site were damaged extensively (LANL 2000, 70351, p. 16).

SWMU 15-009(a) is an inactive septic tank (structure 15-51) that received sanitary wastes from a shop, laboratory (building 15-20) and sink as well as drinking fountain discharges from a shop building (15-50). This reinforced-concrete septic tank was constructed in 1949 and discharged directly to an outfall [most likely SWMU 15-011(c)] until the construction of a dry well/seepage pit [SWMU 15-011(b)] in 1978 (LANL 1993, 20946, p. 5-3). The RFI work plan states that no evidence was found of any hazardous materials being disposed of through this septic tank (LANL 1993, 20946, p. 5-3). The RFI work plan also states that the tank was sampled for HE in 1981; none were detected. The presence of HE in effluent from building 15-50 is possible, although not likely, because the building appeared to have been used only to assemble devices; no machining or casting of HE occurred in the building. It is not known whether the septic tank remains in place or was removed during the 2005 D&D activities at the Hollow.

SWMU 15-011(a) consists of a group of concrete trench drains that formerly received discharges from a shop and laboratory building (15-20) during the early years of its operation. These discharges were reportedly routed to SWMU 15-011(a) through another trench drain [SWMU 15-014(k)] and two manholes (structures 15-150 and 15-151). The effluent from SWMU 15-011(a) was then discharged through a drainpipe to an outfall near the edge of Cañon de Valle [SWMU 15-011(c)]. One of the manholes (structure 15-150) was reportedly removed in the past, and the drainpipe to the outfall was plugged (LANL 1993, 20946, p. 10-2). The RFI work plan did not identify the types of materials that might have been discharged to SWMU 15-011(a). The description and drawings in the RFI work plan, however, indicate that discharges from SWMU 15-011(a) went to the septic tank [SWMU 15-009(a)] through the remaining manhole (structure 15-151) rather than to the outfall [SWMU 15-011(c)]. Before the 1995 RFI, no environmental investigations had been conducted at SWMU 15-011(a) (LANL 1993, 20946, p. 10-8).

SWMU 15-011(b) is an unlined drainage channel from a pulse-power laboratory (building 15-194) that leads to an outfall at the edge of Cañon de Valle [SWMU 15-011(c)]. According to the 1990 SWMU report (LANL 1990, 07512, 15-011 summary), a dry well (4 ft diameter and 50 ft deep) was installed next to the canyon edge in 1978 to receive the effluent from building 15-194. The construction plans for this dry well (LANL 1978, 05526) indicated it was approximately 80 ft from the southwest corner of building 15-194, directly north of the oil-storage tank. The 1990 SWMU report indicates that the dry well is covered with soil and is difficult to locate (LANL 1990, 07512, 15-011 summary). The construction plans are entitled "Acid Rinse Tank," indicating that the dry well was directly connected to a rinse tank associated with the acid tanks in building 15-194. The RFI work plan indicated that building 15-194 had a vapor degreaser and stripping tanks and that SWMU 15-011(b) may have received solvent discharges and acid solutions containing sulfuric, chromic, and/or hydrochloric acids (LANL 1993, 20946, p. 10-82). The vapor degreaser was reportedly removed from building 15-194 around 1987, and the source of discharges at the time the OU 1086 work plan was written was limited to a sink (LANL 1993, 20946, p. 10-2). Before the 1995 RFI, no environmental investigations had been conducted at SWMU 15-011(b) (LANL 1993, 20946, p. 10-82).

SWMU 15-011(c) consists of an outfall on the edge of Cañon de Valle, where many of the drainages associated with discharges in the Hollow converge. These discharges include those from SWMUs 15-011(a), 15-011(b), and 15-014(i), 15-014(j), and 15-014(k). SWMU 15-011(c) is located west of, and approximately 100 ft lower than, the buildings in the Hollow. Materials that may have been discharged to this SWMU include acid residues from sulfuric acid, chromic acid, and hydrochloric acid, degreasing solvents, and inorganic chemicals. Before the 1995 RFI, no environmental investigations had been conducted at SWMU 15-011(c) (LANL 1993, 20946, pp. 10-2–10-4).

SWMU 15-014(i) was a roof drain from a pulse-power laboratory (building 15-194) and the shelter between buildings 15-194 and 15-50. The roof drain appeared to discharge to the ground surface at the northeastern corner of building 15-194 and joined the surface drainage that flowed to an outfall [SWMU 15-011(c)]. The RFI work plan did not identify specific materials expected to be present in roof-drain discharges. Before the 1995 RFI, no environmental investigations had been conducted at SWMU 15-014(i) (LANL 1993, 20946, pp. 10-2–10-4).

SWMU 15-014(j) consists of three outfalls from building 15-50 and an associated concrete trench drain. On the basis of the information presented in the RFI report (LANL 1993, 20946), it appears that these outfalls discharge to the ground surface north of building 15-50, and the concrete trench drain joins the surface drainage that flows to an outfall [SWMU 15-011(c)]. The trench drain is described as being partially asphalt just below the outfalls. The specific materials discharged to this SWMU were not described. Building 15-50 was a shop building that had been used to perform various activities associated with the assembly of experiments conducted at the TA-15 firing sites. Before the 1995 RFI, no environmental investigations had been conducted at SWMU 15-014(j) (LANL 1993, 20946, pp. 10-2–10-4).

SWMU 15-014(k) consists of a trench drain that collected discharges from building 15-20 during the early years of its operation. These discharges were reportedly routed to two manholes (structures 15-150 and 15-151) and then to another trench drain [SWMU 15-011(a)]. The effluent from SWMU 15-011(a) was then discharged through a drainpipe to an outfall near the edge of Cañon de Valle, SWMU 15-011(c). One of the manholes (structure 15-150) was reportedly removed in the past (LANL 1993, 20946, p. 10-2), and the drainpipe to the outfall was plugged. The discharge from the remaining manhole (structure 15-151) was then routed to a septic tank [SWMU 15-009(a)]. The description and drawings in the RFI work plan, however, indicate that discharges from SWMU 15-014(k) went to the septic tank [SWMU 15-009(a)] through structure 15-151 rather than to SWMU 15-011(c). Before the 1995 RFI, no environmental investigations had been conducted at SWMU 15-014(k) (LANL 1993, 20946, p. 10-8.)

AOC 15-014(g) is a former outfall located east of the northeastern corner of a laboratory building (15-203), one of the buildings in an area on the western side of TA-15 referred to as the Hollow. The RFI work plan reported that this outfall was used to discharge once-through cooling water from an air compressor located in building 15-203 (LANL 1993, 20946). The 1990 SWMU report (LANL 1990, 07512, 15-014 summary) indicated that this outfall received discharges from a pulse-power laboratory (building 15-194) located near building 15-203. The outfall discharged to a ditch partially lined with asphalt to Cañon de Valle. The air compressor in building 15-203 reportedly was taken out of service and removed. The period of operation of this outfall is unknown. This outfall operated under a NPDES permit but was removed from the permit before 1994. No hazardous materials are known to have discharged to this outfall. Before the 1995 RFI, no environmental investigations had been conducted at AOC 15-014(g) (LANL 1993, 20946, p. 5-3)

AOC C-15-007 consists of stained soil outside the western corner of a pulsed-power laboratory in building 15-194. This soil staining was noted during a reconnaissance visit in 1988. When the RFI work plan was prepared, this soil had been covered with a metal transportainer (structure 15-372). The stained soil is adjacent to an asphalt-paved parking area (LANL 1993, 20946, p. 10-4).

AOC C-15-010 is the site of a former underground fuel tank (structure 15-52) that was removed in 1989. Structure 15-52, located 15 ft south of the southeastern corner of building 15-20 (LANL 1993, 20946, p. 10-8), was used to store diesel fuel. It was approximately 15 to 20 ft long, 7 ft in diameter, with a capacity of 4000 gal to 6000 gal.

10.8.2 Historical Investigations

Samples were collected from the consolidated units, SWMUs, and AOCs in the Hollow during RFI activities in 1995, 1996, and 1997. All of the 1995 and 1996 analytical results are designated AN95 and are screening-level data, because the samples were submitted to off-site analytical laboratories without going through the SMO. All of the 1997 sample results are decision-level data. The historical samples collected are summarized in Table 10.8-1, and sampling locations are shown in Figure 10.8-1.

The following samples were collected during the 1995 and 1996 RFI activities:

- SWMU 15-009(a): one sludge sample was analyzed for inorganic chemicals, uranium, isotopic uranium, gamma-emitting radionuclides, HE, SVOCs, and VOCs.
- SWMU 15-011(b): one surface and one subsurface soil sample from a single location were analyzed for inorganic chemicals, uranium, HE, and SVOCs. The subsurface sample also was analyzed for VOCs.
- SWMU 15-011(c): two surface and two subsurface soil samples from two locations were analyzed for inorganic chemicals, uranium, and SVOCs. The two subsurface samples also were analyzed for VOCs.
- AOC 15-014(g): two surface soil samples from a single location and one sample were analyzed for HE and the other sample was analyzed for inorganic chemicals, uranium, and SVOCs.
- SWMU 15-014(i): one surface and one subsurface soil sample from a single location were analyzed for inorganic chemicals, uranium, HE, and SVOCs. The subsurface sample also was analyzed for VOCs.
- SWMU 15-014(j): two surface and two subsurface soil samples and one sludge sample from three locations were analyzed for inorganic chemicals, uranium, and SVOCs. Two subsurface samples also were analyzed for VOCs.

- AOC C-15-010: two subsurface soil samples from two locations were analyzed for inorganic chemicals, uranium, SVOCs, and VOCs.

During the 1997 RFI activities, the following samples (all decision-level data) were collected:

- AOC C-15-007: 6 surface soil samples and 10 subsurface soil and tuff samples from 7 locations were analyzed for inorganic chemicals, VOCs, and SVOCs (not all samples included all 3 analyses).
- AOC C-15-010: A total of 19 samples were collected from 3 boreholes (0–6.5 ft, location 15-02517; 0–55 ft, location ID 15-02518; 0–33 ft, location ID 15-02519) and were analyzed for VOCs, SVOCs, and TPH-diesel range organics (DRO) (not all samples included all three analyses).

10.8.2.1 Analytical Results

The results of the RFI sampling are presented in Table 10.8-2 and shown in Figure 10.8-2 for inorganic chemicals and Table 10.8-3 and Figure 10.8-3 for organic chemicals.

SWMU 15-009(a)

Twenty-one inorganic chemicals were detected in the septic tank sludge (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc). Seven organic chemicals (acetone, bis(2-ethylhexyl)phthalate,butanone[2-], chlorobenzene, methylene chloride, phenol, toluene), primarily solvents, were detected in the septic tank sludge (Table 10.8-3). No HE or radionuclides were detected in the sludge sample. No samples were collected beneath or next to the septic tank.

SWMU 15-011(b)

All of the analytical results for SWMU 15-011(b) are screening-level data. Seven inorganic chemicals (cadmium, copper, lead, mercury, silver, uranium, and zinc) were detected in one or both of the soil samples at concentrations greater than the BVs. In addition, thallium had DLs for one or more sample greater than BVs (Table 10.8-2). Six organic chemicals (acetone, dichlorodifluoromethane, methylene chloride, toluene, trichloroethane[1,1,1-], trichloroethene) were detected in the subsurface soil sample (Table 10.8-3). No HE were detected in either of the samples.

SWMU 15-011(c)

All of the analytical results for SWMU 15-011(c) are screening-level data. Mercury and uranium were detected at concentrations greater than the BVs in the surface soil samples. In addition, thallium had DLs for one or more sample greater than BVs (Table 10.8-2). Three organic chemicals (acetone, methylene chloride, and trichlorofluoromethane) were detected in the subsurface soil samples (Table 10.8-3).

AOC 15-014(g)

All of the analytical results for AOC 15-014(g) are screening-level data. Five inorganic chemicals (copper, lead, mercury, uranium, and zinc) were detected in one surface soil sample at concentrations greater than the BVs. In addition, thallium had DLs for one or more sample greater than BVs (Table 10.8-2). Nine organic chemicals (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene,

bis(2-ethylhexyl)phthalate, chrysene, hexachlorobutadiene, phenanthrene, pyrene) were also detected in one surface soil sample (Table 10.8-3). No HE were detected in either of the samples.

SWMU 15-014(i)

All the analytical results for SWMU 15-014(i) are screening-level data. Eight inorganic chemicals were detected at concentrations greater than the BVs in one or both of the two soil samples from the site (antimony, cadmium, copper, lead, silver, thallium, uranium, and zinc). In addition, thallium had DLs for one or more sample greater than BVs (Table 10.8-2). Acetone and methylene chloride were detected in the subsurface soil sample (Table 10.8-3). No HE were detected in either of the samples.

SWMU 15-014(j)

All the analytical results for SWMU 15-014(j) are screening-level data. Numerous inorganic chemicals were detected at concentrations greater than the BVs in one or more of the samples from the site (aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, uranium, vanadium, and zinc). In addition, thallium had DLs for one or more sample greater than BVs (Table 10.8-2). Fourteen organic chemicals (acetone, benzene, bromodichloromethane, carbon tetrachloride, dichlorobenzene[1,4-], dichloropropene[1,1-], ethylbenzene, fluorene, isopropylbenzene, methylene chloride, tetrachlorothene, toluene, trichloroethane[1,1-], and xylenes, primarily solvents) were detected in the subsurface soil samples.

AOC C-15-007

The analytical results for the 1997 samples collected at AOC C-15-007 are decision-level data. Based upon these results, copper, lead, uranium, and zinc were detected at concentrations greater than the BVs in 9 or more of the 14 samples. The organic chemicals detected in the 1997 samples were primarily PAHs, primarily fluoranthene, pyrene, and phenanthrene, all 3 of which were detected in at least 9 of the 14 samples.

AOC C-15-010

Only the analytical results for the 1997 samples collected at AOC C-15-010 are decision-level data. Thirty-eight aromatic and halogenated organic chemicals were detected in samples from AOC C-15-010 in 1997. SVOCs (primarily PAHs) were primarily present in samples collected from depths less than 5 ft bgs. Conversely, VOCs were primarily present in tuff samples deeper than 5.5 ft bgs. TPH-DRO was detected in all but one sample from the three boreholes (Table 10.8-3).

10.8.2.2 Nature and Extent of Contamination

SWMU 15-009(a)

Inorganic and organic chemicals were detected in the septic tank sludge. However, no samples were collected beneath or next to the septic tank, and no samples are associated with a seepage pit to which the septic tank was connected in 1978. The nature and extent of potential contamination at SWMU 15-009(a) have not been defined. In addition, it is not known if the tank still exists. Removal of the tank (if it still exists) and sampling are proposed to define the nature and extent of potential contamination at SWMU 15-009(a) (section 10.11.4).

SWMU 15-011(a)

Because no historical sampling has been performed at SWMU 15-011(a), the nature and extent of potential contamination at this site are not known. Sampling is proposed to define the nature and extent of potential contamination at SWMU 15-009(a) (section 10.11.4).

SWMU 15-011(b)

Because the laboratory analytical results for SWMU 15-011(b) are screening-level data, the nature and extent are not defined by the historical sampling performed at the site. However, the screening-level results indicate the presence of inorganic and organic chemicals (primarily solvents) in the surface and subsurface at SWMU 15-011(b). All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 15-011(b) (section 10.11.4).

SWMU 15-011(c)

Because the laboratory analytical results for SWMU 15-011(c) are screening-level data, nature and extent have not been defined by the historical sampling performed at the site. However, the screening-level results indicate the presence of inorganic and organic chemicals (primarily solvents) in the surface and subsurface at SWMU 15-011(c). All detections of organic and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 15-011(c) (section 10.11.4).

AOC 15-014(g)

Because the laboratory analytical results for AOC 15-014(g) are screening-level data, nature and extent have not been defined by the historical sampling performed at the site. However, the screening-level results indicate the presence of inorganic and organic chemicals (primarily solvents and PAHs) in the surface and subsurface at AOC 15-014(g). All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define nature and extent of potential contamination at AOC 15-014(g) (section 10.11.4).

SWMU 15-014(i)

Because the laboratory analytical results for SWMU 15-014(i) are screening-level data, nature and extent have not been defined by the historical sampling performed at the site. However, the screening-level results indicate the presence of inorganic and organic chemicals (solvents) in the surface and subsurface at SWMU 15-014(i). Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 15-014(i) (section 10.11.4).

SWMU 15-014(j)

Because the laboratory analytical results for SWMU 15-014(j) are screening-level data, nature and extent have not been defined by the historical sampling performed at the site. However, the screening-level results indicate the presence of inorganic and organic chemicals (primarily solvents) in the surface and subsurface at SWMU 15-014(j). All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define nature and extent of potential contamination at SWMU 15-014(j) (section 10.11.4).

SWMU 15-014(k)

Because no historical sampling has been performed at SWMU 15-014(k), the nature and extent of potential contamination at this site are not known. Sampling is proposed to define the nature and extent of potential contamination at SWMU 15-014(k) (section 10.11.4).

AOC C-15-007

The analytical results for AOC C-15-007 indicate the presence of inorganic and organic chemicals (primarily PAHs) in the surface and subsurface at AOC C-15-007. The organic chemicals showed a trend of decreasing concentrations with increasing depth (Table 10.8-3, Figure 10.8-3). However, the nature and extent of contamination have not been defined. Based upon proximity of the site to a paved asphalt area, the RFI concluded that the detected PAHs were not associated with site activities (LANL 1997, 56917, p. 5-12). All detections of organic and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define nature and extent of potential contamination at AOC C-15-007 (section 10.11.4).

AOC C-15-010

Only the analytical results for the 1997 samples collected at AOC C-15-010 are decision-level data. These samples were analyzed for SVOCs, VOCs, and TPH-DRO. Thirty-eight aromatic and halogenated organic chemicals were detected in samples from AOC C-15-010. SVOCs (primarily PAHs) were generally present in samples collected from depths less than 5 ft bgs. Conversely, VOCs were more predominant in subsurface tuff samples deeper than 5.5 ft bgs. TPH-DRO was detected in all but one sample from the three boreholes (Table 10.8-3). To evaluate the vertical extent of the TPH-DRO contamination, the concentration of TPH-DRO with depth for each borehole is shown in Figure 10.8-4. The maximum detected TPH-DRO concentration (2200 mg/kg) in the borehole at location 15-02517 was at the maximum depth of the borehole (6.5 ft bgs). The maximum detected TPH-DRO concentration (13,000 mg/kg) in the borehole at location 15-02518 was at a depth of 15 ft bgs but was still 12,000 mg/kg at 40 ft bgs. At the maximum borehole depth of 55 ft bgs, the TPH-DRO concentration was 56 mg/kg. For the borehole at location 15-02519, the maximum detected TPH-DRO concentration (19,000 mg/kg) was at the maximum borehole depth of 33 ft bgs. All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define nature and extent of potential contamination at AOC C-15-010 (section 10.11.4).

10.8.2.3 Conceptual Site Model

The CSM for the Hollow includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for the Hollow.

Source of Contamination

Contamination at the Hollow primarily originated from release of vapor degreasing solvents and acid strippers used in the shops that discharged through trench drains, drainlines, and outfalls and from spills associated with solvent handling. In addition, fuel leaking from the UST has migrated into the subsurface. It is also possible that HE were released when building 15-50 was used to assemble experiments for testing at TA-15 firing sites.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for the Hollow are summarized in section 1.1.1.

10.8.2.4 Summary of Additional Data/Corrective Action Requirements

Surface and subsurface data are required throughout the Hollow to determine (1) the nature of contamination and (2) the lateral and vertical extent of detected contamination at the site. A discussion of the corrective action and investigation activities for the Hollow is presented in section 10.11.4.

10.9 Septic Systems: Consolidated Unit 15-009(f)-00 and SWMU 15-009(i)

Consolidated Unit 15-009(f)-00 consists of SWMUs 15-009(f) and 15-009(k), which are inactive septic tanks in the building 15-183 area on the western side of TA-15. SWMU 15-009(f) is a septic tank (structure 15-195) located approximately 75 ft northwest of a laboratory and office building (15-183). SWMU 15-009(k) is a septic tank (structure 15-423) located approximately 250 ft north of a radiographic support laboratory (building 15-313).

SWMU 15-009(i) is a septic tank at the location of inactive Firing Site G on the southwestern side of TA-15 (LANL 1993, 20946, pp. 8-18, 8-20).

10.9.1 Site Description and Operational History

The septic tank, structure 15-195 [SWMU 15-009(f)], was originally constructed in 1961 as a 1280-gal. tank, distribution box, and leach field to receive sanitary waste from building 15-183 (LANL 1990, 07512, 15-009 summary). In 1976, the system was upgraded to a 4000-gal. tank and seepage pit (LANL 1990, 07512, 15-009 summary) 4 ft in diameter and 50 ft deep (LANL 1993, 20946, p. 10-18).

The septic tank, structure 15-423, associated with SWMU 15-009(k), has a 1000-gal. capacity and emptied to a leach field (LANL 1990, 07512, 15-009 summary). It was constructed to receive sanitary waste from building 15-313 (LANL 1990, 07512, 15-009 summary); the date of construction is not known.

SWMU 15-009(i), structure 15-284, was constructed in 1979 at the location of inactive Firing Site G on the southwestern side of TA-15. This septic tank has a 750-gal. capacity and is constructed of reinforced concrete. The septic tank received sanitary waste from building 15-233. The tank overflows to a drainline (LANL 1990, 07512, 15-009 summary). At the time of the 1995 RFI, this septic tank was active, and sampling was deferred until decommissioning (LANL 1996, 54977, p. 5-1). No documents were identified that confirmed the removal of the septic tank; if it is present, it is probably inactive. Previous environmental investigations at Firing Site G have not been conducted at SWMU 15-009(i) (LANL 1990, 07512, 15-009 summary).

10.9.2 Historical Investigations

One sample was collected from a septic tank in Consolidated Unit 15-009(f)-00 during RFI activities in 1995 (Table 10.9-1, Figure 10.9-1). This sludge sample was submitted to an off-site laboratory for analysis but was not processed through the SMO. Therefore, the 1995 analytical results are screening-level data (AN95). The sample was analyzed for inorganic chemicals, uranium, HE, SVOCs, and VOCs. In 1996, a single sludge sample was collected from SMWU 15-009(k) and analyzed for inorganic chemicals (no other analyses were conducted on this sample); in addition, a single sludge sample was collected and analyzed for uranium, HE, SVOCs, and VOCs.

10.9.2.1 Analytical Results

The results of the 1995 RFI sludge sampling are presented in Table 10.9-2 and shown in Figure 10.9-2 for inorganic chemicals and in Table 10.9-3 and Figure 10.9-3 for organic chemicals. The samples were not analyzed for radionuclides.

SWMU 15-009(f)

Twenty-one inorganic chemicals were detected in the sludge sample from SWMU 15-009(f).

Methylene chloride was the only organic chemical detected in the sludge sample from SWMU 15-009(f).

No HE were detected in the sludge sample from SWMU 15-009(f). The samples were not analyzed for radionuclides.

SWMU 15-009(k)

Sixteen inorganic chemicals were detected in the sludge sample from SWMU 15-009(k). Methylene chloride was the only organic chemical detected in the sludge sample from SWMU 15-009(k). No HE were detected in the sludge sample from SWMU 15-009(k). The samples were not analyzed for radionuclides.

SWMU 15-009(i)

No samples were collected at SWMU 15-009(i), and therefore no analytical results are available.

10.9.2.2 Nature and Extent of Contamination

SWMU 15-009(f)

No samples have been collected from the soil beneath or next to SWMU 15-009(f). The nature and extent of potential contamination are not known at SWMU 15-009(f). Additionally, it is not known if the tank still exists. Removal action (if the tank exists) and additional sampling are proposed for SWMU 15-009(f) (section 10.11.5).

SWMU 15-009(k)

No samples have been collected from the soil beneath or next to SWMU 15-009(k). The nature and extent of potential contamination are not known at SWMU 15-009(k). In addition, it is not known if the tank still exists. Removal action (if the tank exists) and additional sampling are proposed for SWMU 15-009(k) (section 10.11.5).

SWMU 15-009(i)

Because no historical sampling has been performed at SWMU 15-009(i), the nature and extent of potential contamination at this site are unknown. In addition it is not known if the tank still exists. Removal action (if the tank exists) and additional sampling are proposed for 15-009(i) (section 10.11.5).

10.9.2.3 Conceptual Site Model

The CSM for Consolidated Unit 15-009(f)-00 and SWMU 15-009 (i) includes subsurface sources of potential contamination. The following sections summarize the CSM for these septic systems.

Source of Contamination

Contamination at these septic systems [SWMUs 15-009(f), 15-009(k), and 15-009(i)] originated from effluent from the buildings they served. The RFI work plan (LANL 1993, 20946, p. 10-18) states that SWMUs 15-009(f) and 15-009(k) received only sanitary waste from laboratory buildings. No details on the wastes received at SWMU 15-009(i) are available.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMUs 15-009(f), 15-009(k), and 15-009(i) are summarized in section 1.1.1.

10.9.2.4 Summary of Additional Data/Corrective Action Requirements

Sampling is proposed to characterize any potential subsurface release of contamination from these septic tanks to the surrounding soil. A discussion of the removal action (if the tanks exist) and investigation activities proposed for the septic systems are presented in section 10.11.5.

10.10 Outfalls, Building 15-183: Consolidated Unit 15-014(a)-00

Consolidated Unit 15-014(a)-00 consists of SWMUs 15-014(a) and 15-014(b), outfalls associated with a laboratory and office building (15-183) located in the southwestern corner of TA-15 (LANL 1993, 20946, p. 10-14).

10.10.1 Site Description and Operational History

SWMU 15-014(a) is an outfall used for discharges from various drains in building 15-183 since 1961. Before the outfall was permitted by EPA, discharges to this SWMU included photographic waste (silver, cyanide, and organic chemicals). The drain associated with this outfall was reportedly replaced in 1987 with a new drain installed at the same location and along the same path as the old drain. Photographic wastes were not discharged to this outfall after it was added to the NPDES permit. This outfall is located approximately 130 ft from the edge of Cañon de Valle. Discharges from the outfall follow a surface drainage to the canyon, and the location of the drainage is marked by increased vegetation (LANL 1993, 20946, p. 10-14). This outfall was removed from the NPDES permit as of January 14, 1998. No previous investigations have been conducted at SWMU 15-014(a), other than routine monitoring required by the former NPDES permit. This monitoring included sampling and analysis for pH and silver and, before August 1994, for cyanide.

SWMU 15-014(b) consists of two separate outfalls from drains in building 15-183. Drains discharging to these outfalls include 13 floor drains, 5 sinks, and 1 water fountain. Effluents from a photographic laboratory, containing the same constituents as those at SWMU 15-014(a), may have also discharged to this outfall. Consequently, the same potential contaminants as those at SWMU 15-014(a) (silver, cyanide, and organic chemicals) are associated with SWMU 15-014(b) (LANL 1993, 20946, p. 10-14). The dates of use for SWMU 15-014(b) are not known. The two outfalls are located west of a trailer on the western side of the parking lot to the west of building 15-183. Discharges from the two outfalls follow surface

drainages that join to create a single drainage approximately 130 ft from the edge of Cañon de Valle. This drainage then carries the combined flow of the two outfalls to the canyon (LANL 1993, 20946, p. 10-14).

10.10.2 Historical Investigations

During 1995 RFI activities, four surface and three subsurface soil samples were collected from SWMU 15-014(a), and six surface and six subsurface soil samples were collected from SWMU 15-014(b) (Table 10.10-1, Figure 10.10-1). All of the samples were submitted to an off-site analytical laboratory for analysis but were not processed through the SMO. Therefore, the analytical results are considered screening-level data (AN95). All samples were analyzed for inorganic chemicals and SVOCs but only the subsurface samples were analyzed for VOCs.

10.10.2.1 Analytical Results

The results of the 1995 RFI sampling are presented in Table 10.10-2 and Figure 10.10-2 for inorganic chemicals and in Table 10.10-3 and Figure 10.10-3 for organic chemicals.

SWMU 15-014(a)

Copper and nickel were detected at concentrations greater than BVs in one surface soil sample. Silver was detected at concentrations greater than the BV in two surface and three subsurface soil samples.

Five organic chemicals (acetone, dichlorobenzene[1,3-], methylene chloride, toluene, and xylenes) were detected in one or more of the three subsurface soil samples collected from the site.

SWMU 15-014(b)

Cadmium, copper, and zinc were detected at concentrations greater than the BVs in one or more of the samples from the site. The DLs for antimony and thallium were greater than the BV in one or more of the samples from the site.

Sixteen organic chemicals (acenaphthene, acetone, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, butanone[2-], chrysene, dibenz(a,h)anthracene, dibenzofluoran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylene chloride, naphthalene, phenanthrene, pyrene) were detected in surface and subsurface soil samples from the site.

10.10.2.2 Nature and Extent of Contamination

SWMU 15-014(a)

Because the analytical results for SWMU 15-014(a) are screening-level data, nature and extent have not been defined by the historical sampling performed at the site. However, the screening-level results indicate the presence of inorganic and organic chemicals in the surface and subsurface at SWMU 15-014(a). All detections of organic and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1). Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 15-014(a) (section 10.11.6).

SWMU 15-014(b)

Because the analytical results for SWMU 15-014(b) are screening-level data, nature and extent have not been defined by the historical sampling performed at the site. However, the screening-level results indicate the presence of inorganic and organic chemicals in the surface and subsurface at SWMU 15-014(b). All detections of organic chemicals and inorganic chemicals greater than BVs were below the current SSLs (Table 1.2-1), with the exception of benzo(a)pyrene in two samples and benzo(b)fluoranthene in one sample. Additional sampling is proposed to define the nature and extent of potential contamination at SWMU 15-014(b) (section 10.11.6).

10.10.2.3 Conceptual Site Model

The CSM for these outfalls [Consolidated Unit 15-014(a)-00, which includes SWMUs 15-014(a) and 15-014(b)], covers both surface and subsurface sources of potential contamination. The following sections summarize the CSM for these outfalls.

Source of Contamination

Contamination at these outfalls originated from building 15-183 and may include photographic development waste constituents (silver, cyanide, and organic chemicals).

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for Consolidated Unit 15-014(a)-00 are summarized in section 1.1.1.

10.10.2.4 Summary of Additional Data/Corrective Action Requirements

Sampling of surface and subsurface soil and tuff will be conducted at Consolidated Unit 15-004(a)-00 to define the nature and extent of potential contamination. Proposed investigation activities at Consolidated Unit 15-004(a)-00 are presented in section 10.11.6.

10.11 Scope of Investigation Activities

The following sections discuss the details of the proposed corrective actions and investigation activities for Subaggregate 9.

10.11.1 Firing Site G: Consolidated Unit 15-004(g)-00 [SWMUs 15-004(g) and 15-008(c)] and AOC C-15-001

SWMU 15-004(g)

Investigation of SWMU 15-004 (g) is deferred under Table IV-2 of the Consent Order. Therefore, no investigation or corrective action activities are proposed at this time.

SWMU 15-008(c) and AOC C-15-001

SWMU 15-008(c) and AOC C-15-001 are proposed for waste characterization sampling of the soil matrix and sampling beneath the disposal areas to determine whether potential contaminants have migrated

from the disposal area into the subsurface soil and tuff. Because the sites are located within 150 ft of the Firing Site G detonation area, HE surveys and removal activities must precede all other site activities.

HE Survey and Removal

A ground survey will be performed by qualified HE/ordnance personnel to locate HE fragments in advance of any field activity. The purpose of the ground survey is to identify and remove potentially dangerous fragments of residual HE from the ground in advance of other investigation activities. The ground survey will include a visual survey augmented by a direct instrumentation survey, such as mobile ion spectroscopy. Specific instrumentation is not provided at this time because the technology for HE detection is changing rapidly in response to deployment of Department of Homeland Security technology.

The ground survey will be performed with 100% coverage on top of both sites and in all work zones including exclusion, support, and all roads in the 250-ft radius of the two sites. Beginning with the 250-ft-radius hazard zone, all visual or detected HE locations will be flagged by the survey team and removed at the same time for disposal at an appropriate RCRA-permitted facility. In conjunction with the postremoval geodetic survey, a HE location map will be produced to characterize the extent of HE contamination.

Radiological Survey

Following the HE ground survey and removal, work at SWMU 15-008(c) and AOC C-15-001 will be preceded by a surface radiological walkover survey capable of detecting the presence of beta and gamma radioactivity and the presence of radiological anomalies associated with uranium fragments, depleted uranium fragments, and soil areas containing disseminated oxidized uranium at or near the ground surface (0–0.5 ft bgs). The surveys will be conducted using NaI gamma scintillometers to identify either point-source anomalies (isolated metallic fragments or areas that decrease uniformly away from a discrete point) or area anomalies (disseminated oxidized uranium or other large area anomalies sometimes associated with disturbed areas such as roads, berms, etc.). If the measurements exceed the scintillometer, a portable ion chamber may be used. Radiological survey results will be used to address potential worker safety and protection issues as well as identify target sampling locations in each of the disposal areas.

All detected radiological anomaly locations will be flagged by the survey team. A radiological anomaly will be defined as any location with a beta or gamma reading greater than 2 times the instrument background level. A radiological anomaly map will be produced to determine the extent of radiological contamination. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

Geodetic Survey

A geodetic survey will be performed to locate all flagged HE locations (removal already has taken place) and flagged radiological anomalies. The geodetic survey will be used in support of HE and radiological mapping to define the extent of potential contamination on the surface disposal sites and the adjacent areas.

Waste Volume Confirmation

The soil and debris from the surface disposal areas [SWMU 15-008(c)] and the soil pile (AOC C-15-001) will be measured to accurately obtain mound configurations and waste volumes

Waste Characterization and Nature and Extent Sampling

The proposed sampling locations for the surface disposal areas [SWMU 15-008(c)] and the soil pile (AOC C-15-001) are shown in Figure 10.11-1. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses of the samples is provided in Table 10.11-1. Investigation and sampling at SWMU 15-008(c) and AOC C-15-001 will include the following.

- *Confirmatory sampling following soil removal.* Two locations (1 and 2, Figure 10.11-1) will be sampled from SWMU 15-008(c) and from AOC C-15-001 (3 and 4, Figure 10.11-1). Waste characterization samples will be collected from the surface of each mound and the mid-point of each mound as determined from the field measurements. Samples will also be collected from these two locations at four depths below each mound: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field screened and analyzed for TAL metals, VOCs (except the surface sample), SVOCs, explosive compounds, and by gamma spectroscopy. Waste characterization samples will also be analyzed for TCLP metals and TCLP SVOCs. If during field screening, alpha activity is above 2 times the instrument background levels, samples will also be collected and analyzed by alpha spectroscopy. Samples will be collected using a hand auger, power hand auger, or other hand tools, depending on the results of the HE survey and work restrictions imposed for safety of personnel.

10.11.2 MDA Z Landfill: SWMU 15-007(b)

MDA Z, SWMU 15-007(b), is proposed for removal and confirmatory sampling in the footprint of the former site. Because of the large quantity of debris throughout the MDA and the high levels of total uranium, characterization of the MDA requires significant trenching and sorting of material. Therefore, on-site segregation, characterization, and removal of hazardous and/or radioactive waste are proposed. In addition, sampling will be performed in the drainage channel downgradient of the site. Because MDA Z is within the 750-ft radius of Firing Site G, HE surveys and removal activities must precede all other site activities.

HE Survey and Removal

A ground survey will be performed by qualified HE/ordnance personnel to locate HE fragments in advance of any field activity. The purpose of the ground survey is to identify and remove potentially dangerous fragments of residual HE from the ground in advance of other investigation activities. The ground survey will include a visual survey augmented by a direct instrumentation survey, such as mobile ion spectroscopy. Specific instrumentation is not provided at this time because the technology for HE detection is changing rapidly in response to deployment of Department of Homeland Security technology.

The ground survey will be performed with 100% coverage on MDA Z and in all work zones, including exclusion, support, and all access roads to the site located within the Firing Site G hazard zone. All visual or detected HE locations will be flagged by the survey team and simultaneously removed for disposal at

an appropriate RCRA-permitted facility. In conjunction with the postremoval geodetic survey, a HE location map will be produced to characterize the extent of HE contamination.

Radiological Survey

Following the HE ground survey and removal, work at MDA Z [SWMU 15-007(b)] will be preceded by a surface radiological walkover survey capable of detecting the presence of beta and gamma radioactivity and radiological anomalies associated with uranium fragments, depleted uranium fragments, and soil areas containing disseminated oxidized uranium at or near the ground surface (0–0.5 ft bgs). The surveys will be conducted using NaI gamma scintillometers to identify either point-source anomalies (isolated metallic fragments or areas that decrease uniformly away from a discrete point) or area anomalies (disseminated oxidized uranium or other large area anomalies sometimes associated with disturbed areas such as roads, berms, etc.). If the measurements exceed the scintillometer, a portable ion chamber may be used. Radiological survey results will be used to address potential worker safety and protection issues as well as identify target sampling locations in each of the disposal areas.

All detected radiological anomaly locations will be flagged by the survey team. A radiological anomaly will be defined as any location with a beta or gamma reading greater than 2 times the instrument background levels. A radiological anomaly map will be produced to determine the extent of radiological contamination. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

Geodetic Survey

A geodetic survey will be performed to locate all flagged HE locations (removal already has taken place) and flagged radiological anomalies. The geodetic survey will be used in support of HE and radiological mapping to define the extent of potential contamination on the surface disposal sites and the adjacent areas.

Removal Activities

Based on the dimensions of MDA Z mentioned in section 10.6.1, it is estimated that approximately 2000 yd^3 of soil and debris will be excavated, characterized, and disposed of appropriately. The excavated soil and debris will be segregated into separate waste streams for disposal purposes. Because of the observed heterogeneity of the materials in this disposal area, semiquantitative field-screening techniques will be used to determine the approximate levels and nature of contamination. Waste characterization will be preceded by field analytical screening for PCBs and HE (RDX). Additional waste characterization sampling will include PCBs and HE (as indicated by field analytical screening), TCLP TAL metals, TCLP SVOCs, and radionuclides.

Field-Screening and Field Analytical Activities

As discussed in section 10.6.2.2, metals and PAHs are the primary COPCs at MDA Z. All screening samples will be screened for gross alpha, beta and gamma radioactivity. Field screening will also include photoionization detector (PID) screening for VOCs. Waste characterization samples and subsequent confirmatory samples will be analyzed for HE (RDX) and PCBs using field analytical methods described in Section 12. Because commercially available PAH test kits (immunoassay) have relatively high DLs, field

screening for PAHs will not be conducted. Field analytical results will be used to select samples for off-site laboratory analyses.

Confirmatory and Nature and Extent Sampling

The proposed sampling locations for MDA Z are shown in Figure 10.11-2. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses of the samples is provided in Table 10.11-1. The analytical suites proposed for MDA Z follow the general laboratory analytical strategy for MDAs, as presented in Table 2.9-1. Investigation and sampling at SWMU 15-007(b) will include the following.

- *Confirmatory sampling following debris/soil excavation and removal.* Eight sampling locations will be selected after potentially contaminated materials have been removed or until the underlying original soil is encountered. Seven locations (6 through 13, Figure 10.11-2) will be sampled from four depths at each location: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3-ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be analyzed using field analytical methods for PCBs and HE (RDX). Samples will be analyzed for TAL metals, VOCs (except the surface sample), SVOCs, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination within the drainage channel.* The terrain around MDA Z is gently sloping in a southwesterly direction with a drainage channel that feeds into Cañon de Valle. Five locations will be sampled (1 through 5, Figure 10.11-2) above and within the drainage channel. Four samples will be collected at each location from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. The sampling locations shown in Figure 10.11-2 to determine nature and extent may be moved based on field conditions. Sampling locations will be targeted towards sediment accumulation areas located within the drainage channel. All samples will be analyzed using field analytical methods for PCBs and HE (RDX). Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (except the surface sample), and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. PCBs and explosive compounds will be analyzed only if detected in the field analytical samples. Samples will be collected using a hand auger and/or power hand auger.

10.11.3 Debris Disposal Area: SWMU 15-008(d)

Removal of the disposal area and confirmatory sampling in the footprint of the removed debris will determine whether potential contaminants have migrated into the subsurface soil and tuff. Investigation samples will also be collected in the adjacent drainage channel to determine if potential contaminants have migrated laterally from the debris disposal area. The analytical suites proposed for SWMU 15-008(d) follow the general laboratory analytical strategy for debris disposal areas and drainages, as presented in Table 2.9-1.

Radiological Survey

All work at SWMU 15-008(d) will be preceded by a surface radiological walkover survey capable of detecting the presence of alpha, beta, and gamma radioactivity. Radiological survey results will be used to address potential worker safety and protection issues as well as to target sampling locations requiring focused laboratory analysis of radionuclides. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background levels. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

Trenching and Removal Activities

No previous investigation activities have been conducted at this site. Therefore, to obtain information about the contents of the debris pile and to characterize the soil media, two trenches will be excavated in the locations shown in Figure 10.11-3. The material(s) identified during excavation activities will be logged in the field logbook. The information recorded during trenching will be used to determine the extent of the disposal area, the nature of the debris to be removed, and soil characterization within the debris to ascertain whether the soil must be removed from the site.

Field-Screening and Field Analytical Activities

All samples will be screened for gross alpha, beta, and gamma radioactivity by the on-site RCT. Additional samples will be analyzed by alpha and/or gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Field screening will also include PID screening for VOCs. All samples will be screened using the HE spot test.

Characterization, Confirmatory, and Nature and Extent Sampling

The proposed sampling locations for SWMU 15-008(d) are shown in Figure 10.11-3. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses of the samples is provided in Table 10.11-1. Investigation and sampling at SWMU 15-008(d) will include the following.

- *Sampling to characterize the soil and debris.* A minimum of two soil samples will be collected from each of the two trenches. All samples will be field screened and analyzed for TAL metals, TCLP metals, SVOCs, TCLP SVOCs, explosive compounds, perchlorate and by alpha/gamma spectroscopy to determine whether residual soil may remain on-site or must be removed and disposed of as waste. Samples will be collected using a hand auger and/or power hand auger.
- *Confirmatory sampling to confirm removal of contaminated material.* Following excavation activities, samples will be collected from four locations (5 through 8, Figure 10.11-3) within the footprint of the excavated area. Four samples will be collected from each location from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. All samples will be field screened and analyzed for TAL metals, VOCs (subsurface samples only), SVOCs, perchlorate, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the

presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

- *Sampling to define the nature and extent of contamination in drainage channel.* SWMU 15-008(d) is located near a southern drainage channel that ultimately drains into Cañon de Valle. Two locations (1 and 2, Figure 10.11-3) will be sampled 10 ft south of the surface disposal area, and two additional locations (3 and 4, Figure 10.11-3) will be sampled downgradient at approximately 50-ft intervals. Four samples will be collected at each location from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. The sampling locations shown in Figure 10.11-3 to determine nature and extent may be moved based upon field conditions. Sampling locations will be targeted towards sediment accumulation areas located within the drainage channel. All samples will be field screened and analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand auger and/or power hand auger.

10.11.4 The Hollow: Consolidated Unit 15-009(a)-00, AOC 15-014(g), and AOCs C-15-007 and C-15-010

An investigation to collect surface and subsurface data will be conducted throughout the Hollow to determine (1) the nature of contamination and (2) the lateral and vertical extent of contamination at the site. The investigation will include topographic, geophysical, and radiological surveys, surface sampling, subsurface drilling, and continuous sampling using mechanical drilling methods. Investigation of contamination downgradient of the samples proposed for the Hollow will be addressed in the South Canyons investigation work plan.

Geodetic Survey

A geodetic survey will be performed to determine critical structure locations, historical sampling locations (as needed), and locations of proposed samples. Although site buildings were demolished following significant damage from the 2000 Cerro Grande fire, the building pads may still remain and will be surveyed for key positioning locations. Historical information indicates that a dry well was constructed to accept laboratory waste from the septic tank [SWMU 15-009(a)]. The exact location of this dry well could not be determined from historical records; however, it may be possible to locate the abandoned septic tank.

Radiological Survey

All work at the Hollow will be preceded by a surface radiological walkover survey capable of detecting the presence of beta and gamma radioactivity. The radiological survey results will be used to address potential worker safety and protection issues as well as to target sampling locations requiring focused laboratory analysis of radionuclides. Additional locations may be identified for sample collection in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

Geophysical Survey

Geophysical surveys will be performed in the approximately 7500 ft^2 target area identified as the likely location of the dry well. Geophysical surveys will include magnetic and/or electromagnetic geophysical surveys, gravity surveys, and/or ground-penetrating radar to identify the location of the dry well. The survey will be linked with a real-time GPS.

Removal of SWMU 15-009(a), Septic Tank

The SWMU 15-009(a) septic tank will be located and removed, if it has not been removed already. From the tank, trenching will be conducted to follow the drainline to determine where the tank was connected to the dry well and to confirm the presence and location of the dry well.

Field-Screening and Field Analytical Activities

All samples will be screened for gross alpha, beta, and gamma radioactivity in the field by the on-site RCT. Additional samples will be analyzed by alpha and/or gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Field screening will also include PID screening for VOCs. All samples will be screened using the HE spot test. Field analytical screening for VOCs will include on-site field gas chromatography.

Confirmatory and Nature and Extent Sampling

The proposed sampling locations for Consolidated Unit 15-009(a)-00, AOC 15-014(g), and AOCs C-15-007 and C-15-010 are shown in Figure 10.11-4. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses of the samples is provided in Table 10.11-1. Investigation and sampling at the Hollow [Consolidated Unit 15-009(a)-00 and AOCs 15-014(g), C-15-007, and C-15-010] will include the following.

Borehole Drilling and Collecting Core Samples: Continuous core samples will be collected from each borehole to a TD of 100 ft bgs. Core will be visually inspected and field screened for alpha and beta/gamma radioactivity, VOCs by gas chromatography, and HE using the HE spot test. Lithologic descriptions and fracture-characterization data will be recorded for each borehole. Tuff samples will be collected at specified intervals. A maximum of nine samples will be collected for laboratory analysis from each borehole based on the following criteria: (1) the highest field-screening or field analytical detection for radioactivity, VOCs, and/or HE for a maximum of three sample depth intervals; (2) the maximum depth of a field-screening detection for a maximum of three sample depth intervals; (3) two depth intervals sampled will be collected from fractures, fracture-fill materials, moist zones, and surge beds/higher permeability intervals (if present and if different from field screening and field analytical determined depth intervals); and (4) the TD of the borehole. If criteria 1 and 2 above are not met, (i.e., no field screening of field analytical detections), then two core samples will be selected from two substitute sample depth intervals based upon representative tuff units and vertical profile characterization of the borehole, and a minimum of five samples will be submitted for analyses. If field-screening and/or field analytical screening detections are encountered at the TD of 100 bgs, then drilling will continue until the TD of the borehole is 25 ft beyond the last screening detection.

- *Sampling to define nature and extent of contamination in the vicinity of former septic tank, SWMU 15-009(a).* One borehole (BH1, Figure 10.11-4) will be advanced at the location of the former septic tank following removal. This septic system (including the dry well) is the suspected source of organic chemicals (e.g., acetone and trichloroethylene) detected southeast of the septic

tank at depths of up to 55 ft bgs. All samples will be analyzed for nitrates, perchlorate, TAL metals, VOCs, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. All samples will be collected using mechanical drilling methods.

- *Sampling to define nature and extent of contamination in the vicinity of former UST AOC C-15-010).* One borehole (BH2, Figure 10.11-4) will be advanced at the location of the former UST. Organic chemicals (e.g., acetone and trichloroethylene) and TPH were detected beneath the former UST at depths of up to 55 ft bgs. All samples will be analyzed for perchlorate, TAL metals, VOCs, SVOCs, and TPH. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. In addition, representative borehole samples will be collected from all lithologic units (e.g., Tshirege Members of the Bandelier Tuff) encountered during boring and analyzed for geotechnical parameters, including unsaturated hydraulic conductivity, permeability, porosity, moisture content, and bulk density. All samples will be collected using mechanical drilling methods.
- *Sampling to define nature and extent of potential site-wide contamination at the Hollow.* Seven boreholes (BH3 through BH9, Figure 10.11-4) will be advanced at selected locations across the site to evaluate potential organic chemical contamination from past disposal practices. Proposed borehole location BH9 is centered in a 16 ft^2 opening in the concrete foundation of building 16-194, which may have received waste from operations in the building. All samples will be analyzed for perchlorate, TAL metals, VOCs, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. All samples will be collected using mechanical drilling methods
- *Sampling to define nature and extent of potential contamination at SWMU 15-011(b) dry well.* One borehole (BH10, Figure 10.11-4) will be advanced to evaluate potential organic chemical contamination from past disposal practices. Proposed borehole location BH10 will be placed based upon the findings of the geophysical survey and the excavation of the septic tank [SWMU 15-009(a)]. All samples will be analyzed for nitrates, perchlorate, TAL metals, VOCs, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. In addition, representative borehole samples will be collected from all lithologic units (e.g., Tshirege Members of the Bandelier Tuff) encountered during boring and analyzed for geotechnical parameters including unsaturated hydraulic conductivity, permeability, porosity, moisture content, and bulk density. All samples will be collected using mechanical drilling methods.
- *Sampling to define nature and extent of potential contamination, SWMU 15-011(b) former drainage channel (replaced by the dry well).* Three locations will be sampled along the two drainage channels that converge upon the 15-011(c) outfall (11 through 13, Figure 10.11-4). Each location will be sampled at depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will also be analyzed for explosive compounds if the HE spot test is positive and for VOCs if organic

chemicals are detected using field gas chromatography. Samples will be collected using a hand auger and/or power hand auger.

- *Sampling to define nature and extent of potential contamination, SWMU 15-011(c) outfall.* One location will be sampled immediately below the convergence of the two drainage channels [SWMU 15-011(c)]. Four samples will be collected from one location (14, Figure 10.11-4) at the former outfall. The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will also be analyzed for explosive compounds if the HE spot test is positive and for VOCs if organic chemicals are detected using field gas chromatography. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination, SWMU 15-014(i) roof drain outfall.* Four samples will be collected from one location (15, Figure 10.11-4) at the former outfall. The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. All samples will be analyzed for pH, TAL metals, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will also be analyzed for explosive compounds if the HE spot test is positive and for VOCs if organic chemicals are detected using field gas chromatography. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination, SWMU 15-014(j) outfall and trench drain.* Two locations, one along the trench drain (16 and 17, Figure 10.11-4) and one at the trench drain outfall (18, Figure 10.11-4), will be sampled at depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will also be analyzed for explosive compounds if the HE spot test is positive and for VOCs if organic chemicals are detected using field gas chromatography. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination, SWMU 15-014(k) trench drain.* Four samples will be collected from one borehole along the trench drain (18, Figure 10.11-4) from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will also be analyzed for explosive compounds if the HE spot test is positive and for VOCs if organic chemicals are detected using field gas chromatography. Samples will be collected using a hand auger and/or power hand auger.
- *Sampling to define nature and extent of potential contamination, SWMU 15-011(a) trench drains.* Four samples will be collected from one location (19, Figure 10.11-4) within the trench drains. The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. All samples will be analyzed for pH, nitrates, cyanide,

perchlorate, TAL metals, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will also be analyzed for explosive compounds if the HE spot test is positive and for VOCs if organic chemicals are detected using field gas chromatography. Samples will be collected using a hand auger and/or power hand auger.

- *Sampling to define nature and extent of potential contamination, AOC 15-014(g) outfall.* Four samples will be collected from one location at the outfall (20, Figure 10.11-4) from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, and SVOCs. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will also be analyzed for explosive compounds if the HE spot test is positive and for VOCs if organic chemicals are detected using field gas chromatography. Samples will be collected using a hand auger and/or power hand auger.

10.11.5 Septic Systems: Consolidated Unit 15-009(f)-00, SWMU 15-009(i)

All septic systems in Consolidated Unit 15-009(f)-00 and SWMU 15-009(i) require investigation of the soil surrounding the septic systems to determine whether a potential release of contaminants to the subsurface has occurred. The analytical suites proposed for Consolidated Unit 15-009(f)-00 and SWMU 15-009(i) follow the general laboratory analytical strategy for septic systems, as presented in Table 2.9-1.

Field-Screening and Field Analytical Activities

All samples will be screened for gross alpha, beta, and gamma radioactivity by the on-site RCT. Additional samples will be analyzed by alpha and/or gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Field screening will also include PID screening for VOCs. All samples will be screened using the HE spot test. Field analytical screening for VOCs will include on-site field gas chromatography.

Nature and Extent Sampling

The proposed sampling locations for Consolidated Unit 15-009(f)-00 and SWMU 15-009(i) are shown in Figures 10.11-5 and 10.11-1, respectively. A summary of the purpose of the proposed samples, the planned sampling locations, depths and proposed laboratory analyses for the samples is provided in Table 10.11-1. Corrective action and sampling at Consolidated Unit 15-009(f)-00 and SWMU 15-009(i) will include the following.

- *Confirmation of septic tank locations.* Investigation activities will be performed to confirm the configuration of the septic tank (e.g., combination of geophysical survey, magnetic survey, or other surveys, as appropriate) if site reconnaissance activities fail to locate visible signs of the septic systems.
- *Excavation of Consolidated Unit 15-009(f)-00 [SWMUs 15-009(f) and 15-009(k)].* If the tanks are located, they will be removed and disposed of.
- *Confirmatory sampling at Consolidated Unit 15-009(f)-00.* Following excavation activities, confirmatory soil samples will be collected from the bottom of the excavation (BH1 and BH2,

Figure 10.11-5) from 5–5.5 ft into the tuff, 10–10.5 ft into the tuff, and 15–15.5 ft into the tuff). All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger. Samples will be collected using mechanical drilling methods after the excavation has been backfilled.

- *Sampling to define nature and extent of potential contamination within the leach fields and drainages at Consolidated Unit 15-009(f)-00.* Samples will be collected from the two leach fields, two from locations 15-009(f) (3 and 4, Figure 10.11-5) and two from locations 15-009(k) (5 and 6, Figure 10.11-5), from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.
- *Excavation of SWMU 15-009(i).* If the tank is located, it will be removed and disposed of.
- *Confirmatory sampling at SWMU 15-009(i).* Following excavation activities, confirmatory soil samples will be collected from the bottom of the excavation (BH5, Figure 10.11-1) from 5–5.5 ft into tuff and 10–10.5 ft into tuff and 15–15.5 ft into the tuff. All samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using mechanical drilling methods after the excavation has been backfilled.
- *Sampling to define nature and extent of potential contamination in the outfall drainage channel at SWMU 15-009(i).* Six locations (6 through 11) will be sampled downgradient of the septic tank at SWMU 15-009(i) towards Cañon de Valle (Figure 10.11-1). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

10.11.6 Outfalls, Building 15-183: Consolidated Unit 15-014(a)-00

Sampling will be conducted of soil and tuff media in the surface drainages containing the outfalls from Consolidated Unit 15-014(a)-00 to determine the nature and extent of potential contamination. The analytical suites proposed for Consolidated Unit 15-014(a)-00 follow the general laboratory analytical strategy for outfalls, as presented in Table 2.9-1.

Nature and Extent Sampling

The proposed sampling locations for the outfalls associated with Consolidated Unit 15-014(a)-00 are shown in Figures 10.11-5. A summary of the purpose of the proposed samples, the planned sampling

locations, depths and proposed laboratory analyses for the samples is provided in Table 10.11-1. Sampling at Consolidated Unit 15-014(a)-00 will include the following.

- *Sampling to define nature and extent of potential contamination at SWMU 15-014(a).* Five locations [SWMU 15-014(a), 12 through 16] will be sampled starting at the outfall location and following the surface drainage path towards Cañon de Valle at approximately 50-ft intervals (Figure 10.11-5). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.
- *Sampling to define nature and extent of potential contamination at SWMU 15-014(b).* Five samples [SWMU 15-014(b), 7 through 11] will be collected starting at the outfall location and following the surface drainage path towards Cañon de Valle at approximately 50-ft intervals (Figure 10.11-5). The samples will be collected from depths of 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Samples will be analyzed for pH, nitrates, cyanide, perchlorate, TAL metals, VOCs (subsurface samples only), SVOCs, and explosive compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

11.0 SUBAGGREGATE 10: TA-16-340 COMPLEX

Subaggregate 10, the TA-16-340 Complex, consists of SWMU 16-030(a) and AOC C-16-075. It is located near the central portion of TA-16 between Fishladder Canyon and Martin Spring Canyon (Figure 1.1-11). The majority of the 340 Complex sites have been addressed in other documents (see Table 1.1-2).The 340 Complex operated from 1952 to 1999 and processed large quantities of HE for the production of plastic bonded explosives (LANL 2006, 91450, p. 2). The area near the 340 Complex experienced minor-to-moderate damage as a result of the 2000 Cerro Grande fire (LANL 2000, 70351, p. 25).

The two sites addressed in this subaggregate are the sump and outfall associated with chemical storage building 16-344 [SWMU 16-030(a)] and potentially contaminated soil located adjacent to building 16-340 (AOC C-16-075).

11.1 Surface Conditions

SWMU 16-030(a) and AOC C-16-075 (associated with the 340 Complex) are located in the central portion of TA-16 (Plate 1). The mesa underlying TA-16 is bounded on the north by Cañon de Valle (about 1400 ft north of the 340 Complex) and on the south by Martin Spring Canyon approximately 300 ft south) (Plate 1). Fishladder Canyon heads from the mesa just north of the 340 Complex and watershed divide between the Cañon de Valle and Martin Spring watersheds runs through the southern third of the340 Complex area (LANL 2006, 91450) The elevation of the mesa ranges from 7700 ft to 7500 ft amsl; at the 340 Complex, it ranges from approximately 7540 ft amsl on the mesa top to approximately 7460 ft amsl in Martin Spring Canyon to the south. The topography at the site has a gentle, 5- to 10-degree slope from the northwest to southeast. At the south side of the subaggregate, Martin Spring Canyon drops

steeply (more than 40 ft vertically over 100 ft laterally) into an east-trending drainage (Plate 1). Because Martin Spring Canyon heads just south of the 340 Complex and not in the Sierra de los Valles, the severity of flooding events in this canyon is significantly less than in the larger canyons that head in the Sierra de los Valles.

An area of about 3 acres in the western half of Subaggregate 10 burned at a moderate level in the 2000 Cerro Grande fire, but the adjacent area was affected only slightly, if at all.

The surface vegetation community within the Cañon de Valle Aggregate Area is described in section 2.1.

11.2 Surface Water

Section 2.2 presents a discussion of surface water the Cañon de Valle aggregate area. Surface water in the vicinity of the 340 Complex consists of storm and snowmelt runoff that may flow by small drainages or sheet flow into Fishladder Canyon and Martin Spring Canyon. Fishladder Canyon also contains flowing water during snowmelt and storm events. Alluvial groundwater occasionally discharges at Fishladder Seep, approximately 2000 ft east of the outfall discharge area for former building 16-340. The prevalence of surface flow in Fishladder Canyon has decreased significantly during the past 6 yr (LANL 2006, 91450). Subaggregate 10 sites do not have any site-specific monitoring associated with them.

11.3 Soil Types

The soil types of the Cañon de Valle Aggregate Area are discussed in section 2.3.

11.4 Subsurface Conditions

11.4.1 Stratigraphy

The subsurface stratigraphy of the Cañon de Valle Aggregate Area is discussed in section 2.4.1.

11.4.2 Cliff Retreat and Fractures

Cliff retreat and fractures of the Cañon de Valle Aggregate Area are discussed in section 2.4.2.

11.4.3 Hydrogeology

Section 2.4.3 presents a detailed discussion of the hydrogeology of the Cañon de Valle Aggregate Area.

Although the 340 Complex is located on the mesa top, it drains either to the small, intermittently saturated Martin Spring Canyon or to Fishladder Canyon on the north. Neither perched water nor the aquifer were encountered to a depth of approximately 1400 ft bgs in well CdV-16-3(i), located southeast of Subaggregate 10 (Plate 1). Subaggregate 10 lies in a transitional region between well R-25, which contains a thick perched zone, and well CdV-16-3(i), which does not. The presence, location, and depth of a perched zone directly beneath Subaggregate 10 remain unknown.

11.5 Chemical Storage Outfall: SWMU 16-030(a)

11.5.1 Site Description and Operational History

Building 16-344, located in the southeastern corner of P-Site, was built in 1951 and removed in 2005. In the 1950s, P-Site (historical TA-13) was decommissioned and incorporated into TA-16. SWMU 16-030(a) is the outfall from an active chemical storage building (16-344) in the southeastern corner of P-Site. The SWMU 16-030(a) site is located on the eastern side of the main HE processing area at TA-16. Floor troughs within building 16-344 discharged to outfalls that, in turn, discharged to the south on a moderate slope. This building had three 5-ft-long x 2-ft-wide cement drain troughs projecting from the south wall into a grassy, semicircular bermed area 45 ft in diameter. The building was divided into two rooms and the floors were slightly sloped toward the troughs to receive floor drainage. Two troughs drained the west room and one trough drained the east room. The bermed pit could contain drainage from the two westernmost troughs (draining the west room). The historical drainage from the easternmost trough (draining the east room) does not flow into the pit but drains into a grassy area within the southern portion of the SWMU boundary (LANL 1995, 57225, pp. 5-28-2, 5-28-5).

11.5.2 Historical Investigations

No previous investigations have been conducted at SWMU 16-030(a).

11.5.2.1 Analytical Results

No analytical results are available for SWMU 16-030(a).

11.5.2.2 Nature and Extent of Contamination

The nature and extent of contamination at SWMU 16-030(a) are not known. However, the nature and extent of contamination downgradient of SWMU 16-030(a) in Martin Spring Canyon have been defined as part of the Phase III RFI report for Consolidated Unit 16-021(c)-99 (LANL 2003, 77965). Sampling of surface water, alluvial groundwater, alluvium, sediment, and tuff was conducted between 1992 and 2002 in Martin Spring Canyon to investigate the hydrogeologic and contaminant transport dynamics of the Martin Spring Canyon alluvial and subsurface groundwater systems. Sampling locations were within a reach of the canyon starting just below the spring itself [less than 200 ft from southern portion of SWMU 16-030(a)] to approximately 1 mi downgradient. The COPCs defined for Martin Spring Canyon included a number of metals and HE (primarily RDX); any contribution of these COPCs to the canyon from SWMU 16-030(a) will be defined by the sampling proposed for the site.

11.5.2.3 Conceptual Site Model

The CSM for SWMU 16-030(a) includes both surface and subsurface sources of potential contamination. The following sections summarize the CSM for SWMU 16-030(a).

Source of Contamination

Contamination at SWMU 16-030(a) primarily originated from chemical residue in outfall discharges.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for SWMU 16-030(a) are summarized in section 1.1.1.

11.5.2.4 Summary of Additional Data Requirements

No historical data are available for SWMU 16-030(a) to define the nature and extent of potential contamination. Sampling at both the SWMU location and downgradient locations is proposed to address this data requirement in section 11.7.1.

11.6 Organic Chemical Spill: AOC C-16-075

11.6.1 Site Description and Operational History

AOC C-16-075 is a spill location near an HE-synthesis building (16-340). This AOC was identified on January 30, 1997, during the excavation of a 15-ft x 15-ft x 2-ft concrete pad adjacent to the covered walkway of building 16-340. Organic vapors (fuel-oil odor) were detected during the excavation. The soil was sampled for VOCs. Hydrocarbons were detected in the samples collected, consistent with a kerosene or light diesel oil. The closest SWMUs and AOCs are SWMU 16-012(n), AOC 13-003(a), and AOC 13-003(b). SWMU 16-012(n), a former satellite storage area, is located approximately 50 ft to the northwest. AOCs 13-003(a) and 13-003(b), an inactive septic system that once served P-Site, are located approximately 100 ft to the southwest. No drainlines were discovered during the excavation, and no obvious connection to AOCs 13-003(a) or 13-003(b) was found. This area is probably the site of a one-time spill. The excavated area was backfilled with the original soil.

11.6.2 Historical Investigations

An unknown number of soil samples were collected at AOC C-16-075 in 1997 in conjunction with the excavation project.

11.6.2.1 Analytical Results

No analytical results are available for AOC C-16-075.

11.6.2.2 Nature and Extent of Contamination

The nature and extent of contamination at this AOC C-16-075 are not known.

11.6.2.3 Conceptual Site Model

The CSM for AOC C-16-075 includes potential contamination of both surface and subsurface sources. The following sections summarize the CSM for AOC C-16-075.

Source of Contamination

Contamination at AOC C-16-075 presumably originated from the kerosene and light diesel oil spill.

Transport Mechanisms and Potential Receptors

The transport mechanisms and potential receptors for AOC C-16-075 are summarized in section 1.1.1.

11.6.2.4 Summary and Additional Data Requirements

No historical data are available for AOC C-16-075 to define the nature and extent of potential contamination. Sampling is proposed in section 11.7.2 to address this data requirement.

11.7 Scope of Investigation Activities

11.7.1 Chemical Storage Outfall: SWMU 16-030(a)

Investigative activities at SWMU 16-030(a) will be preceded by a surface radiological walkover survey capable of detecting the presence of beta and gamma radioactivity. The radiological survey results will be used to address potential worker safety and protection issues as well as to help target sampling locations requiring focused laboratory analysis of radionuclides. Additional locations may be identified for sampling in areas where elevated radioactivity is detected at 2 times the instrument background level. After the instrument is calibrated, background levels will be calculated twice daily (once in the morning and again in the afternoon) by the on-site RCT to assess local site conditions. The methods for radiological surveying and screening activity are described in section 12.

The proposed sampling locations at SWMU 16-030(a) are shown in Figure 11.7-1. A summary of the purpose of the proposed samples, the planned sampling locations, depths, and proposed laboratory analyses for the samples is provided in Table 11.7-1. The analytical suites proposed for SWMU 16-030(a) follow the general laboratory analytical strategy for chemical storage buildings, as presented in Table 2.9-1. Sampling at SWMU 16-030(a) will include the following.

- *Sampling to define nature and extent of contamination.* Four locations (1 through 4) will be sampled at four depths: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, VOCs (subsurface samples only), SVOCs, and explosive compounds. Additionally, all samples will be analyzed for nitrates, cyanide, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.
- *Definition of lateral extent of contamination*. Eight locations downgradient of the former outfall (5-12) will be sampled at four depths (0–0.5 ft bgs [soil], 1–1.5 ft bgs [soil], 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff) to determine whether lateral migration has occurred from the outfall. Sampling locations will be visually inspected before sampling begins to identify locations where sediment accumulates. Soil sampling depth intervals may be adjusted during sampling if the depth to the tuff is less than 1.5 ft. Samples will be analyzed for TAL metals, VOCs (subsurface samples only), SVOCs, and HE. Additionally, all samples will be analyzed for nitrates, cyanide, and perchlorate. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

11.7.2 Organic Chemical Spill: AOC C-16-075

The proposed sampling locations at AOC C-16-075 are shown in Figure 11.7-2. A summary of the purpose of the proposed sampling, the planned sampling locations, depths, and proposed laboratory analyses is provided in Table 11.7-2. Sampling at AOC C-16-075 will include the following.

- *Sampling to define nature and extent of contamination.* Samples from the former spill location (1 through 4) will be collected at four depths: 0–0.5 ft bgs (soil), 1–1.5 ft bgs (soil), 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. Because of the extensive soil removal and regrading activities conducted during the D&D of building 16-340 and its associated structures, it is possible that the soil sampled at AOC C-16-075 during this investigation is not representative of the historical contamination that may have been present at the site. Samples will be analyzed for TAL metals, VOCs (subsurface samples only), SVOCs, and TPH compounds. All samples will be screened in the field by the on-site RCT and analyzed by alpha and beta/gamma spectroscopy if field screening indicates the presence of radioactivity as measured at a level of 2 times greater than instrument background levels. Samples will be collected using a hand and/or power hand auger.

12.0 INVESTIGATION METHODS

The current versions of the SOPs, QPs, and the quality management plan, available at http://erproject.lanl.gov/documents/ procedures.html, are applicable to the investigation methods proposed in this investigation work plan and are described below in the following sections. Additional procedures may be added as necessary to describe and document quality-affecting activities. A summary of each procedure referenced below is provided in Table 12.0-1.

12.1 Field Surveys

The following sections describe the field surveys that will be conducted at some or all of the Cañon de Valle Aggregate Area sites.

12.1.1 Geodetic Surveys

Geodetic surveys will be conducted in accordance to the latest version of SOP-03.11 to locate historical structures and proposed sampling locations. Also, geodetic surveys will be conducted to document field activities such as new sampling and excavation locations. Geodetic surveys will be completed using a Trimble GeoXT hand-held GPS, or equivalent. The coordinate values will be expressed in the New Mexico State Plane Coordinate System (Transverse Mercator), Central Zone, North American Datum 1983. All GPS equipment utilized will meet the accuracy requirements specified in the SOP.

12.1.2 Geophysical Surveys

Geophysical surveys will be performed at selected sites to verify the locations of current subsurface structures and the locations of former structures to determine the extent of subsurface MDAs and to verify the orientation of subsurface septic systems. The surveys will verify locations determined from engineering drawings, site reconnaissance, and geodetic surveys and will refine assessments of the subsurface structures and disposal areas. Electromagnetic geophysical methods will be used to detect the septic tank structures and subsurface disposal areas. Historically, electromagnetic surveys have successfully detected the steel-reinforcing bar within the concrete structures. Magnetic line tracing of

drainlines may also be performed to confirm the configuration of the drainline and the locations of any outfalls or leach fields. Other geophysical methods may be used, such as gravity and ground-penetrating radar surveys, to augment the electromagnetic survey, as necessary.

12.1.3 Radiological Surveys

Surface radiological walkover surveys will be conducted at all sites before field work begins to confirm worker safety according to health and safety requirements as well to identify target sampling locations requiring removal and subsequent confirmatory sampling for radionuclides. At SWMUs and AOCs (buildings, building foundations, drainage channels, leach fields, etc.) with structures or former structures, a survey will be completed that fully covers the structure or area of concern. The walkover survey for the remaining SWMU polygon will be completed at a minimum of 10 ft between transects, creating a grid of the SWMU and AOC. The focus of the walkover survey will be to find potential sources of alpha-, beta-, and gamma-emitting radionuclides. Locations with radioactivity measuring 2 times greater than the instrument background level[s] will be marked for additional possible sampling.

The surface radiological walkover survey will be performed by the on-site RCT before any other field work begins at the site. The survey will be capable of detecting the presence of radiological anomalies and will be conducted using NaI gamma scintillometers (or equivalent) to identify either point-source anomalies (isolated metallic fragments or areas that decrease uniformly away from a discrete point) or area anomalies (disseminated oxidized uranium or other large area anomalies sometimes associated with disturbed areas such as roads, berms, etc.). If the measurements exceed the scintillometer, a portable ion chamber may be used.

Radiological walkover surveys will be performed in accordance with SOP-10.14. All instrumentation will be calibrated twice daily before the instrument background level is determined. This calibration will be performed according to the manufacturer's specifications. The on-site RCT will collect two instrument background levels each day at a minimum, one in the morning and one in the afternoon. If more than one site is visited in a one-day period, an instrument background level will be calculated before work begins at each individual site. Background levels will be calculated by taking 10 1-min counts surrounding the area to be surveyed and outside the zone of possible radioactive contamination. These 10 values will then be averaged and this instrument background level will be the background level for the purpose of the radiological walkover survey.

12.2 Subsurface Characterization

12.2.1 Drilling Methods for Boreholes

Boreholes will be drilled using the hollow-stem auger (HSA) method because it allows for collecting undisturbed core samples within the Tshirege Member of the Bandelier Tuff. As required, drilling plans will be developed in accordance with SOP-04.01. Selected boreholes, deeper than 20 ft in TD, will be geophysically logged with caliper, camera, neutron, and natural gamma tools according to the current versions of SOP-04.04 and SOP-07.05.

During geophysical logging, all data will be collected using a Mount Sopris Instrument (MSI) or equivalent. Soil moisture content will be measured using an MSI model number 2NUA-1000 neutron-thermal detector. Gamma radiation will be measured using an MSI model number 2PGA-1000 gamma/SP/SPR meter. Borehole diameter will be measured using an MSI model number 2PCA-1000 three-arm caliper.

Video logging of the borehole will be recorded using an MSI model number OBI-40 ALT optical televiewer.

The boreholes will be drilled using a drill rig configured with the appropriate size HSA flights with a split-core barrel sampler to the TD of the borehole. An HSA consists of a hollow steel shaft with a continuous spiraled steel flight welded onto the exterior site of the stem. The stem is connected to an auger bit and transports cuttings to the surface when it is rotated. The hollow stem of the auger allows drill rods, split-spoon core barrels, Shelby tubes, and other samplers to be inserted through the center of the auger so the samples may be retrieved during drilling operations. The hollow stem also acts to case the borehole temporarily so that the casing (riser) may be inserted through the center of the augers once the desired depth is reached, thus minimizing the risk of possible borehole collapse. A bottom plug or pilot bit can be fastened onto the bottom of the augers to keep out most of the soil and/or water that tend to clog the bottom of the augers during drilling. Drilling without a center plug is acceptable, provided the soil plug formed in the bottom of the auger is removed before sampling or installing well casings. The soil plug can be removed by washing out the plug using a side-discharge rotary bit or by augering out the plug with a solid-stem auger bit sized to fit inside the HSA.

If auger refusal is encountered in any borehole, the drilling will be converted to air-rotary drilling. This method uses a drill pipe or drill stem coupled to a drill bit that rotates and cuts through soil and rock. The cuttings produced from the rotation of the drilling bit are transported to the surface by compressed air, which is forced down the borehole through the drill pipe and returns to the surface through the annular space (between the drill pipe and the borehole wall). The circulation of the compressed air not only removes the cuttings from the borehole but also helps to cool the drill bit. The air-rotary drilling method is best suited for hard rock formations. In soft, unconsolidated formations, casing is driven to keep the formation from caving. When using the air-rotary method, the air compressor will have an in-line organic filter system to filter the air coming from the compressor. The organic filter system will be inspected regularly to ensure that it is functioning properly. In addition, a cyclone-velocity dissipator or similar air-containment/dust-suppression system will be used to funnel the cuttings to one location instead of allowing the cuttings to discharge uncontrolled from the borehole. An air-rotary method that employs the dual-tube (reverse circulation) drilling system is acceptable because the cuttings are contained within the drill stem and are discharged through a cyclone-velocity dissipator to the ground surface.

Samples will be collected at the target depths listed in sampling tables called out in sections 2.0 through 11.0 of this work plan. Samples may be collected at additional depths depending upon screening results. All samples will be field screened for VOCs, radioactivity, and release-specific screening methods, as specified in the site-specific sampling plans. In addition, the samples will be visually inspected and geologically logged. Investigation-derived waste produced during drilling operations will be properly containerized and disposed per SOP 01.10.

The exact location of each borehole will be determined using geodetic field surveys, utility locations identified as part of the excavation permitting process, and other access-restrictive surface conditions in accordance with the current version of SOP-03.11. Each location will be thoroughly examined to identify potential hazards for subsurface drilling. All borehole locations will be field-verified, surveyed in advance relative to subaggregate features, and recorded in field logbooks.

12.2.2 Excavation and Trenching

Excavations and trenching will be completed using a track excavator or backhoe. Excavated soil will be staged a minimum of 3 ft from the edge of the excavation and excavations deeper than 4 ft bgs will be

properly benched to allow access and egress, if necessary. After field-screening, confirmatory sampling, and any necessary over-excavation work is completed, the excavations and/or trenches will be backfilled with clean fill material. Excavators may also be used to collect grab samples for those locations where hand augers or power augers encounter refusal before the maximum proposed sample depth.

12.3 Collection of Subsurface Samples

All boreholes advanced through mechanical drilling methods will be cored continuously to TD. The cores will be geologically logged to TD following the current versions of SOP-04.01 and SOP-12.01. Following the current version of SOP-06.24 and SOP-06.26, subsurface samples will be collected from core extracted in a split-spoon core barrel. Samples collected for chemical analysis will be placed in the appropriate sample containers depending on the analytical method requirement in accordance with the current version of SOP-01.02. The analytical suites for the samples from each borehole will vary according to the data requirements of each site sampling plan, as listed in sections 2.0 through 11.0 of this work plan.

Quality assurance (QA)/QC samples will include (1) field duplicate samples to evaluate the reproducibility of the sampling technique and (2) rinsate blanks to evaluate the effectiveness of decontamination procedures. These samples will be collected following the current version of SOP-01.05 and will comply with a field duplicate collection frequency of 10% of total samples collected and a rinsate blank collection frequency of 10% of total samples collected. Trip blanks will be supplied by the SMO before the start of each field day and will remain with analytical samples when collecting samples for VOC analysis.

Following the current version of SOP-12.01, field documentation of samples collected from fractures will include a detailed physical description of the fracture-fill material and rock matrix sampled. The volumes of fracture-fill and rock-matrix material included in the sample will be estimated from field measurements. Additional samples will be collected from the rock matrix adjacent to the fracture sample material, thus allowing for comparison.

Field documentation will also include detailed borehole logs for each borehole drilled. The borehole logs will document the matrix material in detail and will include the results of all field screening; fractures and matrix samples will be assigned unique identifiers. Field documentation will be completed in accordance with the current version of QP-5.7.

12.3.1 Field Screening of Subsurface Samples

The primary field-screening methods to be used on subsurface samples include (1) visual examination, (2) radiological screening, and (3) vapor screening for VOCs using a PID. Additional screening for release-specific characteristics, such as HE and barium, may be conducted using field analytical methods such as immunoassay (i.e., HE spot test, Strategic Diagnostics, Inc., D-Tech RDX test kits) and XRF techniques (SOP-10.08), respectively.

Radiological Screening

Radiological screening will target gross alpha-, beta-, and gamma-emitting radionuclides. Field screening will be conducted within 1-in. of sample material by the on-site RCT from surface, shallow subsurface, and subsurface material in core or in the sample mixing bowl before material is placed in sample jars. All radiological screening will be conducted using an Eberline E-600 radiation meter with an SHP-380AB alpha/beta scintillation detector, or equivalent. This equipment consists of a dual phosphor plate covered

by two mylar windows housed in a light-excluding metal body. The phosphor plate is a plastic scintillator for the detection of beta emissions and is thinly coated with zinc sulfide for detecting alpha emissions. The operational range varies from trace emissions to 1 mil disintegrations per minute (dpm).

Should a sample indicate a field screen greater than 2 times the instrument background level for the site, a sample will be collected for laboratory analysis of alpha-, beta-, and/or gamma spectroscopy. Instrument background levels will be collected, at a minimum, twice daily, once in the morning and once in the afternoon. If more than one site is visited in a day, background levels will be calculated before work begins at each new site. Background will be measured from 10 locations surrounding the site and away from known or suspected areas of radiological contamination. An average will then be calculated to determine the instrument background level for the site. Radiological field screening will be conducted in accordance with SOP 10.14. All instrument background checks, background ranges, and calibration procedures will be documented daily in the field logbook in accordance with the current version of QP-5.7.

Boreholes completed using mechanical drilling methods will be advanced 25 ft beyond elevated field-screening results for any field screen, including radioactivity, organic vapors, etc. If elevated field-screening results are recorded within 25 ft of the target depth, the borehole will be advanced using mechanical drilling methods in 5-ft intervals until no elevated field-screening results are recorded over a 25-ft interval.

Vapor Screening for VOCs

Organic vapor screening of subsurface core will conducted using a MiniRAE 2000 portable VOC monitor model PGM-7600 PID, or equivalent, and will be equipped with an 11.7-electron volt lamp and sensitivity reading to 1 part per million (ppm). Before each day's field work begins, the PID will be calibrated to the manufacturer's standard for instrument operation (all daily calibration results will be documented in the field logbook). Field screening for VOCs will be accomplished by headspace analysis at 5-ft intervals in each borehole in accordance with SOP-06.33. The maximum value and ambient-air temperature will be recorded in the field borehole or test pit log for each sample. A VOC field-screening result that exceeds the ambient background measurement is defined as greater than 2 times the measured background value. Ambient background measurement is collected by setting aside an empty, sealed plastic ziplock bag for no longer than 5 min and collecting the measurement from inside the plastic bag. Field screening for VOCs should be taken in the same manner but with the sample in a new, sterile bag between each interval. This value should then be recorded in the lithologic log at the interval collected.

Boreholes completed using mechanical drilling methods will be advanced 25 ft beyond elevated field-screening results for any field screen, including radioactivity, organic vapors, etc. If elevated field-screening results are recorded within 25 ft of the target depth, the borehole will be advanced using mechanical drilling methods in 5-ft intervals until no elevated field-screening results are recorded over a 25-ft interval.

Based on this field screening, samples with the highest field-screening results and with the deepest detected field-screening results will be submitted for laboratory analysis. Samples collected at key locations (e.g., below the base of waste units, fracture zones, TD, etc.) will also be submitted for laboratory analysis, regardless of screening results.

Field Analytical Methods

At certain sites, screening for release-specific compounds (e.g., HE, metals) will be used to help guide excavation activities and/or borehole advancement. Quantitative field screening may be completed for target metals, PCBs, and HE. This quantitative field screening will be used to define areas that require soil removal and to bias locations for further sampling and analysis.

HE (RDX) Screening

HE spot tests will be used as a preliminary screening tool for samples. For samples that test positive in the HE spot test, the Strategic Diagnostics, Inc., D-Tech RDX immunoassay test kits will be used to field screen quantitatively for RDX. All assays will be conducted following the manufacturer's instructions, including equipment calibration, equipment use, sample dilution, and reagent storage. An elevated immunoassay result is defined as two times the estimated quantitation limit (approximately 2 ppm). Immunoassay field-screening results will be recorded on the field boring or test pit logs.

Metals Field Screening

A Spectrace 9000 (or similar make and model) field-portable XRF instrument will used to field screen for metals such as barium in accordance with SOP-10.08. An elevated detection for XRF analysis is defined as an instrument reading that exceeds 2 times the BV of the sample matrix. The XRF field-screening results will be recorded on the field boring or test pit logs.

PCB Field Screening

A semiquantitative RaPID assay enzyme immunoassay test kit (or equivalent) will be used to screen samples for the presence of PCBs, specifically Aroclor-1254 as an indicator chemical. The test kit minimum DL and quantitation limit for Aroclor-1254 are 0.2 mg/kg and 0.5 mg/kg, respectively. All assays will be conducted following the manufacturer's instructions, including equipment calibration, use, and sample, diluent, and reagent storage, and according to SOP-10.01. Immunoassay field-screening results will be recorded in the field boring or test pit logs.

12.3.2 Fixed Laboratory Analytical Methods for Subsurface Samples

The analytical suites required for fixed laboratory analyses vary by subaggregate and are specified in the scope of investigation activities for each subaggregate in sections 2.0 through 11.0. All required laboratory analytical suites are presented in the statement of work for analytical laboratories (LANL 2000, 71233). Confirmatory sample collection and analysis will be coordinated with the SMO. A complete list of all fixed laboratory analytical methods is summarized in Table 12.3-1.

12.4 Collection of Surface and Shallow Subsurface Samples

While surface and shallow subsurface samples will be collected during drilling activities, the most common method for collecting these predominantly soil and sediment samples will be the spade-and-scoop method, as described in the current version of SOP-06.09. Stainless-steel shovels, spades, scoops, and bowls will be used for ease of decontamination. Decontamination will be completed using a dry decontamination method with disposable paper towels and over-the-counter cleaner, such as

Fantastik or equivalent. Disposable tools made of polystyrene or Teflon will also be used, if necessary. In some cases, for deeper sample intervals, hand-augering tools, including power augers, will be used to collect shallow subsurface samples if geologic material conditions permit. The tools to be used and their applicability are described in the current version of SOP-06.10. If the surface location is at bedrock, an axe or hammer and chisel will be used to collect samples. All surface and shallow subsurface samples will be collected from four sample depths, 0–0.5 ft, 1–1.5 ft, 1.5–2 ft into the tuff, and 2.5–3 ft into the tuff. The sample depth intervals may be extended if additional sample volume is required for specified analytical suites.

Soil and sediment samples will be field screened as described in the following sections and placed in the appropriate sample container(s) as grab samples collected with hand augers, scoops, or chiseling devices in accordance with the sampling guidance document and appropriate SOPs (the SOP-01.01 through SOP-01.08 series).

12.4.1 Field Screening of Surface and Shallow Subsurface Samples

Field-screening methods and procedures used for soil and sediment samples are similar to those described for tuff (section 12.3.1). The primary screening methods to be used for soil and sediment samples may include (1) visual examination, (2) radiological screening, and (3) vapor screening for VOCs. Additional screening for release-specific characteristics as specified in sampling plans, such as HE and barium, may be conducted using field analytical methods such as immunoassay (i.e., Strategic Diagnostics, Inc., D-Tech RDX test kits) in accordance with the manufacturer's instructions and XRF techniques (SOP-10.08).

12.4.2 Fixed Laboratory Analytical Methods for Surface and Shallow Subsurface Samples

The analytical suites required for fixed laboratory analyses vary by subaggregate and are specified in the scope of investigation activities for each subaggregate (sections 2.0 through 11.0). Confirmatory sample collection and analysis will be coordinated with the SMO. A complete list of all fixed laboratory analytical methods is summarized in Table 12.3-1.

12.5 Collection of Geotechnical Data

Selected boreholes will be cored continuously to TD and will be geologically logged in accordance with American Society for Testing and Materials (ASTM) D2487 and ASTM D2488, including lithology, apparent moisture, structural features, and core recovery compared with interval drilled, according to the current versions of SOP-12.01 and SOP-04.01. Rock-quality designation (RQD) will also be documented in the field. The RQD is expressed as a percentage of solid core obtained and is defined as the collective length of core in excess of 2×4 in. The RQD depends on the strength and number of discontinuities in the rock mass. Low RQDs reflect incompetent, heavily fractured, or sandy formations. High RQDs indicate competent formations. If the RQD is consistently decreasing in a borehole, then brass sleeves will be used to enhance core recovery. A QC will conform to the applicable ASTM methods.

12.6 Collection of Perched Water Samples

During drilling operations, zones of elevated moisture content, localized saturation, and groundwater may be encountered. These zones may not be assignable to either an alluvial or regional groundwater system and may represent a localized phenomenon. If saturation is encountered as a borehole advances, drilling

will be stopped to determine whether sufficient water volume is available for analyzing the water quality. Generally, the total water volume required is approximately 0.5–1 L. If this minimum volume of groundwater cannot be collected, the borehole will be advanced to the targeted depth or until saturation is encountered again and the process is repeated, or until the required TD is achieved. A porous cup lysimeter or absorbent membrane will be installed at the depth of saturation to monitor the zone if the borehole is completed for pore-gas monitoring. Insufficient water sample volumes from discrete depths will not be composited to make up the required volume for screening analysis.

If a sufficient volume exists, a groundwater sample will be collected and analyzed for TAL metals, explosive compounds, anions, VOCs, SVOCs, perchlorate, radionuclides (by alpha and gamma spectroscopy), alkalinity, total organic carbon, total inorganic carbon, and total dissolved solids, at a Laboratory-certified geochemistry laboratory. Typically, results of groundwater screening samples are available within 48 hr. During this time, the borehole may be advanced to the targeted depth, and the perched zone (and any subsequent perched zones encountered during drilling) will be isolated to prevent downhole migration.

Geophysical logging will be conducted according to SOP-04.04 and SOP-05.07. Geophysical logging will determine the thickness of the zone of saturation and the characteristics of the perching horizon. A monitoring well will be designed and submitted to NMED for approval. Following approval of the design, the well will be installed, and a groundwater monitoring plan will be included in the investigation report.

12.7 Borehole Abandonment

All boreholes, except those identified for completion as vapor-monitoring wells or perched groundwater-monitoring wells, will be abandoned by one of the following methods:

- Shallow boreholes, with a TD of 20 ft or less, will be abandoned by filling the borehole with bentonite chips and subsequently hydrated. The borehole will be visually inspected while the bentonite chips are being added to ensure that bridging does not occur.
- Intermediate and deep boreholes, greater than 20 ft in depth, will be pressure-grouted from the bottom of the borehole to the surface using the tremie pipe method. Acceptable grout materials include cement or bentonite grout, neat cement, or concrete.

All boreholes will be properly abandoned according to the most recent version of SOP 5.03, “Monitoring Well and RFI Borehole Abandonment.” The use of backfill materials such as bentonite and concrete will be documented in a field logbook with regard to volume (calculated and actual), intervals of placement, and additives used to enhance backfilling. All cuttings will be managed as IDW, as specified in Appendix C of this document. All borehole abandonment information will be provided in the investigation report.

12.8 Equipment Decontamination

Before and after drilling and sampling activities, all equipment used for drilling and sampling will be decontaminated. Residual material adhering to equipment will be removed using dry decontamination methods such as the use of wire brushes and scrapers according to SOP-01.08. If equipment cannot be free-released using dry-decontamination methods, wet-decontamination methods will be used. The equipment will be pressure-washed with a high-density polyethylene liner on a temporary decontamination pad. Cleaning solutions and wash water will be collected and contained for proper disposal. Decontamination solutions will be sampled and analyzed to determine the final disposition of the

wastewater and the effectiveness of the decontamination procedures. All parts of the drilling equipment, including the undercarriage, wheels, tracks, chassis, and cab, will be thoroughly cleaned. Air filters on equipment operating in the exclusion zone will be considered contaminated and will be removed and replaced before the equipment leaves the site. Sites identified as radiological control areas based upon surface radiological surveys will have all equipment surveyed by a Health and Safety Radiation Control Division technician before it is released from the site.

13.0 ONGOING MONITORING AND SAMPLING PROGRAM

Currently, no ongoing groundwater monitoring occurs at any consolidated units, SWMUs, or AOCs in the Cañon de Valle Aggregate Area. Existing wells in Cañon de Valle will be sampled as part of the sitewide monitoring program (LANL, 1998, 59599). If groundwater is encountered and monitoring wells are installed, a formal groundwater monitoring program will be developed and submitted to NMED for approval. If the results of other investigations determine that vapor-monitoring at any consolidated unit, SWMU, or AOC is warranted, vapor-monitoring plans will be developed and submitted to NMED for approval.

14.0 SCHEDULE

The Cañon de Valle Aggregate Area investigation work plan will be submitted to NMED on September 29, 2006. The notice schedule for NMED comments or approval of the work plan is February 12, 2007. Administrative activities for the subaggregates will begin after the work plan is submitted. Field activity preparation will begin after NMED approves the work plan. Based upon site-access restrictions, all eight TA-16 subaggregates will be investigated and reported on in one investigation report. Because of their geographic proximity, Subaggregates 8 (TA-14) and 9 (TA-15) will be investigated and reported on in a second investigation report. The investigation reports will present information for individual consolidated units, SWMUs, and AOCs, as appropriate. Both investigation reports are currently scheduled to be submitted to NMED by December 15, 2012.

15.0 REFERENCES AND MAP DATA SOURCES

15.1 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 number. This information is also included in text citations. ER ID numbers are assigned by the EP Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the EP master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the EP 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.

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15.2 Map Data Sources

Data sources for all figures are provided below, unless otherwise indicated on the figures themselves.

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Wells: Water Quality and Hydrology Group at Los Alamos National Laboratory, Remediation Services Project at Los Alamos National Laboratory, and Hydrology, Geochemistry, and Geology Group (EES-6); Development edition of 04 November 2004.

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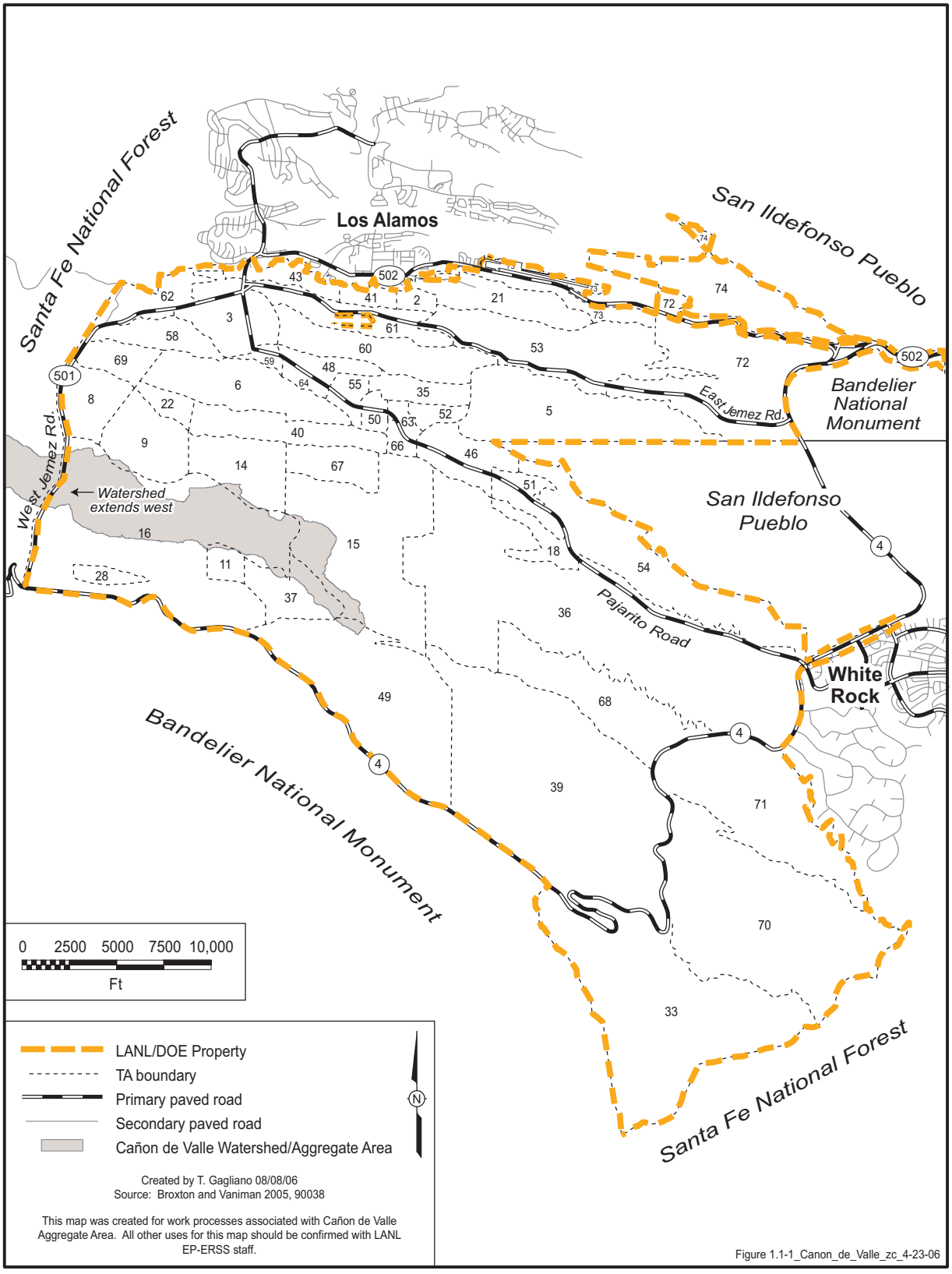


Figure 1.1-1. Location of Cañon de Valle Watershed and Aggregate Area with respect to the Laboratory TAs and surrounding land holdings

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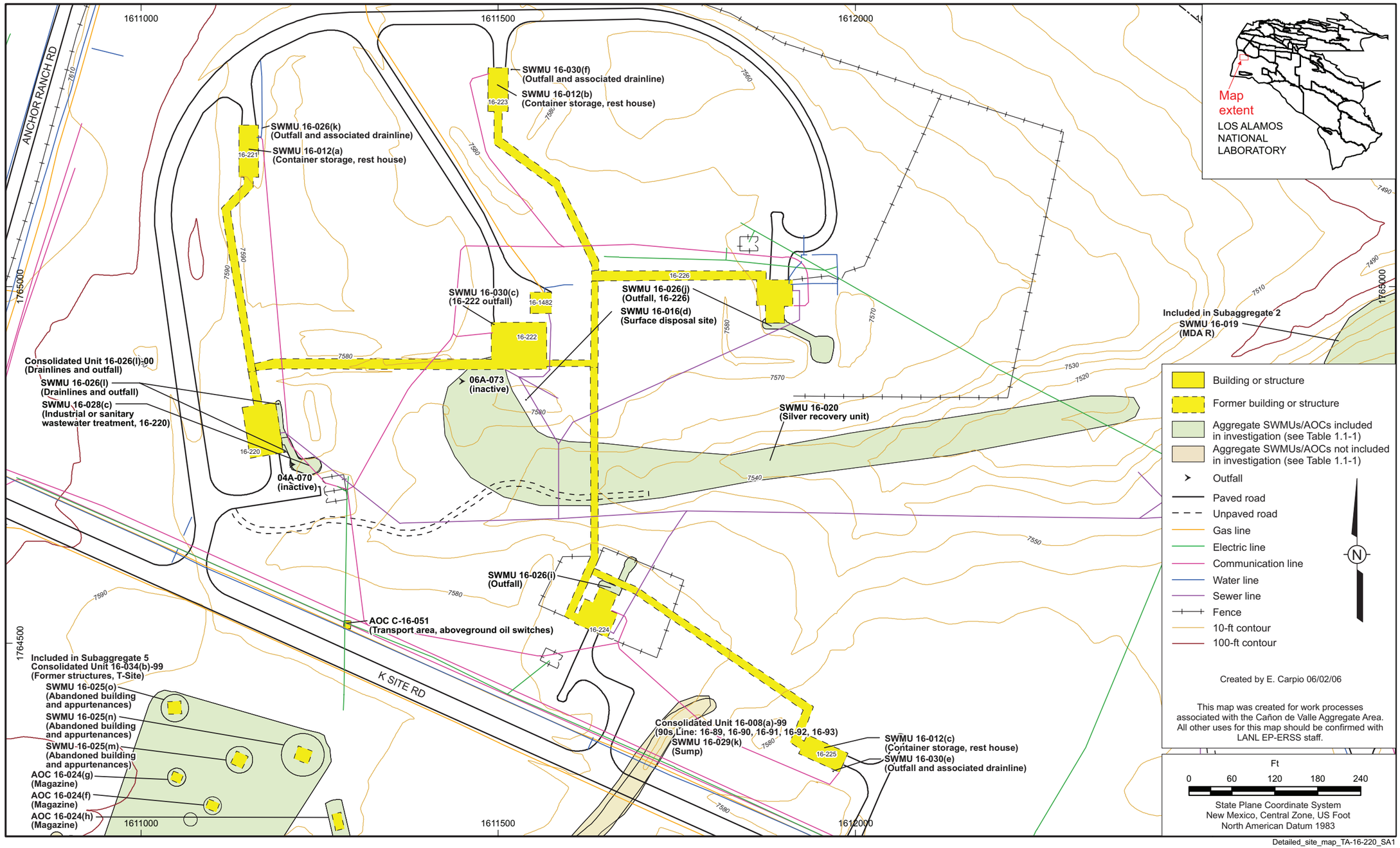


Figure 1.1-2. Detailed site map of Subaggregate 1 (220 Complex), surrounding SWMUs and AOCs, and subsurface utility corridors

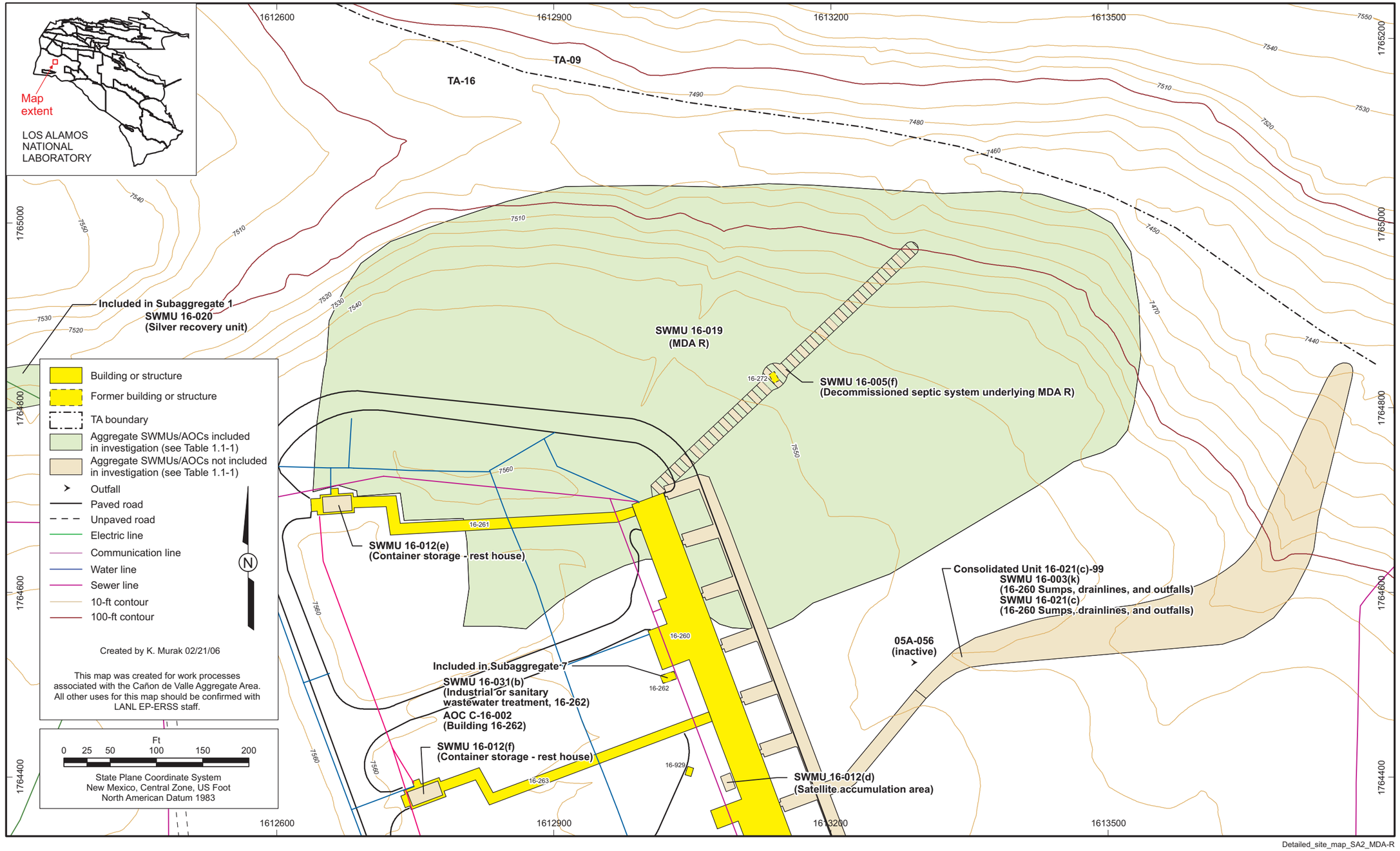


Figure 1.1-3. Detailed site map of Subaggregate 2 (MDA R), surrounding SWMUs and AOCs, and subsurface utility corridors

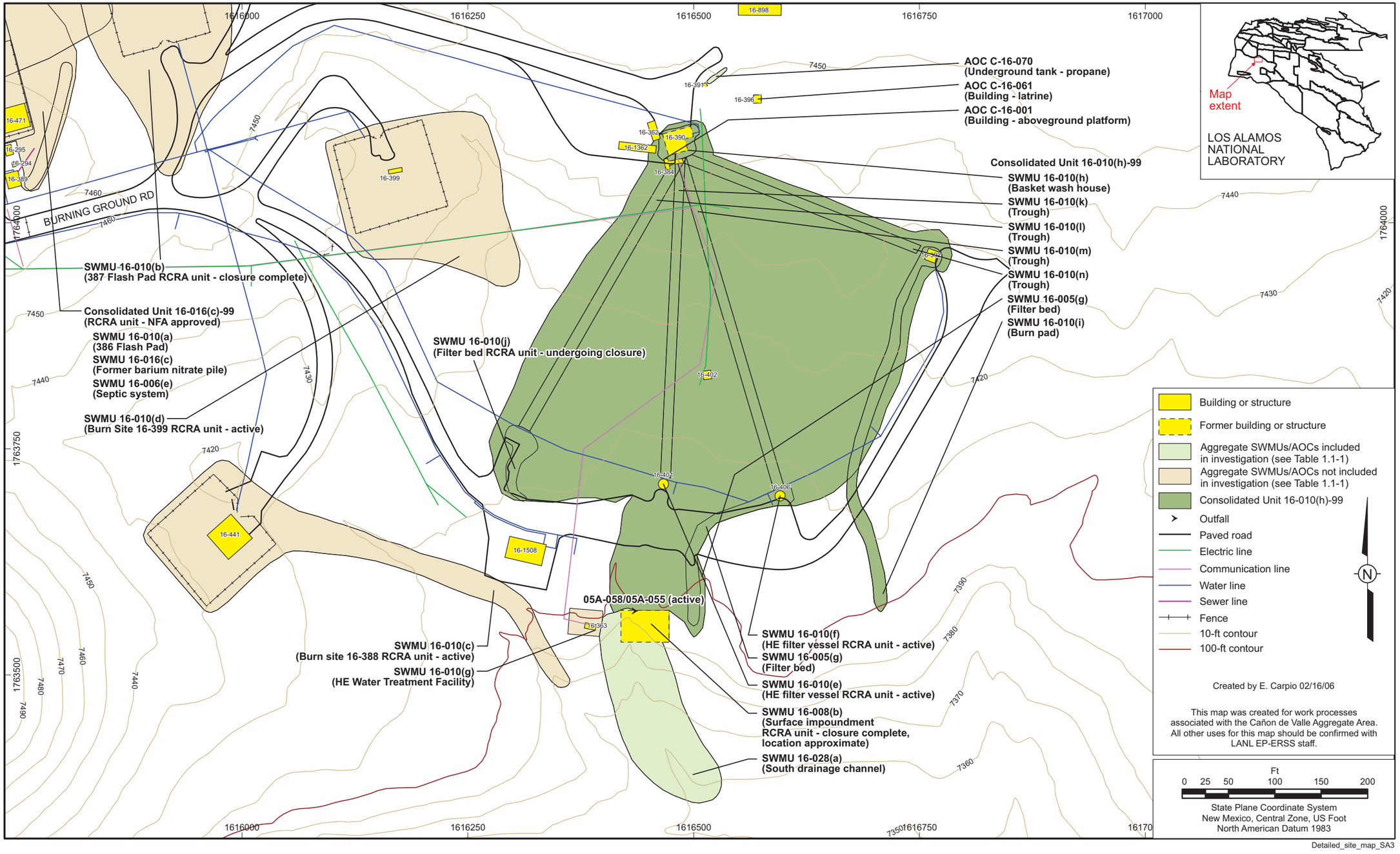


Figure 1.1-4. Detailed site map of Subaggregate 3 (Burning Ground), surrounding SWMUs and AOCs, and subsurface utility corridors

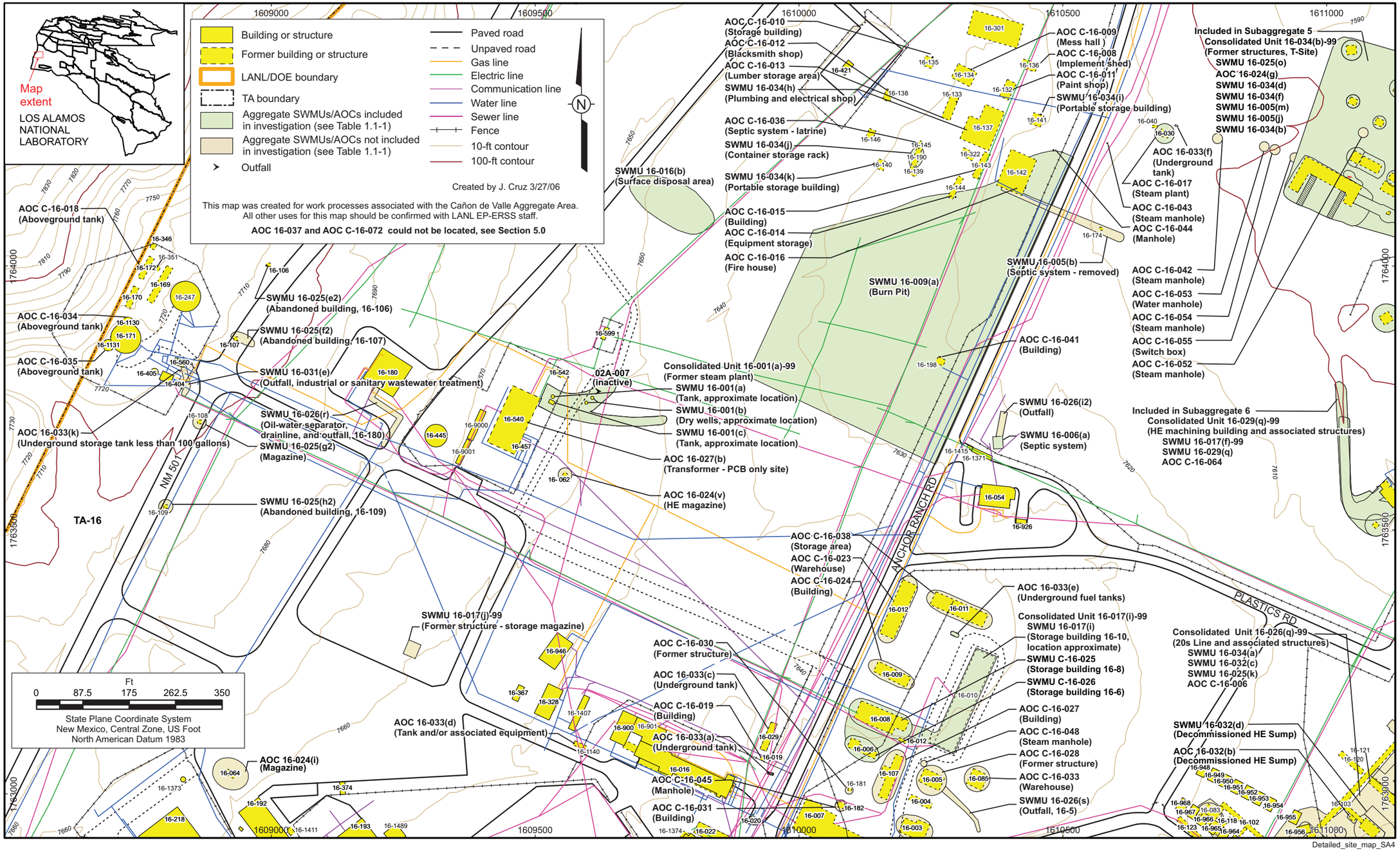


Figure 1.1-5. Detailed site map of Subaggregate 4 (TA-16 Administrative Area), surrounding SWMUs and AOCs, and subsurface utility corridors

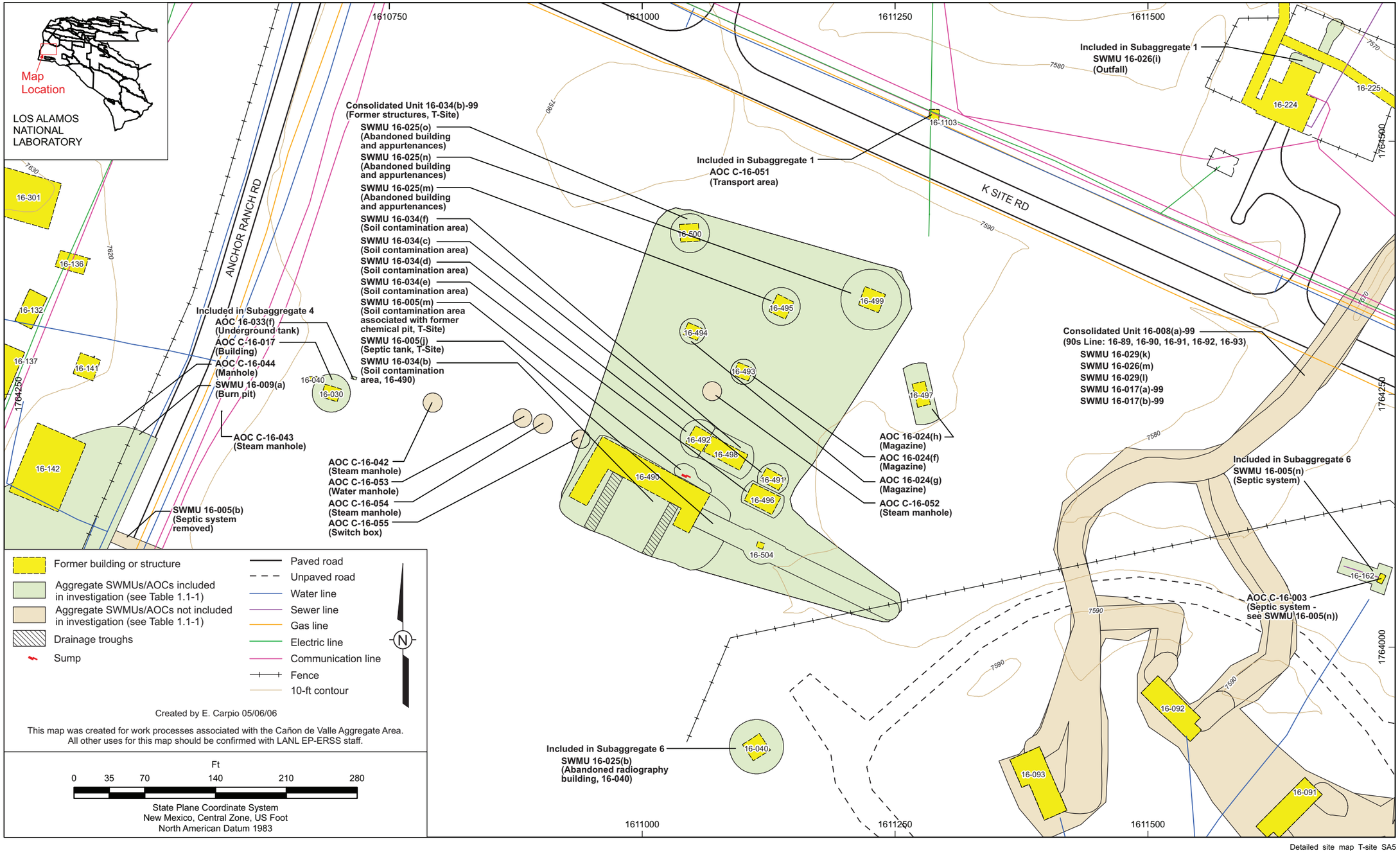


Figure 1.1-6. Detailed site map of Subaggregate 5 (T-Site), surrounding SWMUs and AOCs, and subsurface utility corridors

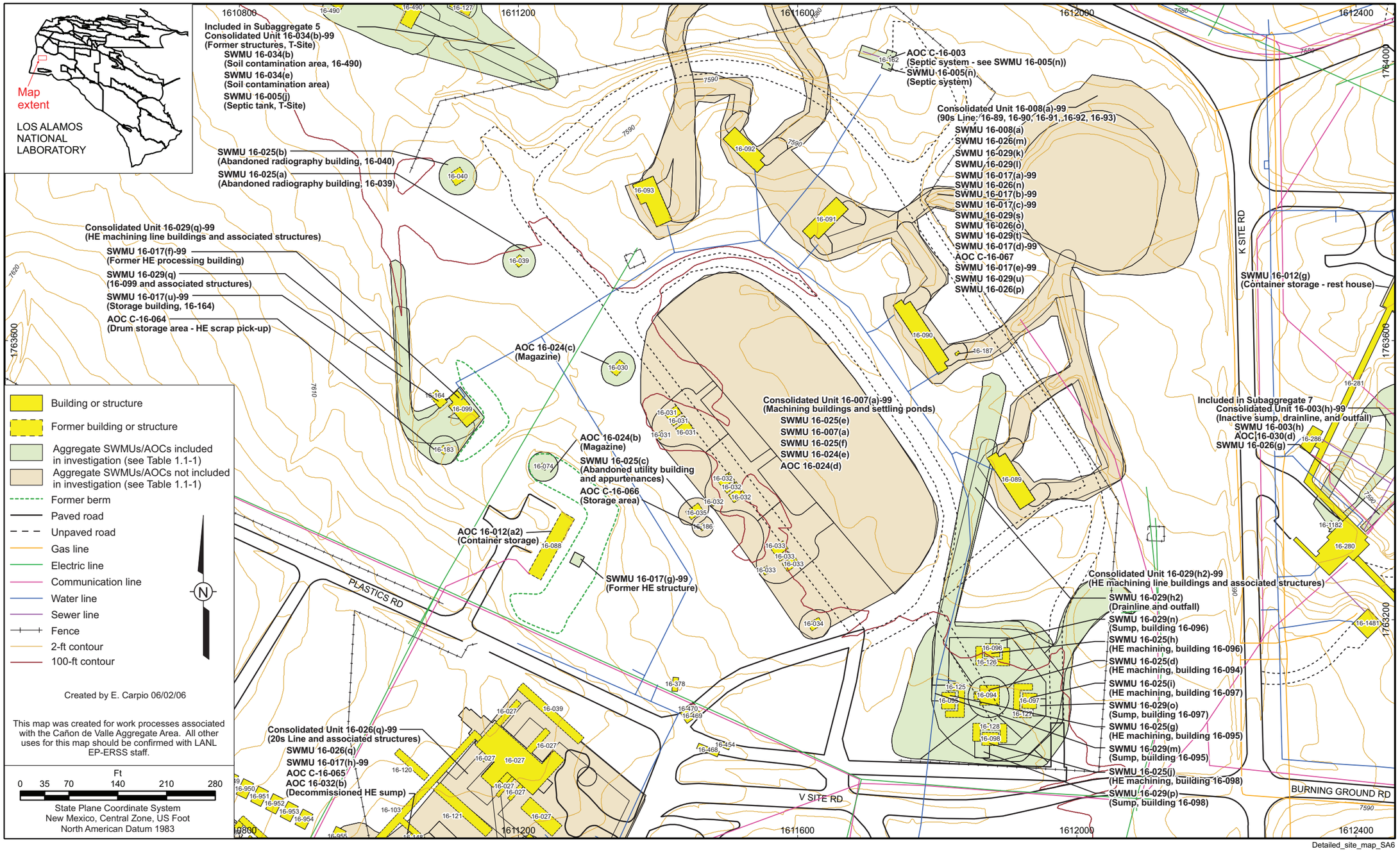


Figure 1.1-7. Detailed site map of Subaggregate 6 (WWII GMX-3 Area), surrounding SWMUs and AOCs, and subsurface utility corridors

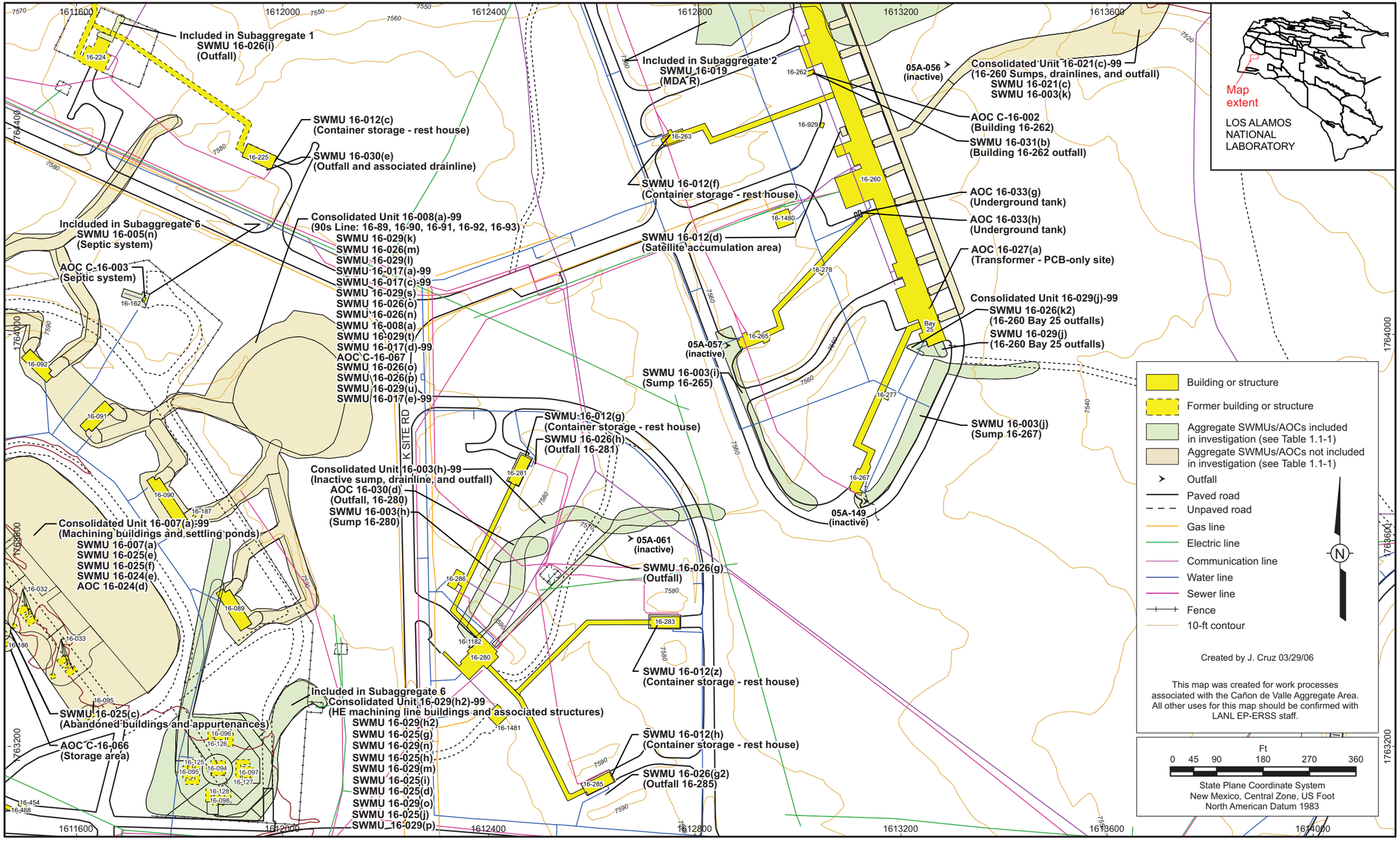


Figure 1.1-8. Detailed site map of Subaggregate 7 (280/260 Complexes), surrounding SWMUs and AOCs, and subsurface utility corridors

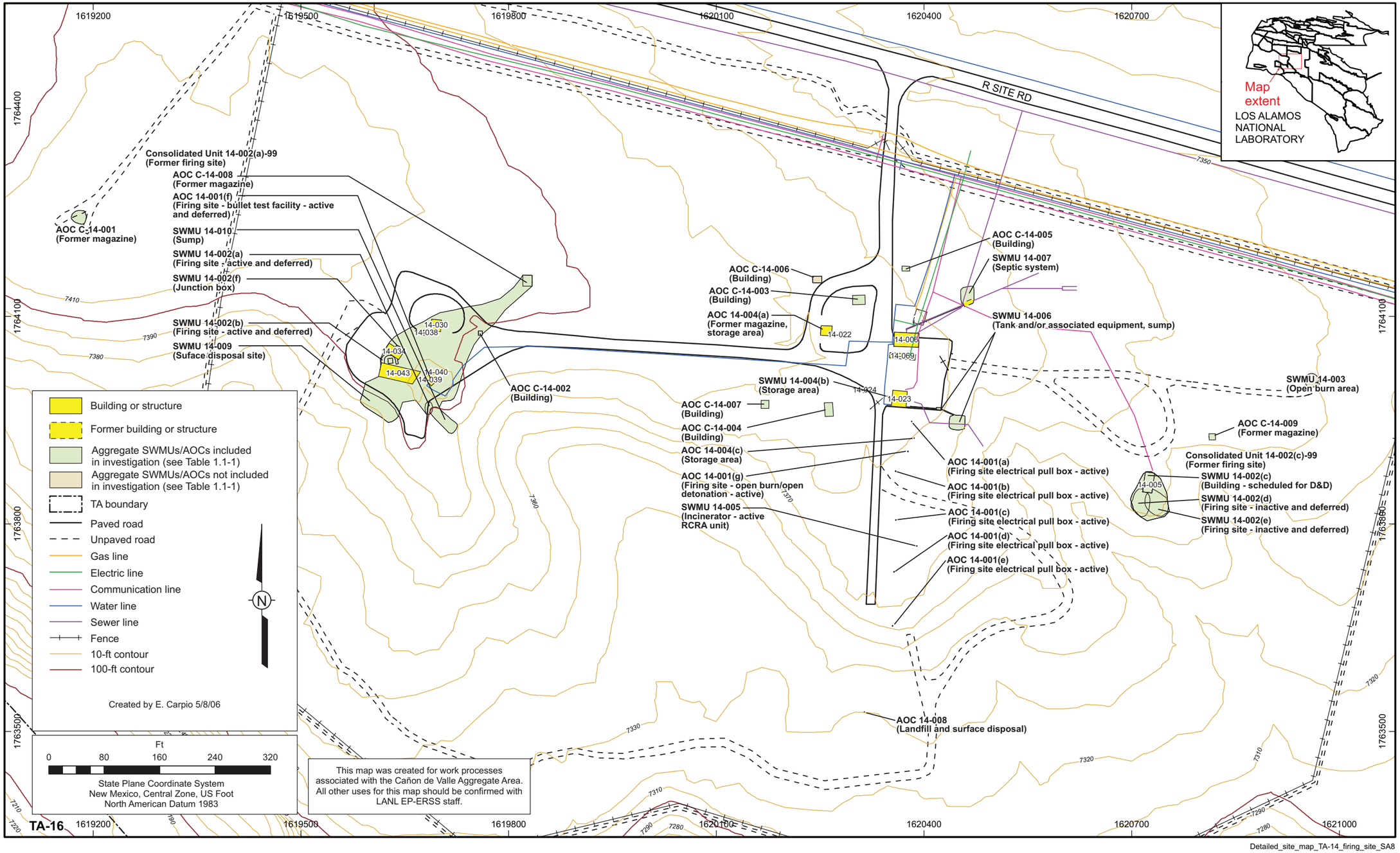


Figure 1.1-9. Detailed site map of Subaggregate 8 (TA-14 Firing Site), surrounding SWMUs and AOCs, and subsurface utility corridors

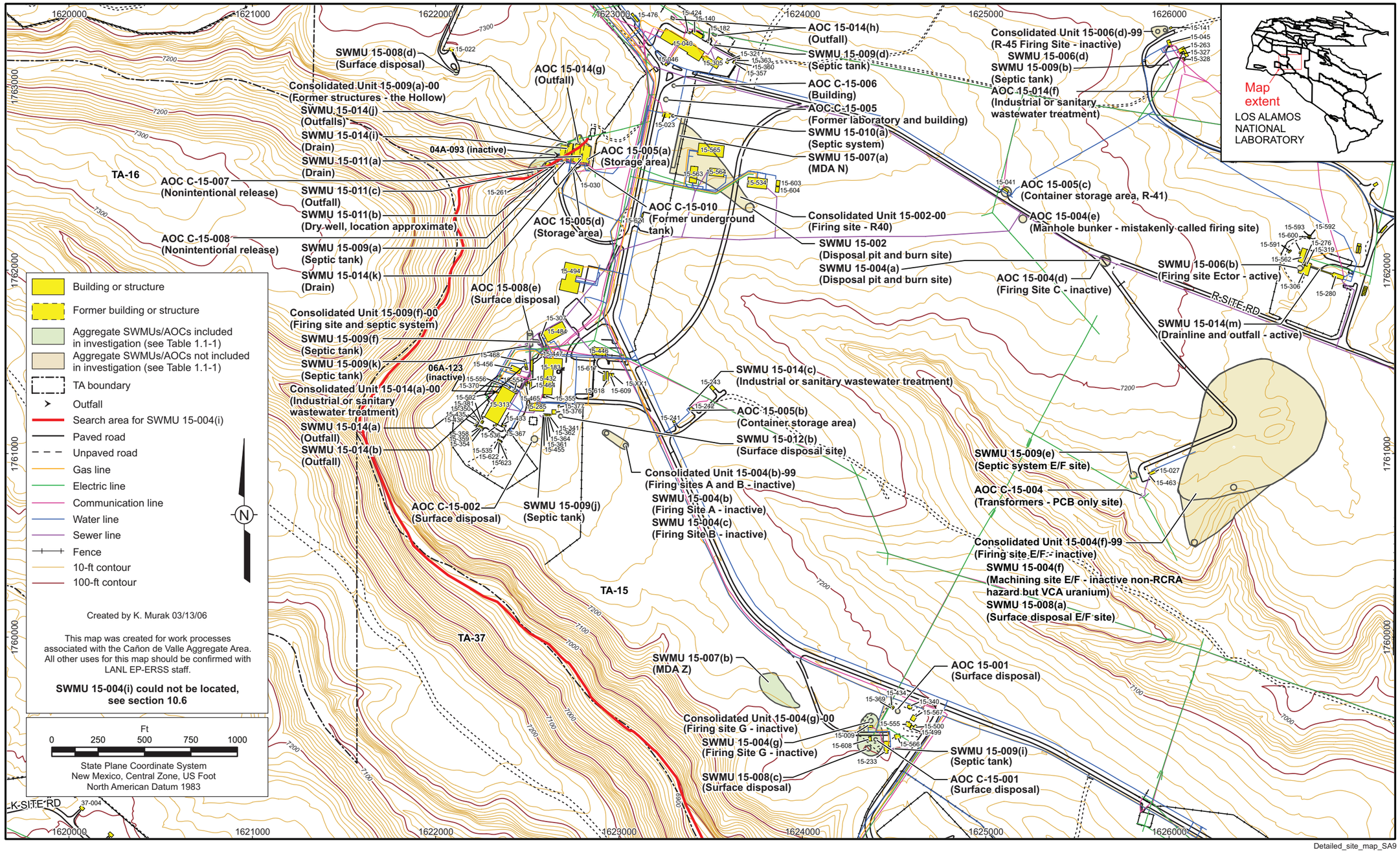


Figure 1.1-10. Detailed site map of Subaggregate 9 (TA-15 West), surrounding SWMUs and AOCs, and subsurface utility corridors

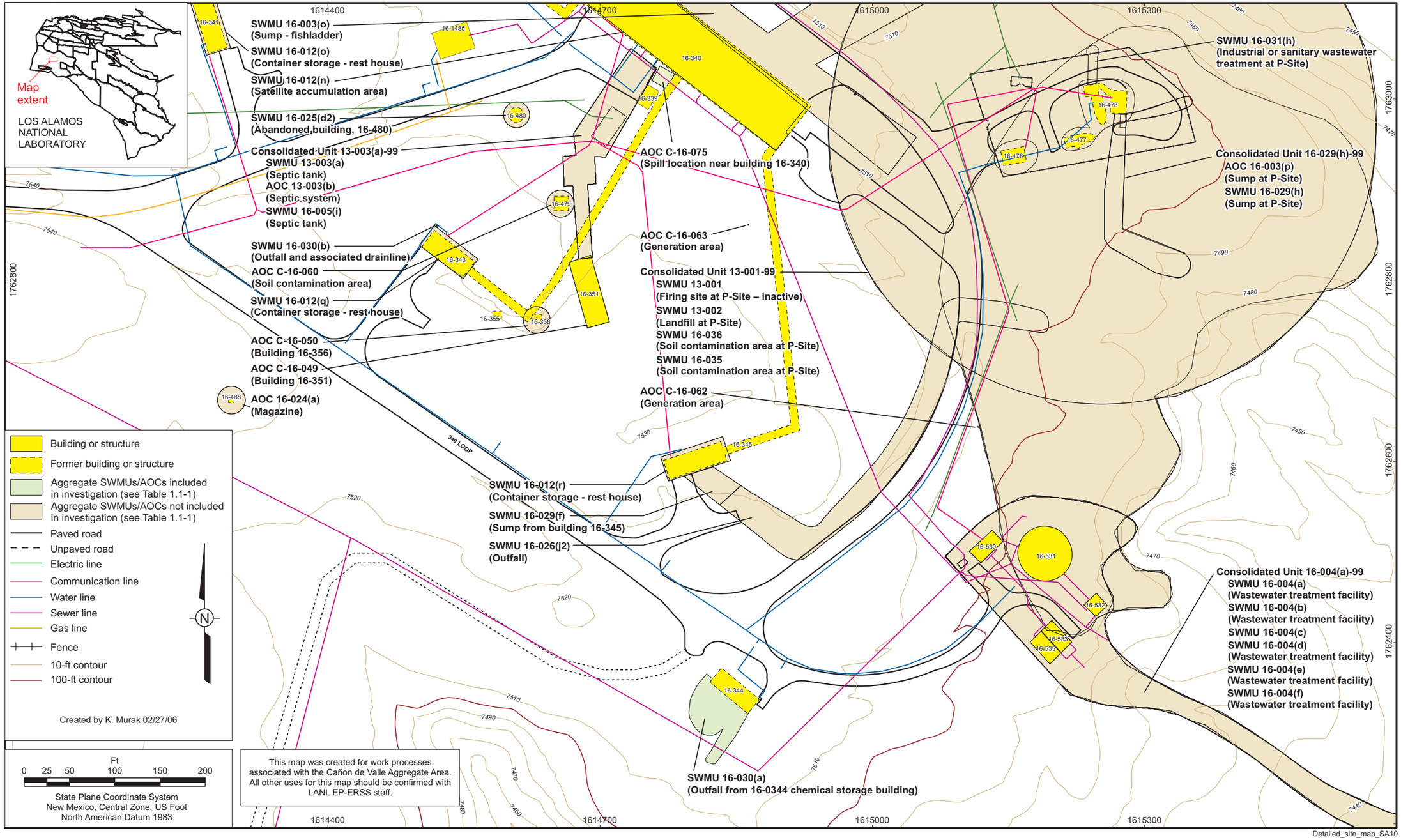


Figure 1.1-11. Detailed site map of Subaggregate 10 (340 Complex), surrounding SWMUs and AOCs, and subsurface utility corridors

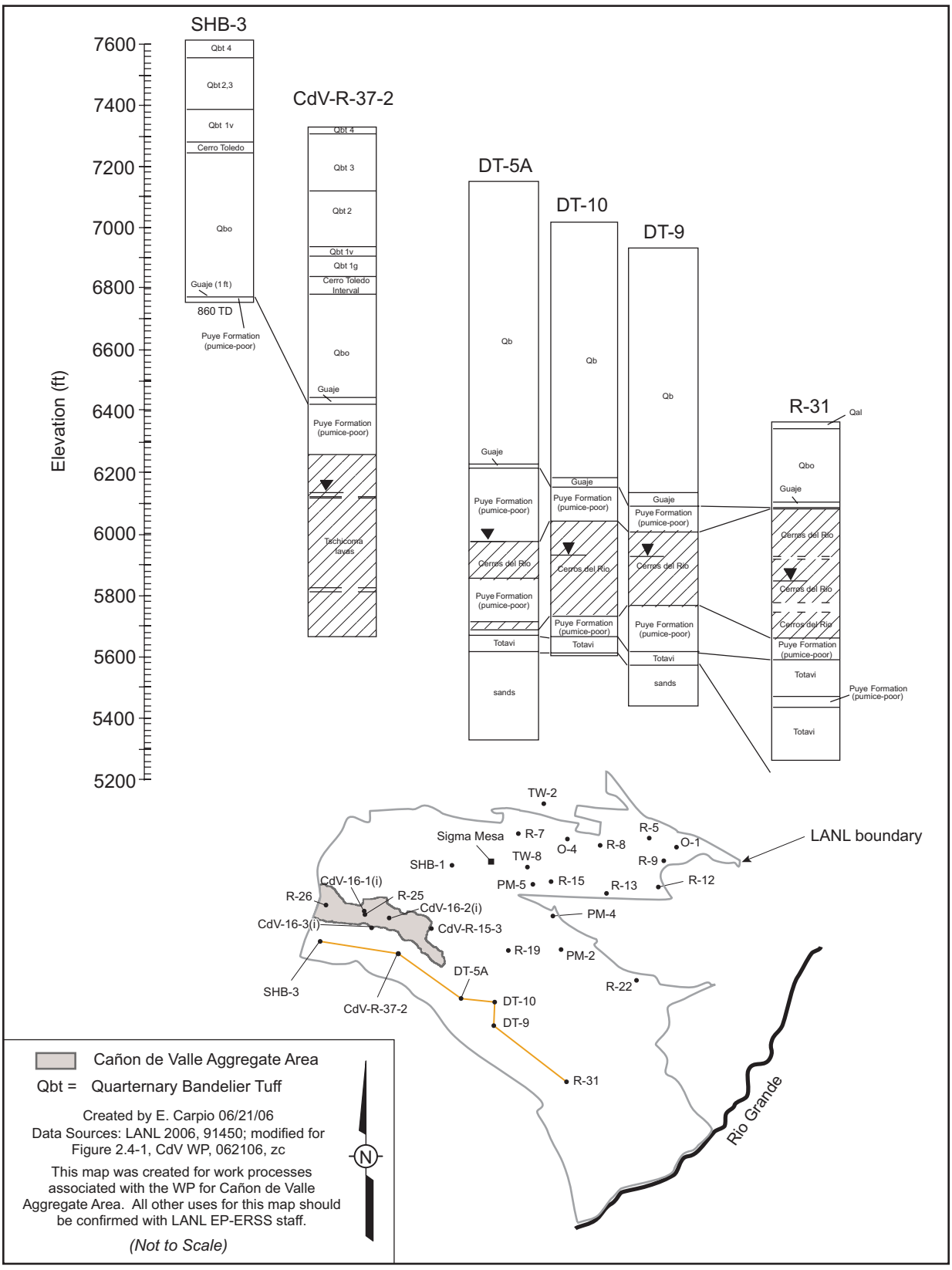


Figure 2.4-1. Stratigraphy and geologic correlations at selected borings (west-northwest to east-southeast)

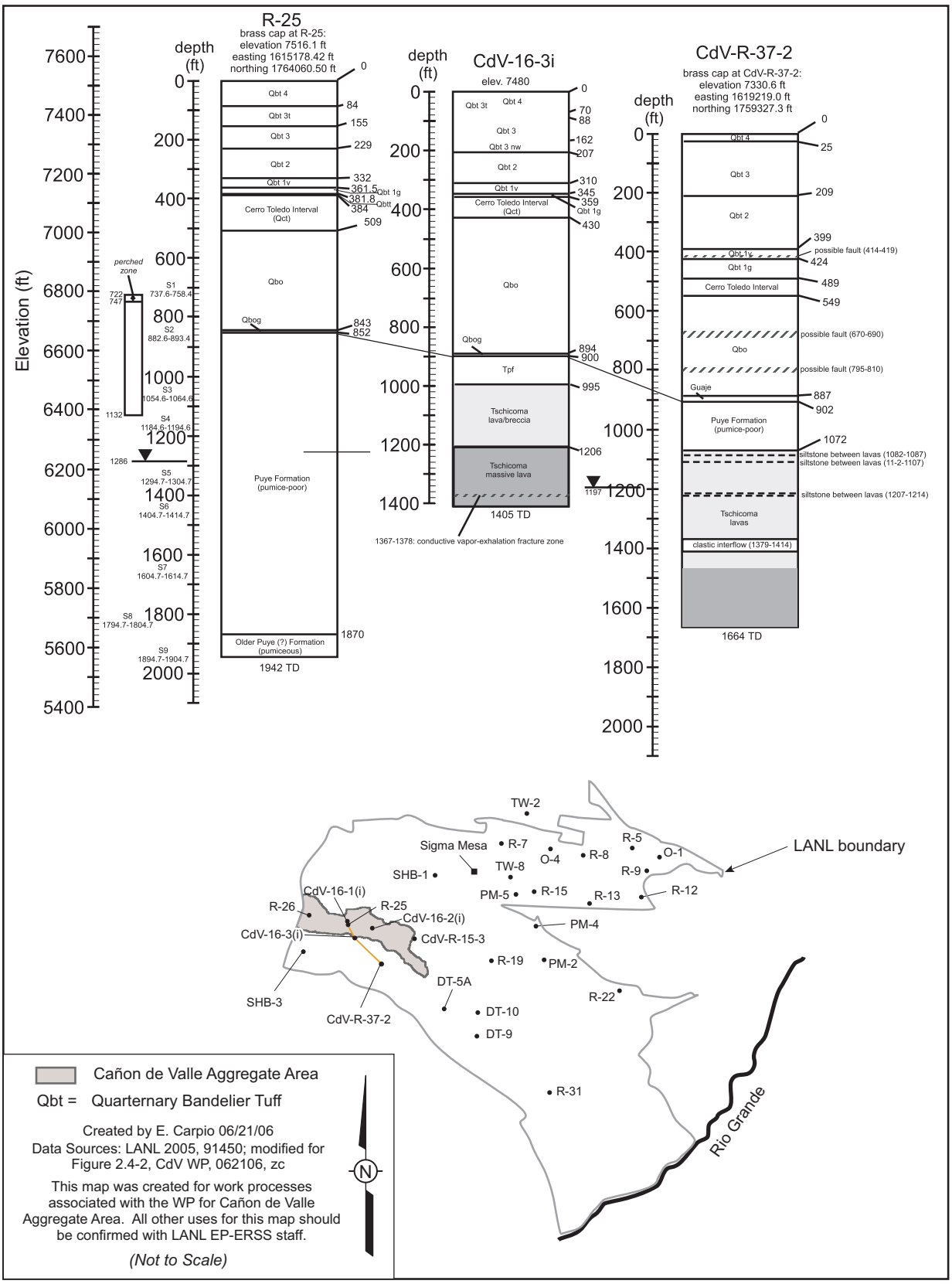


Figure 2.4-2. Stratigraphy and geologic correlations at selected borings (north to south)

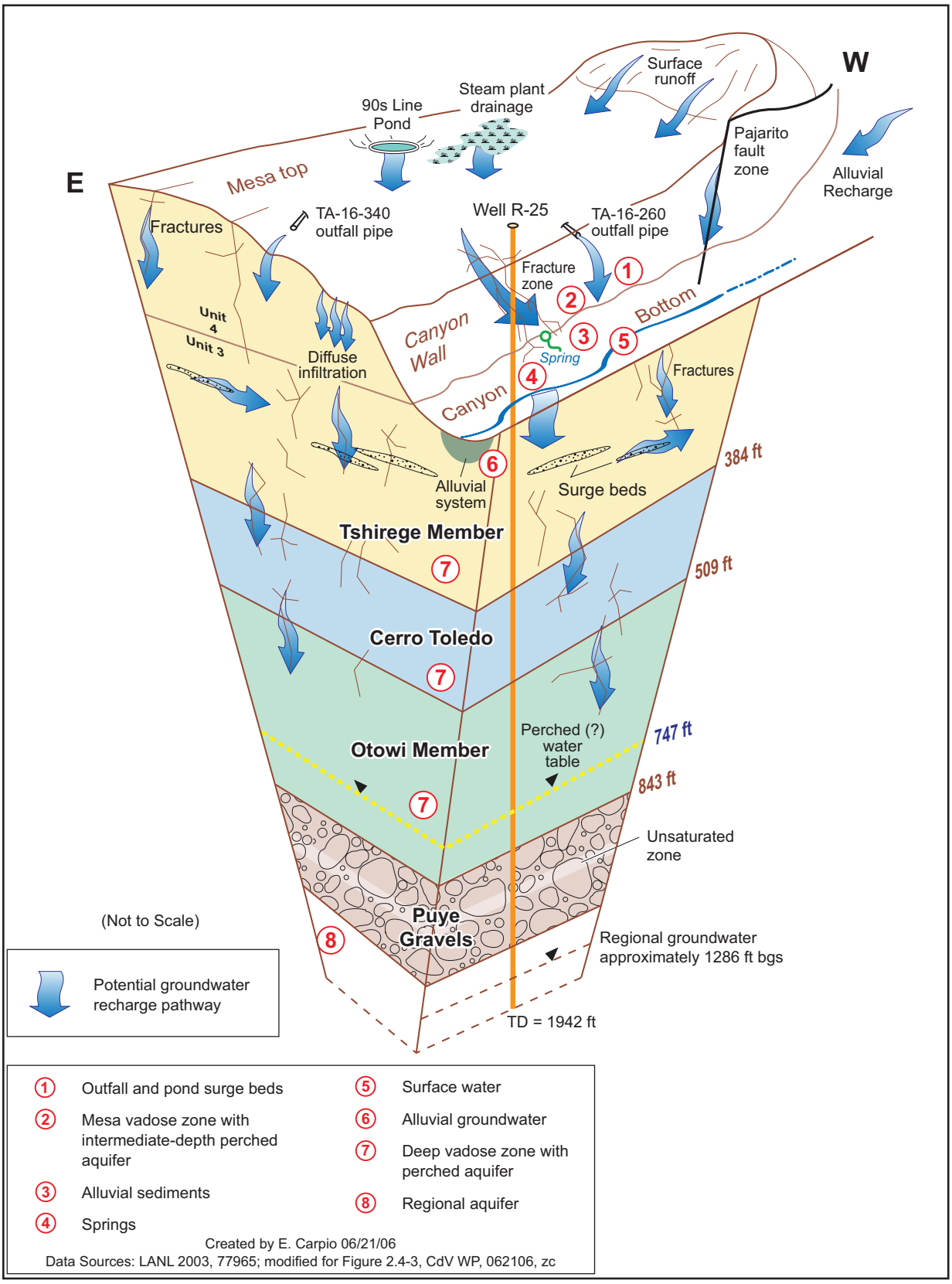


Figure 2.4-3. Hydrogeologic conceptual model for the Cañon de Valle Aggregate Area

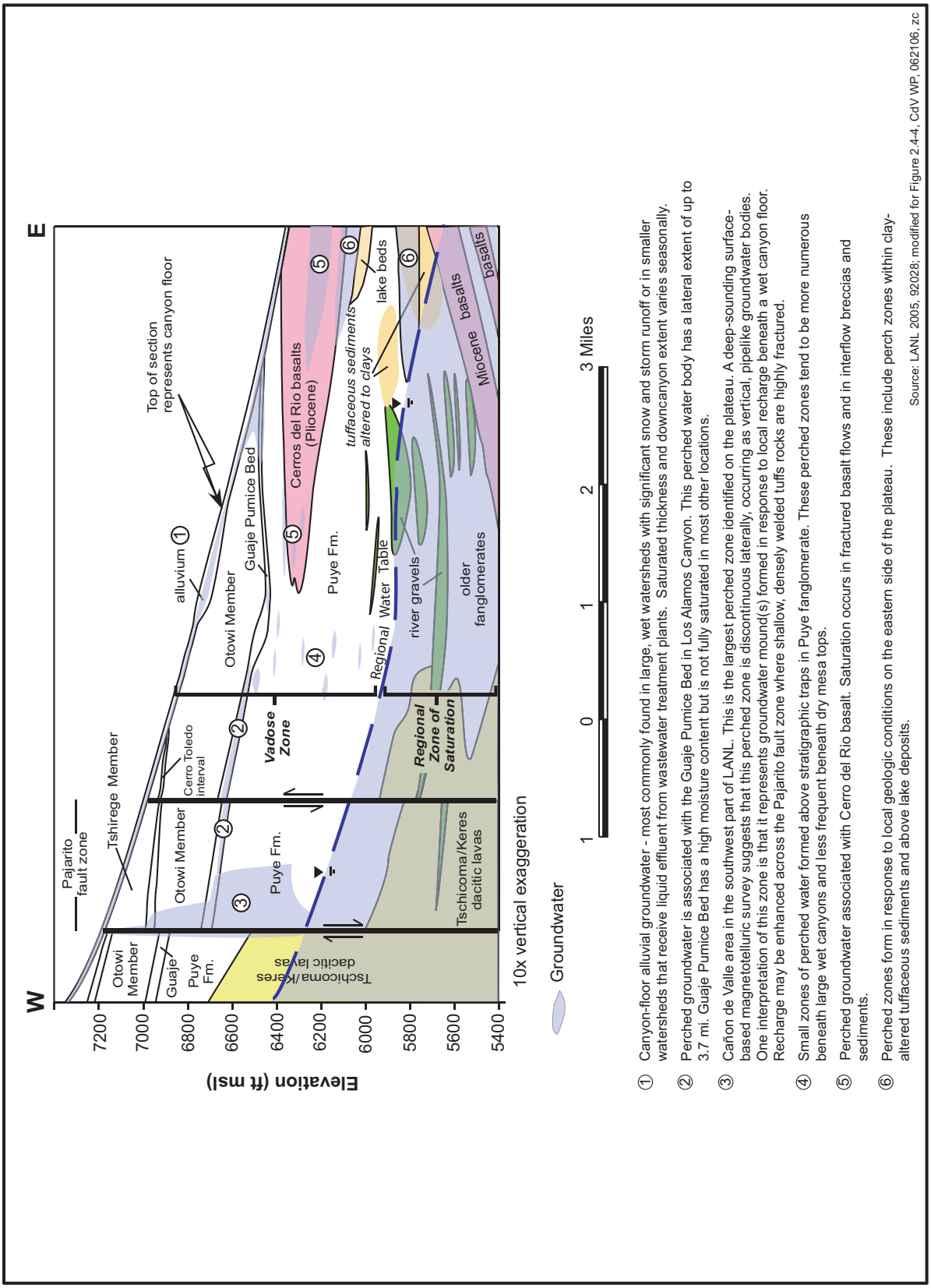
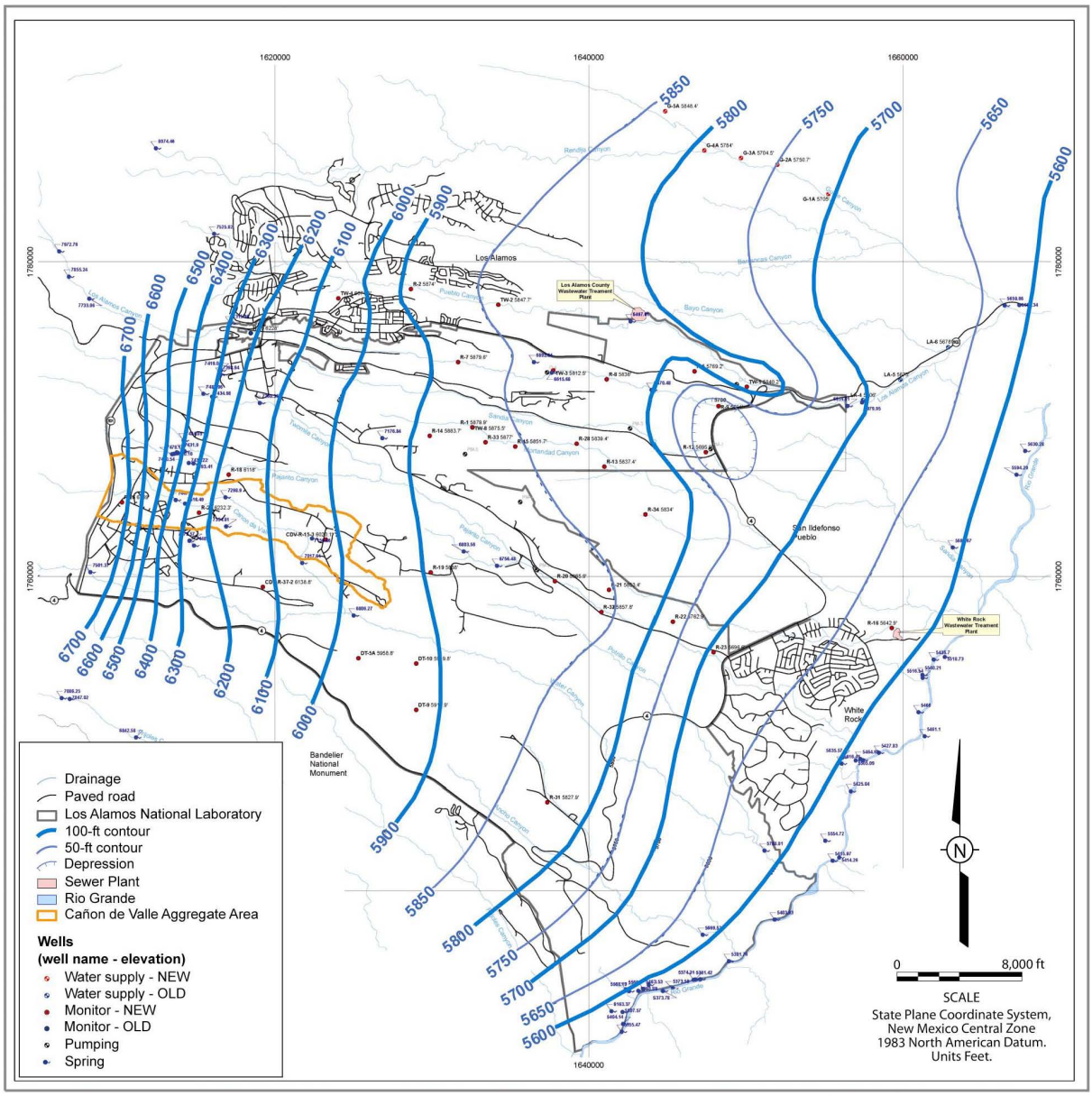


Figure 2.4-4. Generalized east-west hydrostratigraphic cross section through the Pajarito Mesa



Source: LANL 2005, 92028; modified for Figure 2.4-5, CdV WP, 062106, zc

Figure 2.4-5 Elevation of top of regional aquifer for the Pajarito Plateau

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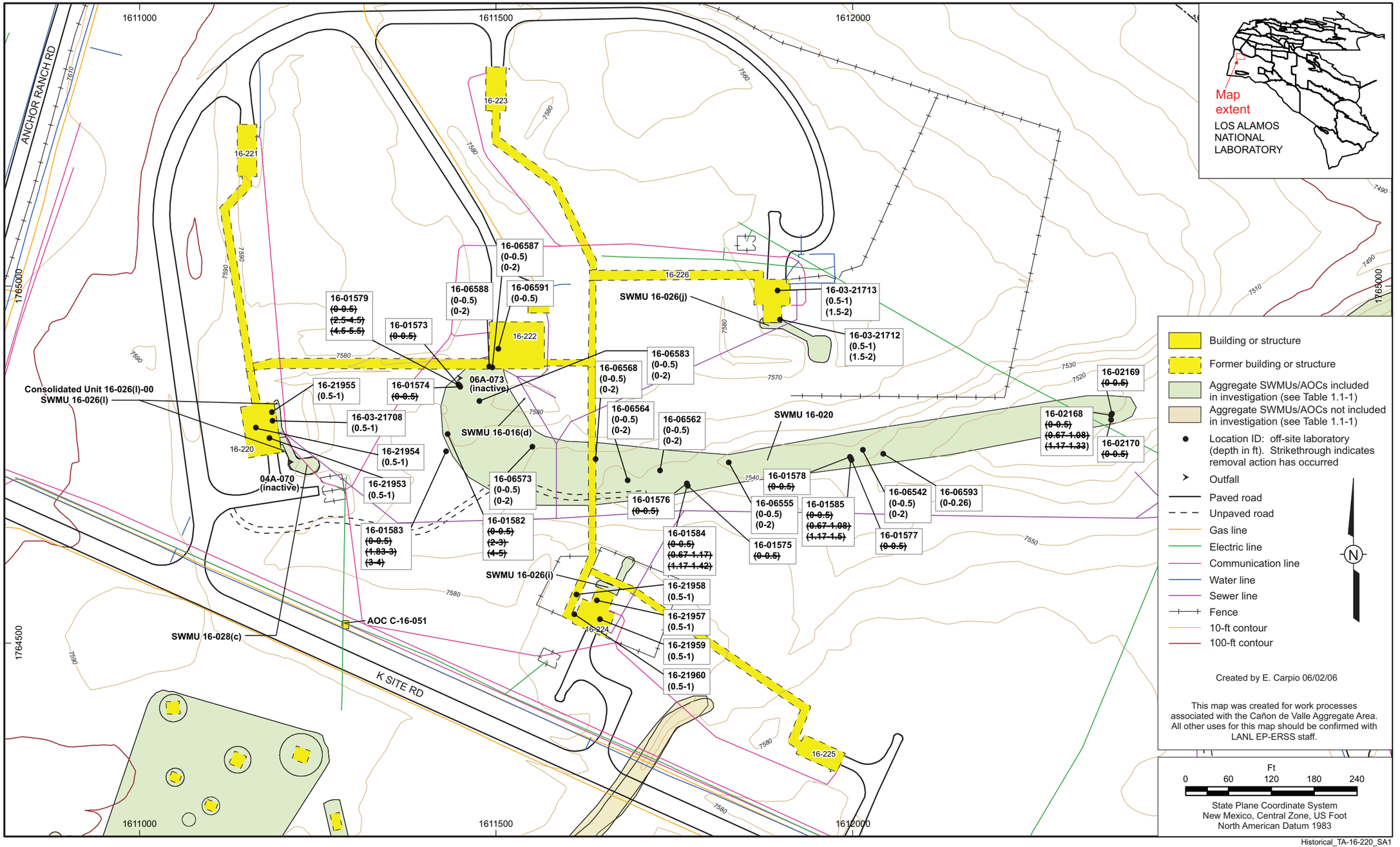


Figure 2.5-1. Subaggregate 1 (220 Complex) historical sampling locations and depths

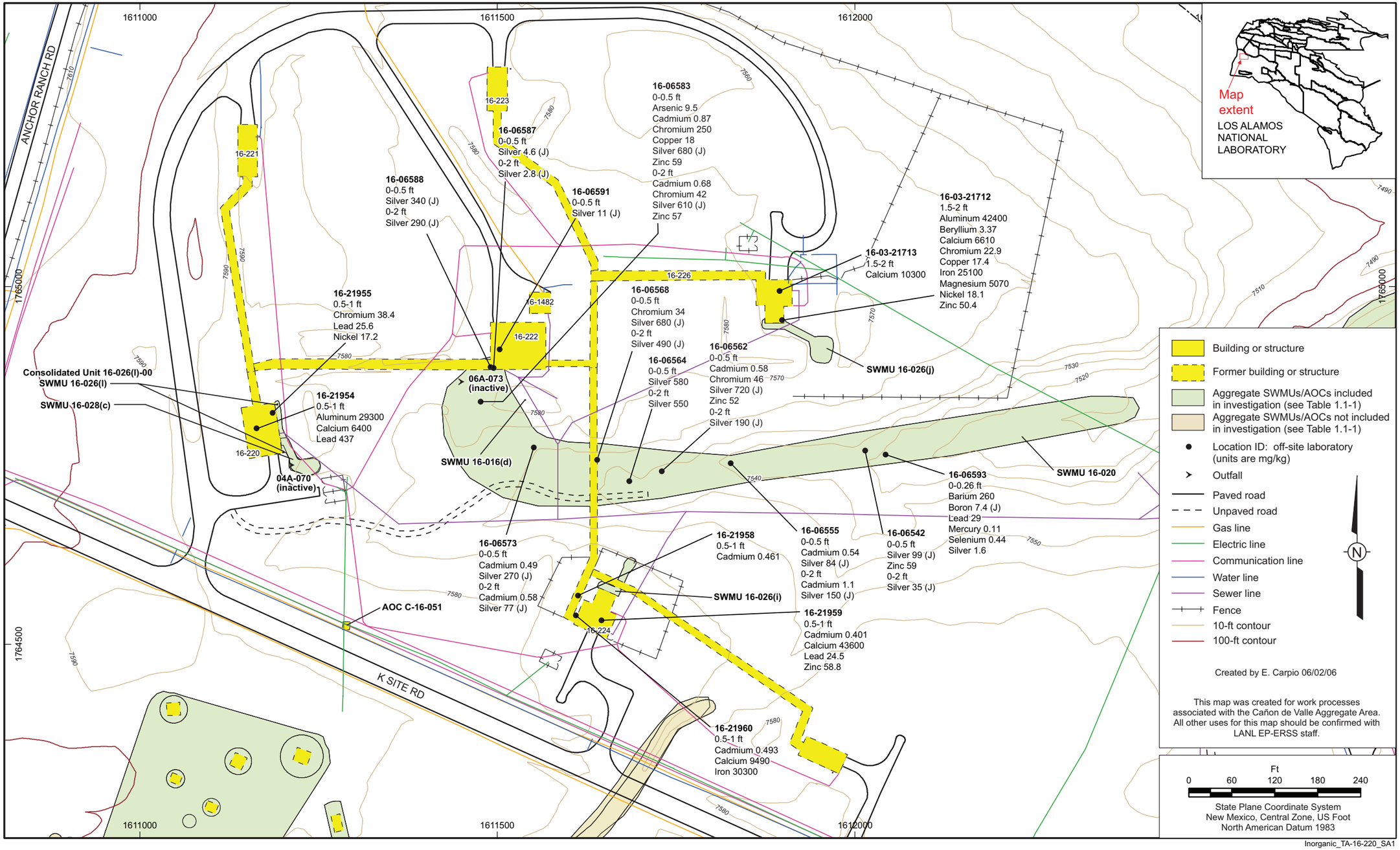


Figure 2.5-2. Subaggregate 1 (220 Complex) historical sampling locations with inorganic chemicals detected greater than background values

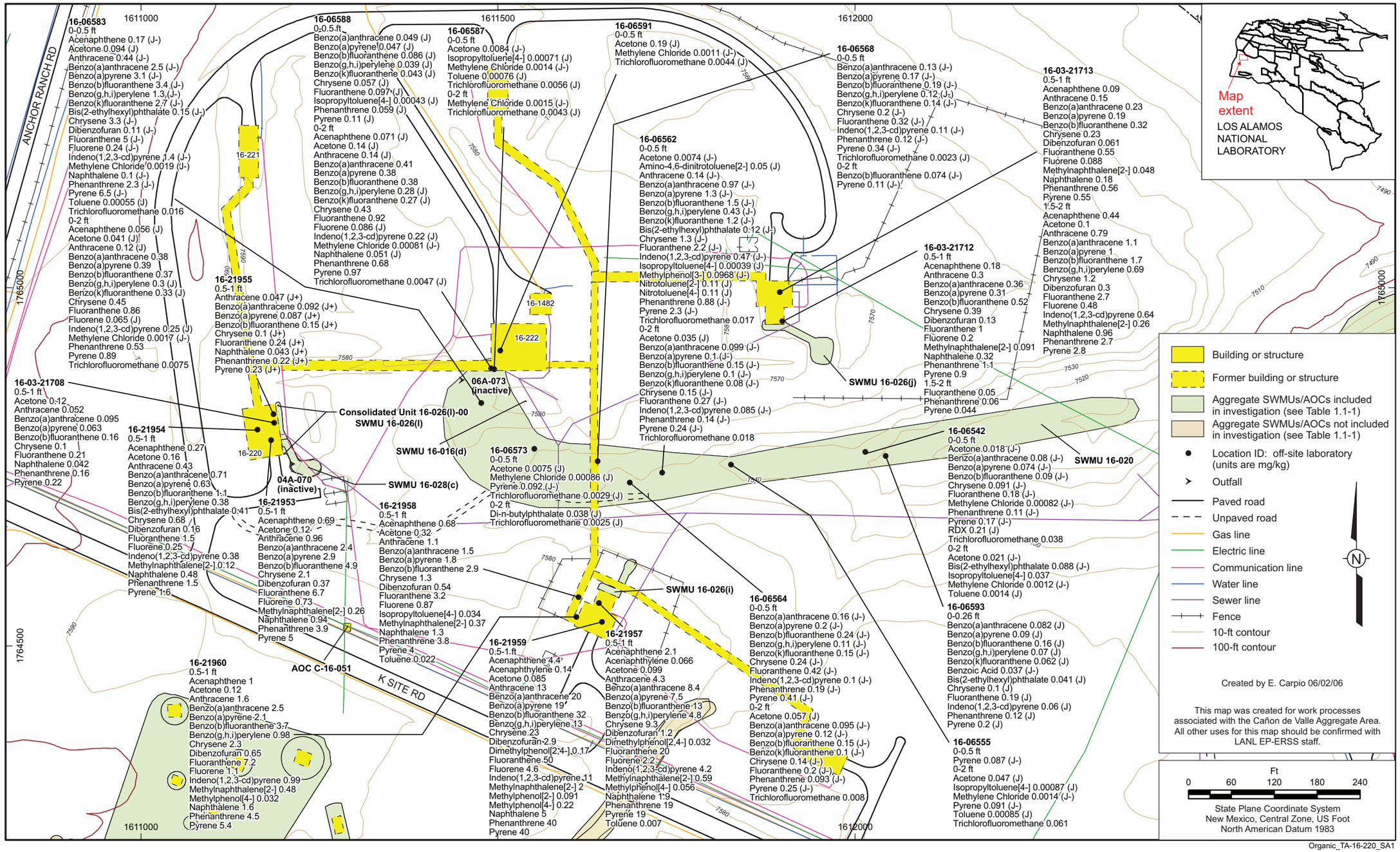


Figure 2.5-3. Subaggregate 1 (220 Complex) historical sampling locations with detected organic chemicals

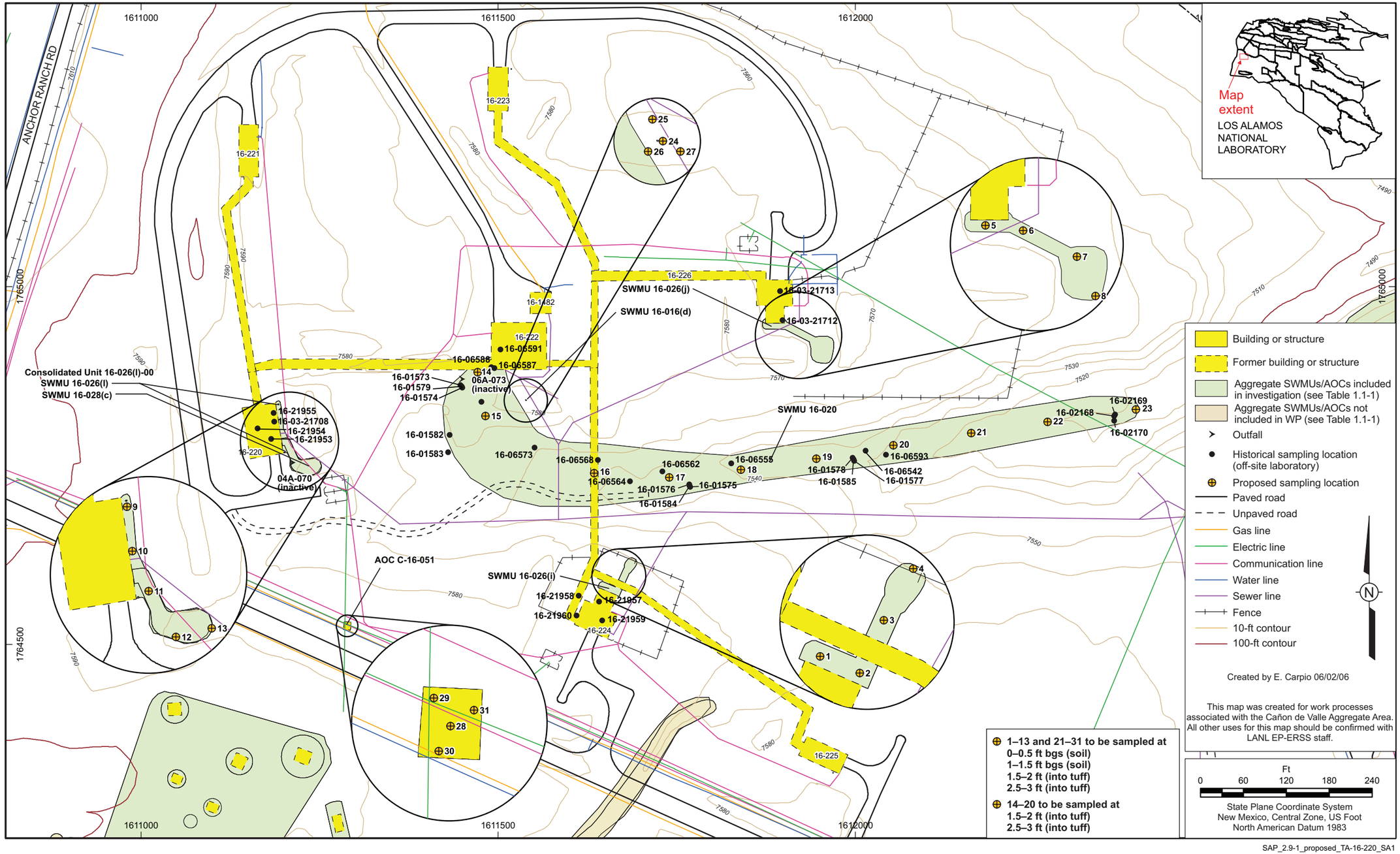


Figure 2.9-1. Subaggregate 1 (220 Complex) proposed sampling locations and depths

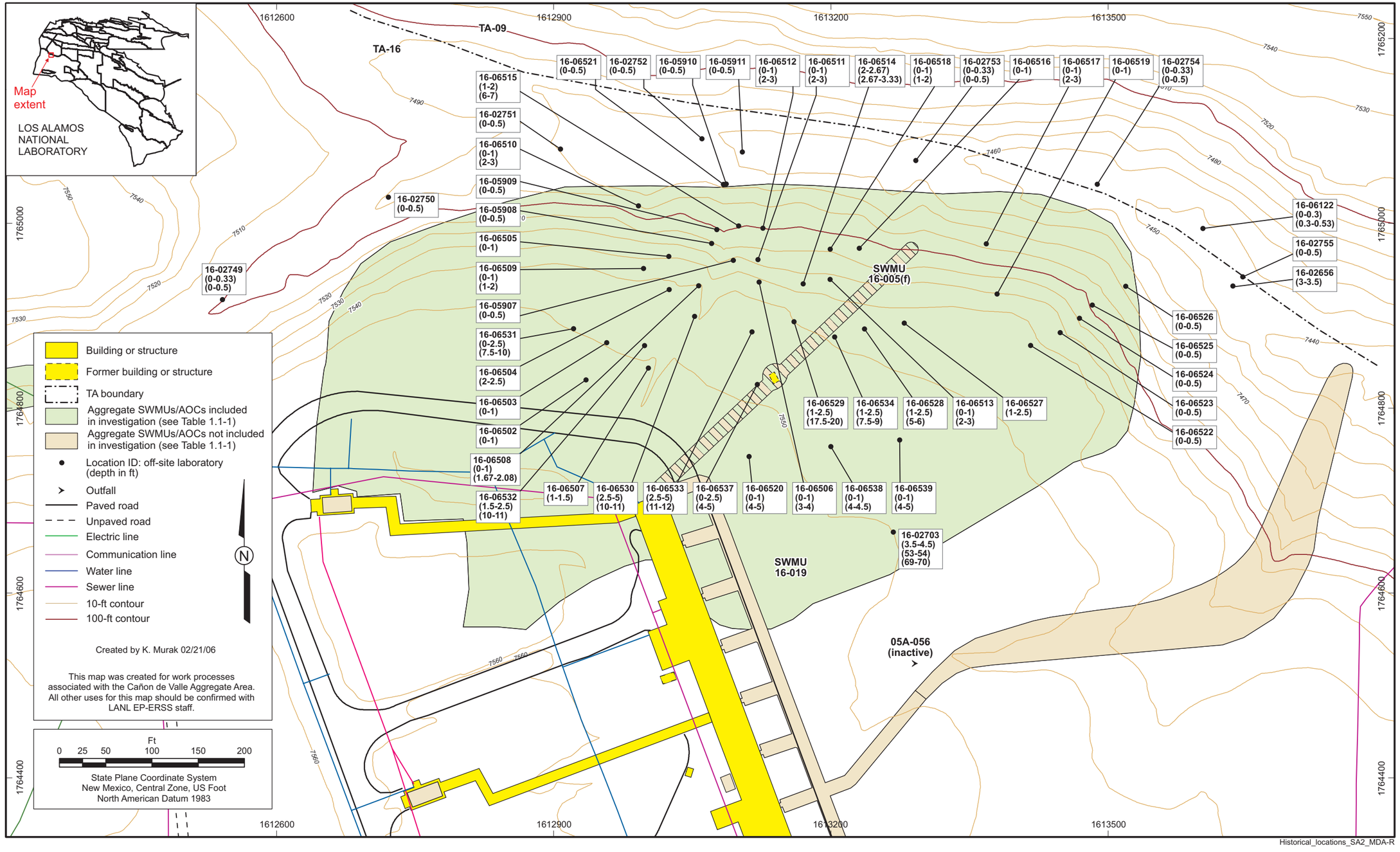


Figure 3.5-1. Subaggregate 2 (MDA R) historical sampling locations and depths

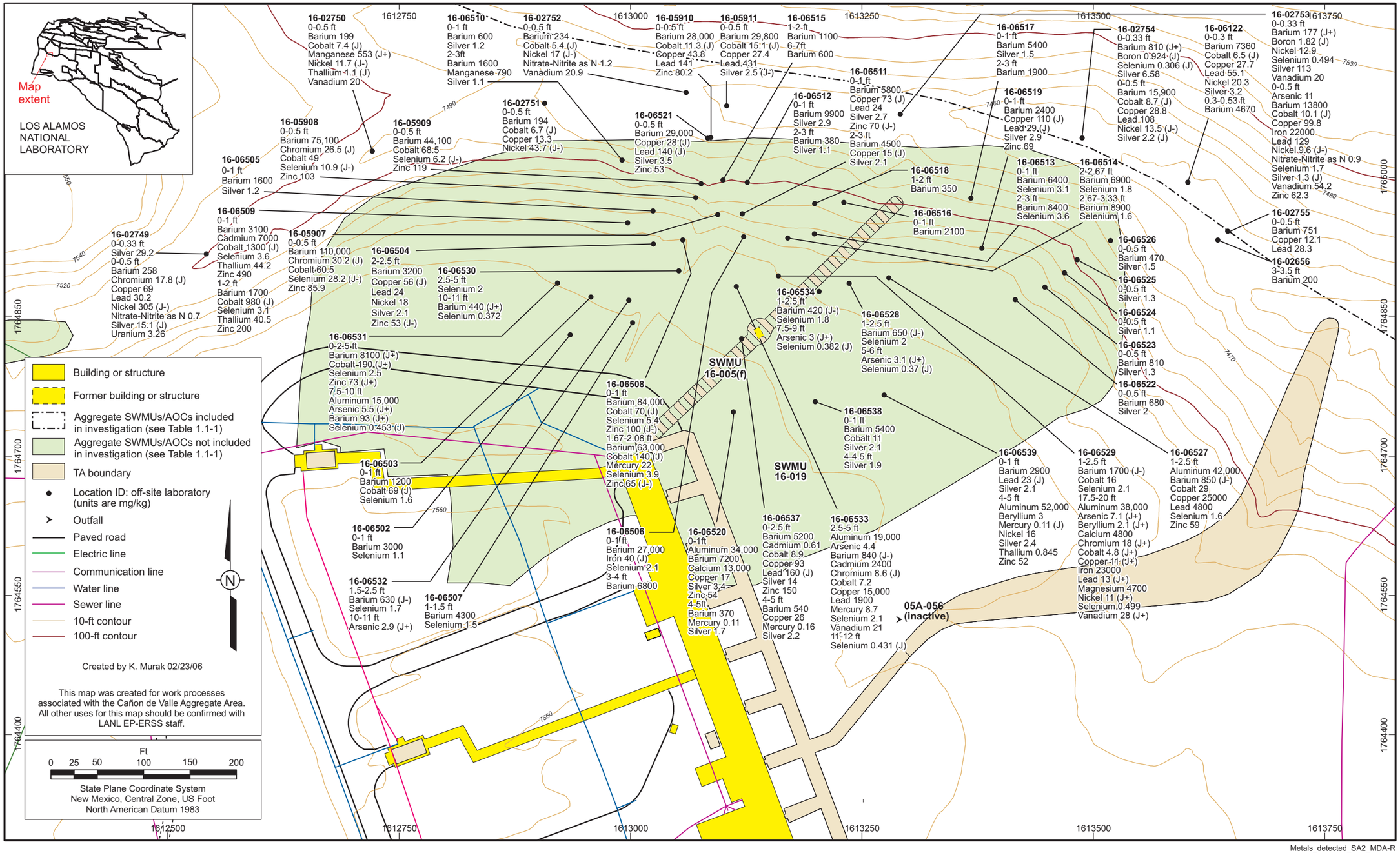


Figure 3.5-2. Subaggregate 2 (MDA R) historical sampling locations with inorganic chemicals detected greater than background values

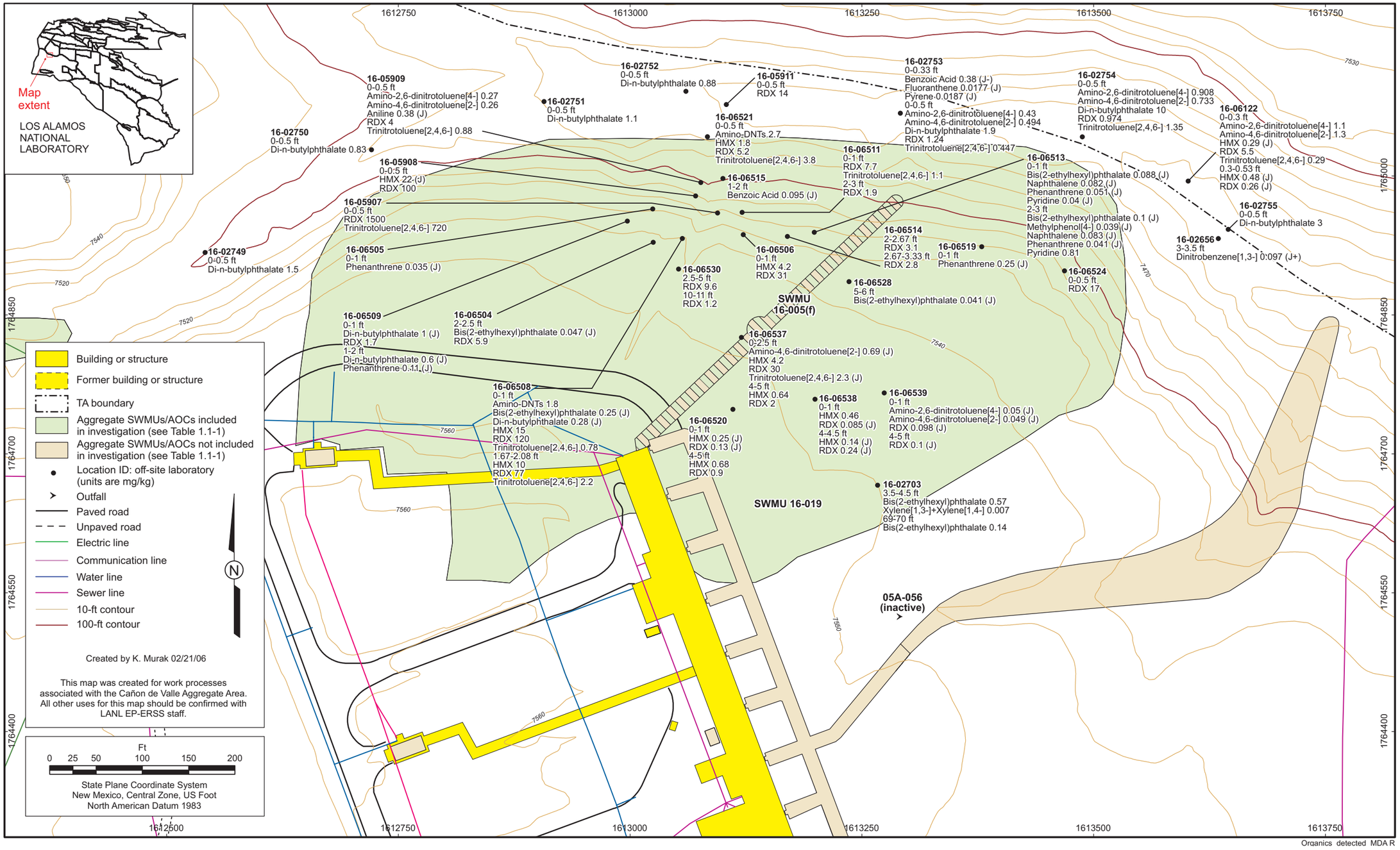


Figure 3.5-3. Subaggregate 2 (MDA R) historical sampling locations with detected organic chemicals

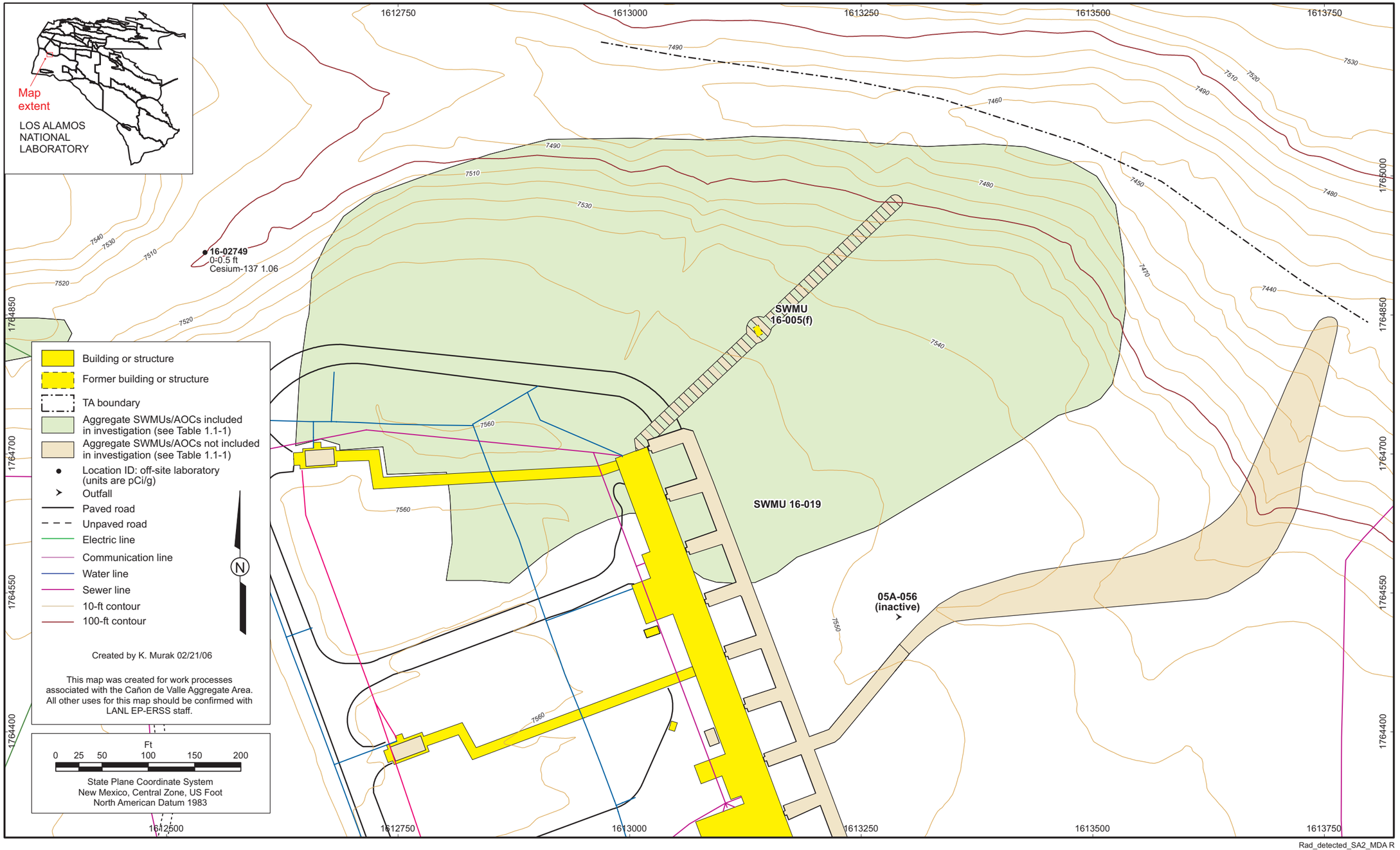


Figure 3.5-4. Subaggregate 2 (MDA R) historical sampling locations with radionuclides detected greater than fallout values

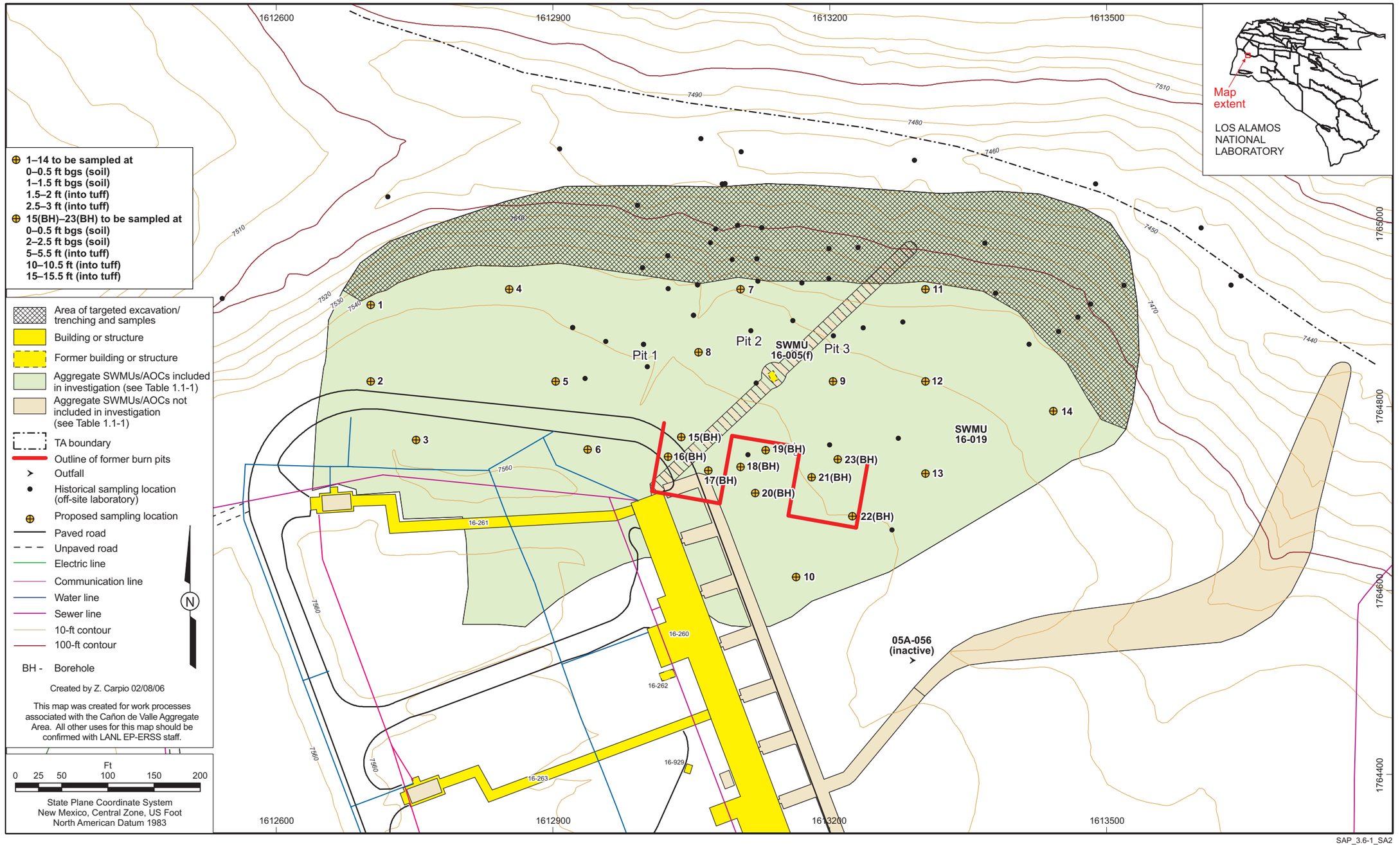


Figure 3.6-1. Subaggregate 2 (MDA R) proposed investigation and sampling locations and depths

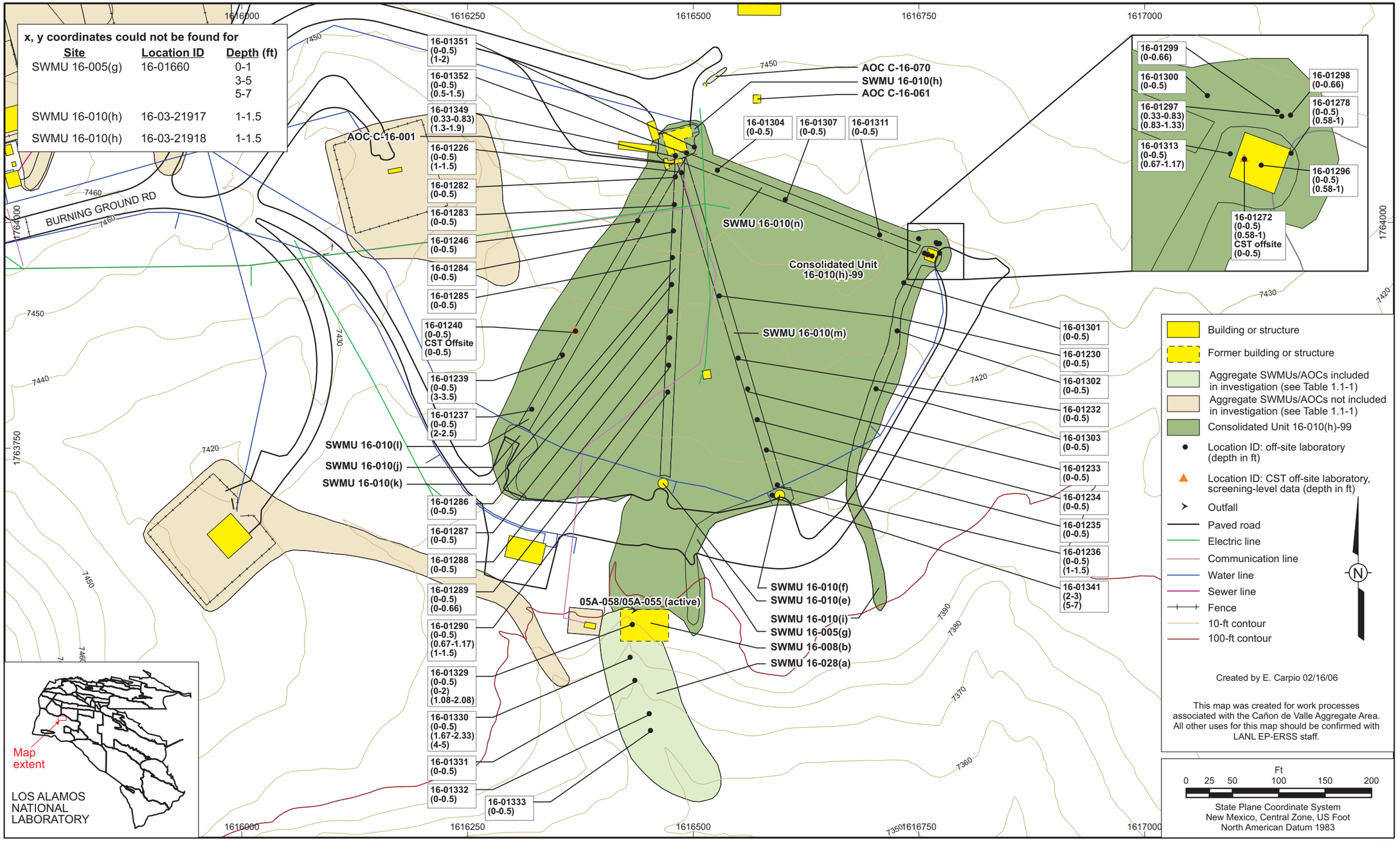


Figure 4.5-1. Subaggregate 3 (Burning Ground) historical sampling locations and depths

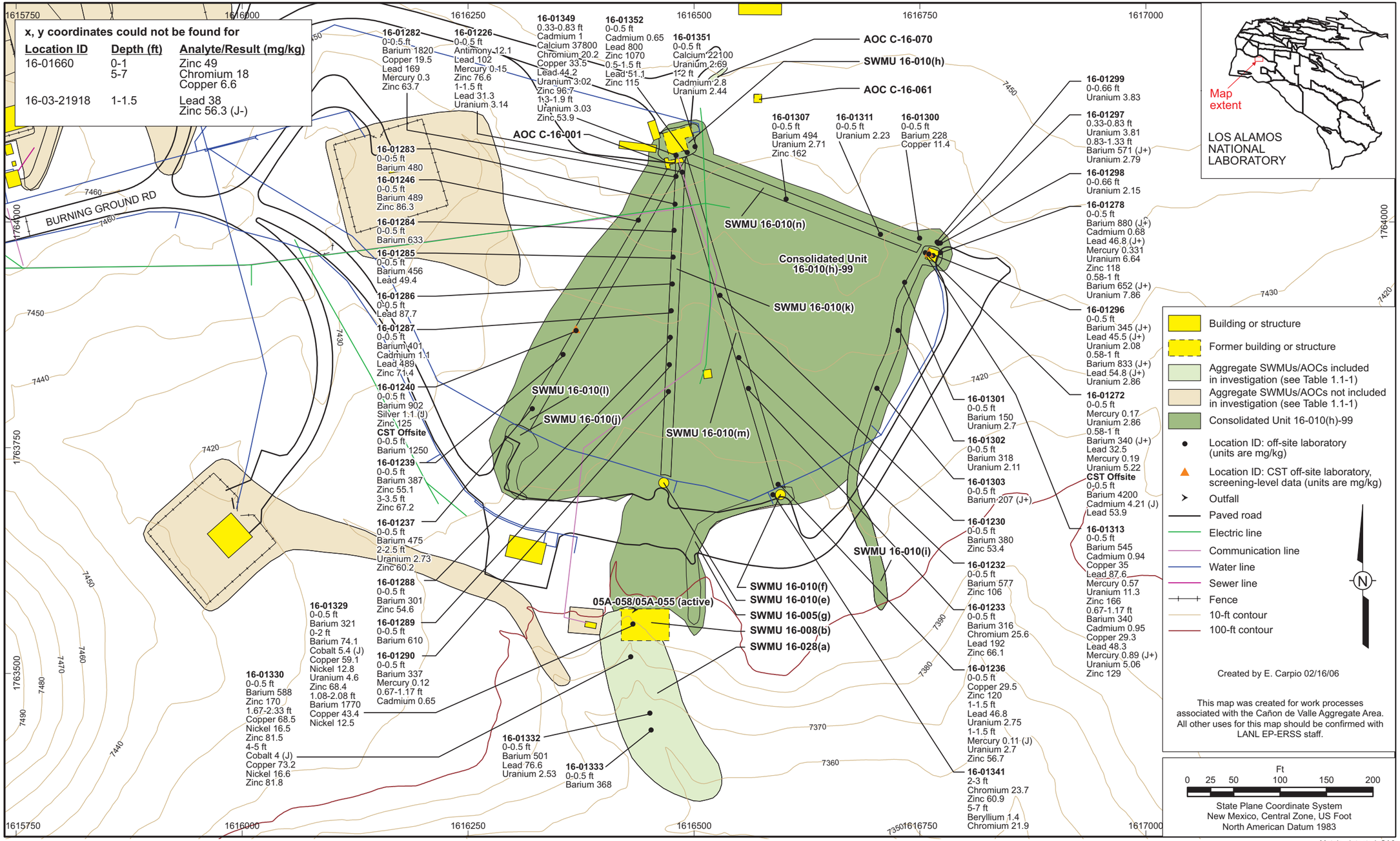


Figure 4.5-2. Subaggregate 3 (Burning Ground) historical sampling locations with inorganic chemicals detected greater than background values

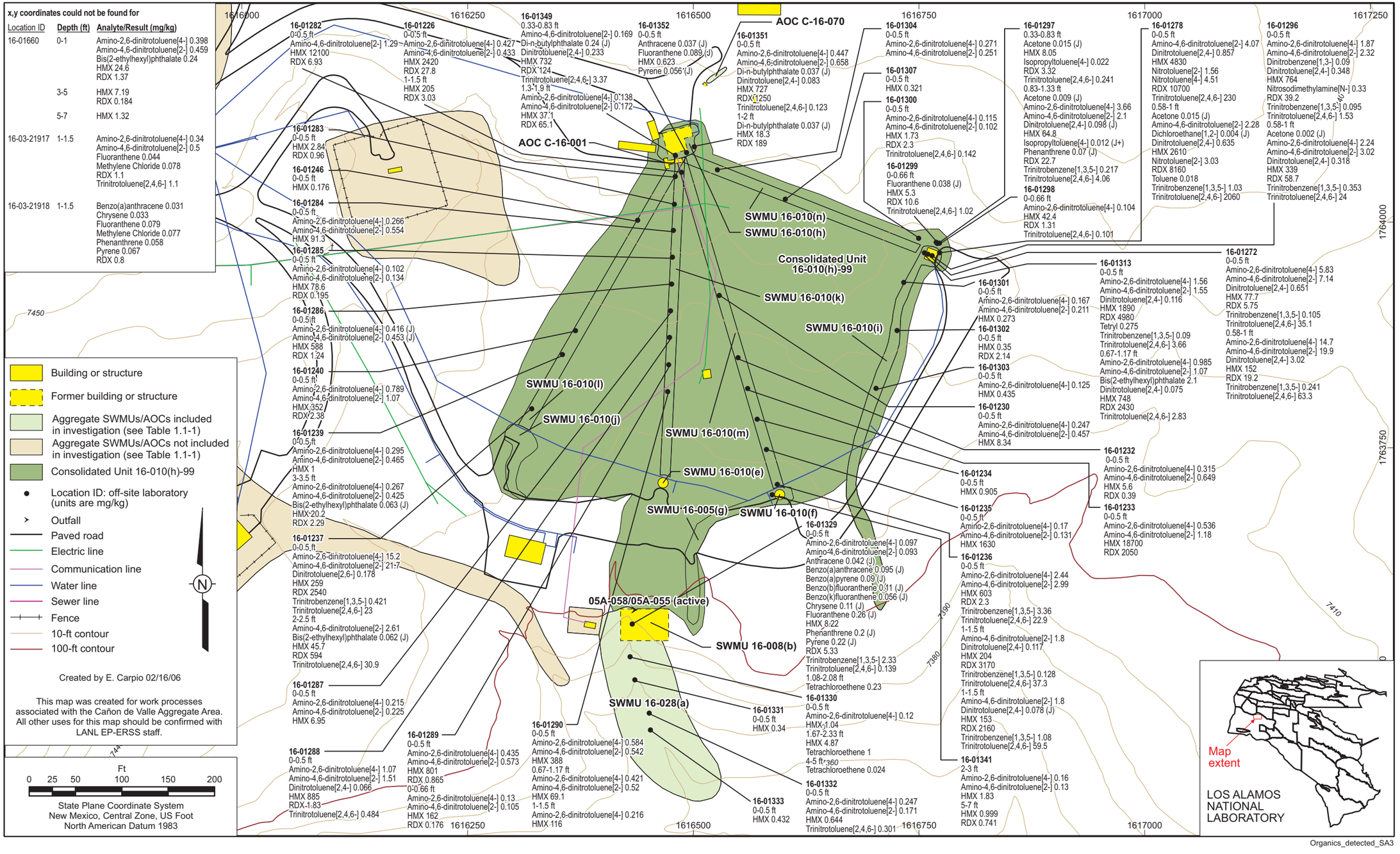


Figure 4.5-3. Subaggregate 3 (Burning Ground) historical sampling locations with detected organic chemicals

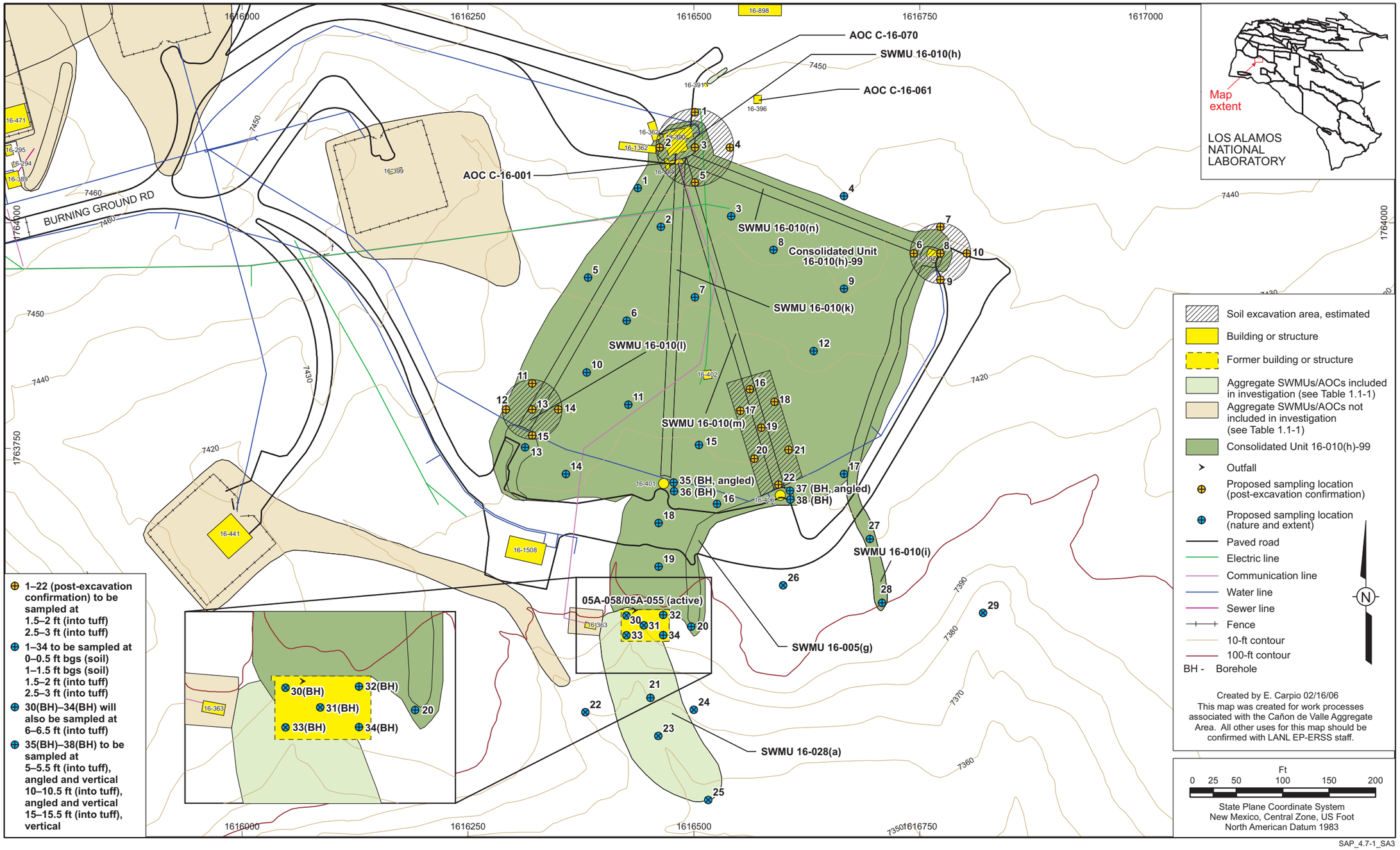


Figure 4.7-1. Subaggregate 3 (Burning Ground) proposed corrective action and sampling

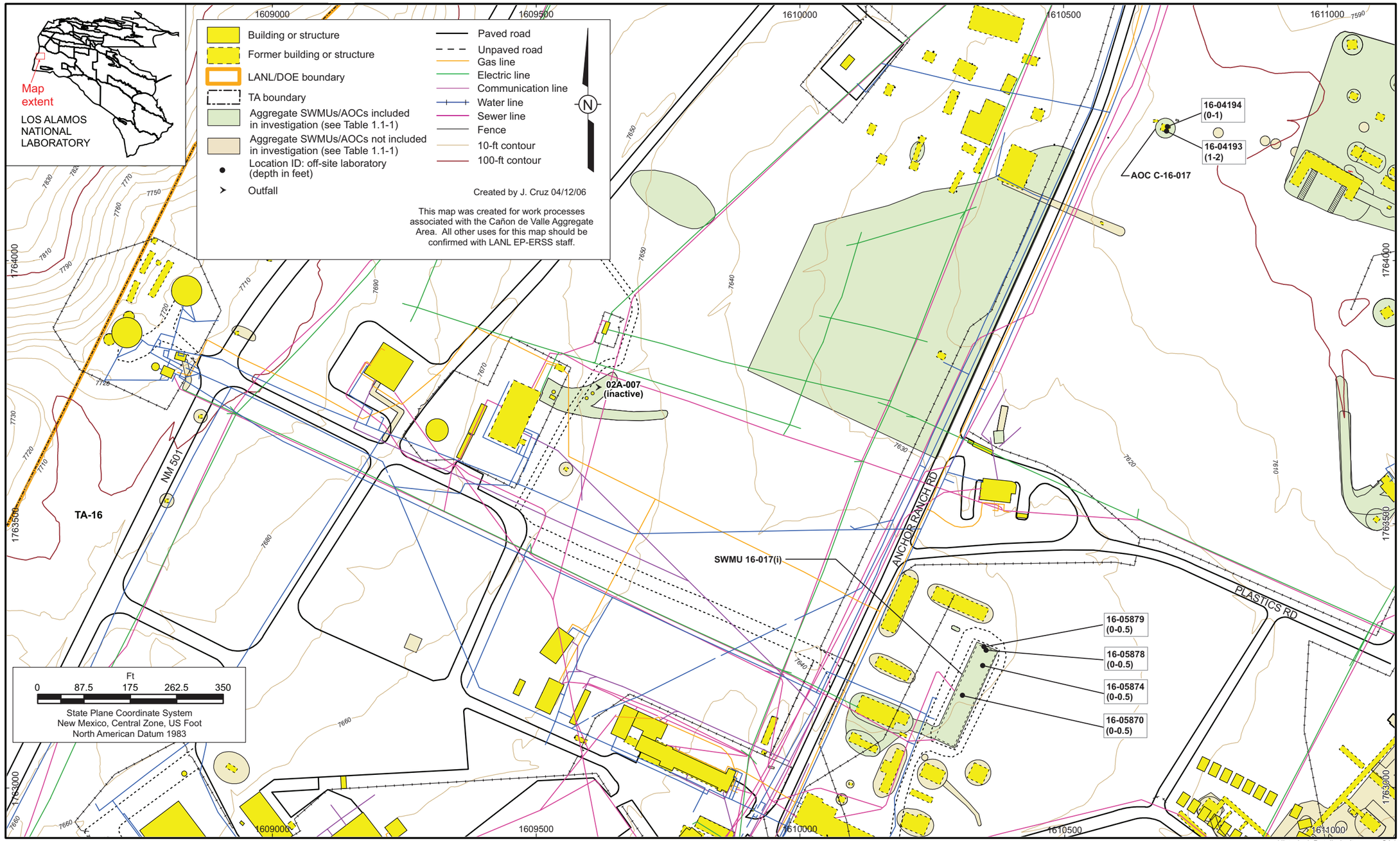


Figure 5.6-1. Subaggregate 4 (TA-16 Administrative Area) historical sampling locations and depths

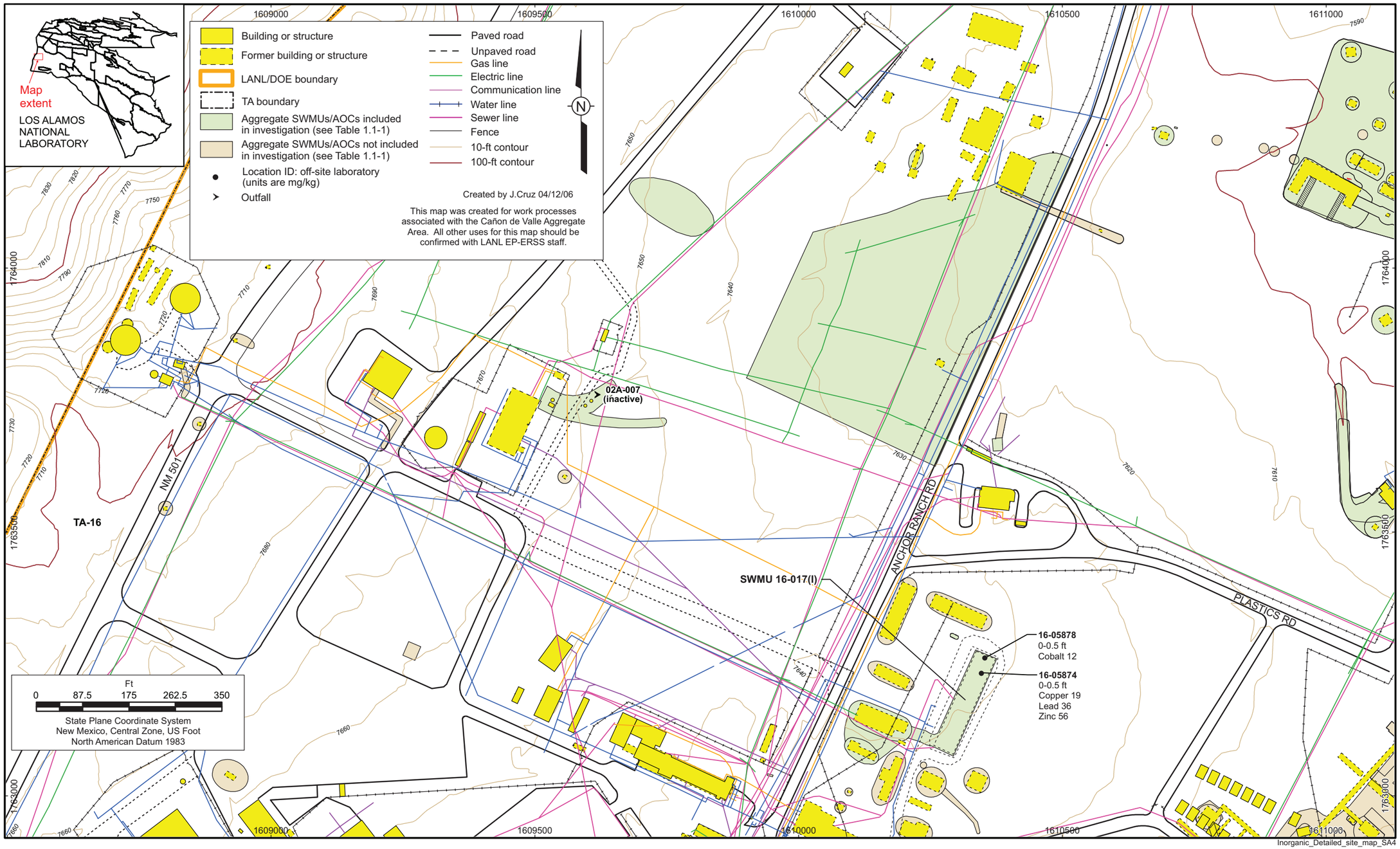


Figure 5.6-2. Subaggregate 4 (TA-16 Administrative Area) historical sampling locations with inorganic chemicals detected greater than background values

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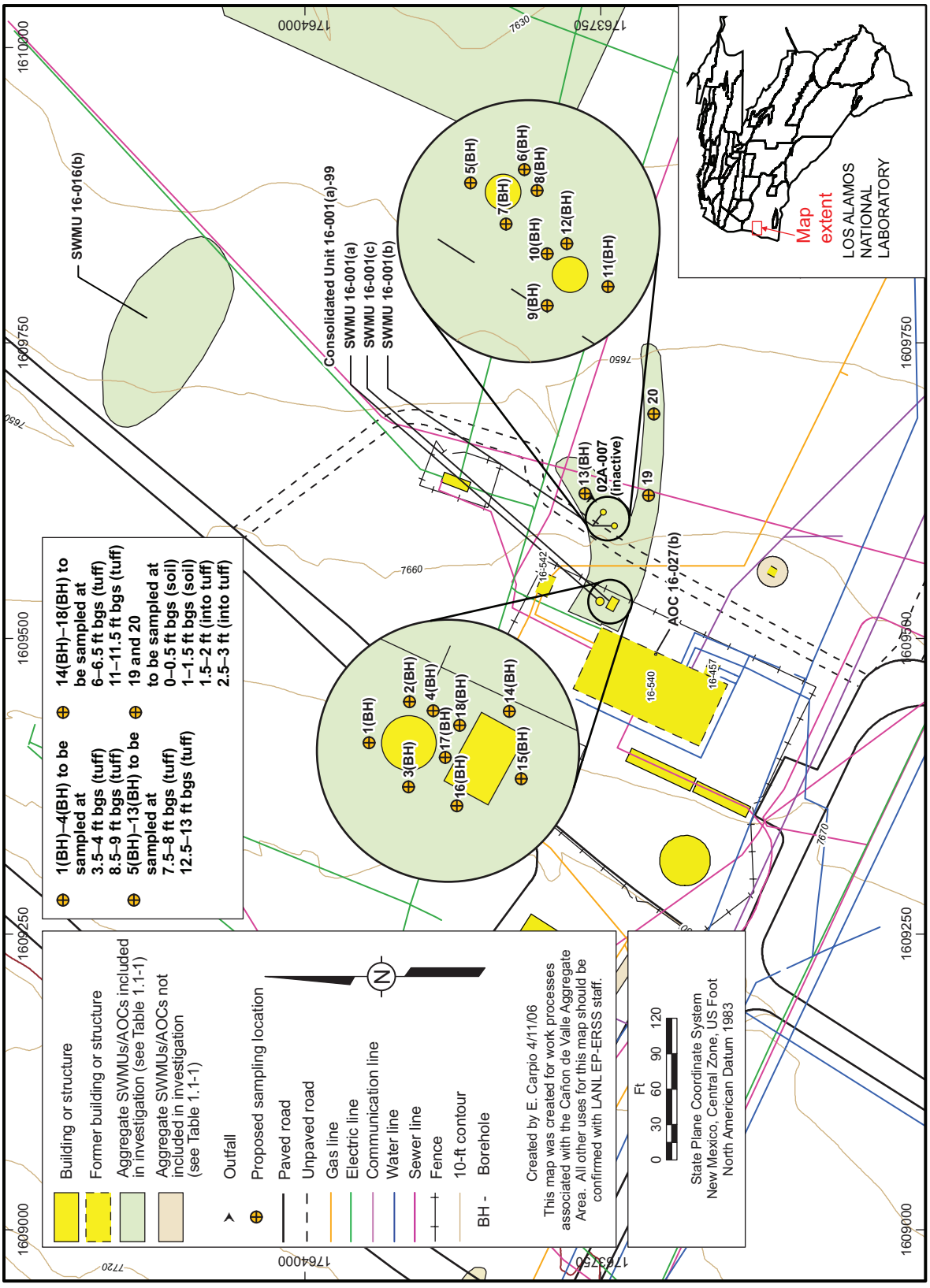


Figure 5.10-1. Subaggregate 4 (TA-16 Administrative Area) proposed sampling locations and depths: former steam plant

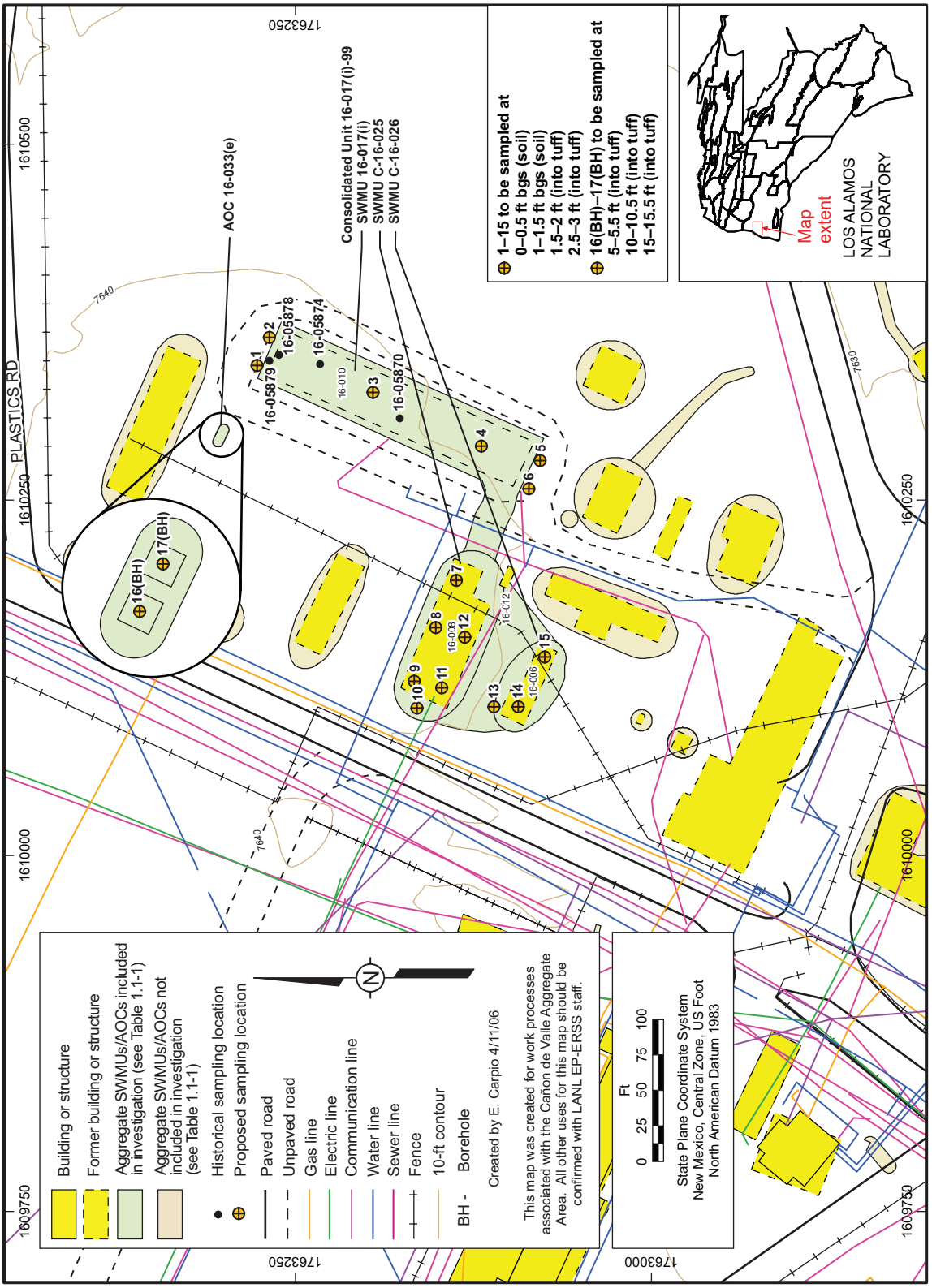


Figure 5.10-2. Subaggregate 4 (TA-16 Administrative Area) proposed sampling locations and depths: former storage buildings, shops, and underground storage tanks

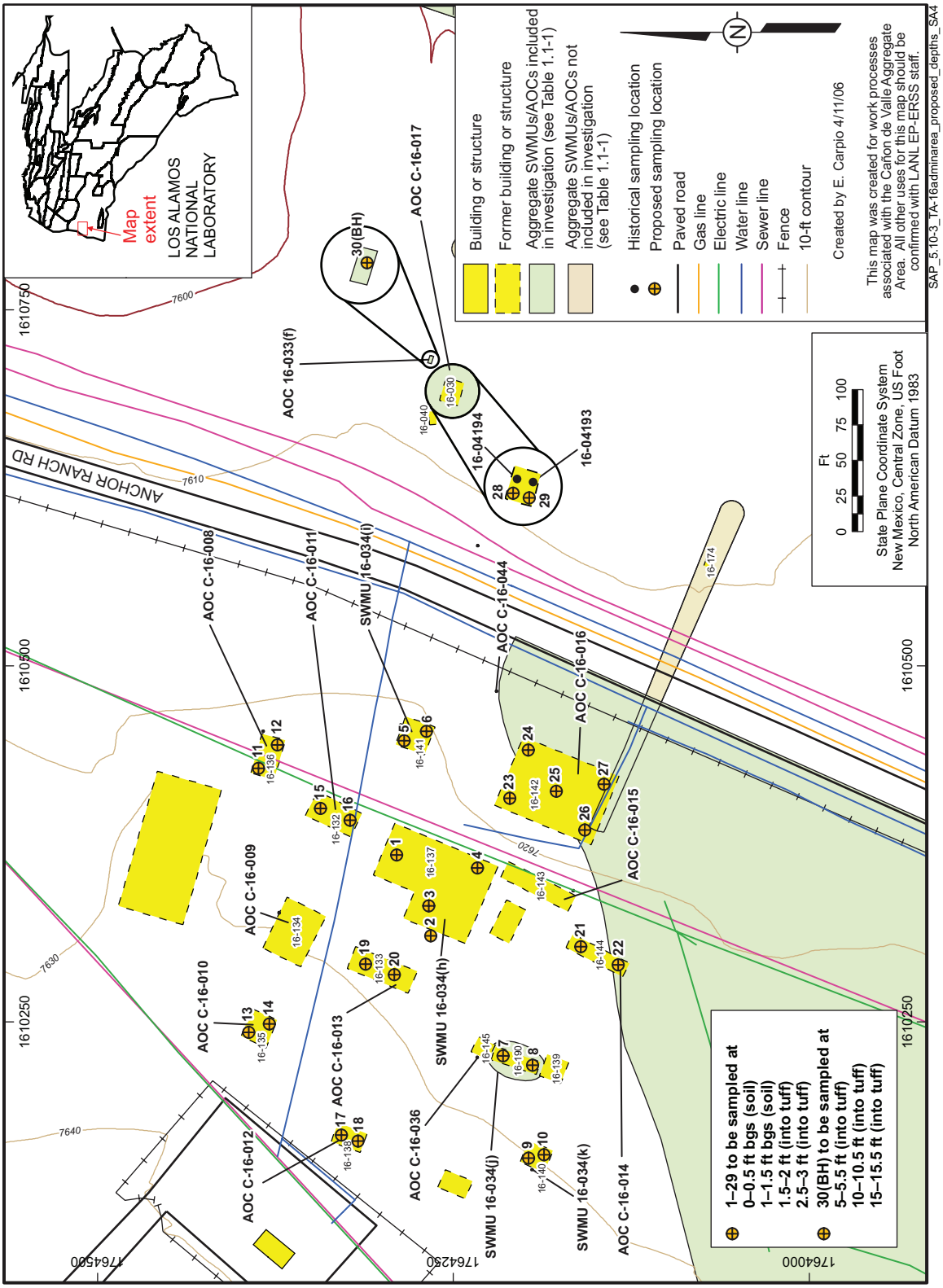


Figure 5.10-3. Subaggregate 4 (TA-16 Administrative Area) proposed sampling locations and depths: former storage buildings, shops, steam plant, and underground storage tank

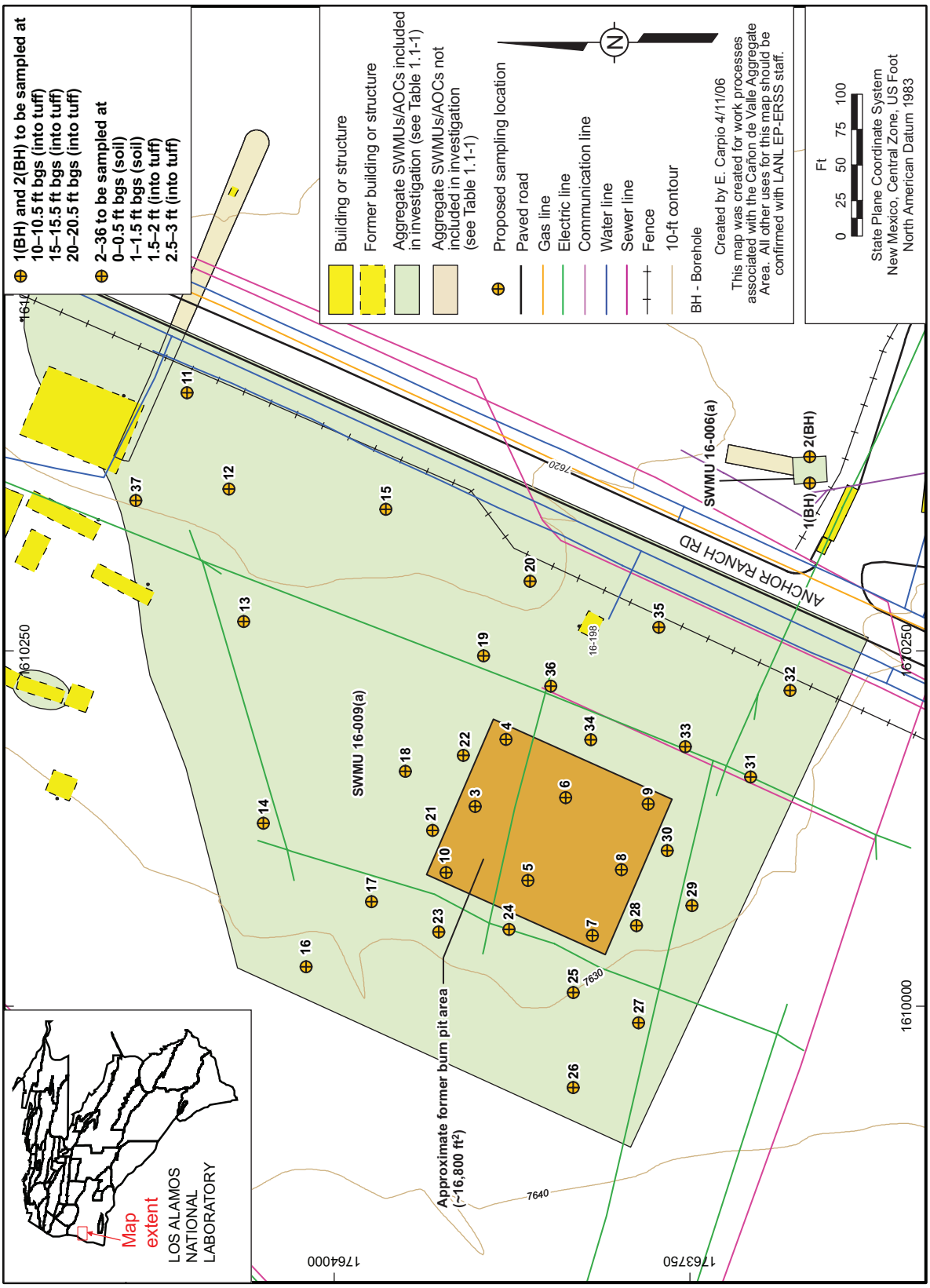


Figure 5.10-4. Subaggregate 4 (TA-16 Administrative Area) proposed sampling locations and depths: burn pit and septic system

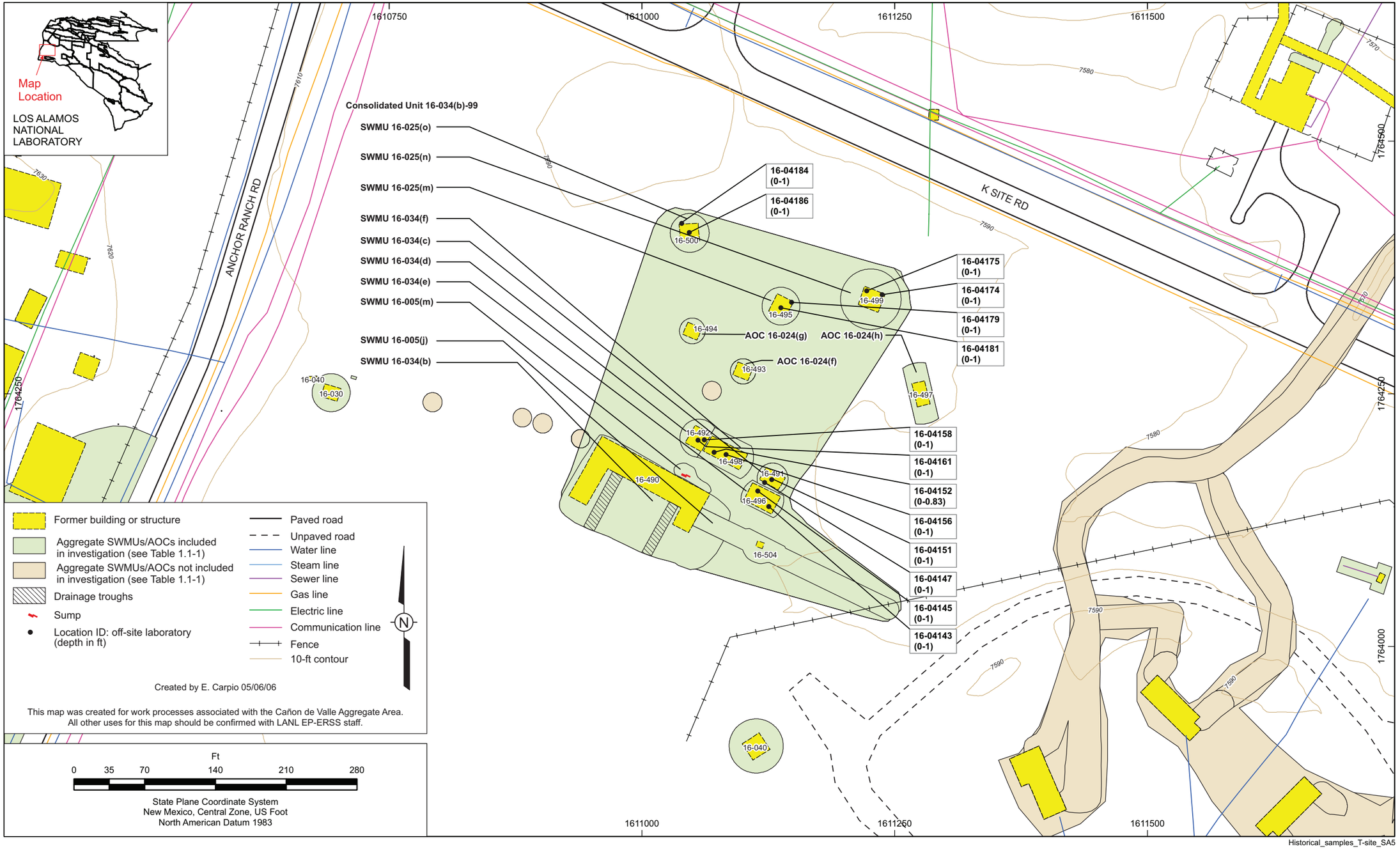


Figure 6.5-1. Subaggregate 5 (T-Site) historical sampling locations and depths

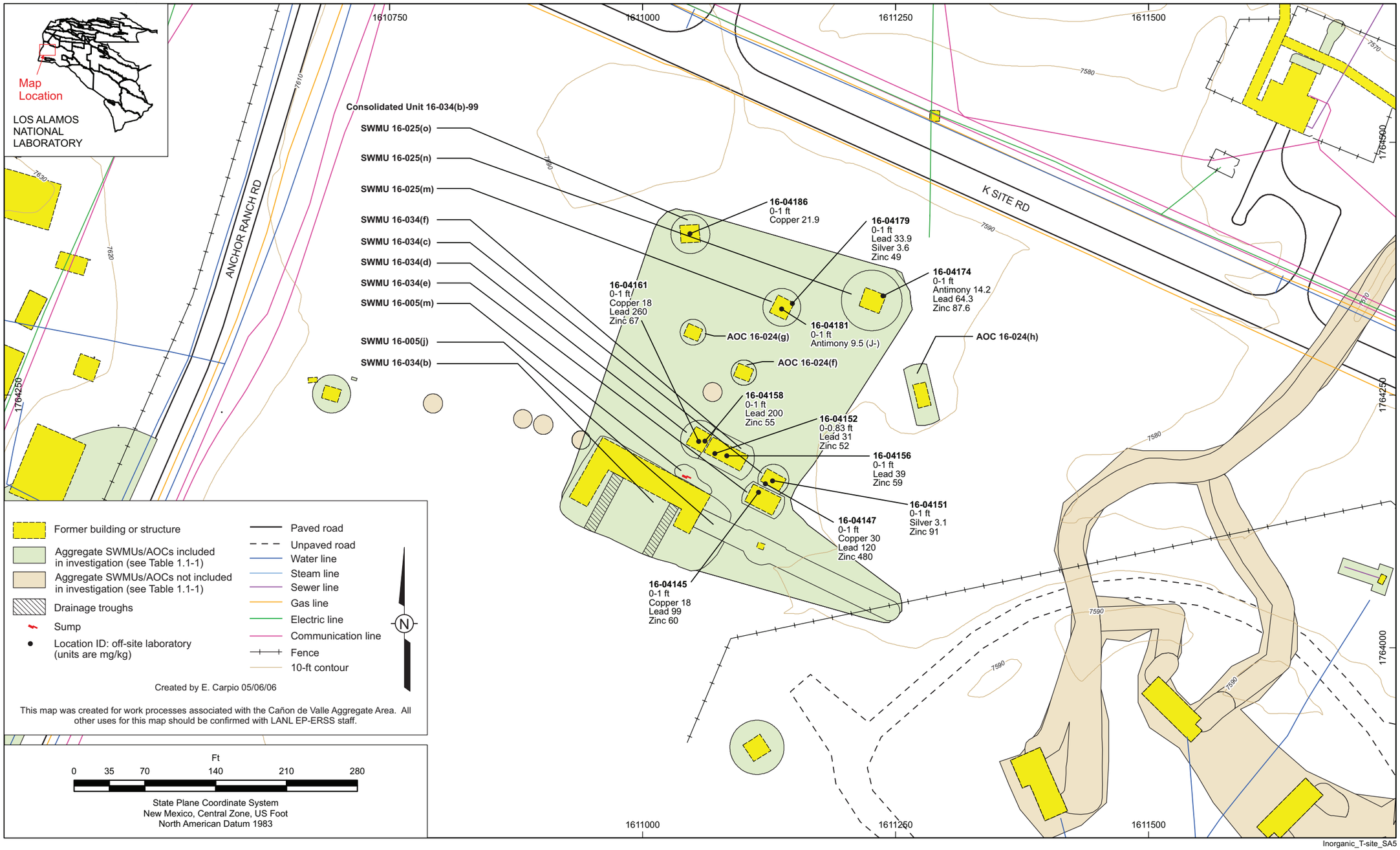


Figure 6.5-2. Subaggregate 5 (T-Site) historical sampling locations with inorganic chemicals detected greater than background values

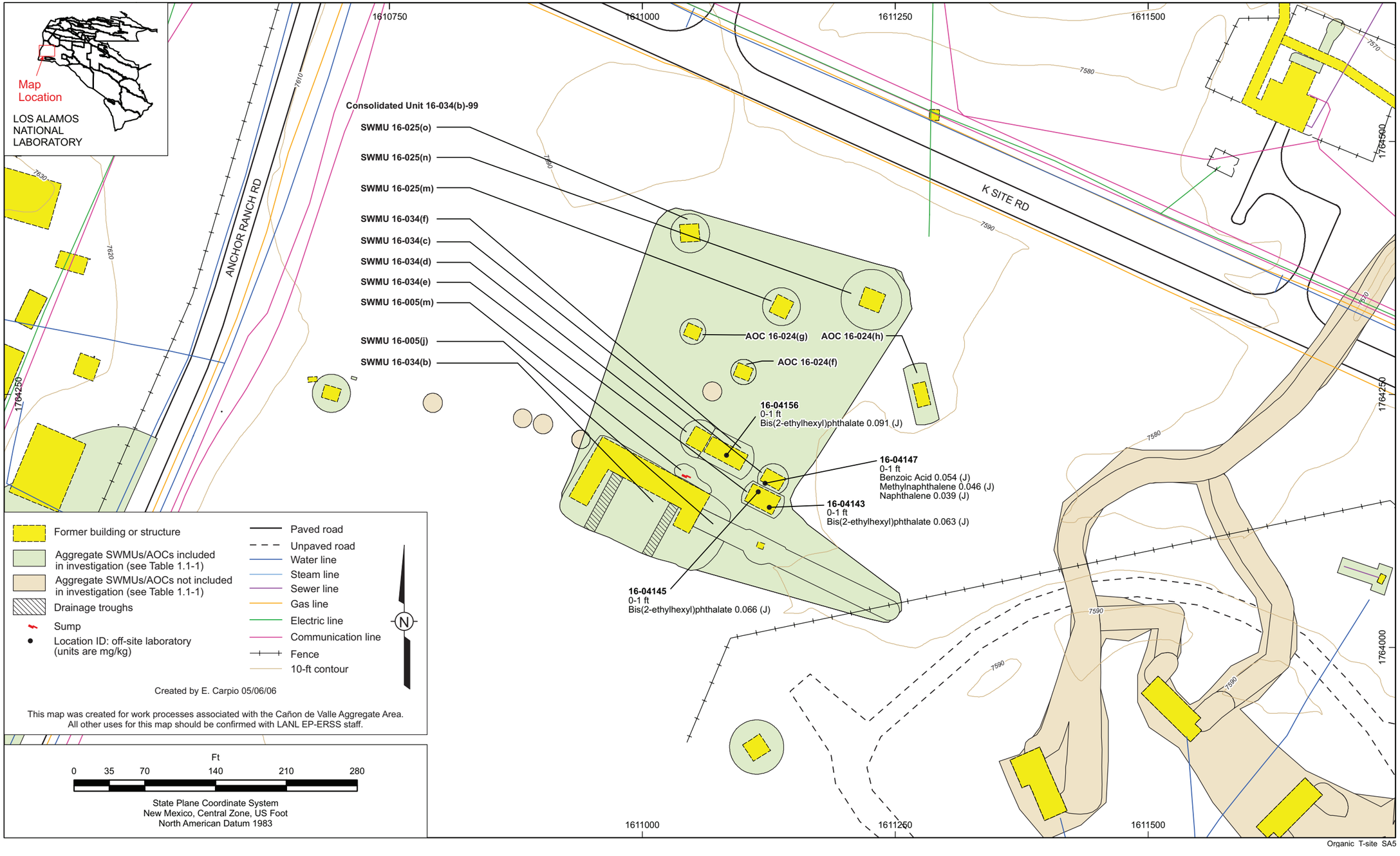


Figure 6.5-3. Subaggregate 5 (T-Site) historical sampling locations with detected organic chemicals

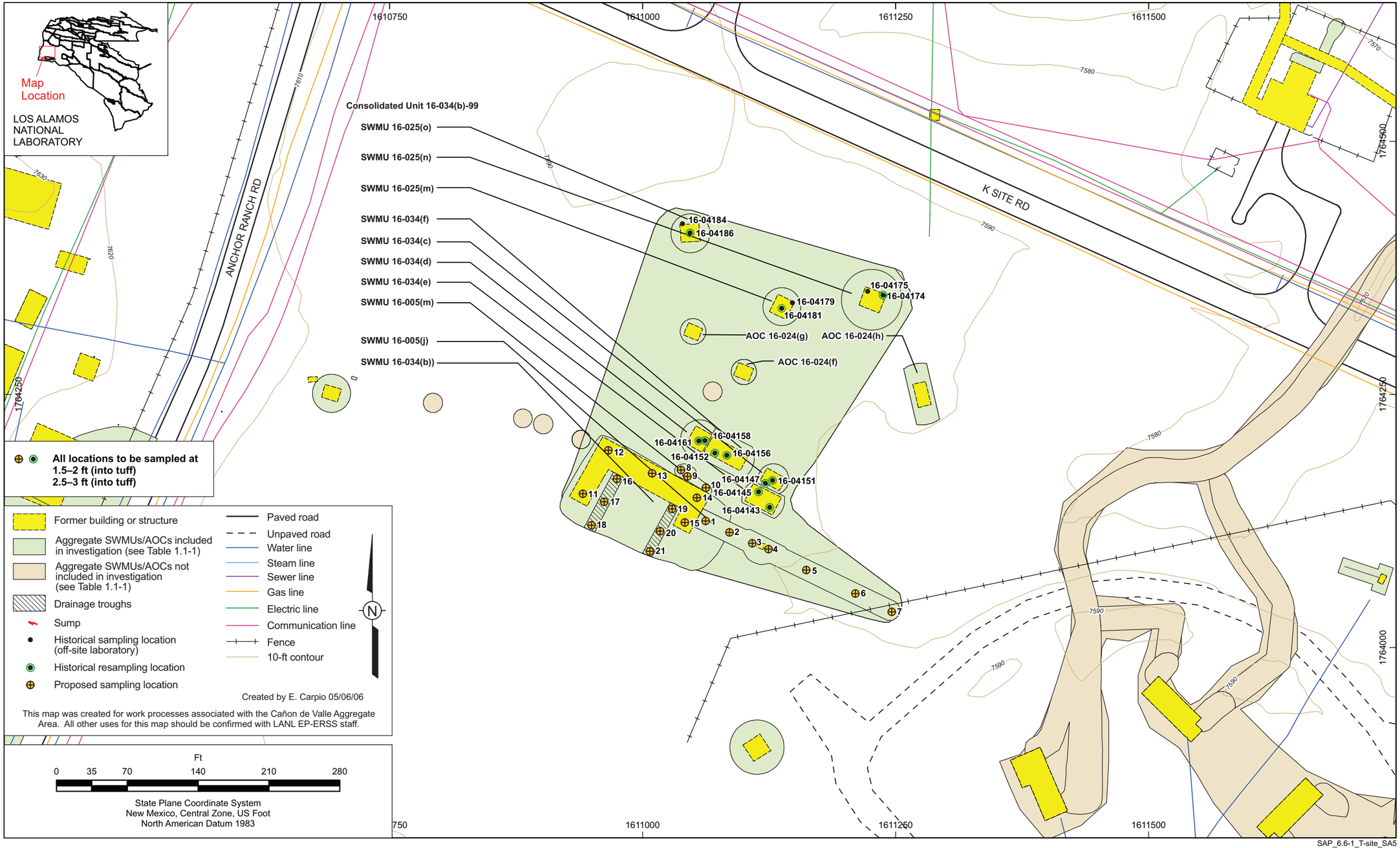


Figure 6.6-1. Subaggregate 5 (T-Site) proposed sampling locations and depths

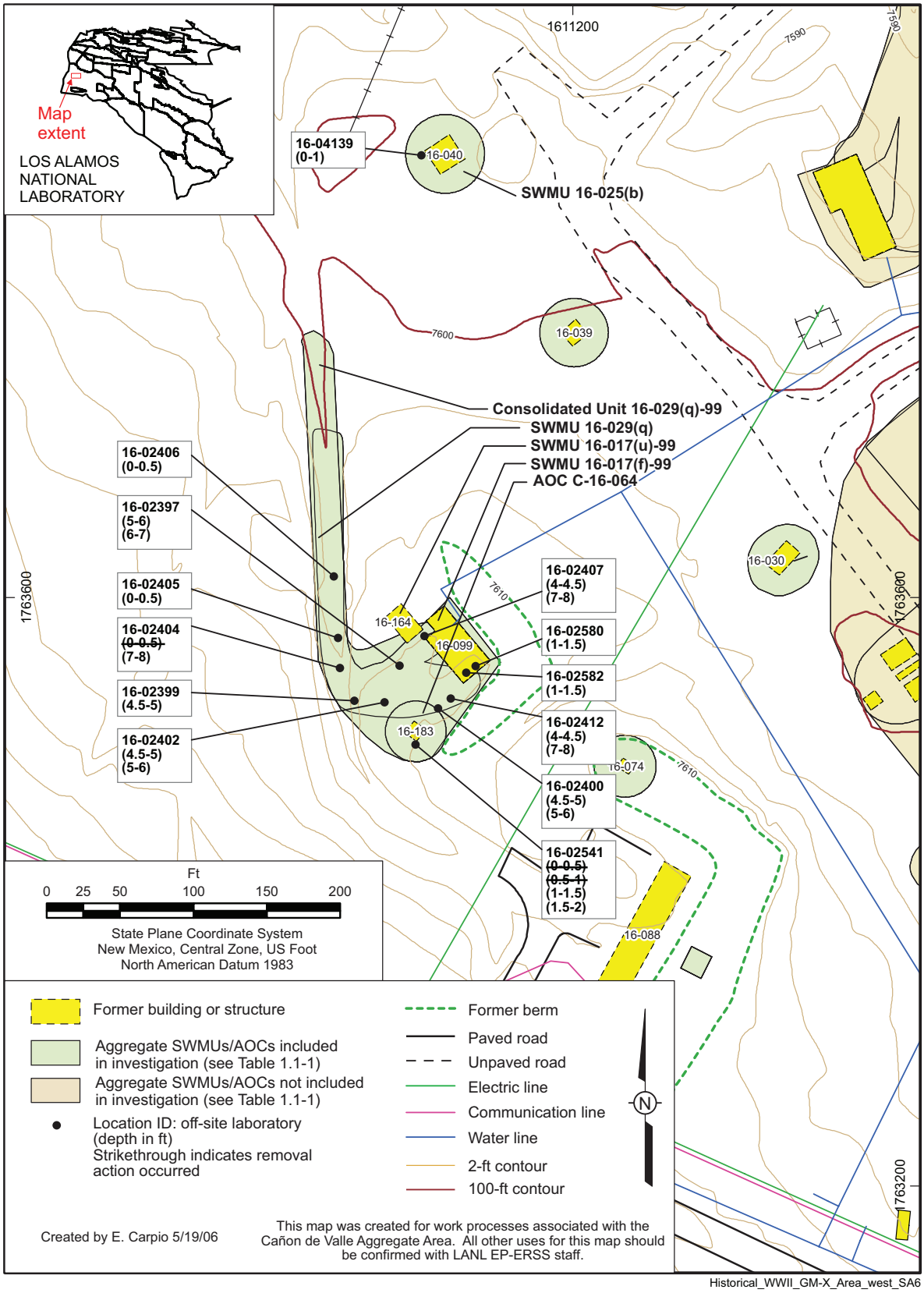


Figure 7.7-1. Subaggregate 6 (WWII GMX-3 Area West) historical sampling locations and depths

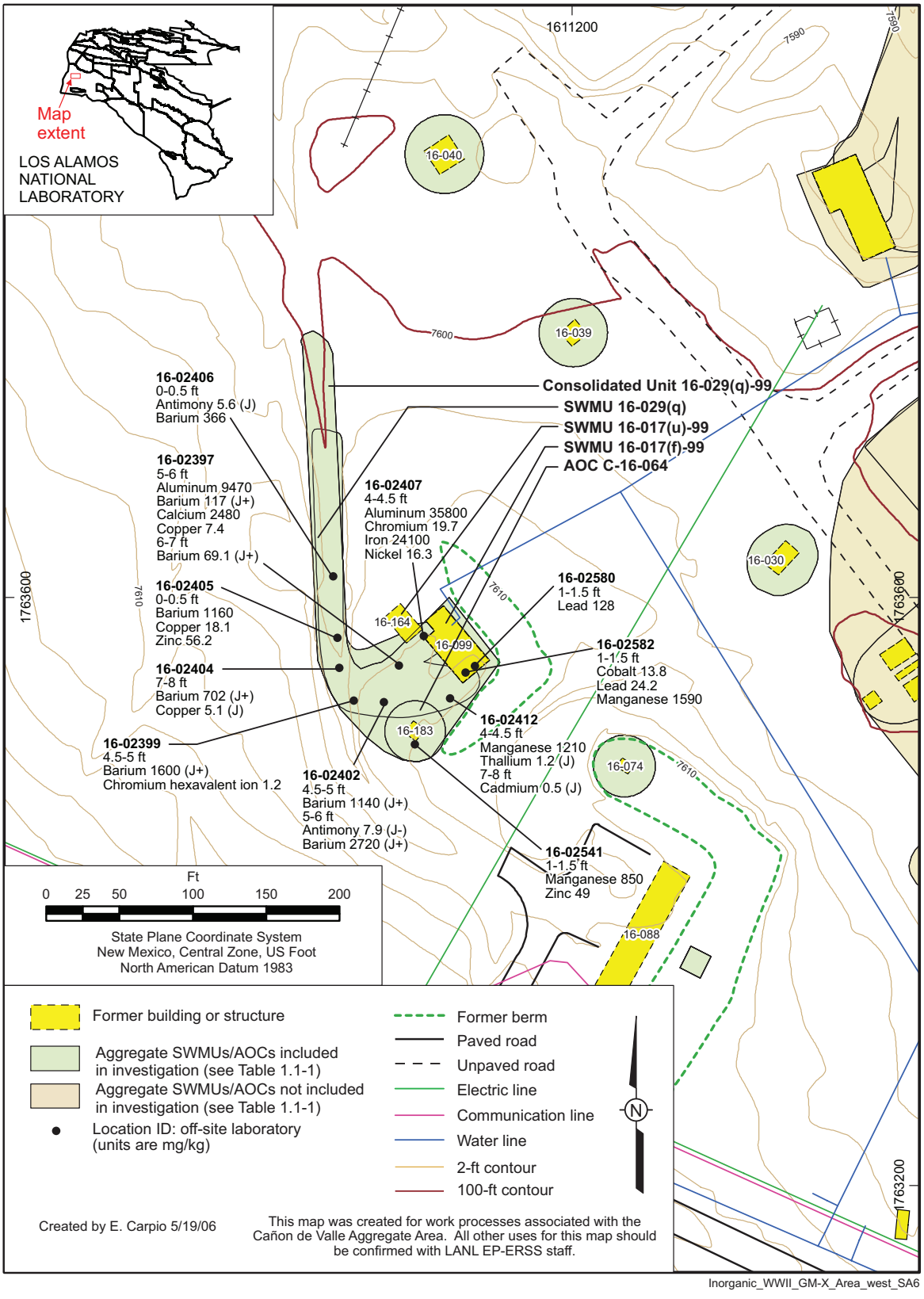


Figure 7.7-2. Subaggregate 6 (WWII GMX-3 Area West) historical sampling locations with inorganic chemicals detected greater than background values

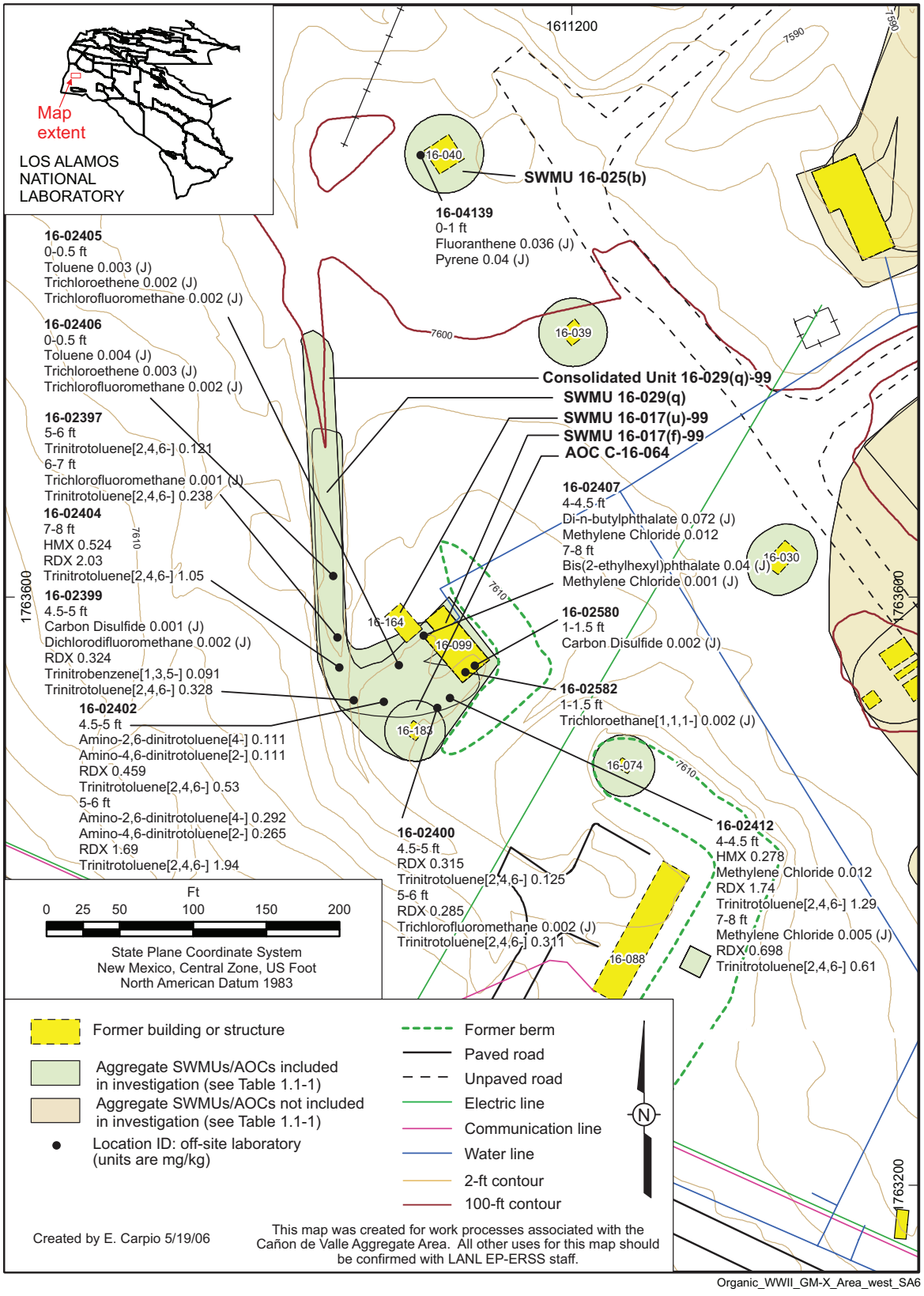


Figure 7.7-3. Subaggregate 6 (WWII GMX-3 Area West) historical sampling locations with detected organic chemicals

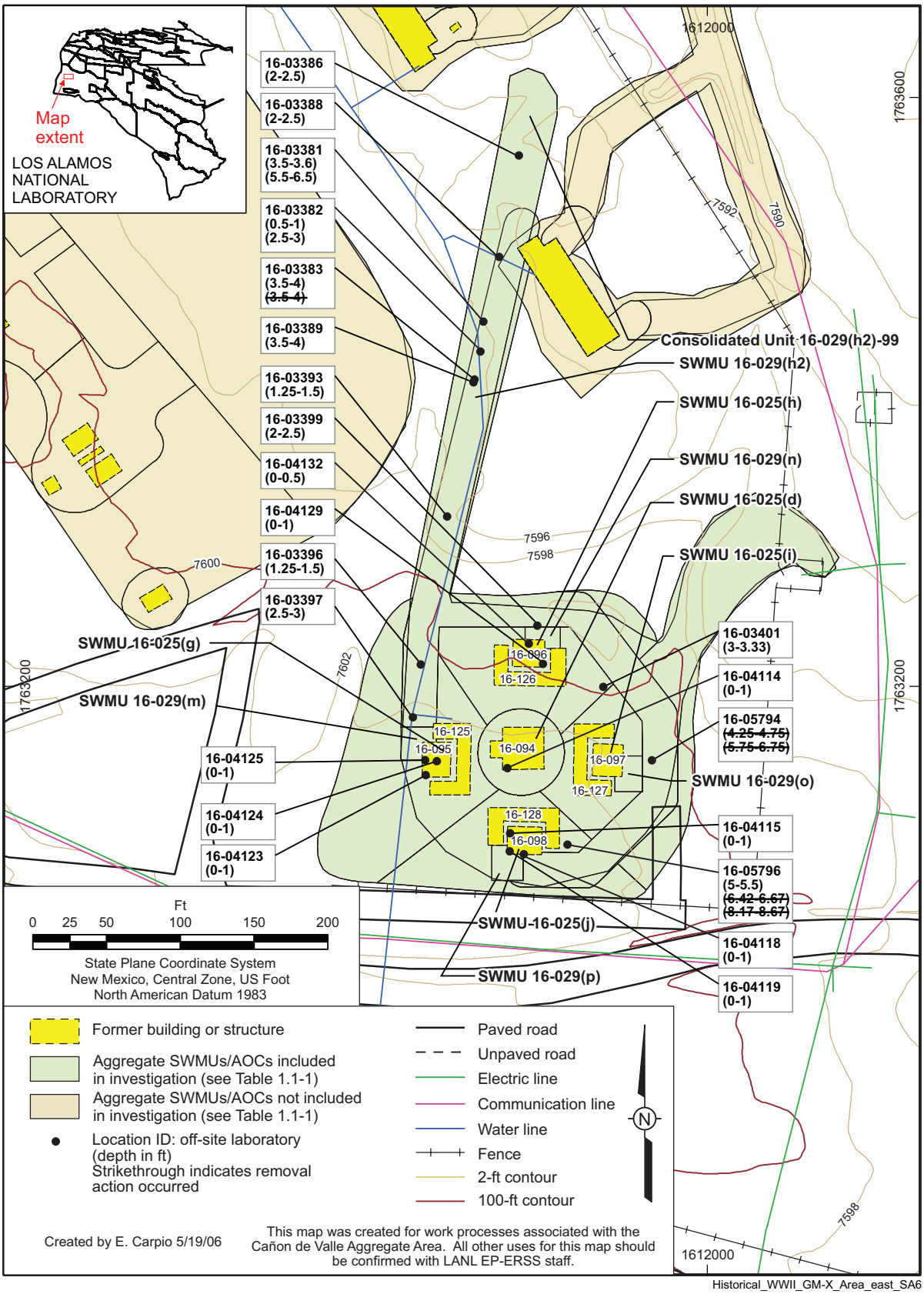


Figure 7.8-1. Subaggregate 6 (WWII GMX-3 Area East) historical sampling locations and depths

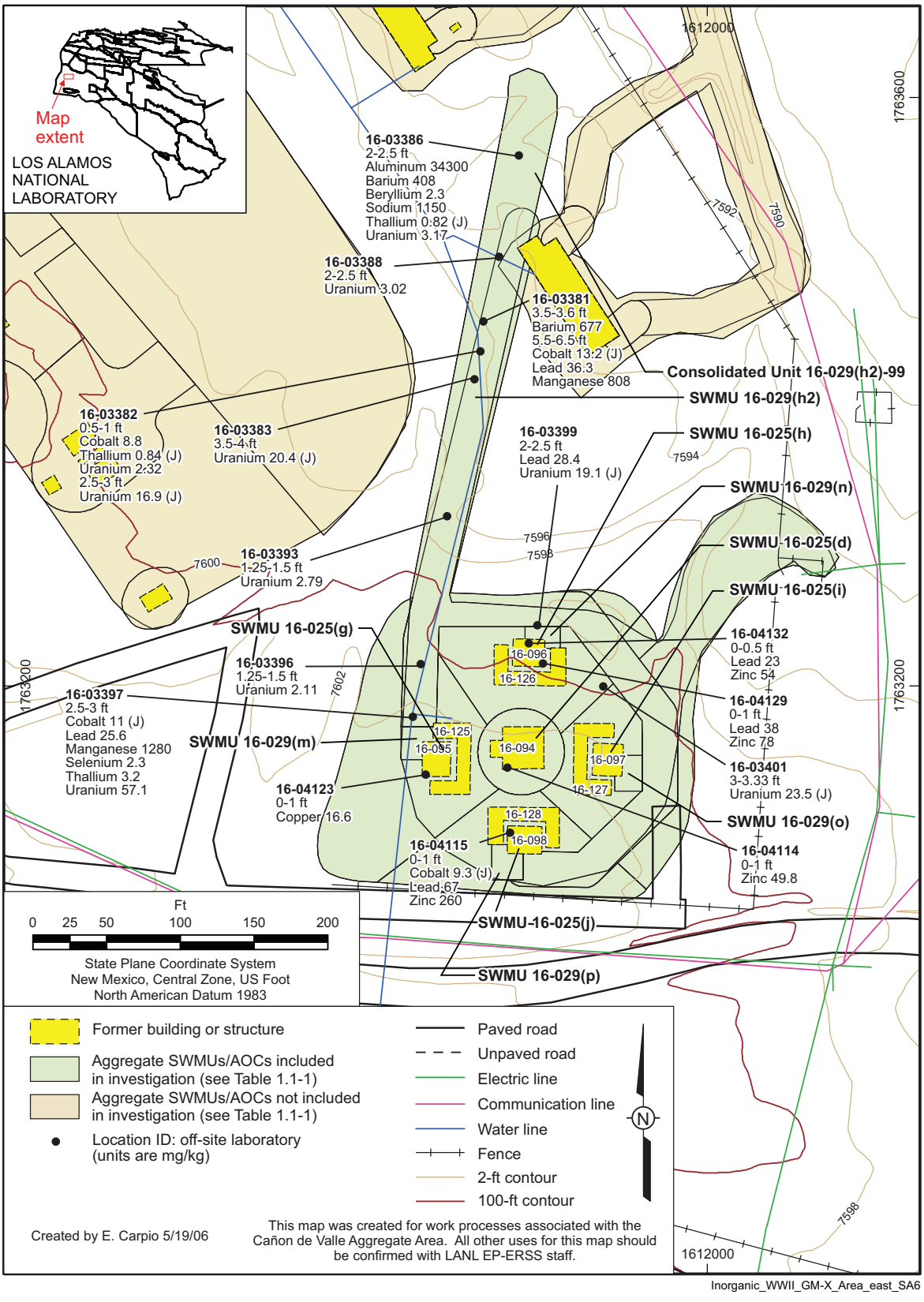


Figure 7.8-2. Subaggregate 6 (WWII GMX-3 Area East) historical sampling locations with inorganic chemicals detected greater than background values

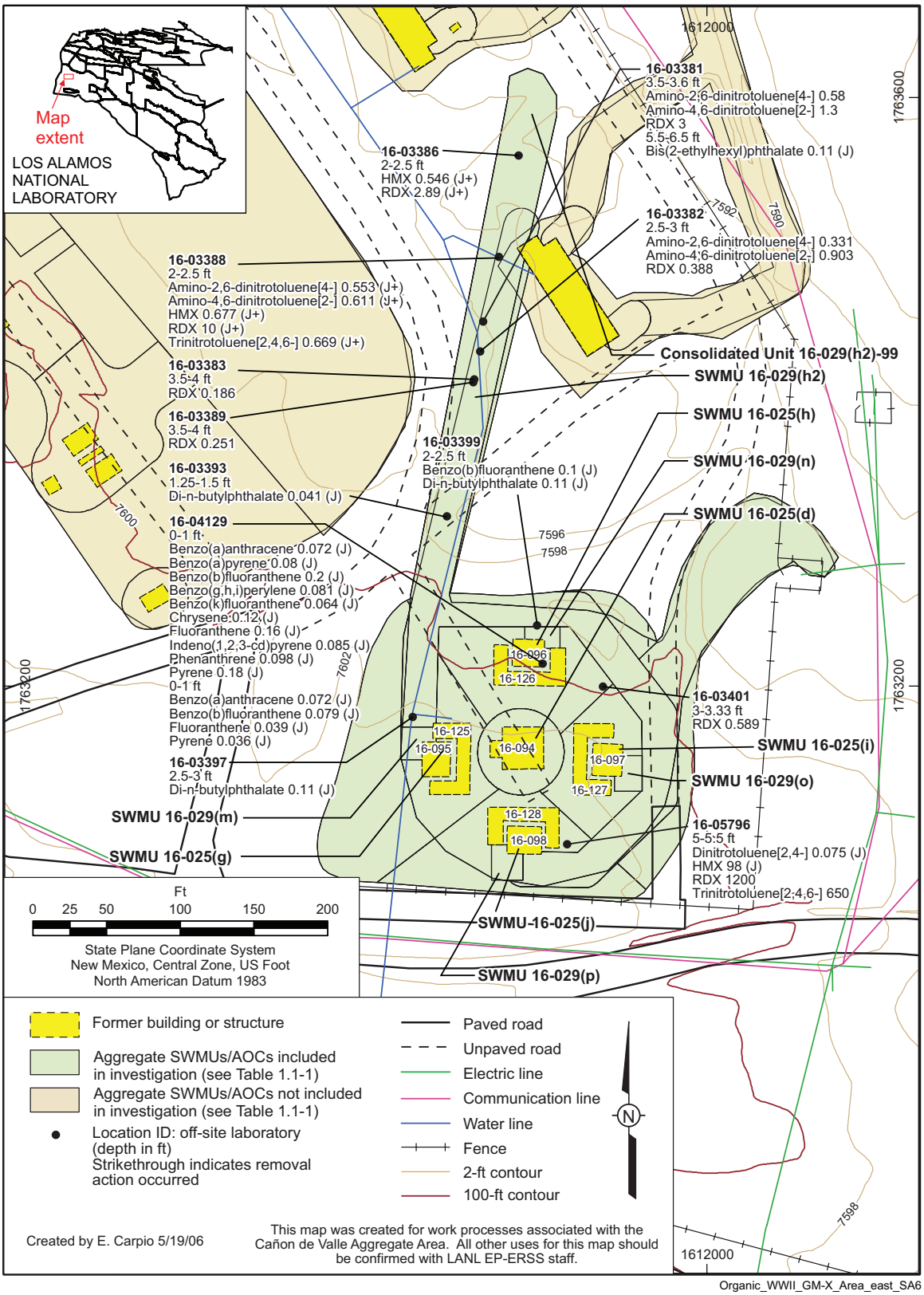


Figure 7.8-3. Subaggregate 6 (WWII GMX-3 Area East) historical sampling locations with detected organic chemicals

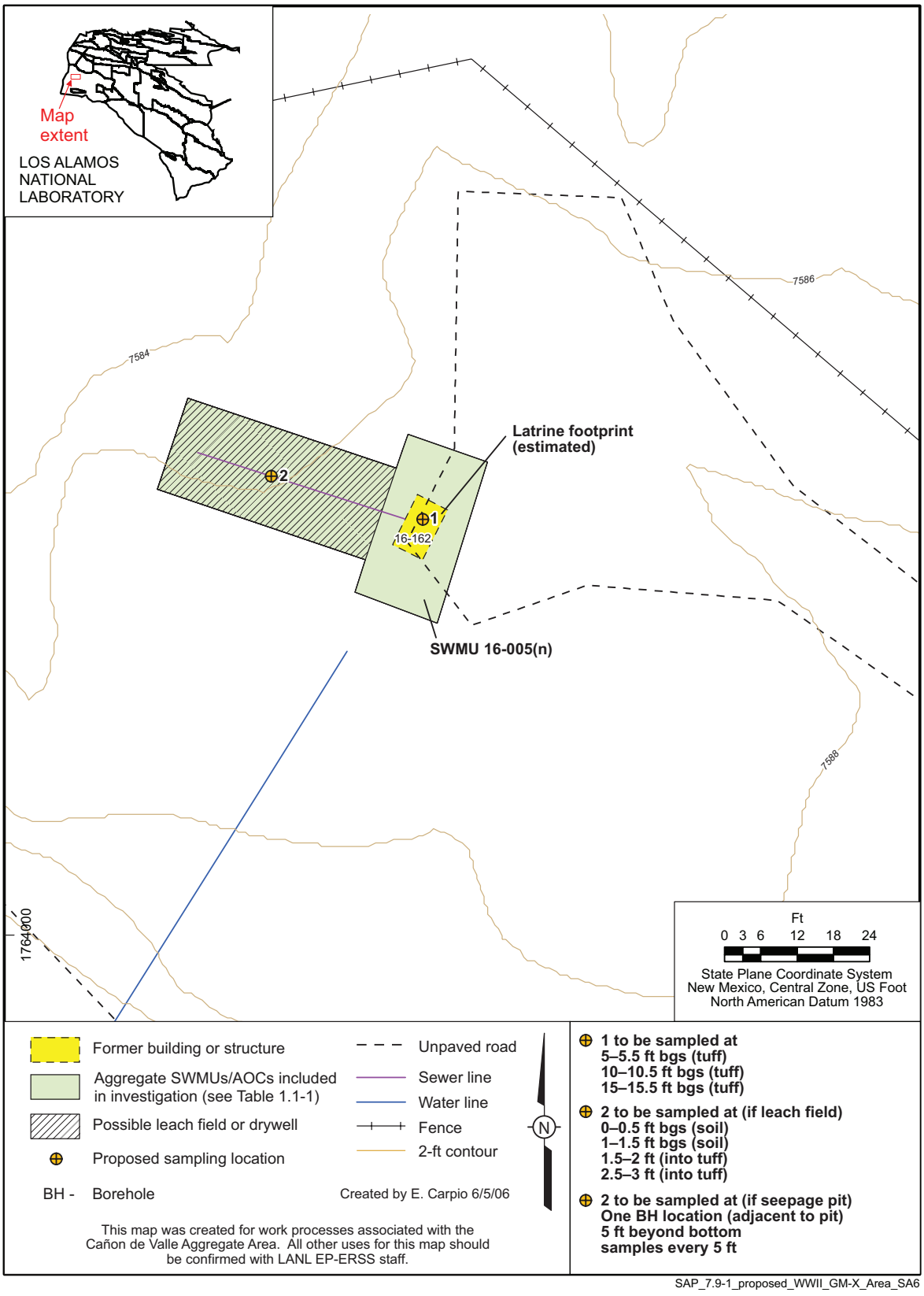


Figure 7.9-1. Subaggregate 6 (WWII GMX-3 Area East) proposed sampling locations and depths: SWMU 16-005(n)

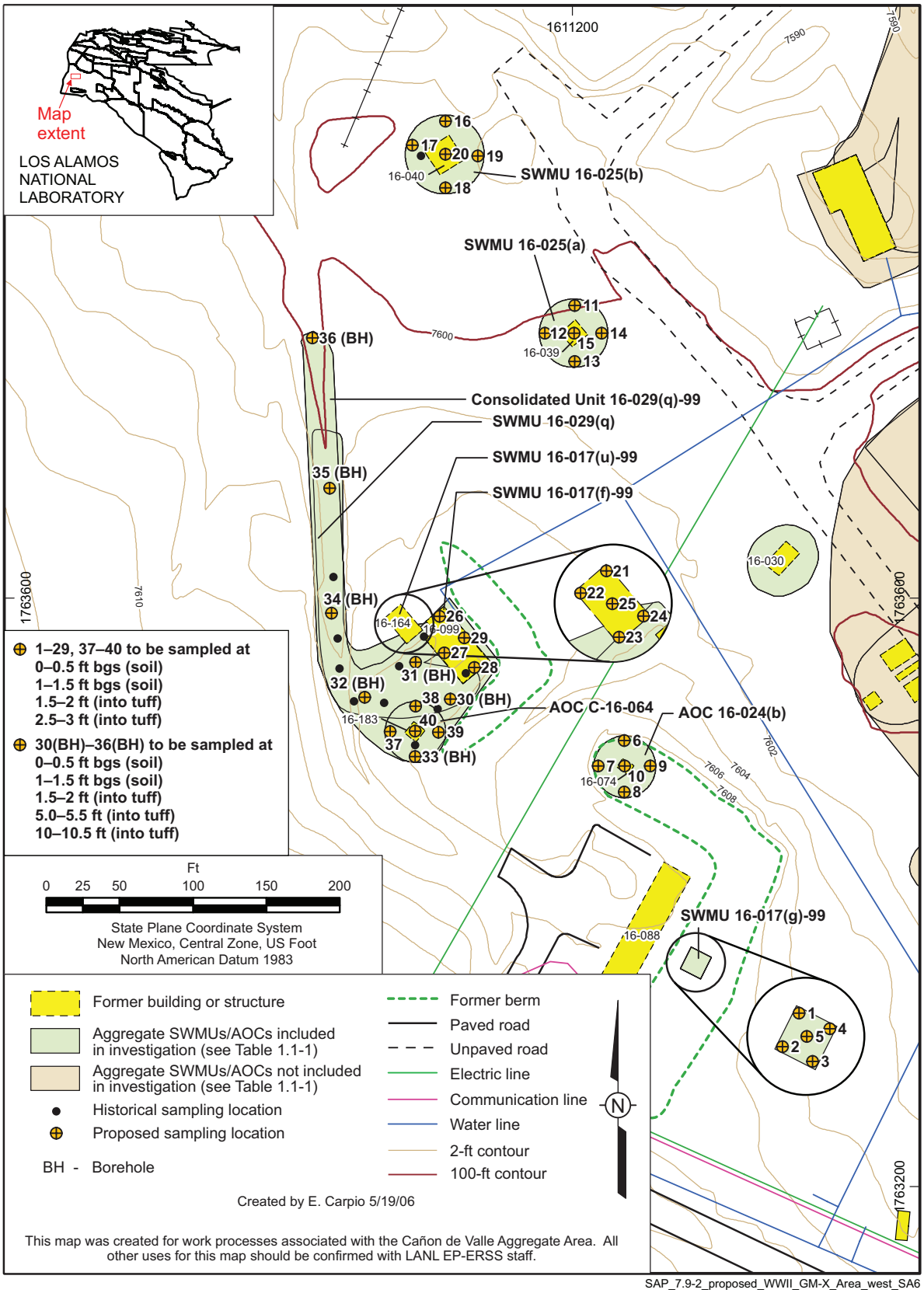


Figure 7.9-2. Subaggregate 6 (WWII GMX-3 Area West) proposed sampling locations and depths

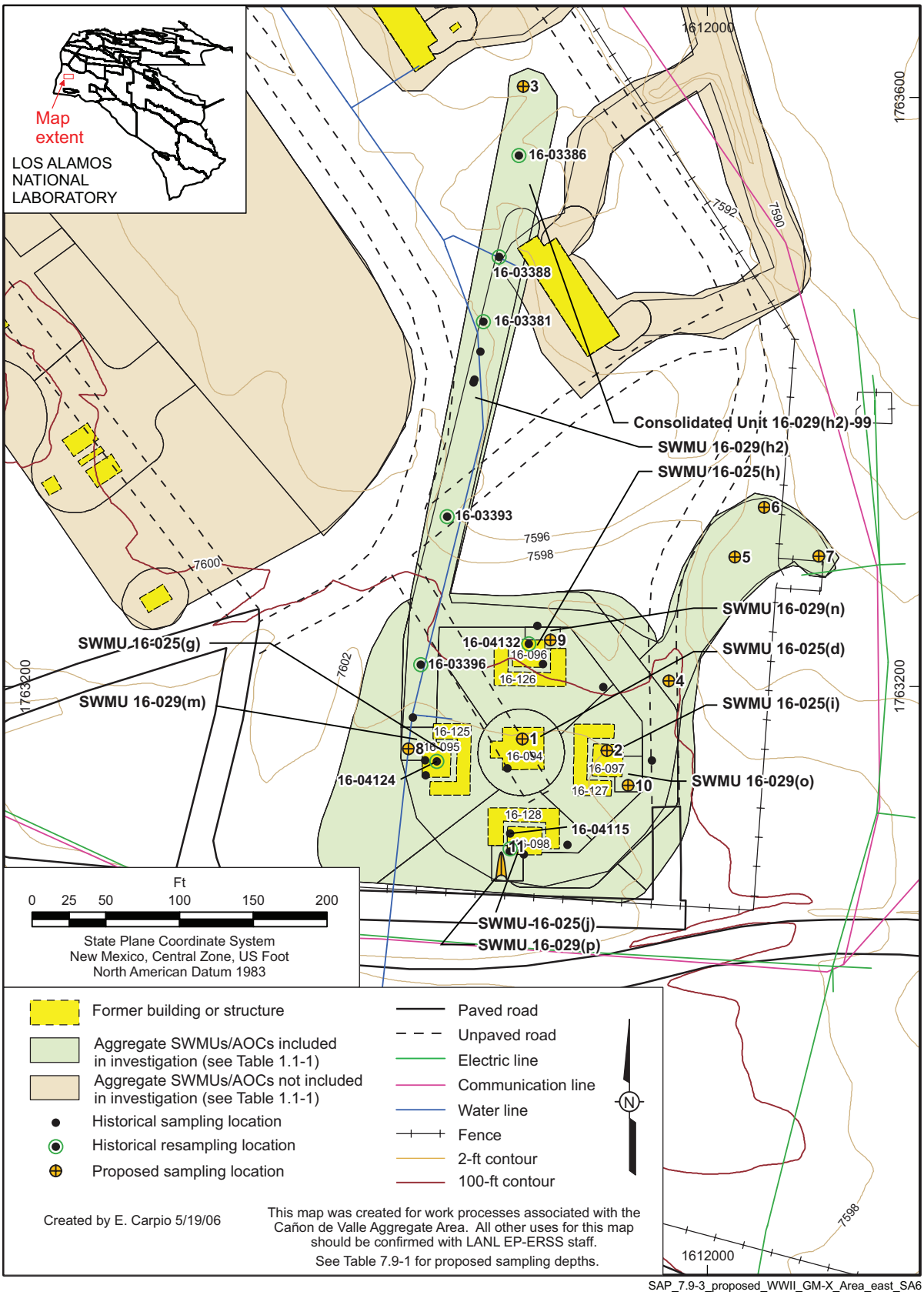


Figure 7.9-3. Subaggregate 6 (WWII GMX-3 Area East) proposed sampling locations and depths

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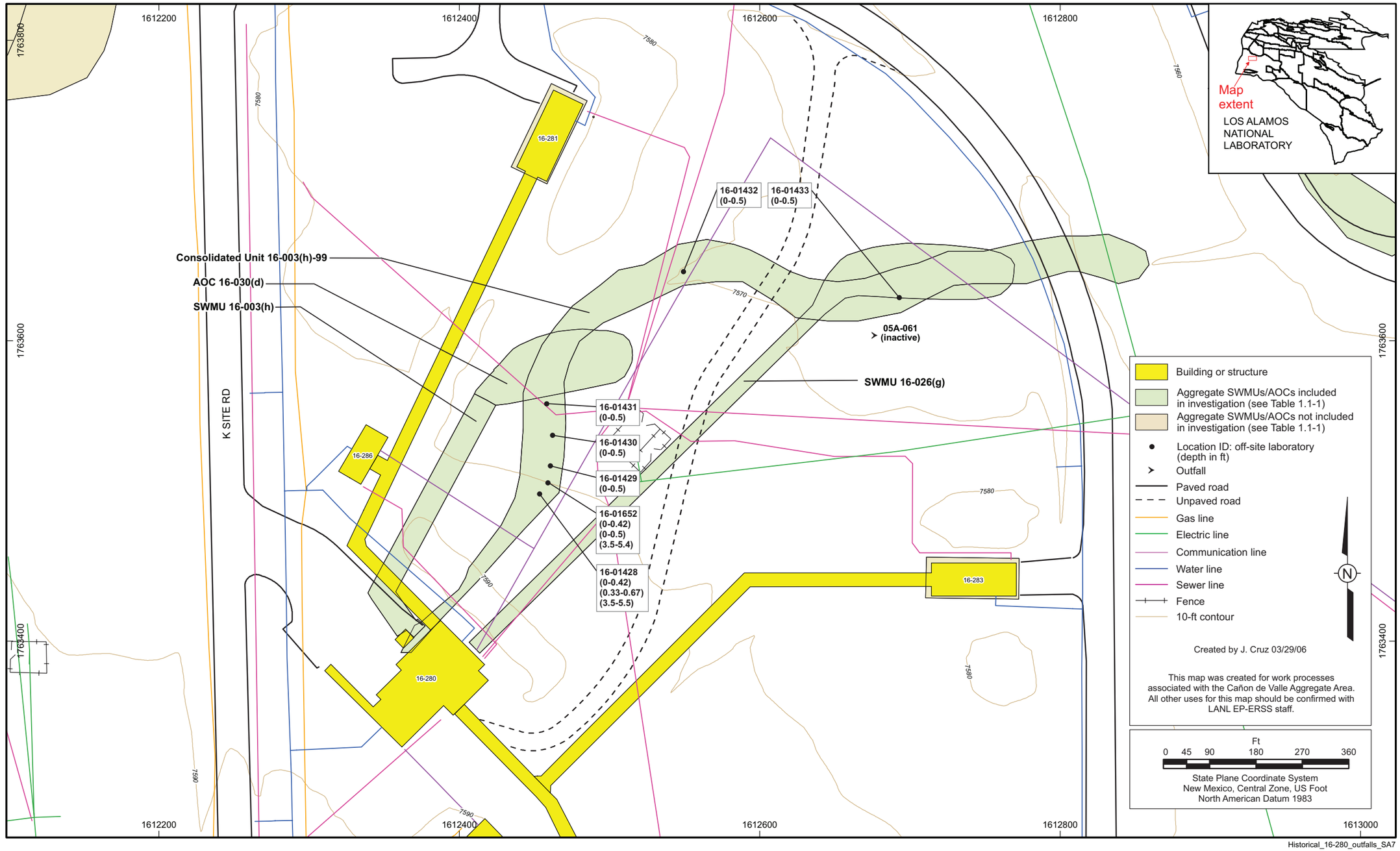


Figure 8.5-1. Subaggregate 7 (280/260 Complexes), 16-280 Outfalls, historical sampling locations and depths

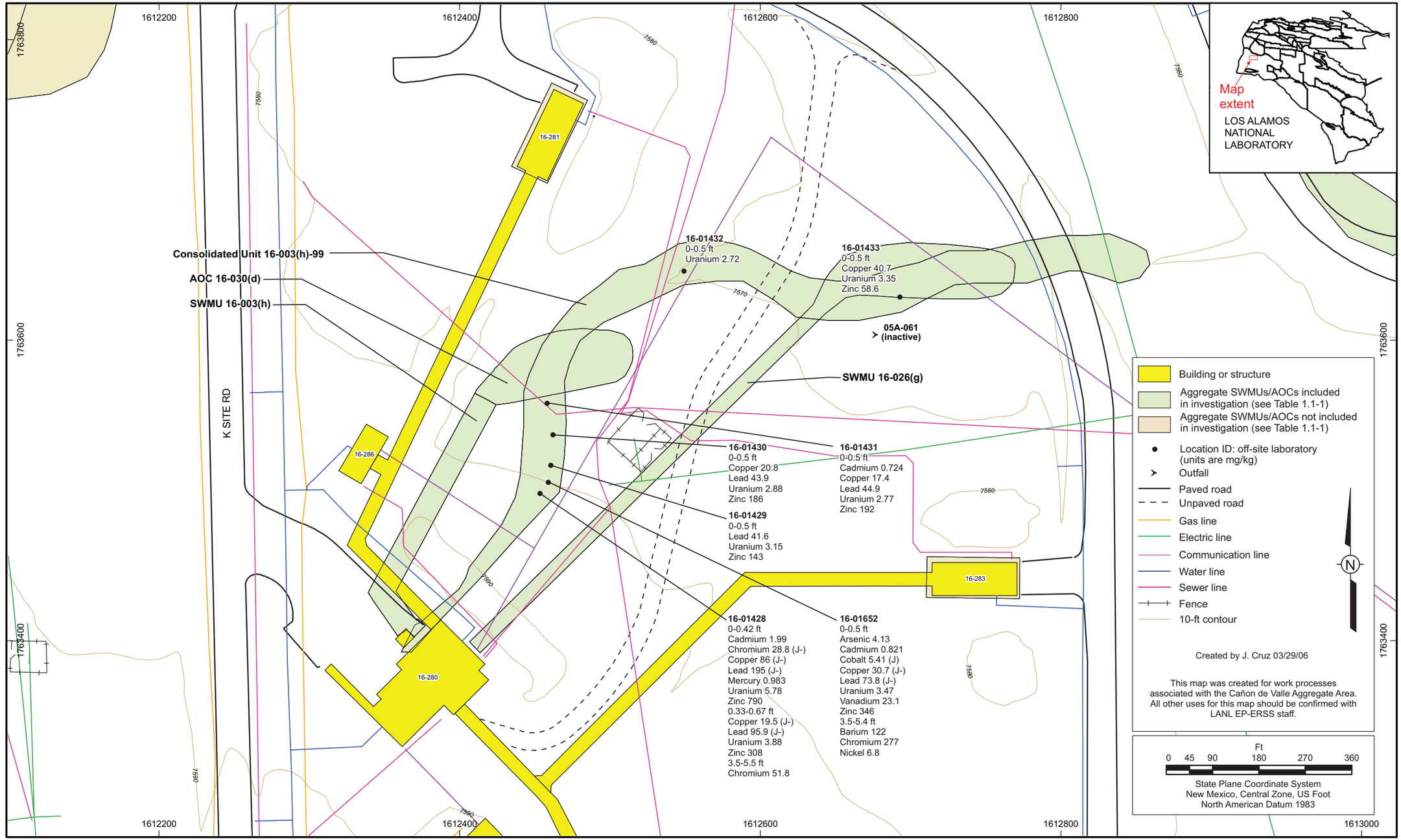


Figure 8.5-2. Subaggregate 7 (280/260 Complexes), 16-280 Outfalls, historical sampling locations with inorganic chemicals detected greater than background values

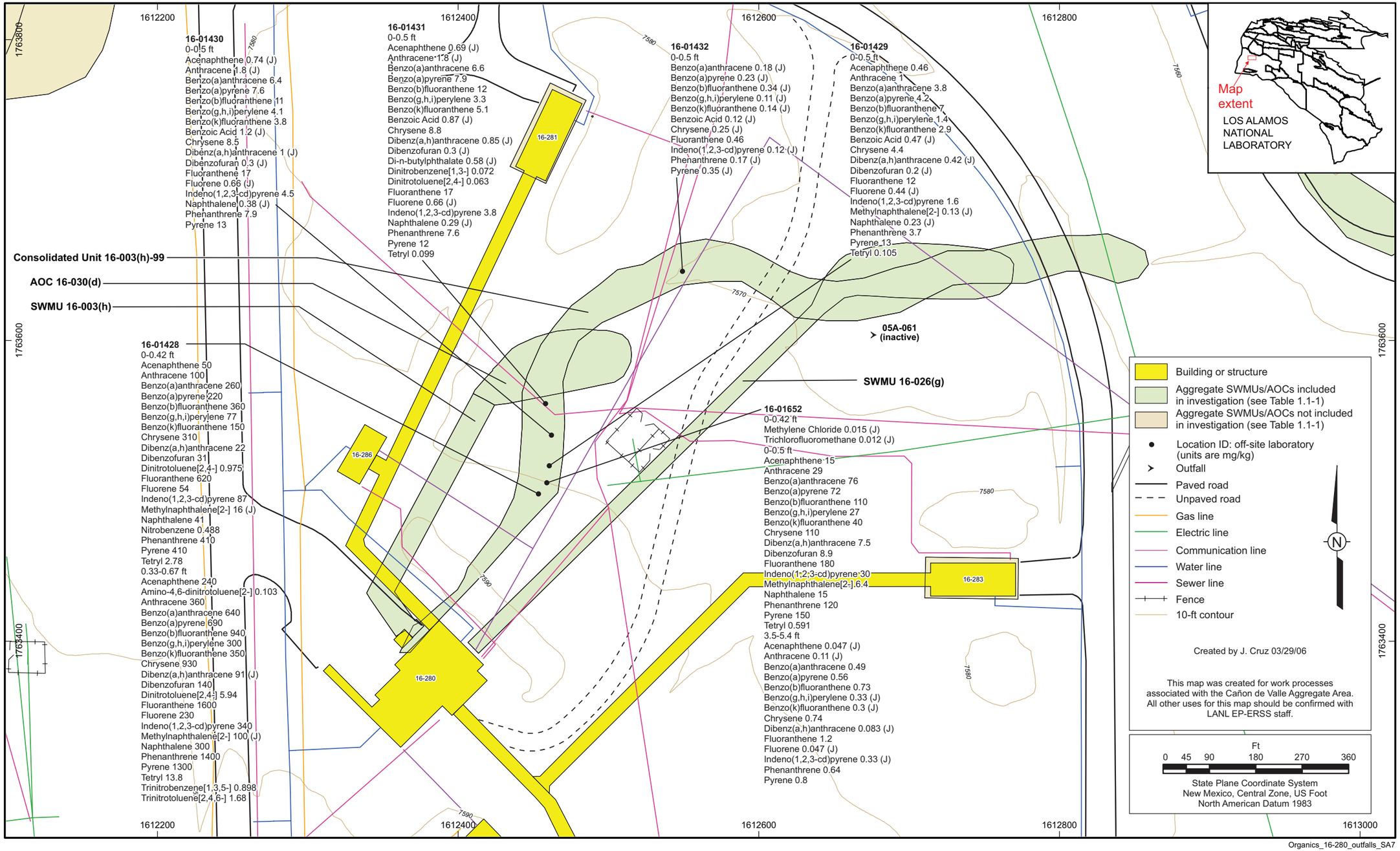


Figure 8.5-3. Subaggregate 7 (280/260 Complexes), 16-280 Outfalls, historical sampling locations with detected organic chemicals

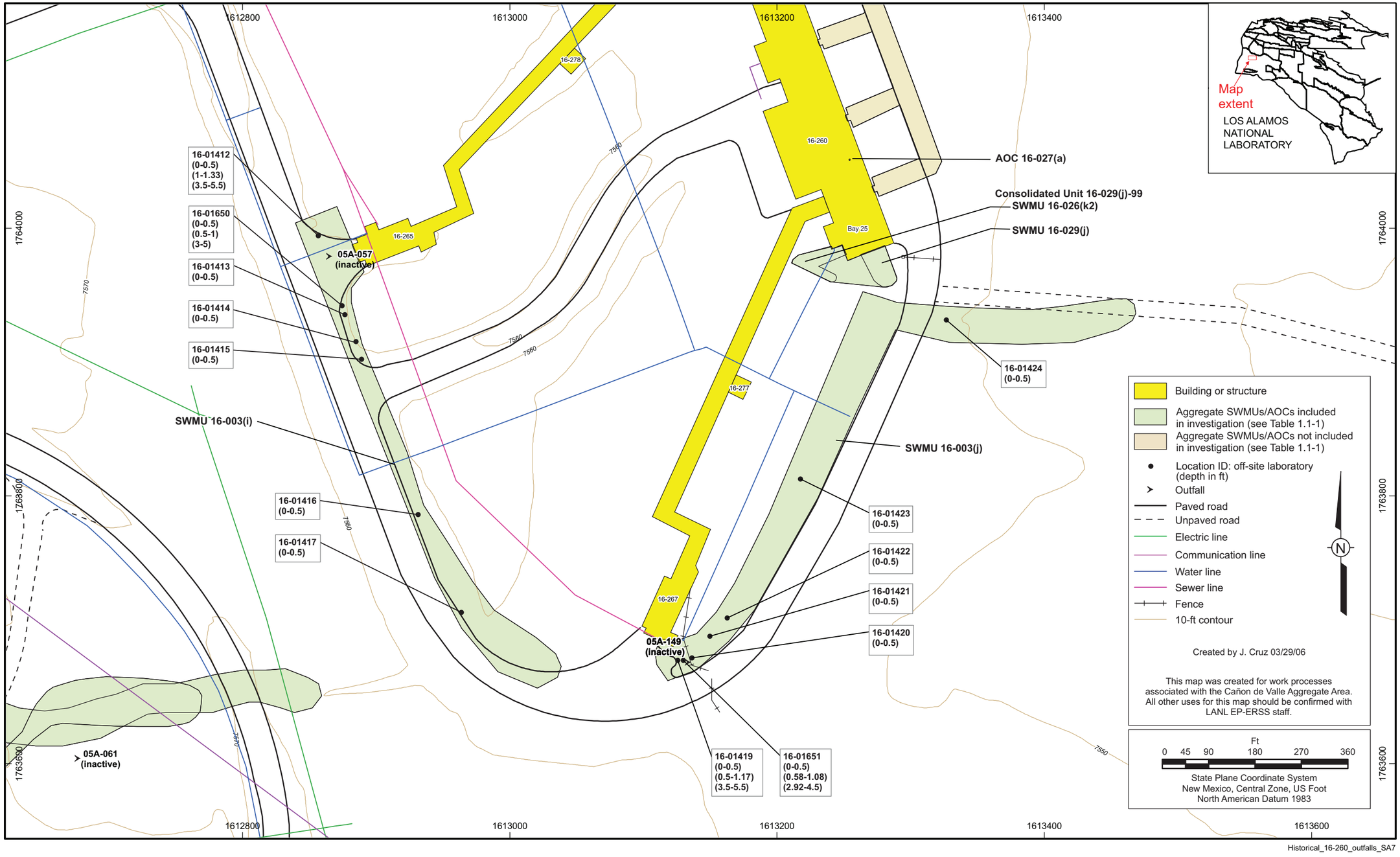


Figure 8.6-1. Subaggregate 7 (280/260 Complexes), 16-260 Outfalls, historical sampling locations and depths

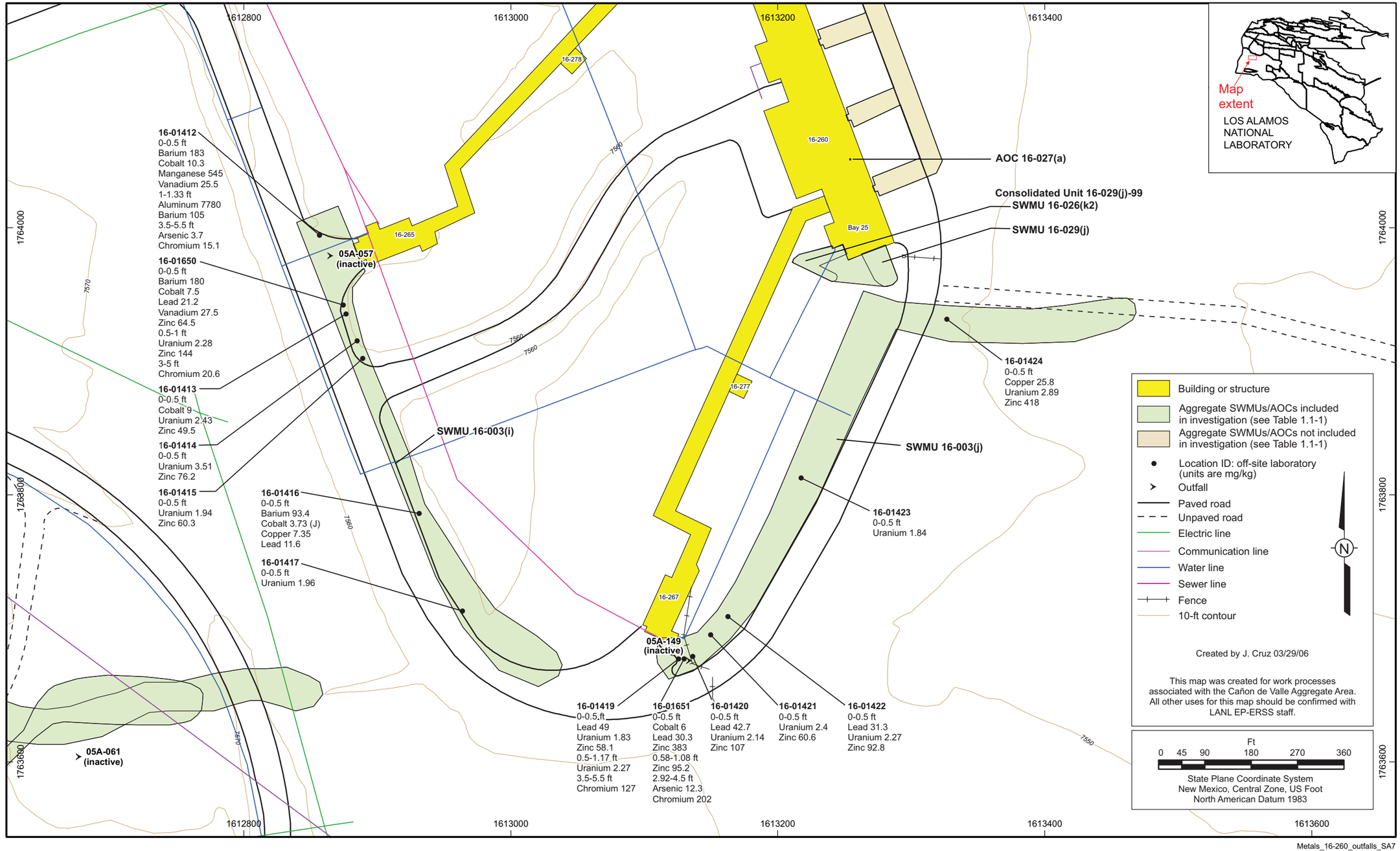


Figure 8.6-2. Subaggregate 7 (280/260 Complexes), 16-260 Outfalls, historical sampling locations with inorganic chemicals detected greater than background values

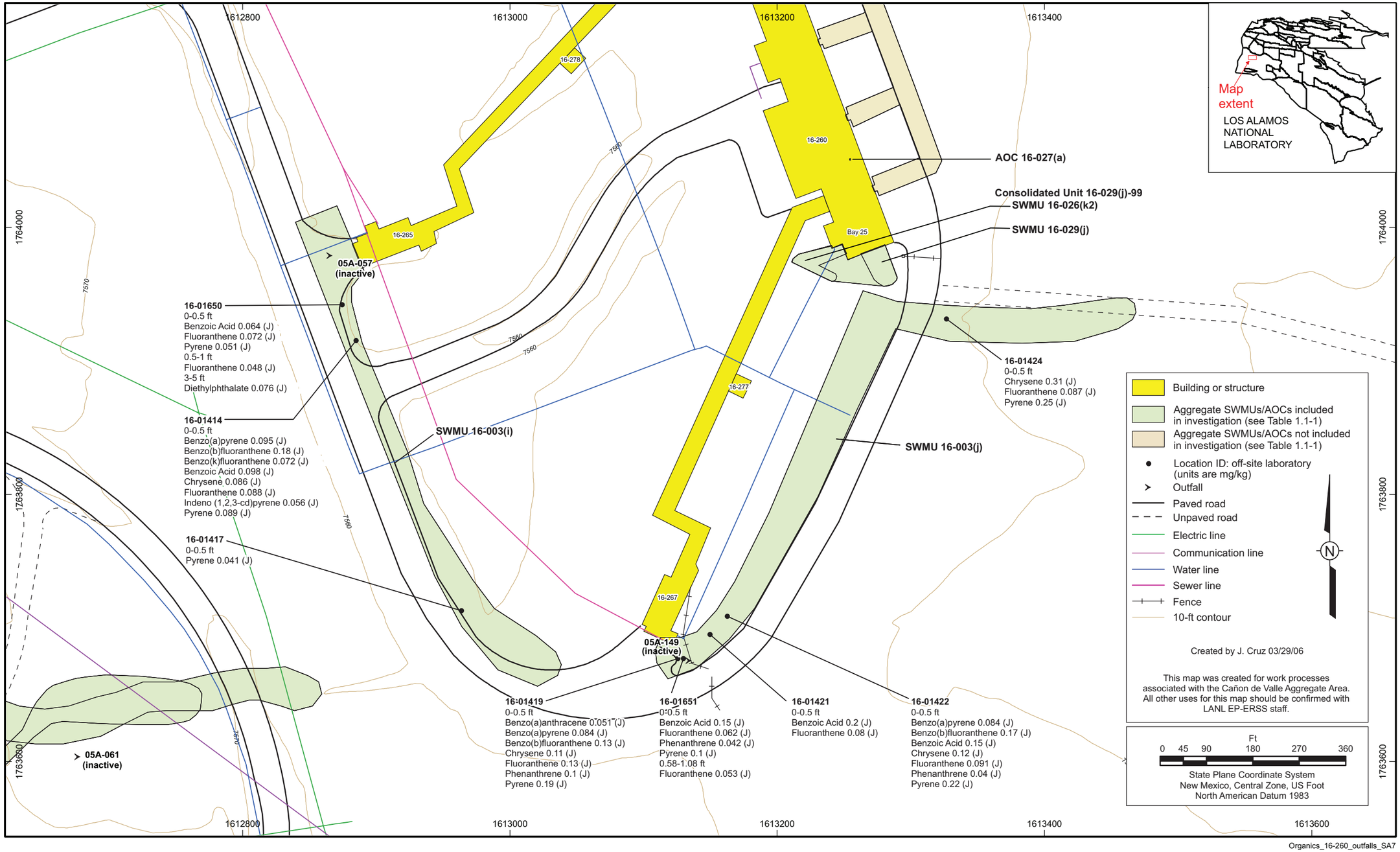


Figure 8.6-3. Subaggregate 7 (280/260 Complexes), 16-260 Outfalls, historical sampling locations with detected organic chemicals

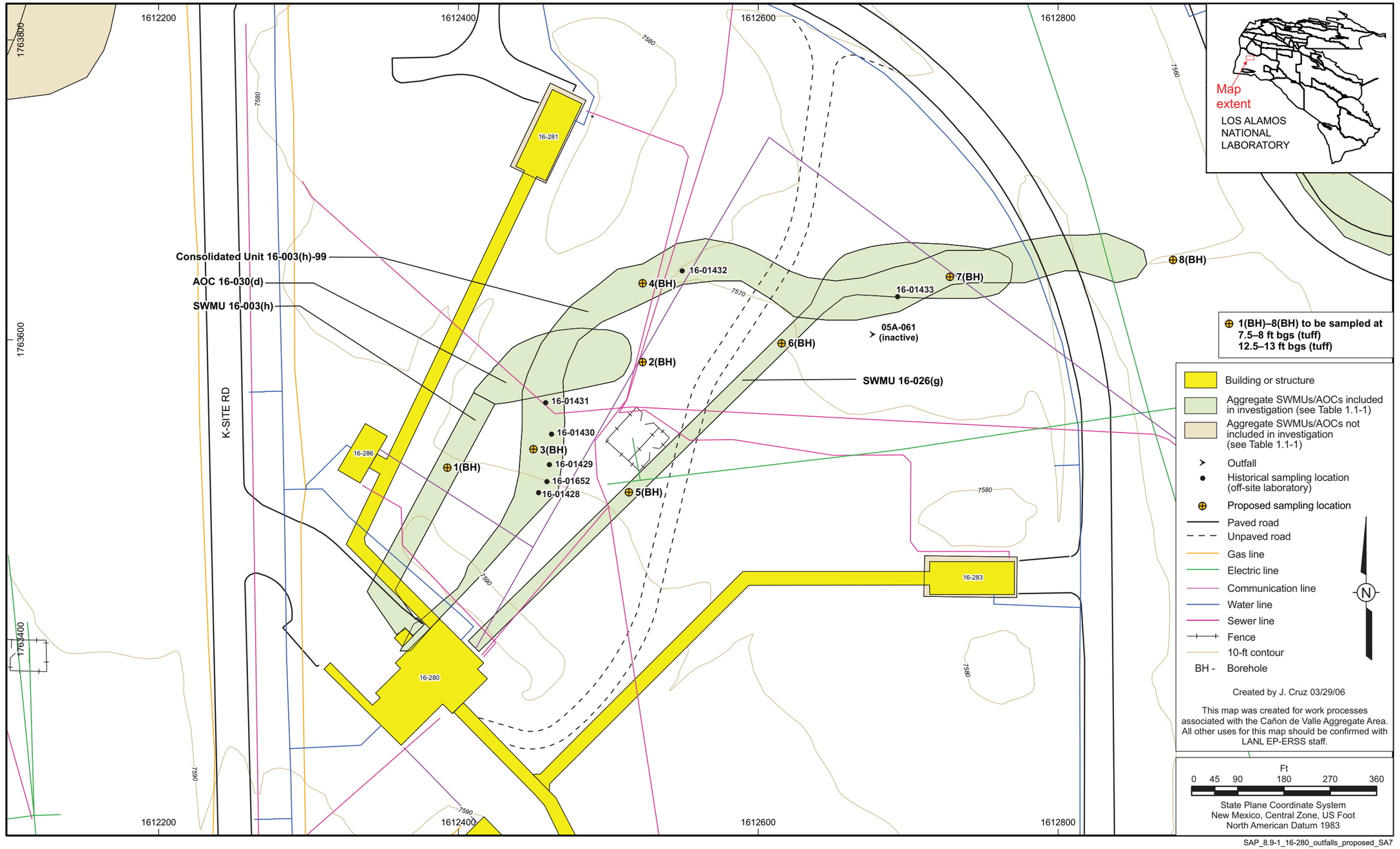


Figure 8.9-1. Subaggregate 7 (280/260 Complexes) proposed sampling locations and depths: 16-280 Outfalls

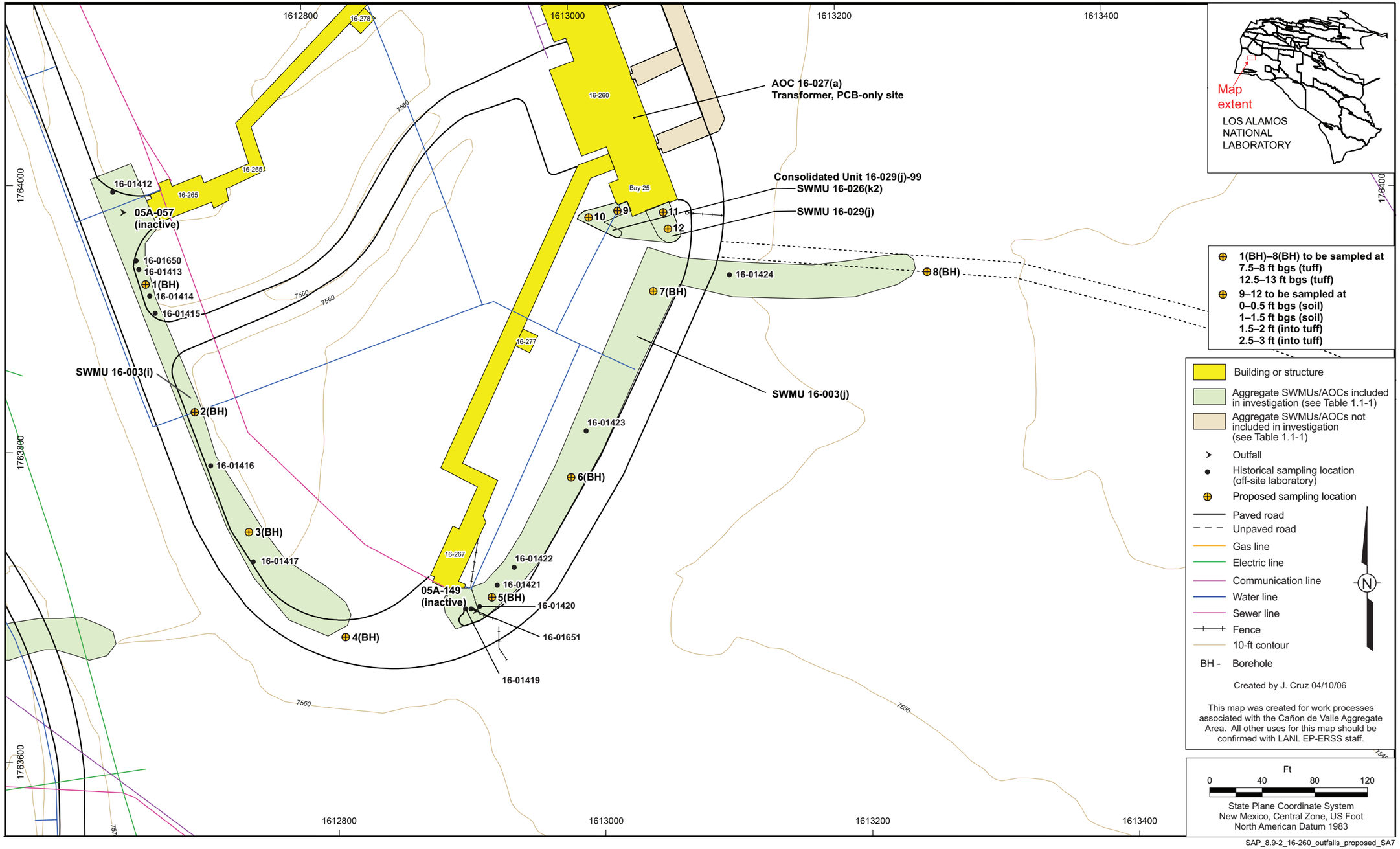


Figure 8.9-2. Subaggregate 7 (280/260 Complexes) proposed sampling locations and depths: 16-260 Outfalls

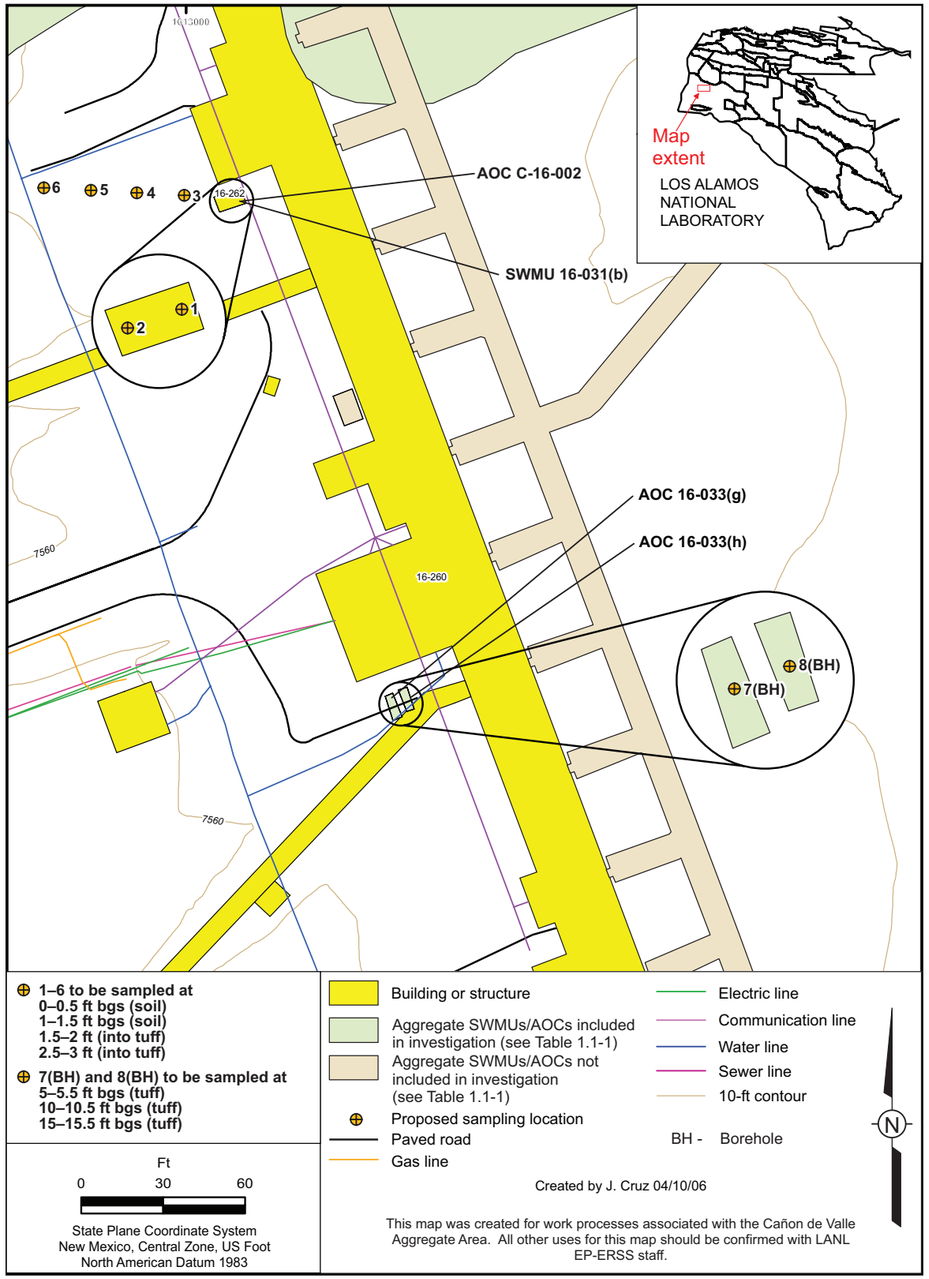


Figure 8.9-3. Subaggregate 7 (280/260 Complexes) proposed sampling locations and depths: Cooling Tower and Underground Storage Tanks

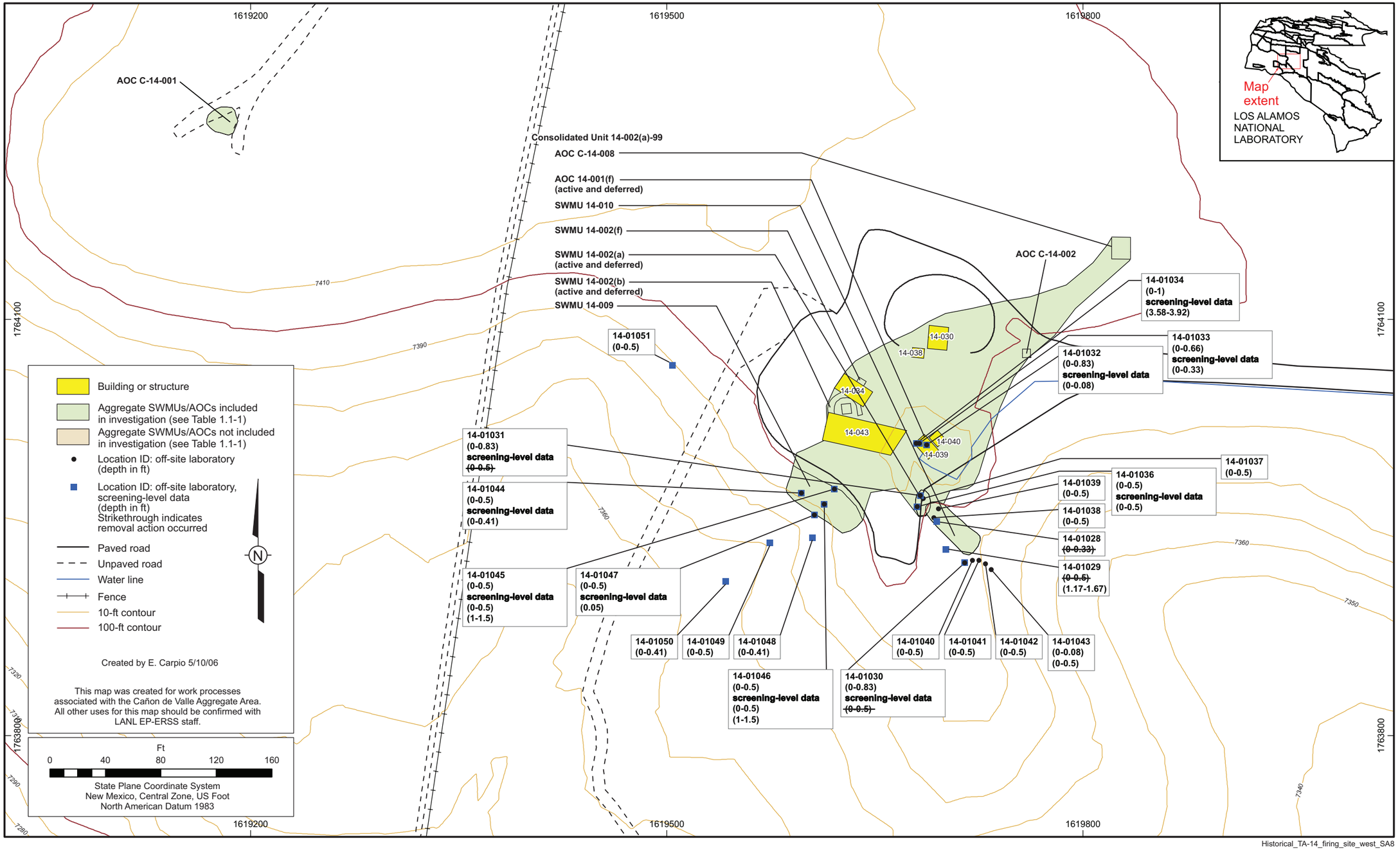


Figure 9.6-1. Subaggregate 8 (TA-14 Firing Site West) historical sampling locations and depths

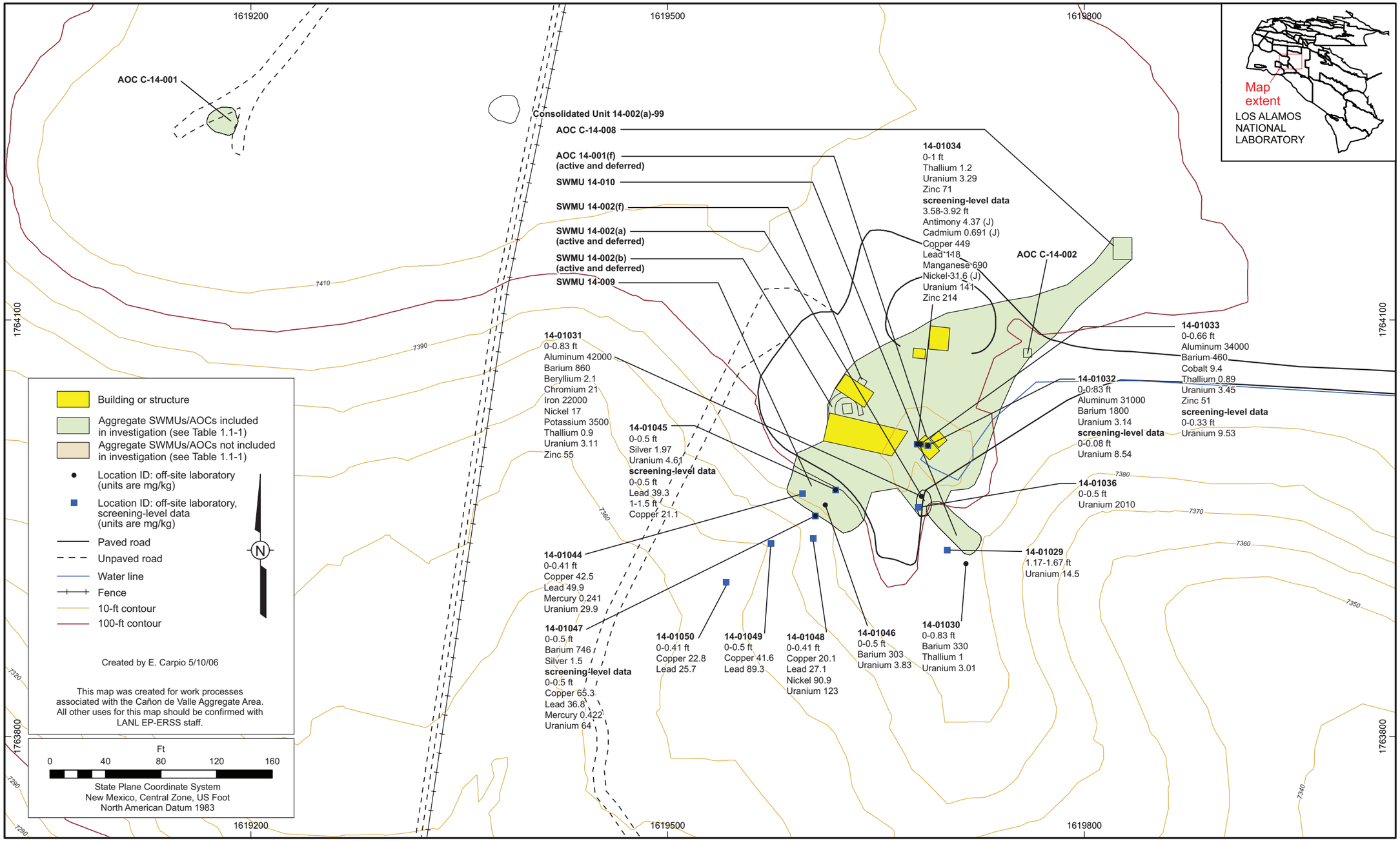


Figure 9.6-2. Subaggregate 8 (TA-14 Firing Site West) historical sampling locations with inorganic chemicals detected greater than background values

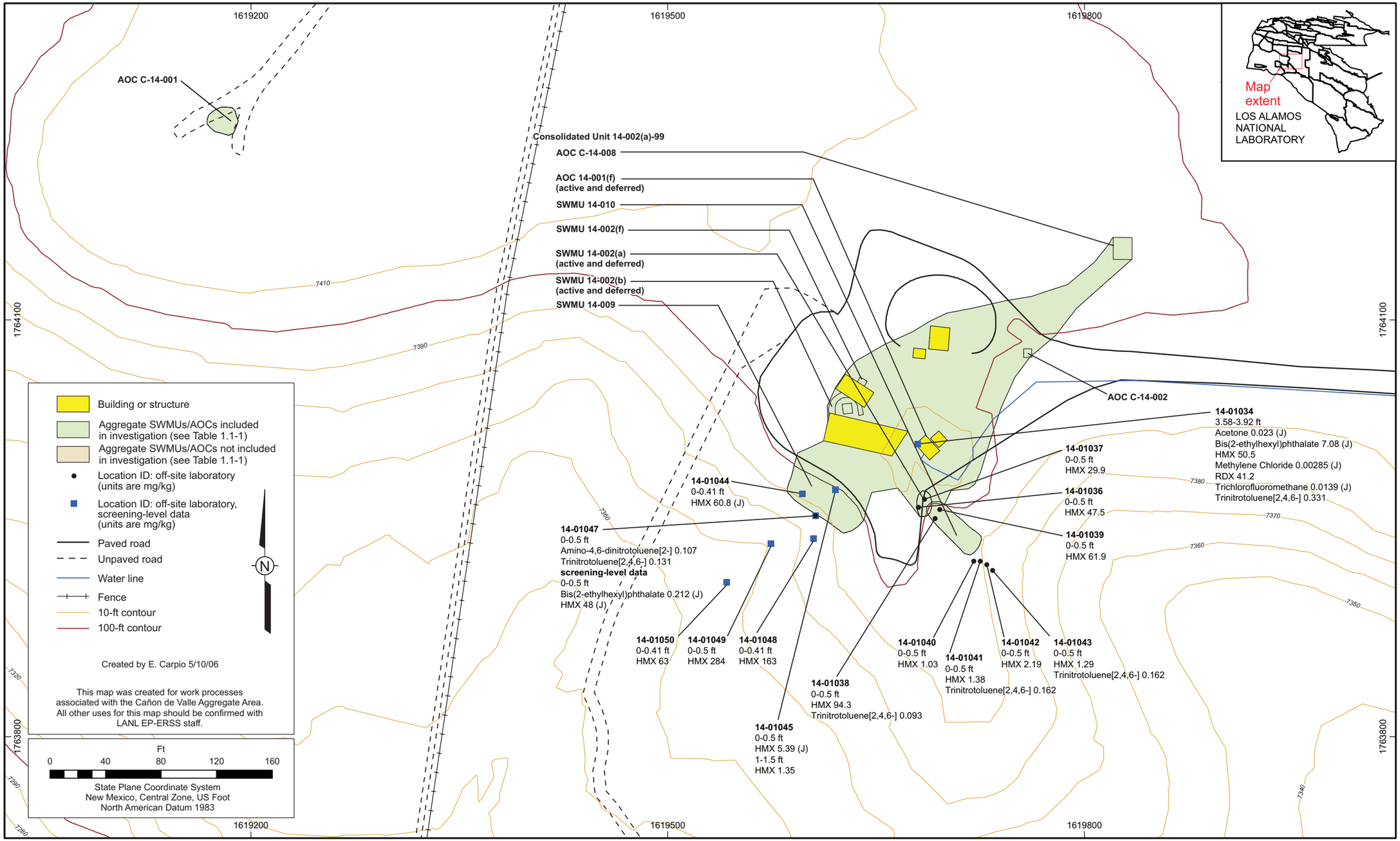


Figure 9.6-3. Subaggregate 8 (TA-14 Firing Site West) historical sampling locations with detected organic chemicals

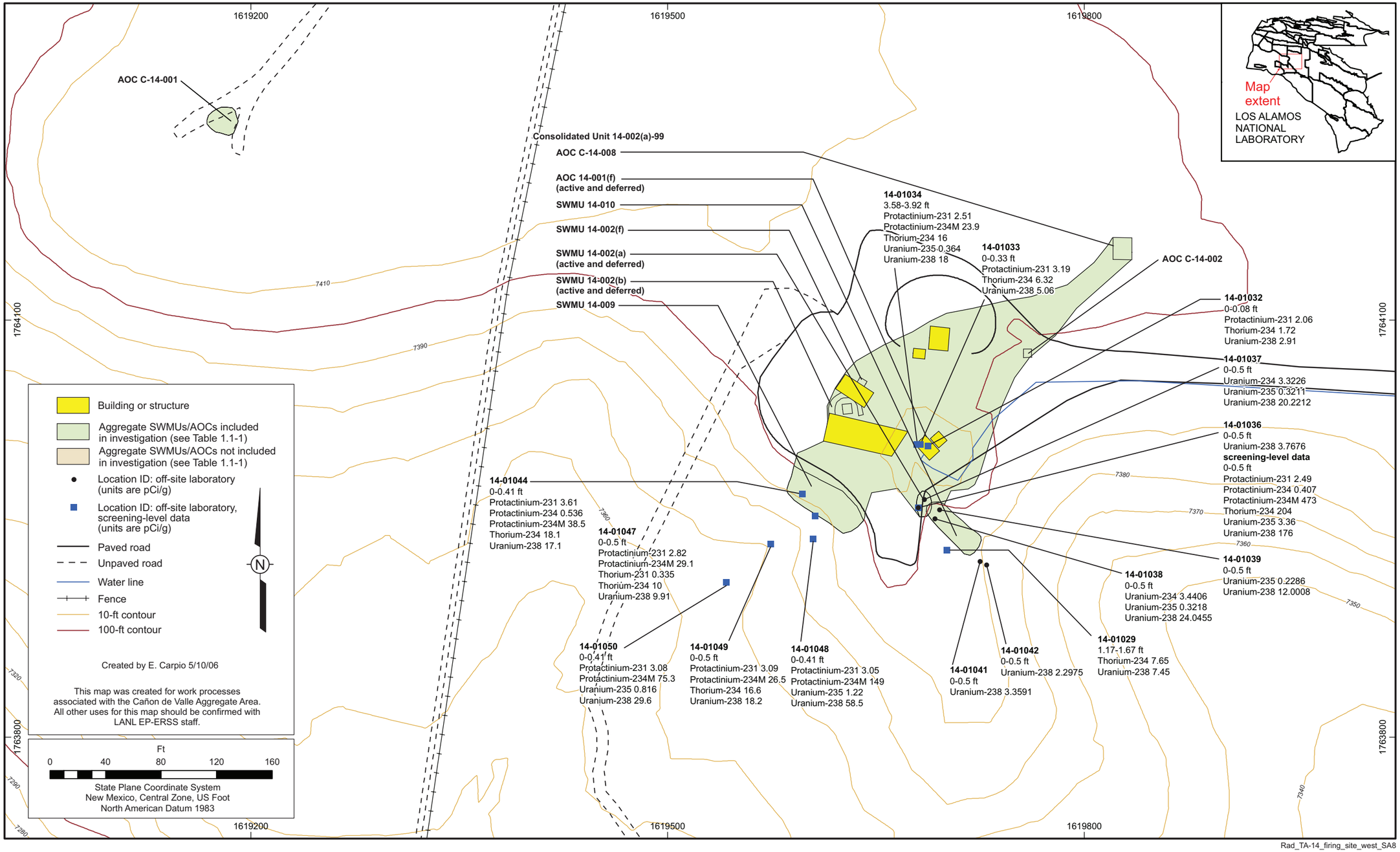


Figure 9.6-4. Subaggregate 8 (TA-14 Firing Site West) historical sampling locations with radionuclides detected, or detected greater than background values

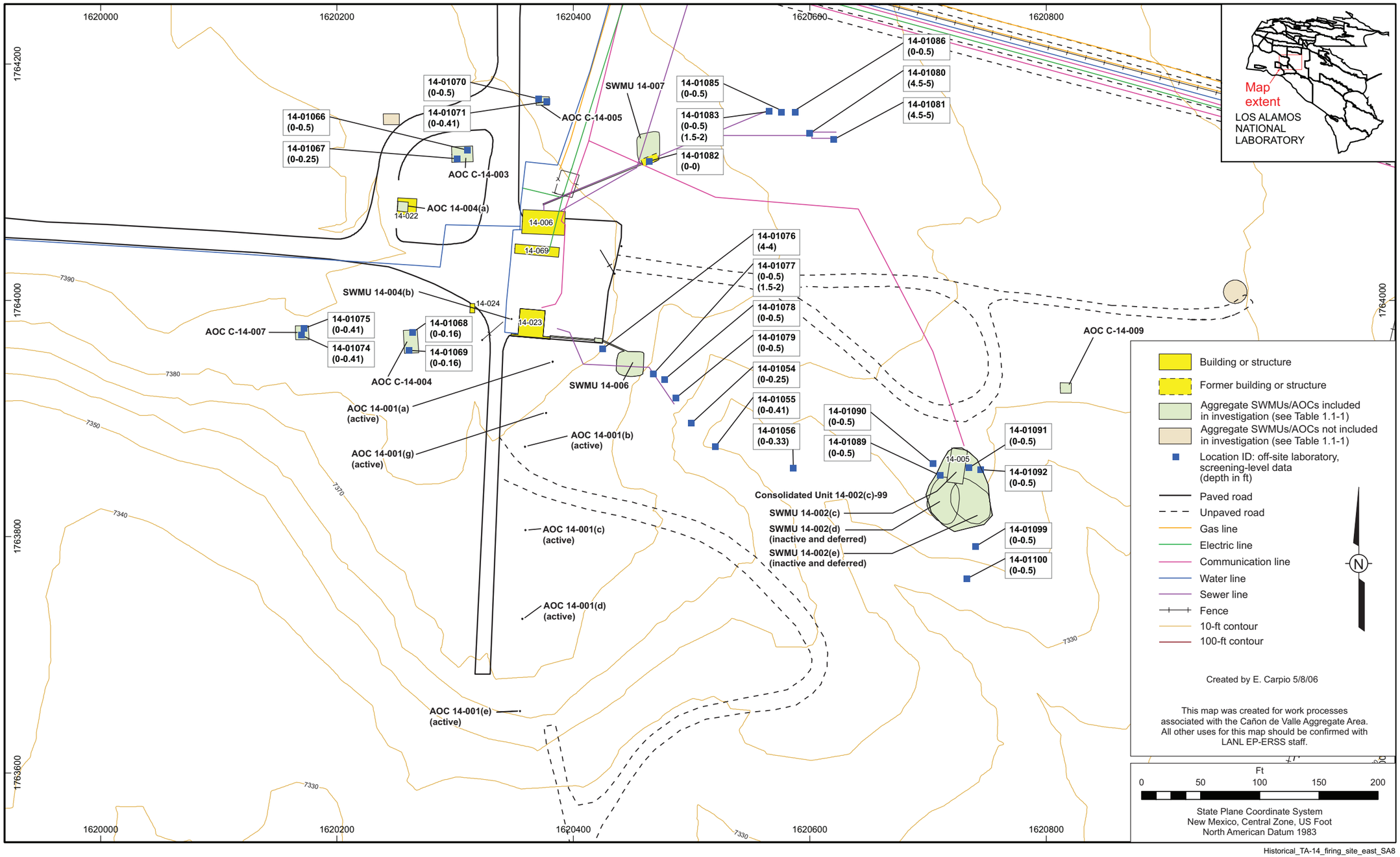


Figure 9.6-5. Subaggregate 8 (TA-14 Firing Site East) historical sampling locations and depths

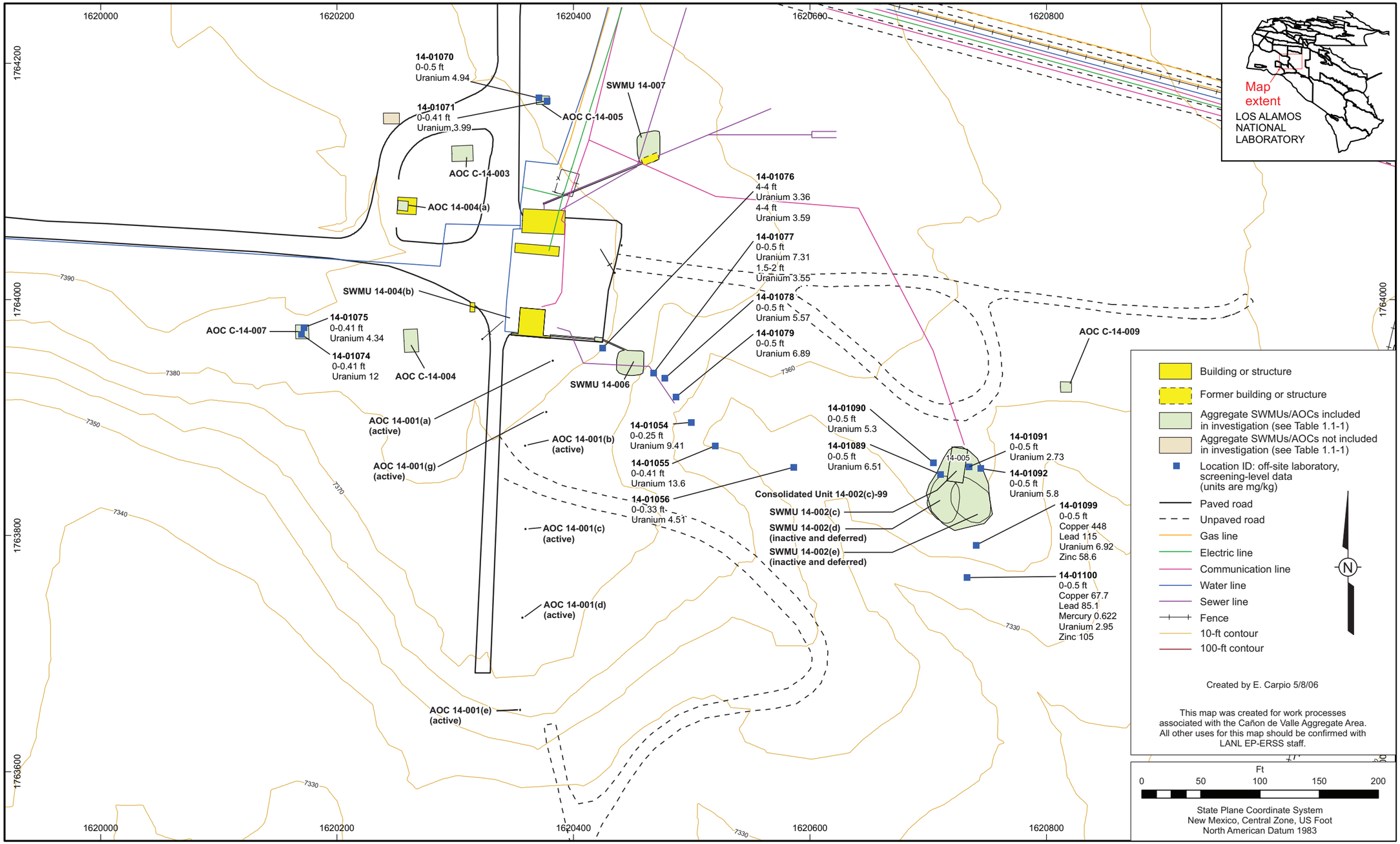


Figure 9.6-6. Subaggregate 8 (TA-14 Firing Site East) historical sampling locations with inorganic chemicals detected greater than background values

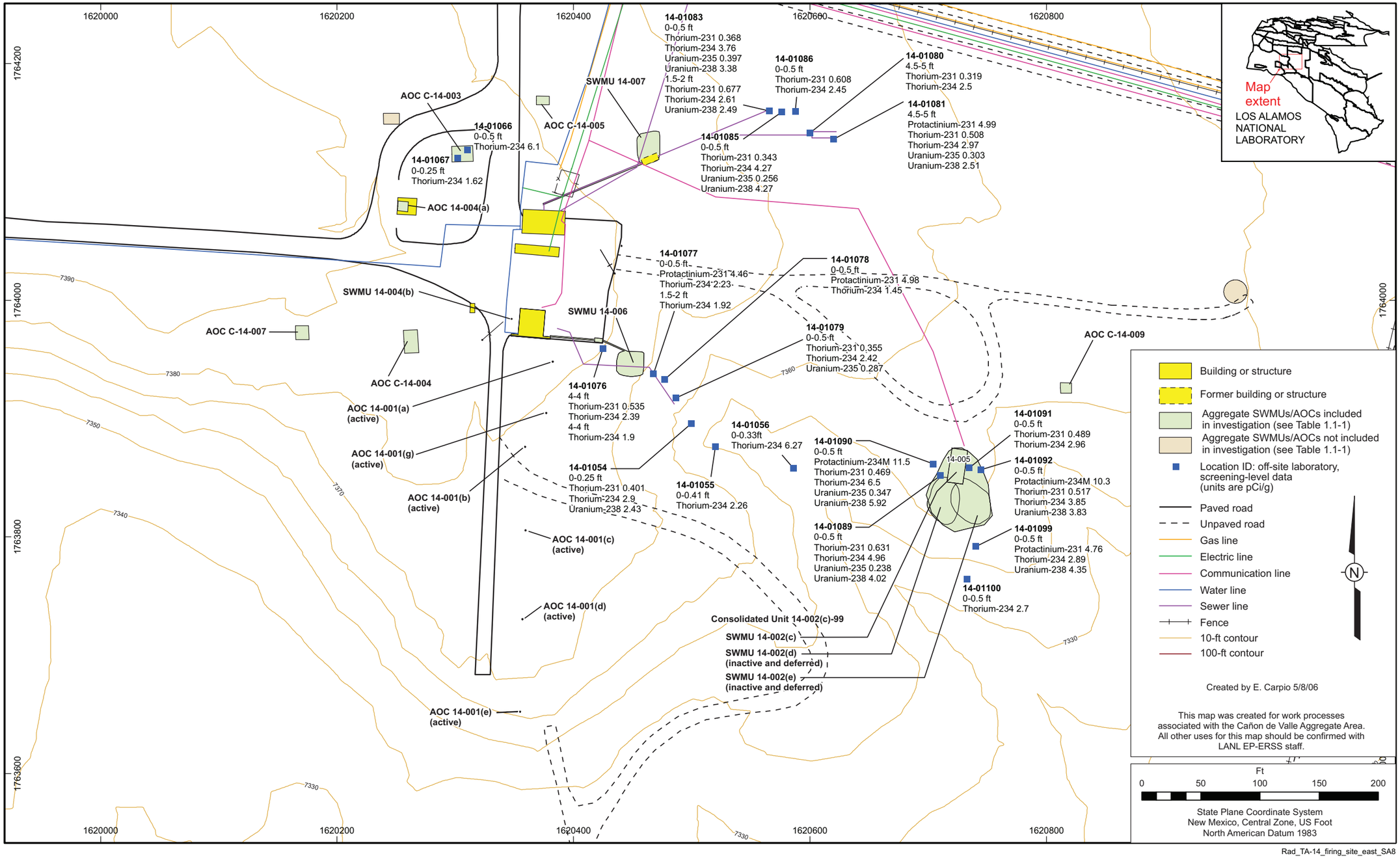


Figure 9.6-7. Subaggregate 8 (TA-14 Firing Site East) historical sampling locations with radionuclides detected, or detected greater than background values

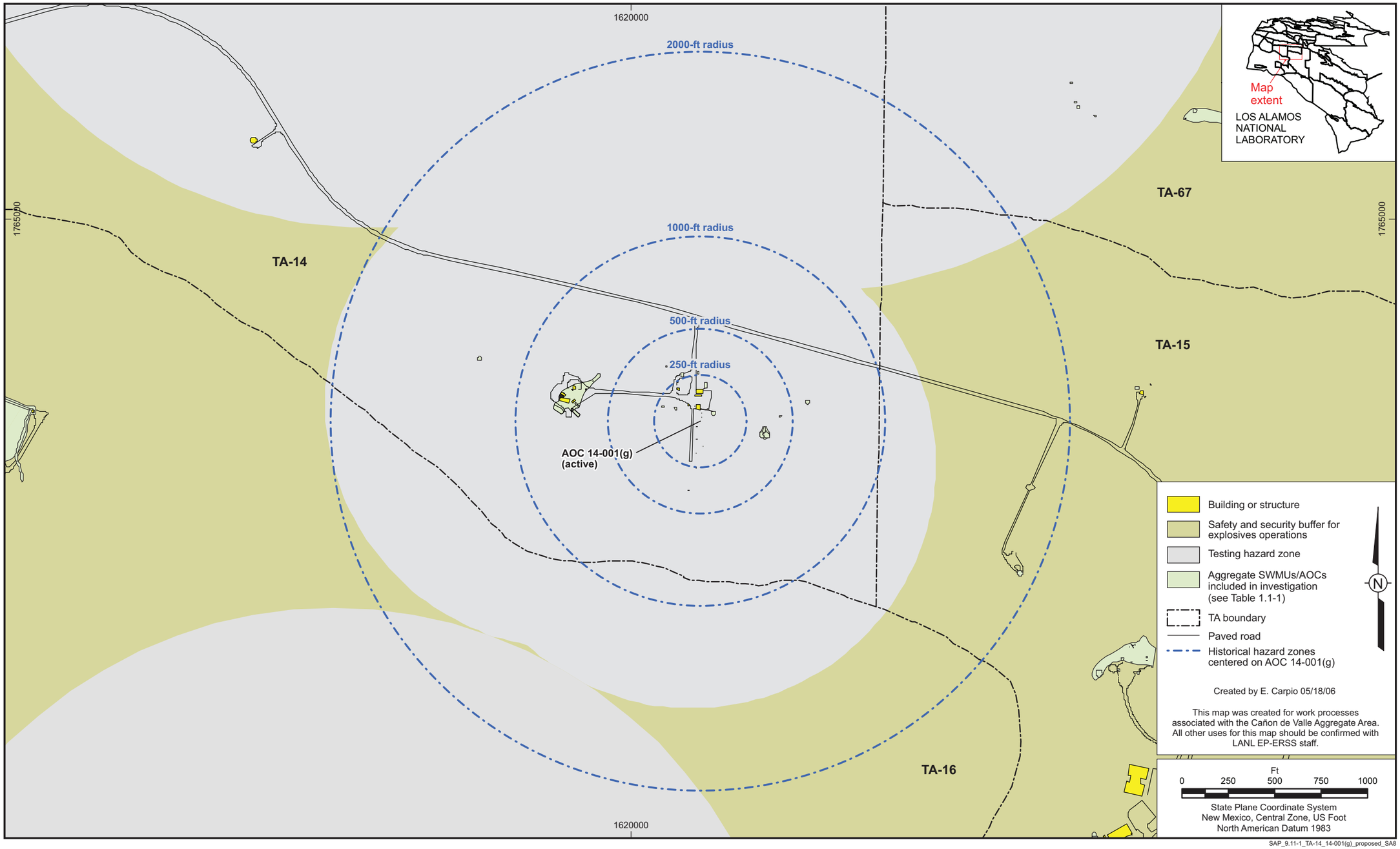


Figure 9.11-1. Subaggregate 8 (TA-14 Firing Site West) proposed radial survey and sampling zones: AOC 14-001(g)

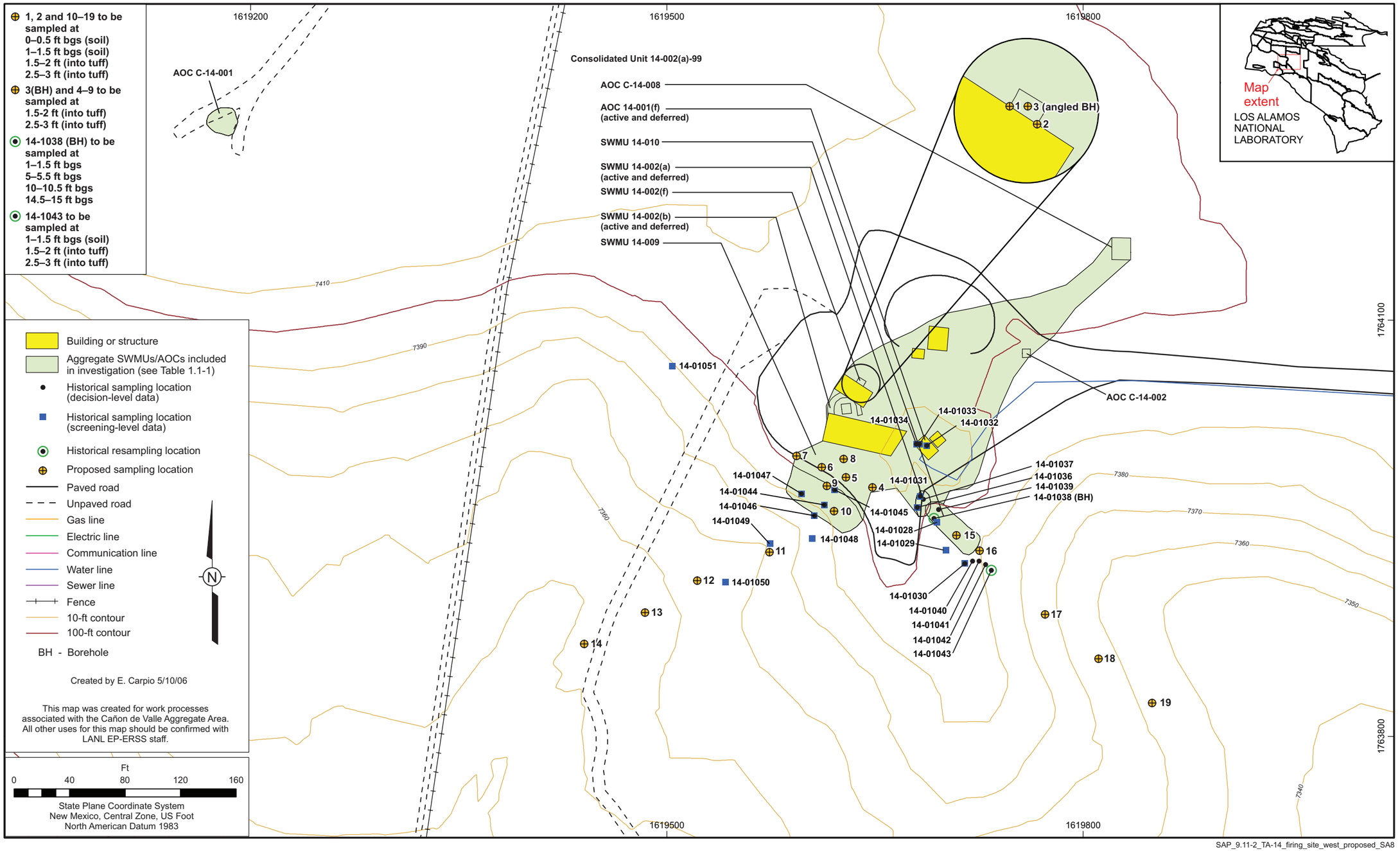


Figure 9.11-2. Subaggregate 8 (TA-14 Firing Site West) proposed sampling locations and depths

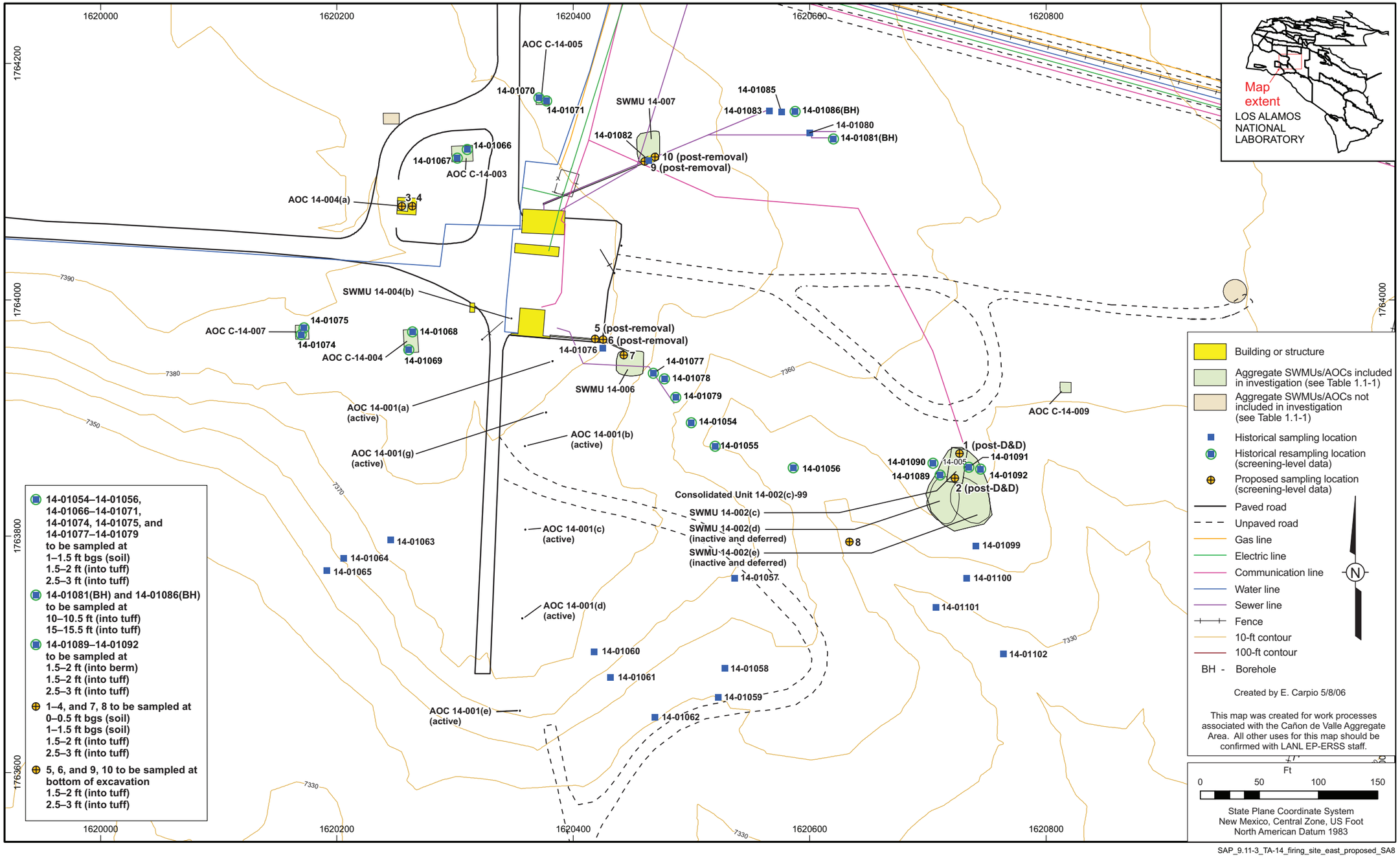


Figure 9.11-3. Subaggregate 8 (TA-14 Firing Site East) proposed sampling locations and depths

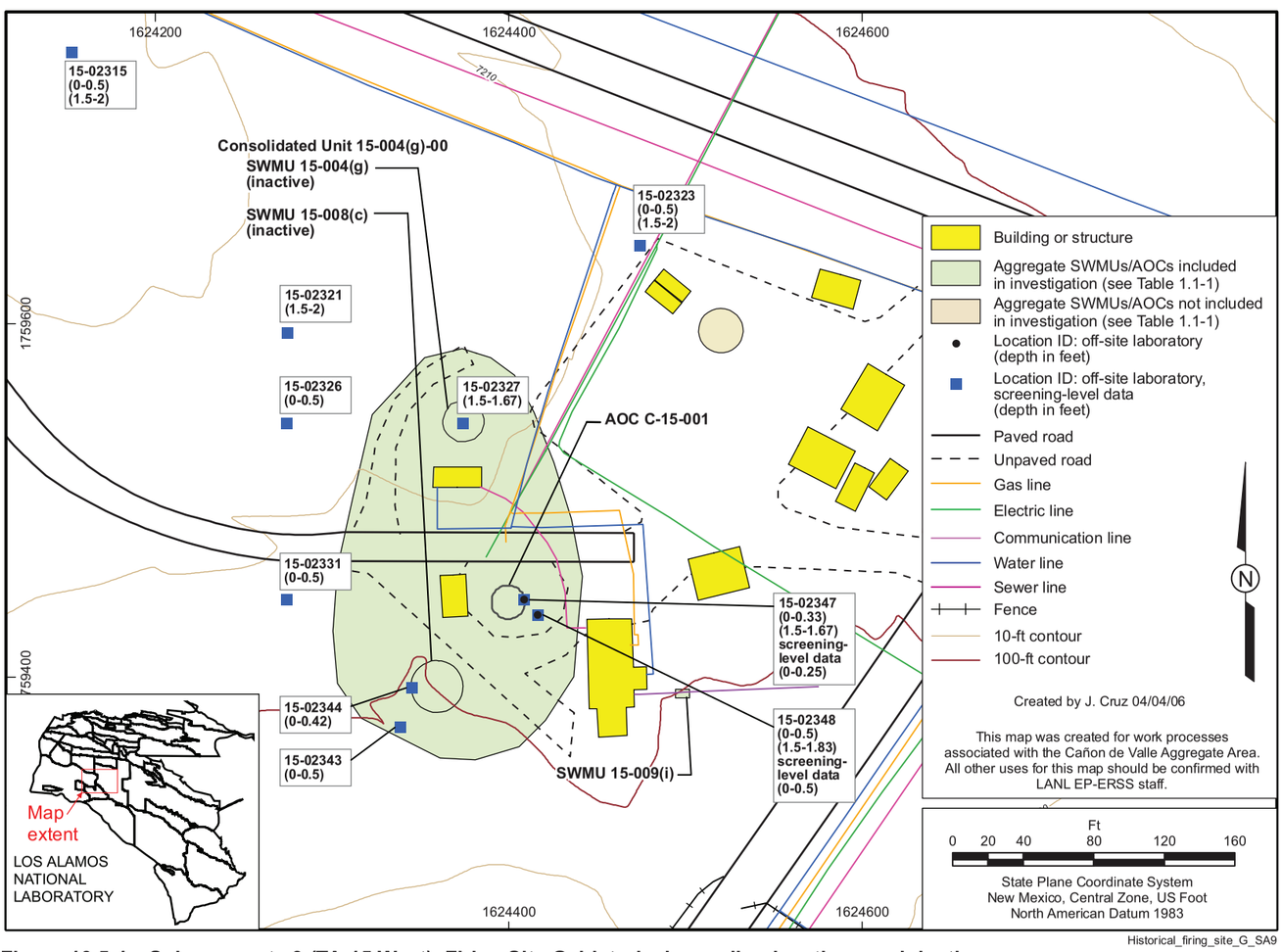


Figure 10.5-1. Subaggregate 9 (TA-15 West), Firing Site G, historical sampling locations and depths

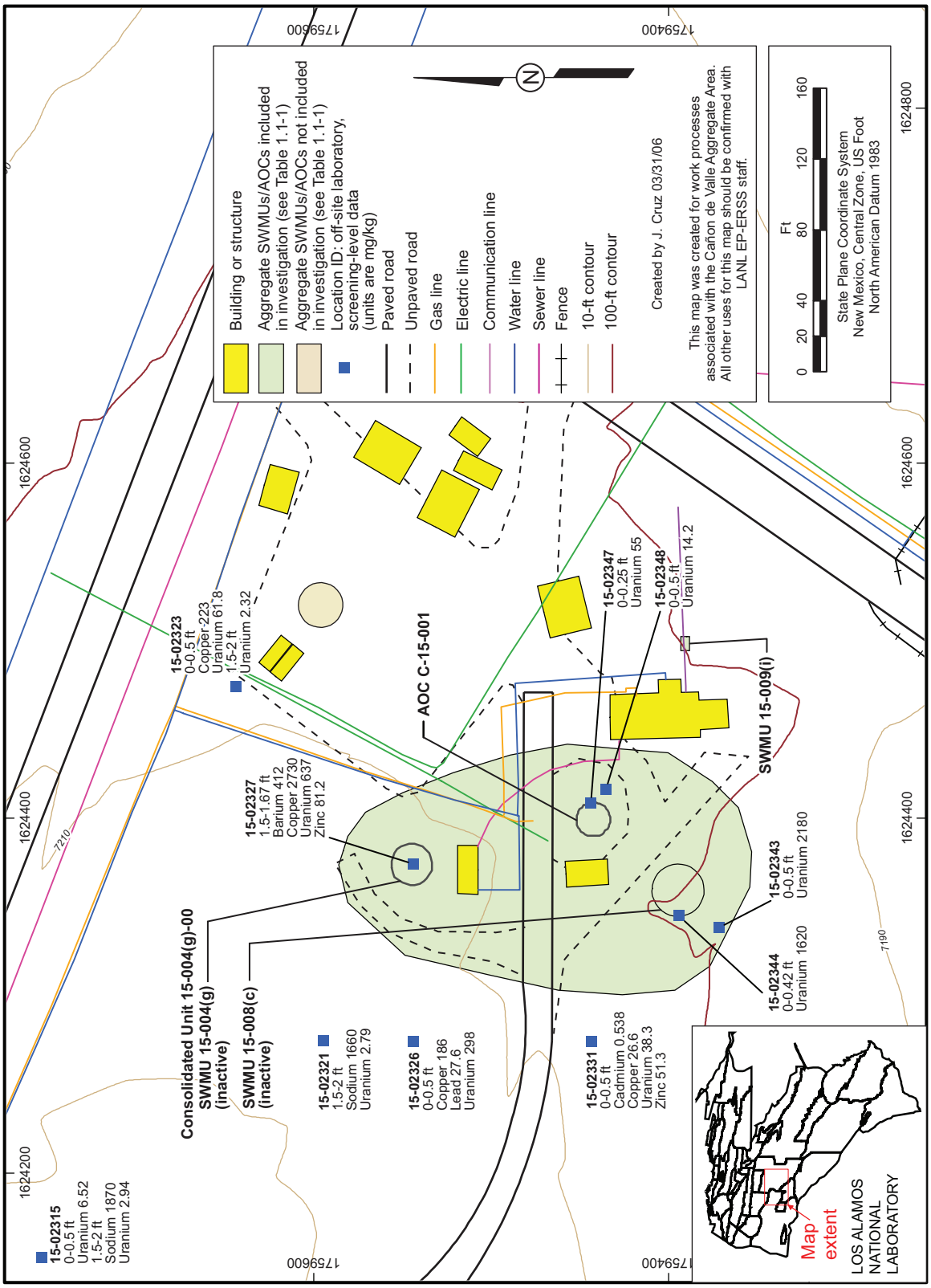


Figure 10.5-2. Subaggregate 9 (TA-15 West), Firing Site G, historical sampling locations with inorganic chemicals detected greater than background values

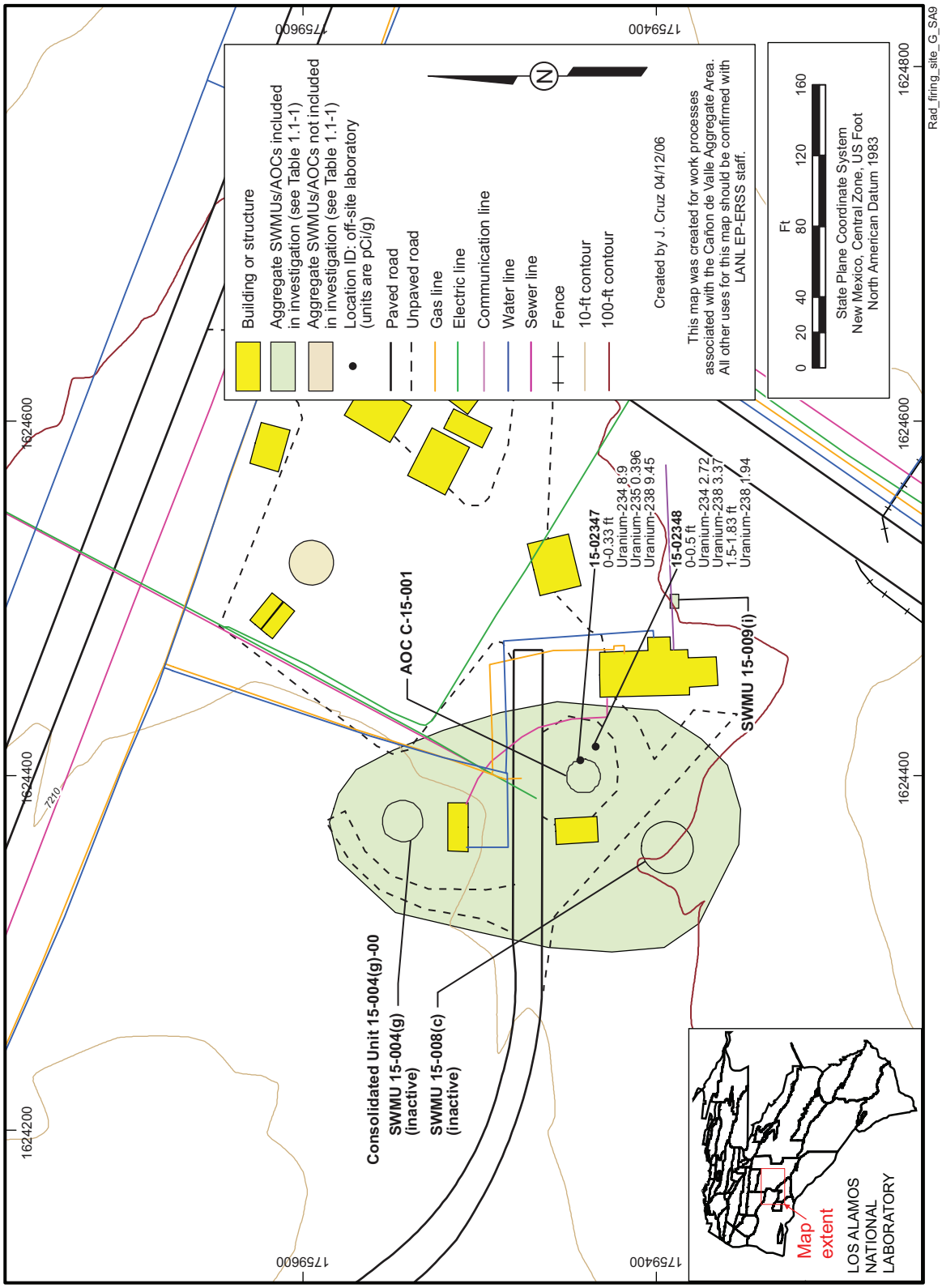


Figure 10.5-3. Subaggregate 9 (TA-15 West), Firing Site G, historical sampling locations with radionuclides detected, or detected greater than background values

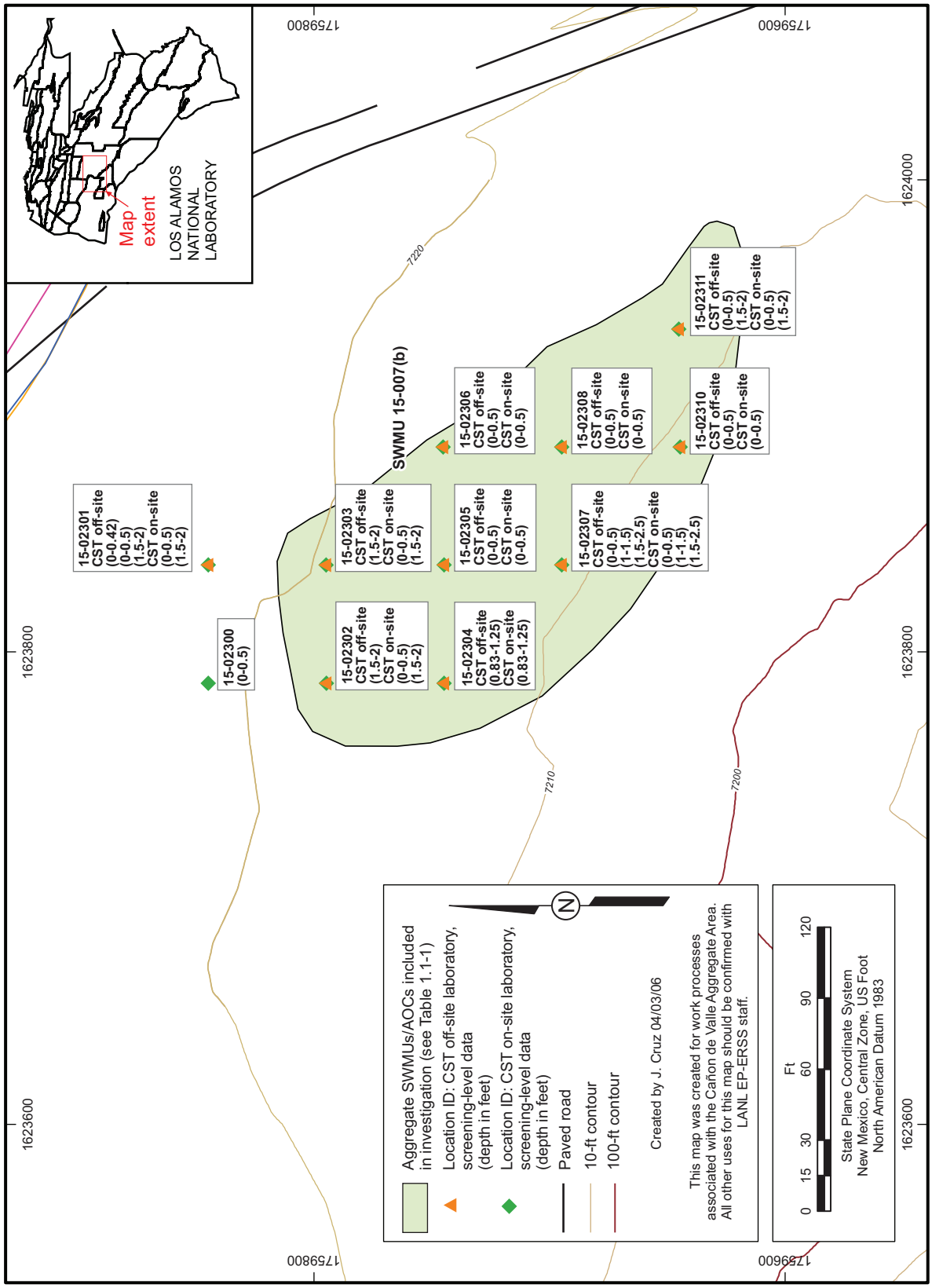


Figure 10.6-1. Subaggregate 9 (TA-15 West), MDA Z, historical sampling locations and depths

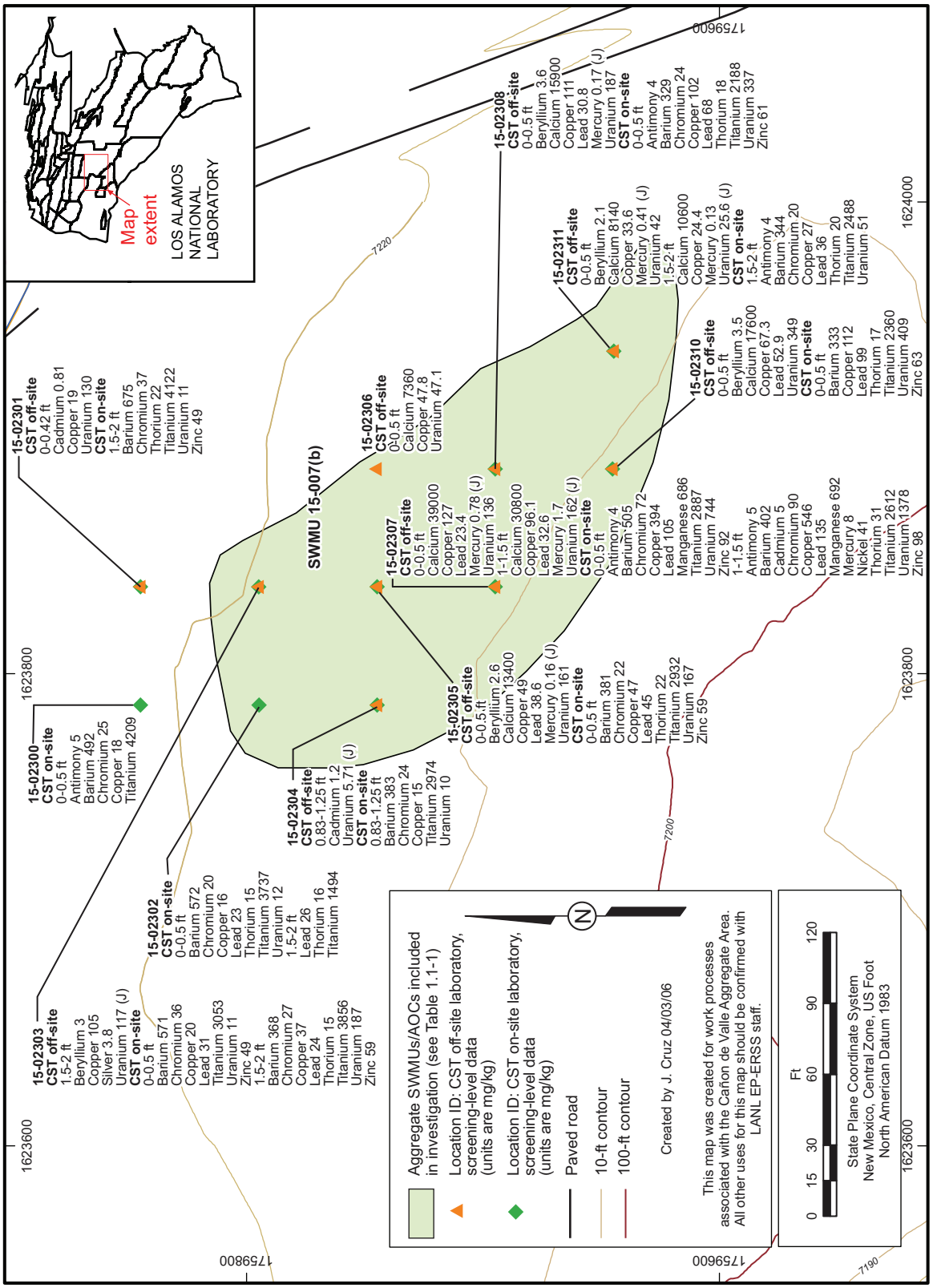


Figure 10.6-2. Subaggregate 9 (TA-15 West), MDA Z, historical sampling locations with inorganic chemicals detected greater than background values

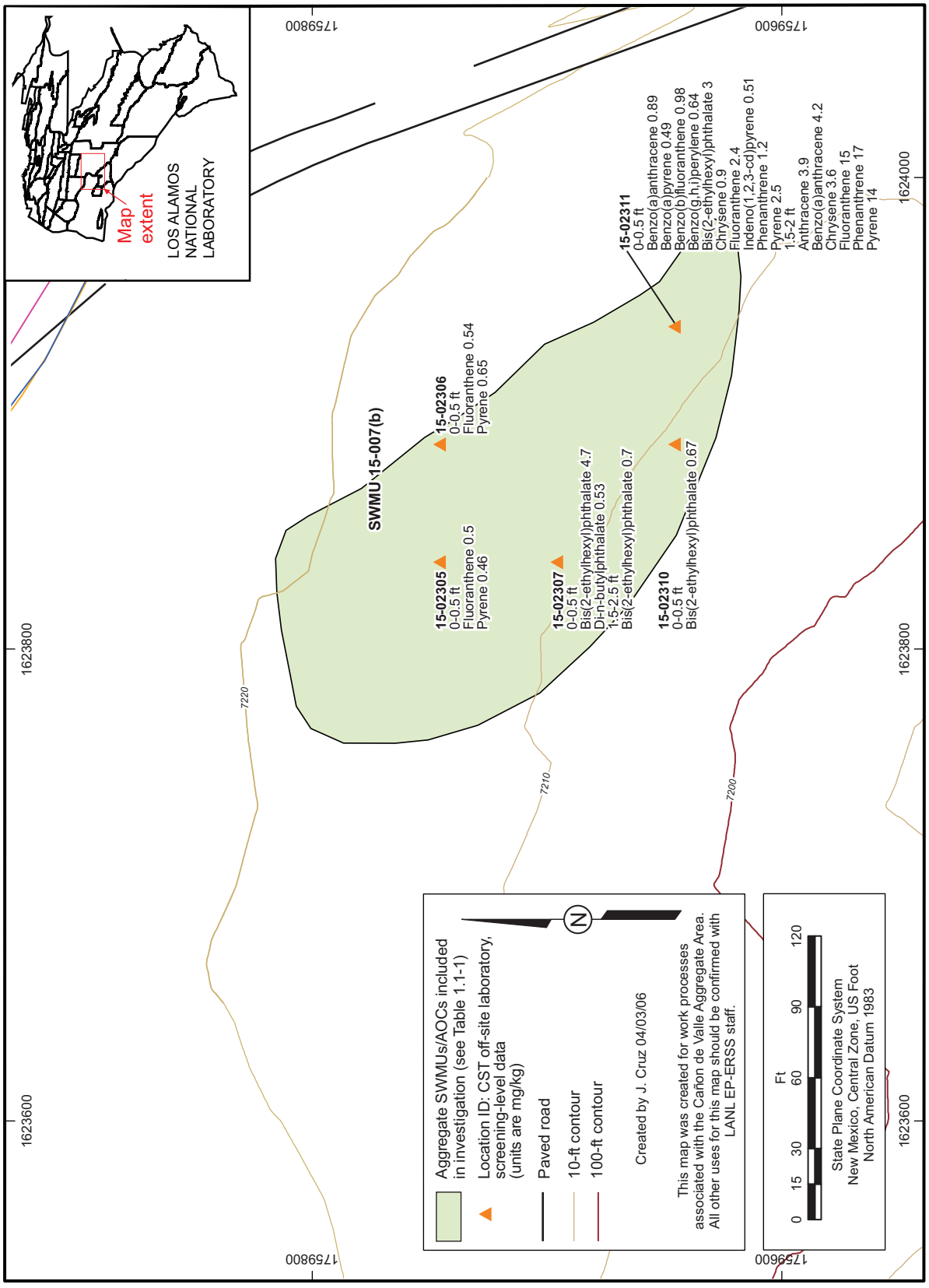


Figure 10.6-3. Subaggregate 9 (TA-15 West), MDA Z, historical sampling locations with detected organic chemicals

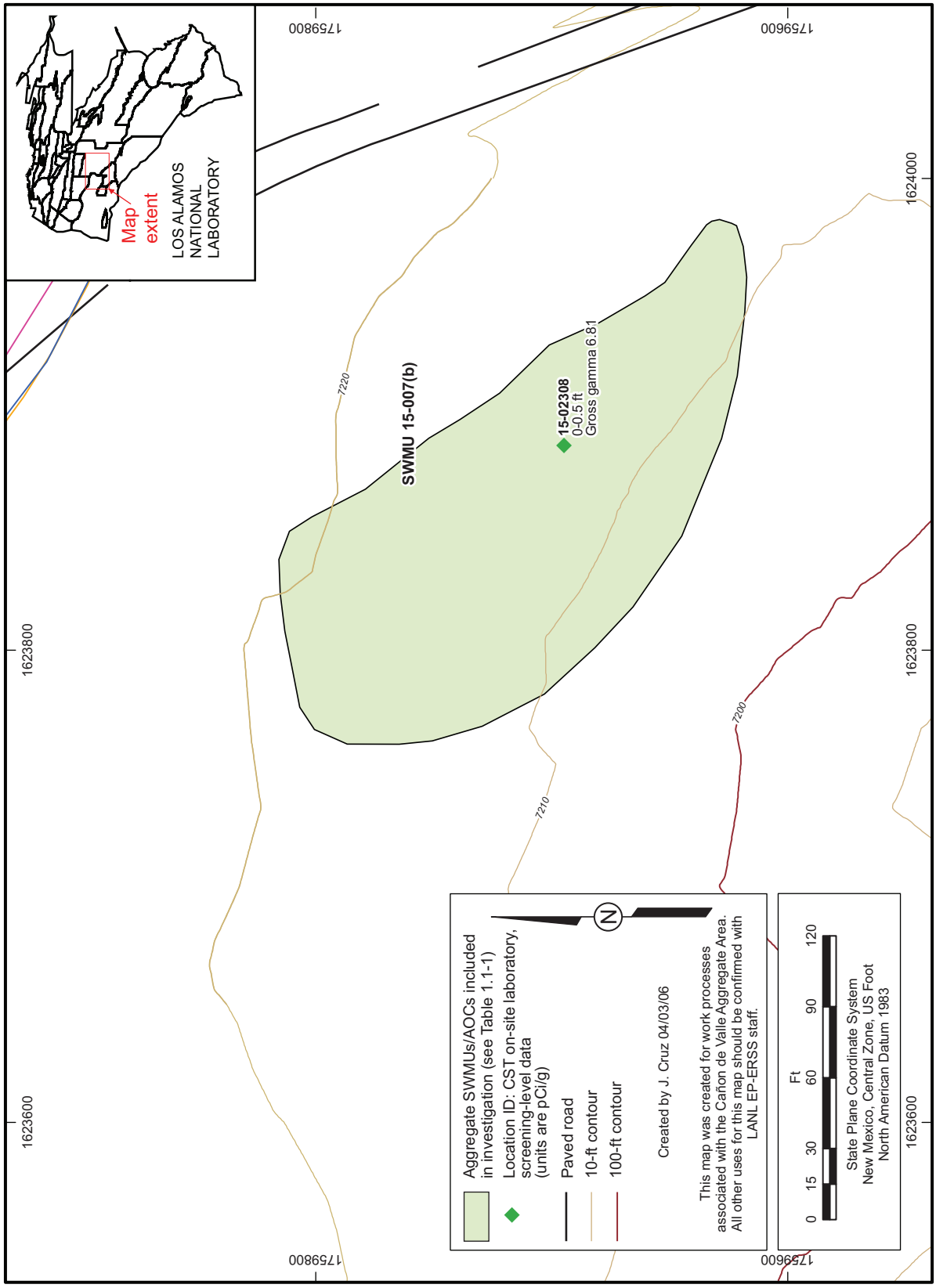


Figure 10.6-4. Subaggregate 9 (TA-15 West), MDA Z, historical sampling location with gross gamma activity

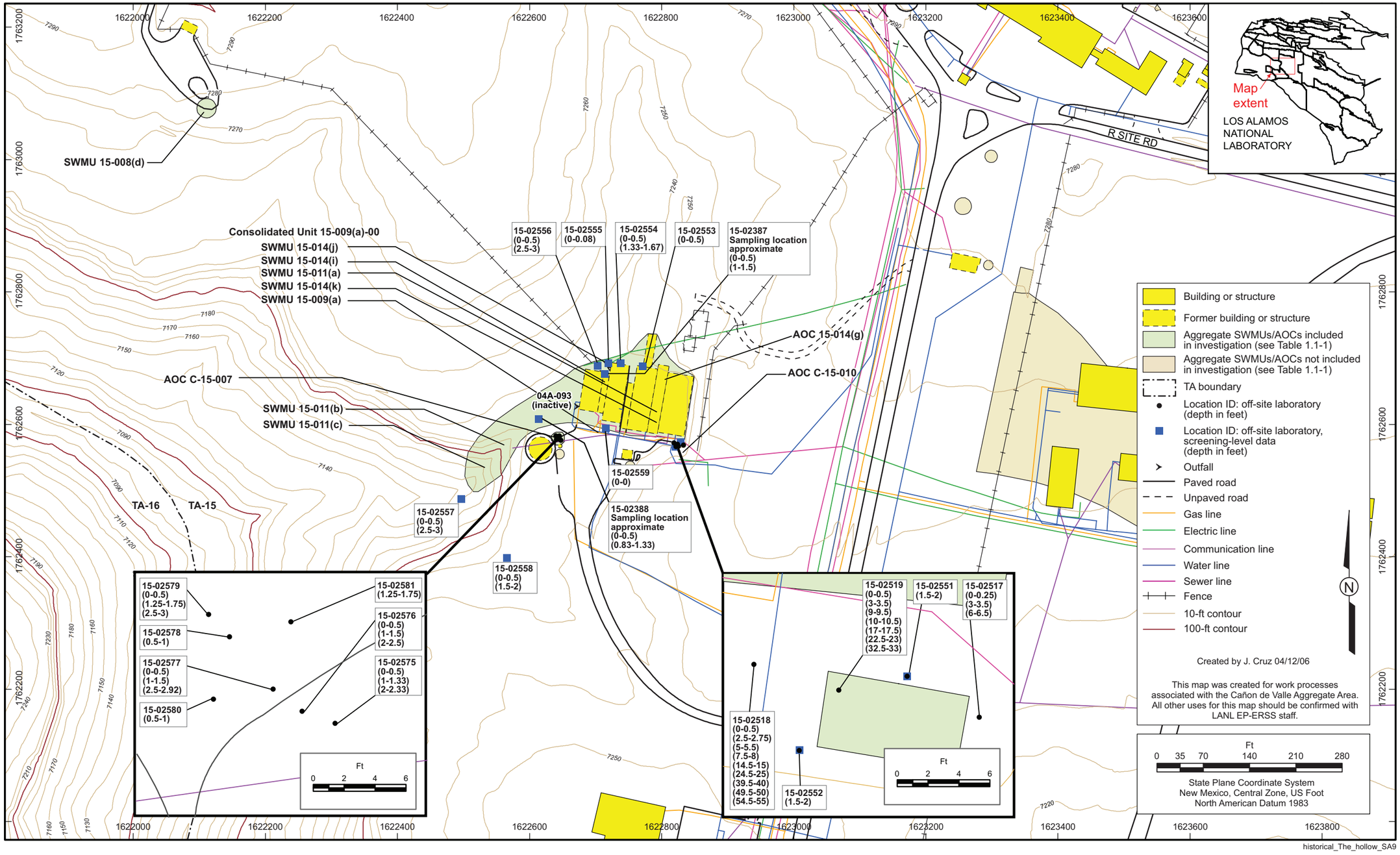


Figure 10.8-1. Subaggregate 9 (TA-15 West), the Hollow, historical sampling locations and depths

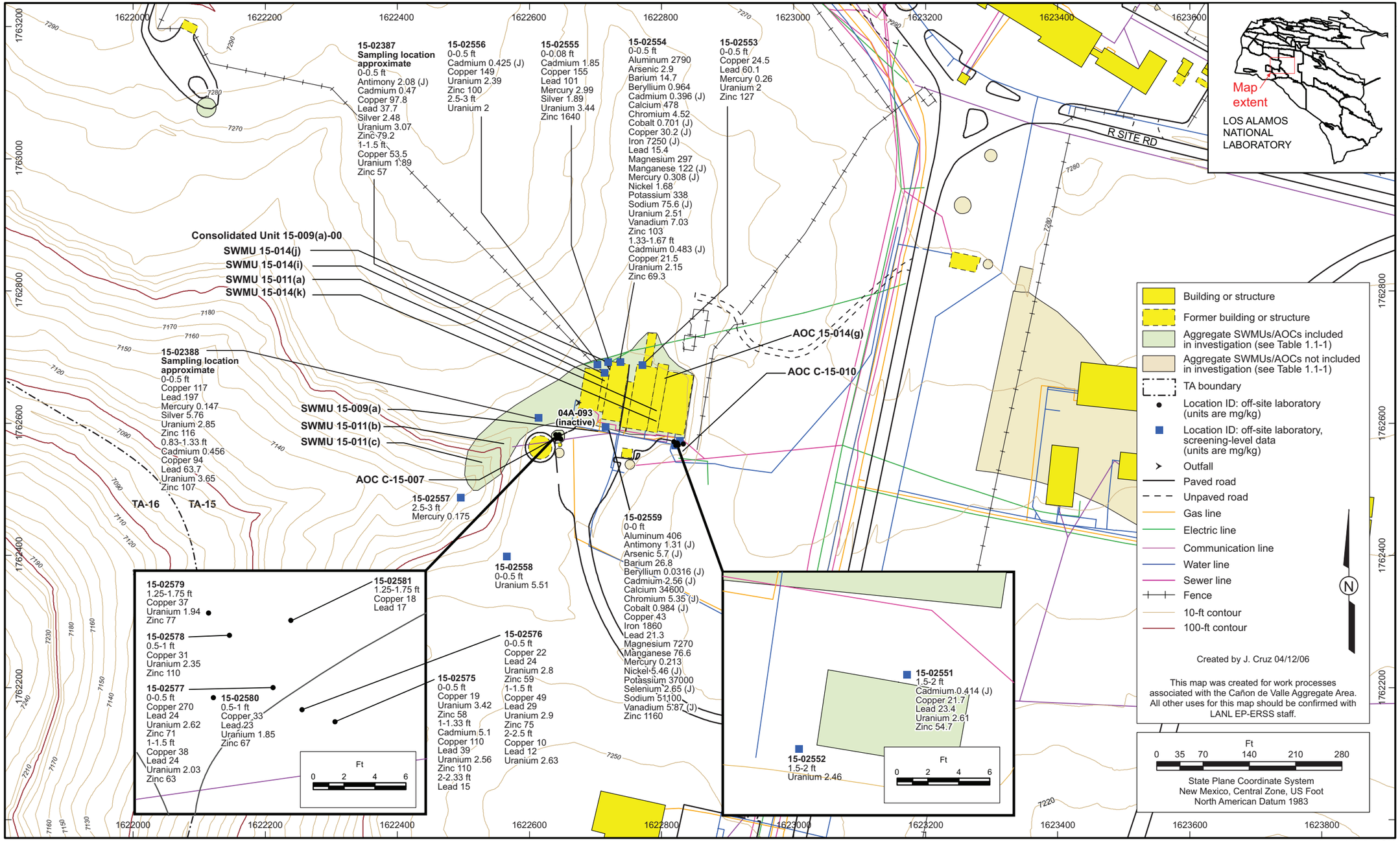


Figure 10.8-2. Subaggregate 9 (TA-15 West), the Hollow, historical sampling locations with inorganic chemicals detected greater than background values

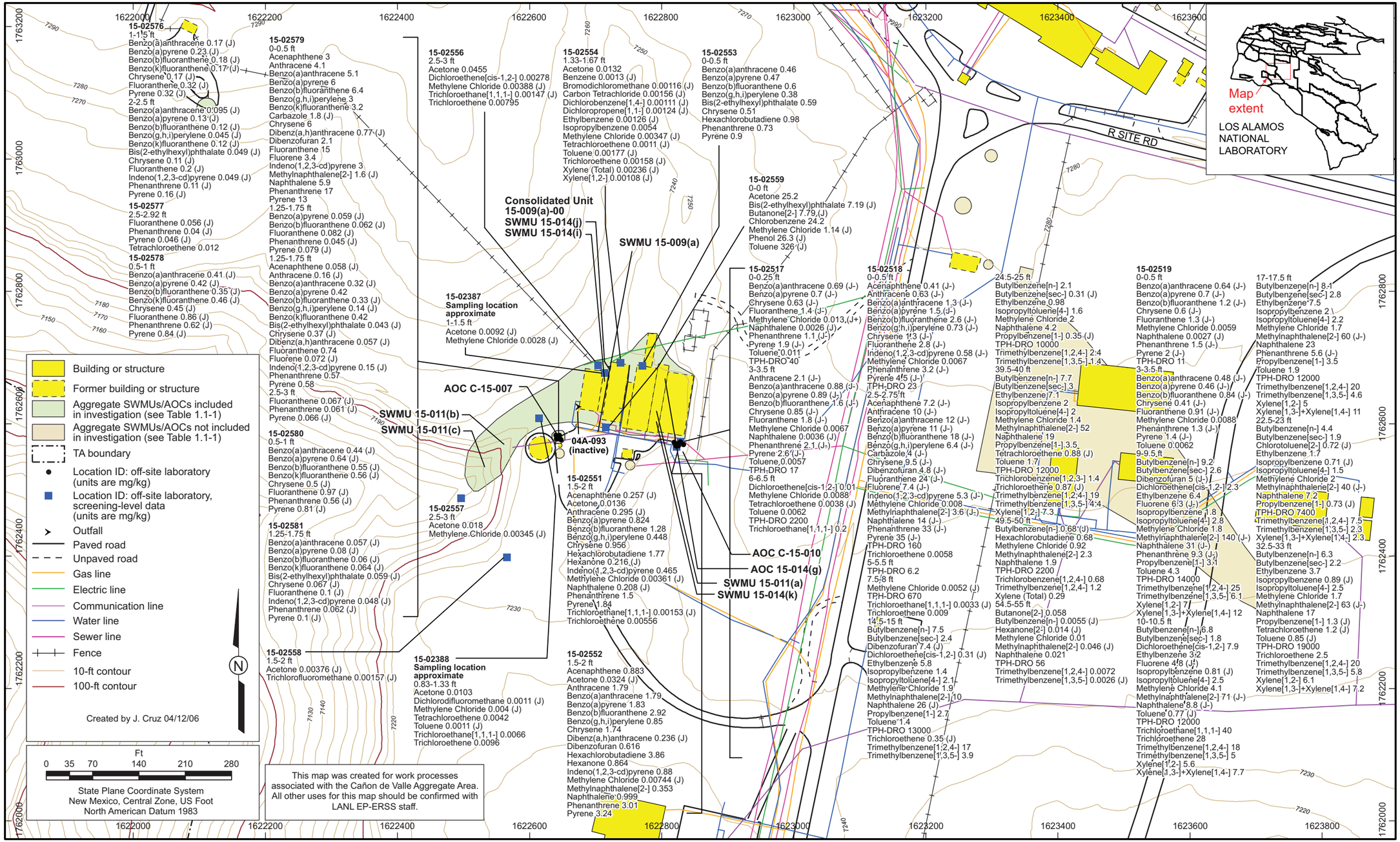


Figure 10.8-3. Subaggregate 9 (TA-15 West), the Hollow, historical sampling locations with detected organic chemicals

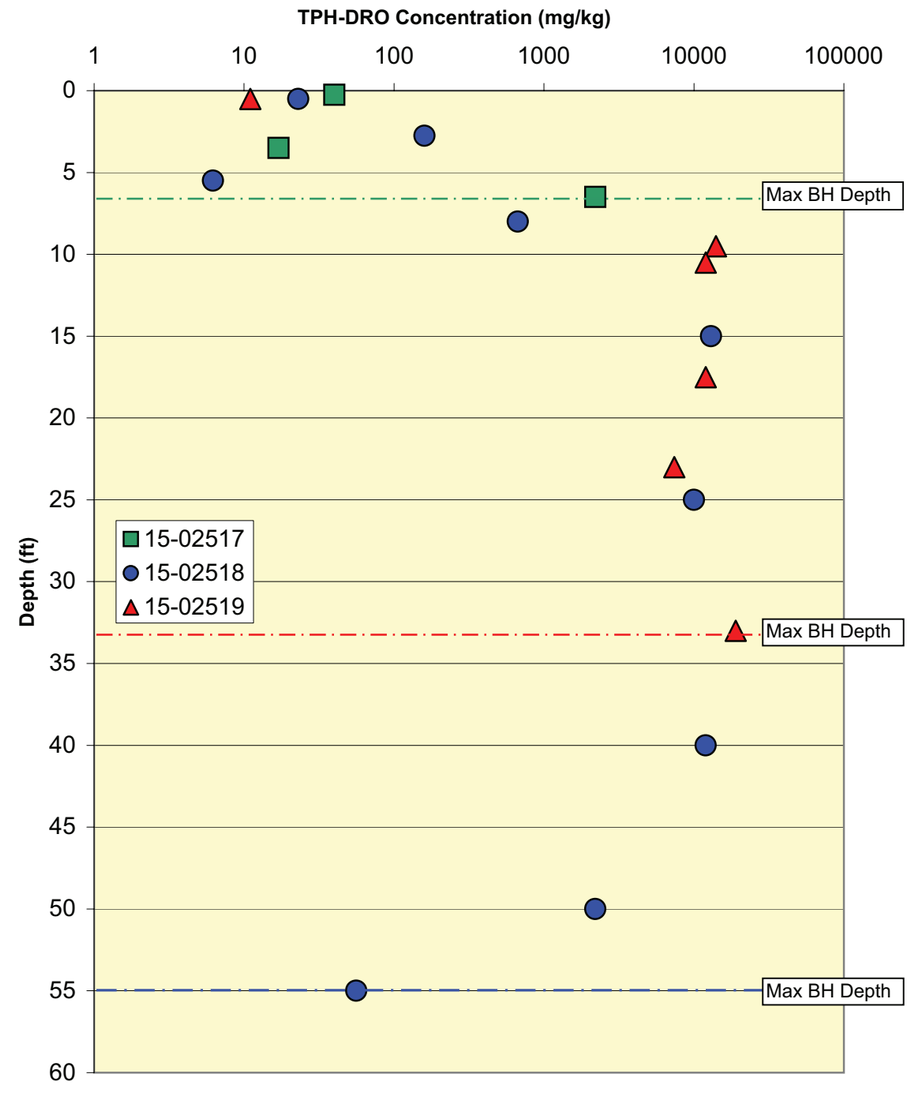


Figure 10.8-4. Subaggregate 9 (TA-15 West), AOC C-15-010, TPH-DRO concentrations with depth

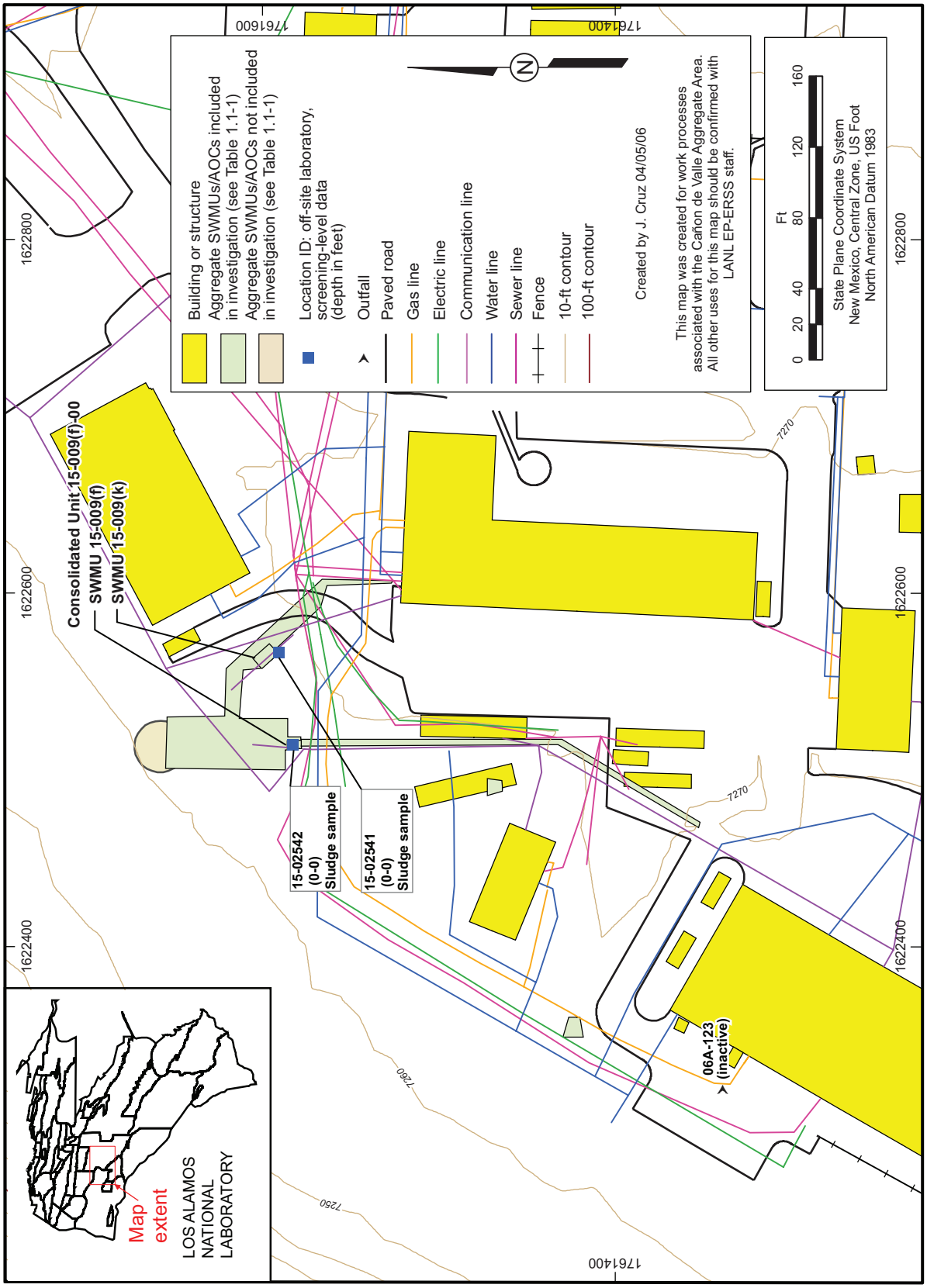


Figure 10.9-1. Subaggregate 9 (TA-15 West), Septic Systems, historical sampling locations and depths

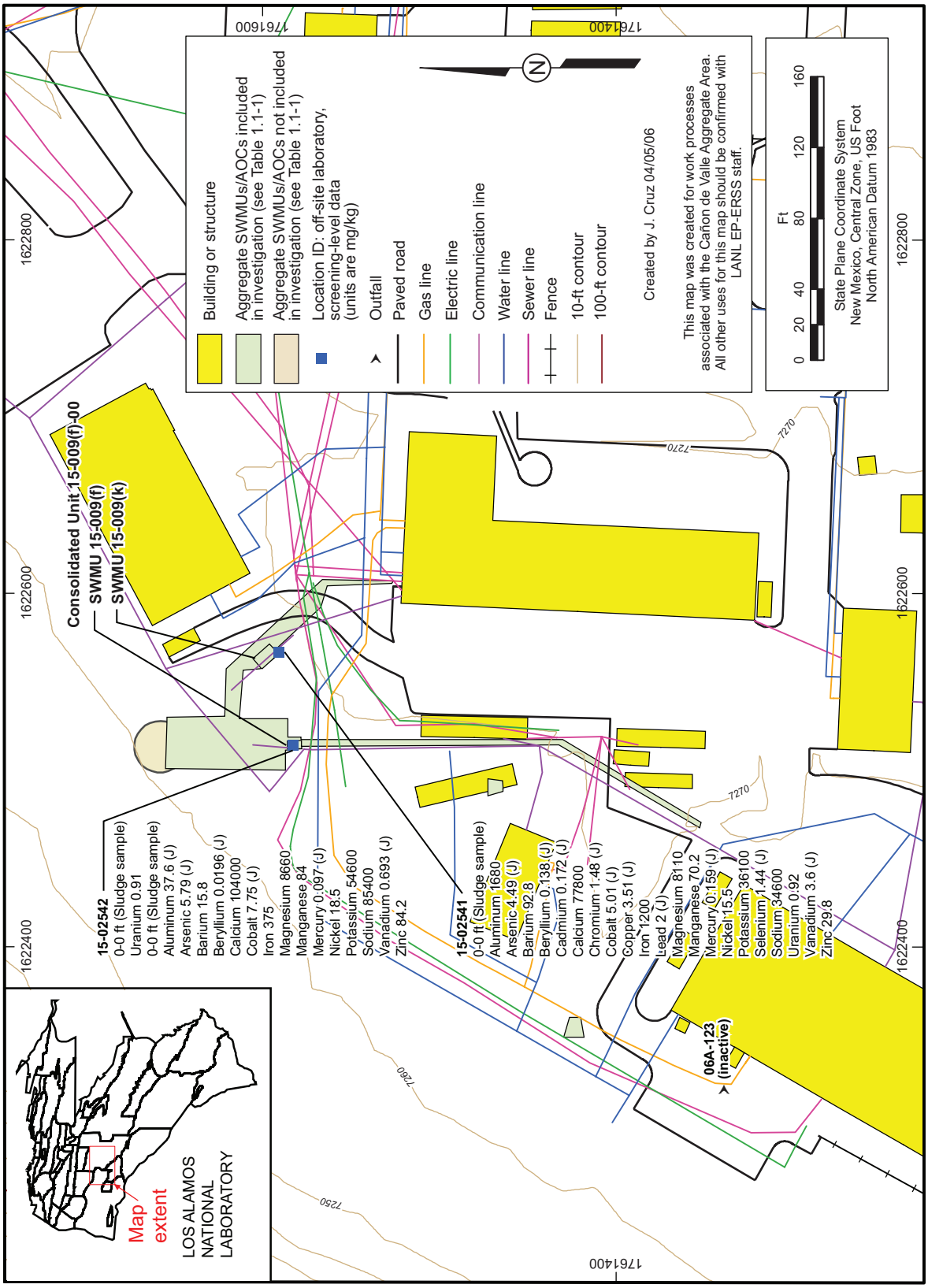


Figure 10.9-2. Subaggregate 9 (TA-15 West), Septic Systems, historical sampling locations with detected inorganic chemicals

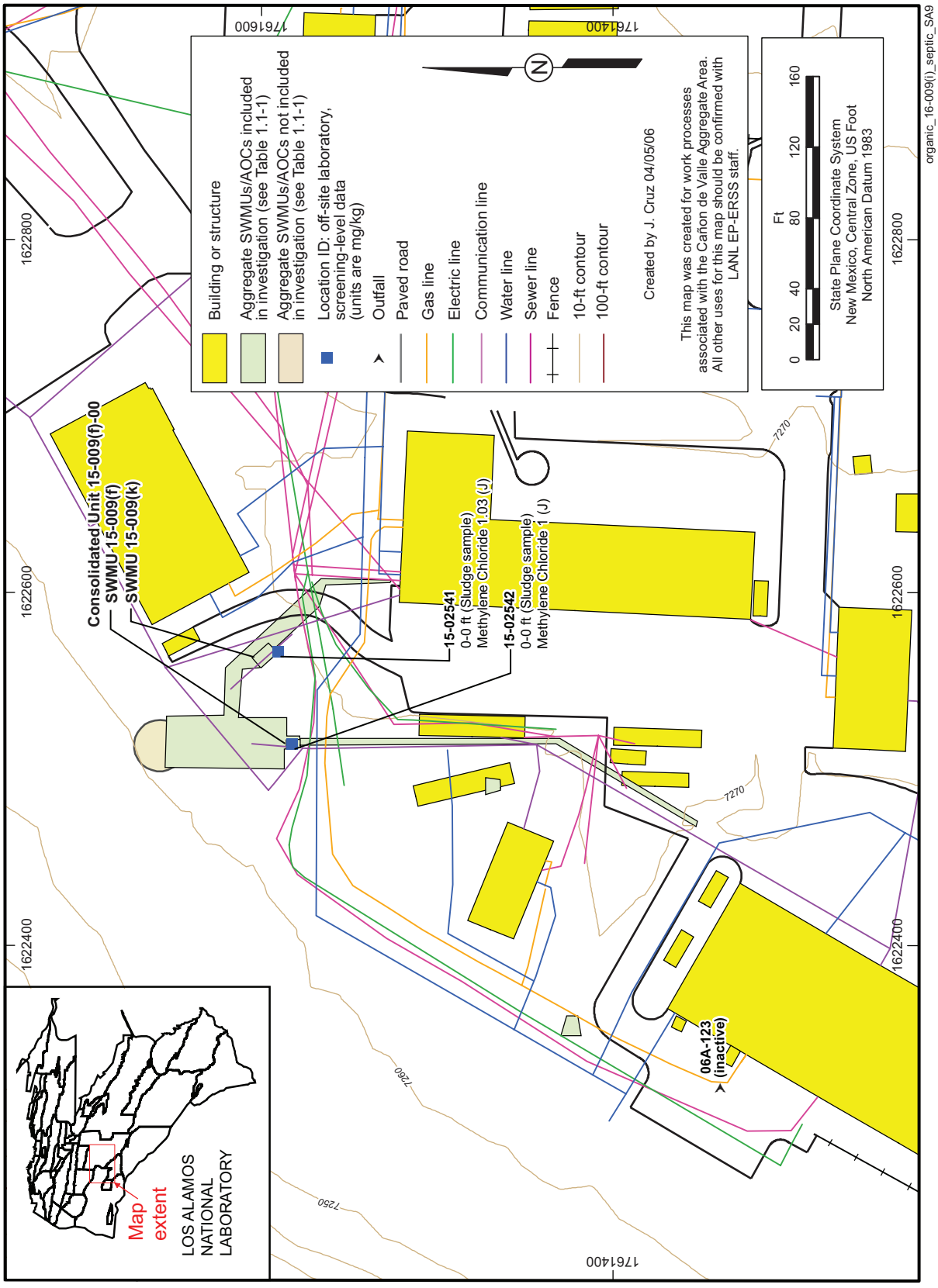


Figure 10.9-3. Subaggregate 9 (TA-15 West), Septic Systems, historical sampling locations with detected organic chemicals

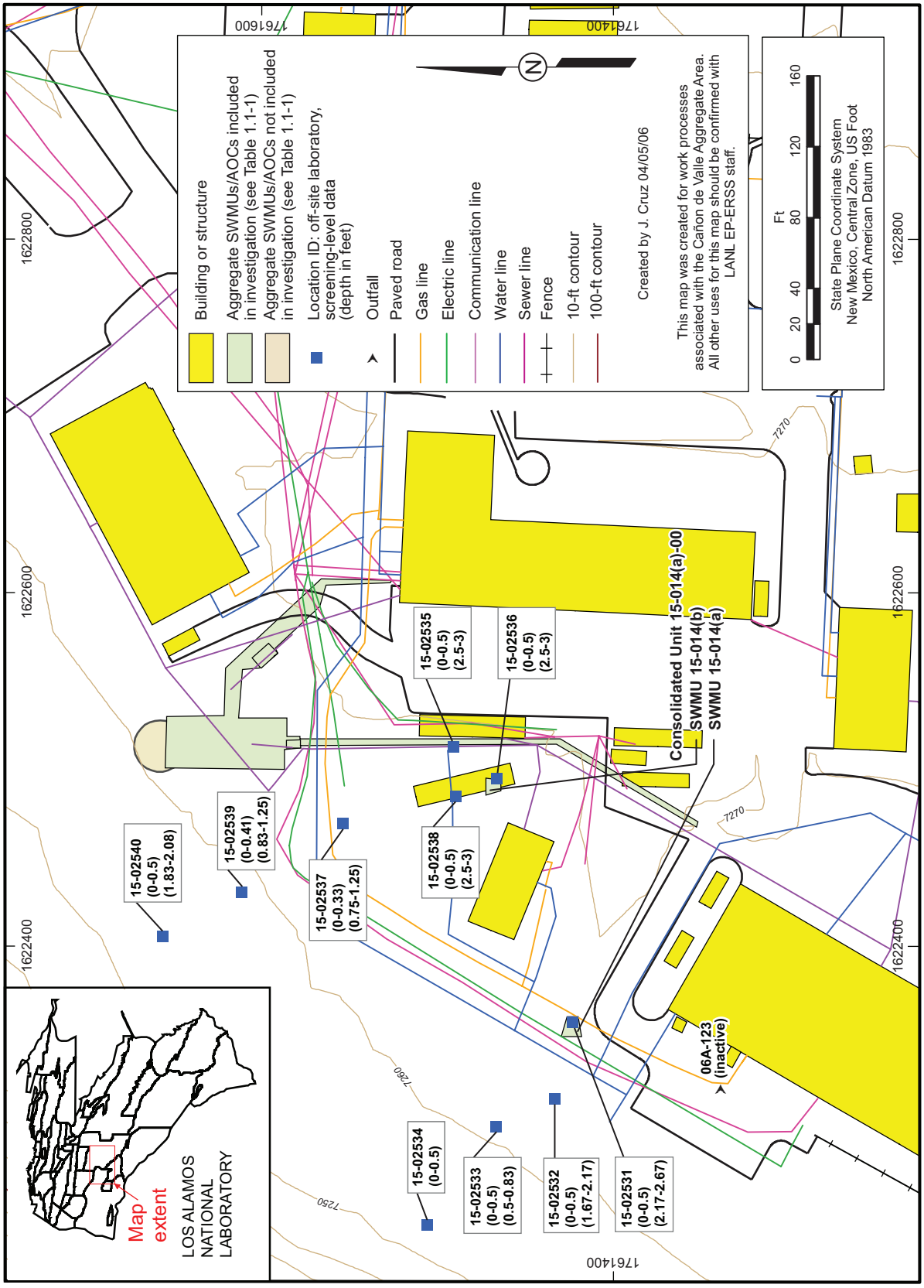


Figure 10.10-1. Subaggregate 9 (TA-15 West), Outfalls, historical sampling locations and depths

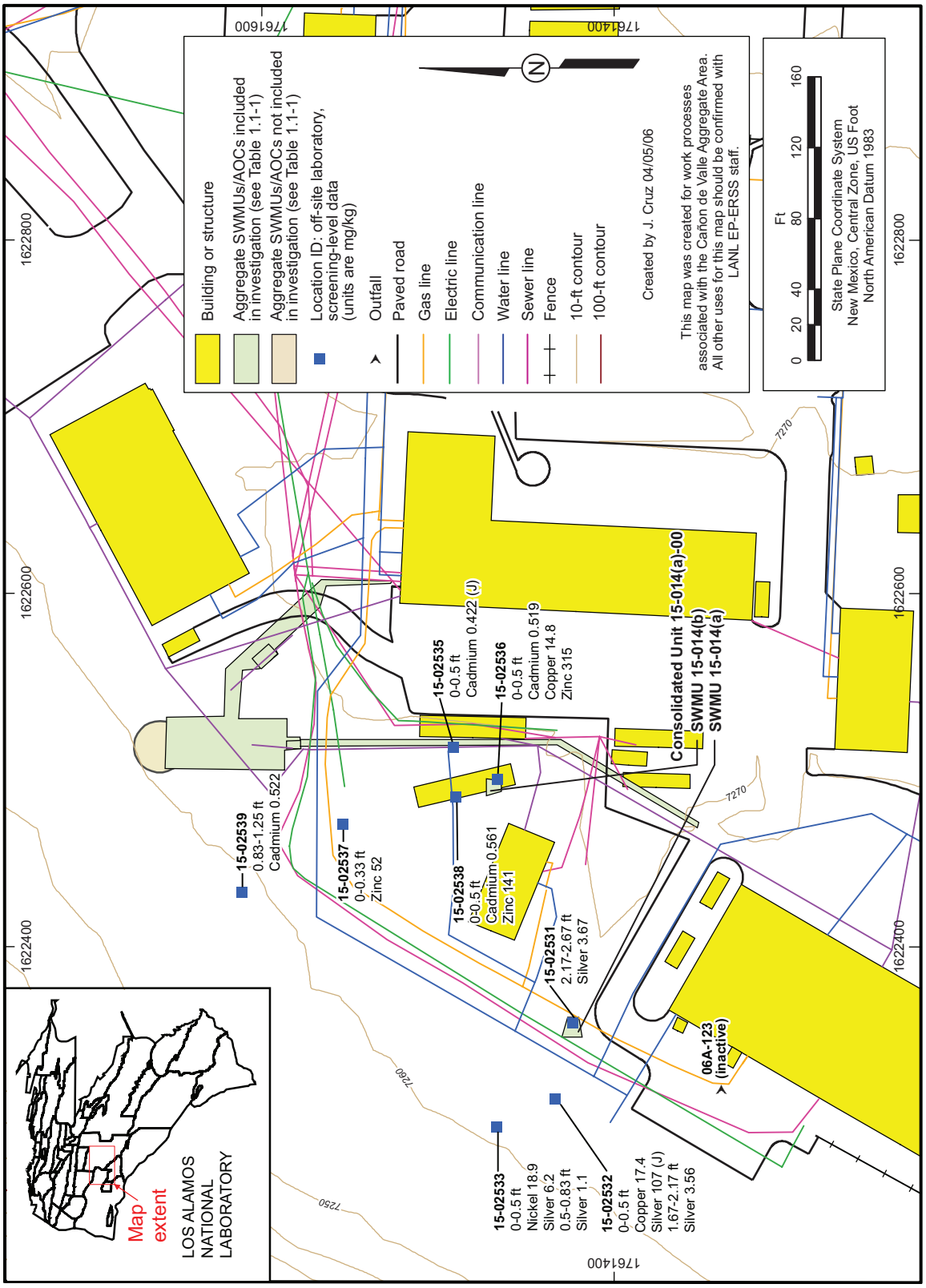


Figure 10.10-2. Subaggregate 9 (TA-15 West), Outfalls, historical sampling locations with inorganic chemicals detected greater than background values

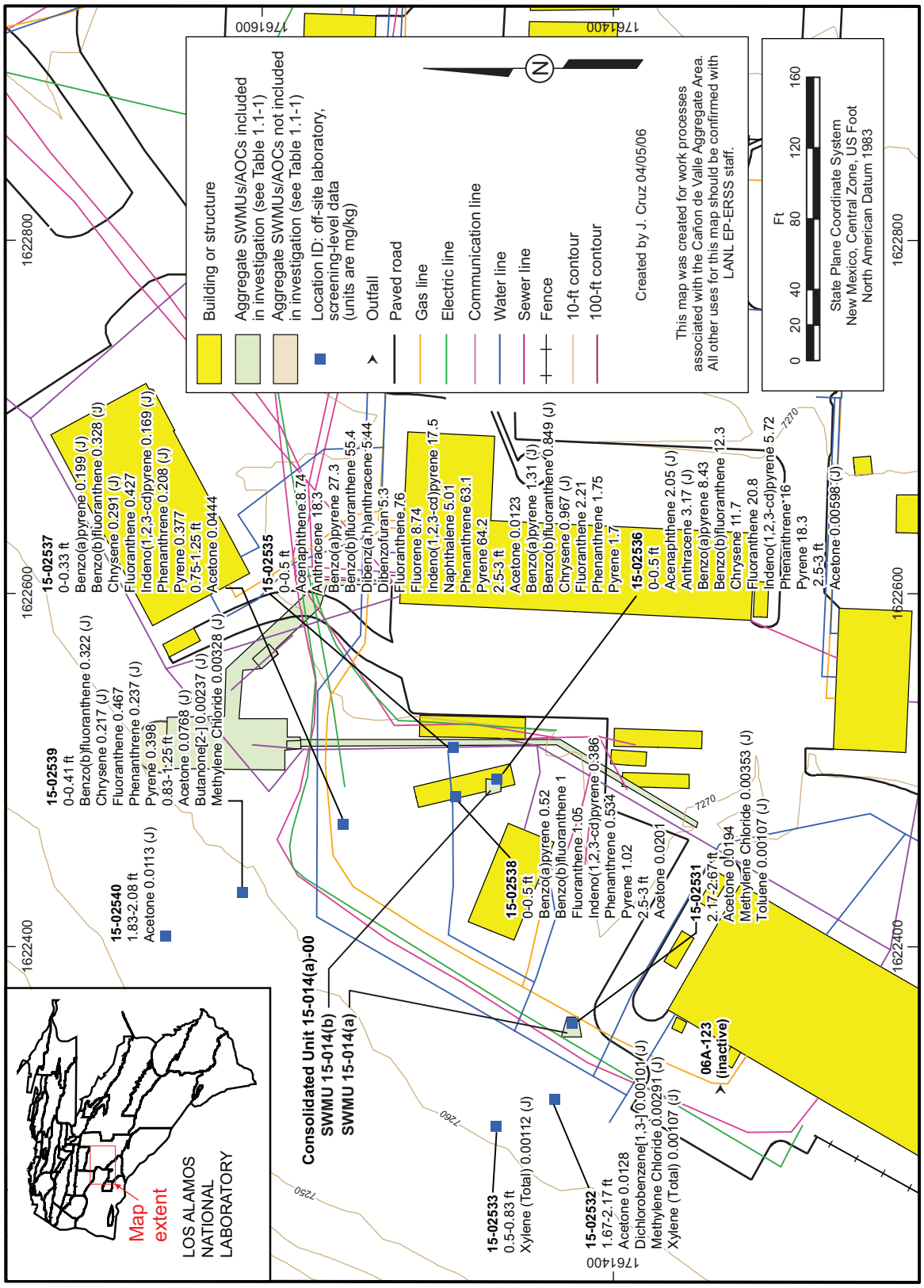


Figure 10.10-3. Subaggregate 9 (TA-15 West), Outfalls, historical sampling locations with detected organic chemicals

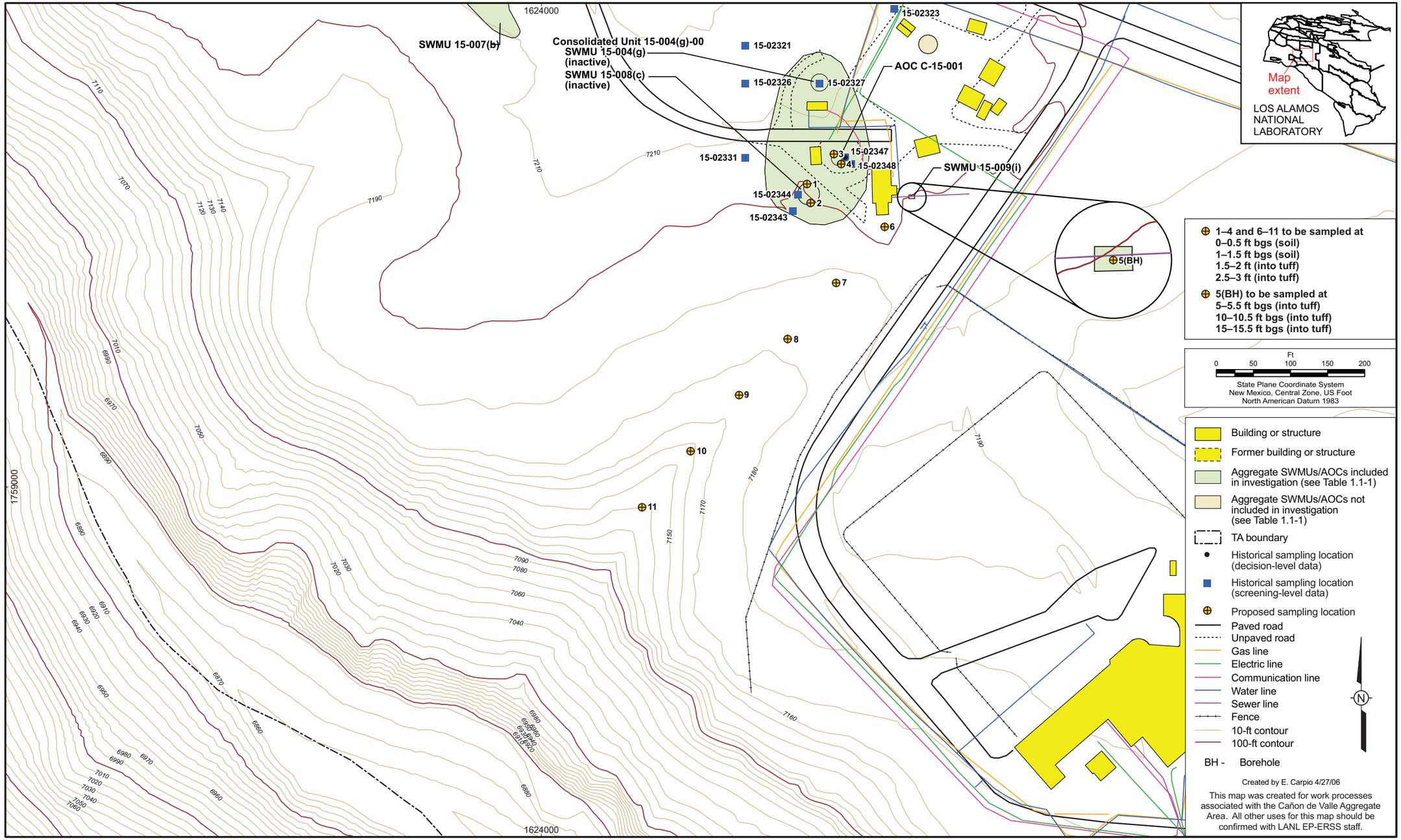


Figure 10.11-1. Subaggregate 9 (TA-15 West) proposed sampling locations and depths: Firing Site G Surface Disposal and Septic Tank

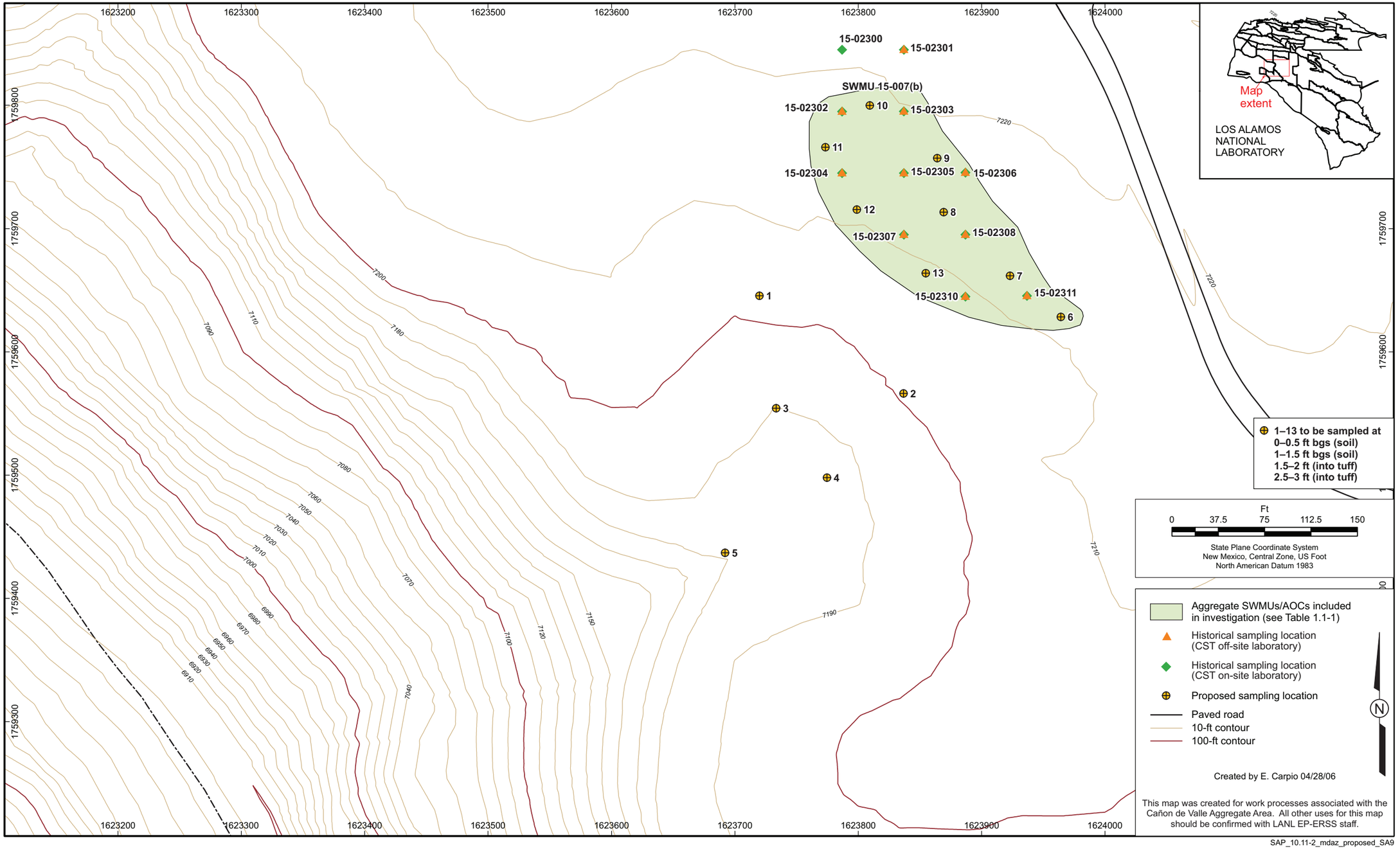


Figure 10.11-2. Subaggregate 9 (TA-15 West) proposed sampling locations and depths: MDA Z

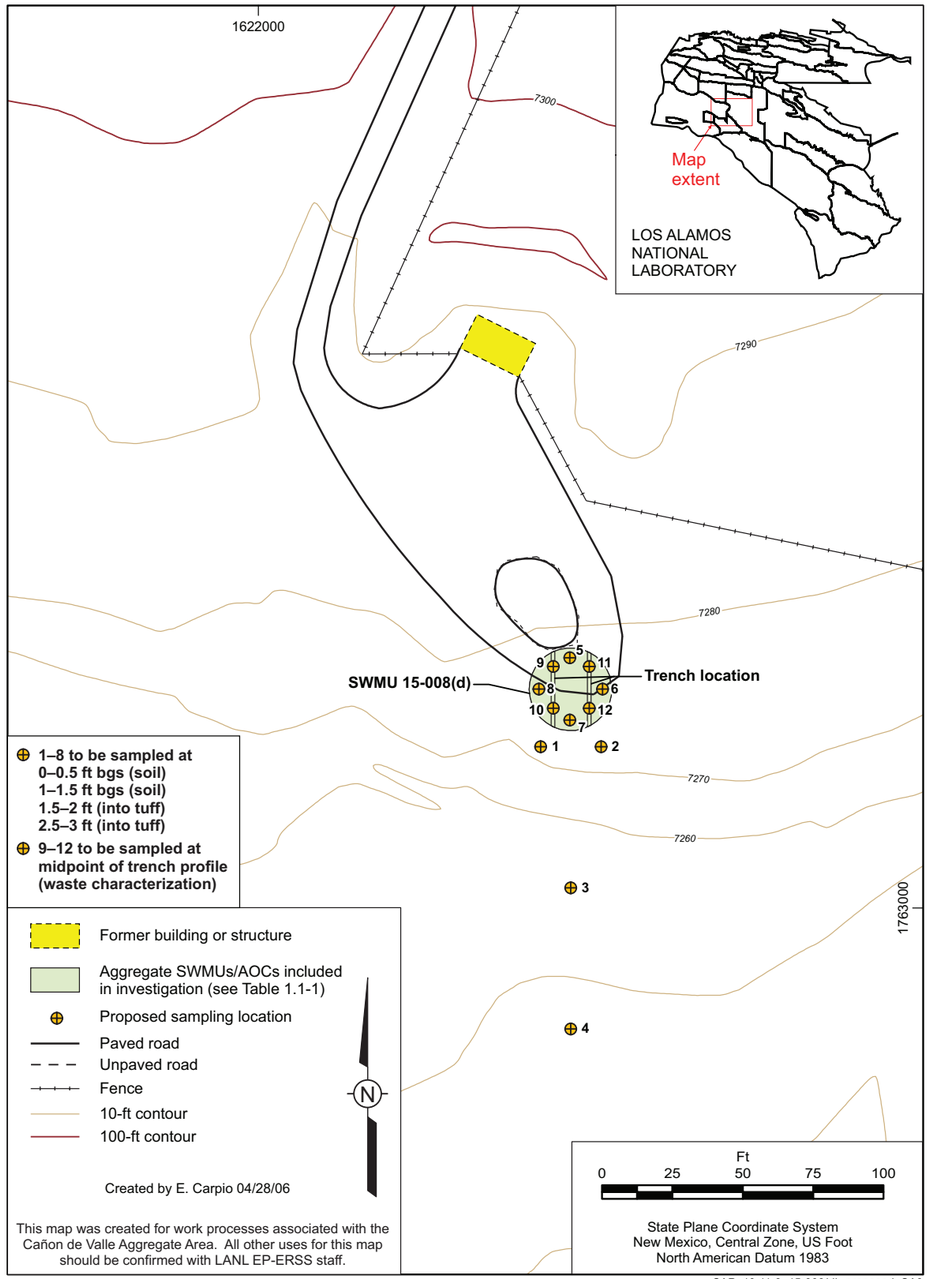


Figure 10.11-3. Subaggregate 9 (TA-15 West) proposed sampling locations and depths: SWMU 15-008(d)

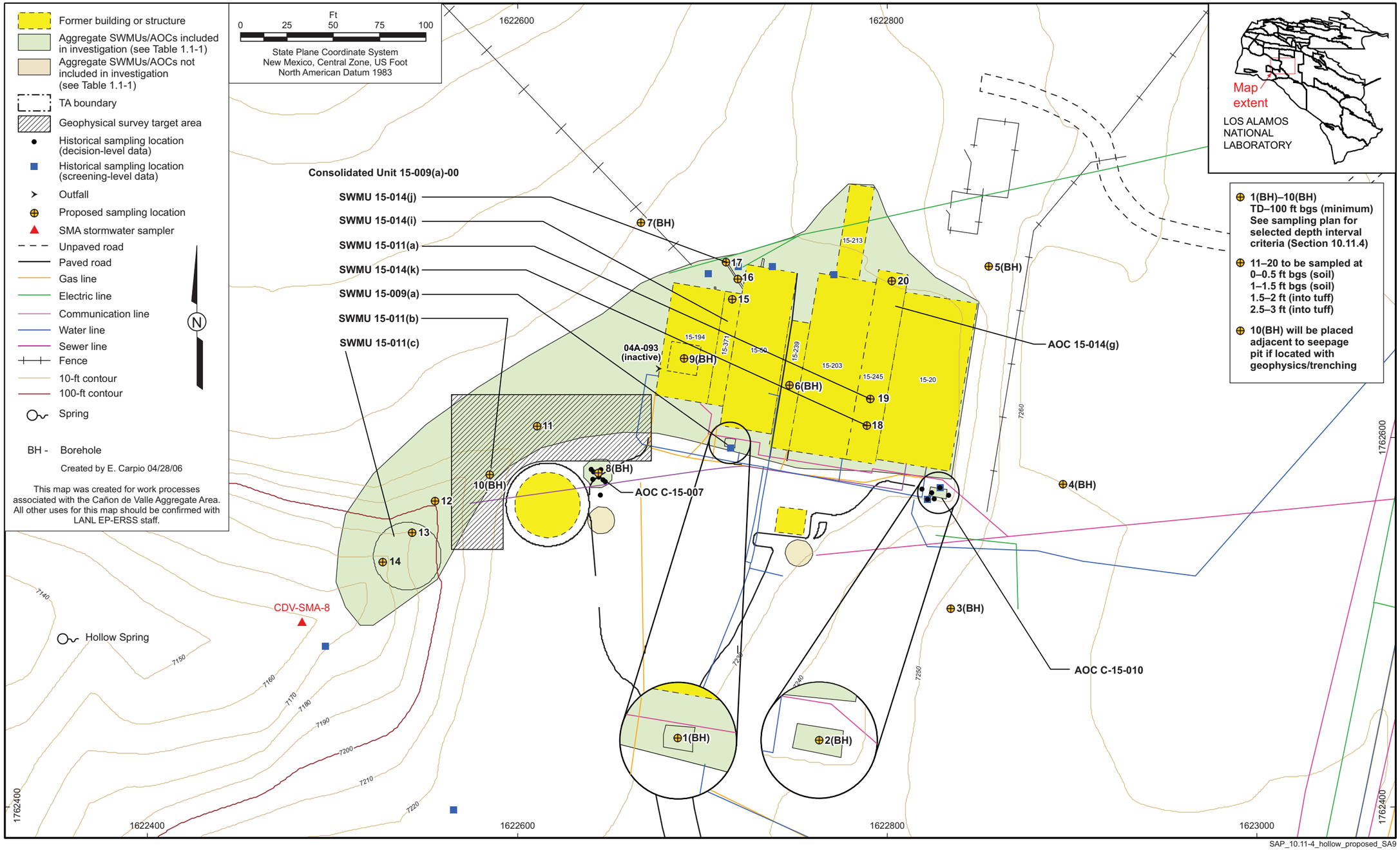


Figure 10.11-4. Subaggregate 9 (TA-15 West) proposed sampling locations and depths: the Hollow

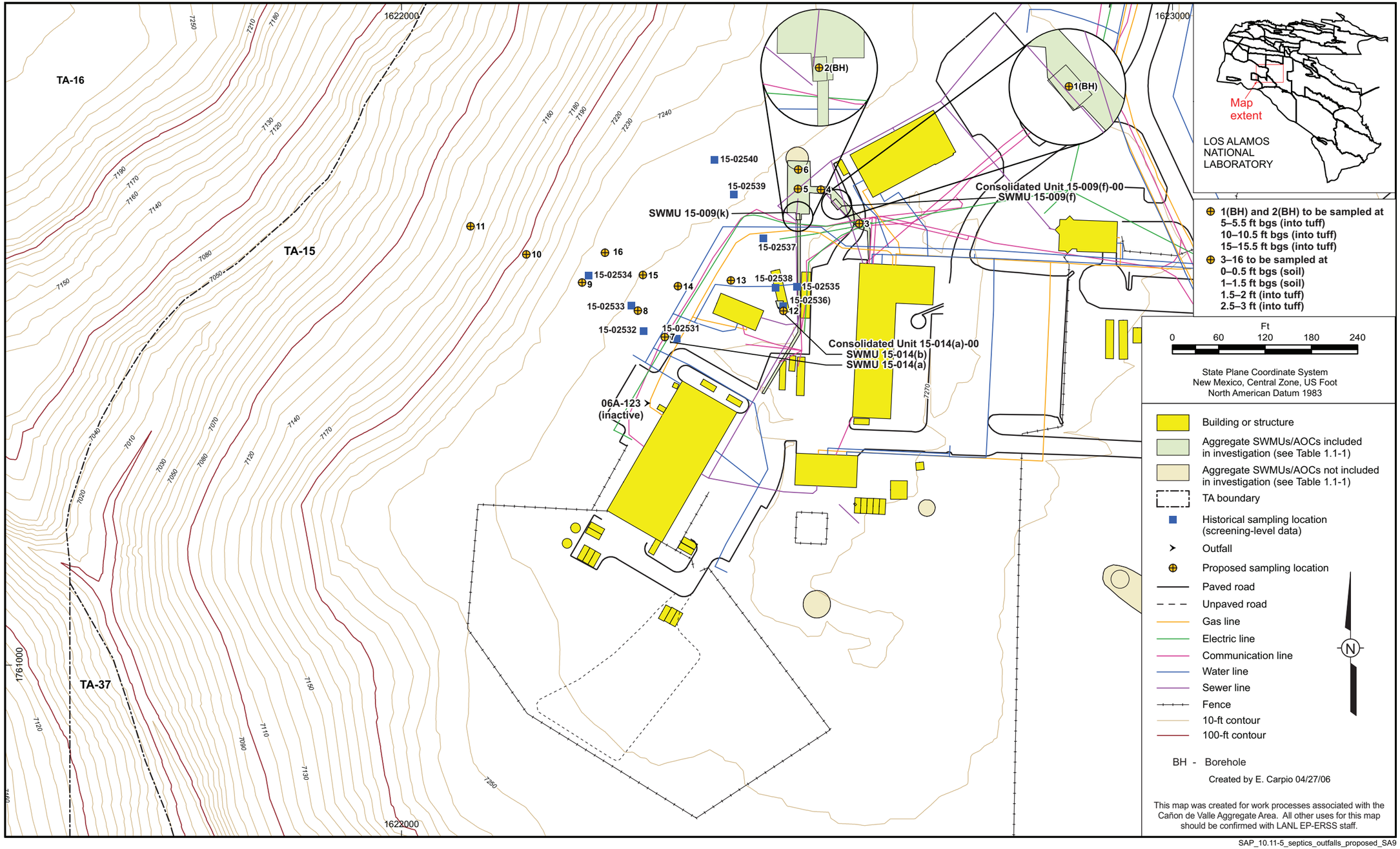


Figure 10.11-5. Subaggregate 9 (TA-15 West) proposed sampling locations and depths: Septic Systems and Outfalls

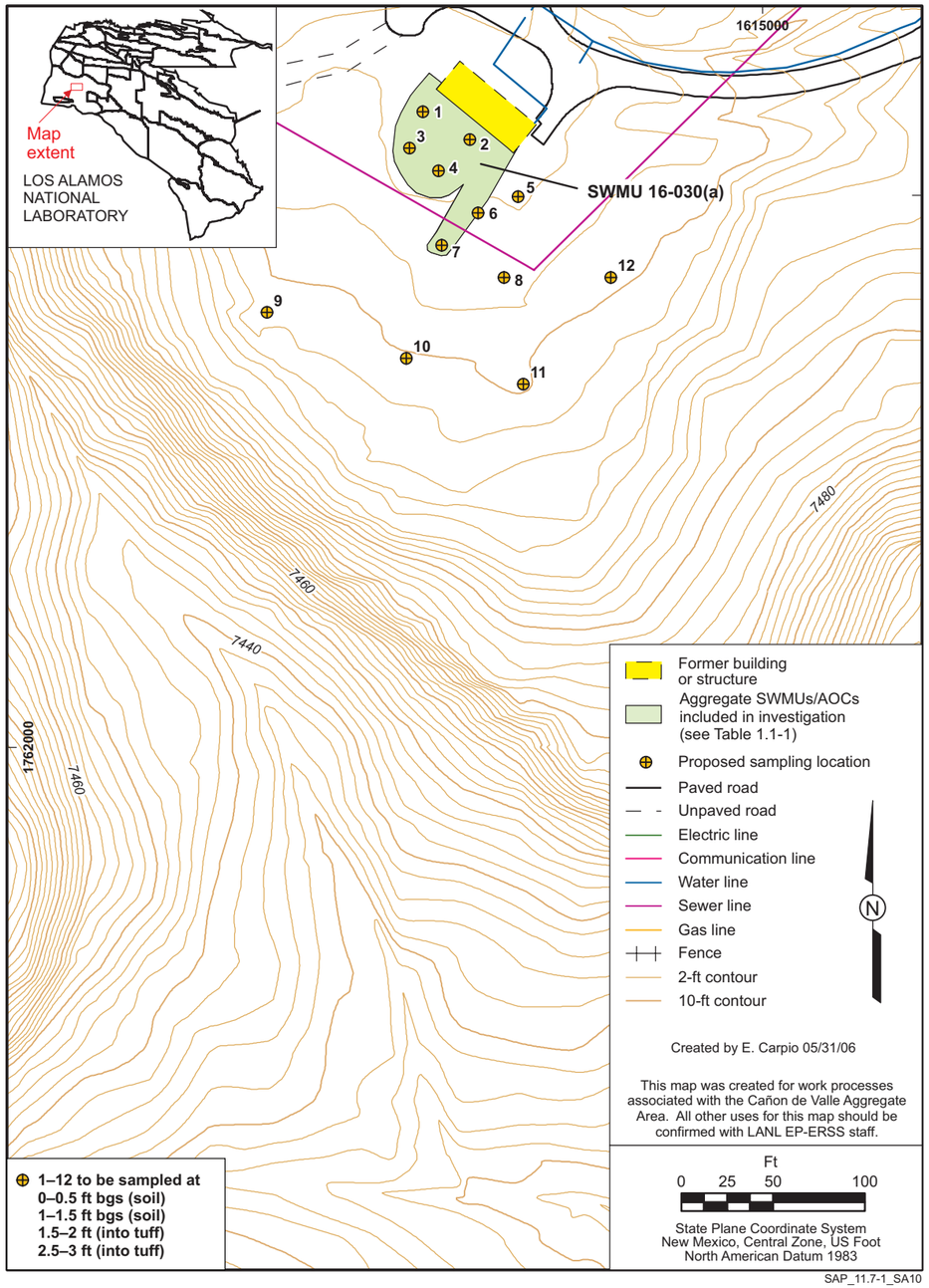


Figure 11.7-1. Subaggregate 10 (TA-16-340 Complex) proposed sampling locations and depths: SWMU 16-030(a)

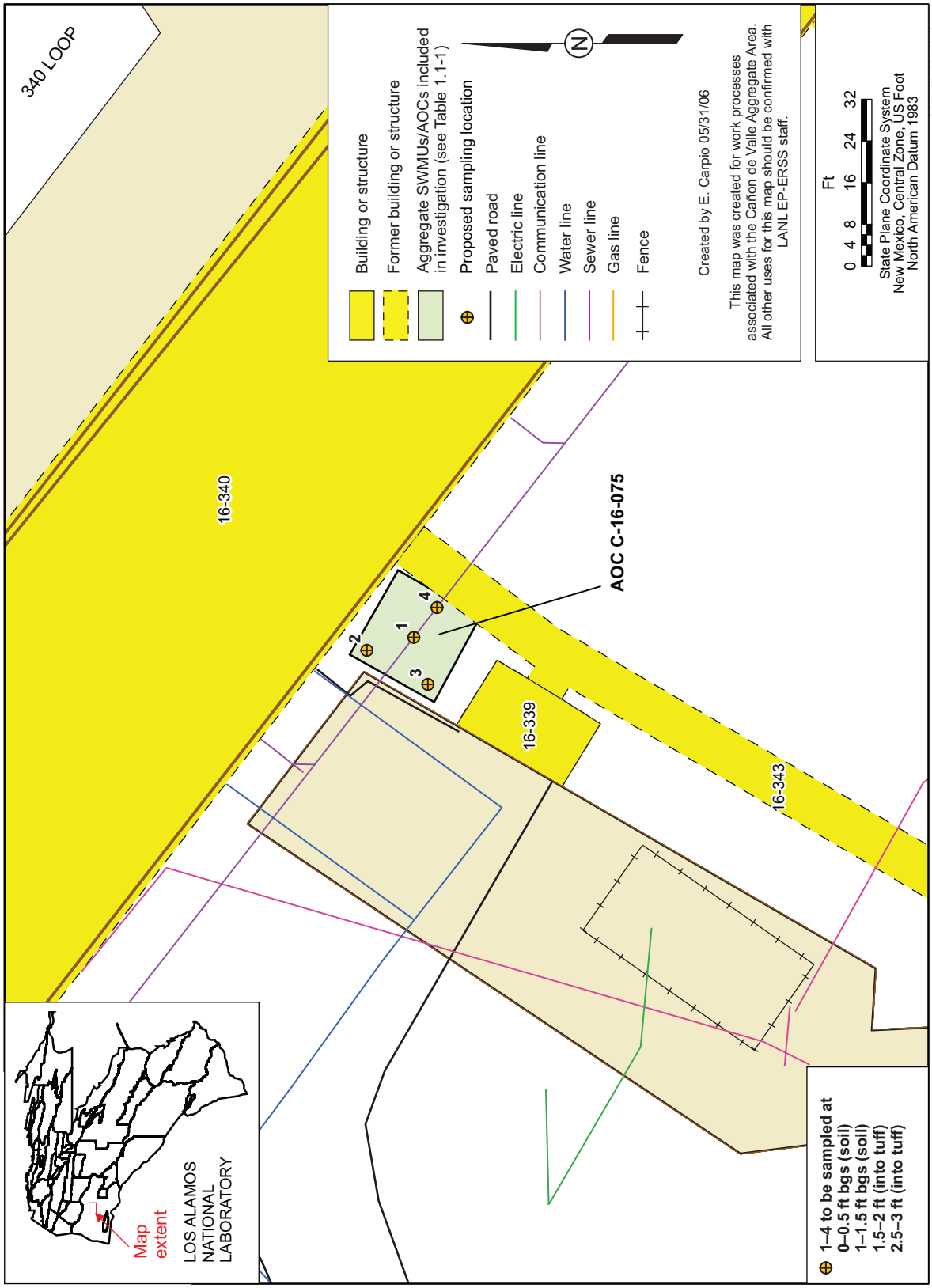


Figure 11.7-2. Subaggregate 10 (TA-16-340 Complex) proposed sampling locations and depths: AOC C-16-075

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Table 1.1-1
Cañon de Valle Aggregate Area List of Consolidated Units, SWMUs, and AOCs

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
AOC 14-001(a)		No	In Progress	Firing site (active)	Subaggregate 8
AOC 14-001(b)		No	In Progress	Firing site (active)	Subaggregate 8
AOC 14-001(c)		No	In Progress	Firing site (active)	Subaggregate 8
AOC 14-001(d)		No	In Progress	Firing site (active)	Subaggregate 8
AOC 14-001(e)		No	In Progress	Firing site (active)	Subaggregate 8
AOC 14-001(g)		No	In Progress	Firing site - open burn/open detonation (active)	Subaggregate 8
Consolidated Unit 14-002(a)-99	AOC 14-001(f)	No	In Progress	Former firing site	Subaggregate 8
	SWMU 14-002(a)	Yes	In Progress	Former firing site	Subaggregate 8
	SWMU 14-002(b)	Yes	In Progress	Former firing site	Subaggregate 8
	SWMU 14-002(f)	Yes	In Progress	Former firing site	Subaggregate 8
	SWMU 14-009	Yes	In Progress	Former firing site	Subaggregate 8
	SWMU 14-010	Yes	In Progress	Former firing site	Subaggregate 8
	AOC C-14-008	No	In Progress	Former firing site	Subaggregate 8
Consolidated Unit 14-002(c)-99	SWMU 14-002(c)	Yes	In Progress	Former firing site	Subaggregate 8
	SWMU 14-002(d)	Yes	In Progress	Former firing site	Subaggregate 8
	SWMU 14-002(e)	Yes	In Progress	Former firing site	Subaggregate 8
SWMU 14-003		Yes	Pending	Open burning ground	LANL 2001, 71096
AOC 14-004(a)		No	In Progress	Storage area (active)	Subaggregate 8
SWMU 14-004(b)		Yes	Removed from Module VIII, HWFP* 12/23/98	Satellite accumulation area	NMED 2001, 70010 (A.1, 5-2-01)
AOC 14-004(c)		No	NFA approved by EPA 1/21/05	Storage area	King 2005, 88464
SWMU 14-005		Yes	In Progress	Incinerator (active)	Subject to RCRA Closure not Consent Order (NMED 2005, 88027; Section III.W.1)
SWMU 14-006		Yes	In Progress	Tank and/or associated equipment	Subaggregate 8
SWMU 14-007		Yes	In Progress	Septic system	Subaggregate 8
AOC 14-008		No	NFA approved by EPA 1/21/05	Landfill and surface disposal	King 2005, 88464
AOC C-14-001		No	In Progress	Building	Subaggregate 8
AOC C-14-002		No	In Progress	Building	Subaggregate 8

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
AOC C-14-003		No	In Progress	Building	Subaggregate 8
AOC C-14-004		No	In Progress	Building	Subaggregate 8
AOC C-14-005		No	In Progress	Building	Subaggregate 8
AOC C-14-007		No	In Progress	Building	Subaggregate 8
AOC C-14-009		No	In Progress	Building	Subaggregate 8
Consolidated Unit 15-004(g)-00	SWMU 15-004(g)	Yes	In Progress	Firing site G (inactive)	Subaggregate 9
	SWMU 15-008(c)	Yes	In Progress	Firing site G (inactive)	Subaggregate 9
SWMU 15-004(i)		Yes	In Progress	The Gulch firing site (inactive)	Subaggregate 9
AOC 15-005(a)		No	NFA approved by EPA 1/21/05	Storage area	King 2005, 88464
AOC 15-005(d)		No	NFA approved by EPA 1/21/05	Storage area	King 2005, 88464
SWMU 15-007(b)		Yes	In Progress	Material disposal area (MDA Z) landfill	Subaggregate 9
SWMU 15-008(d)		Yes	In Progress	Surface disposal	Subaggregate 9
AOC 15-008(e)		No	NFA approved by EPA 1/21/05	Surface disposal	King 2005, 88464
Consolidated Unit 15-009(a)-00	SWMU 15-009(a)	Yes	In Progress	Former structures - the Hollow	Subaggregate 9
	SWMU 15-011(a)	Yes	In Progress	Former structures - the Hollow	Subaggregate 9
	SWMU 15-011(b)	Yes	In Progress	Former structures - the Hollow	Subaggregate 9
	SWMU 15-011(c)	Yes	In Progress	Former structures - the Hollow	Subaggregate 9
	SWMU 15-014(i)	Yes	In Progress	Former structures - the Hollow	Subaggregate 9
	SWMU 15-014(j)	Yes	In Progress	Former structures - the Hollow	Subaggregate 9
	SWMU 15-014(k)	Yes	In Progress	Former structures - the Hollow	Subaggregate 9
Consolidated Unit 15-009(f)-00	SWMU 15-009(f)	Yes	In Progress	Firing site and septic systems	Subaggregate 9
	SWMU 15-009(k)	Yes	In Progress	Firing site and septic systems	Subaggregate 9
SWMU 15-009(i)		Yes	In Progress	Septic tank	Subaggregate 9
SWMU 15-012(a)		Yes	Removed from Module VIII, HWFP 11/09/01	Surface disposal (not located) - does not exist	Young 2001, 70236 (A.1, 11-9-01)

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
Consolidated Unit 15-014(a)-00	SWMU 15-014(a)	Yes	In Progress	Outfalls	Subaggregate 9
	SWMU 15-014(b)	Yes	In Progress	Outfalls	Subaggregate 9
AOC 15-014(g)		No	In Progress	Industrial or sanitary wastewater treatment	Subaggregate 9
AOC C-15-001		No	In Progress	Surface disposal	Subaggregate 9
AOC C-15-002		No	NFA approved by EPA 1/21/05	Surface disposal	King 2005, 88464
AOC C-15-007		No	In Progress	Non-intentional release	Subaggregate 9
AOC C-15-008		No	NFA approved by EPA 1/21/05	Non-intentional release	King 2005, 88464
AOC C-15-010		No	In Progress	Former underground tank	Subaggregate 9
Consolidated Unit 16-001(a)-99	SWMU 16-001(a)	Yes	In Progress	Former steam plant	Subaggregate 4
	SWMU 16-001(b)	Yes	In Progress	Former steam plant	Subaggregate 4
	SWMU 16-001(c)	Yes	In Progress	Former steam plant	Subaggregate 4
Consolidated Unit 16-003(h)-99	SWMU 16-003(h)	Yes	In Progress	Inactive sump, drainline, and outfall	Subaggregate 7
	AOC 16-030(d)	No	In Progress	Inactive sump, drainline, and outfall	Subaggregate 7
SWMU 16-003(i)		Yes	In Progress	Sump 16-265	Subaggregate 7
SWMU 16-003(j)		Yes	In Progress	Sump 16-267	Subaggregate 7
Consolidated Unit 16-003(n)-99	SWMU 16-003(n)	Yes	In Progress	HE sump	TA-16-340 Complex (Fish Ladder) Investigation Work Plan (LANL 2004, 87345)
	SWMU 16-029(i)	Yes	In Progress	HE sump	
SWMU 16-003(o)		Yes	In Progress	Sump- fish ladder	
SWMU 16-005(b)		Yes	Removed from Module VIII, HWFP 05/02/01	Septic system (removed)	NMED 2001, 70010
SWMU 16-005(f)		Yes	Removed from Module VIII, HWFP 12/23/98	Decommissioned septic system	Kelley 1998, 63042
SWMU 16-005(n)		Yes	In Progress	Septic system	Subaggregate 6
SWMU 16-006(a)		Yes	In Progress	Septic system	Subaggregate 4
SWMU 16-006(b)		Yes	Removed from Module VIII, HWFP 12/23/98	Septic system	Kelley 1998, 63042 (A.1 12-23-98)

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
Consolidated Unit 16-007(a)-99	SWMU 16-007(a)	Yes	In Progress	Machining buildings and settling ponds	Ponds Investigation Work Plan (LANL, 2005, 89331) LA-UR-05-6234
	AOC 16-024(d)	No	In Progress	Machining buildings and settling ponds	
	SWMU 16-024(e)	Yes	In Progress	Machining buildings and settling ponds	
	SWMU 16-025(e)	Yes	In Progress	Machining buildings and settling ponds	
	SWMU 16-025(f)	Yes	In Progress	Machining buildings and settling ponds	
AOC 16-007(b)		No	NFA approved by EPA 1/21/05	Surface disposal site - does not exist	King 2005, 88464
Consolidated Unit 16-008(a)-99	SWMU 16-008(a)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	Ponds Investigation Work Plan (LANL, 2005, 89331) LA-UR-05-6234
	SWMU 16-017(a)-99	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-017(b)-99	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	Ponds Investigation Work Plan (LANL, 2005, 89331) LA-UR-05-6234
	SWMU 16-017(c)-99	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-017(d)-99	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-017(e)-99	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-026(m)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-026(n)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-026(o)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-026(p)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-029(k)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
Consolidated Unit 16-008(a)-99 (continued)	SWMU 16-029(l)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-029(s)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-029(t)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	SWMU 16-029(u)	Yes	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
	AOC C-16-067	No	In Progress	90s Line: 16-89, 16-90, 16-91, 16-92, 16-93	
AOC 16-008(b)		No	NFA approved by EPA 1/21/05	Surface impoundment at the TA-16 Burning Ground	King 2005, 88464
SWMU 16-009(a)		Yes	In Progress	Burn site	Subaggregate 4
SWMU 16-010(b)		Yes	In Progress	Flash pad; RCRA unit (undergoing closure)	Subject to RCRA Closure not Consent Order (NMED 2005, 88027; Section III.W.1)
SWMU 16-010(c)		Yes	In Progress	Burn site 16-388 - RCRA Unit (active)	
SWMU 16-010(d)		Yes	In Progress	Burn site 16-399 - RCRA unit (active)	
SWMU 16-010(e)		Yes	In Progress	HE filter vessel; RCRA unit (active)	
SWMU 16-010(f)		Yes	In Progress	HE filter vessel; RCRA unit (active)	
SWMU 16-010(g)		Yes	Removed from Module VIII, HWFP 12/23/98	Wastewater treatment facility	Kelley 1998, 63042 (A.1 12-23-98)
Consolidated Unit 16-010(h)-99	SWMU 16-005(g)	Yes	In Progress	Former burning ground structures	Subaggregate 3
	SWMU 16-010(h)	Yes	In Progress	Former burning ground structures	Subaggregate 3
	SWMU 16-010(i)	Yes	In Progress	Former burning ground structures	Subaggregate 3
	SWMU 16-010(j)	Yes	In Progress	Former burning ground structures (RCRA Closure Unit)	Subject to RCRA Closure not Consent Order (NMED 2005, 88027; Section III.W.1)

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
Consolidated Unit 16-010(h)-99 (continued)	SWMU 16-010(k)	Yes	In Progress	Former burning ground structures	Subaggregate 3
	SWMU 16-010(l)	Yes	In Progress	Former burning ground structures	Subaggregate 3
	SWMU 16-010(m)	Yes	In Progress	Former burning ground structures	Subaggregate 3
	SWMU 16-010(n)	Yes	In Progress	Former burning ground structures	Subaggregate 3
SWMU 16-012(a)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage, rest house	Kelley 1998, 63042 (A.1 12-23-98)
AOC 16-012(a2)		No	NFA approved by EPA 1/21/05	Container storage	King 2005, 88464
SWMU 16-012(b)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	Kelley 1998, 63042 (A.1 12-23-98)
SWMU 16-012(c)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-012(d)		Yes	Removed from Module VIII, HWFP 12/23/98	Satellite accumulation area	
SWMU 16-012(e)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-012(f)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-012(g)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-012(h)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-012(n)		Yes	Removed from Module VIII, HWFP 12/23/98	Satellite accumulation area	
SWMU 16-012(o)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-012(p)		Yes	Removed from Module VIII, HWFP 12/23/98	Less-than-ninety-day storage	

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
SWMU 16-012(q)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-012(r)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-012(z)		Yes	Removed from Module VIII, HWFP 12/23/98	Container storage - rest house	
SWMU 16-016(b)		Yes	In Progress	Landfill	Subaggregate 4
Consolidated Unit 16-016(c)-99	SWMU 16-006(e)	Yes	In Progress	Burning ground	MDA P Closure (LANL 2005, 92251; LANL 2005, 91141)
	SWMU 16-010(a)	Yes	In Progress	Burning ground	
	SWMU 16-016(c)	Yes	In Progress	Burning ground	
SWMU 16-016(d)		Yes	In Progress	Surface disposal site	Subaggregate 1
SWMU 16-017(g)-99		Yes	In Progress	Former HE structure	Subaggregate 6
Consolidated Unit 16-017(i)-99	SWMU C-16-025	Yes	In Progress	Storage building	Subaggregate 4
	SWMU C-16-026	Yes	In Progress	Storage building	
	SWMU 16-017(i)	No	In Progress	Storage building	
SWMU 16-018		Yes	In Progress	Material disposal area (MDA P); RCRA unit (currently undergoing RCRA closure)	MDA P Closure (LANL 2005, 92251; LANL 2005, 91141)
SWMU 16-019		Yes	In Progress	Material disposal area (MDA R)	Subaggregate 2
SWMU 16-020		Yes	In Progress	Silver recovery unit	Subaggregate 1
Consolidated Unit 16-021(c)-99	SWMU 16-003(k)	Yes	In Progress	16-260 Sumps, drainlines, and outfall	CMS (260 Outfall) (LANL 2003, 85531)
	SWMU 16-021(c)	Yes	In Progress	16-260 Sumps, drainlines, and outfall	
AOC 16-023(a)		No	NFA approved by EPA 1/21/05	Incinerator - does not exist	King 2005, 88464
AOC 16-024(b)		No	In Progress	Magazine	Subaggregate 6
AOC 16-024(c)		No	In Progress	Magazine	Subaggregate 6
AOC 16-024(f)		No	In Progress	Magazine	Subaggregate 5
AOC 16-024(g)		No	In Progress	Magazine	Subaggregate 5
AOC 16-024(h)		No	In Progress	Magazine	Subaggregate 5
AOC 16-024(v)		No	In Progress	Magazine	NMED 2006, 91832

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
SWMU 16-025(a)		Yes	In Progress	Abandoned radiography building, 16-39	Subaggregate 6
SWMU 16-025(b)		Yes	In Progress	Abandoned radiography building, 16-40	Subaggregate 6
SWMU 16-025(c)		Yes	Removed from Module VIII, HWFP 12/23/98	Abandoned utility building and appurtenances	Kelley 1998, 63042
SWMU 16-025(e2)		Yes	Pending	Abandoned building, 16-106	LANL 2001, 71096
SWMU 16-025(f2)		Yes	Pending	Abandoned building, 16-107	LANL 2001, 71096
SWMU 16-026(g)		Yes	In Progress	Outfall	Subaggregate 7
SWMU 16-026(g2)		Yes	Pending	Outfall from 16-285	LANL 2005, 91544
SWMU 16-026(h)		Yes	Pending	Outfall from 16-281	LANL 2005, 91544
SWMU 16-026(i)		Yes	In Progress	Outfall	Subaggregate 1
SWMU 16-026(i2)		Yes	Removed from Module VIII, HWFP 12/23/98	Outfall	Kelley 1998, 63042
SWMU 16-026(j)		Yes	In Progress	Outfall, 16-226	Subaggregate 1
SWMU 16-026(j2)		Yes	In Progress	Outfall	TA-16-340 Complex (Fish Ladder) Investigation Work Plan (LANL 2004, 87345.2)
SWMU 16-026(k)		Yes	Pending	Outfall and associated drainline	LANL 2005, 91544
Consolidated Unit 16-026(l)-00	SWMU 16-026(l)	Yes	In Progress	Drainlines and outfall	Subaggregate 1
	SWMU 16-028(c)	Yes	In Progress	Drainlines and outfall	Subaggregate 1
SWMU 16-026(r)		Yes	In Progress	Outfall, 16-180	NMED 2006, 91832
AOC 16-027(a)		No	In Progress	Transformer - PCB only site	Subaggregate 7
AOC 16-027(b)		No	In Progress	Transformer - PCB only site	Subaggregate 4
SWMU 16-028(a)		Yes	In Progress	South drainage channel	Subaggregate 3
SWMU 16-029(f)		Yes	In Progress	Sump from Building 16-345	TA-16-340 Complex (Fish Ladder) Investigation Work Plan (LANL 2004, 87345)

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
Consolidated Unit 16-029(h2)-99	SWMU 16-025(d)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-025(g)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-025(h)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-025(i)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-025(j)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-029(h2)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-029(m)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-029(n)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-029(o)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
	SWMU 16-029(p)	Yes	In Progress	HE machining line buildings and associated structures	Subaggregate 6
Consolidated Unit 16-029(j)-99	SWMU 16-026(k2)	Yes	In Progress	16-260 Bay 25 outfalls	Subaggregate 7
	SWMU 16-029(j)	Yes	In Progress	16-260 Bay 25 outfalls	Subaggregate 7
Consolidated Unit 16-029(q)-99	SWMU 16-017(f)-99	Yes	In Progress	HE machining building and associated structures	Subaggregate 6
	SWMU 16-017(u)-99	Yes	In Progress	Storage building 16-164	Subaggregate 6
	SWMU 16-029(q)	Yes	In Progress	HE machining building and associated structures	Subaggregate 6
	AOC C-16-064	No	In Progress	HE machining building and associated structures	Subaggregate 6

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
SWMU 16-030(a)		Yes	In Progress	Outfall from 16-344, chemical storage building	Subaggregate 10
SWMU 16-030(b)		Yes	Pending	Outfall and associated drainline	LANL 2005, 91544
SWMU 16-030(c)		Yes	Pending	16-222 outfall	LANL 2002, 73664
SWMU 16-030(e)		Yes	Pending	Outfall and associated drainline	LANL 2005, 91544
SWMU 16-030(f)		Yes	Pending	Outfall and associated drainline	LANL 2005, 91544
SWMU 16-031(b)		Yes	In Progress	Industrial or sanitary wastewater treatment, 16-262	Subaggregate 7
AOC 16-033(e)		No	In Progress	Underground tank	Subaggregate 4
AOC 16-033(f)		No	In Progress	Underground tank	Subaggregate 4
AOC 16-033(g)		No	In Progress	Underground tank	Subaggregate 7
AOC 16-033(h)		No	In Progress	Underground tank	Subaggregate 7
Consolidated Unit 16-034(b)-99	SWMU 16-005(j)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
	SWMU 16-005(m)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
	SWMU 16-025(m)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
	SWMU 16-025(n)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
	SWMU 16-025(o)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
	SWMU 16-034(b)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
Consolidated Unit 16-034(b)-99 (continued)	SWMU 16-034(c)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
	SWMU 16-034(d)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
	SWMU 16-034(e)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
	SWMU 16-034(f)	Yes	In Progress	Former structures, T-Site	Subaggregate 5
SWMU 16-034(h)		Yes	In Progress	Soil contamination area, 16-137	Subaggregate 4
SWMU 16-034(i)		Yes	In Progress	Soil contamination area	Subaggregate 4

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
SWMU 16-034(j)		Yes	In Progress	Soil contamination area	Subaggregate 4
SWMU 16-034(k)		Yes	In Progress	Soil contamination area	Subaggregate 4
AOC 16-037		No	In Progress	Aboveground tank - does not exist	Subaggregate 4
AOC C-16-001		No	In Progress	Building	Subaggregate 3
AOC C-16-002		No	In Progress	Building 16-262	Subaggregate 7
AOC C-16-003		No	NFA approved by EPA 1/21/05	Septic system - see SWMU 16-005(n)	King 2005, 88464
AOC C-16-008		No	In Progress	Building	Subaggregate 4
AOC C-16-009		No	In Progress	Building	Subaggregate 4
AOC C-16-010		No	In Progress	Building	Subaggregate 4
AOC C-16-011		No	In Progress	Building TA-16-132	Subaggregate 4
AOC C-16-012		No	In Progress	Building	Subaggregate 4
AOC C-16-013		No	In Progress	Storage area	Subaggregate 4
AOC C-16-014		No	In Progress	Building	Subaggregate 4
AOC C-16-015		No	In Progress	Building	Subaggregate 4
AOC C-16-016		No	In Progress	Building	Subaggregate 4
AOC C-16-017		No	In Progress	Building	Subaggregate 4
AOC C-16-018		No	In Progress	Aboveground tank	Subaggregate 4
AOC C-16-023		No	NFA approved by EPA 1/21/05	Warehouse	King 2005, 88464
AOC C-16-036		No	In Progress	Septic system	Subaggregate 4
AOC C-16-038		No	NFA approved by EPA 1/21/05	Storage area	King 2005, 88464
AOC C-16-041		No	In Progress	Building	Subaggregate 4
AOC C-16-042		No	NFA approved by EPA 1/21/05	Steam manhole	King 2005, 88464
AOC C-16-043		No	NFA approved by EPA 1/21/05	Steam manhole	King 2005, 88464
AOC C-16-044		No	In Progress	Manhole	Subaggregate 4
AOC C-16-051		No	In Progress	Transport area	Subaggregate 1
AOC C-16-052		No	NFA approved by EPA 1/21/05	Steam manhole	King 2005, 88464
AOC C-16-053		No	NFA approved by EPA 1/21/05	Water manhole	
AOC C-16-054		No	NFA approved by EPA 1/21/05	Steam manhole	
AOC C-16-055		No	NFA approved by EPA 1/21/05	Switch box	

Table 1.1-1 (continued)

Site Number	Subunit	Module VIII of the HWF Permit	Status	Description	Reference
AOC C-16-061		No	In Progress	Building	Subaggregate 3
AOC C-16-066		No	NFA approved by EPA 1/21/05	Storage area	King 2005, 88464
AOC C-16-070		No	In Progress	Underground tank	Subaggregate 3
AOC C-16-072		No	In Progress	Tank - does not exist	Subaggregate 4
AOC C-16-075		No	In Progress	Spill location near Building 16-340	Subaggregate 10

Site requires no further investigation or corrective action, as specified in cited reference; not included in Cañon de Valle Aggregate Area Investigation Work Plan/HIR.

Permitted RCRA unit, not included in the Cañon de Valle Aggregate Area Investigation Work Plan/HIR.

Deferred under Table IV-2 of the Consent Order; but included in Cañon de Valle Aggregate Area Investigation Work Plan/HIR.

SWMU or AOC included in Cañon de Valle Aggregate Area Investigation Work Plan/HIR.

SWMU or AOC included in another document/investigation; not included in Cañon de Valle Aggregate Area Investigation Work Plan/HIR.

NFA Approval Pending; not included in Cañon de Valle Aggregate Area Investigation Work Plan/HIR.

*HWFP = The Laboratory's Hazardous Waste Facility Permit.

Table 1.1-2
List of Consolidated Units, SWMUs, and AOCs and
Planned Activities in the Cañon de Valle Aggregate Area Investigation Work Plan

Site Number	Subunit	Description	Subaggregate	Planned SWMU or AOC Work Plan Activities
SWMU 16-016(d)		Surface disposal site	1	Investigation Sampling
SWMU 16-020		Silver recovery unit	1	Investigation Sampling
SWMU 16-026(i)		Outfall	1	Investigation Sampling
SWMU 16-026(j)		Outfall, 16-226	1	Investigation Sampling
Consolidated Unit 16-026(l)-00	SWMU 16-026(l)	Drainlines and outfall	1	Investigation Sampling
	SWMU 16-028(c)	Drainlines and outfall	1	Investigation Sampling
AOC C-16-051		Transport Area	1	Investigation Sampling
SWMU 16-019		Material disposal area (MDA R)	2	Investigation Sampling
Consolidated Unit 16-010(h)-99	SWMU 16-005(g)	Former burning ground structures	3	Removal Action/Confirmatory Sampling
	SWMU 16-010(h)	Former burning ground structures	3	
	SWMU 16-010(i)	Former burning ground structures	3	
	SWMU 16-010(k)	Former burning ground structures	3	
	SWMU 16-010(l)	Former burning ground structures	3	
	SWMU 16-010(m)	Former burning ground structures	3	
	SWMU 16-010(n)	Former burning ground structures	3	
SWMU 16-028(a)		South drainage channel	3	Investigation Sampling
AOC C-16-001		Building	3	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-061		Building	3	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-070		Underground Tank	3	Appendix B, No Further Investigation/ Corrective Action
Consolidated Unit 16-001(a)-99	SWMU 16-001(a)	Former steam plant	4	Investigation Sampling
	SWMU 16-001(b)	Former steam plant	4	Investigation Sampling
	SWMU 16-001(c)	Former steam plant	4	Investigation Sampling
SWMU 16-006(a)		Septic system	4	Investigation Sampling
SWMU 16-009(a)		Burn site	4	Investigation Sampling
SWMU 16-016(b)		Landfill	4	Appendix B, No Further Investigation/ Corrective Action
Consolidated Unit 16-017(i)-99	SWMU C-16-025	Storage building (16-8)	4	Investigation Sampling
	SWMU C-16-026	Storage building (16-6)	4	Investigation Sampling
	SWMU 16-017(i)	Storage building (16-10)	4	Investigation Sampling

Table 1.1-2 (continued)

Site Number	Subunit	Description	Subaggregate	Planned SWMU or AOC Work Plan Activities
AOC 16-027(b)		Transformer-PCB only site	4	Appendix B, No Further Investigation/ Corrective Action
AOC 16-033(e)		Underground tank	4	Investigation Sampling
AOC 16-033(f)		Underground tank	4	Investigation Sampling
SWMU 16-034(h)		Soil contamination area, 16-137	4	Investigation Sampling
SWMU 16-034(i)		Soil contamination area	4	Investigation Sampling
SWMU 16-034(j)		Soil contamination area	4	Investigation Sampling
SWMU 16-034(k)		Soil contamination area	4	Investigation Sampling
AOC 16-037		Aboveground Tank-does not exist	4	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-008		Building	4	Investigation Sampling
AOC C-16-009		Building	4	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-010		Building	4	Investigation Sampling
AOC C-16-011		Building TA-16-132	4	Investigation Sampling
AOC C-16-012		Building	4	Investigation Sampling
AOC C-16-013		Storage Area	4	Investigation Sampling
AOC C-16-014		Building	4	Investigation Sampling
AOC C-16-015		Building	4	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-016		Building	4	Investigation Sampling
AOC C-16-017		Building	4	Investigation Sampling
AOC C-16-018		Aboveground Tank	4	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-036		Septic system	4	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-041		Building	4	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-044		Manhole	4	Appendix B, No Further Investigation/ Corrective Action
AOC C-16-072		Storage Tank	4	Appendix B, No Further Investigation/ Corrective Action

Table 1.1-2 (continued)

Site Number	Subunit	Description	Subaggregate	Planned SWMU or AOC Work Plan Activities
AOC 16-024(f)		Magazine	5	Appendix B, No Further Investigation/ Corrective Action
AOC 16-024(g)		Magazine	5	Appendix B, No Further Investigation/ Corrective Action
AOC 16-024(h)		Magazine	5	Appendix B, No Further Investigation/ Corrective Action
Consolidated Unit 16-034(b)-99	SWMU 16-005(j)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-005(m)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-025(m)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-025(n)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-025(o)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-034(b)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-034(c)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-034(d)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-034(e)	Former structures, T-Site	5	Investigation Sampling
	SWMU 16-034(f)	Former structures, T-Site	5	Investigation Sampling
SWMU 16-005(n)		Septic system	6	Investigation Sampling
SWMU 16-017(g)-99		Former HE structure	6	Investigation Sampling
AOC 16-024(b)		Magazine	6	Investigation Sampling
AOC 16-024(c)		Magazine	6	Appendix B, No Further Investigation/ Corrective Action
SWMU 16-025(a)		Abandoned radiography building, 16-39	6	Investigation Sampling
SWMU 16-025(b)		Abandoned radiography building, 16-40	6	Investigation Sampling
Consolidated Unit 16-029(h2)-99	SWMU 16-025(d)	HE machining line buildings and associated structures	6	Investigation Sampling
	SWMU 16-025(g)	HE machining line buildings and associated structures	6	Investigation Sampling
	SWMU 16-025(h)	HE machining line buildings and associated structures	6	Investigation Sampling
	SWMU 16-025(i)	HE machining line buildings and associated structures	6	Investigation Sampling
	SWMU 16-025(j)	HE machining line buildings and associated structures	6	Investigation Sampling
	SWMU 16-029(h2)	HE machining line buildings and associated structures	6	Investigation Sampling

Table 1.1-2 (continued)

Site Number	Subunit	Description	Subaggregate	Planned SWMU or AOC Work Plan Activities
Consolidated Unit 16-029(h2)-99 (continued)	SWMU 16-029(m)	HE machining line buildings and associated structures	6	Investigation Sampling
	SWMU 16-029(n)	HE machining line buildings and associated structures	6	Investigation Sampling
	SWMU 16-029(o)	HE machining line buildings and associated structures	6	Investigation Sampling
	SWMU 16-029(p)	HE machining line buildings and associated structures	6	Investigation Sampling
Consolidated Unit 16-029(q)-99	SWMU 16-017(f)-99	HE machining building and associated structures	6	Investigation Sampling
	SWMU 16-017(u)-99	Storage Building 16-164	6	Investigation Sampling
	SWMU 16-029(q)	HE machining building and associated structures	6	Investigation Sampling
	AOC C-16-064	HE machining building and associated structures	6	Investigation Sampling
Consolidated Unit 16-003(h)-99	SWMU 16-003(h)	Inactive sump, drainline, and outfall	7	Investigation Sampling
	AOC 16-030(d)	Inactive sump, drainline, and outfall	7	Investigation Sampling
SWMU 16-003(i)		Sump 16-265	7	Investigation Sampling
SWMU 16-003(j)		Sump 16-267	7	Investigation Sampling
SWMU 16-026(g)		Outfall	7	Investigation Sampling
AOC 16-027(a)		Transformer - PCB only site	7	Appendix B, No Further Investigation/ Corrective Action
Consolidated Unit 16-029(j)-99	SWMU 16-026(k2)	16-260 Bay 25 outfalls	7	Investigation Sampling
	SWMU 16-029(j)	16-260 Bay 25 outfalls	7	Investigation Sampling
SWMU 16-031(b)		Industrial or sanitary wastewater treatment, 16-262	7	Investigation Sampling
AOC 16-033(g)		Underground tank	7	Investigation Sampling
AOC 16-033(h)		Underground tank	7	Investigation Sampling
AOC C-16-002		Building 16-262	7	Investigation Sampling
AOC 14-001(a)		Firing Site *(Electrical Pull Box)*	8	Appendix B, No Further Investigation/ Corrective Action
AOC 14-001(b)		Firing Site *(Electrical Pull Box)*	8	Appendix B, No Further Investigation/ Corrective Action
AOC 14-001(c)		Firing Site *(Electrical Pull Box)*	8	Appendix B, No Further Investigation/ Corrective Action

Table 1.1-2 (continued)

Site Number	Subunit	Description	Subaggregate	Planned SWMU or AOC Work Plan Activities
AOC 14-001(d)		Firing Site *(Electrical Pull Box)*	8	Appendix B, No Further Investigation/ Corrective Action
AOC 14-001(e)		Firing Site *(Electrical Pull Box)*	8	Appendix B, No Further Investigation/ Corrective Action
AOC 14-001(g)		Firing site - Open Burn/Open Detonation (active)	8	Corrective Action/Confirmatory Sampling Execution deferred pending cease in operational testing
Consolidated Unit 14-002(a)-99	AOC 14-001(f)	Former firing site	8	Deferred under Table IV-2 of Consent Order
	SWMU 14-002(a)	Former firing site	8	Deferred under Table IV-2 of Consent Order
	SWMU 14-002(b)	Former firing site	8	Deferred under Table IV-2 of Consent Order
	SWMU 14-002(f)	Former firing site	8	Investigation Sampling
	SWMU 14-009	Former firing site	8	Corrective Action/Confirmatory Sampling
	SWMU 14-010	Former firing site	8	Investigation Sampling
	AOC C-14-008	Former firing site	8	Appendix B, No Further Investigation/ Corrective Action
Consolidated Unit 14-002(c)-99	SWMU 14-002(c)	Former firing site	8	Investigation Sampling
	SWMU 14-002(d)	Former firing site	8	Deferred under Table IV-2 of Consent Order
	SWMU 14-002(e)	Former firing site	8	Deferred under Table IV-2 of Consent Order
AOC 14-004(a)		Storage area *(magazine to satellite storage)*	8	Investigation Sampling
SWMU 14-006		Tank and/or associated equipment	8	Corrective Action/Confirmatory Sampling
SWMU 14-007		Septic system	8	Corrective Action/Confirmatory Sampling
AOC C-14-001		Building	8	Appendix B, No Further Investigation/ Corrective Action
AOC C-14-002		Building *(could not be located)*	8	Appendix B, No Further Investigation/ Corrective Action
AOC C-14-003		Building	8	Investigation Sampling

Table 1.1-2 (continued)

Site Number	Subunit	Description	Subaggregate	Planned SWMU or AOC Work Plan Activities
AOC C-14-004		Building	8	Investigation Sampling
AOC C-14-005		Building	8	Investigation Sampling
AOC C-14-007		Building	8	Investigation Sampling
AOC C-14-009		Building	8	Appendix B, No Further Investigation/ Corrective Action
Consolidated Unit 15-004(g)-00	SWMU 15-004(g)	Firing site G (inactive)	9	Deferred under Table IV-2 of Consent Order
	SWMU 15-008(c)	Firing site G (inactive)	9	Investigation Sampling
SWMU 15-004(i)		Gulch Firing Site (inactive)	9	Appendix B, No Further Investigation/ Corrective Action
SWMU 15-007(b)		Material disposal area (MDA Z) landfill	9	Corrective Action/Confirmatory Sampling
SWMU 15-008(d)		Surface disposal	9	Corrective Action/Confirmatory Sampling
Consolidated Unit 15-009(a)-00	SWMU 15-009(a)	Former structures - the Hollow	9	Corrective Action/Confirmatory Sampling
	SWMU 15-011(a)	Former structures - the Hollow	9	Investigation Sampling
	SWMU 15-011(b)	Former structures - the Hollow	9	Investigation Sampling
	SWMU 15-011(c)	Former structures - the Hollow	9	Investigation Sampling
	SWMU 15-014(i)	Former structures - the Hollow	9	Investigation Sampling
	SWMU 15-014(j)	Former structures - the Hollow	9	Investigation Sampling
	SWMU 15-014(k)	Former structures - the Hollow	9	Investigation Sampling
Consolidated Unit 15-009(f)-00	SWMU 15-009(f)	Firing site and septic systems	9	Corrective Action/Confirmatory Sampling
	SWMU 15-009(k)	Firing site and septic systems	9	Corrective Action/Confirmatory Sampling
SWMU 15-009(i)		Septic tank	9	Corrective Action/Confirmatory Sampling
Consolidated Unit 15-014(a)-00	SWMU 15-014(a)	Outfalls	9	Investigation Sampling
	SWMU 15-014(b)	Outfalls	9	Investigation Sampling
AOC 15-014(g)		Industrial or sanitary wastewater treatment	9	Investigation Sampling
AOC C-15-001		Surface disposal	9	Investigation Sampling
AOC C-15-007		Nonintentional release	9	Investigation Sampling
AOC C-15-010		Former underground tank	9	Investigation Sampling

Table 1.1-2 (continued)

Site Number	Subunit	Description	Subaggregate	Planned SWMU or AOC Work Plan Activities
SWMU 16-030(a)		Outfall from 16-344, chemical storage building	10	Investigation Sampling
AOC C-16-075		Spill location near building 16-340	10	Investigation Sampling

Table 1.2-1
Human Health Industrial Soil Screening Levels

Chemical	Industrial Soil Screening Level[a]
Inorganic Chemicals (mg/kg)	
Aluminum	100,000 maximum[b]
Antimony	454[c]
Arsenic	17.7[d]
Barium	100,000 maximum[b]
Beryllium	2250[c]
Boron	100,000 maximum[b]
Cadmium	564[c]
Calcium	Essential Nutrient
Chromium (total)	100,000 maximum[b]
Chromium (hexavalent)	3400[c]
Cobalt	20,500[c]
Copper	45,400[c]
Cyanide (total)	13,700[c]
Iron	100,000 maximum[b]
Lead	800 IEUBK[e]
Magnesium	Essential Nutrient
Manganese	48,400[c]
Mercury	100,000 maximum[b]
Nickel	22,700[c]
Nitrate-Nitrite as N	100,000 maximum[b]
Potassium	Essential Nutrient
Selenium	5680[c]
Silver	5680[c]
Sodium	Essential Nutrient
Thallium	74.9[c]
Thorium	—[f]
Titanium	100,000 maximum[b,g]
Uranium	200[c,g]
Vanadium	1140[c]
Zinc	100,000 maximum[b]
Organic Chemicals (mg/kg)	
Acenaphthene	33,500[c]
Acenaphthylene[h]	30,900[c]
Acetone	100,000 maximum[b]
Amino-2,6-dinitrotoluene[4-][i]	2000[c,j]
Amino-4,6-dinitrotoluene[2-][i]	2000[c,j]

Table 1.2-1 (continued)

Chemical	Industrial Soil Screening Level[a]
Amino-DNTs	2000[c,j]
Aniline	10,000[d,j]
Anthracene	100,000 maximum[b]
Benzene	25.8[d]
Benzo(a)anthracene	23.4[d]
Benzo(a)pyrene	2.34[d]
Benzo(b)fluoranthene	23.4[d]
Benzo(g,h,i)perylene[h]	30,900[c]
Benzo(k)fluoranthene	234[d]
Benzoic Acid	100,000 maximum[b,j]
Bis(2-ethylhexyl)phthalate	1370[d]
Bromodichloromethane	37.2[d]
Butanone[2-]	48,700 sat[k]
Butylbenzene[n-]	62.1 sat[k]
Butylbenzene[sec-]	60.6 sat[k]
Carbazole	2900[d,j]
Carbon Disulfide	460 sat[k]
Carbon Tetrachloride	8.64[d]
Chlorobenzene	245 sat[k]
Chlorotoluene[2-]	202 sat[k]
Chrysene	2310[d]
Dibenz(a,h)anthracene	2.34[d]
Dibenzofuran	1620[c]
Dichlorobenzene[1,3-]	37.4 sat[k]
Dichlorobenzene[1,4-]	103[d]
Dichlorodifluoromethane	211 sat[k]
Dichloroethane[1,2-]	15.2[d]
Dichloroethene[cis-1,2-]	300[c]
Dichloropropene[1,1-]	31.7[d]
Diethylphthalate	100,000 maximum[b]
Dimethylphenol[2,4-]	13,700[c]
Di-n-butylphthalate	68,400[c]
Dinitrobenzene[1,3-]	200[c,j]
Dinitrotoluene[2,4-]	1370[c]
Dinitrotoluene[2,6-]	2000[c,j]
Ethylbenzene	128 sat[k]
Fluoranthene	24,400[c]
Fluorene	26,500[c]
Hexachlorobutadiene	137[c]

Table 1.2-1 (continued)

Chemical	Industrial Soil Screening Level[a]
Hexanone[2-][l]	48,700 sat[k]
HMX	34,200[c]
Indeno(1,2,3-cd)pyrene	23.4[d]
Isopropybenzene	389 sat[k]
Isopropyltoluene[4-][m]	389 sat[k]
Methylene Chloride	490[d]
Methylnaphthalene[2-][n]	300[c]
Methylphenol[2-]	100,000 maximum[b,j]
Methylphenol[3-]	100,000 maximum[b,j]
Methylphenol[4-]	10,000[c,j]
Naphthalene	300[c]
Nitrobenzene	147[c]
Nitrosodimethylamine[n-]	0.376[d]
Nitrotoluene[2-]	32.3[d]
Nitrotoluene[4-]	437[d]
Phenanthrene	20,500[c]
Phenol	100,000 maximum[b]
Propylbenzene[1-]	62.1 sat[k]
Pyrene	30,900[c]
Pyridine	2000[c]
RDX	174[d]
Tetrachloroethane	14.6[d]
Tetryl	2700[j]
Toluene	252 sat[k]
Trichlorobenzene[1,2,3-][o]	269[c]
Trichlorobenzene[1,2,4-]	269[c]
Trichloroethane[1,1,1-]	563 sat[k]
Trichloroethene	1.56[d]
Trichlorofluoromethane	983 sat[k]
Trimethylbenzene[1,2,4-]	213[c]
Trinitrobenzene[1,3,5-]	69.2 sat[k]
Trinitrotoluene[2,4,6-]	342[c]
Xylene[total-]	82.0 sat[k]
Xylene[1,2-]	99.5 sat[k]
Xylene[1,3-]+Xylene[1,4-]	82.0 sat[k]
Radionuclides (pCi/g)[p]	
Cesium-137	23
Protactinium-231	—
Protactinium-234	—

Table 1.2-1 (continued)

Chemical	Industrial Soil Screening Level[a]
Protactinium-234M	—
Thorium-231	—
Thorium-234	—
Uranium-234	1500
Uranium-235	87
Uranium-238	430

[a] SSLs from NMED (2006, 092513), unless otherwise noted.

[b] SSL exceeds 10^5 mg/kg.

[c] Noncarcinogen.

[d] Carcinogen.

[e] IEUBK denotes integrated exposure uptake biokinetic.

[f] — = SSL/SAL is not available.

[g] SSL from 2006 Region 9 Preliminary Remediation Goals (www.epa.gov/region09/waste/sfund/prg).

[h] Pyrene used as a surrogate chemical based on structural similarity.

[i] 2,6-DNT used as a surrogate chemical based on structural similarity.

[j] SSL from Region 6 EPA (2005, 91002).

[k] SSL based on soil saturation limit.

[l] 2-Butanone used as a surrogate chemical based on structural similarity.

[m] Isopropybenzene used as a surrogate chemical based on structural similarity.

[n] Naphthalene used as a surrogate chemical based on structural similarity.

[o] 1,2,4-Trichlorobenzene used as a surrogate chemical based on structural similarity.

[p] SALs from LANL (2005, 88493).

Table 2.2-1
Summary of Surface Water Assessment Results by Subaggregate, Cañon de Valle Aggregate Area

SMA ID	Site ID	Site Description	Erosion Matrix Score	BMPs
Subaggregate 1				
CDV-SMA-1.4	16-016(d)	Surface disposal site	44.5	Jute matting
CDV-SMA-1.4	16-020	Silver recovery unit	61.3	Straw wattles Check dam (rock) Riprap (general) Mulch (straw) Jute matting
CDV-SMA-1.5	16-026(j)	Outfall, 16-226	40.2	Straw wattles
Subaggregate 2				
CDV-SMA-1.7	16-019	MDA R	82.5	Straw bale barrier Check dam (rock) Riprap (general) Straw wattles
Subaggregate 3				
CDV-SMA-2.5	16-028(a)	South drainage channel	51.5	Check dam (rock)
Subaggregate 4				
CDV-SMA-1	16-001(a)	Tank	67.0	Riprap (outlet protection)
CDV-SMA-1	16-001(b)	Dry wells	45.0	Riprap (outlet protection)
CDV-SMA-1	16-001(c)	Tank	45.0	Riprap (outlet protection)
Subaggregate 6				
CDV-SMA-0.5	16-029(s)	Sump	45.5	Berm (earth) is located around SWMU
CDV-SMA-0.5	16-029(t)	Sump	41.5	Berm (earth) is located around SWMU
Subaggregate 7				
CDV-SMA-2	16-021(c)	Industrial or sanitary wastewater treatment at 16-260	73.3	Jute matting Riprap (general) Straw wattles Straw bale barrier Check dam (rock)
Subaggregate 8				
CDV-SMA-6	14-001(g)	Firing site - open burn/open detonation (active)	53.3	Straw wattles
CDV-SMA-4	14-002(a)	Firing site (inactive)	46.3	Straw wattles Check dam (rock) Mulch (wood chip)
CDV-SMA-6	14-002(d)	Firing site (inactive)	40.8	Straw wattles Check dam (rock)
CDV-SMA-6	14-002(e)	Firing site (inactive)	47.8	Straw wattles Mulch (wood chip)
CDV-SMA-6	14-006	Tank and/or associated equipment	47.1	Straw wattles Check dam (rock)

Table 2.2-1 (continued)

SMA ID	Site ID	Site Name	Erosion Matrix Score	BMPs
CDV-SMA-3	14-009	Surface disposal site	53.7	Straw wattles Riprap (general) Check dam (rock) Straw bale barrier Berm (earth)
CDV-SMA-4	14-010	Sump	51.5	Straw wattles Check dam (rock) Mulch (wood chip)
Subaggregate 9				
CDV-SMA-9	15-007(b)	MDA Z landfill	40.2	Straw wattles Check dam (rock)
CDV-SMA-7	15-008(d)	Surface disposal	69.0	Straw wattles
CDV-SMA-8	15-011(b)	Dry well	87.0	Straw wattles
CDV-SMA-8	15-011(c)	Sump	87.0	Straw wattles
CDV-SMA-8	15-014(g)	Industrial or sanitary wastewater treatment	55.5	Channel (asphalt/concrete) Check dam (rock)
CDV-SMA-8	15-014(j)	Outfall	61.3	Channel (asphalt/concrete) Check dam (rock) Wetland (artificial)
CDV-SMA-8	C-15-007	Nonintentional release	51.5	Straw wattles wetland (artificial)

Table 2.4-3
Perched Zone Characteristics, Cañon de Valle Wells

Well Name	Depth to Water (ft bgs)	Saturated Thickness (ft)
R-25	Approximately 409	723
CDV-16-1(i)	563	>120
CDV-16-2(i)	Approximately 825	Unknown, not fully penetrated
CDV-16-3(i)	Approximately 1350	Unknown
R-26	173	Zones of thin, discontinuous saturation associated with fractures
	Approximately 604	Preliminary data suggest high moisture content below 575 ft to the top of the regional aquifer at 954 ft
CDV-R-15-3	611 during drilling 600–620 geophysical	Upper part of Otowi Member, Bandelier Tuff
	708 during drilling	Otowi Member, Bandelier Tuff
	800–820 geophysical	Top of Puye Formation
	920 during drilling	Puye Formation
	960 during drilling 965–990 geophysical	30 at bottom of Puye/top of Cerros del Rio basalt
	1242	7 in Puye Formation

Table 2.5-1
Subaggregate 1 Summary of Historical Samples
Collected in Soil at the X-Ray Buildings: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number			
				High Explosives	Inorganic Chemicals	SVOC	VOC
SWMU 16-026(i)							
16-21957	0.5–1	RE16-03-50423	ALLH	1564S	1564S	1564S	1564S
16-21958	0.5–1	RE16-03-50424	ALLH	1565S	1565S	1565S	1565S
16-21959	0.5–1	RE16-03-50425	ALLH	1565S	1565S	1565S	1565S
16-21960	0.5–1	RE16-03-50426	ALLH	1565S	1565S	1565S	1565S
SWMU 16-026(j)							
16-03-21712	0.5–1	RE16-03-50442	ALLH	1620S	1621S	1620S	1620S
16-03-21712	1.5–2	RE16-03-50443	ALLH	1620S	1621S	1620S	1620S
16-03-21713	0.5–1	RE16-03-50446	ALLH	1618S	1619S	1618S	1618S
16-03-21713	1.5–2	RE16-03-50447	ALLH	1618S	1619S	1618S	1618S
SWMU 16-026(l)							
16-03-21708	0.5–1	RE16-03-50418	ALLH	1564S	1564S	1564S	1564S
16-21953	0.5–1	RE16-03-50417	ALLH	1564S	1564S	1564S	1564S
16-21954	0.5–1	RE16-03-50419	ALLH	1564S	1564S	1564S	1564S
16-21955	0.5–1	RE16-03-50420	ALLH	1564S	1564S	1564S	1564S

Table 2.5-2
Subaggregate 1 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil at the X-Ray Buildings: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Magnesium	Nickel	Zinc
Soil Background Value				**29200**	**1.83**	**0.4**	**6120**	**19.3**	**14.7**	**21500**	**22.3**	**4610**	**15.4**	**48.8**
SWMU 16-026(i)														
16-21958	0.5–1	RE16-03-50424	ALLH	—*	—	0.461	—	—	—	—	—	—	—	—
16-21959	0.5–1	RE16-03-50425	ALLH	—	—	0.401	43600	—	—	—	24.5	—	—	58.8
16-21960	0.5–1	RE16-03-50426	ALLH	—	—	0.493	9490	—	—	30300	—	—	—	—
SWMU 16-026(j)														
16-03-21712	1.5–2	RE16-03-50443	ALLH	42400	3.37	—	6610	22.9	17.4	25100	—	5070	18.1	50.4
16-03-21713	1.5–2	RE16-03-50447	ALLH	—	—	—	10300	—	—	—	—	—	—	—
SWMU 16-026(l)														
16-21954	0.5–1	RE16-03-50419	ALLH	29300	—	—	6400	—	—	—	437	—	—	—
16-21955	0.5–1	RE16-03-50420	ALLH	—	—	—	—	38.4	—	—	25.6	—	17.2	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Note: Units are mg/kg.

*— = If analyzed, sample result is less than background value.

Table 2.5-3
Subaggregate 1 Historical Analytical Results of Organic Chemicals Detected in Soil at the X-Ray Buildings: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Acenaphthylene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenzofuran
SWMU 16-026(i)														
16-21957	0.5–1	RE16-03-50423	ALLH	2.1	0.07	0.1	4.3	8.4	7.5	13	4.8	—*	9.3	1.2
16-21958	0.5–1	RE16-03-50424	ALLH	0.7	—	0.32	1.1	1.5	1.8	2.9	—	—	1.3	0.54
16-21959	0.5–1	RE16-03-50425	ALLH	4.4	0.14	0.09	13	20	19	32	13	—	23	2.9
16-21960	0.5–1	RE16-03-50426	ALLH	1	—	0.12	1.6	2.5	2.1	3.7	1	—	2.3	0.65
SWMU 16-026(j)														
16-03-21712	0.5–1	RE16-03-50442	ALLH	0.2	—	—	0.3	0.36	0.31	0.52	—	—	0.39	0.13
16-03-21712	1.5–2	RE16-03-50443	ALLH	—	—	—	—	—	—	—	—	—	—	—
16-03-21713	0.5–1	RE16-03-50446	ALLH	0.1	—	—	0.15	0.23	0.19	0.32	—	—	0.23	0.06
16-03-21713	1.5–2	RE16-03-50447	ALLH	0.4	—	0.1	0.79	1.1	1	1.7	0.7	—	1.2	0.3
SWMU 16-026(l)														
16-03-21708	0.5–1	RE16-03-50418	ALLH	—	—	0.12	0.052	0.095	0.063	0.16	—	—	0.1	—
16-21953	0.5–1	RE16-03-50417	ALLH	0.7	—	0.12	0.96	2.4	2.9	4.9	—	—	2.1	0.37
16-21954	0.5–1	RE16-03-50419	ALLH	0.3	—	0.16	0.43	0.71	0.63	1.1	0.4	0.4	0.68	0.16
16-21955	0.5–1	RE16-03-50420	ALLH	—	—	—	0.047 (J+)	0.092 (J+)	0.087 (J+)	0.15 (J+)	—	—	0.1 (J+)	—

Table 2.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dimethylphenol[2,4]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4]	Methylnaphthalene[2]	Methylphenol[2]	Methylphenol[4]	Naphthalene	Phenanthrene	Pyrene	Toluene
SWMU 16-026(i)															
16-21957	0.5–1	RE16-03-50423	ALLH	0.03	20	2.2	4.2	—	0.59	—	0.06	1.9	19	19	0.01
16-21958	0.5–1	RE16-03-50424	ALLH	—	3.2	0.87	—	0.03	0.37	—	—	1.3	3.8	4	0.02
16-21959	0.5–1	RE16-03-50425	ALLH	0.17	50	4.6	11	—	2	0.09	0.22	5	40	40	—
16-21960	0.5–1	RE16-03-50426	ALLH	—	7.2	1.1	1	—	0.48	—	0.03	1.6	4.5	5.4	—
SWMU 16-026(j)															
16-03-21712	0.5–1	RE16-03-50442	ALLH	—	1	0.2	—	—	0.09	—	—	0.32	1.1	0.9	—
16-03-21712	1.5–2	RE16-03-50443	ALLH	—	0.05	—	—	—	—	—	—	—	0.06	0.044	—
16-03-21713	0.5–1	RE16-03-50446	ALLH	—	0.55	0.09	—	—	0.05	—	—	0.18	0.56	0.55	—
16-03-21713	1.5–2	RE16-03-50447	ALLH	—	2.7	0.48	0.6	—	0.26	—	—	0.96	2.7	2.8	—
SWMU 16-026(l)															
16-03-21708	0.5–1	RE16-03-50418	ALLH	—	0.21	—	—	—	—	—	—	0.042	0.16	0.22	—
16-21953	0.5–1	RE16-03-50417	ALLH	—	6.7	0.73	—	—	0.26	—	—	0.94	3.9	5	—
16-21954	0.5–1	RE16-03-50419	ALLH	—	1.5	0.25	0.4	—	0.12	—	—	0.48	1.5	1.6	—
16-21955	0.5–1	RE16-03-50420	ALLH	—	0.24 (J+)	—	—	—	—	—	—	0.043 (J+)	0.22 (J+)	0.23 (J+)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is not detected.

Table 2.6-1
Subaggregate 1 Summary of Historical Samples
Collected in Soil, Sediment, and Tuff at the Silver Outfall: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number			
				High Explosive	Inorganic Chemicals	SVOC	VOC
Screening-Level Data							
16-01573	0–0.5	0316-95-0474[a]	ALLH	285	285	284	—[b]
16-01574	0–0.5	0316-95-0475[a]	ALLH	285	285	284	—
16-01575	0–0.5	0316-95-0491[a]	ALLH	285	285	284	—
16-01576	0–0.5	0316-95-0492[a]	ALLH	285	285	284	—
16-01577	0–0.5	0316-95-0496[a]	ALLH	285	285	284	—
16-01578	0–0.5	0316-95-0497[a]	ALLH	285	285	284	—
16-01579	0–0.5	0316-95-0471[a]	ALLH	285	285	284	—
16-01579	2.5–4.5	0316-95-0472[a]	ALLH	1180	1180	1179	1179
16-01579	4.5–5.5	0316-95-0473[a]	ALLH	1180	1180	1179	1179
16-01580	0–0.5	0316-95-0476[a]	ALLH	285	285	284	—
16-01580	2.5–2.92	0316-95-0477[a]	ALLH	1155	1155	1154	1154
16-01580	4–5.5	0316-95-0478[a]	QBT4	1180	1180	1179	1179
16-01581	0–0.5	0316-95-0479[a]	ALLH	285	285	284	—
16-01581	1.25–1.75	0316-95-0480[a]	QBT4	1155	1155	1154	1154
16-01581	3.5–5	0316-95-0481[a]	QBT4	1180	1180	1179	1179
16-01582	0–0.5	0316-95-0482[a]	ALLH	285	285	284	—
16-01582	2–3	0316-95-0483[a]	ALLH	1180	1180	1179	1179
16-01582	4–5	0316-95-0484[a]	QBT4	1180	1180	1179	1179
16-01583	0–0.5	0316-95-0485[a]	ALLH	285	285	284	—
16-01583	1.83–3	0316-95-0486[a]	ALLH	1180	1180	1179	1179
16-01583	3–4	0316-95-0487[a]	QBT4	1180	1180	1179	1179
16-01584	0–0.5	0316-95-0488[a]	SED	285	285	284	—
16-01584	0.67–1.17	0316-95-0489[a]	ALLH	1392	1392	1391	1391
16-01584	1.17–1.42	0316-95-0490[a]	ALLH	1392	1392	1391	1391
16-01585	0–0.5	0316-95-0493[a]	SED	285	285	284	—
16-01585	0.67–1.08	0316-95-0494[a]	ALLH	1392	1392	1391	1391
16-01585	1.17–1.5	0316-95-0495[a]	ALLH	1392	1392	1391	1391
16-02168	0–0.5	0316-95-0512[a]	SED	1392	1392	1391	—
16-02168	0.67–1.08	0316-95-0513[a]	ALLH	1392	1392	1391	1391
16-02168	1.17–1.33	0316-95-0514[a]	ALLH	1392	1392	1391	1391
16-02169	0–0.5	0316-95-0515[a]	ALLH	1392	1392	1391	—
16-02170	0–0.5	0316-95-0516[a]	ALLH	1392	1392	1391	—

Table 2.6-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number			
				High Explosive	Inorganic Chemicals	SVOC	VOC
Decision-Level Data							
16-06542	0–0.5	RE16-00-0304	ALLH	7726R	7725R	7724R	7724R
16-06542	0–2	RE16-00-0305	ALLH	7726R	7725R	7724R	7724R
16-06555	0–0.5	RE16-00-0302	ALLH	7726R	7725R	7724R	7724R
16-06555	0–2	RE16-00-0303	ALLH	7726R	7725R	7724R	7724R
16-06562	0–0.5	RE16-00-0300	ALLH	7726R	7725R	7724R	7724R
16-06562	0–2	RE16-00-0301	ALLH	7726R	7725R	7724R	7724R
16-06564	0–0.5	RE16-00-0320	ALLH	7726R	7725R	7724R	7724R
16-06564	0–2	RE16-00-0321	ALLH	7726R	7725R	7724R	7724R
16-06568	0–0.5	RE16-00-0316	ALLH	7726R	7725R	7724R	7724R
16-06568	0–2	RE16-00-0317	ALLH	7726R	7725R	7724R	7724R
16-06573	0–0.5	RE16-00-0314	ALLH	7726R	7725R	7724R	7724R
16-06573	0–2	RE16-00-0315	ALLH	7726R	7725R	7724R	7724R
16-06583	0–0.5	RE16-00-0306	ALLH	7726R	7725R	7724R	7724R
16-06583	0–2	RE16-00-0307	ALLH	7726R	7725R	7724R	7724R
16-06587	0–0.5	RE16-00-0308	ALLH	7726R	7725R	7724R	7724R
16-06587	0–2	RE16-00-0309	ALLH	7726R	7725R	7724R	7724R
16-06588	0–0.5	RE16-00-0310	ALLH	7726R	7725R	7724R	7724R
16-06588	0–2	RE16-00-0311	ALLH	7726R	7725R	7724R	7724R
16-06591	0–0.5	RE16-00-0312	ALLH	7726R	7725R	7724R	7724R
16-06593	0–0.26	RE16-00-0371	SED	7766R	7768R	7765R	—

[a] Soil removed after sampling.

[b] — = Analysis was not requested.

Table 2.6-2
Subaggregate 1 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Sediment, and Tuff at the Silver Outfall: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper
Soil Background Value				**29200**	**0.83**	**8.17**	**295**	**1.83**	**n/a**[a]	**0.4**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**1.31**	**n/a**	**0.4**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**n/a**	**1.63**	**7.14**	**3.14**	**4.66**
Screening-Level Data													
16-01573	0–0.5	0316-95-0474[b]	ALLH	—[c]	5.1 (U)	—	—	—	—	0.51 (U)	—	—	—
16-01574	0–0.5	0316-95-0475[b]	ALLH	—	5.3 (U)	—	—	—	—	0.53 (U)	30.7	10.6	—
16-01575	0–0.5	0316-95-0491[b]	ALLH	—	9.82 (U)	8.38	—	—	—	0.982 (U)	137	—	16.7
16-01576	0–0.5	0316-95-0492[b]	ALLH	—	8.8 (U)	—	—	—	—	0.99	163	—	18.1
16-01577	0–0.5	0316-95-0496[b]	ALLH	—	6 (U)	—	—	—	—	0.6 (U)	—	—	—
16-01578	0–0.5	0316-95-0497[b]	ALLH	—	5.6 (U)	—	—	—	—	0.56 (U)	—	—	—
16-01579	0–0.5	0316-95-0471[b]	ALLH	—	7.1 (U)	—	—	—	—	0.71 (U)	433	—	54.2
16-01579	2.5–4.5	0316-95-0472[b]	ALLH	—	5.7 (U)	—	—	—	—	0.57 (U)	—	—	—
16-01579	4.5–5.5	0316-95-0473[b]	ALLH	—	6.5 (U)	—	—	—	—	1	277	—	—
16-01580	0–0.5	0316-95-0476[b]	ALLH	—	6.6 (U)	19.3	—	—	—	0.66 (U)	1190	—	29.4
16-01580	2.5–2.92	0316-95-0477[b]	ALLH	—	5.6 (U)	—	—	—	—	1.7	—	—	—
16-01580	4–5.5	0316-95-0478[b]	QBT4	—	5.1 (U)	—	—	—	—	—	8.3	20.8	186
16-01581	0–0.5	0316-95-0479[b]	ALLH	—	8.32 (U)	—	—	—	—	1.2	466	—	45.2
16-01581	1.25–1.75	0316-95-0480[b]	QBT4	17900	6 (U)	—	211	1.5	—	—	15.5	3.4 (J)	10.2
16-01581	3.5–5	0316-95-0481[b]	QBT4	—	5.2 (U)	—	61.6	—	—	—	8.9	8.2	25.7
16-01582	0–0.5	0316-95-0482[b]	ALLH	—	6.81 (U)	17.5	—	—	—	1.41	673	—	16.8
16-01582	2–3	0316-95-0483[b]	ALLH	—	5.5 (U)	—	—	—	—	0.55 (U)	61.8	—	41.5
16-01582	4–5	0316-95-0484[b]	QBT4	—	5.9 (U)	—	47.3	—	—	—	50.3	4.3 (J)	26.3
16-01583	0–0.5	0316-95-0485[b]	ALLH	—	5.9 (U)	—	—	—	—	0.59 (U)	225	—	—

Table 2.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper
Soil Background Value				**29200**	**0.83**	**8.17**	**295**	**1.83**	**n/a**	**0.4**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**1.31**	**n/a**	**0.4**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**n/a**	**1.63**	**7.14**	**3.14**	**4.66**
16-01583	1.83–3	0316-95-0486[b]	ALLH	—	5.5 (U)	—	—	—	—	0.55 (U)	—	9.2	44.9
16-01583	3–4	0316-95-0487[b]	QBT4	—	5.5 (U)	—	—	—	—	—	74.2	14.8	231
16-01584	0–0.5	0316-95-0488[b]	SED	—	9.7 (U)	6.4	—	—	—	1.3	158	—	18
16-01584	0.67–1.17	0316-95-0489[b]	ALLH	—	5.54 (U)	—	—	—	—	0.554 (U)	33.4 (J+)	—	—
16-01584	1.17–1.42	0316-95-0490[b]	ALLH	—	5.3 (U)	—	—	—	—	1.75	—	—	—
16-01585	0–0.5	0316-95-0493[b]	SED	—	5.93 (U)	—	—	—	—	0.934	—	5.43 (J)	—
16-01585	0.67–1.08	0316-95-0494[b]	ALLH	—	5.18 (U)	—	—	—	—	0.518 (U)	—	—	—
16-01585	1.17–1.5	0316-95-0495[b]	ALLH	—	5 (U)	—	—	—	—	0.5 (U)	—	—	—
16-02168	0–0.5	0316-95-0512[b]	SED	—	4.97 (U)	—	—	—	—	0.497 (U)	—	—	33.5
16-02168	0.67–1.08	0316-95-0513[b]	ALLH	—	5.19 (U)	—	—	—	—	0.519 (U)	—	—	22.9
16-02168	1.17–1.33	0316-95-0514[b]	ALLH	—	5.2 (U)	—	—	—	—	0.52 (U)	—	—	25.2
16-02169	0–0.5	0316-95-0515[b]	ALLH	—	5.41 (U)	—	—	—	—	0.541 (U)	—	—	51
16-02170	0–0.5	0316-95-0516[b]	ALLH	—	5.74 (U)	—	—	—	—	0.574 (U)	—	—	65.9
Decision-Level Data													
16-06542	0–0.5	RE16-00-0304	ALLH	—	—	—	—	—	—	—	—	—	—
16-06542	0–2	RE16-00-0305	ALLH	—	—	—	—	—	—	—	—	—	—
16-06555	0–0.5	RE16-00-0302	ALLH	—	—	—	—	—	—	0.54	—	—	—
16-06555	0–2	RE16-00-0303	ALLH	—	—	—	—	—	—	1.1	—	—	—
16-06562	0–0.5	RE16-00-0300	ALLH	—	—	—	—	—	—	0.58	46	—	—
16-06562	0–2	RE16-00-0301	ALLH	—	—	—	—	—	—	—	—	—	—
16-06564	0–0.5	RE16-00-0320	ALLH	—	—	—	—	—	—	—	—	—	—
16-06564	0–2	RE16-00-0321	ALLH	—	—	—	—	—	—	—	—	—	—

Table 2.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper
Soil Background Value				**29200**	**0.83**	**8.17**	**295**	**1.83**	**n/a**	**0.4**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**1.31**	**n/a**	**0.4**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**n/a**	**1.63**	**7.14**	**3.14**	**4.66**
16-06568	0–0.5	RE16-00-0316	ALLH	—	—	—	—	—	—	—	34	—	—
16-06568	0–2	RE16-00-0317	ALLH	—	—	—	—	—	—	—	—	—	—
16-06573	0–0.5	RE16-00-0314	ALLH	—	—	—	—	—	—	0.49	—	—	—
16-06573	0–2	RE16-00-0315	ALLH	—	—	—	—	—	—	0.58	—	—	—
16-06583	0–0.5	RE16-00-0306	ALLH	—	—	9.5	—	—	—	0.87	250	—	18
16-06583	0–2	RE16-00-0307	ALLH	—	—	—	—	—	—	0.68	42	—	—
16-06587	0–0.5	RE16-00-0308	ALLH	—	—	—	—	—	—	—	—	—	—
16-06587	0–2	RE16-00-0309	ALLH	—	—	—	—	—	—	—	—	—	—
16-06588	0–0.5	RE16-00-0310	ALLH	—	—	—	—	—	—	—	—	—	—
16-06588	0–2	RE16-00-0311	ALLH	—	—	—	—	—	—	—	—	—	—
16-06591	0–0.5	RE16-00-0312	ALLH	—	—	—	—	—	—	—	—	—	—
16-06593	0–0.26	RE16-00-0371	SED	—	—	—	260	—	7.4 (J)	—	—	—	—

Table 2.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Zinc
Soil Background Value				**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**39.6**	**48.8**
Sediment Background Value				**0.82**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**0.3**	**1**	**19.7**	**60.2**
QBT4 Background Value				**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**17**	**63.5**
Screening-Level Data														
16-01573	0–0.5	0316-95-0474[b]	ALLH	1 (U)	—	—	—	—	—	—	—	34.6	—	—
16-01574	0–0.5	0316-95-0475[b]	ALLH	1.1 (U)	—	—	—	719	—	—	—	121	—	—
16-01575	0–0.5	0316-95-0491[b]	ALLH	2 (U)	—	—	—	—	0.14 (J)	—	—	454	—	68.5
16-01576	0–0.5	0316-95-0492[b]	ALLH	1.8 (U)	—	24.1	—	—	0.161 (J)	—	—	423	—	62.3
16-01577	0–0.5	0316-95-0496[b]	ALLH	1.2 (U)	—	—	—	—	—	—	—	303	—	—
16-01578	0–0.5	0316-95-0497[b]	ALLH	1.1 (U)	—	—	—	—	—	—	—	82.5	—	—
16-01579	0–0.5	0316-95-0471[b]	ALLH	1.4 (U)	—	56.4	—	—	—	—	—	423	—	160
16-01579	2.5–4.5	0316-95-0472[b]	ALLH	1.2 (U)	—	—	—	—	—	—	—	251	—	—
16-01579	4.5–5.5	0316-95-0473[b]	ALLH	1.3 (U)	—	—	—	—	—	—	—	446	—	—
16-01580	0–0.5	0316-95-0476[b]	ALLH	1.3 (U)	—	—	—	—	0.19	—	—	346	44.4	—
16-01580	2.5–2.92	0316-95-0477[b]	ALLH	1.2 (U)	—	—	—	—	—	—	—	31.2	—	—
16-01580	4–5.5	0316-95-0478[b]	QBT4	1 (U)	—	—	—	—	—	40.8	—	25	—	139
16-01581	0–0.5	0316-95-0479[b]	ALLH	1.7 (U)	—	—	—	—	0.263	—	—	455	—	64
16-01581	1.25–1.75	0316-95-0480[b]	QBT4	1.2 (U)	16200	12.2	1730	—	—	8.6	—	276	24.1	—
16-01581	3.5–5	0316-95-0481[b]	QBT4	1.1 (U)	—	—	—	—	—	11.7	—	47.6	—	—
16-01582	0–0.5	0316-95-0482[b]	ALLH	1.4 (U)	—	—	—	—	0.25	—	—	298	—	—
16-01582	2–3	0316-95-0483[b]	ALLH	1.1 (U)	—	—	—	—	—	35	—	103	—	61.9
16-01582	4–5	0316-95-0484[b]	QBT4	1.2 (U)	—	—	—	—	—	27.5	—	98	—	—
16-01583	0–0.5	0316-95-0485[b]	ALLH	1.2 (U)	—	—	—	—	—	—	—	329	—	—
16-01583	1.83–3	0316-95-0486[b]	ALLH	1.1 (U)	—	—	—	—	—	—	—	397	—	—
16-01583	3–4	0316-95-0487[b]	QBT4	1.1 (U)	—	—	—	—	—	75.4	—	341	—	154

Table 2.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Zinc
Soil Background Value				**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**39.6**	**48.8**
Sediment Background Value				**0.82**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**0.3**	**1**	**19.7**	**60.2**
QBT4 Background Value				**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**17**	**63.5**
16-01584	0–0.5	0316-95-0488[b]	SED	2 (U)	—	25.4	—	—	0.154 (J)	—	0.493 (U)	465	28.8	63.1
16-01584	0.67–1.17	0316-95-0489[b]	ALLH	1.11 (U)	—	—	—	—	—	—	—	672	—	—
16-01584	1.17–1.42	0316-95-0490[b]	ALLH	1.09 (U)	—	—	—	—	—	—	—	345	—	—
16-01585	0–0.5	0316-95-0493[b]	SED	1.2 (U)	—	—	—	549	—	—	—	338	21.6	—
16-01585	0.67–1.08	0316-95-0494[b]	ALLH	1.04 (U)	—	—	—	—	—	—	—	49.5	—	—
16-01585	1.17–1.5	0316-95-0495[b]	ALLH	1.04 (U)	—	—	—	—	—	—	—	43.1	—	—
16-02168	0–0.5	0316-95-0512[b]	SED	1.03 (U)	—	24.7 (J+)	—	—	—	123	—	5.7	—	—
16-02168	0.67–1.08	0316-95-0513[b]	ALLH	1.06 (U)	—	—	—	—	—	106	—	17.6	—	—
16-02168	1.17–1.33	0316-95-0514[b]	ALLH	1.08 (U)	—	—	—	—	—	113	—	25.9	—	—
16-02169	0–0.5	0316-95-0515[b]	ALLH	1.11 (U)	—	23.2 (J+)	—	—	—	147	—	7.91	—	—
16-02170	0–0.5	0316-95-0516[b]	ALLH	1.19 (U)	—	30.4 (J+)	—	—	—	200	—	17.1	—	—
Decision-Level Data														
16-06542	0–0.5	RE16-00-0304	ALLH	—	—	—	—	—	—	—	—	99 (J)	—	59
16-06542	0–2	RE16-00-0305	ALLH	—	—	—	—	—	—	—	—	35 (J)	—	—
16-06555	0–0.5	RE16-00-0302	ALLH	—	—	—	—	—	—	—	—	84 (J)	—	—
16-06555	0–2	RE16-00-0303	ALLH	—	—	—	—	—	—	—	—	150 (J)	—	—
16-06562	0–0.5	RE16-00-0300	ALLH	—	—	—	—	—	—	—	—	720 (J)	—	52
16-06562	0–2	RE16-00-0301	ALLH	—	—	—	—	—	—	—	—	190 (J)	—	—
16-06564	0–0.5	RE16-00-0320	ALLH	—	—	—	—	—	—	—	—	580	—	—
16-06564	0–2	RE16-00-0321	ALLH	—	—	—	—	—	—	—	—	550	—	—
16-06568	0–0.5	RE16-00-0316	ALLH	—	—	—	—	—	—	—	—	680 (J)	—	—
16-06568	0–2	RE16-00-0317	ALLH	—	—	—	—	—	—	—	—	490 (J)	—	—

Table 2.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Zinc
Soil Background Value				**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**39.6**	**48.8**
Sediment Background Value				**0.82**	**13800**	**19.7**	**2370**	**543**	**0.1**	**9.38**	**0.3**	**1**	**19.7**	**60.2**
QBT4 Background Value				**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**17**	**63.5**
16-06573	0–0.5	RE16-00-0314	ALLH	—	—	—	—	—	—	—	—	270 (J)	—	—
16-06573	0–2	RE16-00-0315	ALLH	—	—	—	—	—	—	—	—	77 (J)	—	—
16-06583	0–0.5	RE16-00-0306	ALLH	—	—	—	—	—	—	—	—	680 (J)	—	59
16-06583	0–2	RE16-00-0307	ALLH	—	—	—	—	—	—	—	—	610 (J)	—	57
16-06587	0–0.5	RE16-00-0308	ALLH	—	—	—	—	—	—	—	—	4.6 (J)	—	—
16-06587	0–2	RE16-00-0309	ALLH	—	—	—	—	—	—	—	—	2.8 (J)	—	—
16-06588	0–0.5	RE16-00-0310	ALLH	—	—	—	—	—	—	—	—	340 (J)	—	—
16-06588	0–2	RE16-00-0311	ALLH	—	—	—	—	—	—	—	—	290 (J)	—	—
16-06591	0–0.5	RE16-00-0312	ALLH	—	—	—	—	—	—	—	—	11 (J)	—	—
16-06593	0–0.26	RE16-00-0371	SED	—	—	29	—	—	0.11	—	0.44	1.6	—	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] n/a = Not applicable; no background value available.

[b] Soil removed after sampling.

[c] — = If analyzed, sample result is less than background value.

Table 2.6-3
Subaggregate 1 Historical Analytical Results of Organic Chemicals
Detected in Soil, Sediment, and Tuff at the Silver Outfall: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Acenaphthylene	Acetone	Amino-4,6-dinitrotoluene[2]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene
Screening-Level Data												
16-01573	0–0.5	0316-95-0474[a]	ALLH	0.076 (J)	—[b]	—	—	0.13 (J)	0.36	0.37	0.46	—
16-01574	0–0.5	0316-95-0475[a]	ALLH	0.19 (J)	—	—	—	0.35	1.1	1.1	1.3	0.82
16-01575	0–0.5	0316-95-0491[a]	ALLH	0.27 (J)	—	—	—	0.62 (J)	3.4 (J)	4 (J)	5.3 (J)	3.2 (J)
16-01576	0–0.5	0316-95-0492[a]	ALLH	0.28 (J)	—	—	—	0.51 (J)	3.4 (J)	4 (J)	5.3 (J)	3.7 (J)
16-01577	0–0.5	0316-95-0496[a]	ALLH	—	—	—	—	—	—	—	—	—
16-01579	0–0.5	0316-95-0471[a]	ALLH	50	—	—	—	120	420	460	580	350
16-01579	2.5–4.5	0316-95-0472[a]	ALLH	—	—	0.011 (J)	—	—	0.076 (J)	0.07 (J)	0.089 (J)	—
16-01579	4.5–5.5	0316-95-0473[a]	ALLH	1.5	0.064 (J)	—	—	2.7	8.6	8.5	11	3
16-01580	0–0.5	0316-95-0476[a]	ALLH	1.4 (J)	—	—	—	3.2 (J)	13 (J)	14 (J)	16 (J)	12 (J)
16-01580	2.5–2.92	0316-95-0477[a]	ALLH	—	—	—	—	0.051 (J)	0.15 (J)	0.15 (J)	0.18 (J)	0.066 (J)
16-01580	4–5.5	0316-95-0478[a]	QBT4	—	—	0.009 (J)	—	—	—	—	—	—
16-01581	0–0.5	0316-95-0479[a]	ALLH	1.2 (J)	—	—	—	2.6 (J)	8.9 (J)	10 (J)	12 (J)	8.6 (J)
16-01581	3.5–5	0316-95-0481[a]	QBT4	—	—	0.021 (J)	—	—	—	—	—	—
16-01582	0–0.5	0316-95-0482[a]	ALLH	8.8 (J)	—	—	—	13 (J)	29 (J)	29 (J)	32 (J)	20 (J)
16-01582	2–3	0316-95-0483[a]	ALLH	—	—	0.011 (J)	—	—	—	—	—	—
16-01582	4–5	0316-95-0484[a]	QBT4	—	—	0.018 (J)	—	—	—	—	—	—
16-01583	0–0.5	0316-95-0485[a]	ALLH	0.42 (J)	—	—	—	0.68 (J)	1.9 (J)	2.1 (J)	2.7 (J)	1.6 (J)
16-01583	1.83–3	0316-95-0486[a]	ALLH	—	—	0.012 (J)	—	—	0.058 (J)	0.062 (J)	0.09 (J)	—

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Acenaphthylene	Acetone	Amino-4,6-dinitrotoluene[2]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene
16-01583	3–4	0316-95-0487[a]	QBT4	—	—	0.022 (J)	—	—	0.058 (J)	—	0.079 (J)	—
16-01584	0–0.5	0316-95-0488[a]	SED	0.33 (J)	—	—	—	0.76 (J)	3.9 (J)	4.9 (J)	8.2 (J)	3.5 (J)
16-01584	0.67–1.17	0316-95-0489[a]	ALLH	0.082 (J)	—	—	—	0.19 (J)	0.69	0.8 (J)	1.4 (J)	0.44 (J)
16-01584	1.17–1.42	0316-95-0490[a]	ALLH	0.057 (J)	—	—	—	0.12 (J)	0.66	0.75	1.1	0.45
16-01585	0.67–1.08	0316-95-0494[a]	ALLH	—	—	—	—	—	—	—	—	—
16-01585	1.17–1.5	0316-95-0495[a]	ALLH	—	—	—	—	—	0.13 (J)	0.12 (J)	0.16 (J)	—
16-02168	1.17–1.33	0316-95-0514[a]	ALLH	—	—	—	—	—	—	—	—	—
16-02169	0–0.5	0316-95-0515[a]	ALLH	—	—	—	—	—	—	—	0.07 (J)	—
16-02170	0–0.5	0316-95-0516[a]	ALLH	—	—	—	—	—	—	—	0.093 (J)	—
Decision-Level Data												
16-06542	0–0.5	RE16-00-0304	ALLH	—	—	0.018 (J-)	—	—	0.08 (J-)	0.074 (J-)	0.09 (J-)	—
16-06542	0–2	RE16-00-0305	ALLH	—	—	0.021 (J-)	—	—	—	—	—	—
16-06555	0–0.5	RE16-00-0302	ALLH	—	—	—	—	—	—	—	—	—
16-06555	0–2	RE16-00-0303	ALLH	—	—	0.047 (J)	—	—	—	—	—	—
16-06562	0–0.5	RE16-00-0300	ALLH	—	—	0.0074 (J-)	0.05 (J)	0.14 (J-)	0.97 (J-)	1.3 (J-)	1.5 (J-)	0.43 (J-)
16-06562	0–2	RE16-00-0301	ALLH	—	—	0.035 (J)	—	—	0.099 (J-)	0.1 (J-)	0.15 (J-)	0.1 (J-)
16-06564	0–0.5	RE16-00-0320	ALLH	—	—	—	—	—	0.16 (J-)	0.2 (J-)	0.24 (J-)	0.11 (J-)
16-06564	0–2	RE16-00-0321	ALLH	—	—	0.057 (J)	—	—	0.095 (J-)	0.12 (J-)	0.15 (J-)	—
16-06568	0–0.5	RE16-00-0316	ALLH	—	—	—	—	—	0.13 (J-)	0.17 (J-)	0.19 (J-)	0.12 (J-)
16-06568	0–2	RE16-00-0317	ALLH	—	—	—	—	—	—	—	0.074 (J-)	—
16-06573	0–0.5	RE16-00-0314	ALLH	—	—	0.0075 (J)	—	—	—	—	—	—

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Acenaphthylene	Acetone	Amino-4,6-dinitrotoluene[2]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene
16-06573	0–2	RE16-00-0315	ALLH	—	—	—	—	—	—	—	—	—
16-06583	0–0.5	RE16-00-0306	ALLH	0.17 (J-)	—	0.094 (J)	—	0.44 (J-)	2.5 (J-)	3.1 (J-)	3.4 (J-)	1.3 (J-)
16-06583	0–2	RE16-00-0307	ALLH	0.056 (J)	—	0.041 (J)	—	0.12 (J)	0.38	0.39	0.37	0.3 (J)
16-06587	0–0.5	RE16-00-0308	ALLH	—	—	0.0084 (J-)	—	—	—	—	—	—
16-06587	0–2	RE16-00-0309	ALLH	—	—	—	—	—	—	—	—	—
16-06588	0–0.5	RE16-00-0310	ALLH	—	—	—	—	—	0.049 (J)	0.047 (J)	0.086 (J)	0.039 (J)
16-06588	0–2	RE16-00-0311	ALLH	0.071 (J)	—	0.14 (J)	—	0.14 (J)	0.41	0.38	0.38	0.28 (J)
16-06591	0–0.5	RE16-00-0312	ALLH	—	—	0.19 (J)	—	—	—	—	—	—
16-06593	0–0.26	RE16-00-0371	SED	—	—	—	—	—	0.082 (J)	0.09 (J)	0.16 (J)	0.07 (J)

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Diethylphthalate	Dimethylphenol[2,4]	Di-n-butylphthalate
Screening-Level Data												
16-01573	0–0.5	0316-95-0474[a]	ALLH	0.18 (J)	—	—	0.47	—	0.036 (J)	—	—	—
16-01574	0–0.5	0316-95-0475[a]	ALLH	0.52	—	—	1.3	—	0.077 (J)	—	—	—
16-01575	0–0.5	0316-95-0491[a]	ALLH	2.5 (J)	—	—	6.4 (J)	—	—	—	—	—
16-01576	0–0.5	0316-95-0492[a]	ALLH	1.9 (J)	—	—	6.5 (J)	0.74 (J)	0.12 (J)	—	—	—
16-01577	0–0.5	0316-95-0496[a]	ALLH	—	—	—	—	—	—	—	—	—
16-01579	0–0.5	0316-95-0471[a]	ALLH	140	—	—	610	68	22 (J)	—	—	—
16-01579	2.5–4.5	0316-95-0472[a]	ALLH	—	—	—	0.12 (J)	—	—	—	—	—
16-01579	4.5–5.5	0316-95-0473[a]	ALLH	3.5	—	—	13	0.9	1	—	0.054 (J)	—
16-01580	0–0.5	0316-95-0476[a]	ALLH	—	—	—	21 (J)	3 (J)	0.87 (J)	—	—	—
16-01580	2.5–2.92	0316-95-0477[a]	ALLH	0.077 (J)	—	—	0.22 (J)	0.064 (J)	—	—	—	—
16-01580	4–5.5	0316-95-0478[a]	QBT4	—	—	—	—	—	—	0.043 (J)	—	—
16-01581	0–0.5	0316-95-0479[a]	ALLH	4.8 (J)	—	1.8 (J)	11 (J)	2.3 (J)	0.51 (J)	—	—	—
16-01581	3.5–5	0316-95-0481[a]	QBT4	—	—	—	—	—	—	—	—	—
16-01582	0–0.5	0316-95-0482[a]	ALLH	13 (J)	—	—	45 (J)	5.5 (J)	6.9 (J)	—	—	—
16-01582	2–3	0316-95-0483[a]	ALLH	—	—	—	—	—	—	—	—	—
16-01582	4–5	0316-95-0484[a]	QBT4	—	—	—	0.059 (J)	—	—	—	—	—
16-01583	0–0.5	0316-95-0485[a]	ALLH	0.93 (J)	—	0.31 (J)	3.3 (J)	—	0.26 (J)	—	—	—
16-01583	1.83–3	0316-95-0486[a]	ALLH	—	—	—	0.11 (J)	—	—	—	—	—
16-01583	3–4	0316-95-0487[a]	QBT4	—	—	—	0.097 (J)	—	—	—	—	—
16-01584	0–0.5	0316-95-0488[a]	SED	3.5 (J)	0.98 (J)	0.42 (J)	6.7 (J)	1.8 (J)	—	—	—	0.84 (J)

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Diethylphthalate	Dimethylphenol[2,4]	Di-n-butylphthalate
16-01584	0.67–1.17	0316-95-0489[a]	ALLH	0.59 (J)	0.2 (J)	—	1.2	0.12 (J)	—	—	—	—
16-01584	1.17–1.42	0316-95-0490[a]	ALLH	0.46	0.17 (J)	—	1.1	0.12 (J)	—	—	—	—
16-01585	0.67–1.08	0316-95-0494[a]	ALLH	—	0.26 (J)	—	—	—	—	—	—	—
16-01585	1.17–1.5	0316-95-0495[a]	ALLH	—	—	—	0.16 (J)	—	—	—	—	—
16-02168	1.17–1.33	0316-95-0514[a]	ALLH	—	—	—	—	—	—	—	—	—
16-02169	0–0.5	0316-95-0515[a]	ALLH	—	—	—	0.063 (J)	—	—	—	—	—
16-02170	0–0.5	0316-95-0516[a]	ALLH	—	—	—	0.081 (J)	—	—	—	—	—
Decision-Level Data												
16-06542	0–0.5	RE16-00-0304	ALLH	—	—	—	0.091 (J-)	—	—	—	—	—
16-06542	0–2	RE16-00-0305	ALLH	—	—	0.088 (J-)	—	—	—	—	—	—
16-06555	0–0.5	RE16-00-0302	ALLH	—	—	—	—	—	—	—	—	—
16-06555	0–2	RE16-00-0303	ALLH	—	—	—	—	—	—	—	—	—
16-06562	0–0.5	RE16-00-0300	ALLH	1.2 (J-)	—	0.12 (J-)	1.3 (J-)	—	—	—	—	—
16-06562	0–2	RE16-00-0301	ALLH	0.08 (J-)	—	—	0.15 (J-)	—	—	—	—	—
16-06564	0–0.5	RE16-00-0320	ALLH	0.15 (J-)	—	—	0.24 (J-)	—	—	—	—	—
16-06564	0–2	RE16-00-0321	ALLH	0.1 (J-)	—	—	0.14 (J-)	—	—	—	—	—
16-06568	0–0.5	RE16-00-0316	ALLH	0.14 (J-)	—	—	0.2 (J-)	—	—	—	—	—
16-06568	0–2	RE16-00-0317	ALLH	—	—	—	—	—	—	—	—	—
16-06573	0–0.5	RE16-00-0314	ALLH	—	—	—	—	—	—	—	—	—
16-06573	0–2	RE16-00-0315	ALLH	—	—	—	—	—	—	—	—	0.038 (J)
16-06583	0–0.5	RE16-00-0306	ALLH	2.7 (J-)	—	0.15 (J-)	3.3 (J-)	—	0.11 (J-)	—	—	—

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Diethylphthalate	Dimethylphenol[2,4]	Di-n-butylphthalate
16-06583	0–2	RE16-00-0307	ALLH	0.33 (J)	—	—	0.45	—	—	—	—	—
16-06587	0–0.5	RE16-00-0308	ALLH	—	—	—	—	—	—	—	—	—
16-06587	0–2	RE16-00-0309	ALLH	—	—	—	—	—	—	—	—	—
16-06588	0–0.5	RE16-00-0310	ALLH	0.043 (J)	—	—	0.057 (J)	—	—	—	—	—
16-06588	0–2	RE16-00-0311	ALLH	0.27 (J)	—	—	0.43	—	—	—	—	—
16-06591	0–0.5	RE16-00-0312	ALLH	—	—	—	—	—	—	—	—	—
16-06593	0–0.26	RE16-00-0371	SED	0.062 (J)	0.037 (J-)	0.041 (J)	0.1 (J)	—	—	—	—	—

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4]	Methylene Chloride	Methylnaphthalene[2]	Methylphenol[3]	Methylphenol[4]
Screening-Level Data											
16-01573	0–0.5	0316-95-0474[a]	ALLH	0.88	0.07 (J)	0.27 (J)	—	—	—	—	—
16-01574	0–0.5	0316-95-0475[a]	ALLH	2.4	0.16 (J)	0.78	—	—	0.043 (J)	—	—
16-01575	0–0.5	0316-95-0491[a]	ALLH	8.9 (J)	0.22 (J)	3.4 (J)	—	—	—	—	—
16-01576	0–0.5	0316-95-0492[a]	ALLH	9.8 (J)	0.18 (J)	3.5 (J)	—	—	—	—	—
16-01577	0–0.5	0316-95-0496[a]	ALLH	0.8 (J)	—	—	—	—	—	—	—
16-01579	0–0.5	0316-95-0471[a]	ALLH	980	40	270	—	—	12 (J)	—	—
16-01579	2.5–4.5	0316-95-0472[a]	ALLH	0.2 (J)	—	—	—	—	—	—	—
16-01579	4.5–5.5	0316-95-0473[a]	ALLH	20	1.7	3.6	—	—	0.7	—	0.088 (J)
16-01580	0–0.5	0316-95-0476[a]	ALLH	36 (J)	1.6 (J)	10 (J)	—	—	0.35 (J)	—	—
16-01580	2.5–2.92	0316-95-0477[a]	ALLH	0.32 (J)	—	0.071 (J)	—	—	—	—	—
16-01580	4–5.5	0316-95-0478[a]	QBT4	—	—	—	—	—	—	—	—
16-01581	0–0.5	0316-95-0479[a]	ALLH	26 (J)	1.1 (J)	8.7 (J)	—	—	—	—	—
16-01581	3.5–5	0316-95-0481[a]	QBT4	—	—	—	—	—	—	—	—
16-01582	0–0.5	0316-95-0482[a]	ALLH	62 (J)	11 (J)	18 (J)	—	—	4.6 (J)	—	—
16-01582	2–3	0316-95-0483[a]	ALLH	—	—	—	—	—	—	—	—
16-01582	4–5	0316-95-0484[a]	QBT4	0.078 (J)	—	—	—	—	—	—	—
16-01583	0–0.5	0316-95-0485[a]	ALLH	5.3 (J)	0.43 (J)	1.6 (J)	—	—	0.17 (J)	—	—
16-01583	1.83–3	0316-95-0486[a]	ALLH	0.15 (J)	—	—	—	—	—	—	—
16-01583	3–4	0316-95-0487[a]	QBT4	0.14 (J)	—	—	—	—	—	—	—
16-01584	0–0.5	0316-95-0488[a]	SED	8.3 (J)	0.28 (J)	2.5 (J)	—	—	—	—	—
16-01584	0.67–1.17	0316-95-0489[a]	ALLH	1.5	0.079 (J)	0.5 (J)	—	0.004 (J-)	—	—	—

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4]	Methylene Chloride	Methylnaphthalene[2]	Methylphenol[3]	Methylphenol[4]
16-01584	1.17–1.42	0316-95-0490[a]	ALLH	1.4	0.05 (J)	0.47	—	0.005 (J-)	—	—	—
16-01585	0.67–1.08	0316-95-0494[a]	ALLH	0.081 (J)	—	—	—	0.005 (J-)	—	—	—
16-01585	1.17–1.5	0316-95-0495[a]	ALLH	0.28 (J)	—	—	—	—	—	—	—
16-02168	1.17–1.33	0316-95-0514[a]	ALLH	0.068 (J)	—	—	—	—	—	—	—
16-02169	0–0.5	0316-95-0515[a]	ALLH	0.1 (J)	—	—	—	—	—	—	—
16-02170	0–0.5	0316-95-0516[a]	ALLH	0.14 (J)	—	—	—	—	—	—	—
Decision-Level Data											
16-06542	0–0.5	RE16-00-0304	ALLH	0.18 (J-)	—	—	—	0.00082 (J-)	—	—	—
16-06542	0–2	RE16-00-0305	ALLH	—	—	—	0.037	0.0012 (J-)	—	—	—
16-06555	0–0.5	RE16-00-0302	ALLH	—	—	—	—	—	—	—	—
16-06555	0–2	RE16-00-0303	ALLH	—	—	—	0.00087 (J)	0.0014 (J-)	—	—	—
16-06562	0–0.5	RE16-00-0300	ALLH	2.2 (J-)	—	0.47 (J-)	0.00039 (J)	—	—	0.0968 (J-)	—
16-06562	0–2	RE16-00-0301	ALLH	0.27 (J-)	—	0.085 (J-)	—	—	—	—	—
16-06564	0–0.5	RE16-00-0320	ALLH	0.42 (J-)	—	0.1 (J-)	—	—	—	—	—
16-06564	0–2	RE16-00-0321	ALLH	0.2 (J-)	—	—	—	—	—	—	—
16-06568	0–0.5	RE16-00-0316	ALLH	0.32 (J-)	—	0.11 (J-)	—	—	—	—	—
16-06568	0–2	RE16-00-0317	ALLH	—	—	—	—	—	—	—	—
16-06573	0–0.5	RE16-00-0314	ALLH	—	—	—	—	0.00086 (J)	—	—	—
16-06573	0–2	RE16-00-0315	ALLH	—	—	—	—	—	—	—	—
16-06583	0–0.5	RE16-00-0306	ALLH	5 (J-)	0.24 (J-)	1.4 (J-)	—	0.0019 (J-)	—	—	—
16-06583	0–2	RE16-00-0307	ALLH	0.86	0.065 (J)	0.25 (J)	—	0.0017 (J-)	—	—	—
16-06587	0–0.5	RE16-00-0308	ALLH	—	—	—	0.00071 (J)	0.0014 (J-)	—	—	—

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4]	Methylene Chloride	Methylnaphthalene[2]	Methylphenol[3]	Methylphenol[4]
16-06587	0–2	RE16-00-0309	ALLH	—	—	—	—	0.0015 (J-)	—	—	—
16-06588	0–0.5	RE16-00-0310	ALLH	0.097 (J)	—	—	0.00043 (J)	—	—	—	—
16-06588	0–2	RE16-00-0311	ALLH	0.92	0.086 (J)	0.22 (J)	—	0.00081 (J-)	—	—	—
16-06591	0–0.5	RE16-00-0312	ALLH	—	—	—	—	0.0011 (J-)	—	—	—
16-06593	0–0.26	RE16-00-0371	SED	0.19 (J)	—	0.06 (J)	—	—	—	—	—

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Naphthalene	Nitrotoluene[2]	Nitrotoluene[4]	Phenanthrene	Pyrene	RDX	Toluene	Trichlorofluoromethane
Screening-Level Data											
16-01573	0–0.5	0316-95-0474[a]	ALLH	0.083 (J)	—	—	0.63	0.82	—	—	—
16-01574	0–0.5	0316-95-0475[a]	ALLH	0.14 (J)	—	—	1.6	2.1	—	—	—
16-01575	0–0.5	0316-95-0491[a]	ALLH	—	—	—	3.4 (J)	5.9 (J)	—	—	—
16-01576	0–0.5	0316-95-0492[a]	ALLH	—	—	—	3.3 (J)	5.4 (J)	—	—	—
16-01577	0–0.5	0316-95-0496[a]	ALLH	—	—	—	0.6 (J)	0.54 (J)	—	—	—
16-01579	0–0.5	0316-95-0471[a]	ALLH	34	—	—	610	720	—	—	—
16-01579	2.5–4.5	0316-95-0472[a]	ALLH	—	—	—	0.16 (J)	0.14 (J)	—	—	—
16-01579	4.5–5.5	0316-95-0473[a]	ALLH	1.8	—	—	15	15	—	—	0.007
16-01580	0–0.5	0316-95-0476[a]	ALLH	1.1 (J)	—	—	16 (J)	21 (J)	—	—	—
16-01580	2.5–2.92	0316-95-0477[a]	ALLH	—	—	—	0.24 (J)	0.29 (J)	—	—	—
16-01580	4–5.5	0316-95-0478[a]	QBT4	—	—	—	—	—	—	—	—
16-01581	0–0.5	0316-95-0479[a]	ALLH	0.54 (J)	—	—	11 (J)	14 (J)	—	—	—
16-01581	3.5–5	0316-95-0481[a]	QBT4	—	—	—	—	—	—	—	0.009
16-01582	0–0.5	0316-95-0482[a]	ALLH	17 (J)	—	—	61 (J)	50 (J)	—	—	—
16-01582	2–3	0316-95-0483[a]	ALLH	—	—	—	—	—	—	—	0.007
16-01582	4–5	0316-95-0484[a]	QBT4	—	—	—	—	0.066 (J)	—	—	0.008
16-01583	0–0.5	0316-95-0485[a]	ALLH	0.64 (J)	—	—	3.2 (J)	4 (J)	—	—	—
16-01583	1.83–3	0316-95-0486[a]	ALLH	—	—	—	0.065 (J)	0.12 (J)	—	—	0.009
16-01583	3–4	0316-95-0487[a]	QBT4	—	—	—	0.065 (J)	0.11 (J)	—	—	0.009
16-01584	0–0.5	0316-95-0488[a]	SED	—	—	—	3.7 (J)	5.6 (J)	—	—	—

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Naphthalene	Nitrotoluene[2]	Nitrotoluene[4]	Phenanthrene	Pyrene	RDX	Toluene	Trichlorofluoromethane
16-01584	0.67–1.17	0316-95-0489[a]	ALLH	—	—	—	0.91	2.6	—	—	0.005 (J-)
16-01584	1.17–1.42	0316-95-0490[a]	ALLH	—	—	—	0.69	1.8	—	0.003 (J)	0.009 (J-)
16-01585	0.67–1.08	0316-95-0494[a]	ALLH	—	—	—	—	0.13 (J)	—	—	0.01 (J-)
16-01585	1.17–1.5	0316-95-0495[a]	ALLH	—	—	—	0.25 (J)	0.34 (J)	—	—	0.012 (J-)
16-02168	1.17–1.33	0316-95-0514[a]	ALLH	—	—	—	0.047 (J)	0.044 (J)	—	—	—
16-02169	0–0.5	0316-95-0515[a]	ALLH	—	—	—	0.048 (J)	0.11 (J)	—	—	—
16-02170	0–0.5	0316-95-0516[a]	ALLH	—	—	—	0.077 (J)	0.13 (J)	—	—	—
Decision-Level Data											
16-06542	0–0.5	RE16-00-0304	ALLH	—	—	—	0.11 (J-)	0.17 (J-)	0.21 (J)	—	0.038
16-06542	0–2	RE16-00-0305	ALLH	—	—	—	—	—	—	0.0014 (J)	—
16-06555	0–0.5	RE16-00-0302	ALLH	—	—	—	—	0.087 (J-)	—	—	—
16-06555	0–2	RE16-00-0303	ALLH	—	—	—	—	0.091 (J-)	—	0.00085 (J)	0.061
16-06562	0–0.5	RE16-00-0300	ALLH	—	0.11 (J)	0.11 (J)	0.88 (J-)	2.3 (J-)	—	—	0.017
16-06562	0–2	RE16-00-0301	ALLH	—	—	—	0.14 (J-)	0.24 (J-)	—	—	0.018
16-06564	0–0.5	RE16-00-0320	ALLH	—	—	—	0.19 (J-)	0.41 (J-)	—	—	—
16-06564	0–2	RE16-00-0321	ALLH	—	—	—	0.093 (J-)	0.25 (J-)	—	—	0.008
16-06568	0–0.5	RE16-00-0316	ALLH	—	—	—	0.12 (J-)	0.34 (J-)	—	—	0.0023 (J)
16-06568	0–2	RE16-00-0317	ALLH	—	—	—	—	0.11 (J-)	—	—	—
16-06573	0–0.5	RE16-00-0314	ALLH	—	—	—	—	0.092 (J-)	—	—	0.0029 (J)
16-06573	0–2	RE16-00-0315	ALLH	—	—	—	—	—	—	—	0.0025 (J)
16-06583	0–0.5	RE16-00-0306	ALLH	0.1 (J-)	—	—	2.3 (J-)	6.5 (J-)	—	0.00055 (J)	0.016

Table 2.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Naphthalene	Nitrotoluene[2]	Nitrotoluene[4]	Phenanthrene	Pyrene	RDX	Toluene	Trichlorofluoromethane
16-06583	0–2	RE16-00-0307	ALLH	—	—	—	0.53	0.89	—	—	0.0075
16-06587	0–0.5	RE16-00-0308	ALLH	—	—	—	—	—	—	0.00076 (J)	0.0056 (J)
16-06587	0–2	RE16-00-0309	ALLH	—	—	—	—	—	—	—	0.0043 (J)
16-06588	0–0.5	RE16-00-0310	ALLH	—	—	—	0.059 (J)	0.11 (J)	—	—	—
16-06588	0–2	RE16-00-0311	ALLH	0.051 (J)	—	—	0.68	0.97	—	—	0.0047 (J)
16-06591	0–0.5	RE16-00-0312	ALLH	—	—	—	—	—	—	—	0.0044 (J)
16-06593	0–0.26	RE16-00-0371	SED	—	—	—	0.12 (J)	0.2 (J)	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Soil removed after sampling.

[b] — = If analyzed, sample result is not detected.

Table 2.9-1
Sampling Strategy for Fixed Laboratory Analyses in the Cañon de Valle Aggregate Area Investigation Work Plan

Site Functional Group	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
Outfalls/ Drainages (associated with radiography buildings)	Yes, acids associated with x-ray film processing; however, likely neutralized after 20 years	No, not associated with radiography/ film processing process	Yes, associated with x-ray film processing	No, not associated with radiography/ film processing process; possible if drainage has test sites further upstream	Yes, barium and metals associated with explosives; film processing (silver)	No, not associated with radiography/ film processing process	Yes, PAHs may be associated with waste stream
Outfalls/ Drainages (not associated with radiography buildings)	Yes, consistent with surface-water monitoring in related LANL programs	Yes, consistent with surface-water monitoring in related LANL programs	Yes, if downgradient of radiography buildings/ process or surface disposal	Yes, if downgradient of a firing site or open detonation site	Yes, barium and metals associated with explosives	Yes, if downgradient of surface disposal site (subsurface samples only)	Yes, if downgradient of surface disposal site
Surface Disposal Sites (except MDAs)	Yes, consistent with surface-water monitoring in related LANL programs	Yes, consistent with surface-water monitoring in related LANL programs	Yes, may have received laboratory waste	Yes, may have disposed-of rocket propellant and perchloric acid from tests at firing sites	Yes, barium and metals associated with explosives	Yes, unless all historical samples are negative (only subsurface sampling recommended)	Yes, unless all historical samples are negative
Oil Switches (assumed mineral oil)	No, not associated with mineral oil	No, not associated with mineral oil	No, not associated with mineral oil	No, not associated with mineral oil	No, not associated with mineral oil	No, only C_{12} fraction or heavier associated with mineral oil	No, not associated with mineral oil
MDA (R, Z)	Yes, possible laboratory waste chemicals	Yes, consistent with surface-water monitoring in related LANL programs	Yes, may have received laboratory waste chemicals	Yes, may be mixed with HE, disposed-of spent rocket propellant in tests from firing sites or other open detonation, disposal of spent perchloric acid	Yes, barium and metals associated with explosives	Yes, unless all historical samples are negative (only subsurface sampling recommended)	Yes, PAHs likely (MDA R only)

Table 2.9-1 (continued)

Site Functional Group	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
Filter Basket Wash	No, neutral wash process with water	Yes, consistent with surface-water monitoring in related LANL programs and residual nitrate species may be present	No, not associated with HE wash site	Yes, associated with HE, potentially as use of perchloric acid	Yes, barium and metals associated with explosives	Yes, VOCs possibly associated with solvents in cleaning process (only subsurface sampling recommended)	Yes, downgradient of machining and may detect solvents (some SVOCs in historical samples)
Steam Plants and Cooling Towers (associated blow-down water and floor drains)	Yes, possible pH issues related to scale treatment	No, not associated with blow-down water	No, not associated with blow-down water	No, not associated with steam plants	Yes, possible chromates, iron, and copper used for bacterial control	No, not associated with steam plants	Yes, may have been used as boiler water additives
Storage Buildings/Shops	Yes, acids and bases likely stored on site	Yes, may be associated with acids	No, should not be a waste unless chemical storage building	Yes, may be associated with storage of perchloric acid	Yes, unless all historical data show no BV exceedences	Yes, must assume organic chemical storage (potential spills), unless documented otherwise	Yes, must assume organic chemical storage (potential spills), unless documented otherwise
HE Storage Magazines	No, pH not an issue with solid HE storage	Yes, potential residual nitrate species	No, not associated with HE components in storage	Yes, possible component of HE mixture	Yes, barium and metals associated with explosives	No, not associated with HE components in storage	No, not associated with HE components in storage
Fuel Storage Tanks - Oils	No, pH not an issue with heavy fuels	No, not associated with heavy fuels	No, not associated with heavy fuels	No, not associated with heavy fuels	Yes, possible fuel additives to heavy oil fractions	Yes, VOCs may be present	Yes, PAHs may be present
Septic Tank Systems	Yes, depending on operations served	Yes, depending on operations served	Yes, depending on operations served	Yes, depending on operations served (perchloric acid spill, releases)	Yes, waste with metals exceeding BV is possible	Yes, depending on operations served	Yes, depending on operations served

Table 2.9-1 (continued)

Site Functional Group	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
Open Burn Sites	Yes, consistent with surface-water monitoring in related LANL programs	Yes, consistent with surface-water monitoring in related LANL programs	No, should not be a waste associated with open burn site	Yes, may have disposed-of spent rocket propellant in open burn area	Yes, barium and metals associated with explosives	Yes, possibly associated with starter fuels or solvents	Yes, PAHs may be present
Laboratories	Yes, depending on type of laboratory facility (wet chemistry) and site history	Yes, depending on type of laboratory facility (wet chemistry) and site history	Yes, depending on type of laboratory facility (wet chemistry) and site history	Yes, possibly associated with perchloric acid use	Yes, waste with metals exceeding BV is possible	Yes, unless historical samples are negative (subsurface samples only)	Yes, likely laboratory waste
HE Machining Buildings	Yes, may have had associated acid/base use	Yes, residual nitrate species	No, not associated with HE machining process	Yes, possibly associated with perchloric acid use	Yes, barium and metals associated with explosives	Yes, other possible cleaning solvents	Yes, possible halogenated solvents in machining parts cleaning
Firing Sites/Open Detonation	Yes, consistent with surface-water monitoring in related LANL programs	Yes, consistent with surface-water monitoring in related LANL programs	No, should not be a waste at open detonation site	Yes, may have used rocket propellant in tests at firing sites or other open detonation	Yes, barium and metals associated with explosives	No, VOCs not likely following HE detonation (even partial)	Yes, PAH burn residues possible
Sump/Drain Lines (lined/unlined)	Yes, consistent with surface-water monitoring in related LANL programs (most upgradient of surface-water discharge)	Yes, consistent with surface-water monitoring in related LANL programs	Yes, if downgradient of radiography buildings/process or surface disposal site	Yes, if downgradient of a firing site or open detonation site	Yes, barium and metals associated with explosives	Yes, if downgradient of surface disposal site or laboratories (subsurface samples only)	Yes, if downgradient of surface disposal site or laboratories

Table 2.9-1 (continued)

Site Functional Group	TPH (SW-846 8015M)	Pesticides (SW-846 8081A) Herbicides (SW-846 8151A)	PCBs (SW-846 8082)	HE Compounds (SW-846 8321A)	Gamma Spectroscopy (EPA Method 901.1)*	Alpha Spectroscopy (HASL 300)*	Tritium (EPA Method 906)
Outfalls/ Drainages (associated with radiography buildings)	No, petroleum fractions are not part of waste stream	No, operational use only, not part of waste stream	No, PCBs are not associated with operations	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	Yes, radiological sources contained in x-ray machines may not have been closed system x-ray tubes	No, x-ray sources would have been gamma emitters	No, tritium sources are not associated with this waste stream
Outfalls/ Drainages (not associated with radiography buildings)	Yes, if downgradient of open burn site or surface disposal site	No, operational use only, not part of waste stream	Yes, if downgradient of surface disposal site or buildings requiring significant electricity	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	Yes, if downgradient of radiography buildings/process or surface disposal site	Yes, if downgradient of firing site or open burn site (depleted uranium)	No, tritium sources are not associated with this waste stream
Surface Disposal Sites (except MDAs)	No, petroleum fractions are not part of waste stream (VOCs and SVOCs are recommended for sampling)	Yes, if there is documentation of waste chemical disposal or burning at the site	Yes, possible that transformer oil disposed of (unless historical data exists)	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	Yes, unknown waste inventory at most sites	Yes, unknown waste inventory at most sites	No, tritium sources are not associated with this waste stream
Oil Switches (assumed mineral oil)	Yes, will detect C_{12} fraction and heavier (DRO)	No, operational use only, not associated with mineral oil	Yes, mineral oil may have contained PCBs	No, not associated with mineral oil	No, not associated with mineral oil	No, not associated with mineral oil	No, not associated with mineral oil

Table 2.9-1 (continued)

Site Functional Group	TPH (SW-846 8015M)	Pesticides (SW-846 8081A) Herbicides (SW-846 8151A)	PCBs (SW-846 8082)	HE Compounds (SW-846 8321A)	Gamma Spectroscopy (EPA Method 901.1)*	Alpha Spectroscopy (HASL 300)*	Tritium (EPA Method 906)
MDA (R, Z)	Yes, residual starter fuels may be part of waste stream (MDA R only)	Yes, if spent chemical disposal and/or burning occurred	No, transformers should not have been taken to MDAs	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	Yes, unless there is documentation that no radionuclides were part of waste disposed of at site	Yes, spent devices sent to MDAs may have contained uranium (depleted uranium, other radionuclides)	No, not associated with this waste stream
Filter Basket Wash	Yes, residual starter fuels may have been used	No, operational use only, not associated with HE wash process	No, not associated with operations	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	No, gamma-emitting radiochemicals not associated with the basket wash	Yes, uranium-contaminated HE/devices were washed and burned at site; filtrate released	No, not associated with this waste stream
Steam Plants and Cooling Towers (associated blow-down water and floor drains)	No, not associated with steam plants	No, operational use only, not associated with steam plants	No, not associated with steam plants	No, not associated with steam plants	No, not associated with steam plants	No, not associated with steam plants	No, not associated with steam plants
Storage Buildings/Shops	No, VOCs and SVOCs sufficient for unknowns unless fuel storage within building (unlikely) is documented	No, operational use only unless storage building is associated with grounds maintenance	Yes, transformers near buildings may have contained PCBs	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	No, not associated with these operations	No, unless device assembly was performed in building	No, not associated with storage buildings/shops supporting HE sites

Table 2.9-1 (continued)

Site Functional Group	TPH (SW-846 8015M)	Pesticides (SW-846 8081A) Herbicides (SW-846 8151A)	PCBs (SW-846 8082)	HE Compounds (SW-846 8321A)	Gamma Spectroscopy (EPA Method 901.1)*	Alpha Spectroscopy (HASL 300)*	Tritium (EPA Method 906)
HE Storage Magazines	No, petroleum fractions are not part of potential waste release	No, operational use only; not associated with HE storage	No, not associated with HE components in storage	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	No, not associated with HE components in storage	No, not associated with HE components in storage	No, not associated with HE components in storage
Fuel Storage Tanks - Oils	Yes, will detect C_{12} fraction and heavier (DRO)	No, not associated with heavy fuels	No, not associated with heavy fuels	No, not associated with heavy fuels	No, not associated with heavy fuels	No, not associated with fuel oil	No, not associated with heavy fuels
Septic Tank Systems	No, petroleum fractions are not part of waste stream	No, operational use only, unless system served storage building associated with grounds maintenance	No, not associated with operations	Yes, depending on operations served	No, not likely unless system served radiography building(s)	No, not likely unless system served assembly shop for devices	No, not associated with septic tanks
Open Burn Sites	Yes, residual starter fuels may be present	Yes, unless there is documentation of no waste chemical burning at the site	No, not associated with operations	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	Yes, unless there is documentation that no radionuclides were disposed of at site	Yes, devices at open burn sites may have contained uranium (depleted uranium, other radionuclides)	No, not associated with open burn site
Laboratories	No, petroleum fractions are not part of waste stream	No, operational use only, not part of laboratory operations or waste	No, not associated with operations	Yes, depending on type of laboratory facility (wet chemistry) and site history	Yes, depending on type of laboratory facility (wet chemistry) and site history	Yes, depending on type of laboratory facility (wet chemistry) and site history	No, not associated with open burn site

Table 2.9-1 (continued)

Site Functional Group	TPH (SW-846 8015M)	Pesticides (SW-846 8081A) Herbicides (SW-846 8151A)	PCBs (SW-846 8082)	HE Compounds (SW-846 8321A)	Gamma Spectroscopy (EPA Method 901.1)*	Alpha Spectroscopy (HASL 300)*	Tritium (EPA Method 906)
HE Machining Buildings	No, petroleum fractions are not part of waste stream	No, operational use only, not associated with operations	No, not associated with operations	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	No, not associated with operations	No, not associated with operations	No, not associated with operations
Firing Sites/Open Detonation	No, petroleum fractions not associated with open detonation sites	No, operational use only, not part of open detonation process or waste	No, not associated with open detonation operations	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	No, uranium isotopes (alpha emitters) are most likely associated with devices	Yes, devices tested at firing sites may have contained uranium (depleted uranium, other radionuclides)	No, not associated with open detonation operations
Sump/Drain Lines (lined/unlined)	Yes, if downgradient of open burn, open detonation, or surface disposal site	No, operational use only, unless receives runoff from grounds maintenance building	No, not associated with operations	Yes, to comply with Consent Order explosives compound list, unless all historical data are negative for HE compounds	Yes, if downgradient of radiography buildings/process or surface disposal site	Yes, if downgradient of firing site or open burn site (uranium/depleted uranium)	No, not associated with sumps and drainlines

*Field screening will be used to determine if individual samples will be analyzed by gamma or alpha spectroscopy.

Table 2.9-2
Subaggregate 1 Proposed Samples in Soil and Tuff at the TA-16-220 Complex

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)
X-Ray Buildings (Outfalls)										
1–4	SWMU 16-026(i), location of former outfall for building 16-224	Sampling to define nature and extent of contamination within the outfall boundary	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	—[b] — — —	x x x x	— — — —	x x x x	— — — —
5–8	SWMU 16-026(j), location of former outfall for building 16-226	Sampling to define nature and extent of contamination within the outfall boundary	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	x x x x	— — — —	x x x x	— — — —
9–13	Consolidated Unit 16-026(l)-00, location of former outfalls for building 16-220	Sampling to define nature and extent of contamination within the outfall boundaries	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	x x x x	— — — —	x x x x	— — — —
Silver Outfall										
14–20	SWMU 16-020, location of former building 16-222 Silver Outfall	Sampling to define vertical extent of metals and PAHs within the outfall boundary	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —
21–23	SWMU 16-020, location of former building 16-222 Silver Outfall	Sampling to define vertical and downgradient lateral extent of metals and PAHs within the outfall boundary	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	x x x x	— — — —

Table 2.9-2 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)
Debris Disposal Area										
24–27	SWMU 16-016(d), location of former debris disposal area	Confirmatory sampling to define nature and extent of metals and HE contamination within the former debris disposal area	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	x x x x	— — — —
Oil Switches										
28–31	AOC C-16-051, location of former oil switches	Sampling to define nature and extent of contamination of TPH and PCBs at the location of the former oil switches	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —

Table 2.9-2 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	PCBs (SW-846 8082)	Alpha Spectroscopy (HASL 300)[c]	Gamma Spectroscopy (EPA Method 901.1)[c]	Explosive Compounds (SW-846 8321A)
X-Ray Buildings (Outfalls)										
1–4	SWMU 16-026(i), location of former outfall for building 16-224	Sampling to define nature and extent of contamination within the outfall boundary	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD[d]	TBD	x x x x
5–8	SWMU 16-026(j), location of former outfall for building 16-226	Sampling to define nature and extent of contamination within the outfall boundary	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	x x x x
9–13	Consolidated Unit 16-026(l)-00, location of former outfalls for building 16-220	Sampling to define nature and extent of contamination within the outfall boundaries	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	x x x x
Silver Outfall										
14–20	SWMU 16-020, location of former building 16-222 Silver Outfall	Sampling to define vertical extent of metals and PAHs within the outfall boundary	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	x x	— —	— —	TBD	TBD	— —
21–23	SWMU 16-020, location of former building 16-222 Silver Outfall	Sampling to define vertical and downgradient lateral extent of metals and PAHs within the outfall boundary	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	— — — —

Table 2.9-2 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	PCBs (SW-846 8082)	Alpha Spectroscopy (HASL 300)[c]	Gamma Spectroscopy (EPA Method 901.1)[c]	Explosive Compounds (SW-846 8321A)
Debris Disposal Area										
24–27	SWMU 16-016(d), location of former debris disposal area	Confirmatory sampling to define nature and extent of metals and HE contamination within the former debris disposal area	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	TBD	TBD	x x x x
Oil Switches										
28–31	AOC C-16-051, location of former oil switches	Sampling to define nature and extent of contamination of TPH and PCBs at the location of the former oil switches	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	x x x x	x x x x	— — — —	— — — —	— — — —

[a] Depth intervals may be extended if additional sample volume is required.

[b] — = Analysis is not required.

[c] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[d] TBD = To be determined.

Table 3.5-1
Subaggregate 2 Summary of Historical Samples Collected in Soil, Fill, Sediment, and Tuff at MDA R: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number						
				Anions	Cyanide	Gamma Spectroscopy	High Explosives	Inorganic Chemicals	SVOC	VOC
Landfill										
16-02703	3.5–4.5	0316-97-0268	ALLH	—[a]	3904R	—	3903R	3904R	3902R	3902R
16-02703	53–54	0316-97-0270	QBT4	—	3904R	—	3903R	3904R	3902R	3902R
16-02703	69–70	0316-97-0269	QBT4	—	3904R	—	3903R	3904R	3902R	3902R
16-05907	0–0.5	RE16-98-2007	ALLH	—	—	—	5013R	5015R	5012R	—
16-05908	0–0.5	RE16-98-2008	ALLH	—	—	—	5013R	5015R	5012R	—
16-05909	0–0.5	RE16-98-2009	ALLH	—	—	—	5013R	5015R	5012R	—
16-06502	0–1	RE16-00-0200	FILL	—	—	—	7670R	7671R	7668R	—
16-06503	0–1	RE16-00-0201	FILL	—	—	—	7670R	7671R	7668R	—
16-06504	2–2.5	RE16-00-0343	ALLH	—	—	—	7670R	7671R	7668R	—
16-06505	0–1	RE16-00-0344	FILL	—	—	—	7670R	7671R	7668R	—
16-06506	0–1	RE16-00-0204	FILL	—	—	—	7670R	7671R	7668R	—
16-06506	3–4	RE16-00-0244	FILL	—	—	—	—	7671R	7668R	—
16-06507	1–1.5	RE16-00-0205	ALLH	—	—	—	7670R	7671R	7668R	—
16-06508	0–1	RE16-00-0326	FILL	—	—	—	7670R	7671R	7668R	—
16-06508	1.67–2.08	RE16-00-0327	ALLH	—	—	—	7670R	7671R	7668R	—
16-06509	0–1	RE16-00-0207	FILL	—	—	—	7670R	7671R	7668R	—
16-06509	1–2	RE16-00-0247	ALLH	—	—	—	7670R	7671R	7668R	—
16-06510	0–1	RE16-00-0208	FILL	—	—	—	7670R	7671R	7668R	—
16-06510	2–3	RE16-00-0248	ALLH	—	—	—	7670R	7671R	7668R	—
16-06511	0–1	RE16-00-0328	FILL	—	—	—	7670R	7671R	7668R	—
16-06511	2–3	RE16-00-0329	ALLH	—	—	—	7670R	7671R	7668R	—
16-06512	0–1	RE16-00-0330	ALLH	—	—	—	7670R	7671R	7668R	—
16-06512	2–3	RE16-00-0331	ALLH	—	—	—	7670R	7671R	7668R	—

Table 3.5-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number						
				Anions	Cyanide	Gamma Spectroscopy	High Explosives	Inorganic Chemicals	SVOC	VOC
16-06513	0–1	RE16-00-0334	FILL	—	—	—	7670R	7671R	7668R	—
16-06513	2–3	RE16-00-0335	ALLH	—	—	—	7670R	7671R	7668R	—
16-06514	2–2.67	RE16-00-0212	ALLH	—	—	—	7670R	7671R	7668R	—
16-06514	2.67–3.33	RE16-00-0252	ALLH	—	—	—	7670R	7671R	7668R	—
16-06515	1–2	RE16-00-0213	FILL	—	—	—	7670R	7671R	7668R	—
16-06515	6–7	RE16-00-0253	ALLH	—	—	—	7670R	7671R	7668R	—
16-06516	0–1	RE16-00-0336	FILL	—	—	—	7670R	7671R	7668R	—
16-06517	0–1	RE16-00-0340	ALLH	—	—	—	7670R	7671R	7668R	—
16-06517	2–3	RE16-00-0341	ALLH	—	—	—	7670R	7671R	7668R	—
16-06518	0–1	RE16-00-0342	FILL	—	—	—	7670R	7671R	7668R	—
16-06518	1–2	RE16-00-0345	ALLH	—	—	—	7670R	7671R	7668R	—
16-06519	0–1	RE16-00-0249	FILL	—	—	—	7670R	7671R	7668R	—
16-06520	0–1	RE16-00-0210	FILL	—	—	—	7753R	7755R	7752R	—
16-06520	4–5	RE16-00-0250	FILL	—	—	—	7753R	7755R	7752R	—
16-06522	0–0.5	RE16-00-0220	FILL	—	—	—	7670R	7671R	7668R	—
16-06523	0–0.5	RE16-00-0221	FILL	—	—	—	7670R	7671R	7668R	—
16-06524	0–0.5	RE16-00-0222	FILL	—	—	—	7670R	7671R	7668R	—
16-06525	0–0.5	RE16-00-0223	ALLH	—	—	—	7670R	7671R	7668R	—
16-06526	0–0.5	RE16-00-0224	FILL	—	—	—	7670R	7671R	7668R	—
16-06527	1–2.5	RE16-00-0225	FILL	—	—	—	7485R	7487R	7484R	—
16-06528	1–2.5	RE16-00-0226	FILL	—	—	—	7485R	7487R	7484R	—
16-06528	5–6	RE16-00-0256	QBT4	—	—	—	7560R	7562R	7559R	—
16-06529	1–2.5	RE16-00-0227	FILL	—	—	—	7485R	7487R	7484R	—
16-06529	17.5–20	RE16-00-0234	QBT4	—	—	—	7560R	7562R	7559R	—
16-06530	2.5–5	RE16-00-0228	FILL	—	—	—	7564R	7566R	7563R	—

Table 3.5-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number						
				Anions	Cyanide	Gamma Spectroscopy	High Explosives	Inorganic Chemicals	SVOC	VOC
16-06530	10–11	RE16-00-0235	QBT4	—	—	—	7560R	7562R	7559R	—
16-06531	0–2.5	RE16-00-0229	FILL	—	—	—	7581R	7583R	7580R	—
16-06531	7.5–10	RE16-00-0236	QBT4	—	—	—	7581R	7583R	7580R	—
16-06532	1.5–2.5	RE16-00-0230	FILL	—	—	—	7485R	7487R	7484R	—
16-06532	10–11	RE16-00-0237	QBT4	—	—	—	7581R	7583R	7580R	—
16-06533	2.5–5	RE16-00-0231	QBT4	—	—	—	7485R	7487R	7484R	—
16-06533	11–12	RE16-00-0238	QBT4	—	—	—	7560R	7562R	7559R	—
16-06534	1–2.5	RE16-00-0232	FILL	—	—	—	7485R	7487R	7484R	—
16-06534	7.5–9	RE16-00-0239	QBT4	—	—	—	7560R	7562R	7559R	—
16-06537	0–2.5	RE16-00-0211	FILL	—	—	—	7753R	7755R	7752R	—
16-06537	4–5	RE16-00-0251	ALLH	—	—	—	7753R	7755R	7752R	—
16-06538	0–1	RE16-00-0332	FILL	—	—	—	7753R	7755R	7752R	—
16-06538	4–4.5	RE16-00-0333	ALLH	—	—	—	7753R	7755R	7752R	—
16-06539	0–1	RE16-00-0338	FILL	—	—	—	7753R	7755R	7752R	—
16-06539	4–5	RE16-00-0339	ALLH	—	—	—	7753R	7755R	7752R	—
Drainage										
16-02656	3–3.5	0316-97-0404	SED	—	3910R	—	3909R	3910R	3908R	3908R
16-02749	0–0.33	RE16-02-46396	SED	—	—	—	1051S	1052S	1051S	—
16-02749	0–0.5	0816-96-0060	SED	2609	2609	2610	2613	2610	2608	—
16-02750	0–0.5	0816-96-0061	SED	2609	2609	2610	2613	2610	2608	—
16-02751	0–0.5	0816-96-0062	SED	2609	2609	2610	2613	2610	2608	—
16-02752	0–0.5	0816-96-0063	SED	2609	2609	2610	2613	2610	2608	—
16-02753	0–0.33	RE16-02-46397	SED	—	—	—	1051S	1052S	1051S	—
16-02753	0–0.5	0816-96-0064	SED	2609	2609	2610	2613	2610	2608	—
16-02754	0–0.33	RE16-02-46398	SED	—	—	—	1051S	1052S	1051S	—

Table 3.5-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number						
				Anions	Cyanide	Gamma Spectroscopy	High Explosives	Inorganic Chemicals	SVOC	VOC
16-02754	0–0.5	0816-96-0065	SED	2609	2609	2610	2613	2610	2608	—
16-02755	0–0.5	0816-96-0066	SED	2609	2609	2610	2613	2610	2608	—
16-05910	0–0.5	RE16-98-2010	ALLH	—	—	—	5013R	5015R	5012R	—
16-05911	0–0.5	RE16-98-2011	ALLH	—	—	—	5013R	5015R	5012R	—
16-06122	0–0.3	RE16-99-0089	SED	—	—	—	6091R	6092R	—	—
16-06122	0.3–0.53	RE16-99-0090	SED	—	—	—	6091R	6092R	—	—
16-06521	0–0.5	RE16-00-0219	FILL	—	—	—	7670R	7671R	7668R	—
Upgradient										
16-02168	0–0.5	0316-95-0512[b]	SED	—	1392	—	—	1392	1391	—
16-02168	0.67–1.08	0316-95-0513[b]	ALLH	—	1392	—	—	1392	1391	1391
16-02168	1.17–1.42	0316-95-0514[b]	ALLH	—	1392	—	—	1392	1391	1391
16-02169	0–0.5	0316-95-0515[b]	ALLH	—	1392	—	—	1392	1391	—
16-02170	0–0.5	0316-95-0516[b]	ALLH	—	1392	—	—	1392	1391	—

[a] — = The analysis was not requested.

[b] Soil removed after sampling.

Table 3.5-2
Subaggregate 2 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil, Fill, and Tuff at the Landfill at MDA R: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron
Soil Background Value[a]				**29200**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**
QBT4 Background Value				**7340**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**
16-05907	0–0.5	RE16-98-2007	ALLH	—[b]	—	110000	—	—	—	30.2 (J)	60.5	—	—
16-05908	0–0.5	RE16-98-2008	ALLH	—	—	75100	—	—	—	26.5 (J)	49	—	—
16-05909	0–0.5	RE16-98-2009	ALLH	—	—	44100	—	—	—	—	68.5	—	—
16-06502	0–1	RE16-00-0200	FILL	—	—	3000	—	—	—	—	—	—	—
16-06503	0–1	RE16-00-0201	FILL	—	—	1200	—	—	—	—	69 (J)	—	—
16-06504	2–2.5	RE16-00-0343	ALLH	—	—	3200	—	—	—	—	—	56 (J)	—
16-06505	0–1	RE16-00-0344	FILL	—	—	1600	—	—	—	—	—	—	—
16-06506	0–1	RE16-00-0204	FILL	—	—	27000	—	—	—	—	—	—	—
16-06506	3–4	RE16-00-0244	FILL	—	—	6800	—	—	—	—	—	—	—
16-06507	1–1.5	RE16-00-0205	ALLH	—	—	4300	—	—	—	—	—	—	—
16-06508	0–1	RE16-00-0326	FILL	—	—	84000	—	—	—	—	70 (J)	—	—
16-06508	1.67–2.08	RE16-00-0327	ALLH	—	—	63000	—	—	—	—	140 (J)	—	—
16-06509	0–1	RE16-00-0207	FILL	—	—	3100	—	7000	—	—	1300 (J)	—	—
16-06509	1–2	RE16-00-0247	ALLH	—	—	1700	—	—	—	—	980 (J)	—	—
16-06510	0–1	RE16-00-0208	FILL	—	—	600	—	—	—	—	—	—	—
16-06510	2–3	RE16-00-0248	ALLH	—	—	1600	—	—	—	—	—	—	—
16-06511	0–1	RE16-00-0328	FILL	—	—	5800	—	—	—	—	—	73 (J)	—
16-06511	2–3	RE16-00-0329	ALLH	—	—	4500	—	—	—	—	—	15 (J)	—
16-06512	0–1	RE16-00-0330	ALLH	—	—	9900	—	—	—	—	—	—	—
16-06512	2–3	RE16-00-0331	ALLH	—	—	380	—	—	—	—	—	—	—
16-06513	0–1	RE16-00-0334	FILL	—	—	6400	—	—	—	—	—	—	—

Table 3.5-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron
Soil Background Value[a]				**29200**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**
QBT4 Background Value				**7340**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**
16-06513	2–3	RE16-00-0335	ALLH	—	—	8400	—	—	—	—	—	—	—
16-06514	2–2.67	RE16-00-0212	ALLH	—	—	6900	—	—	—	—	—	—	—
16-06514	2.67–3.33	RE16-00-0252	ALLH	—	—	8900	—	—	—	—	—	—	—
16-06515	1–2	RE16-00-0213	FILL	—	—	1100	—	—	—	—	—	—	—
16-06515	6–7	RE16-00-0253	ALLH	—	—	600	—	—	—	—	—	—	—
16-06516	0–1	RE16-00-0336	FILL	—	—	2100	—	—	—	—	—	—	—
16-06517	0–1	RE16-00-0340	ALLH	—	—	5400	—	—	—	—	—	—	—
16-06517	2–3	RE16-00-0341	ALLH	—	—	1900	—	—	—	—	—	—	—
16-06518	1–2	RE16-00-0345	ALLH	—	—	350	—	—	—	—	—	—	—
16-06519	0–1	RE16-00-0249	FILL	—	—	2400	—	—	—	—	—	110 (J)	—
16-06520	0–1	RE16-00-0210	FILL	34000	—	7200	—	—	13000	—	—	17	—
16-06520	4–5	RE16-00-0250	FILL	—	—	370	—	—	—	—	—	—	—
16-06522	0–0.5	RE16-00-0220	FILL	—	—	680	—	—	—	—	—	—	—
16-06523	0–0.5	RE16-00-0221	FILL	—	—	810	—	—	—	—	—	—	—
16-06524	0–0.5	RE16-00-0222	FILL	—	—	—	—	—	—	—	—	—	—
16-06525	0–0.5	RE16-00-0223	ALLH	—	—	—	—	—	—	—	—	—	—
16-06526	0–0.5	RE16-00-0224	FILL	—	—	470	—	—	—	—	—	—	—
16-06527	1–2.5	RE16-00-0225	FILL	42000	—	850 (J-)	—	—	—	—	29	25000	—
16-06528	1–2.5	RE16-00-0226	FILL	—	—	650 (J-)	—	—	—	—	—	—	—
16-06528	5–6	RE16-00-0256	QBT4	—	3.1 (J+)	—	—	—	—	—	—	—	—
16-06529	1–2.5	RE16-00-0227	FILL	—	—	1700 (J-)	—	—	—	—	16	—	—
16-06529	17.5–20	RE16-00-0234	QBT4	38000	7.1 (J+)	—	2.1 (J+)	—	4800	18 (J+)	4.8 (J+)	11 (J+)	23000

Table 3.5-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron
Soil Background Value[a]				**29200**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**
QBT4 Background Value				**7340**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**
16-06530	2.5–5	RE16-00-0228	FILL	—	—	—	—	—	—	—	—	—	—
16-06530	10–11	RE16-00-0235	QBT4	—	—	440 (J+)	—	—	—	—	—	—	—
16-06531	0–2.5	RE16-00-0229	FILL	—	—	8100 (J+)	—	—	—	—	190 (J+)	—	—
16-06531	7.5–10	RE16-00-0236	QBT4	15000	5.5 (J+)	93 (J+)	—	—	—	—	—	—	—
16-06532	1.5–2.5	RE16-00-0230	FILL	—	—	630 (J-)	—	—	—	—	—	—	—
16-06532	10–11	RE16-00-0237	QBT4	—	2.9 (J+)	—	—	—	—	—	—	—	—
16-06533	2.5–5	RE16-00-0231	QBT4	19000	4.4	840 (J-)	—	2400	—	8.6 (J)	7.2	15000	—
16-06533	11–12	RE16-00-0238	QBT4	—	—	—	—	—	—	—	—	—	—
16-06534	1–2.5	RE16-00-0232	FILL	—	—	420 (J-)	—	—	—	—	—	—	—
16-06534	7.5–9	RE16-00-0239	QBT4	—	3 (J+)	—	—	—	—	—	—	—	—
16-06537	0–2.5	RE16-00-0211	FILL	—	—	5200	—	0.61	—	—	8.9	93	—
16-06537	4–5	RE16-00-0251	ALLH	—	—	540	—	—	—	—	—	26	—
16-06538	0–1	RE16-00-0332	FILL	—	—	5400	—	—	—	—	11	—	—
16-06538	4–4.5	RE16-00-0333	ALLH	—	—	—	—	—	—	—	—	—	—
16-06539	0–1	RE16-00-0338	FILL	—	—	2900	—	—	—	—	—	—	—
16-06539	4–5	RE16-00-0339	ALLH	52000	—	—	3	—	—	—	—	—	—

Table 3.5-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Soil Background Value[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**39.6**	**48.8**
QBT4 Background Value				**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**17**	**63.5**
16-05907	0–0.5	RE16-98-2007	ALLH	—	—	—	—	—	28.2 (J-)	—	—	—	85.9
16-05908	0–0.5	RE16-98-2008	ALLH	—	—	—	—	—	10.9 (J-)	—	—	—	103
16-05909	0–0.5	RE16-98-2009	ALLH	—	—	—	—	—	6.2 (J-)	—	—	—	119
16-06502	0–1	RE16-00-0200	FILL	—	—	—	—	—	1.1	—	—	—	—
16-06503	0–1	RE16-00-0201	FILL	—	—	—	—	—	1.6	—	—	—	—
16-06504	2–2.5	RE16-00-0343	ALLH	24	—	—	—	18	—	2.1	—	—	53 (J-)
16-06505	0–1	RE16-00-0344	FILL	—	—	—	—	—	—	1.2	—	—	—
16-06506	0–1	RE16-00-0204	FILL	—	—	—	—	—	2.1	—	—	—	—
16-06506	3–4	RE16-00-0244	FILL	—	—	—	—	—	—	—	—	—	—
16-06507	1–1.5	RE16-00-0205	ALLH	—	—	—	—	—	1.5	—	—	—	—
16-06508	0–1	RE16-00-0326	FILL	—	—	—	—	—	5.4	—	—	—	100 (J-)
16-06508	1.67–2.08	RE16-00-0327	ALLH	—	—	—	22	—	3.9	—	—	—	65 (J-)
16-06509	0–1	RE16-00-0207	FILL	—	—	—	—	—	3.6	—	44.2	—	490
16-06509	1–2	RE16-00-0247	ALLH	—	—	—	—	—	3.1	—	40.5	—	200
16-06510	0–1	RE16-00-0208	FILL	—	—	—	—	—	—	1.2	—	—	—
16-06510	2–3	RE16-00-0248	ALLH	—	—	790	—	—	—	1.1	—	—	—
16-06511	0–1	RE16-00-0328	FILL	24	—	—	—	—	—	2.7	—	—	70 (J-)
16-06511	2–3	RE16-00-0329	ALLH	—	—	—	—	—	—	2.1	—	—	—
16-06512	0–1	RE16-00-0330	ALLH	—	—	—	—	—	—	2.9	—	—	—
16-06512	2–3	RE16-00-0331	ALLH	—	—	—	—	—	—	1.1	—	—	—
16-06513	0–1	RE16-00-0334	FILL	—	—	—	—	—	3.1	—	—	—	—

Table 3.5-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Soil Background Value[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**39.6**	**48.8**
QBT4 Background Value				**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**17**	**63.5**
16-06513	2–3	RE16-00-0335	ALLH	—	—	—	—	—	3.6	—	—	—	—
16-06514	2–2.67	RE16-00-0212	ALLH	—	—	—	—	—	1.8	—	—	—	—
16-06514	2.67–3.33	RE16-00-0252	ALLH	—	—	—	—	—	1.6	—	—	—	—
16-06515	1–2	RE16-00-0213	FILL	—	—	—	—	—	—	—	—	—	—
16-06515	6–7	RE16-00-0253	ALLH	—	—	—	—	—	—	—	—	—	—
16-06516	0–1	RE16-00-0336	FILL	—	—	—	—	—	—	—	—	—	—
16-06517	0–1	RE16-00-0340	ALLH	—	—	—	—	—	—	1.5	—	—	—
16-06517	2–3	RE16-00-0341	ALLH	—	—	—	—	—	—	—	—	—	—
16-06518	1–2	RE16-00-0345	ALLH	—	—	—	—	—	—	—	—	—	—
16-06519	0–1	RE16-00-0249	FILL	29 (J)	—	—	—	—	—	2.9	—	—	69
16-06520	0–1	RE16-00-0210	FILL	—	—	—	—	—	—	3.4	—	—	54
16-06520	4–5	RE16-00-0250	FILL	—	—	—	0.11	—	—	1.7	—	—	—
16-06522	0–0.5	RE16-00-0220	FILL	—	—	—	—	—	—	2	—	—	—
16-06523	0–0.5	RE16-00-0221	FILL	—	—	—	—	—	—	1.3	—	—	—
16-06524	0–0.5	RE16-00-0222	FILL	—	—	—	—	—	—	1.1	—	—	—
16-06525	0–0.5	RE16-00-0223	ALLH	—	—	—	—	—	—	1.3	—	—	—
16-06526	0–0.5	RE16-00-0224	FILL	—	—	—	—	—	—	1.5	—	—	—
16-06527	1–2.5	RE16-00-0225	FILL	4800	—	—	—	—	1.6	—	—	—	59
16-06528	1–2.5	RE16-00-0226	FILL	—	—	—	—	—	2	—	—	—	—
16-06528	5–6	RE16-00-0256	QBT4	—	—	—	—	—	0.37 (J)	—	—	—	—
16-06529	1–2.5	RE16-00-0227	FILL	—	—	—	—	—	2.1	—	—	—	—
16-06529	17.5–20	RE16-00-0234	QBT4	13 (J+)	4700	—	—	11 (J+)	0.499	—	—	28 (J+)	—

Table 3.5-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Soil Background Value[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**39.6**	**48.8**
QBT4 Background Value				**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**17**	**63.5**
16-06530	2.5–5	RE16-00-0228	FILL	—	—	—	—	—	2	—	—	—	—
16-06530	10–11	RE16-00-0235	QBT4	—	—	—	—	—	0.372	—	—	—	—
16-06531	0–2.5	RE16-00-0229	FILL	—	—	—	—	—	2.5	—	—	—	73 (J+)
16-06531	7.5–10	RE16-00-0236	QBT4	—	—	—	—	—	0.453 (J)	—	—	—	—
16-06532	1.5–2.5	RE16-00-0230	FILL	—	—	—	—	—	1.7	—	—	—	—
16-06532	10–11	RE16-00-0237	QBT4	—	—	—	—	—	—	—	—	—	—
16-06533	2.5–5	RE16-00-0231	QBT4	1900	—	—	8.7	—	2.1	—	—	21	—
16-06533	11–12	RE16-00-0238	QBT4	—	—	—	—	—	0.431 (J)	—	—	—	—
16-06534	1–2.5	RE16-00-0232	FILL	—	—	—	—	—	1.8	—	—	—	—
16-06534	7.5–9	RE16-00-0239	QBT4	—	—	—	—	—	0.382 (J)	—	—	—	—
16-06537	0–2.5	RE16-00-0211	FILL	160 (J)	—	—	—	—	—	14	—	—	150
16-06537	4–5	RE16-00-0251	ALLH	—	—	—	0.16	—	—	2.2	—	—	—
16-06538	0–1	RE16-00-0332	FILL	—	—	—	—	—	—	2.1	—	—	—
16-06538	4–4.5	RE16-00-0333	ALLH	—	—	—	—	—	—	1.9	—	—	—
16-06539	0–1	RE16-00-0338	FILL	23 (J)	—	—	—	—	—	2.1	—	—	—
16-06539	4–5	RE16-00-0339	ALLH	—	—	—	0.11 (J)	16	—	2.4	0.845	—	52

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Fill samples were compared to soil background values.

[b] — = If analyzed, sample result is less than background value.

Table 3.5-3
Subaggregate 2 Historical Analytical Results of Organic Chemicals Detected in Soil, Fill, and Tuff at the Landfill at MDA R: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Amino-DNTs	Aniline	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	HMX
16-02703	3.5–4.5	0316-97-0268	ALLH	—*	—	—	—	—	0.57	—	—
16-02703	69–70	0316-97-0269	QBT4	—	—	—	—	—	0.14	—	—
16-05907	0–0.5	RE16-98-2007	ALLH	—	—	—	—	—	—	—	—
16-05908	0–0.5	RE16-98-2008	ALLH	—	—	—	—	—	—	—	22 (J)
16-05909	0–0.5	RE16-98-2009	ALLH	0.27	0.26	—	0.38 (J)	—	—	—	—
16-06504	2–2.5	RE16-00-0343	ALLH	—	—	—	—	—	0.047 (J)	—	—
16-06505	0–1	RE16-00-0344	FILL	—	—	—	—	—	—	—	—
16-06506	0–1	RE16-00-0204	FILL	—	—	—	—	—	—	—	4.2
16-06508	0–1	RE16-00-0326	FILL	—	—	1.8	—	—	0.25 (J)	0.28 (J)	15
16-06508	1.67–2.08	RE16-00-0327	ALLH	—	—	—	—	—	—	—	10
16-06509	0–1	RE16-00-0207	FILL	—	—	—	—	—	—	1 (J)	—
16-06509	1–2	RE16-00-0247	ALLH	—	—	—	—	—	—	0.6 (J)	—
16-06511	0–1	RE16-00-0328	FILL	—	—	—	—	—	—	—	—
16-06511	2–3	RE16-00-0329	ALLH	—	—	—	—	—	—	—	—
16-06513	0–1	RE16-00-0334	FILL	—	—	—	—	—	0.088 (J)	—	—
16-06513	2–3	RE16-00-0335	ALLH	—	—	—	—	—	0.1 (J)	—	—
16-06514	2–2.67	RE16-00-0212	ALLH	—	—	—	—	—	—	—	—
16-06514	2.67–3.33	RE16-00-0252	ALLH	—	—	—	—	—	—	—	—

Table 3.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Amino-DNTs	Aniline	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	HMX
16-06515	1–2	RE16-00-0213	FILL	—	—	—	—	0.095 (J)	—	—	—
16-06519	0–1	RE16-00-0249	FILL	—	—	—	—	—	—	—	—
16-06520	0–1	RE16-00-0210	FILL	—	—	—	—	—	—	—	0.25 (J)
16-06520	4–5	RE16-00-0250	FILL	—	—	—	—	—	—	—	0.68
16-06524	0–0.5	RE16-00-0222	FILL	—	—	—	—	—	—	—	—
16-06528	5–6	RE16-00-0256	QBT4	—	—	—	—	—	0.041 (J)	—	—
16-06530	10–11	RE16-00-0235	QBT4	—	—	—	—	—	—	—	—
16-06530	2.5–5	RE16-00-0228	FILL	—	—	—	—	—	—	—	—
16-06537	0–2.5	RE16-00-0211	FILL	—	0.69 (J)	—	—	—	—	—	4.2
16-06537	4–5	RE16-00-0251	ALLH	—	—	—	—	—	—	—	0.64
16-06538	0–1	RE16-00-0332	FILL	—	—	—	—	—	—	—	0.46
16-06538	4–4.5	RE16-00-0333	ALLH	—	—	—	—	—	—	—	0.14 (J)
16-06539	0–1	RE16-00-0338	FILL	0.05 (J)	0.049 (J)	—	—	—	—	—	—
16-06539	4–5	RE16-00-0339	ALLH	—	—	—	—	—	—	—	—

Table 3.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyridine	RDX	Trinitrotoluene[2,4,6-]	Xylene[1,3-] + Xylene[1,4-]
16-02703	3.5–4.5	0316-97-0268	ALLH	—	—	—	—	—	—	0.007
16-02703	69–70	0316-97-0269	QBT4	—	—	—	—	—	—	—
16-05907	0–0.5	RE16-98-2007	ALLH	—	—	—	—	1500	720	—
16-05908	0–0.5	RE16-98-2008	ALLH	—	—	—	—	100	—	—
16-05909	0–0.5	RE16-98-2009	ALLH	—	—	—	—	4	0.88	—
16-06504	2–2.5	RE16-00-0343	ALLH	—	—	—	—	5.9	—	—
16-06505	0–1	RE16-00-0344	FILL	—	—	0.035 (J)	—	—	—	—
16-06506	0–1	RE16-00-0204	FILL	—	—	—	—	31	—	—
16-06508	0–1	RE16-00-0326	FILL	—	—	—	—	120	0.78	—
16-06508	1.67–2.08	RE16-00-0327	ALLH	—	—	—	—	77	2.2	—
16-06509	0–1	RE16-00-0207	FILL	—	—	—	—	1.7	—	—
16-06509	1–2	RE16-00-0247	ALLH	—	—	0.11 (J)	—	—	—	—
16-06511	0–1	RE16-00-0328	FILL	—	—	—	—	7.7	1.1	—
16-06511	2–3	RE16-00-0329	ALLH	—	—	—	—	1.9	—	—
16-06513	0–1	RE16-00-0334	FILL	—	0.082 (J)	0.051 (J)	0.04 (J)	—	—	—
16-06513	2–3	RE16-00-0335	ALLH	0.039 (J)	0.083 (J)	0.041 (J)	0.81	—	—	—
16-06514	2–2.67	RE16-00-0212	ALLH	—	—	—	—	3.1	—	—
16-06514	2.67–3.33	RE16-00-0252	ALLH	—	—	—	—	2.8	—	—
16-06515	1–2	RE16-00-0213	FILL	—	—	—	—	—	—	—

Table 3.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyridine	RDX	Trinitrotoluene[2,4,6-]	Xylene[1,3-] + Xylene[1,4-]
16-06519	0–1	RE16-00-0249	FILL	—	—	0.25 (J)	—	—	—	—
16-06520	0–1	RE16-00-0210	FILL	—	—	—	—	0.13 (J)	—	—
16-06520	4–5	RE16-00-0250	FILL	—	—	—	—	0.9	—	—
16-06524	0–0.5	RE16-00-0222	FILL	—	—	—	—	17	—	—
16-06528	5–6	RE16-00-0256	QBT4	—	—	—	—	—	—	—
16-06530	2.5–5	RE16-00-0228	FILL	—	—	—	—	9.6	—	—
16-06530	10–11	RE16-00-0235	QBT4	—	—	—	—	1.2	—	—
16-06537	0–2.5	RE16-00-0211	FILL	—	—	—	—	30	2.3 (J)	—
16-06537	4–5	RE16-00-0251	ALLH	—	—	—	—	2	—	—
16-06538	0–1	RE16-00-0332	FILL	—	—	—	—	0.085 (J)	—	—
16-06538	4–4.5	RE16-00-0333	ALLH	—	—	—	—	0.24 (J)	—	—
16-06539	0–1	RE16-00-0338	FILL	—	—	—	—	0.098 (J)	—	—
16-06539	4–5	RE16-00-0339	ALLH	—	—	—	—	0.1 (J)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is not detected.

Table 3.5-4
Subaggregate 2 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, and Sediment at Downgradient Drainage Locations at MDA R: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Arsenic	Barium	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead
Soil Background Value[a]				**8.17**	**295**	**n/a**[b]	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**
Sediment Background Value				**3.98**	**127**	**n/a**	**0.4**	**10.5**	**4.73**	**11.2**	**0.82**	**13800**	**19.7**
16-02656	3–3.5	0316-97-0404	SED	—[c]	200	—	—	—	—	—	—	—	—
16-02749	0–0.33	RE16-02-46396	SED	—	—	—	0.491 (U)	—	—	—	—	—	—
16-02749	0–0.5	0816-96-0060	SED	—	258	—	—	17.8 (J)	—	69	—	—	30.2
16-02750	0–0.5	0816-96-0061	SED	4.2 (U)	199	—	—	—	7.4 (J)	—	—	—	—
16-02751	0–0.5	0816-96-0062	SED	4.1 (U)	194	—	—	—	6.7 (J)	13.3	—	—	—
16-02752	0–0.5	0816-96-0063	SED	—	234	—	—	—	5.4 (J)	—	—	—	—
16-02753	0–0.33	RE16-02-46397	SED	—	177 (J+)	1.82 (J)	—	—	—	—	—	—	—
16-02753	0–0.5	0816-96-0064	SED	11	13800	—	—	—	10.1 (J)	99.8	—	22000	129
16-02754	0–0.33	RE16-02-46398	SED	—	810 (J+)	0.924 (J)	0.484 (U)	—	—	—	—	—	—
16-02754	0–0.5	0816-96-0065	SED	—	15900	—	—	—	8.7 (J)	28.8	1.1 (U)	—	108
16-02755	0–0.5	0816-96-0066	SED	—	751	—	—	—	—	12.1	—	—	28.3
16-05910	0–0.5	RE16-98-2010	ALLH	—	28000	—	—	—	11.3 (J)	43.8	—	—	141
16-05911	0–0.5	RE16-98-2011	ALLH	—	29800	—	—	—	15.1 (J)	27.4	—	—	431
16-06122	0–0.3	RE16-99-0089	SED	—	7360	—	—	—	6.5 (J)	27.7	—	—	55.1
16-06122	0.3–0.53	RE16-99-0090	SED	—	4670	—	—	—	—	—	—	—	—
16-06521	0–0.5	RE16-00-0219	FILL	—	29000	—	—	—	—	28 (J)	—	—	140 (J)

Table 3.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Manganese	Nickel	Nitrate-Nitrite as N	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
Soil Background Value[a]				**671**	**15.4**	**n/a**	**1.52**	**1**	**0.73**	**1.82**	**39.6**	**48.8**
Sediment Background Value				**543**	**9.38**	**n/a**	**0.3**	**1**	**0.73**	**2.22**	**19.7**	**60.2**
16-02656	3–3.5	0316-97-0404	SED	—	—	—	0.57 (U)	—	—	—	—	—
16-02749	0–0.33	RE16-02-46396	SED	—	—	—	0.491 (U)	29.2	—	—	—	—
16-02749	0–0.5	0816-96-0060	SED	—	305 (J-)	0.7	0.67 (U)	15.1 (J)	0.77 (U)	3.26	—	—
16-02750	0–0.5	0816-96-0061	SED	553 (J+)	11.7 (J-)	—	0.97 (U)	—	1.1 (J)	—	20	—
16-02751	0–0.5	0816-96-0062	SED	—	43.7 (J-)	—	0.45 (U)	—	0.86 (U)	—	—	—
16-02752	0–0.5	0816-96-0063	SED	—	17 (J-)	1.2	0.42 (U)	—	0.77 (U)	—	20.9	—
16-02753	0–0.33	RE16-02-46397	SED	—	12.9	—	0.494	113	—	—	20	—
16-02753	0–0.5	0816-96-0064	SED	—	9.6 (J-)	0.9	1.7	1.3 (J)	0.75 (U)	—	54.2	62.3
16-02754	0–0.33	RE16-02-46398	SED	—	—	—	0.306 (J)	6.58	—	—	—	—
16-02754	0–0.5	0816-96-0065	SED	—	13.5 (J-)	—	0.4 (U)	2.2 (J)	0.76 (U)	—	—	—
16-02755	0–0.5	0816-96-0066	SED	—	—	—	0.45 (U)	—	0.86 (U)	—	—	—
16-05910	0–0.5	RE16-98-2010	ALLH	—	—	—	—	—	—	—	—	80.2
16-05911	0–0.5	RE16-98-2011	ALLH	—	—	—	—	2.5 (J-)	—	—	—	—
16-06122	0–0.3	RE16-99-0089	SED	—	20.3	—	0.66 (U)	3.2	1 (U)	—	—	—
16-06122	0.3–0.53	RE16-99-0090	SED	—	—	—	0.65 (U)	—	1 (U)	—	—	—
16-06521	0–0.5	RE16-00-0219	FILL	—	—	—	—	3.5	—	—	—	53

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Fill samples were compared to soil background values.

[b] n/a = Not applicable; no background value available.

[c] — = If analyzed, sample result is less than background value.

Table 3.5-5
Subaggregate 2 Historical Analytical Results of Organic Chemicals
Detected in Soil, Fill, and Sediment at Downgradient Drainage Locations at MDA R: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Amino-DNTs	Benzoic Acid	Di-n-butylphthalate	Dinitrobenzene[1,3-]	Fluoranthene	HMX	Pyrene	RDX	Trinitrotoluene[2,4,6-]
16-02656	3–3.5	0316-97-0404	SED	—*	—	—	—	—	0.097 (J+)	—	—	—	—	—
16-02749	0–0.5	0816-96-0060	SED	—	—	—	—	1.5	—	—	—	—	—	—
16-02750	0–0.5	0816-96-0061	SED	—	—	—	—	0.83	—	—	—	—	—	—
16-02751	0–0.5	0816-96-0062	SED	—	—	—	—	1.1	—	—	—	—	—	—
16-02752	0–0.5	0816-96-0063	SED	—	—	—	—	0.88	—	—	—	—	—	—
16-02753	0–0.33	RE16-02-46397	SED	—	—	—	0.38 (J-)	—	—	0.0177 (J)	—	0.0187 (J)	—	—
16-02753	0–0.5	0816-96-0064	SED	0.43	0.494	—	—	1.9	—	—	—	—	1.24	0.447
16-02754	0–0.5	0816-96-0065	SED	0.908	0.733	—	—	10	—	—	—	—	0.974	1.35
16-02755	0–0.5	0816-96-0066	SED	—	—	—	—	3	—	—	—	—	—	—
16-05911	0–0.5	RE16-98-2011	ALLH	—	—	—	—	—	—	—	—	—	14	—
16-06122	0–0.3	RE16-99-0089	SED	1.1	1.3	—	—	—	—	—	0.29 (J)	—	5.5	0.29
16-06122	0.3–0.53	RE16-99-0090	SED	—	—	—	—	—	—	—	0.48 (J)	—	0.26 (J)	—
16-06521	0–0.5	RE16-00-0219	FILL	—	—	2.7	—	—	—	—	1.8	—	5.2	3.8

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is not detected.

Table 3.5-6
Subaggregate 2 Historical Analytical
Results of Radionuclides Detected Greater Than Fallout Values in
Sediment at Downgradient Drainage Locations at MDA R: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Cesium-137
Sediment Fallout Value				
16-02749	0–0.5	0816-96-0060	SED	1.06

Source: Fallout values from LANL (1998, 59730, Table 6.0-2, p. 45).
Note: Units are pCi/g.

Table 3.5-7
Subaggregate 2 Historical Analytical Results of Inorganic Chemicals
Greater Than Background Values in Soil and Sediment at Upgradient Drainage Locations at MDA R: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Cadmium	Copper	Cyanide	Lead	Nickel	Silver
Soil Background Value				**0.83**	**0.4**	**14.7**	**0.5**	**22.3**	**15.4**	**1**
Sediment Background Value				**0.83**	**0.4**	**11.2**	**0.82**	**19.7**	**9.38**	**1**
16-02168	0–0.5	0316-95-0512[a]	SED	4.97 (U)	0.497 (U)	33.5	1.06 (U)	24.7 (J+)	123	5.7
16-02168	0.67–1.08	0316-95-0513[a]	ALLH	5.19 (U)	0.519 (U)	22.9	1.03 (U)	—[b]	106	17.6
16-02168	1.17–1.42	0316-95-0514[a]	ALLH	5.2 (U)	0.52 (U)	25.2	1.08 (U)	—	113	25.9
16-02169	0–0.5	0316-95-0515[a]	ALLH	5.41 (U)	0.541 (U)	51	1.11 (U)	23.2 (J+)	147	7.91
16-02170	0–0.5	0316-95-0516[a]	ALLH	5.74 (U)	0.574 (U)	65.9	1.19 (U)	30.4 (J+)	200	17.1

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).
Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] Soil removed after sampling.
[b] — = If analyzed, sample result is less than background value.

Table 3.5-8
Subaggregate 2 Historical Analytical Results of Organic
Chemicals Detected in Soil at Upgradient Drainage Locations at MDA R: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Benzo(b)fluoranthene	Chrysene	Fluoranthene	Phenanthrene	Pyrene
16-02168	1.17–1.42	0316-95-0514[a]	ALLH	—[b]	—	0.068 (J)	0.047 (J)	0.044 (J)
16-02169	0–0.5	0316-95-0515[a]	ALLH	0.07 (J)	0.063 (J)	0.1 (J)	0.048 (J)	0.11 (J)
16-02170	0–0.5	0316-95-0516[a]	ALLH	0.093 (J)	0.081 (J)	0.14 (J)	0.077 (J)	0.13 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] Soil removed after sampling.
[b] — = If analyzed, sample result is not detected.

Table 3.6-1
Subaggregate 2 Proposed Samples in Soil and Tuff at MDA R

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method 314.0 and SW-846 8321A)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
1–14	Upgradient landfill area	Sampling to define nature and extent of potential contamination within landfill boundary	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	—[b] x x x	x x x x
15–23	Within footprint of former burn pits	Sampling to define nature and extent of possible releases from former burn pits	0–0.5 2–2.5 5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Soil Soil Tuff Tuff Tuff	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	— x x x x	x x x x x
TBD[c] (minimum of 3 samples for each of 5 trenches)	Within exploratory trenches along steeply sloping portion of the site	Sampling to define nature and extent of possible contamination from waste material and debris pushed over the side	TBD (bottom of excavation)	Soil or Tuff	x	x	x	x	x	x	x

Table 3.6-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	TPH (SW-846 8015M)	Pesticides (SW-846 8081A) and Herbicides (SW-846 8151A)	PCBs (SW-846 8082) and Dioxins/Furans (SW-846 8290A)[d]	Alpha Spectroscopy (HASL 300)[e]	Gamma Spectroscopy (EPA Method 901.1)[e]	Explosive Compounds (SW-846 8321A)
1–14	Upgradient landfill area	Sampling to define nature and extent of potential contamination within landfill boundary	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	TBD	TBD	x x x x
15–23	Within footprint of former burn pits	Sampling to define nature and extent of possible releases from former burn pits	0–0.5 2–2.5 5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Soil Soil Tuff Tuff Tuff	x x x x x	x x x x x	TBD	TBD	TBD	x x x x x
TBD (minimum of 3 samples for each of 5 trenches)	Within exploratory trenches along steeply sloping portion of the site	Sampling to define nature and extent of possible contamination from waste material and debris pushed over the side	TBD (bottom of excavation)	Soil or Tuff	x	x	TBD	TBD	TBD	x

[a] Depth intervals may be extended if additional sample volume is required.

[b] — = Analysis is not required.

[c] TBD = To be determined.

[d] Analysis for PCBs and dioxins/furans will be performed only if PCBs are detected by field analytical methods.

[e] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if surface beta/gamma survey indicates presence of radionuclides at the site.

Table 4.5-1
Subaggregate 3 Summary of Historical Samples
Collected in Soil, Fill, Sediment, and Tuff at the TA-16 Burning Ground: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide	High Explosives	Inorganic Chemicals	SVOC	VOC
SWMU 16-005(g)								
16-01341	2–3	0316-95-0468	FILL	904	903	904	903	903
16-01341	5–7	0316-95-0469	QBT4	904	903	904	903	903
16-01660	0–1	0316-97-0611	ALLH	—*	3677R	3676R	3675R	3675R
16-01660	3–5	0316-97-0612	ALLH	—	3677R	3676R	3675R	3675R
16-01660	5–7	0316-97-0613	QBT4	—	3677R	3676R	3675R	3675R
SWMU 16-010(h)								
16-01349	0.33–0.83	0316-95-0307	FILL	1437	1436	1438	1436	—
16-01349	1.3–1.9	0316-95-0308	FILL	1437	1436	1438	1436	—
16-01351	0–0.5	0316-95-0305	FILL	1437	1436	1438	1436	—
16-01351	1–2	0316-95-0306	FILL	1437	1436	1438	1436	—
16-01352	0–0.5	0316-95-0303	ALLH	1313	1312	1314	1312	—
16-01352	0.5–1.5	0316-95-0304	ALLH	1313	1312	1314	1312	—
16-03-21917	1–1.5	RE16-03-50636	ALLH	—	1567S	1568S	1567S	1567S
16-03-21918	1–1.5	RE16-03-50637	ALLH	—	1567S	1568S	1567S	1567S
SWMU 16-010(i)								
16-01272	0–0.5	0316-95-0311	FILL	1398	1397	1399	1397	—
16-01272	0.58–1	0316-95-0312	FILL	1398	1397	1399	1397	1397
16-01278	0–0.5	0316-95-0313	FILL	1398	1397	1399	1397	—
16-01278	0.58–1	0316-95-0314	FILL	1398	1397	1399	1397	1397
16-01296	0–0.5	0316-95-0309	FILL	1398	1397	1399	1397	—
16-01296	0.58–1	0316-95-0310	FILL	1398	1397	1399	1397	1397
16-01297	0.33–0.83	0316-95-0315	ALLH	1398	1397	1399	1397	1397
16-01297	0.83–1.33	0316-95-0316	ALLH	1398	1397	1399	1397	1397
16-01298	0–0.66	0316-95-0317	ALLH	1298	1297	1299	1297	1297
16-01299	0–0.66	0316-95-0318	ALLH	1298	1297	1299	1297	1297
16-01300	0–0.5	0316-95-0319	SED	1298	1297	1299	1297	—
16-01301	0–0.5	0316-95-0320	SED	1398	1397	1399	1397	—
16-01302	0–0.5	0316-95-0321	ALLH	1298	1297	1299	1297	—
16-01303	0–0.5	0316-95-0322	SED	1398	1397	1399	1397	—
16-01313	0–0.5	0316-95-0356	ALLH	1374	1373	1375	—	—
16-01313	0.67–1.17	0316-95-0382	FILL	1521	1520	1522	1520	1520

Table 4.5-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide	High Explosives	Inorganic Chemicals	SVOC	VOC
SWMU 16-010(k)								
16-01282	0–0.5	0316-95-0333	ALLH	1374	1373	1374	—	—
16-01283	0–0.5	0316-95-0334	ALLH	1374	1373	1374	—	—
16-01284	0–0.5	0316-95-0335	ALLH	1374	1373	1374	—	—
16-01285	0–0.5	0316-95-0336	ALLH	1374	1373	1374	—	—
16-01286	0–0.5	0316-95-0337	ALLH	1374	1373	1374	—	—
16-01287	0–0.5	0316-95-0338	ALLH	1374	1373	1374	—	—
16-01288	0–0.5	0316-95-0339	ALLH	1374	1373	1374	—	—
16-01289	0–0.5	0316-95-0340	ALLH	1374	1373	1374	—	—
16-01289	0–0.66	0316-95-0379	ALLH	1313	1312	1314	1312	1312
16-01290	0–0.5	0316-95-0341	ALLH	1374	1373	1374	—	—
16-01290	0.67–1.17	0316-95-2018	ALLH	1313	1312	1314	1312	1312
16-01290	1–1.5	0316-95-0378	ALLH	1313	1312	1314	1312	1312
SWMU 16-010(l)								
16-01237	0–0.5	0316-95-0323	ALLH	1374	1373	1374	—	—
16-01237	2–2.5	0316-95-0376	ALLH	1521	1520	1522	1520	1520
16-01239	0–0.5	0316-95-0324	ALLH	1374	1373	1374	—	—
16-01239	3–3.5	0316-95-0377	ALLH	1521	1520	1522	1520	1520
16-01240	0–0.5	0316-95-0325	ALLH	1252	1251	1252	—	—
16-01246	0–0.5	0316-95-0326	ALLH	1252	1251	1252	—	—
SWMU 16-010(m)								
16-01226	0–0.5	0316-95-0343	ALLH	1374	1373	1374	—	—
16-01226	1–1.5	0316-95-0381	ALLH	1437	1436	1438	1436	1436
16-01230	0–0.5	0316-95-0344	ALLH	1252	1251	1252	—	—
16-01232	0–0.5	0316-95-0345	ALLH	1252	1251	1252	—	—
16-01233	0–0.5	0316-95-0346	ALLH	1374	1373	1374	—	—
16-01234	0–0.5	0316-95-0347	ALLH	1374	1373	1374	—	—
16-01235	0–0.5	0316-95-0348	ALLH	1374	1373	1374	—	—
16-01236	0–0.5	0316-95-0349	FILL	1374	1373	1374	—	—
16-01236	1–1.5	0316-95-0380	FILL	1437	1436	1438	1436	1436
16-01236	1–1.5	0316-95-2019	FILL	1437	1436	1438	1436	1436
SWMU 16-010(n)								
16-01304	0–0.5	0316-95-0353	ALLH	1252	1251	1253	—	—
16-01307	0–0.5	0316-95-0354	ALLH	1252	1251	1253	—	—
16-01311	0–0.5	0316-95-0355	ALLH	1252	1251	1253	—	—

Table 4.5-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide	High Explosives	Inorganic Chemicals	SVOC	VOC
SWMU 16-028(a)								
16-01329	0–0.5	0316-95-0363	FILL	1392	1391	1393	1391	—
16-01329	0–2	0316-97-0602	QBT4	—	3625R	3627R	3624R	3624R
16-01329	1.08–2.08	0316-97-0601	QBT4	—	3625R	3627R	—	3624R
16-01330	0–0.5	0316-95-0364	FILL	1392	1391	1393	1391	—
16-01330	1.67–2.33	0316-97-0603	ALLH	—	3625R	3627R	—	3624R
16-01330	4–5	0316-97-0604	QBT4	—	3625R	3627R	—	3624R
16-01331	0–0.5	0316-95-0365	FILL	1392	1391	1393	1391	—
16-01332	0–0.5	0316-95-0366	FILL	1392	1391	1393	1391	—
16-01333	0–0.5	0316-95-0367	FILL	1392	1391	1393	1391	—

*— = The analysis was not requested.

Table 4.5-2
Subaggregate 3 Summary of Historical Samples
Collected in Soil at the TA-16 Burning Ground: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number		
				Inorganic Chemicals	SVOC	VOC
SWMU 16-010(i)						
16-01272	0–0.5	0316-96-0003	ALLH	79265	79266	79328
SWMU 16-010(l)						
16-01240	0–0.5	0316-96-0004	ALLH	79265	79266	79328

Table 4.5-3
Subaggregate 3 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, Sediment, and Tuff at the TA-16 Burning Ground: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper
Soil Background Value[a]				**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**0.83**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**0.5**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**
SWMU 16-005(g)											
16-01341	2–3	0316-95-0468	FILL	6.1 (U)	—[b]	—	0.61 (U)	—	23.7	—	—
16-01341	5–7	0316-95-0469	QBT4	5.8 (U)	—	1.4	—	—	21.9	—	—
16-01660	0–1	0316-97-0611	ALLH	—	—	—	0.6 (U)	—	—	—	—
16-01660	3–5	0316-97-0612	ALLH	—	—	—	0.64 (U)	—	—	—	—
16-01660	5–7	0316-97-0613	QBT4	—	—	—	—	—	18	—	6.6
SWMU 16-010(h)											
16-01349	0.33–0.83	0316-95-0307	FILL	5.4 (U)	—	—	1	37800	20.2	—	33.5
16-01349	1.3–1.9	0316-95-0308	FILL	6.1 (U)	—	—	0.61 (U)	—	—	—	—
16-01351	0–0.5	0316-95-0305	FILL	5.5 (U)	—	—	0.55 (U)	22100	—	—	—
16-01351	1–2	0316-95-0306	FILL	5.5 (U)	—	—	2.8	—	—	—	—
16-01352	0–0.5	0316-95-0303	ALLH	5.3 (U)	—	—	0.65	—	—	—	—
16-01352	0.5–1.5	0316-95-0304	ALLH	5.2 (U)	—	—	0.52 (U)	—	—	—	—
16-03-21918	1–1.5	RE16-03-50637	ALLH	—	—	—	—	—	—	—	—
SWMU 16-010(i)											
16-01272	0–0.5	0316-95-0311	FILL	4.8 (U)	—	—	0.48 (U)	—	—	—	—
16-01272	0.58–1	0316-95-0312	FILL	4.8 (U)	340 (J+)	—	0.48 (U)	—	—	—	—
16-01278	0–0.5	0316-95-0313	FILL	4.9 (U)	880 (J+)	—	0.68	—	—	—	—
16-01278	0.58–1	0316-95-0314	FILL	5 (U)	652 (J+)	—	0.5 (U)	—	—	—	—
16-01296	0–0.5	0316-95-0309	FILL	4.9 (U)	345 (J+)	—	0.49 (U)	—	—	—	—

Table 4.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper
Soil Background Value[a]				**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**0.83**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**0.5**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**
16-01296	0.58–1	0316-95-0310	FILL	4.9 (U)	833 (J+)	—	0.49 (U)	—	—	—	—
16-01297	0.33–0.83	0316-95-0315	ALLH	5.4 (U)	—	—	0.54 (U)	—	—	—	—
16-01297	0.83–1.33	0316-95-0316	ALLH	5.1 (U)	571 (J+)	—	0.51 (U)	—	—	—	—
16-01298	0–0.66	0316-95-0317	ALLH	5.03 (U)	—	—	0.503 (U)	—	—	—	—
16-01299	0–0.66	0316-95-0318	ALLH	5.46 (U)	—	—	0.546 (U)	—	—	—	—
16-01300	0–0.5	0316-95-0319	SED	5.34 (U)	228	—	0.534 (U)	—	—	—	11.4
16-01301	0–0.5	0316-95-0320	SED	5 (U)	150	—	0.5 (U)	—	—	—	—
16-01302	0–0.5	0316-95-0321	ALLH	5.28 (U)	318	—	0.528 (U)	—	—	—	—
16-01303	0–0.5	0316-95-0322	SED	5.1 (U)	207 (J+)	—	0.51 (U)	—	—	—	—
16-01313	0–0.5	0316-95-0356	ALLH	5.2 (U)	545	—	0.94	—	—	—	35
16-01313	0.67–1.17	0316-95-0382	FILL	5.4 (U)	340	—	0.95	—	—	—	29.3
SWMU 16-010(k)											
16-01282	0–0.5	0316-95-0333	ALLH	5.8 (U)	1820	—	0.58 (U)	—	—	—	19.5
16-01283	0–0.5	0316-95-0334	ALLH	5.4 (U)	480	—	0.54 (U)	—	—	—	—
16-01284	0–0.5	0316-95-0335	ALLH	5.5 (U)	633	—	0.55 (U)	—	—	—	—
16-01285	0–0.5	0316-95-0336	ALLH	5.3 (U)	456	—	0.53 (U)	—	—	—	—
16-01286	0–0.5	0316-95-0337	ALLH	5.1 (U)	—	—	0.51 (U)	—	—	—	—
16-01287	0–0.5	0316-95-0338	ALLH	5.1 (U)	401	—	1.1	—	—	—	—
16-01288	0–0.5	0316-95-0339	ALLH	5.2 (U)	301	—	0.52 (U)	—	—	—	—
16-01289	0–0.5	0316-95-0340	ALLH	5.7 (U)	610	—	0.57 (U)	—	—	—	—
16-01289	0–0.66	0316-95-0379	ALLH	5.8 (U)	—	—	0.58 (U)	—	—	—	—
16-01290	0–0.5	0316-95-0341	ALLH	5.4 (U)	337	—	0.54 (U)	—	—	—	—

Table 4.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper
Soil Background Value[a]				**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**0.83**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**0.5**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**
16-01290	0.67–1.17	0316-95-2018	ALLH	5.3 (U)	—	—	0.65	—	—	—	—
16-01290	1–1.5	0316-95-0378	ALLH	6 (U)	—	—	0.6 (U)	—	—	—	—
SWMU 16-010(l)											
16-01237	0–0.5	0316-95-0323	ALLH	5.7 (U)	475	—	0.57 (U)	—	—	—	—
16-01237	2–2.5	0316-95-0376	ALLH	5.6 (U)	—	—	0.56 (U)	—	—	—	—
16-01239	0–0.5	0316-95-0324	ALLH	5.5 (U)	387	—	0.55 (U)	—	—	—	—
16-01239	3–3.5	0316-95-0377	ALLH	6.2 (U)	—	—	0.62 (U)	—	—	—	—
16-01240	0–0.5	0316-95-0325	ALLH	5.7 (U)	902	—	0.57 (U)	—	—	—	—
16-01246	0–0.5	0316-95-0326	ALLH	5.1 (U)	489	—	0.51 (U)	—	—	—	—
SWMU 16-010(m)											
16-01226	0–0.5	0316-95-0343	ALLH	12.1	—	—	0.56 (U)	—	—	—	—
16-01226	1–1.5	0316-95-0381	ALLH	6 (U)	—	—	0.6 (U)	—	—	—	—
16-01230	0–0.5	0316-95-0344	ALLH	5.3 (U)	380	—	0.53 (U)	—	—	—	—
16-01232	0–0.5	0316-95-0345	ALLH	5.2 (U)	577	—	0.52 (U)	—	—	—	—
16-01233	0–0.5	0316-95-0346	ALLH	5.7 (U)	316	—	0.57 (U)	—	25.6	—	—
16-01234	0–0.5	0316-95-0347	ALLH	5.6 (U)	—	—	0.56 (U)	—	—	—	—
16-01235	0–0.5	0316-95-0348	ALLH	5.6 (U)	—	—	0.56 (U)	—	—	—	—
16-01236	0–0.5	0316-95-0349	FILL	5.9 (U)	—	—	0.59 (U)	—	—	—	29.5
16-01236	1–1.5	0316-95-0380	FILL	6 (U)	—	—	0.6 (U)	—	—	—	—
16-01236	1–1.5	0316-95-2019	FILL	6 (U)	—	—	0.6 (U)	—	—	—	—

Table 4.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper
Soil Background Value[a]				**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**0.83**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**0.5**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**
SWMU 16-010(n)											
16-01304	0–0.5	0316-95-0353	ALLH	5.6 (U)	—	—	0.56 (U)	—	—	—	—
16-01307	0–0.5	0316-95-0354	ALLH	5.3 (U)	494	—	0.53 (U)	—	—	—	—
16-01311	0–0.5	0316-95-0355	ALLH	5.5 (U)	—	—	0.55 (U)	—	—	—	—
SWMU 16-028(a)											
16-01329	0–0.5	0316-95-0363	FILL	4.94 (U)	321	—	0.494 (U)	—	—	—	—
16-01329	0–2	0316-97-0602	QBT4	0.71 (UJ)	74.1	—	—	—	—	5.4 (J)	59.1
16-01329	1.08–2.08	0316-97-0601	QBT4	0.8 (UJ)	1770	—	—	—	—	—	43.4
16-01330	0–0.5	0316-95-0364	FILL	5.09 (U)	588	—	0.509 (U)	—	—	—	—
16-01330	1.67–2.33	0316-97-0603	ALLH	—	—	—	—	—	—	—	68.5
16-01330	4–5	0316-97-0604	QBT4	0.77 (UJ)	—	—	—	—	—	4 (J)	73.2
16-01331	0–0.5	0316-95-0365	FILL	4.92 (U)	—	—	0.492 (U)	—	—	—	—
16-01332	0–0.5	0316-95-0366	FILL	5.69 (U)	501	—	0.569 (U)	—	—	—	—
16-01333	0–0.5	0316-95-0367	FILL	5.03 (U)	368	—	0.503 (U)	—	—	—	—

Table 4.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Zinc
Soil Background Value[a]				**22.3**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**1.82**	**48.8**
Sediment Background Value				**19.7**	**0.1**	**9.38**	**0.3**	**1**	**0.73**	**2.22**	**60.2**
QBT4 Background Value				**11.2**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**2.4**	**63.5**
SWMU 16-005(g)											
16-01341	2–3	0316-95-0468	FILL	—	—	—	—	—	—	—	60.9
16-01341	5–7	0316-95-0469	QBT4	—	—	—	—	—	—	—	—
16-01660	0–1	0316-97-0611	ALLH	—	0.12 (U)	—	—	2.4 (U)	1.5 (U)	—	49
16-01660	3–5	0316-97-0612	ALLH	—	0.13 (U)	—	—	2.6 (U)	1.6 (U)	—	—
16-01660	5–7	0316-97-0613	QBT4	—	0.12 (U)	—	—	2.4 (U)	1.5 (U)	—	—
SWMU 16-010(h)											
16-01349	0.33–0.83	0316-95-0307	FILL	44.2	—	—	—	—	—	3.02	96.7
16-01349	1.3–1.9	0316-95-0308	FILL	—	—	—	—	—	—	3.03	53.9
16-01351	0–0.5	0316-95-0305	FILL	—	—	—	—	—	—	2.69	—
16-01351	1–2	0316-95-0306	FILL	—	—	—	—	—	—	2.44	—
16-01352	0–0.5	0316-95-0303	ALLH	800	—	—	—	—	—	—	1070
16-01352	0.5–1.5	0316-95-0304	ALLH	51.1	—	—	—	—	—	—	115
16-03-21918	1–1.5	RE16-03-50637	ALLH	38	—	—	—	—	—	—	56.3 (J-)
SWMU 16-010(i)											
16-01272	0–0.5	0316-95-0311	FILL	—	0.17	—	—	—	—	2.86	—
16-01272	0.58–1	0316-95-0312	FILL	32.5	0.19	—	—	—	—	5.22	—
16-01278	0–0.5	0316-95-0313	FILL	46.8 (J+)	0.331	—	—	—	—	6.64	118
16-01278	0.58–1	0316-95-0314	FILL	—	—	—	—	—	—	7.86	—
16-01296	0–0.5	0316-95-0309	FILL	45.5 (J+)	—	—	—	—	—	2.08	—
16-01296	0.58–1	0316-95-0310	FILL	54.8 (J+)	—	—	—	—	—	2.86	—
16-01297	0.33–0.83	0316-95-0315	ALLH	—	—	—	—	—	—	3.81	—

Table 4.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Zinc
Soil Background Value[a]				**22.3**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**1.82**	**48.8**
Sediment Background Value				**19.7**	**0.1**	**9.38**	**0.3**	**1**	**0.73**	**2.22**	**60.2**
QBT4 Background Value				**11.2**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**2.4**	**63.5**
16-01297	0.83–1.33	0316-95-0316	ALLH	—	—	—	—	—	—	2.79	—
16-01298	0–0.66	0316-95-0317	ALLH	—	—	—	—	—	—	2.15	—
16-01299	0–0.66	0316-95-0318	ALLH	—	—	—	—	—	—	3.83	—
16-01300	0–0.5	0316-95-0319	SED	—	—	—	—	—	—	—	—
16-01301	0–0.5	0316-95-0320	SED	—	—	—	—	—	—	2.7	—
16-01302	0–0.5	0316-95-0321	ALLH	—	—	—	—	—	—	2.11	—
16-01303	0–0.5	0316-95-0322	SED	—	—	—	—	—	—	—	—
16-01313	0–0.5	0316-95-0356	ALLH	87.6	0.57	—	—	—	—	11.3	166
16-01313	0.67–1.17	0316-95-0382	FILL	48.3	0.89 (J+)	—	—	—	—	5.06	129
SWMU 16-010(k)											
16-01282	0–0.5	0316-95-0333	ALLH	169	0.3	—	—	—	—	—	63.7
16-01283	0–0.5	0316-95-0334	ALLH	—	—	—	—	—	—	—	—
16-01284	0–0.5	0316-95-0335	ALLH	—	—	—	—	—	—	—	—
16-01285	0–0.5	0316-95-0336	ALLH	49.4	—	—	—	—	—	—	—
16-01286	0–0.5	0316-95-0337	ALLH	87.7	—	—	—	—	—	—	—
16-01287	0–0.5	0316-95-0338	ALLH	489	—	—	—	—	—	—	71.4
16-01288	0–0.5	0316-95-0339	ALLH	—	—	—	—	—	—	—	54.6
16-01289	0–0.5	0316-95-0340	ALLH	—	—	—	—	—	—	—	—
16-01289	0–0.66	0316-95-0379	ALLH	—	—	—	—	—	—	—	—
16-01290	0–0.5	0316-95-0341	ALLH	—	0.12	—	—	—	—	—	—
16-01290	0.67–1.17	0316-95-2018	ALLH	—	—	—	—	—	—	—	—
16-01290	1–1.5	0316-95-0378	ALLH	—	—	—	—	—	—	—	—

Table 4.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Zinc
Soil Background Value[a]				**22.3**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**1.82**	**48.8**
Sediment Background Value				**19.7**	**0.1**	**9.38**	**0.3**	**1**	**0.73**	**2.22**	**60.2**
QBT4 Background Value				**11.2**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**2.4**	**63.5**
SWMU 16-010(l)											
16-01237	0–0.5	0316-95-0323	ALLH	—	—	—	—	—	—	—	—
16-01237	2–2.5	0316-95-0376	ALLH	—	—	—	—	—	—	2.73	60.2
16-01239	0–0.5	0316-95-0324	ALLH	—	—	—	—	—	—	—	55.1
16-01239	3–3.5	0316-95-0377	ALLH	—	—	—	—	—	—	—	67.2
16-01240	0–0.5	0316-95-0325	ALLH	—	—	—	—	1.1 (J)	—	—	125
16-01246	0–0.5	0316-95-0326	ALLH	—	—	—	—	—	—	—	86.3
SWMU 16-010(m)											
16-01226	0–0.5	0316-95-0343	ALLH	102	0.15	—	—	—	—	—	76.6
16-01226	1–1.5	0316-95-0381	ALLH	31.3	—	—	—	—	—	3.14	—
16-01230	0–0.5	0316-95-0344	ALLH	—	—	—	—	—	—	—	53.4
16-01232	0–0.5	0316-95-0345	ALLH	—	—	—	—	—	—	—	106
16-01233	0–0.5	0316-95-0346	ALLH	192	—	—	—	—	—	—	66.1
16-01234	0–0.5	0316-95-0347	ALLH	—	—	—	—	—	—	—	—
16-01235	0–0.5	0316-95-0348	ALLH	—	—	—	—	—	—	—	—
16-01236	0–0.5	0316-95-0349	FILL	—	—	—	—	—	—	—	120
16-01236	1–1.5	0316-95-0380	FILL	46.8	—	—	—	—	—	2.75	—
16-01236	1–1.5	0316-95-2019	FILL	—	0.11 (J)	—	—	—	—	2.7	56.7
SWMU 16-010(n)											
16-01304	0–0.5	0316-95-0353	ALLH	—	—	—	—	—	—	1.84 (U)	—
16-01307	0–0.5	0316-95-0354	ALLH	—	—	—	—	—	—	2.71	162
16-01311	0–0.5	0316-95-0355	ALLH	—	—	—	—	—	—	2.23	—

Table 4.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Zinc
Soil Background Value[a]				**22.3**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**1.82**	**48.8**
Sediment Background Value				**19.7**	**0.1**	**9.38**	**0.3**	**1**	**0.73**	**2.22**	**60.2**
QBT4 Background Value				**11.2**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**2.4**	**63.5**
SWMU 16-028(a)											
16-01329	0–0.5	0316-95-0363	FILL	—	—	—	—	—	—	—	—
16-01329	0–2	0316-97-0602	QBT4	—	—	12.8	0.56 (U)	—	—	4.6	68.4
16-01329	1.08–2.08	0316-97-0601	QBT4	—	—	12.5	0.64 (U)	—	—	—	—
16-01330	0–0.5	0316-95-0364	FILL	—	—	—	—	—	—	—	170
16-01330	1.67–2.33	0316-97-0603	ALLH	—	—	16.5	—	—	—	—	81.5
16-01330	4–5	0316-97-0604	QBT4	—	—	16.6	0.61 (U)	—	—	—	81.8
16-01331	0–0.5	0316-95-0365	FILL	—	—	—	—	—	—	—	—
16-01332	0–0.5	0316-95-0366	FILL	76.6	—	—	—	—	—	2.53	—
16-01333	0–0.5	0316-95-0367	FILL	—	—	—	—	—	—	—	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Fill samples were compared to soil background values.

[b] — = If analyzed, sample result is less than background value.

Table 4.5-4
Subaggregate 3 Historical Analytical Results of
Organic Chemicals Detected in Soil, Fill, Sediment, and Tuff at the TA-16 Burning Ground: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene
SWMU 16-005(g)													
16-01341	2–3	0316-95-0468	FILL	—*	0.16	0.13	—	—	—	—	—	—	—
16-01341	5–7	0316-95-0469	QBT4	—	—	—	—	—	—	—	—	—	—
16-01660	0–1	0316-97-0611	ALLH	—	0.398	0.459	—	—	—	—	—	0.24	—
16-01660	3–5	0316-97-0612	ALLH	—	—	—	—	—	—	—	—	—	—
16-01660	5–7	0316-97-0613	QBT4	—	—	—	—	—	—	—	—	—	—
SWMU 16-010(h)													
16-01349	0.33–0.83	0316-95-0307	FILL	—	—	0.169	—	—	—	—	—	—	—
16-01349	1.3–1.9	0316-95-0308	FILL	—	0.138	0.172	—	—	—	—	—	—	—
16-01351	0–0.5	0316-95-0305	FILL	—	0.447	0.658	—	—	—	—	—	—	—
16-01351	1–2	0316-95-0306	FILL	—	—	—	—	—	—	—	—	—	—
16-01352	0–0.5	0316-95-0303	ALLH	—	—	—	0.037 (J)	—	—	—	—	—	—
16-03-21917	1–1.5	RE16-03-50636	ALLH	—	0.34	0.5	—	—	—	—	—	—	—
16-03-21918	1–1.5	RE16-03-50637	ALLH	—	—	—	—	0.031	—	—	—	—	0.033
SWMU 16-010(i)													
16-01272	0–0.5	0316-95-0311	FILL	—	5.83	7.14	—	—	—	—	—	—	—
16-01272	0.58–1	0316-95-0312	FILL	—	14.7	19.9	—	—	—	—	—	—	—
16-01278	0–0.5	0316-95-0313	FILL	—	—	4.07	—	—	—	—	—	—	—
16-01278	0.58–1	0316-95-0314	FILL	0.015 (J)	—	2.28	—	—	—	—	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene
16-01296	0–0.5	0316-95-0309	FILL	—	1.87	2.32	—	—	—	—	—	—	—
16-01296	0.58–1	0316-95-0310	FILL	0.002 (J)	2.24	3.02	—	—	—	—	—	—	—
16-01297	0.33–0.83	0316-95-0315	ALLH	0.015 (J)	—	—	—	—	—	—	—	—	—
16-01297	0.83–1.33	0316-95-0316	ALLH	0.009 (J-)	3.66	2.1	—	—	—	—	—	—	—
16-01298	0–0.66	0316-95-0317	ALLH	—	0.104	—	—	—	—	—	—	—	—
16-01299	0–0.66	0316-95-0318	ALLH	—	—	—	—	—	—	—	—	—	—
16-01300	0–0.5	0316-95-0319	SED	—	0.115	0.102	—	—	—	—	—	—	—
16-01301	0–0.5	0316-95-0320	SED	—	0.167	0.211	—	—	—	—	—	—	—
16-01302	0–0.5	0316-95-0321	ALLH	—	—	—	—	—	—	—	—	—	—
16-01303	0–0.5	0316-95-0322	SED	—	0.125	—	—	—	—	—	—	—	—
16-01313	0–0.5	0316-95-0356	ALLH	—	1.56	1.55	—	—	—	—	—	—	—
16-01313	0.67–1.17	0316-95-0382	FILL	—	0.985	1.07	—	—	—	—	—	2.1	—
SWMU 16-010(k)													
16-01282	0–0.5	0316-95-0333	ALLH	—	—	1.29	—	—	—	—	—	—	—
16-01283	0–0.5	0316-95-0334	ALLH	—	—	—	—	—	—	—	—	—	—
16-01284	0–0.5	0316-95-0335	ALLH	—	0.266	0.554	—	—	—	—	—	—	—
16-01285	0–0.5	0316-95-0336	ALLH	—	0.102	0.134	—	—	—	—	—	—	—
16-01286	0–0.5	0316-95-0337	ALLH	—	0.416 (J)	0.453 (J)	—	—	—	—	—	—	—
16-01287	0–0.5	0316-95-0338	ALLH	—	0.215	0.225	—	—	—	—	—	—	—
16-01288	0–0.5	0316-95-0339	ALLH	—	1.07	1.51	—	—	—	—	—	—	—
16-01289	0–0.5	0316-95-0340	ALLH	—	0.435	0.573	—	—	—	—	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene
16-01289	0–0.66	0316-95-0379	ALLH	—	0.13	0.105	—	—	—	—	—	—	—
16-01290	0–0.5	0316-95-0341	ALLH	—	0.584	0.542	—	—	—	—	—	—	—
16-01290	0.67–1.17	0316-95-2018	ALLH	—	0.421	0.52	—	—	—	—	—	—	—
16-01290	1–1.5	0316-95-0378	ALLH	—	0.216	—	—	—	—	—	—	—	—
SWMU 16-010(l)													
16-01237	0–0.5	0316-95-0323	ALLH	—	15.2	21.7	—	—	—	—	—	—	—
16-01237	2–2.5	0316-95-0376	ALLH	—	—	2.61	—	—	—	—	—	0.062 (J)	—
16-01239	0–0.5	0316-95-0324	ALLH	—	0.295	0.465	—	—	—	—	—	—	—
16-01239	3–3.5	0316-95-0377	ALLH	—	0.267	0.425	—	—	—	—	—	0.063 (J)	—
16-01240	0–0.5	0316-95-0325	ALLH	—	0.789	1.07	—	—	—	—	—	—	—
16-01246	0–0.5	0316-95-0326	ALLH	—	—	—	—	—	—	—	—	—	—
SWMU 16-010(m)													
16-01226	0–0.5	0316-95-0343	ALLH	—	0.427	0.433	—	—	—	—	—	—	—
16-01226	1–1.5	0316-95-0381	ALLH	—	—	—	—	—	—	—	—	—	—
16-01230	0–0.5	0316-95-0344	ALLH	—	0.247	0.457	—	—	—	—	—	—	—
16-01232	0–0.5	0316-95-0345	ALLH	—	0.315	0.649	—	—	—	—	—	—	—
16-01233	0–0.5	0316-95-0346	ALLH	—	0.536	1.18	—	—	—	—	—	—	—
16-01234	0–0.5	0316-95-0347	ALLH	—	—	—	—	—	—	—	—	—	—
16-01235	0–0.5	0316-95-0348	ALLH	—	0.17	0.131	—	—	—	—	—	—	—
16-01236	0–0.5	0316-95-0349	FILL	—	2.44	2.99	—	—	—	—	—	—	—
16-01236	1–1.5	0316-95-0380	FILL	—	—	1.8	—	—	—	—	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene
16-01236	1–1.5	0316-95-2019	FILL	—	—	1.8	—	—	—	—	—	—	—
SWMU 16-010(n)													
16-01304	0–0.5	0316-95-0353	ALLH	—	0.271	0.251	—	—	—	—	—	—	—
16-01307	0–0.5	0316-95-0354	ALLH	—	—	—	—	—	—	—	—	—	—
SWMU 16-028(a)													
16-01329	0–0.5	0316-95-0363	FILL	—	0.097	0.093	0.042 (J)	0.095 (J)	0.09 (J)	0.11 (J)	0.056 (J)	—	0.11 (J)
16-01329	1.08–2.08	0316-97-0601	QBT4	—	—	—	—	—	—	—	—	—	—
16-01330	0–0.5	0316-95-0364	FILL	—	0.12	—	—	—	—	—	—	—	—
16-01330	1.67–2.33	0316-97-0603	ALLH	—	—	—	—	—	—	—	—	—	—
16-01330	4–5	0316-97-0604	QBT4	—	—	—	—	—	—	—	—	—	—
16-01331	0–0.5	0316-95-0365	FILL	—	—	—	—	—	—	—	—	—	—
16-01332	0–0.5	0316-95-0366	FILL	—	0.247	0.171	—	—	—	—	—	—	—
16-01333	0–0.5	0316-95-0367	FILL	—	—	—	—	—	—	—	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dichloroethane[1,2-]	Di-n-butylphthalate	Dinitrobenzene[1,3-]	Dinitrotoluene[2,4-]	Dinitrotoluene[2,6-]	Fluoranthene	HMX	Isopropyltoluene[4-]	Methylene Chloride	Nitrosodimethylamine[n-]
SWMU 16-005(g)													
16-01341	2–3	0316-95-0468	FILL	—	—	—	—	—	—	1.83	—	—	—
16-01341	5–7	0316-95-0469	QBT4	—	—	—	—	—	—	0.999	—	—	—
16-01660	0–1	0316-97-0611	ALLH	—	—	—	—	—	—	24.6	—	—	—
16-01660	3–5	0316-97-0612	ALLH	—	—	—	—	—	—	7.19	—	—	—
16-01660	5–7	0316-97-0613	QBT4	—	—	—	—	—	—	1.32	—	—	—
SWMU 16-010(h)													
16-01349	0.33–0.83	0316-95-0307	FILL	—	0.24 (J)	—	0.233	—	—	732	—	—	—
16-01349	1.3–1.9	0316-95-0308	FILL	—	—	—	—	—	—	37.1	—	—	—
16-01351	0–0.5	0316-95-0305	FILL	—	0.037 (J)	—	0.083	—	—	727	—	—	—
16-01351	1–2	0316-95-0306	FILL	—	0.037 (J)	—	—	—	—	18.3	—	—	—
16-01352	0–0.5	0316-95-0303	ALLH	—	—	—	—	—	0.089 (J)	0.623	—	—	—
16-03-21917	1–1.5	RE16-03-50636	ALLH	—	—	—	—	—	0.044	—	—	0.078	—
16-03-21918	1–1.5	RE16-03-50637	ALLH	—	—	—	—	—	0.079	—	—	0.077	—
SWMU 16-010(i)													
16-01272	0–0.5	0316-95-0311	FILL	—	—	—	0.651	—	—	77.7	—	—	—
16-01272	0.58–1	0316-95-0312	FILL	—	—	—	3.02	—	—	152	—	—	—
16-01278	0–0.5	0316-95-0313	FILL	—	—	—	0.857	—	—	4830	—	—	—
16-01278	0.58–1	0316-95-0314	FILL	0.004 (J)	—	—	0.635	—	—	2610	—	—	—
16-01296	0–0.5	0316-95-0309	FILL	—	—	0.09	0.348	—	—	764	—	—	0.33
16-01296	0.58–1	0316-95-0310	FILL	—	—	—	0.318	—	—	339	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dichloroethane[1,2-]	Di-n-butylphthalate	Dinitrobenzene[1,3-]	Dinitrotoluene[2,4-]	Dinitrotoluene[2,6-]	Fluoranthene	HMX	Isopropyltoluene[4-]	Methylene Chloride	Nitrosodimethylamine[n-]
16-01297	0.33–0.83	0316-95-0315	ALLH	—	—	—	—	—	—	8.05	0.022	—	—
16-01297	0.83–1.33	0316-95-0316	ALLH	—	—	—	0.098 (J)	—	—	64.8	0.012 (J+)	—	—
16-01298	0–0.66	0316-95-0317	ALLH	—	—	—	—	—	—	42.4	—	—	—
16-01299	0–0.66	0316-95-0318	ALLH	—	—	—	—	—	0.038 (J)	5.3	—	—	—
16-01300	0–0.5	0316-95-0319	SED	—	—	—	—	—	—	1.73	—	—	—
16-01301	0–0.5	0316-95-0320	SED	—	—	—	—	—	—	0.273	—	—	—
16-01302	0–0.5	0316-95-0321	ALLH	—	—	—	—	—	—	0.35	—	—	—
16-01303	0–0.5	0316-95-0322	SED	—	—	—	—	—	—	0.435	—	—	—
16-01313	0–0.5	0316-95-0356	ALLH	—	—	—	0.116	—	—	1890	—	—	—
16-01313	0.67–1.17	0316-95-0382	FILL	—	—	—	0.075	—	—	748	—	—	—
SWMU 16-010(k)													
16-01282	0–0.5	0316-95-0333	ALLH	—	—	—	—	—	—	12100	—	—	—
16-01283	0–0.5	0316-95-0334	ALLH	—	—	—	—	—	—	2.84	—	—	—
16-01284	0–0.5	0316-95-0335	ALLH	—	—	—	—	—	—	91.3	—	—	—
16-01285	0–0.5	0316-95-0336	ALLH	—	—	—	—	—	—	78.6	—	—	—
16-01286	0–0.5	0316-95-0337	ALLH	—	—	—	—	—	—	588	—	—	—
16-01287	0–0.5	0316-95-0338	ALLH	—	—	—	—	—	—	6.95	—	—	—
16-01288	0–0.5	0316-95-0339	ALLH	—	—	—	0.066	—	—	885	—	—	—
16-01289	0–0.5	0316-95-0340	ALLH	—	—	—	—	—	—	801	—	—	—
16-01289	0–0.66	0316-95-0379	ALLH	—	—	—	—	—	—	162	—	—	—
16-01290	0–0.5	0316-95-0341	ALLH	—	—	—	—	—	—	388	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dichloroethane[1,2-]	Di-n-butylphthalate	Dinitrobenzene[1,3-]	Dinitrotoluene[2,4-]	Dinitrotoluene[2,6-]	Fluoranthene	HMX	Isopropyltoluene[4-]	Methylene Chloride	Nitrosodimethylamine[n-]
16-01290	0.67–1.17	0316-95-2018	ALLH	—	—	—	—	—	—	69.1	—	—	—
16-01290	1–1.5	0316-95-0378	ALLH	—	—	—	—	—	—	116	—	—	—
SWMU 16-010(l)													
16-01237	0–0.5	0316-95-0323	ALLH	—	—	—	—	0.18	—	259	—	—	—
16-01237	2–2.5	0316-95-0376	ALLH	—	—	—	—	—	—	45.7	—	—	—
16-01239	0–0.5	0316-95-0324	ALLH	—	—	—	—	—	—	1	—	—	—
16-01239	3–3.5	0316-95-0377	ALLH	—	—	—	—	—	—	20.2	—	—	—
16-01240	0–0.5	0316-95-0325	ALLH	—	—	—	—	—	—	352	—	—	—
16-01246	0–0.5	0316-95-0326	ALLH	—	—	—	—	—	—	0.176	—	—	—
SWMU 16-010(m)													
16-01226	0–0.5	0316-95-0343	ALLH	—	—	—	—	—	—	2420	—	—	—
16-01226	1–1.5	0316-95-0381	ALLH	—	—	—	—	—	—	205	—	—	—
16-01230	0–0.5	0316-95-0344	ALLH	—	—	—	—	—	—	8.34	—	—	—
16-01232	0–0.5	0316-95-0345	ALLH	—	—	—	—	—	—	5.6	—	—	—
16-01233	0–0.5	0316-95-0346	ALLH	—	—	—	—	—	—	18700	—	—	—
16-01234	0–0.5	0316-95-0347	ALLH	—	—	—	—	—	—	0.905	—	—	—
16-01235	0–0.5	0316-95-0348	ALLH	—	—	—	—	—	—	1630	—	—	—
16-01236	0–0.5	0316-95-0349	FILL	—	—	—	—	—	—	603	—	—	—
16-01236	1–1.5	0316-95-0380	FILL	—	—	—	0.117	—	—	204	—	—	—
16-01236	1–1.5	0316-95-2019	FILL	—	—	—	0.078 (J)	—	—	153	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dichloroethane[1,2-]	Di-n-butylphthalate	Dinitrobenzene[1,3-]	Dinitrotoluene[2,4-]	Dinitrotoluene[2,6-]	Fluoranthene	HMX	Isopropyltoluene[4-]	Methylene Chloride	Nitrosodimethylamine[n-]
SWMU 16-010(n													
16-01304	0–0.5	0316-95-0353	ALLH	—	—	—	—	—	—	—	—	—	—
16-01307	0–0.5	0316-95-0354	ALLH	—	—	—	—	—	—	0.321	—	—	—
SWMU 16-028(a)													
16-01329	0–0.5	0316-95-0363	FILL	—	—	—	—	—	0.26 (J)	8.22	—	—	—
16-01329	1.08–2.08	0316-97-0601	QBT4	—	—	—	—	—	—	—	—	—	—
16-01330	0–0.5	0316-95-0364	FILL	—	—	—	—	—	—	1.04	—	—	—
16-01330	1.67–2.33	0316-97-0603	ALLH	—	—	—	—	—	—	4.87	—	—	—
16-01330	4–5	0316-97-0604	QBT4	—	—	—	—	—	—	—	—	—	—
16-01331	0–0.5	0316-95-0365	FILL	—	—	—	—	—	—	0.34	—	—	—
16-01332	0–0.5	0316-95-0366	FILL	—	—	—	—	—	—	0.644	—	—	—
16-01333	0–0.5	0316-95-0367	FILL	—	—	—	—	—	—	0.432	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Nitrotoluene[2-]	Nitrotoluene[4-]	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Tetryl	Toluene	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
SWMU 16-005(g)													
16-01341	2–3	0316-95-0468	FILL	—	—	—	—	—	—	—	—	—	—
16-01341	5–7	0316-95-0469	QBT4	—	—	—	—	0.741	—	—	—	—	—
16-01660	0–1	0316-97-0611	ALLH	—	—	—	—	1.37	—	—	—	—	—
16-01660	3–5	0316-97-0612	ALLH	—	—	—	—	0.184	—	—	—	—	—
16-01660	5–7	0316-97-0613	QBT4	—	—	—	—	—	—	—	—	—	—
SWMU 16-010(h)													
16-01349	0.33–0.83	0316-95-0307	FILL	—	—	—	—	124	—	—	—	—	3.37
16-01349	1.3–1.9	0316-95-0308	FILL	—	—	—	—	65.1	—	—	—	—	—
16-01351	0–0.5	0316-95-0305	FILL	—	—	—	—	1250	—	—	—	—	0.12
16-01351	1–2	0316-95-0306	FILL	—	—	—	—	189	—	—	—	—	—
16-01352	0–0.5	0316-95-0303	ALLH	—	—	—	0.056 (J)	—	—	—	—	—	—
16-03-21917	1–1.5	RE16-03-50636	ALLH	—	—	—	—	1.1	—	—	—	—	1.1
16-03-21918	1–1.5	RE16-03-50637	ALLH	—	—	0.058	0.067	0.8	—	—	—	—	—
SWMU 16-010(i)													
16-01272	0–0.5	0316-95-0311	FILL	—	—	—	—	5.75	—	—	—	0.11	35.1
16-01272	0.58–1	0316-95-0312	FILL	—	—	—	—	19.2	—	—	—	0.24	63.3
16-01278	0–0.5	0316-95-0313	FILL	1.6	4.5	—	—	10700	—	—	—	—	230
16-01278	0.58–1	0316-95-0314	FILL	3	—	—	—	8160	—	—	0.02	1.03	2060
16-01296	0–0.5	0316-95-0309	FILL	—	—	—	—	39.2	—	—	—	0.1	1.53
16-01296	0.58–1	0316-95-0310	FILL	—	—	—	—	58.7	—	—	—	0.35	24
16-01297	0.33–0.83	0316-95-0315	ALLH	—	—	—	—	3.32	—	—	—	—	0.24

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Nitrotoluene[2-]	Nitrotoluene[4-]	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Tetryl	Toluene	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
16-01297	0.83–1.33	0316-95-0316	ALLH	—	—	0.07 (J)	—	22.7	—	—	—	0.22	4.06
16-01298	0–0.66	0316-95-0317	ALLH	—	—	—	—	1.31	—	—	—	—	0.1
16-01299	0–0.66	0316-95-0318	ALLH	—	—	—	—	10.6	—	—	—	—	1.02
16-01300	0–0.5	0316-95-0319	SED	—	—	—	—	2.3	—	—	—	—	0.14
16-01301	0–0.5	0316-95-0320	SED	—	—	—	—	—	—	—	—	—	—
16-01302	0–0.5	0316-95-0321	ALLH	—	—	—	—	2.14	—	—	—	—	—
16-01303	0–0.5	0316-95-0322	SED	—	—	—	—	—	—	—	—	—	—
16-01313	0–0.5	0316-95-0356	ALLH	—	—	—	—	4980	—	0.28	—	0.09	3.66
16-01313	0.67–1.17	0316-95-0382	FILL	—	—	—	—	2430	—	—	—	—	2.83
SWMU 16-010(k)													
16-01282	0–0.5	0316-95-0333	ALLH	—	—	—	—	6.93	—	—	—	—	—
16-01283	0–0.5	0316-95-0334	ALLH	—	—	—	—	0.96	—	—	—	—	—
16-01284	0–0.5	0316-95-0335	ALLH	—	—	—	—	—	—	—	—	—	—
16-01285	0–0.5	0316-95-0336	ALLH	—	—	—	—	0.195	—	—	—	—	—
16-01286	0–0.5	0316-95-0337	ALLH	—	—	—	—	1.24	—	—	—	—	—
16-01287	0–0.5	0316-95-0338	ALLH	—	—	—	—	—	—	—	—	—	—
16-01288	0–0.5	0316-95-0339	ALLH	—	—	—	—	1.83	—	—	—	—	0.48
16-01289	0–0.5	0316-95-0340	ALLH	—	—	—	—	0.865	—	—	—	—	—
16-01289	0–0.66	0316-95-0379	ALLH	—	—	—	—	0.176	—	—	—	—	—
16-01290	0–0.5	0316-95-0341	ALLH	—	—	—	—	—	—	—	—	—	—
16-01290	0.67–1.17	0316-95-2018	ALLH	—	—	—	—	—	—	—	—	—	—
16-01290	1–1.5	0316-95-0378	ALLH	—	—	—	—	—	—	—	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Nitrotoluene[2-]	Nitrotoluene[4-]	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Tetryl	Toluene	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
SWMU 16-010(l)													
16-01237	0–0.5	0316-95-0323	ALLH	—	—	—	—	2540	—	—	—	0.42	23
16-01237	2–2.5	0316-95-0376	ALLH	—	—	—	—	594	—	—	—	—	30.9
16-01239	0–0.5	0316-95-0324	ALLH	—	—	—	—	—	—	—	—	—	—
16-01239	3–3.5	0316-95-0377	ALLH	—	—	—	—	2.29	—	—	—	—	—
16-01240	0–0.5	0316-95-0325	ALLH	—	—	—	—	2.38	—	—	—	—	—
16-01246	0–0.5	0316-95-0326	ALLH	—	—	—	—	—	—	—	—	—	—
SWMU 16-010(m)													
16-01226	0–0.5	0316-95-0343	ALLH	—	—	—	—	27.8	—	—	—	—	—
16-01226	1–1.5	0316-95-0381	ALLH	—	—	—	—	3.03	—	—	—	—	—
16-01230	0–0.5	0316-95-0344	ALLH	—	—	—	—	—	—	—	—	—	—
16-01232	0–0.5	0316-95-0345	ALLH	—	—	—	—	0.39	—	—	—	—	—
16-01233	0–0.5	0316-95-0346	ALLH	—	—	—	—	2050	—	—	—	—	—
16-01234	0–0.5	0316-95-0347	ALLH	—	—	—	—	—	—	—	—	—	—
16-01235	0–0.5	0316-95-0348	ALLH	—	—	—	—	—	—	—	—	—	—
16-01236	0–0.5	0316-95-0349	FILL	—	—	—	—	2.3	—	—	—	3.36	22.9
16-01236	1–1.5	0316-95-0380	FILL	—	—	—	—	3170	—	—	—	0.13	37.3
16-01236	1–1.5	0316-95-2019	FILL	—	—	—	—	2160	—	—	—	1.08	59.5
SWMU 16-010(n)													
16-01304	0–0.5	0316-95-0353	ALLH	—	—	—	—	—	—	—	—	—	—
16-01307	0–0.5	0316-95-0354	ALLH	—	—	—	—	—	—	—	—	—	—

Table 4.5-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Nitrotoluene[2-]	Nitrotoluene[4-]	Phenanthrene	Pyrene	RDX	Tetrachloroethene	Tetryl	Toluene	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
SWMU 16-028(a)													
16-01329	0–0.5	0316-95-0363	FILL	—	—	0.2 (J)	0.22 (J)	5.33	—	—	—	2.33	0.14
16-01329	1.08–2.08	0316-97-0601	QBT4	—	—	—	—	—	0.23	—	—	—	—
16-01330	0–0.5	0316-95-0364	FILL	—	—	—	—	—	—	—	—	—	—
16-01330	1.67–2.33	0316-97-0603	ALLH	—	—	—	—	—	1	—	—	—	—
16-01330	4–5	0316-97-0604	QBT4	—	—	—	—	—	0.02	—	—	—	—
16-01331	0–0.5	0316-95-0365	FILL	—	—	—	—	—	—	—	—	—	—
16-01332	0–0.5	0316-95-0366	FILL	—	—	—	—	—	—	—	—	—	0.3
16-01333	0–0.5	0316-95-0367	FILL	—	—	—	—	—	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is not detected.

Table 4.5-5
Subaggregate 3 Historical Analytical Results of
Inorganic Chemicals Greater Than Background Values in Soil at the TA-16 Burning Ground: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Arsenic	Barium	Cadmium	Lead	Mercury	Selenium	Silver
Soil Background Value				**8.17**	**295**	**0.4**	**22.3**	**0.1**	**1.52**	**1**
SWMU 16-010(i)										
16-01272	0–0.5	0316-96-0003	ALLH	10 (U)	4200	4.21 (J)	53.9	2 (U)	5.27 (U)	10 (U)
SWMU 16-010(l)										
16-01240	0–0.5	0316-96-0004	ALLH	10 (U)	1250	0.402 (U)	—*	2 (U)	8.59 (U)	10 (U)

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is less than background value.

Table 4.7-1
Subaggregate 3 Proposed Samples in Soil and Tuff at the TA-16 Burning Ground

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method 314.0 and SW-846 8321A)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)
Post-Excavation Confirmation (1–22)	Areas of excavated soil	Confirmatory sampling of tuff beneath areas of soil excavation	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	—[b] —	x x	— —	x x	x x	x x
Nature and Extent (1–17)	Area between former trough lines	Sampling to define nature and extent of contamination between former trough lines	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	x x x x	— — — —	x x x x	x x x x	— x x x
Nature and Extent (18–29)	Downgradient locations	Sampling to define nature and extent of contamination downgradient of the main Burning Ground operations	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x
Nature and Extent (30–34)	Surface Impoundment	Sampling to define nature and extent of contamination at the Surface Impoundment	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff) 6–6.5 (into tuff)	Soil Soil Tuff Tuff Tuff	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	— x x x x
Nature and Extent (35 and 37)	Pressure filter vessels	Sampling to define nature and extent of contamination beneath vessels	5–5.5 (into tuff, angled borehole) 10–10.5 (into tuff, angled borehole)	Tuff Tuff	— —	x x	— —	x x	x x	x x
Nature and Extent (36 and 38)	Pressure filter vessels	Sampling to define nature and extent of contamination beneath vessels	5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Tuff Tuff Tuff	— — —	x x x	— — —	x x x	x x x	x x x

Table 4.7-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	Dioxins/Furans (SW-846 8290A)[c]	Alpha Spectroscopy (HASL 300)[d]	Gamma Spectroscopy (EPA Method 901.1)[d]	Explosive Compounds (SW-846 8321A)
Post-Excavation Confirmation (1–22)	Areas of excavated soil	Confirmatory sampling of tuff beneath areas of soil excavation	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	x x	x x	x x	TBD[e]	TBD	x x
Nature and Extent (1–17)	Area between former trough lines	Sampling to define nature and extent of contamination between former trough lines	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	TBD	TBD	x x x x
Nature and Extent (18–29)	Downgradient locations	Sampling to define nature and extent of contamination downgradient of the main Burning Ground operations	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	TBD	TBD	x x x x
Nature and Extent (30–34)	Surface Impoundment	Sampling to define nature and extent of contamination at the Surface Impoundment	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff) 6–6.5 (into tuff)	Soil Soil Tuff Tuff Tuff	x x x x x	x x x x x	— — — — —	TBD	TBD	x x x x x
Nature and Extent (35 and 37)	Pressure filter vessels	Sampling to define nature and extent of contamination beneath vessels	5–5.5 (into tuff, angled borehole) 10–10.5 (into tuff, angled borehole)	Tuff Tuff	x x	x x	— —	TBD	TBD	x x
Nature and Extent (36 and 38)	Pressure filter vessels	Sampling to define nature and extent of contamination beneath vessels	5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Tuff Tuff Tuff	x x x	x x x	— — —	TBD	TBD	x x x

[a] Depth intervals may be extended if additional sample volume is required.

[b] — = Analysis is not required.

[c] Analysis for dioxins/furans will be performed on 10% of the confirmatory samples from HE/uranium filter bed and nature and extent samples from burn tray.

[d] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[e] TBD = To be determined.

Table 5.6-1
Subaggregate 4 Summary of Historical Samples Collected in Soil and Fill at TA-16 Administrative Area Storage Buildings: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number			
				High Explosives	Inorganic Chemicals	SVOC	VOC
AOC C-16-017							
16-04193	1–2	0316-97-0592	ALLH	—*	3528R	3526R	—
16-04194	0–1	0316-97-0573	ALLH	—	3440R	3438R	—
SWMU 16-017(i)							
16-05870	0–0.5	RE16-98-0060	FILL	4497R	4499R	4496R	4496R
16-05874	0–0.5	RE16-98-0061	ALLH	4497R	4499R	4496R	4496R
16-05878	0–0.5	RE16-98-0062	ALLH	4497R	4499R	4496R	4496R
16-05879	0–0.5	RE16-98-0063	ALLH	4497R	4499R	4496R	4496R

*— = The analysis was not requested.

Table 5.6-2
Subaggregate 4 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil and Fill at TA-16 Administrative Area Storage Buildings: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Cadmium	Cobalt	Copper	Lead	Mercury	Silver	Uranium	Zinc
Soil Background Value[a]				**0.83**	**0.4**	**8.64**	**14.7**	**22.3**	**0.1**	**1**	**1.82**	**48.8**
SWMU 16-017(i)												
16-05870	0–0.5	RE16-98-0060	FILL	11 (UJ)	0.54 (U)	—[b]	—	—	0.11 (U)	2.2 (U)	26.8 (U)	—
16-05874	0–0.5	RE16-98-0061	ALLH	13 (UJ)	0.66 (U)	—	19	36	0.13 (U)	2.6 (U)	30.2 (U)	56
16-05878	0–0.5	RE16-98-0062	ALLH	12 (UJ)	0.6 (U)	12	—	—	0.12 (U)	2.4 (U)	29.4 (U)	—
16-05879	0–0.5	RE16-98-0063	ALLH	12 (UJ)	0.62 (U)	—	—	—	0.12 (U)	2.5 (U)	30 (U)	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Fill samples were compared to soil background values.

[b] — = If analyzed, sample result is less than background value.

Table 5.10-1
Subaggregate 4 Proposed Samples in Soil and Tuff at the TA-16 Administrative Area

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
Steam Plant: Consolidated Unit 16-001(a)-99											
1–4 (Figure 5.10-1)	SWMU 16-001(a), location of former steam plant tank	Sampling to define nature and extent of contamination beneath the former steam plant tank	3.5–4 8.5–9	Tuff Tuff	x x	—[b] —	— —	— —	x x	— —	x x
5–12 (Figure 5.10-1)	SWMU 16-001(b), location of former steam plant dry wells	Sampling to define nature and extent of contamination beneath the former steam plant dry wells	7.5–8 12.5–13	Tuff Tuff	x x	— —	— —	— —	x x	— —	x x
13 (Figure 5.10-1)	SWMUs 16-001(a) and 16-001(b), location of former steam plant outfall	Sampling to define nature and extent of contamination at the outfall	7.5–8 12.5–13	Tuff Tuff	x x	— —	— —	— —	x x	— —	x x
14–18 (Figure 5.10-1)	SWMU 16-001(c), location of former steam plant tank	Sampling to define nature and extent of contamination beneath the former steam plant tank	6–6.5 11–11.5	Tuff Tuff	x x	— —	— —	— —	x x	— —	x x
19 and 20 (Figure 5.10-1)	SWMU 16-001(c), location of former steam plant tank outfall ditch	Sampling to define nature and extent of contamination at the outfall ditch	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	— — — —	x x x x	— — — —	x x x x

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
Warehouse (Building 16-010), Cabinet Shop (Building 16-008), and Carpentry Shop (Building 16-006): Consolidated Unit 16-017(i)-99											
1–6 (Figure 5.10-2)	SWMU 16-017(i), location of former warehouse, building 16-010	Sampling to define nature and extent of contamination within, and adjacent to, former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
7–12 (Figure 5.10-2)	SWMU C-16-025, location of former cabinet shop, building 16-008	Sampling to define nature and extent of contamination within, and adjacent to, former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
13–15 (Figure 5.10-2)	SWMU C-16-026, location of former carpentry shop, building 16-006	Sampling to define nature and extent of contamination within, and adjacent to, former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
Plumbing and Electrical Maintenance Shop (Building 16-137) Potentially Contaminated Soil: SWMU 16-034(h)											
1–4 (Figure 5.10-3)	SWMU 16-034(h), location of former maintenance shop, building 16-137	Sampling to define nature and extent of contamination within, and adjacent to, former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
Portable Storage Building (Building 16-141) Potentially Contaminated Soil: SWMU 16-034(i)											
5 and 6 (Figure 5.10-3)	SWMU 16-034(i), location of former portable storage, building 16-141	Sampling to define nature and extent of contamination within former portable storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
Container Storage Rack (Building 16-190) Potentially Contaminated Soil: SWMU 16-034(j)											
7 and 8 (Figure 5.10-3)	SWMU 16-034(j), location of former container storage rack, building 16-190	Sampling to define nature and extent of contamination within former container storage rack footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x
Portable Storage Building (Building 16-140) Potentially Contaminated Soil: SWMU 16-034(k)											
9 and 10 (Figure 5.10-3)	SWMU 16-034(k), assumed location of former portable storage, building 16-140	Sampling to define nature and extent of contamination within former portable storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
Other TA-16 Administrative Area Buildings											
11 and 12 (Figure 5.10-3)	AOC C-16-008, location of former implement shed, building 16-136	Sampling to define nature and extent of contamination within former implement shed footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
13 and 14 (Figure 5.10-3)	AOC C-16-010, location of former storage, building 16-135	Sampling to define nature and extent of contamination within former storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
15 and 16 (Figure 5.10-3)	AOC C-16-011, location of former paint shop, building 16-132	Sampling to define nature and extent of contamination within former paint shop building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
17 and 18 (Figure 5.10-3)	AOC C-16-012, location of former blacksmith shop, building 16-138	Sampling to define nature and extent of contamination within former blacksmith building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
19 and 20 (Figure 5.10-3)	AOC C-16-013, location of former lumber storage, building 16-133	Sampling to define nature and extent of contamination within former lumber storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
21 and 22 (Figure 5.10-3)	AOC C-16-014, location of former equipment area, building 16-144	Sampling to define nature and extent of contamination within former equipment area building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
23–27 (Figure 5.10-3)	AOC C-16-016, location of former fire house, building 16-142	Sampling to define nature and extent of contamination within former fire house building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x
Steam Plant: AOC C-16-017											
28 and 29 (Figure 5.10-3)	AOC C-16-017, location of former steam plant, building 16-030	Sampling to define nature and extent of contamination within former steam plant building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —
Underground Storage Tanks: AOCs 16-033(e) and 16-033(f)											
16 and 17 (Figure 5.10-2)	AOC 16-033(e), location of underground storage tanks (if tanks are located)	Sampling to define nature and extent of contamination beneath tanks	5–5.5 10–10.5 15–15.5	Tuff Tuff Tuff	— — —	— — —	— — —	— — —	x x x	x x x	x x x

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)
30 (Figure 5.10-3)	AOC 16-033(f), location of underground storage tank	Sampling to define nature and extent of contamination beneath tank	5–5.5 10–10.5 15–15.5	Tuff Tuff Tuff	— — —	— — —	— — —	— — —	x x x	x x x	x x x
Septic Tank: SWMU 16-006(a)											
1 and 2 (Figure 5.10-4)	SWMU 16-006(a), location of septic tank	Sampling to define nature and extent of contamination at tank	10–10.5 15–15.5 20–20.5	Tuff Tuff Tuff	x x x	x x x	x x x	x x x	x x x	x x x	x x x
Burn Pit: SWMU 16-009(a)											
3–10 (Figure 5.10-4)	SWMU 16-009(a), location of former burn pit	Sampling to define nature and extent of contamination within former burn pit footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x
11–37 (Figure 5.10-4)	SWMU 16-009(a), location of burn pit and berm's leveled area	Sampling to define lateral nature and extent of contamination outside former burn pit footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x
20% of locations	SWMU 16-009(a), location of burn pit and berm's leveled area	Sampling to define lateral nature and extent of pesticide and herbicide contamination outside former burn pit footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	TPH (SW-846 8015M)	Pesticides/Herbicides (SW-846 8081A/8151A)	PCBs (SW-846 8082)	Dioxins/Furans (SW-846 8290A)	Alpha Spectroscopy (HASL 300)[c]	Gamma Spectroscopy (EPA Method 901.1)[c]	Explosive Compounds (SW-846 8321A)
Steam Plant: Consolidated Unit 16-001(a)-99											
1–4 (Figure 5.10-1)	SWMU 16-001(a), location of former steam plant tank	Sampling to define nature and extent of contamination beneath the former steam plant tank	3.5–4 8.5–9	Tuff Tuff	— —	— —	— —	— —	TBD[d]	TBD	— —
5–12 (Figure 5.10-1)	SWMU 16-001(b), location of former steam plant dry wells	Sampling to define nature and extent of contamination beneath the former steam plant dry wells	7.5–8 12.5–13	Tuff Tuff	— —	— —	— —	— —	TBD	TBD	— —
13 (Figure 5.10-1)	SWMUs 16-001(a) and 16-001(b), location of former steam plant outfall	Sampling to define nature and extent of contamination at the outfall	7.5–8 12.5–13	Tuff Tuff	— —	— —	— —	— —	TBD	TBD	— —
14–18 (Figure 5.10-1)	SWMU 16-001(c), location of former steam plant tank	Sampling to define nature and extent of contamination beneath the former steam plant tank	6–6.5 11–11.5	Tuff Tuff	— —	— —	— —	— —	TBD	TBD	— —
19 and 20 (Figure 5.10-1)	SWMU 16-001(c), location of former steam plant tank outfall ditch	Sampling to define nature and extent of contamination at the outfall ditch	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	TBD	TBD	— — — —
Warehouse (Building 16-010), Cabinet Shop (Building 16-008), and Carpentry Shop (Building 16-006): Consolidated Unit 16-017(i)-99											
1–6 (Figure 5.10-2)	SWMU 16-017(i), location of former warehouse, building 16-010	Sampling to define nature and extent of contamination within, and adjacent to, former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	TPH (SW-846 8015M)	Pesticides/Herbicides (SW-846 8081A/8151A)	PCBs (SW-846 8082)	Dioxins/Furans (SW-846 8290A)	Alpha Spectroscopy (HASL 300)[c]	Gamma Spectroscopy (EPA Method 901.1)[c]	Explosive Compounds (SW-846 8321A)
7–12 (Figure 5.10-2)	SWMU C-16-025, location of former cabinet shop, building 16-008	Sampling to define nature and extent of contamination within, and adjacent to, former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
13–15 (Figure 5.10-2)	SWMU C-16-026, location of former carpentry shop, building 16-006	Sampling to define nature and extent of contamination within, and adjacent to, former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
Plumbing and Electrical Maintenance Shop (Building 16-137) Potentially Contaminated Soil: SWMU 16-034(h)											
1–4 (Figure 5.10-3)	SWMU 16-034(h), location of former maintenance shop, building 16-137	Sampling to define nature and extent of contamination within, and adjacent to, former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
Portable Storage Building (Building 16-141) Potentially Contaminated Soil: SWMU 16-034(i)											
5 and 6 (Figure 5.10-3)	SWMU 16-034(i), location of former portable storage, building 16-141	Sampling to define nature and extent of contamination within former portable storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
Container Storage Rack (Building 16-190) Potentially Contaminated Soil: SWMU 16-034(j)											
7 and 8 (Figure 5.10-3)	SWMU 16-034(j), location of former container storage rack, building 16-190	Sampling to define nature and extent of contamination within former container storage rack footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	x x x x	— — — —	TBD	TBD	x x x x

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	TPH (SW-846 8015M)	Pesticides/Herbicides (SW-846 8081A/8151A)	PCBs (SW-846 8082)	Dioxins/Furans (SW-846 8290A)	Alpha Spectroscopy (HASL 300)[c]	Gamma Spectroscopy (EPA Method 901.1)[c]	Explosive Compounds (SW-846 8321A)
Portable Storage Building (Building 16-140) Potentially Contaminated Soil: SWMU 16-034(k)											
9 and 10 (Figure 5.10-3)	SWMU 16-034(k), assumed location of former portable storage, building 16-140	Sampling to define nature and extent of contamination within former portable storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
Other TA-16 Administrative Area Buildings											
11 and 12 (Figure 5.10-3)	AOC C-16-008, location of former implement shed, building 16-136	Sampling to define nature and extent of contamination within former implement shed footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
13 and 14 (Figure 5.10-3)	AOC C-16-010, location of former storage, building 16-135	Sampling to define nature and extent of contamination within former storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
15 and 16 (Figure 5.10-3)	AOC C-16-011, location of former paint shop, building 16-132	Sampling to define nature and extent of contamination within former paint shop building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
17 and 18 (Figure 5.10-3)	AOC C-16-012, location of former blacksmith shop, building 16-138	Sampling to define nature and extent of contamination within former blacksmith building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
19 and 20 (Figure 5.10-3)	AOC C-16-013, location of former lumber storage, building 16-133	Sampling to define nature and extent of contamination within former lumber storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	TPH (SW-846 8015M)	Pesticides/Herbicides (SW-846 8081A/8151A)	PCBs (SW-846 8082)	Dioxins/Furans (SW-846 8290A)	Alpha Spectroscopy (HASL 300)[c]	Gamma Spectroscopy (EPA Method 901.1)[c]	Explosive Compounds (SW-846 8321A)
21 and 22 (Figure 5.10-3)	AOC C-16-014, location of former equipment area, building 16-144	Sampling to define nature and extent of contamination within former equipment area building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
23–27 (Figure 5.10-3)	AOC C-16-016, location of former fire house, building 16-142	Sampling to define nature and extent of contamination within former fire house building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
Steam Plant: AOC C-16-017											
28 and 29 (Figure 5.10-3)	AOC C-16-017, location of former steam plant, building 16-030	Sampling to define nature and extent of contamination within former steam plant building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	TBD	TBD	x x x x
Underground Storage Tanks: AOCs 16-033(e) and 16-033(f)											
16 and 17 (Figure 5.10-2)	AOC 16-033(e), location of underground storage tanks (if tanks are located)	Sampling to define nature and extent of contamination beneath tanks	5–5.5 10–10.5 15–15.5	Tuff Tuff Tuff	x x x	— — —	— — —	— — —	TBD	TBD	— — —
30 (Figure 5.10-3)	AOC 16-033(f), location of underground storage tank	Sampling to define nature and extent of contamination beneath tank	5–5.5 10–10.5 15–15.5	Tuff Tuff Tuff	x x x	— — —	— — —	— — —	TBD	TBD	— — —
Septic Tank: SWMU 16-006(a)											
1 and 2 (Figure 5.10-4)	SWMU 16-006(a), location of septic tank	Sampling to define nature and extent of contamination at tank	10–10.5 15–15.5 20–20.5	Tuff Tuff Tuff	— — —	— — —	— — —	— — —	TBD	TBD	x x x

Table 5.10-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	TPH (SW-846 8015M)	Pesticides/Herbicides (SW-846 8081A/8151A)	PCBs (SW-846 8082)	Dioxins/Furans (SW-846 8290A)	Alpha Spectroscopy (HASL 300)[c]	Gamma Spectroscopy (EPA Method 901.1)[c]	Explosive Compounds (SW-846 8321A)
Burn Pit: SWMU 16-009(a)											
3–10 (Figure 5.10-4)	SWMU 16-009(a), location of former burn pit	Sampling to define nature and extent of contamination within former burn pit footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
11–37 (Figure 5.10-4)	SWMU 16-009(a), location of burn pit and berm's leveled area	Sampling to define lateral nature and extent of contamination outside former burn pit footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	— — — —	TBD	TBD	x x x x
20% of locations	SWMU 16-009(a), location of burn pit and berm's leveled area	Sampling to define lateral nature and extent of pesticide and herbicide contamination outside former burn pit footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	x x x x	— — — —	x x x x	— — — —	— — — —	— — — —

[a] Depth intervals may be extended if additional sample volume is required.

[b] — = Analysis is not required.

[c] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[d] TBD = To be determined.

Table 6.5-1
Subaggregate 5 Summary of Historical Samples Collected in Soil at T-Site Laboratories, Offices, and Warehouses: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number									
				Cyanide	Gamma Spectroscopy	High Explosives	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	Inorganic Chemicals	Strontium-90	SVOC	Uranium
SWMU 16-025(m)													
16-04179	0–1	0316-97-0568	ALLH	—*	3420R	3418R	—	3420R	3420R	3419R	3420R	3417R	—
16-04181	0–1	0316-97-0569	ALLH	—	3420R	3418R	—	3420R	3420R	3419R	3420R	3417R	—
SWMU 16-025(n)													
16-04174	0–1	0316-97-0566	ALLH	—	3420R	3418R	—	3420R	3420R	3419R	3420R	3417R	—
16-04175	0–1	0316-97-0567	ALLH	—	3420R	3418R	—	3420R	3420R	3419R	3420R	3417R	—
SWMU 16-025(o)													
16-04184	0–1	0316-97-0570	ALLH	—	3420R	3418R	—	3420R	3420R	3419R	3420R	3417R	—
16-04186	0–1	0316-97-0571	ALLH	—	3420R	3418R	—	3420R	3420R	3419R	3420R	3417R	—
SWMU 16-034(c)													
16-04151	0–1	0316-97-0560	ALLH	—	—	3402R	—	—	—	3403R	—	3401R	—
16-04147	0–1	0316-97-0586	ALLH	—	—	3402R	—	—	—	3403R	—	3401R	—
SWMU 16-034(d)													
16-04158	0–1	0316-97-0587	ALLH	—	—	3402R	—	—	—	3403R	—	3401R	—
16-04161	0–1	0316-97-0563	ALLH	—	—	3402R	—	—	—	3403R	—	3401R	—
SWMU 16-034(e)													
16-04143	0–1	0316-97-0558	ALLH	—	—	3402R	—	—	—	3403R	—	3401R	3404R
16-04145	0–1	0316-97-0559	ALLH	—	—	3402R	—	—	—	3403R	—	3401R	3404R
SWMU 16-034(f)													
16-04152	0–0.83	0316-97-0562	ALLH	3403R	—	3402R	3404R	—	3404R	3403R	—	3401R	—
16-04156	0–1	0316-97-0561	ALLH	3403R	—	3402R	3404R	—	3404R	3403R	—	3401R	—

*— = The analysis was not requested.

Table 6.5-2
Subaggregate 5 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil at T-Site Laboratories, Offices, and Warehouses: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Cadmium	Copper	Cyanide (Total)	Lead	Mercury	Silver	Uranium	Zinc
Soil Background Value				**0.83**	**0.4**	**14.7**	**0.5**	**22.3**	**0.1**	**1**	**1.82**	**48.8**
SWMU 16-025(m)												
16-04179	0–1	0316-97-0568	ALLH	6.8 (UJ)	0.59 (U)	—*	—	33.9	—	3.6	—	49
16-04181	0–1	0316-97-0569	ALLH	9.5 (J-)	0.64 (U)	—	—	—	—	—	—	—
SWMU 16-025(n)												
16-04174	0–1	0316-97-0566	ALLH	14.2	0.56 (U)	—	—	64.3	—	—	—	87.6
16-04175	0–1	0316-97-0567	ALLH	5.9 (UJ)	0.51 (U)	—	—	—	—	—	—	—
SWMU 16-025(o)												
16-04184	0–1	0316-97-0570	ALLH	5.8 (UJ)	0.5 (U)	—	—	—	—	—	—	—
16-04186	0–1	0316-97-0571	ALLH	6.2 (UJ)	0.54 (U)	21.9	—	—	—	—	—	—
SWMU 16-034(c)												
16-04147	0–1	0316-97-0586	ALLH	—	0.54 (U)	30	—	120	0.11 (U)	2.2 (U)	—	480
16-04151	0–1	0316-97-0560	ALLH	—	0.53 (U)	—	—	—	0.11 (U)	3.1	—	91
SWMU 16-034(d)												
16-04158	0–1	0316-97-0587	ALLH	—	0.52 (U)	—	—	200	—	2.1 (U)	—	55
16-04161	0–1	0316-97-0563	ALLH	—	0.52 (U)	18	—	260	—	2.1 (U)	—	67
SWMU 16-034(e)												
16-04143	0–1	0316-97-0558	ALLH	—	0.53 (U)	—	—	—	0.11 (U)	2.1 (U)	3.05 (U)	—
16-04145	0–1	0316-97-0559	ALLH	—	0.54 (U)	18	—	99	0.11 (U)	2.2 (U)	3.02 (U)	60
SWMU 16-034(f)												
16-04152	0–0.83	0316-97-0562	ALLH	—	0.52 (U)	—	0.52 (U)	31	—	2.1 (U)	—	52
16-04156	0–1	0316-97-0561	ALLH	—	0.52 (U)	—	0.52 (U)	39	—	2.1 (U)	—	59

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is less than background value.

Table 6.5-3
Subaggregate 5 Historical Analytical Results of Organic Chemicals
Detected in Soil at T-Site Laboratories, Offices, and Warehouses: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Methylnaphthalene[2-]	Naphthalene
SWMU 16-034(c)							
16-04147	0–1	0316-97-0586	ALLH	0.054 (J)	—*	0.046 (J)	0.039 (J)
SWMU 16-034(e)							
16-04143	0–1	0316-97-0558	ALLH	—	0.063 (J)	—	—
16-04145	0–1	0316-97-0559	ALLH	—	0.066 (J)	—	—
SWMU 16-034(f)							
16-04156	0–1	0316-97-0561	ALLH	—	0.091 (J)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
*— = If analyzed, sample result is not detected.

Table 6.6-1
Subaggregate 5 Proposed Samples in Tuff at T-Site

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
Former Structures: Consolidated Unit 16-034(b)-99														
1–7	SWMU 16-005(j), location of former septic tank	Sampling to define nature and extent of contamination beneath the former septic tank and inlet and outlet piping	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	x x	x x	x x	x x	x x	x x	x x	TBD[c]	TBD	x x
8–10	SWMU 16-005(m), location of former sump	Sampling to define nature and extent of contamination beneath the former sump location	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	x x	x x	x x	x x	x x	x x	x x	TBD	TBD	x x
11–15	SWMU 16-034(b), location of former building 16-490	Sampling to define nature and extent of contamination beneath the former building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	x x	x x	x x	x x	x x	x x	x x	TBD	TBD	x x
16–21	SWMU 16-034(b), location of former building 16-490 drainage troughs	Sampling to define nature and extent of contamination beneath the former drainage troughs	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	x x	x x	x x	x x	x x	x x	x x	TBD	TBD	x x

Table 6.6-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
16-04181	SWMU 16-025(m), location of former building 16-495	Sampling to define vertical extent of metals contamination beneath the former building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	—[d] —	— —	— —	— —	x x	— —	— —	TBD	TBD	— —
16-04174	SWMU 16-025(n), location of former building 16-499	Sampling to define vertical extent of metals contamination beneath the former building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	— —	TBD	TBD	— —
16-04186	SWMU 16-025(o), location of former building 16-500	Sampling to define vertical extent of metals contamination beneath the former building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	— —	TBD	TBD	— —
16-04147 and 16-04151	SWMU 16-034(c), location of former building 16-491	Sampling to define vertical extent of metals contamination beneath the former building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	x x	TBD	TBD	— —
16-04158 and 16-04161	SWMU 16-034(d), location of former building 16-492	Sampling to define vertical extent of metals contamination beneath the former building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	— —	TBD	TBD	— —

Table 6.6-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
16-04143 and 16-04145	SWMU 16-034(e), location of former building 16-496	Sampling to define vertical extent of metals and SVOC contamination beneath the former building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	x x	TBD	TBD	— —
16-04152 and 16-04156	SWMU 16-034(f), location of former building 16-498	Sampling to define vertical extent of metals and SVOC contamination beneath the former building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	x x	TBD	TBD	— —

[a] Depth intervals may be extended if additional sample volume is required.

[b] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[c] TBD = To be determined.

[d] — = Analysis is not required.

Table 7.7-1
Subaggregate 6 Summary of Historical Samples
Collected in Soil at Radiography Buildings: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number						
				Gamma Spectroscopy	High Explosives	Isotopic Radium	Isotopic Uranium	Inorganic Chemicals	Strontium-90	SVOC
SWMU 16-025(b)										
16-04139	0–1	0316-97-0557	ALLH	3460R	3458R	3460R	3460R	3459R	3460R	3457R

Table 7.7-2
Subaggregate 6 Historical Analytical Results of Inorganic Chemicals Greater
Than Background Values in Soil at Radiography Buildings: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Cadmium
Soil Background Value				**0.83**	**0.4**
SWMU 16-025(b)					
16-04139	0–1	0316-97-0557	ALLH	7.3 (UJ)	0.63 (U)

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).
Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

Table 7.7-3
Subaggregate 6 Historical Analytical Results of Organic
Chemicals Detected in Soil at Radiography Buildings: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Fluoranthene	Pyrene
SWMU 16-025(b)					
16-04139	0–1	0316-97-0557	ALLH	0.036 (J)	0.04 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

Table 7.8-1
Subaggregate 6 Summary of Historical Samples Collected in Soil, Fill, and Tuff at HE Machining Buildings and Associated Structures: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide (Total)	High Explosives	Inorganic Chemicals	SVOC	VOC
Consolidated Unit 16-029(h2)-99—Screening-Level Data								
SWMU 16-025(i)								
16-05794	4.25–4.75	RE16-98-0011[a]	QBT4	—[b]	4262R	4265R	4263R	4263R
16-05794	5.75–6.75	RE16-98-0012[a]	QBT4	—	4262R	4265R	4263R	4263R
SWMU 16-025(j)								
16-05796	6.42–6.67	RE16-98-0013[a]	QBT4	—	4262R	4265R	4263R	—
16-05796	8.17–8.67	RE16-98-0014[a]	QBT4	—	4262R	4265R	4263R	4263R
SWMU 16-029(h2)								
16-03383	3.5–4	0316-97-0106[a]	ALLH	—	—	3901R	—	—
Consolidated Unit 16-029(q)-99—Screening-Level Data								
AOC C-16-064								
16-02541	0–0.5	0316-96-0130[a]	ALLH	1885	1886	1885	1884	—
16-02541	0.5–1	0316-96-0199[a]	ALLH	1885	1886	1885	1884	1884
SWMU 16-029(q)								
16-02404	0–0.5	0316-96-0063[a]	ALLH	2033	2034	2033	2032	2032
Consolidated Unit 16-029(h2)-99—Decision-Level Data								
SWMU 16-025(d)								
16-04114	0–1	0316-97-0550	ALLH	—	3442R	3443R	3441R	—
SWMU 16-025(g)								
16-04123	0–1	0316-97-0584	ALLH	—	3442R	3443R	3441R	—
16-04124	0–1	0316-97-0553	ALLH	—	3442R	3443R	3441R	—
16-04125	0–1	0316-97-0552	ALLH	—	3442R	3443R	3441R	—

Table 7.8-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide (Total)	High Explosives	Inorganic Chemicals	SVOC	VOC
SWMU 16-025(h)								
16-03401	3–3.33	0316-97-0104	ALLH	—	3962R	3963R	3960R	3960R
16-04129	0–1	0316-97-0554	ALLH	—	3402R	3403R	3401R	—
16-04129	0–1	0316-97-0585	FILL	—	3402R	3403R	3401R	—
16-04132	0–0.5	0316-97-0555	FILL	—	3402R	3403R	3401R	—
SWMU 16-025(j)								
16-04115	0–1	0316-97-0583	ALLH	—	3442R	3443R	3441R	—
16-04118	0–1	0316-97-0551	ALLH	—	3442R	3443R	3441R	—
16-04119	0–1	0316-97-0582	ALLH	—	3442R	3443R	3441R	—
16-05796	5–5.5	RE16-98-0010	ALLH	—	4245R	4244R	4243R	4243R
SWMU 16-029(h2)								
16-03381	3.5–3.6	RE16-98-0008	ALLH	—	4245R	4244R	4243R	4243R
16-03381	5.5–6.5	RE16-98-0009	ALLH	—	4245R	4246R	4243R	4243R
16-03382	0.5–1	0316-97-0105	ALLH	—	—	3901R	—	—
16-03382	2.5–3	0316-97-0112	ALLH	—	3930R	3931R	3928R	3928R
16-03383	3.5–4	0316-97-0113	ALLH	—	3930R	3931R	3928R	3928R
16-03386	2–2.5	0316-97-0107	ALLH	—	3912R	3914R	3911R	3911R
16-03388	2–2.5	0316-97-0109	ALLH	—	3912R	3914R	3911R	3911R
16-03389	3.5–4	0316-97-0101	ALLH	—	3930R	3931R	3928R	3928R
16-03393	1.25–1.5	0316-97-0110	ALLH	—	3917R	3919R	3916R	3916R
16-03396	1.25–1.5	0316-97-0111	ALLH	—	3917R	3919R	3916R	3916R
16-03397	2.5–3	0316-97-0102	ALLH	—	3940R	3942R	3939R	3939R
16-03399	2–2.5	0316-97-0103	ALLH	—	3940R	3942R	3939R	3939R

Table 7.8-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide (Total)	High Explosives	Inorganic Chemicals	SVOC	VOC
Consolidated Unit 16-029(q)-99—Decision-Level Data								
AOC C-16-064								
16-02541	1–1.5	0316-96-0162	ALLH	2492	2494	2492	2491	2491
16-02541	1.5–2	0316-96-0163	ALLH	2492	2494	2492	2491	2491
SWMU 16-017(f)-99								
16-02580	1–1.5	0316-96-0142	ALLH	2033	2034	2033	2032	2032
16-02582	1–1.5	0316-96-0143	ALLH	2033	2034	2033	2032	2032
SWMU 16-029(q)								
16-02397	5–6	0316-96-0122	QBT4	2158	2159	2158	2157	2157
16-02397	6–7	0316-96-0152	QBT4	2158	2159	2158	2157	2157
16-02399	4.5–5	0316-96-0062	ALLH	2033	2034	2033	2032	2032
16-02400	4.5–5	0316-96-0120	ALLH	2158	2159	2158	2157	2157
16-02400	5–6	0316-96-0150	ALLH	2158	2159	2158	2157	2157
16-02402	4.5–5	0316-96-0121	ALLH	2158	2159	2158	2157	2157
16-02402	5–6	0316-96-0151	ALLH	2158	2159	2158	2157	2157
16-02404	7–8	0316-96-0144	QBT4	2158	2159	2158	2157	2157
16-02405	0–0.5	0316-96-0126	ALLH	2242	2243	2242	2241	2241
16-02406	0–0.5	0316-96-0127	ALLH	2242	2243	2242	2241	2241
16-02407	4–4.5	0316-96-0061	FILL	1885	1886	1885	1884	1884
16-02407	7–8	0316-96-0069	QBT4	1911	1912	1911	1910	1910
16-02412	4–4.5	0316-96-0060	ALLH	1885	1886	1885	1884	1884
16-02412	7–8	0316-96-0068	FILL	1911	1912	1911	1910	1910

[a] Soil removed after sampling.

[b] — = The analysis was not requested.

Table 7.8-2
Subaggregate 6 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, and Tuff at HE Machining Buildings and Associated Structures: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium
Soil Background Value[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**
QBT 2,3,4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**
Consolidated Unit 16-029(h2)-99—Screening-Level Data											
SWMU 16-025(i)											
16-05794	4.25–4.75	RE16-98-0011[b]	QBT4	13000	—[c]	2.8	1570 (J-)	—	—	3880	—
16-05794	5.75–6.75	RE16-98-0012[b]	QBT4	—	—	—	936 (J-)	—	—	—	—
SWMU 16-025(j)											
16-05796	6.42–6.67	RE16-98-0013[b]	QBT4	—	—	—	49.1 (J-)	—	—	—	—
16-05796	8.17–8.67	RE16-98-0014[b]	QBT4	—	—	—	172 (J-)	—	—	—	—
SWMU 16-029(h2)											
16-03383	3.5–4	0316-97-0106[b]	ALLH	—	—	—	—	—	—	—	—
Consolidated Unit 16-029(q)-99—Screening-Level Data											
AOC C-16-064											
16-02541	0–0.5	0316-96-0130[b]	ALLH	—	11.2 (UJ)	—	999	—	0.69 (U)	—	—
16-02541	0.5–1	0316-96-0199[b]	ALLH	—	11.3 (UJ)	—	387	—	0.7 (U)	—	—
SWMU 16-029(q)											
16-02404	0–0.5	0316-96-0063[b]	ALLH	—	6.7 (U)	8.7	1220 (J+)	—	0.88 (U)	—	—
Consolidated Unit 16-029(h2)-99—Decision-Level Data											
SWMU 16-025(d)											
16-04114	0–1	0316-97-0550	ALLH	—	—	—	—	—	—	—	—
SWMU 16-025(g)											
16-04123	0–1	0316-97-0584	ALLH	—	—	—	—	—	—	—	—

Table 7.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium
Soil Background Value[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**
QBT 2,3,4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**
SWMU 16-025(h)											
16-03401	3–3.33	0316-97-0104	ALLH	—	5.3 (U)	—	—	—	0.53 (U)	—	—
16-04129	0–1	0316-97-0554	ALLH	—	—	—	—	—	0.54 (U)	—	—
16-04129	0–1	0316-97-0585	FILL	—	—	—	—	—	0.56 (U)	—	—
16-04132	0–0.5	0316-97-0555	FILL	—	—	—	—	—	0.53 (U)	—	—
SWMU 16-025(j)											
16-04115	0–1	0316-97-0583	ALLH	—	—	—	—	—	—	—	—
16-05796	5–5.5	RE16-98-0010	ALLH	—	1.1 (U)	—	—	—	—	—	—
SWMU 16-029(h2)											
16-03381	3.5–3.6	RE16-98-0008	ALLH	—	1.3 (U)	—	677	—	—	—	—
16-03381	5.5–6.5	RE16-98-0009	ALLH	—	1.4 (U)	—	—	—	—	—	—
16-03382	0.5–1	0316-97-0105	ALLH	—	—	—	—	—	—	—	—
16-03382	2.5–3	0316-97-0112	ALLH	—	4.2 (U)	—	—	—	0.42 (U)	—	—
16-03383	3.5–4	0316-97-0113	ALLH	—	4.5 (U)	—	—	—	0.45 (U)	—	—
16-03386	2–2.5	0316-97-0107	ALLH	34300	—	—	408	2.3	—	—	—
16-03388	2–2.5	0316-97-0109	ALLH	—	—	—	—	—	—	—	—
16-03389	3.5–4	0316-97-0101	ALLH	—	5.4 (U)	—	—	—	0.54 (U)	—	—
16-03393	1.25–1.5	0316-97-0110	ALLH	—	—	—	—	—	0.57 (U)	—	—
16-03396	1.25–1.5	0316-97-0111	ALLH	—	—	—	—	—	0.55 (U)	—	—
16-03397	2.5–3	0316-97-0102	ALLH	—	—	—	—	—	—	—	—
16-03399	2–2.5	0316-97-0103	ALLH	—	—	—	—	—	—	—	—

Table 7.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium
Soil Background Value[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**
QBT 2,3,4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**
Consolidated Unit 16-029(q)-99—Decision-Level Data											
AOC C-16-064											
16-02541	1–1.5	0316-96-0162	ALLH	—	12 (UJ)	—	—	—	0.59 (U)	—	—
16-02541	1.5–2	0316-96-0163	ALLH	—	11 (UJ)	—	—	—	0.57 (U)	—	—
SWMU 16-017(f)-99											
16-02580	1–1.5	0316-96-0142	ALLH	—	6.7 (U)	—	—	—	0.88 (U)	—	—
16-02582	1–1.5	0316-96-0143	ALLH	—	6.6 (U)	—	—	—	0.86 (U)	—	—
SWMU 16-029(q)											
16-02255	0–0.5	0316-96-0128	ALLH	—	5.7 (U)	—	1010	—	0.75 (U)	—	—
16-02256	0–0.5	0316-96-0129	ALLH	—	5.5 (U)	—	598	—	0.73 (U)	—	—
16-02397	5–6	0316-96-0122	QBT4	9470	7.5 (UJ)	—	117 (J+)	—	—	2480	—
16-02397	6–7	0316-96-0152	QBT4	—	7 (UJ)	—	69.1 (J+)	—	—	—	—
16-02399	4.5–5	0316-96-0062	ALLH	—	6.6 (U)	—	1600 (J+)	—	0.87 (U)	—	—
16-02400	4.5–5	0316-96-0120	ALLH	—	6.2 (UJ)	—	—	—	0.74 (U)	—	—
16-02400	5–6	0316-96-0150	ALLH	—	6.5 (UJ)	—	—	—	0.77 (U)	—	—
16-02402	4.5–5	0316-96-0121	ALLH	—	6.2 (UJ)	—	1140 (J+)	—	0.74 (U)	—	—
16-02402	5–6	0316-96-0151	ALLH	—	7.9 (J-)	—	2720 (J+)	—	0.86 (U)	—	—
16-02404	7–8	0316-96-0144	QBT4	—	6.8 (UJ)	—	702 (J+)	—	—	—	—
16-02405	0–0.5	0316-96-0126	ALLH	—	5.5 (U)	—	1160	—	0.72 (U)	—	—
16-02406	0–0.5	0316-96-0127	ALLH	—	5.6 (J)	—	366	—	0.72 (U)	—	—
16-02407	4–4.5	0316-96-0061	FILL	35800	12.4 (UJ)	—	—	—	0.77 (U)	—	19.7
16-02407	7–8	0316-96-0069	QBT4	—	0.67 (U)	—	—	—	—	—	—
16-02412	4–4.5	0316-96-0060	ALLH	—	12.6 (UJ)	—	—	—	0.78 (U)	—	—
16-02412	7–8	0316-96-0068	FILL	—	—	—	—	—	0.5 (J)	—	—

Table 7.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chromium Hexavalent Ion	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese
Soil Background Value[a]				**n/a[d]**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**
QBT 2,3,4 Background Value				**n/a**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**
Consolidated Unit 16-029(h2)-99—Screening-Level Data											
SWMU 16-025(i)											
16-05794	4.25–4.75	RE16-98-0011[b]	QBT4	—	—	6.8	—	—	—	2170	—
16-05794	5.75–6.75	RE16-98-0012[b]	QBT4	—	—	—	—	—	—	—	—
SWMU 16-025(j)											
16-05796	6.42–6.67	RE16-98-0013[b]	QBT4	—	—	—	—	—	—	—	—
16-05796	8.17–8.67	RE16-98-0014[b]	QBT4	—	—	—	—	—	—	—	—
SWMU 16-029(h2)											
16-03383	3.5–4	0316-97-0106[b]	ALLH	—	—	—	—	—	—	—	—
Consolidated Unit 16-029(q)-99—Screening-Level Data											
AOC C-16-064											
16-02541	0–0.5	0316-96-0130[b]	ALLH	—	—	—	0.67 (U)	—	41.7	—	—
16-02541	0.5–1	0316-96-0199[b]	ALLH	—	—	—	0.68 (U)	—	—	—	—
SWMU 16-029(q)											
16-02404	0–0.5	0316-96-0063[b]	ALLH	—	—	15.8	0.59 (U)	—	—	—	—
Consolidated Unit 16-029(h2)-99—Decision-Level Data											
SWMU 16-025(d)											
16-04114	0–1	0316-97-0550	ALLH	—	—	—	—	—	—	—	—
SWMU 16-025(g)											
16-04123	0–1	0316-97-0584	ALLH	—	—	16.6	—	—	—	—	—
SWMU 16-025(h)											
16-03401	3–3.33	0316-97-0104	ALLH	—	—	—	—	—	—	—	—
16-04129	0–1	0316-97-0554	ALLH	—	—	—	—	—	—	—	—

Table 7.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chromium Hexavalent Ion	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese
Soil Background Value[a]				**n/a[d]**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**
QBT 2,3,4 Background Value				**n/a**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**
16-04129	0–1	0316-97-0585	FILL	—	—	—	—	—	38	—	—
16-04132	0–0.5	0316-97-0555	FILL	—	—	—	—	—	23	—	—
SWMU 16-025(j)											
16-04115	0–1	0316-97-0583	ALLH	—	9.3 (J)	—	—	—	67	—	—
16-05796	5–5.5	RE16-98-0010	ALLH	—	—	—	—	—	—	—	—
SWMU 16-029(h2)											
16-03381	3.5–3.6	RE16-98-0008	ALLH	—	—	—	—	—	—	—	—
16-03381	5.5–6.5	RE16-98-0009	ALLH	—	13.2 (J)	—	—	—	36.3	—	808
16-03382	0.5–1	0316-97-0105	ALLH	—	8.8	—	—	—	—	—	—
16-03382	2.5–3	0316-97-0112	ALLH	—	—	—	—	—	—	—	—
16-03383	3.5–4	0316-97-0113	ALLH	—	—	—	—	—	—	—	—
16-03386	2–2.5	0316-97-0107	ALLH	—	—	—	—	—	—	—	—
16-03388	2–2.5	0316-97-0109	ALLH	—	—	—	—	—	—	—	—
16-03389	3.5–4	0316-97-0101	ALLH	—	—	—	—	—	—	—	—
16-03393	1.25–1.5	0316-97-0110	ALLH	—	—	—	—	—	—	—	—
16-03396	1.25–1.5	0316-97-0111	ALLH	—	—	—	—	—	—	—	—
16-03397	2.5–3	0316-97-0102	ALLH	—	11 (J)	—	—	—	25.6	—	1280
16-03399	2–2.5	0316-97-0103	ALLH	—	—	—	—	—	28.4	—	—
Consolidated Unit 16-029(q)-99—Decision-Level Data											
AOC C-16-064											
16-02541	1–1.5	0316-96-0162	ALLH	—	—	—	0.59 (U)	—	—	—	850
16-02541	1.5–2	0316-96-0163	ALLH	—	—	—	0.57 (U)	—	—	—	—

Table 7.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chromium Hexavalent Ion	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese
Soil Background Value[a]				**n/a[d]**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**
QBT 2,3,4 Background Value				**n/a**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**
SWMU 16-017(f)-99											
16-02580	1–1.5	0316-96-0142	ALLH	—	—	—	0.6 (U)	—	128	—	—
16-02582	1–1.5	0316-96-0143	ALLH	—	13.8	—	0.58 (U)	—	24.2	—	1590
SWMU 16-029(q)											
16-02255	0–0.5	0316-96-0128	ALLH	—	—	—	0.51 (U)	—	—	—	—
16-02256	0–0.5	0316-96-0129	ALLH	—	—	—	0.52 (U)	—	—	—	—
16-02397	5–6	0316-96-0122	QBT4	—	—	7.4	0.64 (U)	—	—	—	—
16-02397	6–7	0316-96-0152	QBT4	—	—	—	0.59 (U)	—	—	—	—
16-02399	4.5–5	0316-96-0062	ALLH	1.2	—	—	0.59 (U)	—	—	—	—
16-02400	4.5–5	0316-96-0120	ALLH	—	—	—	0.53 (U)	—	—	—	—
16-02400	5–6	0316-96-0150	ALLH	—	—	—	0.55 (U)	—	—	—	—
16-02402	4.5–5	0316-96-0121	ALLH	—	—	—	0.53 (U)	—	—	—	—
16-02402	5–6	0316-96-0151	ALLH	—	—	—	0.62 (U)	—	—	—	—
16-02404	7–8	0316-96-0144	QBT4	—	—	5.1 (J)	0.58 (U)	—	—	—	—
16-02405	0–0.5	0316-96-0126	ALLH	—	—	18.1	0.52 (U)	—	—	—	—
16-02406	0–0.5	0316-96-0127	ALLH	—	—	—	0.52 (U)	—	—	—	—
16-02407	4–4.5	0316-96-0061	FILL	—	—	—	0.73 (U)	24100	—	—	—
16-02407	7–8	0316-96-0069	QBT4	—	—	—	0.57 (U)	—	—	—	—
16-02412	4–4.5	0316-96-0060	ALLH	—	—	—	0.72 (U)	—	—	—	1210
16-02412	7–8	0316-96-0068	FILL	—	—	—	0.64 (U)	—	—	—	—

Table 7.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Mercury	Nickel	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil Background Value[a]				**0.1**	**15.4**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
QBT 2,3,4 Background Value				**0.1**	**6.58**	**0.3**	**1**	**2770**	**1.10**	**2.40**	**63.5**
Consolidated Unit 16-029(h2)-99—Screening-Level Data											
SWMU 16-025(i)											
16-05794	4.25–4.75	RE16-98-0011[b]	QBT4	—	—	0.94 (U)	—	—	1.3 (U)	25.2 (U)	—
16-05794	5.75–6.75	RE16-98-0012[b]	QBT4	—	—	0.93 (U)	—	—	1.3 (U)	25.2 (U)	—
SWMU 16-025(j)											
16-05796	6.42–6.67	RE16-98-0013[b]	QBT4	—	—	0.89 (U)	—	—	1.2 (U)	25.2 (U)	—
16-05796	8.17–8.67	RE16-98-0014[b]	QBT4	—	—	0.89 (U)	—	—	1.2 (U)	25.2 (U)	—
SWMU 16-029(h2)											
16-03383	3.5–4	0316-97-0106[b]	ALLH	—	—	—	—	—	0.81 (J)	2.58	51.4
Consolidated Unit 16-029(q)-99—Screening-Level Data											
AOC C-16-064											
16-02541	0–0.5	0316-96-0130[b]	ALLH	—	—	2.4 (U)	2.2 (UJ)	—	—	—	54
16-02541	0.5–1	0316-96-0199[b]	ALLH	—	—	—	2.2 (UJ)	—	—	—	63.9
SWMU 16-029(q)											
16-02404	0–0.5	0316-96-0063[b]	ALLH	—	—	—	1.6 (U)	—	—	—	—
Consolidated Unit 16-029(h2)-99—Decision-Level Data											
SWMU 16-025(d)											
16-04114	0–1	0316-97-0550	ALLH	—	—	—	—	—	—	—	49.8
SWMU 16-025(g)											
16-04123	0–1	0316-97-0584	ALLH	—	—	—	—	—	—	—	—
SWMU 16-025(h)											
16-03401	3–3.33	0316-97-0104	ALLH	—	—	—	—	—	—	23.5 (J)	—
16-04129	0–1	0316-97-0554	ALLH	0.11 (U)	—	—	2.2 (U)	—	—	—	—
16-04129	0–1	0316-97-0585	FILL	0.11 (U)	—	—	2.2 (U)	—	—	—	78

Table 7.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Mercury	Nickel	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil Background Value[a]				**0.1**	**15.4**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
QBT 2,3,4 Background Value				**0.1**	**6.58**	**0.3**	**1**	**2770**	**1.10**	**2.40**	**63.5**
16-04132	0–0.5	0316-97-0555	FILL	0.11 (U)	—	—	2.1 (U)	—	—	—	54
SWMU 16-025(j)											
16-04115	0–1	0316-97-0583	ALLH	—	—	—	—	—	—	—	260
16-05796	5–5.5	RE16-98-0010	ALLH	—	—	—	—	—	1.1 (U)	27.3 (U)	—
SWMU 16-029(h2)											
16-03381	3.5–3.6	RE16-98-0008	ALLH	—	—	—	—	—	1.3 (U)	31.9 (U)	—
16-03381	5.5–6.5	RE16-98-0009	ALLH	—	—	—	—	—	1.4 (U)	33.4 (U)	—
16-03382	0.5–1	0316-97-0105	ALLH	—	—	—	—	—	0.84 (J)	2.32	—
16-03382	2.5–3	0316-97-0112	ALLH	—	—	—	—	—	—	16.9(J)	—
16-03383	3.5–4	0316-97-0113	ALLH	—	—	—	—	—	—	20.4 (J)	—
16-03386	2–2.5	0316-97-0107	ALLH	—	—	—	—	1150	0.82 (J)	3.17	—
16-03388	2–2.5	0316-97-0109	ALLH	—	—	—	—	—	—	3.02	—
16-03389	3.5–4	0316-97-0101	ALLH	—	—	—	—	—	—	16.1 (U)	—
16-03393	1.25–1.5	0316-97-0110	ALLH	0.11 (U)	—	—	2.3 (UJ)	—	—	2.79	—
16-03396	1.25–1.5	0316-97-0111	ALLH	0.11 (U)	—	—	2.2 (UJ)	—	—	2.11	—
16-03397	2.5–3	0316-97-0102	ALLH	—	—	2.3	—	—	3.2	57.1	—
16-03399	2–2.5	0316-97-0103	ALLH	—	—	—	—	—	—	19.1 (J)	—
Consolidated Unit 16-029(q)-99—Decision-Level Data											
AOC C-16-064											
16-02541	1–1.5	0316-96-0162	ALLH	0.12 (U)	—	—	2.4 (U)	—	1.5 (U)	—	49
16-02541	1.5–2	0316-96-0163	ALLH	0.11 (U)	—	—	2.3 (U)	—	1.4 (U)	—	—
SWMU 16-017(f)-99											
16-02580	1–1.5	0316-96-0142	ALLH	—	—	—	1.6 (U)	—	—	—	—
16-02582	1–1.5	0316-96-0143	ALLH	—	—	—	1.6 (U)	—	—	—	—

Table 7.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Mercury	Nickel	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil Background Value[a]				**0.1**	**15.4**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
QBT 2,3,4 Background Value				**0.1**	**6.58**	**0.3**	**1**	**2770**	**1.10**	**2.40**	**63.5**
SWMU 16-029(q)											
16-02255	0–0.5	0316-96-0128	ALLH	—	—	—	1.4 (U)	—	—	—	53.1
16-02256	0–0.5	0316-96-0129	ALLH	—	—	—	1.3 (U)	—	—	—	—
16-02397	5–6	0316-96-0122	QBT4	—	—	0.56 (UJ)	1.3 (U)	—	—	—	—
16-02397	6–7	0316-96-0152	QBT4	—	—	0.52 (UJ)	1.3 (U)	—	—	—	—
16-02399	4.5–5	0316-96-0062	ALLH	—	—	—	1.6 (U)	—	—	—	—
16-02400	4.5–5	0316-96-0120	ALLH	—	—	—	1.1 (U)	—	—	—	—
16-02400	5–6	0316-96-0150	ALLH	—	—	—	1.2 (U)	—	—	—	—
16-02402	4.5–5	0316-96-0121	ALLH	—	—	—	1.1 (U)	—	—	—	—
16-02402	5–6	0316-96-0151	ALLH	—	—	—	1.3 (U)	—	—	—	—
16-02404	7–8	0316-96-0144	QBT4	—	—	0.51 (UJ)	1.2 (U)	—	—	—	—
16-02405	0–0.5	0316-96-0126	ALLH	—	—	—	1.3 (U)	—	—	—	56.2
16-02406	0–0.5	0316-96-0127	ALLH	—	—	—	1.3 (U)	—	—	—	—
16-02407	4–4.5	0316-96-0061	FILL	—	16.3	2.6 (U)	2.5 (UJ)	—	—	—	—
16-02407	7–8	0316-96-0069	QBT4	—	—	0.5 (UJ)	—	—	—	—	—
16-02412	4–4.5	0316-96-0060	ALLH	—	—	2.6 (U)	2.5 (UJ)	—	1.2 (J)	—	—
16-02412	7–8	0316-96-0068	FILL	—	—	—	—	—	—	—	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).
Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Fill samples were compared to soil background values.

[b] Soil removed after sampling.

[c] — = If analyzed, sample result is less than background value.

[d] n/a = Not applicable; no background value available.

Table 7.8-3
Subaggregate 6 Historical Analytical Results of Organic Chemicals Detected in Soil, Fill, and Tuff at HE Machining Buildings and Associated Structures: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Carbon Disulfide
Consolidated Unit 16-029(h2)-99—Screening-Level Data												
SWMU 16-025(i)												
16-05794	4.25–4.75	RE16-98-0011[a]	QBT4	—[b]	—	—	—	—	—	—	—	—
16-05794	5.75–6.75	RE16-98-0012[a]	QBT4	—	—	—	—	—	—	—	—	—
SWMU 16-025(j)												
16-05796	6.42–6.67	RE16-98-0013[a]	QBT4	—	—	—	—	—	—	—	0.056 (J)	—
16-05796	8.17–8.67	RE16-98-0014[a]	QBT4	—	—	—	—	—	—	—	0.028 (J)	—
Consolidated Unit 16-092(q)-99—Screening-Level Data												
SWMU 16-029(q)												
16-02404	0–0.5	0316-96-0063[a]	ALLH	0.515	0.674	—	—	—	—	—	—	—
AOC C-16-064												
16-02541	0–0.5	0316-96-0130[a]	ALLH	0.584	0.401	—	—	—	—	—	—	—
16-02541	0.5–1	0316-96-0199[a]	ALLH	0.296	0.272	—	—	—	—	—	—	—
Consolidated Unit 16-029(h2)-99—Decision-Level Data												
SWMU 16-025(h)												
16-03401	3–3.33	0316-97-0104	ALLH	—	—	—	—	—	—	—	—	—
16-04129	0–1	0316-97-0554	ALLH	—	—	0.072 (J)	0.08 (J)	0.2 (J)	0.081 (J)	0.064 (J)	—	—
16-04129	0–1	0316-97-0585	FILL	—	—	0.072 (J)	—	0.079 (J)	—	—	—	—

Table 7.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Carbon Disulfide
SWMU 16-025(j)												
16-05796	5–5.5	RE16-98-0010	ALLH	—	—	—	—	—	—	—	—	—
SWMU 16-029(h2)												
16-03381	3.5–3.6	RE16-98-0008	ALLH	0.58	1.3	—	—	—	—	—	—	—
16-03381	5.5–6.5	RE16-98-0009	ALLH	—	—	—	—	—	—	—	0.11 (J)	—
16-03382	2.5–3	0316-97-0112	ALLH	0.331	0.903	—	—	—	—	—	—	—
16-03383	3.5–4	0316-97-0113	ALLH	—	—	—	—	—	—	—	—	—
16-03386	2–2.5	0316-97-0107	ALLH	—	—	—	—	—	—	—	—	—
16-03388	2–2.5	0316-97-0109	ALLH	0.553 (J+)	0.611 (J+)	—	—	—	—	—	—	—
16-03389	3.5–4	0316-97-0101	ALLH	—	—	—	—	—	—	—	—	—
16-03393	1.25–1.5	0316-97-0110	ALLH	—	—	—	—	—	—	—	—	—
16-03397	2.5–3	0316-97-0102	ALLH	—	—	—	—	—	—	—	—	—
16-03399	2–2.5	0316-97-0103	ALLH	—	—	—	—	0.1 (J)	—	—	—	—
Consolidated Unit 16-029(q)-99—Decision-Level Data												
SWMU 16-017(f)-99												
16-02580	1–1.5	0316-96-0142	ALLH	—	—	—	—	—	—	—	—	0.002 (J)
16-02582	1–1.5	0316-96-0143	ALLH	—	—	—	—	—	—	—	—	—
SWMU 16-029(q)												
16-02255	0–0.5	0316-96-0128	ALLH	—	—	—	—	—	—	—	—	—
16-02256	0–0.5	0316-96-0129	ALLH	—	—	—	—	—	—	—	—	—
16-02397	5–6	0316-96-0122	QBT4	—	—	—	—	—	—	—	—	—

Table 7.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Carbon Disulfide
16-02397	6–7	0316-96-0152	QBT4	—	—	—	—	—	—	—	—	—
16-02399	4.5–5	0316-96-0062	ALLH	—	—	—	—	—	—	—	—	0.001 (J)
16-02400	4.5–5	0316-96-0120	ALLH	—	—	—	—	—	—	—	—	—
16-02400	5–6	0316-96-0150	ALLH	—	—	—	—	—	—	—	—	—
16-02402	4.5–5	0316-96-0121	ALLH	0.111	0.111	—	—	—	—	—	—	—
16-02402	5–6	0316-96-0151	ALLH	0.292	0.265	—	—	—	—	—	—	—
16-02404	7–8	0316-96-0144	QBT4	—	—	—	—	—	—	—	—	—
16-02405	0–0.5	0316-96-0126	ALLH	—	—	—	—	—	—	—	—	—
16-02406	0–0.5	0316-96-0127	ALLH	—	—	—	—	—	—	—	—	—
16-02407	4–4.5	0316-96-0061	FILL	—	—	—	—	—	—	—	—	—
16-02407	7–8	0316-96-0069	QBT4	—	—	—	—	—	—	—	0.04 (J)	—
16-02412	4–4.5	0316-96-0060	ALLH	—	—	—	—	—	—	—	—	—
16-02412	7–8	0316-96-0068	FILL	—	—	—	—	—	—	—	—	—

Table 7.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chrysene	Dichlorodifluoromethane	Dichloroethene[cis-1,2-]	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	HMX	Indeno(1,2,3-cd)pyrene	Methylene Chloride
Consolidated Unit 16-029(h2)-99—Screening-Level Data												
SWMU 16-025(i)												
16-05794	4.25–4.75	RE16-98-0011[a]	QBT4	—	—	—	—	—	—	—	—	—
16-05794	5.75–6.75	RE16-98-0012[a]	QBT4	—	—	—	—	—	—	—	—	—
SWMU 16-025(j)												
16-05796	6.42–6.67	RE16-98-0013[a]	QBT4	—	—	—	—	—	—	—	—	—
16-05796	8.17–8.67	RE16-98-0014[a]	QBT4	—	—	—	—	—	—	—	—	—
Consolidated Unit 16-029(q)-99—Screening-Level Data												
SWMU 16-029(q)												
16-02404	0–0.5	0316-96-0063[a]	ALLH	—	—	—	—	—	—	0.401	—	—
AOC C-16-064												
16-02541	0–0.5	0316-96-0130[a]	ALLH	—	—	—	—	—	—	25.9	—	—
16-02541	0.5–1	0316-96-0199[a]	ALLH	—	—	—	—	—	—	—	—	0.011
Consolidated Unit 16-029(h2)-99—Decision-Level Data												
SWMU 16-025(h)												
16-03401	3–3.33	0316-97-0104	ALLH	—	—	—	—	—	—	—	—	—
16-04129	0–1	0316-97-0554	ALLH	0.12 (J)	—	—	—	—	0.16 (J)	—	0.085 (J)	—
16-04129	0–1	0316-97-0585	FILL	—	—	—	—	—	0.039 (J)	—	—	—
SWMU 16-025(j)												
16-05796	5–5.5	RE16-98-0010	ALLH	—	—	—	—	0.075 (J)	—	98 (J)	—	—

Table 7.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chrysene	Dichlorodifluoromethane	Dichloroethene[cis-1,2-]	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	HMX	Indeno(1,2,3-cd)pyrene	Methylene Chloride
SWMU 16-029(h2)												
16-03381	3.5–3.6	RE16-98-0008	ALLH	—	—	—	—	—	—	—	—	—
16-03381	5.5–6.5	RE16-98-0009	ALLH	—	—	—	—	—	—	—	—	—
16-03382	2.5–3	0316-97-0112	ALLH	—	—	—	—	—	—	—	—	—
16-03383	3.5–4	0316-97-0113	ALLH	—	—	—	—	—	—	—	—	—
16-03386	2–2.5	0316-97-0107	ALLH	—	—	—	—	—	—	0.546 (J+)	—	—
16-03388	2–2.5	0316-97-0109	ALLH	—	—	—	—	—	—	0.677 (J+)	—	—
16-03389	3.5–4	0316-97-0101	ALLH	—	—	—	—	—	—	—	—	—
16-03393	1.25–1.5	0316-97-0110	ALLH	—	—	—	0.041 (J)	—	—	—	—	—
16-03397	2.5–3	0316-97-0102	ALLH	—	—	—	0.11 (J)	—	—	—	—	—
16-03399	2–2.5	0316-97-0103	ALLH	—	—	—	0.11 (J)	—	—	—	—	—
Consolidated Unit 16-029(q)-99—Decision-Level Data												
SWMU 16-017(f)-99												
16-02580	1–1.5	0316-96-0142	ALLH	—	—	—	—	—	—	—	—	—
16-02582	1–1.5	0316-96-0143	ALLH	—	—	—	—	—	—	—	—	—
SWMU 16-029(q)												
16-02255	0–0.5	0316-96-0128	ALLH	—	—	0.001 (J)	—	—	—	—	—	—
16-02256	0–0.5	0316-96-0129	ALLH	—	—	0.001 (J)	—	—	—	—	—	—
16-02397	5–6	0316-96-0122	QBT4	—	—	—	—	—	—	—	—	—
16-02397	6–7	0316-96-0152	QBT4	—	—	—	—	—	—	—	—	—
16-02399	4.5–5	0316-96-0062	ALLH	—	0.002 (J)	—	—	—	—	—	—	—

Table 7.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chrysene	Dichlorodifluoromethane	Dichloroethene[cis-1,2-]	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Fluoranthene	HMX	Indeno(1,2,3-cd)pyrene	Methylene Chloride
16-02400	4.5–5	0316-96-0120	ALLH	—	—	—	—	—	—	—	—	—
16-02400	5–6	0316-96-0150	ALLH	—	—	—	—	—	—	—	—	—
16-02402	4.5–5	0316-96-0121	ALLH	—	—	—	—	—	—	—	—	—
16-02402	5–6	0316-96-0151	ALLH	—	—	—	—	—	—	—	—	—
16-02404	7–8	0316-96-0144	QBT4	—	—	—	—	—	—	0.524	—	—
16-02405	0–0.5	0316-96-0126	ALLH	—	—	—	—	—	—	—	—	—
16-02406	0–0.5	0316-96-0127	ALLH	—	—	—	—	—	—	—	—	—
16-02407	4–4.5	0316-96-0061	FILL	—	—	—	0.072 (J)	—	—	—	—	0.012
16-02407	7–8	0316-96-0069	QBT4	—	—	—	—	—	—	—	—	0.001 (J)
16-02412	4–4.5	0316-96-0060	ALLH	—	—	—	—	—	—	0.278	—	0.012
16-02412	7–8	0316-96-0068	FILL	—	—	—	—	—	—	—	—	0.005 (J)

Table 7.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Phenanthrene	Pyrene	RDX	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Consolidated Unit 16-029(h2)-99—Screening-Level Data												
SWMU 16-025(i)												
16-05794	4.25–4.75	RE16-98-0011[a]	QBT4	—	—	1.3	—	—	—	—	1.6	0.89 (J+)
16-05794	5.75–6.75	RE16-98-0012[a]	QBT4	—	—	—	—	—	—	—	2.3	1.9 (J+)
SWMU 16-025(j)												
16-05796	6.42–6.67	RE16-98-0013[a]	QBT4	—	—	—	—	—	—	—	—	—
16-05796	8.17–8.67	RE16-98-0014[a]	QBT4	—	—	—	—	—	—	—	—	—
Consolidated Unit 16-029(q)-99—Screening-Level Data												
SWMU 16-029(q)												
16-02404	0–0.5	0316-96-0063[a]	ALLH	—	—	3.85	—	0.002 (J)	—	—	—	0.688
AOC C-16-064												
16-02541	0–0.5	0316-96-0130[a]	ALLH	—	—	164	—	—	—	—	—	0.3
16-02541	0.5–1	0316-96-0199[a]	ALLH	—	—	0.229	—	—	—	—	—	—
Consolidated Unit 16-029(h2)-99—Decision-Level Data												
SWMU 16-025(h)												
16-03401	3–3.33	0316-97-0104	ALLH	—	—	0.589	—	—	—	—	—	—
16-04129	0–1	0316-97-0554	ALLH	0.098 (J)	0.18 (J)	—	—	—	—	—	—	—
16-04129	0–1	0316-97-0585	FILL	—	0.036 (J)	—	—	—	—	—	—	—
SWMU 16-025(j)												
16-05796	5–5.5	RE16-98-0010	ALLH	—	—	1200	—	—	—	—	—	650
SWMU 16-029(h2)												
16-03381	3.5–3.6	RE16-98-0008	ALLH	—	—	3	—	—	—	—	—	—

Table 7.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Phenanthrene	Pyrene	RDX	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
16-03381	5.5–6.5	RE16-98-0009	ALLH	—	—	—	—	—	—	—	—	—
16-03382	2.5–3	0316-97-0112	ALLH	—	—	0.388	—	—	—	—	—	—
16-03383	3.5–4	0316-97-0113	ALLH	—	—	0.186	—	—	—	—	—	—
16-03386	2–2.5	0316-97-0107	ALLH	—	—	2.89 (J+)	—	—	—	—	—	—
16-03388	2–2.5	0316-97-0109	ALLH	—	—	10 (J+)	—	—	—	—	—	0.669 (J+)
16-03389	3.5–4	0316-97-0101	ALLH	—	—	0.251	—	—	—	—	—	—
16-03393	1.25–1.5	0316-97-0110	ALLH	—	—	—	—	—	—	—	—	—
16-03397	2.5–3	0316-97-0102	ALLH	—	—	—	—	—	—	—	—	—
16-03399	2–2.5	0316-97-0103	ALLH	—	—	—	—	—	—	—	—	—
Consolidated Unit 16-029(q)-99—Decision-Level Data												
SWMU 16-017(f)-99												
16-02580	1–1.5	0316-96-0142	ALLH	—	—	—	—	—	—	—	—	—
16-02582	1–1.5	0316-96-0143	ALLH	—	—	—	—	0.002 (J)	—	—	—	—
SWMU 16-029(q)												
16-02255	0–0.5	0316-96-0128	ALLH	—	—	—	0.005	—	0.006	0.002 (J)	—	—
16-02256	0–0.5	0316-96-0129	ALLH	—	—	—	0.004 (J)	—	0.005	0.001 (J)	—	—
16-02397	5–6	0316-96-0122	QBT4	—	—	—	—	—	—	—	—	0.121
16-02397	6–7	0316-96-0152	QBT4	—	—	—	—	—	—	0.001 (J)	—	0.238
16-02399	4.5–5	0316-96-0062	ALLH	—	—	0.324	—	—	—	—	0.09	0.328
16-02400	4.5–5	0316-96-0120	ALLH	—	—	0.315	—	—	—	—	—	0.125
16-02400	5–6	0316-96-0150	ALLH	—	—	0.285	—	—	—	0.002 (J)	—	0.311
16-02402	4.5–5	0316-96-0121	ALLH	—	—	0.459	—	—	—	—	—	0.53

Table 7.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Phenanthrene	Pyrene	RDX	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
16-02402	5–6	0316-96-0151	ALLH	—	—	1.69	—	—	—	—	—	1.94
16-02404	7–8	0316-96-0144	QBT4	—	—	2.03	—	—	—	—	—	1.05
16-02405	0–0.5	0316-96-0126	ALLH	—	—	—	0.003 (J)	—	0.002 (J)	0.002 (J)	—	—
16-02406	0–0.5	0316-96-0127	ALLH	—	—	—	0.004 (J)	—	0.003 (J)	0.002 (J)	—	—
16-02407	4–4.5	0316-96-0061	FILL	—	—	—	—	—	—	—	—	—
16-02407	7–8	0316-96-0069	QBT4	—	—	—	—	—	—	—	—	—
16-02412	4–4.5	0316-96-0060	ALLH	—	—	1.74	—	—	—	—	—	1.29
16-02412	7–8	0316-96-0068	FILL	—	—	0.698	—	—	—	—	—	0.61

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Soil removed after sampling.

[b] — = If analyzed, sample result is not detected.

Table 7.9-1
Subaggregate 6 Proposed Samples in Soil and Tuff at WWII GMX 3 Sites

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method 314.0 and SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
Septic Tank: SWMU 16-005(n)														
1 (Figure 7.9-1)	SWMU 16-005(n) septic tank	Sampling to define the vertical nature and extent of contamination at the septic tank location (former)	5–5.5 10–10.5 15–15.5	Tuff Tuff Tuff	x x x	x x x	x x x	x x x	x x x	x x x	x x x	TBD[c]	TBD	x x x
2–5 (Figure 7.9-1), minimum of 4 sample locations	SWMU 16-005(n) leach field or drywell	Sampling to define vertical extent in leach field or drywell[d]	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	TBD	TBD	x x x x
HE Magazines: SWMU 16-017(g)-99 and AOC 16-024(b)														
1–5 (Figure 7.9-2)	SWMU 16-017(g)-99, HE storage magazine footprint	Sampling to define the lateral and vertical nature and extent of contamination within the former magazine footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	—[e] — — —	x x x x	— — — —	x x x x	x x x x	— — — —	— — — —	TBD	TBD	x x x x
6–10 (Figure 7.9-2)	AOC 16-024(b), HE storage magazine footprint	Sampling to define the lateral and vertical nature and extent of contamination within the former magazine footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	x x x x	— — — —	x x x x	x x x x	— — — —	— — — —	TBD	TBD	x x x x

Table 7.9-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method 314.0 and SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
Radiography Buildings: SWMU 16-025(a) and SWMU 16-025(b)														
11–15 (Figure 7.9-2)	SWMU 16-025(a) radiography building footprint	Sampling to define the lateral and vertical nature and extent of contamination within the former radiography building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	x x x x	x x x x	x x x x	— — — —	x x x x	TBD	TBD	— — — —
16–20 (Figure 7.9-2)	SWMU 16-025(b) radiography building footprint	Sampling to define the lateral and vertical nature and extent of contamination within the former radiography building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	x x x x	x x x x	x x x x	— — — —	x x x x	TBD	TBD	— — — —
HE Machining Buildings: Consolidated Unit 16-029(h2)-99														
1 (Figure 7.9-3)	SWMU 16-025(d), building 16-94 footprint	Sampling to define vertical extent of metals contamination within the building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	x x x x	— — — —	— — — —	TBD	TBD	— — — —
16-04124 (Figure 7.9-3)	SWMU 16-025(g), building 16-95 footprint	Sampling to define vertical extent of metals contamination within the building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	— —	TBD	TBD	— —
16-04132 (Figure 7.9-3)	SWMU 16-025(h), building 16-96 footprint	Sampling to define vertical extent of metals and organic chemical contamination within the building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	x x	TBD	TBD	x x

Table 7.9-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method 314.0 and SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
2 (Figure 7.9-3)	SWMU 16-025(i), building 16-97 footprint	Sampling to define nature and extent of metals and organic chemical contamination within the building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	x x x x	— — — —	x x x x	TBD	TBD	x x x x
16-04115 (Figure 7.9-3)	SWMU 16-025(j), building 16-98 footprint	Sampling to define vertical extent of metals and organic chemical contamination within the building footprint	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	x x	TBD	TBD	x x
16-03381, 16-03386, 16-03388, 16-03393, 16-03396 (Figure 7.9-3)	SWMU 16-029(h2), drainline and outfall	Sampling to define vertical extent of metals and organic chemical contamination along the drainline and outfall	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— —	— —	— —	— —	x x	— —	x x	TBD	TBD	x x
3 (Figure 7.9-3)	SWMU 16-029(h2), drainline and outfall	Sampling to define vertical extent of metals and organic chemical contamination along the drainline and outfall	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	x x x x	— — — —	x x x x	TBD	TBD	x x x x
4–7 (Figure 7.9-3)	SWMU 16-029(h2), eastern drainage area	Sampling to define nature and extent of metals and organic chemical contamination within the eastern portion of the site	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	x x x x	— — — —	x x x x	TBD	TBD	x x x x

Table 7.9-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method 314.0 and SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
8 (Figure 7.9-3)	SWMU 16-029(m), sump for building 16-95	Sampling to define nature and extent of metals and organic chemical contamination at the former sump location	0–0.5	Soil	x	x	x	x	x	—	x	TBD	TBD	x
			1–1.5	Soil	x	x	x	x	x	x	x			x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			5.0–5.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			10 –10.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x
9 (Figure 7.9-3)	SWMU 16-029(n), sump for building 16-96	Sampling to define nature and extent of metals and organic chemical contamination at the former sump location	0–0.5	Soil	x	x	x	x	x	—	x	TBD	TBD	x
			1–1.5	Soil	x	x	x	x	x	x	x			x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			5.0–5.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			10–10.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x
10 (Figure 7.9-3)	SWMU 16-029(o), sump for building 16-97	Sampling to define nature and extent of metals and organic chemical contamination at the former sump location	0–0.5	Soil	x	x	x	x	x	—	x	TBD	TBD	x
			1–1.5	Soil	x	x	x	x	x	x	x			x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			5.0–5.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			10–10.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x
11 (Figure 7.9-3)	SWMU 16-029(p), sump for building 16-98	Sampling to define nature and extent of metals and organic chemical contamination at the former sump location	0–0.5	Soil	x	x	x	x	x	—	x	TBD	TBD	x
			1–1.5	Soil	x	x	x	x	x	x	x			x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			5.0–5.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			10–10.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x

Table 7.9-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method 314.0 and SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
HE Machining Buildings: Consolidated Unit 16-029(q)-99														
21–25 (Figure 7.9-2)	SWMU 16-017(u)-99, storage building footprint	Sampling to define the lateral and vertical nature and extent of contamination within the former storage building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	— — — —	x x x x	x x x x	— x x x	x x x x	TBD	TBD	x x x x
26–29 (Figure 7.9-2)	SWMU 16-017(f)-99, HE processing building footprint	Sampling to define the lateral and vertical nature and extent of contamination within the former HE processing building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x	TBD	TBD	x x x x
30–36 (Figure 7.9-2)	SWMU 16-029(q) sump, drainline, and outfall from building 16-99	Sampling to define the lateral and vertical nature and extent of contamination from sump, drainline, and outfall	0–0.5 1–1.5 1.5–2 (into tuff) 5.0–5.5 (into tuff) 10 –10.5 (into tuff)	Soil Soil Tuff Tuff Tuff	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	— x x x x	x x x x x	TBD	TBD	x x x x x
37–40 (Figure 7.9-2)	AOC C-16-064, HE scrap drum storage area footprint	Sampling to define the lateral and vertical nature and extent of contamination within the former HE scrap drum storage footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	— — — —	x x x x	— — — —	— — — —	TBD	TBD	x x x x

[a] Depth intervals may be extended if additional sample volume is required.

[b] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[c] TBD = To be determined.

[d] For drywell, samples will be collected at BH2 5 ft beyond bottom of drywell and at 5-ft intervals; same analyses as proposed for leach field.

[e] — = Analysis is not required.

Table 8.5-1
Subaggregate 7 Summary of Historical Samples Collected in Soil, Sediment, and Tuff at TA-16-280 Outfalls: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide	High Explosives	Inorganic Chemicals	SVOC	VOC
Consolidated Unit 16-003(h)-99								
16-01428	0–0.42	0316-95-0059	ALLH	924	923	925	923	—*
16-01428	0.33–0.67	0316-95-0060	ALLH	924	923	925	923	923
16-01428	3.5–5.5	0316-95-0061	QBT4	1022	1021	1023	1021	1021
16-01429	0–0.5	0316-95-0065	ALLH	307	306	308	306	—
16-01430	0–0.5	0316-95-0066	ALLH	307	306	308	306	—
16-01431	0–0.5	0316-95-0067	ALLH	307	306	308	306	—
16-01432	0–0.5	0316-95-0068	SED	307	306	308	306	—
16-01433	0–0.5	0316-95-0069	ALLH	307	306	308	306	—
16-01652	0–0.42	0316-95-0063	SED	—	—	—	—	923
16-01652	0–0.5	0316-95-0062	SED	924	923	925	923	—
16-01652	3.5–5.4	0316-95-0064	QBT4	1022	1021	1023	1021	1021

*— = The analysis was not requested.

Table 8.5-2
Subaggregate 7 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Sediment, and Tuff at TA-16-280 Outfalls: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Cyanide (Total)
Soil Background Value				**0.83**	**8.17**	**295**	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**
Sediment Background Value				**0.83**	**3.98**	**127**	**0.4**	**10.5**	**4.73**	**11.2**	**0.82**
QBT4 Background Value				**0.5**	**2.79**	**46**	**1.63**	**7.14**	**3.14**	**4.66**	**0.5**
Consolidated Unit 16-003(h)-99											
16-01428	0–0.42	0316-95-0059	ALLH	11.5 (U)	—*	—	1.99	28.8 (J-)	—	86 (J-)	2.4 (U)
16-01428	0.33–0.67	0316-95-0060	ALLH	7.15 (U)	—	—	0.715 (U)	—	—	19.5 (J-)	1.49 (U)
16-01428	3.5–5.5	0316-95-0061	QBT4	5.3 (U)	—	—	—	51.8	—	—	1.1 (U)
16-01429	0–0.5	0316-95-0065	ALLH	6.5 (U)	—	—	0.65 (U)	—	—	—	0.668 (U)
16-01430	0–0.5	0316-95-0066	ALLH	8 (U)	—	—	0.8 (U)	—	—	20.8	0.808 (U)
16-01431	0–0.5	0316-95-0067	ALLH	7.16 (U)	—	—	0.724	—	—	17.4	0.737 (U)
16-01432	0–0.5	0316-95-0068	SED	5.96 (U)	—	—	0.596 (U)	—	—	—	—
16-01433	0–0.5	0316-95-0069	ALLH	6.29 (U)	—	—	0.629 (U)	—	—	40.7	0.637 (U)
16-01652	0–0.5	0316-95-0062	SED	8 (U)	4.13	—	0.821	—	5.41 (J)	30.7 (J-)	1.65 (U)
16-01652	3.5–5.4	0316-95-0064	QBT4	5.6 (U)	—	122	—	277	—	—	1.1 (U)

Table 8.5-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Lead	Mercury	Nickel	Selenium	Silver	Uranium	Vanadium	Zinc
Soil Background Value				**22.3**	**0.1**	**15.4**	**1.52**	**1**	**1.82**	**39.6**	**48.8**
Sediment Background Value				**19.7**	**0.1**	**9.38**	**0.3**	**1**	**2.22**	**19.7**	**60.2**
QBT4 Background Value				**11.2**	**0.1**	**6.58**	**0.3**	**1**	**2.4**	**17**	**63.5**
Consolidated Unit 16-003(h)-99											
16-01428	0–0.42	0316-95-0059	ALLH	195 (J-)	0.983	—	—	1.15 (U)	5.78	—	790
16-01428	0.33–0.67	0316-95-0060	ALLH	95.9 (J-)	0.276 (U)	—	—	—	3.88	—	308
16-01428	3.5–5.5	0316-95-0061	QBT4	—	—	—	—	—	—	—	—
16-01429	0–0.5	0316-95-0065	ALLH	41.6	—	—	—	—	3.15	—	143
16-01430	0–0.5	0316-95-0066	ALLH	43.9	—	—	—	—	2.88	—	186
16-01431	0–0.5	0316-95-0067	ALLH	44.9	—	—	—	—	2.77	—	192
16-01432	0–0.5	0316-95-0068	SED	—	—	—	0.302 (U)	—	2.72	—	—
16-01433	0–0.5	0316-95-0069	ALLH	—	—	—	—	—	3.35	—	58.6
16-01652	0–0.5	0316-95-0062	SED	73.8 (J-)	0.228 (U)	—	0.391 (U)	—	3.47	23.1	346
16-01652	3.5–5.4	0316-95-0064	QBT4	—	—	6.8	—	—	—	—	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is less than background value.

Table 8.5-3
Subaggregate 7 Historical Analytical Results of Organic Chemicals
Detected in Soil, Sediment, and Tuff at TA-16-280 Outfalls: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Amino-4,6-dinitro-toluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Chrysene
Consolidated Unit 16-003(h)-99													
16-01428	0–0.42	0316-95-0059	ALLH	50	—*	100	260	220	360	77	150	—	310
16-01428	0.33–0.67	0316-95-0060	ALLH	240	0.103	360	640	690	940	300	350	—	930
16-01429	0–0.5	0316-95-0065	ALLH	0.46	—	1	3.8	4.2	7	1.4	2.9	0.47 (J)	4.4
16-01430	0–0.5	0316-95-0066	ALLH	0.74 (J)	—	1.8 (J)	6.4	7.6	11	4.1	3.8	1.2 (J)	8.5
16-01431	0–0.5	0316-95-0067	ALLH	0.69 (J)	—	1.8 (J)	6.6	7.9	12	3.3	5.1	0.87 (J)	8.8
16-01432	0–0.5	0316-95-0068	SED	—	—	—	0.18 (J)	0.23 (J)	0.34 (J)	0.11 (J)	0.14 (J)	0.12 (J)	0.25 (J)
16-01652	0–0.42	0316-95-0063	SED	—	—	—	—	—	—	—	—	—	—
16-01652	0–0.5	0316-95-0062	SED	15	—	29	76	72	110	27	40	—	110
16-01652	3.5–5.4	0316-95-0064	QBT4	0.047 (J)	—	0.11 (J)	0.49	0.56	0.73	0.33 (J)	0.3 (J)	—	0.74

Table 8.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dibenz(a,h)anthracene	Dibenzofuran	Di-n-butylphthalate	Dinitrobenzene[1,3-]	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylene Chloride
Consolidated Unit 16-003(h)-99												
16-01428	0–0.42	0316-95-0059	ALLH	22	31	—	—	0.975	620	54	87	—
16-01428	0.33–0.67	0316-95-0060	ALLH	91 (J)	140	—	—	5.94	1600	230	340	—
16-01429	0–0.5	0316-95-0065	ALLH	0.42 (J)	0.2 (J)	—	—	—	12	0.44 (J)	1.6	—
16-01430	0–0.5	0316-95-0066	ALLH	1 (J)	0.3 (J)	—	—	—	17	0.66 (J)	4.5	—
16-01431	0–0.5	0316-95-0067	ALLH	0.85 (J)	0.3 (J)	0.58 (J)	0.072	0.063	17	0.66 (J)	3.8	—
16-01432	0–0.5	0316-95-0068	SED	—	—	—	—	—	0.46	—	0.12 (J)	—
16-01652	0–0.42	0316-95-0063	SED	—	—	—	—	—	—	—	—	0.015 (J)
16-01652	0–0.5	0316-95-0062	SED	7.5	8.9	—	—	—	180	—	30	—
16-01652	3.5–5.4	0316-95-0064	QBT4	0.083 (J)	—	—	—	—	1.2	0.047 (J)	0.33 (J)	—

Table 8.5-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Methylnaphthalene[2-]	Naphthalene	Nitrobenzene	Phenanthrene	Pyrene	Tetryl	Trichlorofluoromethane	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Consolidated Unit 16-003(h)-99												
16-01428	0–0.42	0316-95-0059	ALLH	16 (J)	41	0.488	410	410	2.78	—	—	—
16-01428	0.33–0.67	0316-95-0060	ALLH	100 (J)	300	—	1400	1300	13.8	—	0.898	1.68
16-01429	0–0.5	0316-95-0065	ALLH	0.13 (J)	0.23 (J)	—	3.7	13	0.105	—	—	—
16-01430	0–0.5	0316-95-0066	ALLH	—	0.38 (J)	—	7.9	13	—	—	—	—
16-01431	0–0.5	0316-95-0067	ALLH	—	0.29 (J)	—	7.6	12	0.099	—	—	—
16-01432	0–0.5	0316-95-0068	SED	—	—	—	0.17 (J)	0.35 (J)	—	—	—	—
16-01652	0–0.42	0316-95-0063	SED	—	—	—	—	—	—	0.012 (J)	—	—
16-01652	0–0.5	0316-95-0062	SED	6.4	15	—	120	150	0.591	—	—	—
16-01652	3.5–5.4	0316-95-0064	QBT4	—	—	—	0.64	0.8	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is not detected.

Table 8.6-1
Subaggregate 7 Summary of Historical Samples Collected in Soil, Fill, Sediment, and Tuff at TA-16-260 Outfalls: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide	High Explosives	Inorganic Chemicals	SVOC	VOC
SWMU 16-003(i)								
16-01412	0–0.5	0316-95-0070	SED	1083	1082	1084	1082	—*
16-01412	1–1.33	0316-95-0071	QBT4	1083	1082	1084	1082	1082
16-01412	3.5–5.5	0316-95-0072	QBT4	1083	1082	1084	1082	1082
16-01413	0–0.5	0316-95-0076	ALLH	310	309	311	309	—
16-01414	0–0.5	0316-95-0077	ALLH	310	309	311	309	—
16-01415	0–0.5	0316-95-0078	ALLH	310	309	311	309	—
16-01416	0–0.5	0316-95-0079	QBT4	310	309	311	309	—
16-01417	0–0.5	0316-95-0080	ALLH	310	309	311	309	—
16-01650	0–0.5	0316-95-0073	SED	1083	1082	1084	1082	—
16-01650	0.5–1	0316-95-0074	FILL	1083	1082	1084	1082	1082
16-01650	3–5	0316-95-0075	QBT4	1083	1082	1084	1082	1082
SWMU 16-003(j)								
16-01419	0–0.5	0316-95-0081	FILL	1083	1082	1084	1082	—
16-01419	0.5–1.17	0316-95-0082	ALLH	1083	1082	1084	1082	1082
16-01419	3.5–5.5	0316-95-0083	QBT4	1083	1082	1084	1082	1082
16-01420	0–0.5	0316-95-0087	ALLH	310	309	311	309	—
16-01421	0–0.5	0316-95-0088	ALLH	310	309	311	309	—
16-01422	0–0.5	0316-95-0089	ALLH	310	309	311	309	—
16-01423	0–0.5	0316-95-0090	ALLH	310	309	311	309	—
16-01424	0–0.5	0316-95-0091	SED	310	309	311	309	—
16-01651	0–0.5	0316-95-0084	SED	1083	1082	1084	1082	—
16-01651	0.58–1.08	0316-95-0085	ALLH	1083	1082	1084	1082	1082
16-01651	2.92–4.5	0316-95-0086	QBT4	1083	1082	1084	1082	1082

*— = The analysis was not requested.

Table 8.6-2
Subaggregate 7 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, Sediment, and Tuff at TA-16-260 Outfalls: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper
Soil Background Value[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**0.4**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.63**	**7.14**	**3.14**	**4.66**
SWMU 16-003(i)											
16-01412	0–0.5	0316-95-0070	SED	—[b]	5.6 (U)	—	183	0.56 (U)	—	10.3	—
16-01412	1–1.33	0316-95-0071	QBT4	7780	6.9 (U)	—	105	—	—	—	—
16-01412	3.5–5.5	0316-95-0072	QBT4	—	5.9 (U)	3.7	—	—	15.1	—	—
16-01413	0–0.5	0316-95-0076	ALLH	—	5.87 (U)	—	—	0.587 (U)	—	9	—
16-01414	0–0.5	0316-95-0077	ALLH	—	5.58 (U)	—	—	0.558 (U)	—	—	—
16-01415	0–0.5	0316-95-0078	ALLH	—	5.86 (U)	—	—	0.586 (U)	—	—	—
16-01416	0–0.5	0316-95-0079	QBT4	—	5.37 (U)	—	93.4	—	—	3.73 (J)	7.35
16-01417	0–0.5	0316-95-0080	ALLH	—	5.55 (U)	—	—	0.555 (U)	—	—	—
16-01650	0–0.5	0316-95-0073	SED	—	5.9 (U)	—	180	0.59 (U)	—	7.5	—
16-01650	0.5–1	0316-95-0074	FILL	—	6 (U)	—	—	0.6 (U)	—	—	—
16-01650	3–5	0316-95-0075	QBT4	—	5.6 (U)	—	—	—	20.6	—	—
SWMU 16-003(j)											
16-01419	0–0.5	0316-95-0081	FILL	—	4.9 (U)	—	—	0.49 (U)	—	—	—
16-01419	0.5–1.17	0316-95-0082	ALLH	—	5.8 (U)	—	—	0.58 (U)	—	—	—
16-01419	3.5–5.5	0316-95-0083	QBT4	—	5.7 (U)	—	—	—	127	—	—
16-01420	0–0.5	0316-95-0087	ALLH	—	5.7 (U)	—	—	0.57 (U)	—	—	—
16-01421	0–0.5	0316-95-0088	ALLH	—	5.78 (U)	—	—	0.578 (U)	—	—	—
16-01422	0–0.5	0316-95-0089	ALLH	—	5.9 (U)	—	—	0.59 (U)	—	—	—

Table 8.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper
Soil Background Value[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**19.3**	**8.64**	**14.7**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**0.4**	**10.5**	**4.73**	**11.2**
QBT4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.63**	**7.14**	**3.14**	**4.66**
16-01423	0–0.5	0316-95-0090	ALLH	—	5.22 (U)	—	—	0.522 (U)	—	—	—
16-01424	0–0.5	0316-95-0091	SED	—	6.07 (U)	—	—	0.607 (U)	—	—	25.8
16-01651	0–0.5	0316-95-0084	SED	—	5.6 (U)	—	—	0.56 (U)	—	6	—
16-01651	0.58–1.08	0316-95-0085	ALLH	—	5.8 (U)	—	—	0.58 (U)	—	—	—
16-01651	2.92–4.5	0316-95-0086	QBT4	—	5.6 (U)	12.3	—	—	202	—	—

Table 8.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Cyanide (Total)	Lead	Manganese	Selenium	Uranium	Vanadium	Zinc
Soil Background Value[a]				**0.5**	**22.3**	**671**	**1.52**	**1.82**	**39.6**	**48.8**
Sediment Background Value				**0.82**	**19.7**	**543**	**0.3**	**2.22**	**19.7**	**60.2**
QBT4 Background Value				**0.5**	**11.2**	**482**	**0.3**	**2.4**	**17**	**63.5**
SWMU 16-003(i)										
16-01412	0–0.5	0316-95-0070	SED	1.2 (U)	—	545	—	—	25.5	—
16-01412	1–1.33	0316-95-0071	QBT4	1.5 (U)	—	—	0.35 (UJ)	—	—	—
16-01412	3.5–5.5	0316-95-0072	QBT4	1.2 (U)	—	—	—	—	—	—
16-01413	0–0.5	0316-95-0076	ALLH	1.2 (U)	—	—	—	2.43	—	49.5
16-01414	0–0.5	0316-95-0077	ALLH	1.1 (U)	—	—	—	3.51	—	76.2
16-01415	0–0.5	0316-95-0078	ALLH	1.2 (U)	—	—	—	1.94	—	60.3
16-01416	0–0.5	0316-95-0079	QBT4	1.1 (U)	11.6	—	—	—	—	—
16-01417	0–0.5	0316-95-0080	ALLH	1.1 (U)	—	—	—	1.96	—	—
16-01650	0–0.5	0316-95-0073	SED	1.2 (U)	21.2	—	—	—	27.5	64.5
16-01650	0.5–1	0316-95-0074	FILL	1.3 (U)	—	—	—	2.28	—	144
16-01650	3–5	0316-95-0075	QBT4	1.1 (U)	—	—	—	—	—	—
SWMU 16-003(j)										
16-01419	0–0.5	0316-95-0081	FILL	1 (U)	49	—	—	1.83	—	58.1
16-01419	0.5–1.17	0316-95-0082	ALLH	1.2 (U)	—	—	—	2.27	—	—
16-01419	3.5–5.5	0316-95-0083	QBT4	1.2 (U)	—	—	—	—	—	—
16-01420	0–0.5	0316-95-0087	ALLH	1.2 (U)	42.7	—	—	2.14	—	107
16-01421	0–0.5	0316-95-0088	ALLH	1.2 (U)	—	—	—	2.4	—	60.6
16-01422	0–0.5	0316-95-0089	ALLH	1.2 (U)	31.3	—	—	2.27	—	92.8
16-01423	0–0.5	0316-95-0090	ALLH	1 (U)	—	—	—	1.84	—	—

Table 8.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Cyanide (Total)	Lead	Manganese	Selenium	Uranium	Vanadium	Zinc
Soil Background Value[a]				**0.5**	**22.3**	**671**	**1.52**	**1.82**	**39.6**	**48.8**
Sediment Background Value				**0.82**	**19.7**	**543**	**0.3**	**2.22**	**19.7**	**60.2**
QBT4 Background Value				**0.5**	**11.2**	**482**	**0.3**	**2.4**	**17**	**63.5**
16-01424	0–0.5	0316-95-0091	SED	1.3 (U)	—	—	0.316 (U)	2.89	—	418
16-01651	0–0.5	0316-95-0084	SED	1.1 (U)	30.3	—	—	—	—	383
16-01651	0.58–1.08	0316-95-0085	ALLH	1.2 (U)	—	—	—	—	—	95.2
16-01651	2.92–4.5	0316-95-0086	QBT4	1.1 (U)	—	—	—	—	—	—

Source: Background values from LANL (1998, 59730, Table 6.0.1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Fill samples were compared to soil background values.

[b] — = If analyzed, sample result is less than background value.

Table 8.6-3
Subaggregate 7 Historical Analytical Results of Organic Chemicals
Detected in Soil, Fill, Sediment, and Tuff at TA-16-260 Outfalls: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzoic Acid	Chrysene	Diethylphthalate	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
SWMU 16-003(i)														
16-01414	0–0.5	0316-95-0077	ALLH	—*	0.095 (J)	0.18 (J)	0.072 (J)	0.098 (J)	0.086 (J)	—	0.088 (J)	0.056 (J)	—	0.089 (J)
16-01417	0–0.5	0316-95-0080	ALLH	—	—	—	—	—	—	—	—	—	—	0.041 (J)
16-01650	0–0.5	0316-95-0073	SED	—	—	—	—	0.064 (J)	—	—	0.072 (J)	—	—	0.051 (J)
16-01650	0.5–1	0316-95-0074	FILL	—	—	—	—	—	—	—	0.048 (J)	—	—	—
16-01650	3–5	0316-95-0075	QBT4	—	—	—	—	—	—	0.076 (J)	—	—	—	—
SWMU 16-003(j)														
16-01419	0–0.5	0316-95-0081	FILL	0.051 (J)	0.084 (J)	0.13 (J)	—	—	0.11 (J)	—	0.13 (J)	—	0.1 (J)	0.19 (J)
16-01421	0–0.5	0316-95-0088	ALLH	—	—	—	—	0.2 (J)	—	—	0.08 (J)	—	—	—
16-01422	0–0.5	0316-95-0089	ALLH	—	0.084 (J)	0.17 (J)	—	0.15 (J)	0.12 (J)	—	0.091 (J)	—	0.04 (J)	0.22 (J)
16-01424	0–0.5	0316-95-0091	SED	—	—	—	—	—	0.31 (J)	—	0.087 (J)	—	—	0.25 (J)
16-01651	0–0.5	0316-95-0084	SED	—	—	—	—	0.15 (J)	—	—	0.062 (J)	—	0.042 (J)	0.1 (J)
16-01651	0.58–1.08	0316-95-0085	ALLH	—	—	—	—	—	—	—	0.053 (J)	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
*— = If analyzed, sample result is not detected.

Table 8.9-1
Subaggregate 7 Proposed Samples in Soil and Tuff at TA-16-280/260 Outfalls

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Perchlorate (SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
16-280 Outfalls: Consolidated Unit 16-003(h)-99 and SWMU 16-026(g)														
1 (Figure 8.9-1)	SWMU 16-003(h), location of former 16-280 sump drainline	Sampling to define lateral and vertical extent of PAH contamination along former drainline	7.5–8 (tuff) 12.5–13 (tuff)	Tuff Tuff	x x	x x	x x	x x	—[c] —	x x	— —	TBD[d]	TBD	— —
2 and 8 (Figure 8.9-1)	AOC 16-030(d), location of former 16-280 outfall SWMU 16-003(h)-99, location of former 16-280 drainline and outfall	Sampling to define vertical extent of PAH contamination within former outfall	0–0.5 1–1.5 7.5–8 (tuff) 12.5–13 (tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	— — — —	x x x x	— — — —	TBD	TBD	— — — —
3 and 4 (Figure 8.9-1)	SWMU 16-003(h)-99, location of former 16-280 drainline and outfall	Sampling to define lateral and vertical extent of PAH contamination along former drainline and outfall	7.5–8 (tuff) 12.5–13 (tuff)	Tuff Tuff	x x	x x	x x	x x	— —	x x	— —	TBD	TBD	— —
5 and 6 (Figure 8.9-1)	SWMU 16-026(g), location of former 16-280 drainline	Sampling to define lateral and vertical extent of PAH contamination within former outfall	7.5–8 (tuff) 12.5–13 (tuff)	Tuff Tuff	x x	x x	x x	x x	— —	x x	— —	TBD	TBD	— —

Table 8.9-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Perchlorate (SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
7 (Figure 8.9-1)	SWMU 16-026(g), location of former 16-280 outfall	Sampling to define vertical extent of PAH contamination downgradient of former outfall	7.5–8 (tuff) 12.5–13 (tuff)	Tuff Tuff	x x	x x	x x	x x	— —	x x	— —	TBD	TBD	— —
16-260 Outfalls: Consolidated Unit 16-029(j)-99, SWMU 16-003(i), and SWMU 16-003(j)														
1–3 (Figure 8.9-2) 5–7	SWMU 16-003(i), location of former 16-260 outfall SWMU 16-003(j), location of former 16-260 outfall	Sampling to define lateral and vertical extent of PAH and uranium contamination within former outfall	7.5–8 (tuff) 12.5–13 (tuff)	Tuff Tuff	x x	x x	x x	x x	— —	x x	— —	TBD	TBD	— —
4 and 8 (Figure 8.9-2)	SWMU 16-003(i), location of former 16-260 outfall SWMU 16-003(j), location of former 16-260 outfall	Sampling to define lateral and vertical extent of PAH and uranium contamination within former outfall	0–0.5 1–1.5 7.5–8 (tuff) 12.5–13 (tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	— — — —	x x x x	— — — —	TBD	TBD	— — — —
9 and 10 (Figure 8.9-2)	SWMU 16-026(k2), location of former outfall at bay 25	Sampling to define nature and extent of contamination within former outfall	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	— — — —	TBD	TBD	x x x x
11 and 12 (Figure 8.9-2)	SWMU 16-029(j), location of former outfall at bay 25	Sampling to define nature and extent of contamination within former outfall	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	— — — —	TBD	TBD	x x x x

Table 8.9-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Perchlorate (SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
Cooling Tower: SWMU 16-031(b) and AOC C-16-002														
1 and 2 (Figure 8.9-3)	AOC C-16-002, location of former cooling tower	Sampling to define nature and extent of contamination within former building footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	— — — —	x x x x	— — — —	TBD	TBD	— — — —
3–6 (Figure 8.9-3)	SWMU 16-031(b), location of former cooling tower outfall	Sampling to define nature and extent of contamination within former cooling tower outfall	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	— — — —	x x x x	— — — —	TBD	TBD	— — — —
Underground Storage Tanks: AOCs 16-033(g) and 16-033(h)														
7 and 8 (Figure 8.9-3)	AOCs 16-033(g) and 16-033(h), center of former underground tank locations	Sampling to define nature and extent of contamination at the former tank locations	5–5.5 (tuff) 10–10.5 (tuff) 15–15.5 (tuff)	Tuff Tuff Tuff	— — —	— — —	— — —	x x x	x x x	x x x	x x x	TBD	TBD	— — —

[a] Depth intervals may be extended if additional sample volume is required.

[b] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[c] — = Analysis is not required.

[d] TBD = To be determined.

Table 9.6-1
Subaggregate 8 Summary of Historical Samples Collected in Soil and Sediment at Former Firing Sites: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number						
				Gamma Spectroscopy	High Explosives	Isotopic Uranium	Inorganic Chemicals	SVOC	Uranium	VOC
Screening-Level Data										
AOC 14-001(f)										
14-01032	0–0.08	0214-95-0053	ALLH	68714	—[a]	68714	—	69207	68716	—
14-01033	0–0.33	0214-95-0054	ALLH	68714	—	68714	—	69207	68716	—
14-01034	3.58–3.92	0214-95-0055	ALLH	69743	69881	69743	70268	69786	69761	69892
SWMU 14-002(a)										
14-01031	0–0.5	0214-95-0052[b]	ALLH	68714	—	68714	—	—	68716	—
14-01036	0–0.5	0214-95-0058	ALLH	68994	—	68994	—	—	69000	—
SWMU 14-009										
14-01044	0–0.5	0214-95-0066	ALLH	—	68962	—	69998	69207	—	—
14-01044	1–1.5	0214-95-0067	ALLH	—	68962	—	69998	69207	—	—
14-01045	0–0.5	0214-95-0068	ALLH	—	68962	—	69998	69207	—	—
14-01045	1–1.5	0214-95-0069	ALLH	—	68962	—	69998	69207	—	—
14-01046	0–0.5	0214-95-0070	ALLH	68994	68962	68994	69352	69207	69000	—
14-01047	0–0.41	0214-95-0071	ALLH	68994	68962	68994	69352	69207	69000	—
14-01048	0–0.41	0214-95-0072	ALLH	68994	68962	68994	69352	69207	69000	—
14-01049	0–0.5	0214-95-0073	ALLH	68714	69174	68714	69352	—	—	—
14-01050	0–0.41	0214-95-0074	ALLH	68714	69174	68714	69352	—	—	—
SWMU 14-010										
14-01028	0–0.33	0214-95-0049[b]	SED	68714	—	68714	—	—	68716	—
14-01029	0–0.5	0214-95-0050[b]	ALLH	68714	—	68714	—	—	68716	—
14-01029	1.17–1.67	0214-95-0048	ALLH	68714	—	68714	—	—	68716	—
14-01030	0–0.5	0214-95-0051[b]	SED	68714	—	68714	—	—	68716	—

Table 9.6-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number						
				Gamma Spectroscopy	High Explosives	Isotopic Uranium	Inorganic Chemicals	SVOC	Uranium	VOC
Consolidated Unit 14-002(a)-99										
14-01051	0–0.5	0214-95-0075	SED	68714	69174	68714	69998	—	—	—
Consolidated Unit 14-002(c)-99										
14-01089	0–0.5	0214-95-0115	ALLH	68169	—	68169	—	—	68277	—
14-01090	0–0.5	0214-95-0117	ALLH	68169	—	68169	—	—	68277	—
14-01091	0–0.5	0214-95-0118	ALLH	68169	—	68169	—	—	68277	—
14-01092	0–0.5	0214-95-0119	ALLH	68169	—	68169	—	—	68277	—
14-01099	0–0.5	0214-95-0127	ALLH	68994	69174	68994	69352	—	69000	—
14-01100	0–0.5	0214-95-0128	ALLH	68994	69174	68994	69352	—	69000	—
Decision-Level Data										
AOC 14-001(f)										
14-01032	0–0.83	0214-97-0009	ALLH	—	3179R	—	3180R	—	3181R	—
14-01033	0–0.66	0214-97-0010	ALLH	—	3179R	—	3180R	—	3181R	—
14-01034	0–1	0214-97-0011	ALLH	—	3179R	—	3180R	—	3181R	—
SWMU 14-002(a)										
14-01031	0–0.83	0214-97-0008	ALLH	—	3179R	—	3180R	—	3181R	—
14-01036	0–0.5	0214-97-0032	ALLH	—	—	3365R	—	—	—	—
14-01036	0–0.5	0214-97-0043	ALLH	—	3630R	—	—	—	—	—
14-01037	0–0.5	0214-97-0033	SED	—	—	3365R	—	—	—	—
14-01037	0–0.5	0214-97-0044	SED	—	3630R	—	—	—	—	—
SWMU 14-009										
14-01044	0–0.5	0214-97-0013	ALLH	—	3392R	—	3393R	—	3394R	—
14-01045	0–0.5	0214-97-0014	ALLH	—	3392R	—	3393R	—	3394R	—
14-01046	0–0.5	0214-97-0015	ALLH	—	3392R	—	3393R	—	3394R	—
14-01047	0–0.5	0214-97-0016	ALLH	—	3392R	—	3393R	—	3394R	—

Table 9.6-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number						
				Gamma Spectroscopy	High Explosives	Isotopic Uranium	Inorganic Chemicals	SVOC	Uranium	VOC
SWMU 14-010										
14-01030	0–0.83	0214-97-0007	ALLH	—	3179R	—	3180R	—	3181R	—
14-01038	0–0.5	0214-97-0034	SED	—	—	3365R	—	—	—	—
14-01038	0–0.5	0214-97-0045	SED	—	3628R	—	—	—	—	—
14-01039	0–0.5	0214-97-0035	SED	—	—	3365R	—	—	—	—
14-01039	0–0.5	0214-97-0046	SED	—	3628R	—	—	—	—	—
14-01040	0–0.5	0214-97-0036	SED	—	—	3365R	—	—	—	—
14-01040	0–0.5	0214-97-0047	SED	—	3628R	—	—	—	—	—
14-01041	0–0.5	0214-97-0037	SED	—	—	3365R	—	—	—	—
14-01041	0–0.5	0214-97-0050	SED	—	3628R	—	—	—	—	—
14-01042	0–0.5	0214-97-0041	SED	—	—	3365R	—	—	—	—
14-01042	0–0.5	0214-97-0048	SED	—	3628R	—	—	—	—	—
14-01043	0–0.08	0214-97-0042	SED	—	—	3365R	—	—	—	—
14-01043	0–0.5	0214-97-0049	SED	—	3628R	—	—	—	—	—

[a] — = The analysis was not requested.

[b] Soil removed after sampling.

Table 9.6-2
Subaggregate 8 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil and Sediment at Former Firing Sites: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
Soil Background Value				**29200**	**0.83**	**295**	**1.83**	**0.4**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**
Sediment Background Value				**15400**	**0.83**	**127**	**1.31**	**0.4**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**
Screening-Level Data													
AOC 14-001(f)													
14-01032	0–0.08	0214-95-0053	ALLH	—[a]	—	—	—	—	—	—	—	—	—
14-01033	0–0.33	0214-95-0054	ALLH	—	—	—	—	—	—	—	—	—	—
14-01034	3.58–3.92	0214-95-0055	ALLH	—	4.37 (J)	—	—	0.691 (J)	—	—	449	—	118
SWMU 14-002(a)													
14-01031	0–0.5	0214-95-0052[b]	ALLH	—	—	—	—	—	—	—	—	—	—
14-01036	0–0.5	0214-95-0058	ALLH	—	—	—	—	—	—	—	—	—	—
SWMU 14-009													
14-01045	0–0.5	0214-95-0068	ALLH	—	—	—	—	—	—	—	—	—	39.3
14-01045	1–1.5	0214-95-0069	ALLH	—	—	—	—	—	—	—	21.1	—	—
14-01046	0–0.5	0214-95-0070	ALLH	—	—	—	—	—	—	—	65.3	—	36.8
14-01047	0–0.41	0214-95-0071	ALLH	—	—	—	—	—	—	—	42.5	—	49.9
14-01048	0–0.41	0214-95-0072	ALLH	—	—	—	—	—	—	—	20.1	—	27.1
14-01049	0–0.5	0214-95-0073	ALLH	—	—	—	—	—	—	—	41.6	—	89.3
14-01050	0–0.41	0214-95-0074	ALLH	—	—	—	—	—	—	—	22.8	—	25.7
SWMU 14-010													
14-01028	0–0.33	0214-95-0049[b]	SED	—	—	—	—	—	—	—	—	—	—
14-01029	0–0.5	0214-95-0050[b]	ALLH	—	—	—	—	—	—	—	—	—	—
14-01029	1.17–1.67	0214-95-0048	ALLH	—	—	—	—	—	—	—	—	—	—
14-01030	0–0.5	0214-95-0051[b]	SED	—	—	—	—	—	—	—	—	—	—

Table 9.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
Soil Background Value				**29200**	**0.83**	**295**	**1.83**	**0.4**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**
Sediment Background Value				**15400**	**0.83**	**127**	**1.31**	**0.4**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**
Consolidated Unit 14-002(c)-99													
14-01089	0–0.5	0214-95-0115	ALLH	—	—	—	—	—	—	—	—	—	—
14-01090	0–0.5	0214-95-0117	ALLH	—	—	—	—	—	—	—	—	—	—
14-01091	0–0.5	0214-95-0118	ALLH	—	—	—	—	—	—	—	—	—	—
14-01092	0–0.5	0214-95-0119	ALLH	—	—	—	—	—	—	—	—	—	—
14-01099	0–0.5	0214-95-0127	ALLH	—	—	—	—	—	—	—	448	—	115
14-01100	0–0.5	0214-95-0128	ALLH	—	—	—	—	—	—	—	67.7	—	85.1
Decision-Level Data													
AOC 14-001(f)													
14-01032	0–0.83	0214-97-0009	ALLH	31000	13 (U)	1800	—	0.64 (U)	—	—	—	—	—
14-01033	0–0.66	0214-97-0010	ALLH	34000	12 (U)	460	—	0.6 (U)	—	9.4	—	—	—
14-01034	0–1	0214-97-0011	ALLH	—	12 (U)	—	—	0.6 (U)	—	—	—	—	—
SWMU 14-002(a)													
14-01031	0–0.83	0214-97-0008	ALLH	42000	13 (U)	860	2.1	0.64 (U)	21	—	—	22000	—
SWMU 14-009													
14-01044	0–0.5	0214-97-0013	ALLH	—	4.77 (U)	303	—	0.477 (U)	—	—	—	—	—
14-01045	0–0.5	0214-97-0014	ALLH	—	4.77 (U)	—	—	0.477 (U)	—	—	—	—	—
14-01046	0–0.5	0214-97-0015	ALLH	—	5.28 (U)	746	—	0.528 (U)	—	—	—	—	—
14-01047	0–0.5	0214-97-0016	ALLH	—	4.46 (U)	—	—	0.446 (U)	—	—	—	—	—
SWMU 14-010													
14-01030	0–0.83	0214-97-0007	ALLH	—	12 (U)	330	—	0.61 (U)	—	—	—	—	—

Table 9.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Manganese	Mercury	Nickel	Potassium	Silver	Sodium	Thallium	Uranium	Zinc
Soil Background Value				**671**	**0.1**	**15.4**	**3460**	**1**	**915**	**0.73**	**1.82**	**48.8**
Sediment Background Value				**543**	**0.1**	**9.38**	**2690**	**1**	**1470**	**0.73**	**2.22**	**60.2**
Screening-Level Data												
AOC 14-001(f)												
14-01032	0–0.08	0214-95-0053	ALLH	—	—	—	—	—	—	—	8.54	—
14-01033	0–0.33	0214-95-0054	ALLH	—	—	—	—	—	—	—	9.53	—
14-01034	3.58–3.92	0214-95-0055	ALLH	690	—	31.6 (J)	—	—	—	0.935 (U)	141	214
SWMU 14-002(a)												
14-01031	0–0.5	0214-95-0052[b]	ALLH	—	—	—	—	—	—	—	6.97	—
14-01036	0–0.5	0214-95-0058	ALLH	—	—	—	—	—	—	—	2010	—
SWMU 14-009												
14-01045	0–0.5	0214-95-0068	ALLH	—	—	—	—	—	—	—	—	—
14-01045	1–1.5	0214-95-0069	ALLH	—	—	—	—	—	—	—	—	—
14-01046	0–0.5	0214-95-0070	ALLH	—	0.422	—	—	—	—	—	64	—
14-01047	0–0.41	0214-95-0071	ALLH	—	0.241	—	—	—	—	—	29.9	—
14-01048	0–0.41	0214-95-0072	ALLH	—	—	90.9	—	—	—	—	123	—
14-01049	0–0.5	0214-95-0073	ALLH	—	—	—	—	—	—	—	—	—
14-01050	0–0.41	0214-95-0074	ALLH	—	—	—	—	—	—	—	—	—
SWMU 14-010												
14-01028	0–0.33	0214-95-0049[b]	SED	—	—	—	—	—	—	—	1370	—
14-01029	0–0.5	0214-95-0050[b]	ALLH	—	—	—	—	—	—	—	681	—
14-01029	1.17–1.67	0214-95-0048	ALLH	—	—	—	—	—	—	—	14.5	—
14-01030	0–0.5	0214-95-0051[b]	SED	—	—	—	—	—	—	—	8.56	—

Table 9.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Manganese	Mercury	Nickel	Potassium	Silver	Sodium	Thallium	Uranium	Zinc
Soil Background Value				**671**	**0.1**	**15.4**	**3460**	**1**	**915**	**0.73**	**1.82**	**48.8**
Sediment Background Value				**543**	**0.1**	**9.38**	**2690**	**1**	**1470**	**0.73**	**2.22**	**60.2**
Consolidated Unit 14-002(c)-99												
14-01089	0–0.5	0214-95-0115	ALLH	—	—	—	—	—	—	—	6.51	—
14-01090	0–0.5	0214-95-0117	ALLH	—	—	—	—	—	—	—	5.3	—
14-01091	0–0.5	0214-95-0118	ALLH	—	—	—	—	—	—	—	2.73	—
14-01092	0–0.5	0214-95-0119	ALLH	—	—	—	—	—	—	—	5.8	—
14-01099	0–0.5	0214-95-0127	ALLH	—	—	—	—	—	—	—	6.92	58.6
14-01100	0–0.5	0214-95-0128	ALLH	—	0.622	—	—	—	—	—	2.95	105
Decision-Level Data												
AOC 14-001(f)												
14-01032	0–0.83	0214-97-0009	ALLH	—	0.13 (U)	—	—	2.6 (U)	—	—	3.14	—
14-01033	0–0.66	0214-97-0010	ALLH	—	0.12 (U)	—	—	2.4 (U)	—	0.89	3.45	51
14-01034	0–1	0214-97-0011	ALLH	—	0.12 (U)	—	—	2.4 (U)	—	1.2	3.29	71
SWMU 14-002(a)												
14-01031	0–0.83	0214-97-0008	ALLH	—	0.13 (U)	17	3500	2.6 (U)	—	0.9	3.11	55
SWMU 14-009												
14-01044	0–0.5	0214-97-0013	ALLH	—	—	—	—	—	—	—	3.83	—
14-01045	0–0.5	0214-97-0014	ALLH	—	—	—	—	1.97	—	—	4.61	—
14-01046	0–0.5	0214-97-0015	ALLH	—	—	—	—	1.5	—	—	3.46 (U)	—
14-01047	0–0.5	0214-97-0016	ALLH	—	—	—	—	—	—	—	2.98 (U)	—
SWMU 14-010												
14-01030	0–0.83	0214-97-0007	ALLH	—	0.12 (U)	—	—	2.4 (U)	—	1	3.01	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] — = If analyzed, sample result is less than background value.

[b] Soil removed after sampling.

Table 9.6-3
Subaggregate 8 Historical Analytical Results of Organic Chemicals
Detected in Soil and Sediment at Former Firing Sites: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Acetone	Amino-4,6-dinitrotoluene[2-]	Bis(2-ethylhexyl)phthalate	HMX	Methylene Chloride	RDX	Trichlorofluoromethane	Trinitrotoluene[2,4,6-]
Screening-Level Data											
AOC 14-001(f)											
14-01034	3.58–3.92	0214-95-0055	ALLH	0.023 (J)	—*	7.08 (J)	50.5	0.00285 (J)	41.2	0.0139 (J)	0.331
SWMU 14-009											
14-01045	0–0.5	0214-95-0068	ALLH	—	—	—	5.39 (J)	—	—	—	—
14-01045	1–1.5	0214-95-0069	ALLH	—	—	—	1.35	—	—	—	—
14-01046	0–0.5	0214-95-0070	ALLH	—	—	0.212 (J)	48 (J)	—	—	—	—
14-01047	0–0.41	0214-95-0071	ALLH	—	—	—	60.8 (J)	—	—	—	—
14-01048	0–0.41	0214-95-0072	ALLH	—	—	—	163	—	—	—	—
14-01049	0–0.5	0214-95-0073	ALLH	—	—	—	284	—	—	—	—
14-01050	0–0.41	0214-95-0074	ALLH	—	—	—	63	—	—	—	—
Decision-Level Data											
SWMU 14-002(a)											
14-01036	0–0.5	0214-97-0043	ALLH	—	—	—	47.5	—	—	—	—
14-01037	0–0.5	0214-97-0044	SED	—	—	—	29.9	—	—	—	—
SWMU 14-009											
14-01046	0–0.5	0214-97-0015	ALLH	—	0.107	—	—	—	—	—	0.131

Table 9.6-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Acetone	Amino-4,6-dinitrotoluene[2-]	Bis(2-ethylhexyl)phthalate	HMX	Methylene Chloride	RDX	Trichlorofluoromethane	Trinitrotoluene[2,4,6-]
SWMU 14-010											
14-01038	0–0.5	0214-97-0045	SED	—	—	—	94.3	—	—	—	0.093
14-01039	0–0.5	0214-97-0046	SED	—	—	—	61.9	—	—	—	—
14-01040	0–0.5	0214-97-0047	SED	—	—	—	1.03	—	—	—	—
14-01041	0–0.5	0214-97-0050	SED	—	—	—	1.38	—	—	—	0.162
14-01042	0–0.5	0214-97-0048	SED	—	—	—	2.19	—	—	—	—
14-01043	0–0.5	0214-97-0049	SED	—	—	—	1.29	—	—	—	0.162

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is not detected.

Table 9.6-4
Subaggregate 8 Historical Analytical Results of Radionuclides Detected or Detected Greater Than Background Values in Soil and Sediment at Former Firing Sites: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Protactinium-231	Protactinium-234	Protactinium-234M	Thorium-231	Thorium-234	Uranium-234	Uranium-235	Uranium-238
Soil Background Value				**n/a**[a]	**n/a**	**n/a**	**n/a**	**n/a**	**2.59**	**0.2**	**2.29**
Sediment Background Value				**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**2.59**	**0.2**	**2.29**
Screening-Level Data											
AOC 14-001(f)											
14-01032	0–0.08	0214-95-0053	ALLH	2.06	—[b]	—	—	1.72	—	—	2.91
14-01033	0–0.33	0214-95-0054	ALLH	3.19	—	—	—	6.32	—	—	5.06
14-01034	3.58–3.92	0214-95-0055	ALLH	2.51	—	23.9	—	16	—	0.364	18
Consolidated Unit 14-002(c)-99											
14-01089	0–0.5	0214-95-0115	ALLH	—	—	—	0.631	4.96	—	0.238	4.02
14-01090	0–0.5	0214-95-0117	ALLH	—	—	11.5	0.469	6.5	—	0.347	5.92
14-01091	0–0.5	0214-95-0118	ALLH	—	—	—	0.489	2.96	—	—	—
14-01092	0–0.5	0214-95-0119	ALLH	—	—	10.3	0.517	3.85	—	—	3.83
14-01099	0–0.5	0214-95-0127	ALLH	4.76	—	—	—	2.89	—	—	4.35
14-01100	0–0.5	0214-95-0128	ALLH	—	—	—	—	2.7	—	—	—
SWMU 14-002(a)											
14-01031	0–0.5	0214-95-0052[b]	ALLH	3.02	—	—	0.275	7.17	—	—	7.25
14-01036	0–0.5	0214-95-0058	ALLH	2.49	0.407	473	—	204	—	3.36	176
SWMU 14-009											
14-01046	0–0.5	0214-95-0070	ALLH	2.82	—	29.1	0.335	10	—	—	9.91
14-01047	0–0.41	0214-95-0071	ALLH	3.61	0.536	38.5	—	18.1	—	—	17.1
14-01048	0–0.41	0214-95-0072	ALLH	3.05	—	149	—	—	—	1.22	58.5

Table 9.6-4 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Protactinium-231	Protactinium-234	Protactinium-234M	Thorium-231	Thorium-234	Uranium-234	Uranium-235	Uranium-238
Soil Background Value				**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**2.59**	**0.2**	**2.29**
Sediment Background Value				**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**2.59**	**0.2**	**2.29**
14-01049	0–0.5	0214-95-0073	ALLH	3.09	—	26.5	—	16.6	—	—	18.2
14-01050	0–0.41	0214-95-0074	ALLH	3.08	—	75.3	—	—	—	0.816	29.6
SWMU 14-010											
14-01028	0–0.33	0214-95-0049[c]	SED	2.77	—	295	—	166	—	2.67	143
14-01029	0–0.5	0214-95-0050[c]	ALLH	0.29	—	70.9	—	32.3	—	0.625	36
14-01029	1.17–1.67	0214-95-0048	ALLH	—	—	—	—	7.65	—	—	7.45
14-01030	0–0.5	0214-95-0051[c]	SED	4.68	—	—	0.499	3.37	—	—	3.49
Decision-Level Data											
SWMU 14-002(a)											
14-01036	0–0.5	0214-97-0032	ALLH	—	—	—	—	—	—	—	3.7676
14-01037	0–0.5	0214-97-0033	SED	—	—	—	—	—	3.3226	0.3211	20.2212
SWMU 14-010											
14-01038	0–0.5	0214-97-0034	SED	—	—	—	—	—	3.4406	0.3218	24.0455
14-01039	0–0.5	0214-97-0035	SED	—	—	—	—	—	—	0.2286	12.0008
14-01041	0–0.5	0214-97-0037	SED	—	—	—	—	—	—	—	3.3591
14-01042	0–0.5	0214-97-0041	SED	—	—	—	—	—	—	—	2.2975

Source: Background values from LANL (1998, 59730, Table 6.0-2, p. 45).

Note: Units are pCi/g.

[a] n/a = Not applicable; no background value available.

[b] — = If analyzed, sample result is less than background value or is not detected.

[c] Soil removed after sampling.

Table 9.8-1
Subaggregate 8 Summary of Historical Samples Collected in Soil and Sediment at HE Sump and Drainline: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number			
				Gamma Spectroscopy	Isotopic Uranium	SVOC	Uranium
Screening-Level Data							
SWMU 14-006							
14-01054	0–0.25	0214-95-0078	ALLH	68054	68054	—*	67991
14-01055	0–0.41	0214-95-0080	SED	68054	68054	—	67991
14-01056	0–0.33	0214-95-0081	SED	68054	68054	—	67991
14-01076	4–4	0214-95-0101	ALLH	68054	68054	68345	67992
14-01076	4–4	0214-95-0102	ALLH	68054	68054	68345	67992
14-01077	0–0.5	0214-95-0103	ALLH	68054	68054	68345	67992
14-01077	1.5–2	0214-95-0104	ALLH	68054	68054	68345	67992
14-01078	0–0.5	0214-95-0105	ALLH	68054	68054	68345	67992
14-01079	0–0.5	0214-95-0106	ALLH	68054	68054	68345	67992

* — = The analysis was not requested.

Table 9.8-2
Subaggregate 8 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil and Sediment at HE Sump and Drainline: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Uranium
Soil Background Value				**1.82**
Sediment Background Value				**2.22**
SWMU 14-006				
14-01054	0–0.25	0214-95-0078	ALLH	9.41
14-01055	0–0.41	0214-95-0080	SED	13.6
14-01056	0–0.33	0214-95-0081	SED	4.51
14-01076	4–4	0214-95-0101	ALLH	3.36
14-01076	4–4	0214-95-0102	ALLH	3.59
14-01077	0–0.5	0214-95-0103	ALLH	7.31
14-01077	1.5–2	0214-95-0104	ALLH	3.55
14-01078	0–0.5	0214-95-0105	ALLH	5.57
14-01079	0–0.5	0214-95-0106	ALLH	6.89

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).
Note: Units are mg/kg.

Table 9.8-3
Subaggregate 8 Historical Analytical Results of
Radionuclides Detected or Detected Greater Than Background
Values in Soil and Sediment at HE Sump and Drainline: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Protactinium-231	Thorium-231	Thorium-234	Uranium-235	Uranium-238
Soil Background Value				**n/a**[a]	**n/a**	**n/a**	**0.2**	**2.29**
Sediment Background Value				**n/a**	**n/a**	**n/a**	**0.2**	**2.29**
SWMU 14-006								
14-01054	0–0.25	0214-95-0078	ALLH	—[b]	0.401	2.9	—	2.43
14-01055	0–0.41	0214-95-0080	SED	—	—	2.26	—	—
14-01056	0–0.33	0214-95-0081	SED	—	—	6.27	—	—
14-01076	4–4	0214-95-0101	ALLH	—	—	1.9	—	—
14-01076	4–4	0214-95-0102	ALLH	—	0.535	2.39	—	—
14-01077	0–0.5	0214-95-0103	ALLH	4.46	—	2.23	—	—
14-01077	1.5–2	0214-95-0104	ALLH	—	—	1.92	—	—
14-01078	0–0.5	0214-95-0105	ALLH	4.98	—	1.45	—	—
14-01079	0–0.5	0214-95-0106	ALLH	—	0.355	2.42	0.287	—

Source: Background values from LANL (1998, 59730, Table 6.0-2, p. 45).

Note: Units are pCi/g.

[a] n/a = Not applicable; no background value available.

[b] — = If analyzed, sample result is less than background value or is not detected.

Table 9.9-1
Subaggregate 8 Summary of Historical Samples
Collected in Soil and Sludge from Septic System: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				Cyanide (Total)	Gamma Spectroscopy	High Explosives	Isotopic Uranium	SVOC
Screening-Level Data								
SWMU 14-007								
14-01080	4.5–5	0214-95-0107	ALLH	68395	68392	—*	68392	68694
14-01081	4.5–5	0214-95-0108	ALLH	68395	68392	—	68392	68694
14-01082	0–0	0214-95-0109	SLUDGE	68651	69264	—	69264	68663
14-01082	0–0	0214-95-0110	SLUDGE	—	—	69172	—	—
14-01083	0–0.5	0214-95-0111	ALLH	68395	68392	—	68392	68694
14-01083	1.5–2	0214-95-0112	ALLH	68395	68392	—	68392	68694
14-01085	0–0.5	0214-95-0113	ALLH	68395	68392	—	68392	68694
14-01086	0–0.5	0214-95-0114	ALLH	68395	68392	—	68392	68694

*— = The analysis was not requested.

Table 9.9-2
Subaggregate 8 Historical Analytical Results of Inorganic Chemicals
Greater Than Background Values in Soil from Septic System: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Cyanide (Total)
Soil Background Value				**0.5**
SWMU 14-007				
14-01080	4.5–5	0214-95-0107	ALLH	9.8 (U)
14-01083	1.5–2	0214-95-0112	ALLH	9.9 (U)

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).
Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

Table 9.9-3
Subaggregate 8 Historical Analytical Results of Radionuclides Detected or Detected Greater Than Background Values in Soil from Septic System: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Protactinium-231	Thorium-231	Thorium-234	Uranium-235	Uranium-238
Soil Background Value				**n/a**[a]	**n/a**	**n/a**	**0.2**	**2.29**
Sediment Background Value				**n/a**	**n/a**	**n/a**	**0.2**	**2.29**
SWMU 14-007								
14-01080	4.5–5	0214-95-0107	ALLH	—[b]	0.319	2.5	—	—
14-01081	4.5–5	0214-95-0108	ALLH	4.99	0.508	2.97	0.303	2.51
14-01083	0–0.5	0214-95-0111	ALLH	—	0.368	3.76	0.397	3.38
14-01083	1.5–2	0214-95-0112	ALLH	—	0.677	2.61	—	2.49
14-01085	0–0.5	0214-95-0113	ALLH	—	0.343	4.27	0.256	4.27
14-01086	0–0.5	0214-95-0114	ALLH	—	0.608	2.45	—	—

Source: Background values from LANL (1998, 59730, Table 6.0-2, p. 45).
Note: Units are pCi/g.
[a] n/a = Not applicable; no background value available.
[b] — = If analyzed, sample result is less than background value or is not detected.

Table 9.10-1
Subaggregate 8 Summary of Historical Samples Collected in Soil at Removed Buildings: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number			
				Gamma Spectroscopy	Isotopic Uranium	SVOC	Uranium
Screening-Level Data							
AOC C-14-003							
14-01066	0–0.5	0214-95-0091	ALLH	68994	68994	—*	—
14-01067	0–0.25	0214-95-0092	ALLH	68994	68994	—	69000
AOC C-14-004							
14-01068	0–0.16	0214-95-0093	ALLH	—	—	68345	—
14-01069	0–0.16	0214-95-0094	ALLH	—	—	68345	—
AOC C-14-005							
14-01070	0–0.5	0214-95-0095	ALLH	—	—	—	67992
14-01071	0–0.41	0214-95-0096	ALLH	—	—	—	67992
AOC C-14-007							
14-01074	0–0.41	0214-95-0099	ALLH	—	—	68345	67992
14-01075	0–0.41	0214-95-0100	ALLH	—	—	68345	67991

*— = The analysis was not requested.

Table 9.10-2
Subaggregate 8 Historical Analytical Results of Inorganic Chemicals Detected Greater Than Background Values in Soil at Removed Buildings: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Uranium
Soil Background Value				**1.82**
AOC C-14-005				
14-01070	0–0.5	0214-95-0095	ALLH	4.94
14-01071	0–0.41	0214-95-0096	ALLH	3.99
AOC C-14-007				
14-01074	0–0.41	0214-95-0099	ALLH	12
14-01075	0–0.41	0214-95-0100	ALLH	4.34

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).
Note: Units are mg/kg.

Table 9.10-3
Subaggregate 8 Historical Analytical Results of Radionuclides Detected in Soil at Removed Buildings: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Thorium-234
Soil Background Value				**n/a**
14-01066	0–0.5	0214-95-0091	ALLH	6.1
14-01067	0–0.25	0214-95-0092	ALLH	1.62

Source: Background values from LANL (1998, 59730, Table 6.0-2, p. 45).
Note: Units are pCi/g.
*n/a = Not applicable; no background value available.

Table 9.11-1
Subaggregate 8 Proposed Samples in Soil and Tuff at TA-14 Firing Sites

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (SW-846 6850)	TAL Metals (SW-846 6010B/6020)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
Firing Site: AOC 14-001(g)														
TBD[c] (20% of all field analytical samples for HE; 20% of radiological anomalies)	AOC 14-001(g)	Sampling to define nature and extent of contamination in the surface soil	0–0.5	Soil	—[d]	—	—	x	x	—	—	TBD	TBD	x
Former Firing Site: Consolidated Unit 14-002(a)-99														
1 and 2 (Figure 9.11-2)	SWMU 14-002(f), location of former structure 14-12	Sampling to define nature and extent of contamination below the former structure	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	x x x x	x x x x	— — — —	— — — —	TBD	TBD	x x x x
3 (Figure 9.11-2)	SWMU 14-002(f), angled borehole below former structure 14-12	Sampling to define nature and extent of contamination below the former structure	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	— — — —	— — — —	— — —	x x	x x	— —	— —	TBD	TBD	x x
4–9 (Figure 9.11-2)	SWMU 14-009, post-excavation samples from within the surface disposal area	Confirmatory sampling after removal of contaminated soil and debris	1.5–2 (into tuff) 2.5–3 (into tuff)	Tuff Tuff	x x	x x	x x	x x	x[e] x[e]	x x	x x	TBD	TBD	x x
10–14 (Figure 9.11-2)	SWMU 14-009, downgradient of the surface disposal area within the drainage channel	Sampling to define nature and extent of contamination downgradient of SWMU 14-009	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x[e] x[e] x[e] x[e]	— x x x	x x x x	TBD	TBD	x x x x

Table 9.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (SW-846 6850)	TAL Metals (SW-846 6010B/6020)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
14-01038 (Figure 9.11-2)	SWMU 14-010, decommissioned HE sump	Sampling to define vertical nature and extent of contamination at the former sump location	1–1.5 5–5.5 10–10.5 14.5–15	Soil Tuff Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	TBD	TBD	x x x x
15 and 16 (Figure 9.11-2)	SWMU 14-010, drainline from HE sump	Sampling to define nature and extent of contamination along the former HE sump drainline	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x	TBD	TBD	x x x x
14-01043 (Figure 9.11-2)	SWMU 14-010, vicinity of former HE sump drainline outfall	Sampling to define vertical nature and extent of contamination at the former drainline outfall	1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Tuff Tuff	x x x	x x x	x x x	x x x	x x x	x x x	x x x	TBD	TBD	x x x
17–19 (Figure 9.11-2)	SWMU 14-010, downgradient, within the drainage channel	Sampling to define nature and extent of contamination downgradient of SWMU 14-010	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x	TBD	TBD	x x x x
Former Firing Site: Consolidated Unit 14-002(c)-99														
14-01089 14-01090 14-01091 14-01092 (Figure 9.11-3)	SWMU 14-002(c), berms located on east and west sides of control building (structure 14-5)	Sampling to characterize earthen berms and to define vertical nature and extent of contamination beneath the berms	1.5–2 (into berm) 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Tuff Tuff	— — —	— — —	x x x	x x x	x x x	— — —	— — —	TBD	TBD	x x x

Table 9.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (SW-846 6850)	TAL Metals (SW-846 6010B/6020)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
1 and 2 (Figure 9.11-3)	SWMU 14-002(c), footprint of control building (structure 14-5)	Sampling to define nature and extent of contamination beneath the footprint of the control building	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	x x x x	x x x x	x x x x	— — — —	— — — —	TBD	TBD	x x x x
Storage Magazine: AOC 14-004(a)														
3 and 4 (Figure 9.11-3)	AOC 14-004(a), footprint of storage magazine (structure 14-22)	Sampling to define nature and extent of contamination beneath the footprint of the storage magazine	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x	TBD	TBD	x x x x
HE Sump and Drainline: SWMU 14-006														
5 and 6 (Figure 9.11-3)	SWMU 14-006, HE sump excavation	Post-excavation confirmatory sampling	5–5.5 (bottom of excavation 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Tuff Tuff	x x x	x x x	x x x	x x x	x x x	x x x	x x x	TBD	TBD	x x x
7 and 8 (Figure 9.11-3)	SWMU 14-006, HE sump drainline outfall and drainage	Sampling to define nature and extent of contamination at drainline outfall	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x	TBD	TBD	x x x x
14-01077 14-01078 14-01079 14-01054 14-01055 14-01056 (Figure 9.11-3)	SWMU 14-006, downgradient, within the drainage channel	Sampling to define nature and extent of contamination downgradient of HE sump and drainline	1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Tuff Tuff	x x x	x x x	x x x	x x x	x x x	x x x	x x x	TBD	TBD	x x x

Table 9.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (SW-846 6850)	TAL Metals (SW-846 6010B/6020)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
Septic System: SWMU 14-007														
9 and 10 (Figure 9.11-3)	SWMU 14-007, septic tank excavation	Post-excavation confirmatory sampling	6–6.5 (bottom of excavation)	Soil	x	x	x	x	x	x	x	TBD	TBD	x
			1–1.5 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	x	x			x
14-01081 and 14-01086 (Figure 9.11-3)	SWMU 14-007, drainline outfall	Boreholes to define nature and extent of contamination at drainline outfall	10–10.5	Tuff	x	x	x	x	x	x	x	TBD	TBD	x
			15–15.5	Tuff	x	x	x	x	x	x	x			x
Former Buildings: AOCs C-14-003, C-14-004, C-14-005, and C-14-007														
14-01066 and 14-01067 (Figure 9.11-3)	AOC C-14-003, footprint of former building	Sampling to define nature and extent of contamination beneath the former building	0–0.5	Soil	x	x	x	x	x	—	x	TBD	TBD	x
			1–1.5	Soil	x	x	x	x	x	x	x			x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	x	x			x
14-01068 and 14-01069 (Figure 9.11-3)	AOC C-14-004, footprint of former building	Sampling to define nature and extent of contamination beneath the former building	0–0.5	Soil	x	x	x	x	x	—	x	TBD	TBD	x
			1–1.5	Soil	x	x	x	x	x	x	x			x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	x	x			x
14-01070 and 14-01071 (Figure 9.11-3)	AOC C-14-005, footprint of former building	Sampling to define nature and extent of contamination beneath the former building	0–0.5	Soil	x	x	x	x	x	—	x	TBD	TBD	x
			1–1.5	Soil	x	x	x	x	x	x	x			x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x	x			x
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	x	x			x

Table 9.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (SW-846 6850)	TAL Metals (SW-846 6010B/6020)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
14-01074 and 14-01075 (Figure 9.11-3)	AOC C-14-007, footprint of former building	Sampling to define nature and extent of contamination beneath the former building	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x	TBD	TBD	x x x x

[a] Depth intervals may be extended if additional sample volume is required.

[b] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[c] TBD = To be determined.

[d] — = Analysis is not required.

[e] Sample will also be analyzed for total uranium.

Table 10.5-1
Subaggregate 9 Summary of Historical Samples
Collected in Soil and Tuff at Firing Site G at TA-15 West: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number		
				Isotopic Uranium	Inorganic Chemicals	Uranium
Screening-Level Data						
AOC C-15-001						
15-02347	0–0.25	0215-95-0275	ALLH	—*	—	69304
15-02348	0–0.5	0215-95-0276	ALLH	—	—	69304
SWMU 15-004(g)						
15-02315	0–0.5	0215-95-0250	ALLH	—	70468	70066
15-02315	1.5–2	0215-95-0251	ALLH	—	70468	70066
15-02321	1.5–2	0215-95-0253	ALLH	—	70468	70066
15-02323	0–0.5	0215-95-0255	ALLH	—	70468	70066
15-02323	1.5–2	0215-95-0256	ALLH	—	70468	70066
15-02326	0–0.5	0215-95-0259	ALLH	—	70468	70066
15-02327	1.5–1.67	0215-95-0261	ALLH	—	70468	70066
15-02331	0–0.5	0215-95-0267	ALLH	—	70468	70066
SWMU 15-008(c)						
15-02343	0–0.5	0215-95-0273	ALLH	—	—	69304
15-02344	0–0.42	0215-95-0274	ALLH	—	—	69304
Decision-Level Data						
AOC C-15-001						
15-02347	0–0.33	0215-97-0093	ALLH	3582R	—	—
15-02347	1.5–1.67	0215-97-0094	QBT2	3582R	—	—
15-02348	0–0.5	0215-97-0095	ALLH	3582R	—	—
15-02348	1.5–1.83	0215-97-0096	QBT2	3582R	—	—

*— = The analysis was not requested.

Table 10.5-2
Subaggregate 9 Historical Analytical Results of Inorganic
Chemicals Detected Greater Than Background Values in Soil at Firing Site G at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Barium	Cadmium	Copper	Lead	Sodium	Uranium	Zinc
Soil Background Value				**295**	**0.4**	**14.7**	**22.3**	**915**	**1.82**	**48.8**
AOC C-15-001										
15-02347	0–0.25	0215-95-0275	ALLH	—*	—	—	—	—	55	—
15-02348	0–0.5	0215-95-0276	ALLH	—	—	—	—	—	14.2	—
SWMU 15-004(g)										
15-02315	0–0.5	0215-95-0251	ALLH	—	—	—	—	—	6.52	—
15-02315	1.5–2	0215-95-0251	ALLH	—	—	—	—	1870	2.94	—
15-02321	1.5–2	0215-95-0253	ALLH	—	—	—	—	1660	2.79	—
15-02323	0–0.5	0215-95-0255	ALLH	—	—	223	—	—	61.8	—
15-02323	1.5–2	0215-95-0256	ALLH	—	—	—	—	—	2.32	—
15-02326	0–0.5	0215-95-0259	ALLH	—	—	186	27.6	—	298	—
15-02327	1.5–1.67	0215-95-0261	ALLH	412	—	2730	—	—	637	81.2
15-02331	0–0.5	0215-95-0267	ALLH	—	0.538	26.6	—	—	38.3	51.3
SWMU 15-008(c)										
15-02343	0–0.5	0215-95-0273	ALLH	—	—	—	—	—	2180	—
15-02344	0–0.42	0215-95-0274	ALLH	—	—	—	—	—	1620	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Note: Units are mg/kg.

*— = If analyzed, sample result is less than background value.

Table 10.5-3
Subaggregate 9 Historical Analytical Results of Radionuclides Detected Greater Than Background Values in Soil and Tuff at Firing Site G at TA-15 West: Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Uranium-234	Uranium-235	Uranium-238
Soil Background Value				**2.59**	**0.2**	**2.29**
QBT2 Background Value				**1.98**	**0.09**	**1.93**
AOC C-15-001						
15-02347	0–0.33	0215-97-0093	ALLH	8.9	0.396	9.45
15-02348	0–0.5	0215-97-0095	ALLH	2.72	—*	3.37
15-02348	1.5–1.83	0215-97-0096	QBT2	—	—	1.94

Source: Background values from LANL (1998, 59730, Table 6.0-2, p. 45).
Note: Units are pCi/g.
*— = If analyzed, sample result is less than background value.

Table 10.6-1
Subaggregate 9 Summary of Historical Samples Collected in Soil at MDA Z at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Screen Type	Request Number					
					Gross Alpha/Beta	Gross Gamma	Inorganic Chemicals	SVOC	Uranium	VOC
SWMU 15-007(b)										
15-02300	0–0.5	AAB3427	ALLH	CSTCV	—*	—	20993	—	—	—
15-02301	0–0.42	AAB3438	ALLH	CST_Off	—	—	18681	—	19509	—
15-02301	0–0.5	AAB3534	ALLH	CST_Off	—	—	—	18658	—	—
15-02301	0–0.5	AAB3534	ALLH	CSTRV	20391	20391	—	—	—	—
15-02301	1.5–2	AAB3422	ALLH	CST_Off	—	—	18687	—	19816	—
15-02301	1.5–2	AAB3539	ALLH	CST_Off	—	—	—	18658	—	18658
15-02301	1.5–2	AAB3422	ALLH	CSTCV	—	—	20982	—	—	—
15-02301	1.5–2	AAB3422	ALLH	CSTRV	21066	21066	—	—	—	—
15-02301	1.5–2	AAB3539	ALLH	CSTRV	20391	20391	—	—	—	—
15-02302	0–0.5	AAB3437	ALLH	CSTCV	—	—	20993	—	—	—
15-02302	1.5–2	AAB3443	ALLH	CST_Off	—	—	18687	—	19816	—
15-02302	1.5–2	AAB3540	ALLH	CST_Off	—	—	—	18658	—	18658
15-02302	1.5–2	AAB3443	ALLH	CSTCV	—	—	20982	—	—	—
15-02302	1.5–2	AAB3443	ALLH	CSTRV	21066	21066	—	—	—	—
15-02302	1.5–2	AAB3540	ALLH	CSTRV	20391	20391	—	—	—	—
15-02303	0–0.5	AAB3432	ALLH	CSTCV	—	—	20993	—	—	—
15-02303	1.5–2	AAB3424	ALLH	CST_Off	—	—	18687	—	19816	—
15-02303	1.5–2	AAB3541	ALLH	CST_Off	—	—	—	18658	—	18658
15-02303	1.5–2	AAB3424	ALLH	CSTCV	—	—	20982	—	—	—
15-02303	1.5–2	AAB3424	ALLH	CSTRV	21066	21066	—	—	—	—
15-02303	1.5–2	AAB3541	ALLH	CSTRV	20391	20391	—	—	—	—
15-02304	0.83–1.25	AAB3421	ALLH	CST_Off	—	—	18687	—	19816	—
15-02304	0.83–1.25	AAB3542	ALLH	CST_Off	—	—	—	18658	—	18658

Table 10.6-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Screen Type	Request Number					
					Gross Alpha/Beta	Gross Gamma	Inorganic Chemicals	SVOC	Uranium	VOC
15-02304	0.83–1.25	AAB3421	ALLH	CSTCV	—	—	20982	—	—	—
15-02304	0.83–1.25	AAB3421	ALLH	CSTRV	21066	21066	—	—	—	—
15-02304	0.83–1.25	AAB3542	ALLH	CSTRV	20391	20391	—	—	—	—
15-02305	0–0.5	AAB3428	ALLH	CST_Off	—	—	18681	—	19509	—
15-02305	0–0.5	AAB6080	ALLH	CST_Off	—	—	—	18696	—	—
15-02305	0–0.5	AAB3428	ALLH	CSTCV	—	—	20993	—	—	—
15-02306	0–0.5	AAB3431	ALLH	CST_Off	—	—	18681	—	19509	—
15-02306	0–0.5	AAB3538	ALLH	CST_Off	—	—	—	18658	—	—
15-02306	0–0.5	AAB3538	ALLH	CSTRV	20391	20391	—	—	—	—
15-02307	0–0.5	AAB3433	ALLH	CST_Off	—	—	18681	—	19509	—
15-02307	0–0.5	AAB3537	ALLH	CST_Off	—	—	—	18658	—	—
15-02307	0–0.5	AAB3433	ALLH	CSTCV	—	—	20993	—	—	—
15-02307	0–0.5	AAB3537	ALLH	CSTRV	20391	20391	—	—	—	—
15-02307	1–1.5	AAB3442	ALLH	CST_Off	—	—	18687	—	19816	—
15-02307	1–1.5	AAB3442	ALLH	CSTCV	—	—	20982	—	—	—
15-02307	1–1.5	AAB3442	ALLH	CSTRV	21066	21066	—	—	—	—
15-02307	1.5–2.5	AAB3543	ALLH	CST_Off	—	—	—	18658	—	18658
15-02307	1.5–2.5	AAB3543	ALLH	CSTRV	20391	20391	—	—	—	—
15-02308	0–0.5	AAB3430	ALLH	CST_Off	—	—	18681	—	19509	—
15-02308	0–0.5	AAB3533	ALLH	CST_Off	—	—	—	18658	—	—
15-02308	0–0.5	AAB3430	ALLH	CSTCV	—	—	20993	—	—	—
15-02308	0–0.5	AAB3533	ALLH	CSTRV	20391	20391	—	—	—	—
15-02310	0–0.5	AAB3429	ALLH	CST_Off	—	—	18681	—	19509	—
15-02310	0–0.5	AAB3535	ALLH	CST_Off	—	—	—	18658	—	—
15-02310	0–0.5	AAB3429	ALLH	CSTCV	—	—	20993	—	—	—
15-02310	0–0.5	AAB3535	ALLH	CSTRV	20391	20391	—	—	—	—

Table 10.6-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Screen Type	Request Number					
					Gross Alpha/Beta	Gross Gamma	Inorganic Chemicals	SVOC	Uranium	VOC
15-02311	0–0.5	AAB3435	ALLH	CST_Off	—	—	18681	—	19509	—
15-02311	0–0.5	AAB3536	ALLH	CST_Off	—	—	—	18658	—	—
15-02311	0–0.5	AAB3536	ALLH	CSTRV	20391	20391	—	—	—	—
15-02311	1.5–2	AAB3444	ALLH	CST_Off	—	—	18687	—	19816	—
15-02311	1.5–2	AAB3544	ALLH	CST_Off	—	—	—	18658	—	18658
15-02311	1.5–2	AAB3444	ALLH	CSTCV	—	—	20982	—	—	—
15-02311	1.5–2	AAB3444	ALLH	CSTRV	21066	21066	—	—	—	—
15-02311	1.5–2	AAB3544	ALLH	CSTRV	20391	20391	—	—	—	—

*— = The analysis was not requested.

Table 10.6-2
Subaggregate 9 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil at MDA Z at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Screen Type	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Lead	Manganese
Soil Background Value					**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**671**
SWMU 15-007(b)													
15-02300	0–0.5	AAB3427	ALLH	CSTCV	5	492	—[a]	3 (U)	—	25	18	—	—
15-02301	0–0.42	AAB3438	ALLH	CST_Off	3.8 (U)	—	—	0.81	—	—	19	—	—
15-02301	1.5–2	AAB3422	ALLH	CST_Off	3.9 (U)	—	—	0.8 (U)	—	—	—	—	—
15-02301	1.5–2	AAB3422	ALLH	CSTCV	4 (U)	675	—	3 (U)	—	37	—	—	—
15-02302	0–0.5	AAB3437	ALLH	CSTCV	4 (U)	572	—	3 (U)	—	20	16	23	—
15-02302	1.5–2	AAB3443	ALLH	CST_Off	3.8 (U)	—	—	0.75 (U)	—	—	—	—	—
15-02302	1.5–2	AAB3443	ALLH	CSTCV	4 (U)	—	—	3 (U)	—	—	—	26	—
15-02303	0–0.5	AAB3432	ALLH	CSTCV	4 (U)	571	—	3 (U)	—	36	20	31	—
15-02303	1.5–2	AAB3424	ALLH	CST_Off	4 (U)	—	3	0.9 (U)	—	—	105	—	—
15-02303	1.5–2	AAB3424	ALLH	CSTCV	4 (U)	368	—	3 (U)	—	27	37	24	—
15-02304	0.83–1.25	AAB3421	ALLH	CST_Off	4 (U)	—	—	1.2	—	—	—	—	—
15-02304	0.83–1.25	AAB3421	ALLH	CSTCV	4 (U)	383	—	3 (U)	—	24	15	—	—
15-02305	0–0.5	AAB3428	ALLH	CST_Off	3.7 (U)	—	2.6	0.71 (U)	13400	—	49	38.6	—
15-02305	0–0.5	AAB3428	ALLH	CSTCV	4 (U)	381	—	3 (U)	—	22	47	45	—
15-02306	0–0.5	AAB3431	ALLH	CST_Off	3.7 (U)	—	—	0.99 (U)	7360	—	47.8	—	—
15-02307	0–0.5	AAB3433	ALLH	CST_Off	3.7 (U)	—	—	0.71 (U)	39000	—	127	23.4	—
15-02307	0–0.5	AAB3433	ALLH	CSTCV	4	505	—	3 (U)	—	72	394	105	686
15-02307	1–1.5	AAB3442	ALLH	CST_Off	3.7 (U)	—	—	0.77 (U)	30800	—	96.1	32.6	—
15-02307	1–1.5	AAB3442	ALLH	CSTCV	5	402	—	5	—	90	546	135	692
15-02308	0–0.5	AAB3430	ALLH	CST_Off	3.7 (U)	—	3.6	0.41 (U)	15900	—	111	30.8	—

Table 10.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Screen Type	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Lead	Manganese
Soil Background Value					**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**671**
15-02308	0–0.5	AAB3430	ALLH	CSTCV	4	329	—	3 (U)	—	24	102	68	—
15-02310	0–0.5	AAB3429	ALLH	CST_Off	3.7 (U)	—	3.5	0.41 (U)	17600	—	67.3	52.9	—
15-02310	0–0.5	AAB3429	ALLH	CSTCV	4 (U)	333	—	3 (U)	—	—	112	99	—
15-02311	0–0.5	AAB3435	ALLH	CST_Off	3.8 (U)	—	2.1	0.7 (U)	8140	—	33.6	—	—
15-02311	1.5–2	AAB3444	ALLH	CST_Off	3.9 (U)	—	—	0.9 (U)	10600	—	24.4	—	—
15-02311	1.5–2	AAB3444	ALLH	CSTCV	4	344	—	3 (U)	—	20	27	36	—

Table 10.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Screen Type	Mercury	Nickel	Selenium	Silver	Thorium	Titanium	Uranium	Zinc
Soil Background Value					**0.1**	**15.4**	**1.52**	**1**	**14.6**	**n/a**[b]	**1.82**	**48.8**
SWMU 15-007(b)												
15-02300	0–0.5	AAB3427	ALLH	CSTCV	5 (U)	—	4 (U)	—	—	4209	8 (U)	—
15-02301	0–0.42	AAB3438	ALLH	CST_Off	0.11 (U)	—	—	—	—	—	130	—
15-02301	1.5–2	AAB3422	ALLH	CST_Off	—	—	—	—	—	—	—	—
15-02301	1.5–2	AAB3422	ALLH	CSTCV	5 (U)	—	4 (U)	—	22	4122	11	49
15-02302	0–0.5	AAB3437	ALLH	CSTCV	5 (U)	—	4 (U)	—	15	3737	12	—
15-02302	1.5–2	AAB3443	ALLH	CST_Off	—	—	—	—	—	—	—	—
15-02302	1.5–2	AAB3443	ALLH	CSTCV	5 (U)	—	4 (U)	—	16	1494	8 (U)	—
15-02303	0–0.5	AAB3432	ALLH	CSTCV	5 (U)	—	4 (U)	—	—	3053	11	49
15-02303	1.5–2	AAB3424	ALLH	CST_Off	—	—	—	3.8	—	—	117 (J)	—
15-02303	1.5–2	AAB3424	ALLH	CSTCV	5 (U)	—	4 (U)	—	15	3856	187	59
15-02304	0.83–1.25	AAB3421	ALLH	CST_Off	0.11 (U)	—	—	—	—	—	5.71 (J)	—
15-02304	0.83–1.25	AAB3421	ALLH	CSTCV	5 (U)	—	4 (U)	—	—	2974	10	—
15-02305	0–0.5	AAB3428	ALLH	CST_Off	0.16 (J)	—	—	—	—	—	161	—
15-02305	0–0.5	AAB3428	ALLH	CSTCV	5 (U)	—	4 (U)	—	22	2932	167	59
15-02306	0–0.5	AAB3431	ALLH	CST_Off	—	—	—	—	—	—	47.1	—
15-02307	0–0.5	AAB3433	ALLH	CST_Off	0.78 (J)	—	—	1.4 (U)	—	—	136	—
15-02307	0–0.5	AAB3433	ALLH	CSTCV	5 (U)	—	4 (U)	—	—	2887	744	92
15-02307	1–1.5	AAB3442	ALLH	CST_Off	1.7	—	—	—	—	—	162 (J)	—
15-02307	1–1.5	AAB3442	ALLH	CSTCV	8	41	4 (U)	—	31	2612	1378	98
15-02308	0–0.5	AAB3430	ALLH	CST_Off	0.17 (J)	—	—	—	—	—	187	—
15-02308	0–0.5	AAB3430	ALLH	CSTCV	5 (U)	—	4 (U)	—	18	2188	337	61

Table 10.6-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Screen Type	Mercury	Nickel	Selenium	Silver	Thorium	Titanium	Uranium	Zinc
Soil Background Value					**0.1**	**15.4**	**1.52**	**1**	**14.6**	**n/a**[b]	**1.82**	**48.8**
15-02310	0–0.5	AAB3429	ALLH	CST_Off	—	—	—	—	—	—	349	—
15-02310	0–0.5	AAB3429	ALLH	CSTCV	5 (U)	—	4 (U)	—	17	2360	409	63
15-02311	0–0.5	AAB3435	ALLH	CST_Off	0.41 (J)	—	—	—	—	—	42	—
15-02311	1.5–2	AAB3444	ALLH	CST_Off	0.13	—	—	—	—	—	25.6 (J)	—
15-02311	1.5–2	AAB3444	ALLH	CSTCV	5 (U)	—	4 (U)	—	20	2488	51	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] = If analyzed, sample result is less than background value.

[b] n/a = Not applicable; no background value available.

Table 10.6-3
Subaggregate 9 Historical Analytical Results of
Organic Chemicals Detected in Soil at MDA Z at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Bis(2-ethylhexyl)phthalate	Chrysene	Di-n-butylphthalate	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
SWMU 15-007(b)															
15-02305	0–0.5	AAB6080	ALLH	—*	—	—	—	—	—	—	—	0.5	—	—	0.46
15-02306	0–0.5	AAB3538	ALLH	—	—	—	—	—	—	—	—	0.54	—	—	0.65
15-02307	0–0.5	AAB3537	ALLH	—	—	—	—	—	4.7	—	0.53	—	—	—	—
15-02307	1.5–2.5	AAB3543	ALLH	—	—	—	—	—	0.7	—	—	—	—	—	—
15-02310	0–0.5	AAB3535	ALLH	—	—	—	—	—	0.67	—	—	—	—	—	—
15-02311	0–0.5	AAB3536	ALLH	—	0.89	0.49	0.98	0.64	3	0.9	—	2.4	0.51	1.2	2.5
15-02311	1.5–2	AAB3544	ALLH	3.9	4.2	—	—	—	—	3.6	—	15	—	17	14

Note: Units are mg/kg.

*— = If analyzed, sample result is not detected.

Table 10.6-4
Subaggregate 9 Historical Analytical Results of Radionuclides Detected in Soil at MDA Z at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Gross Gamma
SWMU 15-007(b)				
15-02308	0–0.5	AAB3533	ALLH	6.81

Note: Units are pCi/g.

Table 10.8-1
Subaggregate 9 Summary of Historical Samples Collected in Soil, Fill, Tuff, and Sludge at the Hollow at TA-15 West: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number							
				Gamma Spectroscopy	High Explosives	Isotopic Uranium	Inorganic Chemicals	SVOC	TPH-DRO	Uranium	VOC
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	—*	—	—	71524	71478	—	70725	71436
15-02552	1.5–2	0215-95-0138	ALLH	—	—	—	71524	71478	—	70725	71436
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	71441	71042	71441	71501	71377	—	70999	71522
SWMU 15-011(b)											
15-02388	0–0.5	0215-96-0704	ALLH	—	82462	—	82886	82474	—	82461	—
15-02388	0.83–1.33	0215-96-0705	ALLH	—	82462	—	82886	82474	—	82461	82481
SWMU 15-011(c)											
15-02557	0–0.5	0215-95-0147	ALLH	—	—	—	70317	70235	—	69761	—
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	70317	70235	—	69761	70446
15-02558	0–0.5	0215-95-0149	ALLH	—	—	—	70317	70235	—	69761	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	70317	70235	—	69761	70446
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0008	ALLH	—	6528913	—	—	—	—	—	—
15-02553	0–0.5	0215-95-0139	ALLH	—	—	—	6528825	6528723	—	6528402	—
SWMU 15-014(i)											
15-02387	0–0.5	0215-96-0702	ALLH	—	82462	—	82886	82474	—	82461	—
15-02387	1–1.5	0215-96-0703	ALLH	—	82462	—	82886	82474	—	82461	82481
SWMU 15-014(j)											
15-02554	0–0.5	0215-95-0141	SLUDGE	—	—	—	71524	71076	—	70725	—
15-02554	1.33–1.67	0215-95-0142	ALLH	—	—	—	71524	71076	—	70725	71436

Table 10.8-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number							
				Gamma Spectroscopy	High Explosives	Isotopic Uranium	Inorganic Chemicals	SVOC	TPH-DRO	Uranium	VOC
15-02555	0–0.08	0215-95-0143	ALLH	—	—	—	71524	71076	—	70725	—
15-02556	0–0.5	0215-95-0145	ALLH	—	—	—	71524	71076	—	70725	—
15-02556	2.5–3	0215-95-0146	ALLH	—	—	—	71524	71076	—	70725	71436
Decision-Level Data											
AOC C-15-007											
15-02575	0–0.5	0215-97-0075	ALLH	—	—	—	3589R	3587R	—	—	—
15-02575	1–1.33	0215-97-0076	FILL	—	—	—	3589R	3587R	—	—	3587R
15-02575	2–2.33	0215-97-0077	QBT2	—	—	—	3589R	3587R	—	—	3587R
15-02576	0–0.5	0215-97-0078	FILL	—	—	—	3589R	3587R	—	—	—
15-02576	1–1.5	0215-97-0079	FILL	—	—	—	3589R	3587R	—	—	3587R
15-02576	2–2.5	0215-97-0080	QBT2	—	—	—	3589R	3587R	—	—	3587R
15-02577	0–0.5	0215-97-0081	FILL	—	—	—	3589R	3587R	—	—	—
15-02577	1–1.5	0215-97-0082	FILL	—	—	—	3589R	3587R	—	—	3587R
15-02577	2.5–2.92	0215-97-0083	QBT2	—	—	—	3589R	3587R	—	—	3587R
15-02578	0.5–1	0215-97-0084	FILL	—	—	—	3589R	3587R	—	—	3587R
15-02579	0–0.5	0215-97-0089	ALLH	—	—	—	—	3655R	—	—	—
15-02579	1.25–1.75	0215-97-0085	ALLH	—	—	—	3589R	3587R	—	—	3587R
15-02579	1.25–1.75	0215-97-0090	ALLH	—	—	—	—	3655R	—	—	—
15-02579	2.5–3	0215-97-0091	QBT2	—	—	—	—	3655R	—	—	—
15-02580	0.5–1	0215-97-0086	ALLH	—	—	—	3589R	3587R	—	—	3587R
15-02581	1.25–1.75	0215-97-0087	QBT2	—	—	—	3589R	3587R	—	—	3587R
AOC C-15-010											
15-02517	0–0.25	0215-97-0040	FILL	—	—	—	—	3524R	3524R	—	3524R
15-02517	3–3.5	0215-97-0041	QBT2	—	—	—	—	3524R	3524R	—	3524R
15-02517	6–6.5	0215-97-0042	QBT2	—	—	—	—	—	3524R	—	3524R

Table 10.8-1 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number							
				Gamma Spectroscopy	High Explosives	Isotopic Uranium	Inorganic Chemicals	SVOC	TPH-DRO	Uranium	VOC
15-02518	0–0.5	0215-97-0046	ALLH	—	—	—	—	3524R	3524R	—	3524R
15-02518	2.5–2.75	0215-97-0047	QBT2	—	—	—	—	3525R	3525R	—	3525R
15-02518	5–5.5	0215-97-0048	QBT2	—	—	—	—	3525R	3525R	—	3525R
15-02518	7.5–8	0215-97-0049	QBT2	—	—	—	—	3525R	3525R	—	3525R
15-02518	14.5–15	0215-97-0050	QBT2	—	—	—	—	3525R	3525R	—	3525R
15-02518	24.5–25	0215-97-0051	QBT2	—	—	—	—	3525R	3525R	—	3525R
15-02518	39.5–40	0215-97-0044	QBT2	—	—	—	—	3525R	3525R	—	3525R
15-02518	49.5–50	0215-97-0045	QBT2	—	—	—	—	3525R	3525R	—	3525R
15-02518	54.5–55	0215-97-0097	QBT2	—	—	—	—	3524R	3524R	—	3524R
15-02519	0–0.5	0215-97-0052	FILL	—	—	—	—	3524R	3524R	—	3524R
15-02519	3–3.5	0215-97-0053	FILL	—	—	—	—	3524R	3524R	—	3524R
15-02519	9–9.5	0215-97-0055	QBT2	—	—	—	—	3524R	3524R	—	3524R
15-02519	10–10.5	0215-97-0054	QBT2	—	—	—	—	3524R	3524R	—	3524R
15-02519	17–17.5	0215-97-0056	QBT2	—	—	—	—	3524R	3524R	—	3524R
15-02519	22.5–23	0215-97-0057	QBT2	—	—	—	—	3524R	3524R	—	3524R
15-02519	32.5–33	0215-97-0043	QBT2	—	—	—	—	3524R	3524R	—	3524R

*— = The analysis was not requested.

Table 10.8-2
Subaggregate 9 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil, Fill, Tuff, and Sludge at the Hollow at TA-15 West: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium
Soil Background Value[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**
QBT2 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	—[b]	—	—	—	—	0.414 (J)	—	—
15-02552	1.5–2	0215-95-0138	ALLH	—	0.909 (U)	—	—	—	—	—	—
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	406	1.31 (J)	5.7 (J)	26.8	0.0316 (J)	2.56 (J)	34600	5.35 (J)
SWMU 15-011(b)											
15-02388	0–0.5	0215-96-0704	ALLH	—	0.888 (U)	—	—	—	—	—	—
15-02388	0.83–1.33	0215-96-0705	ALLH	—	0.923 (U)	—	—	—	0.456	—	—
SWMU 15-011(c)											
15-02557	0–0.5	0215-95-0147	ALLH	—	—	—	—	—	—	—	—
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	—	—	—	—	—
15-02558	0–0.5	0215-95-0149	ALLH	—	—	—	—	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	—	—	—	—	—
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0139	ALLH	—	9 (U)	—	—	—	1.1 (U)	—	—
SWMU 15-014(i)											
15-02387	0–0.5	0215-96-0702	ALLH	—	2.08 (J)	—	—	—	0.47	—	—
15-02387	1–1.5	0215-96-0703	ALLH	—	1.25 (U)	—	—	—	—	—	—

Table 10.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium
Soil Background Value[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**
QBT2 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**
SWMU 15-014(j)											
15-02554	0–0.5	0215-95-0141	SLUDGE	2790	—	2.9	14.7	0.964	0.396 (J)	478	4.52
15-02554	1.33–1.67	0215-95-0142	ALLH	—	0.967 (U)	—	—	—	0.483 (J)	—	—
15-02555	0–0.08	0215-95-0143	ALLH	—	—	—	—	—	1.85	—	—
15-02556	0–0.5	0215-95-0145	ALLH	—	0.937 (U)	—	—	—	0.425 (J)	—	—
15-02556	2.5–3	0215-95-0146	ALLH	—	0.961 (U)	—	—	—	—	—	—
Decision-Level Data											
AOC C-15-007											
15-02575	0–0.5	0215-97-0075	ALLH	—	11 (UJ)	—	—	—	0.56 (U)	—	—
15-02575	1–1.33	0215-97-0076	FILL	—	11 (UJ)	—	—	—	5.1	—	—
15-02575	2–2.33	0215-97-0077	QBT2	—	12 (U)	—	—	—	—	—	—
15-02576	0–0.5	0215-97-0078	FILL	—	11 (UJ)	—	—	—	0.55 (U)	—	—
15-02576	1–1.5	0215-97-0079	FILL	—	11(U)	—	—	—	0.57 (U)	—	—
15-02576	2–2.5	0215-97-0080	QBT2	—	12 (UJ)	—	—	—	—	—	—
15-02577	0–0.5	0215-97-0081	FILL	—	11 (UJ)	—	—	—	0.55 (U)	—	—
15-02577	1–1.5	0215-97-0082	FILL	—	11 (UJ)	—	—	—	0.57 (U)	—	—
15-02577	2.5–2.92	0215-97-0083	QBT2	—	12 (UJ)	—	—	—	—	—	—
15-02578	0.5–1	0215-97-0084	FILL	—	12 (UJ)	—	—	—	0.59 (U)	—	—
15-02579	1.25–1.75	0215-97-0085	ALLH	—	12 (UJ)	—	—	—	0.62 (U)	—	—
15-02580	0.5–1	0215-97-0086	ALLH	—	11 (UJ)	—	—	—	0.57 (U)	—	—
15-02581	1.25–1.75	0215-97-0087	QBT2	—	11 (UJ)	—	—	—	—	—	—

Table 10.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel
Soil Background Value[a]				**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**
QBT2 Background Value				**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	—	21.7	—	23.4	—	—	—	—
15-02552	1.5–2	0215-95-0138	ALLH	—	—	—	—	—	—	—	—
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	0.984 (J)	43	1860	21.3	7270	76.6	0.213	5.46 (J)
SWMU 15-011(b)											
15-02388	0–0.5	0215-96-0704	ALLH	—	117	—	197	—	—	0.147	—
15-02388	0.83–1.33	0215-96-0705	ALLH	—	94	—	63.7	—	—	—	—
SWMU 15-011(c)											
15-02557	0–0.5	0215-95-0147	ALLH	—	—	—	—	—	—	—	—
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	—	—	—	0.175	—
15-02558	0–0.5	0215-95-0149	ALLH	—	—	—	—	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	—	—	—	—	—
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0139	ALLH	—	24.5	—	60.1	—	—	0.26	—
SWMU 15-014(i)											
15-02387	0–0.5	0215-96-0702	ALLH	—	97.8	—	37.7	—	—	—	—
15-02387	1–1.5	0215-96-0703	ALLH	—	53.5	—	—	—	—	—	—
SWMU 15-014(j)											
15-02554	0–0.5	0215-95-0141	SLUDGE	0.701 (J)	30.2 (J)	7250 (J)	15.4	297	122 (J)	0.308 (J)	1.68
15-02554	1.33–1.67	0215-95-0142	ALLH	—	21.5	—	—	—	—	—	—

Table 10.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel
Soil Background Value[a]				**8.64**	**14.7**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**
QBT2 Background Value				**3.14**	**4.66**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**
15-02555	0–0.08	0215-95-0143	ALLH	—	155	—	101	—	—	2.99	—
15-02556	0–0.5	0215-95-0145	ALLH	—	149	—	—	—	—	—	—
15-02556	2.5–3	0215-95-0146	ALLH	—	—	—	—	—	—	—	—
Decision-Level Data											
AOC C-15-007											
15-02575	0–0.5	0215-97-0075	ALLH	—	19	—	—	—	—	0.11 (UJ)	—
15-02575	1–1.33	0215-97-0076	FILL	—	110	—	39	—	—	0.11 (UJ)	—
15-02575	2–2.33	0215-97-0077	QBT2	—	—	—	15	—	—	0.12 (UJ)	—
15-02576	0–0.5	0215-97-0078	FILL	—	22	—	24	—	—	0.11 (U)	—
15-02576	1–1.5	0215-97-0079	FILL	—	49	—	29	—	—	0.11 (U)	—
15-02576	2–2.5	0215-97-0080	QBT2	—	10	—	12	—	—	0.12 (UJ)	—
15-02577	0–0.5	0215-97-0081	FILL	—	270	—	24	—	—	0.11 (UJ)	—
15-02577	1–1.5	0215-97-0082	FILL	—	38	—	24	—	—	0.11 (UJ)	—
15-02577	2.5–2.92	0215-97-0083	QBT2	—	—	—	—	—	—	0.12 (UJ)	—
15-02578	0.5–1	0215-97-0084	FILL	—	31	—	—	—	—	0.12 (UJ)	—
15-02579	1.25–1.75	0215-97-0085	ALLH	—	37	—	—	—	—	0.12 (U)	—
15-02580	0.5–1	0215-97-0086	ALLH	—	33	—	23	—	—	0.11 (UJ)	—
15-02581	1.25–1.75	0215-97-0087	QBT2	—	18	—	17	—	—	0.11 (UJ)	—

Table 10.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value[a]				**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
QBT2 Background Value				**43700**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	—	—	—	—	—	2.61	—	54.7
15-02552	1.5–2	0215-95-0138	ALLH	—	—	—	—	0.909 (U)	2.46	—	—
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	37000	2.65 (J)	—	51100	—	—	5.87 (J)	1160
SWMU 15-011(b)											
15-02388	0–0.5	0215-96-0704	ALLH	—	—	5.76	—	1.24 (U)	2.85	—	116
15-02388	0.83–1.33	0215-96-0705	ALLH	—	—	—	—	1.2 (U)	3.65	—	107
SWMU 15-011(c)											
15-02557	0–0.5	0215-95-0147	ALLH	—	—	—	—	0.971 (U)	—	—	—
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	—	0.971 (U)	—	—	—
15-02558	0–0.5	0215-95-0149	ALLH	—	—	—	—	0.935 (U)	5.51	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	—	0.962 (U)	—	—	—
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0139	ALLH	—	—	2.2 (U)	—	1.1 (U)	2	—	127
SWMU 15-014(i)											
15-02387	0–0.5	0215-96-0702	ALLH	—	—	2.48	—	—	3.07	—	79.2
15-02387	1–1.5	0215-96-0703	ALLH	—	—	1.25 (U)	—	1.15 (U)	1.89	—	57
SWMU 15-014(j)											
15-02554	0–0.5	0215-95-0141	SLUDGE	338	—	—	75.6 (J)	—	2.51	7.03	103
15-02554	1.33–1.67	0215-95-0142	ALLH	—	—	—	—	0.967 (U)	2.15	—	69.3
15-02555	0–0.08	0215-95-0143	ALLH	—	—	1.89	—	0.942 (U)	3.44	—	1640

Table 10.8-2 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value[a]				**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
QBT2 Background Value				**43700**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
15-02556	0–0.5	0215-95-0145	ALLH	—	—	—	—	0.937 (U)	2.39	—	100
15-02556	2.5–3	0215-95-0146	ALLH	—	—	—	—	0.961 (U)	2	—	—
Decision-Level Data											
AOC C-15-007											
15-02575	0–0.5	0215-97-0075	ALLH	—	—	2.2 (U)	—	—	3.42	—	58
15-02575	1–1.33	0215-97-0076	FILL	—	—	2.2 (U)	—	—	2.56	—	110
15-02575	2–2.33	0215-97-0077	QBT2	—	0.59 (UJ)	2.4 (U)	—	—	—	—	—
15-02576	0–0.5	0215-97-0078	FILL	—	—	2.2 (U)	—	—	2.8	—	59
15-02576	1–1.5	0215-97-0079	FILL	—	—	2.3 (U)	—	—	2.9	—	75
15-02576	2–2.5	0215-97-0080	QBT2	—	0.6 (U)	2.4 (U)	—	—	2.63	—	—
15-02577	0–0.5	0215-97-0081	FILL	—	—	2.2 (U)	—	—	2.62	—	71
15-02577	1–1.5	0215-97-0082	FILL	—	—	2.3 (U)	—	—	2.03	—	63
15-02577	2.5–2.92	0215-97-0083	QBT2	—	0.6 (U)	2.4 (U)	—	—	—	—	—
15-02578	0.5–1	0215-97-0084	FILL	—	—	2.4 (U)	—	—	2.35	—	110
15-02579	1.25–1.75	0215-97-0085	ALLH	—	—	2.5 (U)	—	—	1.94	—	77
15-02580	0.5–1	0215-97-0086	ALLH	—	—	2.3 (U)	—	—	1.85	—	67
15-02581	1.25–1.75	0215-97-0087	QBT2	—	0.57 (U)	2.3 (U)	—	—	—	—	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] Fill samples were compared to soil background values.

[b] — = If analyzed, sample result is less than background value.

Table 10.8-3
Subaggregate 9 Historical Analytical Results of Organic Chemicals
Detected in Soil, Fill, Tuff, and Sludge at the Hollow at TA-15 West: Screening- and Decision-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Acetone	Anthracene	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	0.257 (J)	0.0136	0.295 (J)	—*	—	0.824	1.28	0.448
15-02552	1.5–2	0215-95-0138	ALLH	0.883	0.0324 (J)	1.79	—	1.79	1.83	2.92	0.85
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	—	25.2	—	—	—	—	—	—
SWMU 15-011(b)											
15-02388	0.83–1.33	0215-96-0705	ALLH	—	0.0103	—	—	—	—	—	—
SWMU 15-011(c)											
15-02557	2.5–3	0215-95-0148	ALLH	—	0.018	—	—	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	0.00376 (J)	—	—	—	—	—	—
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0139	ALLH	—	—	—	—	0.46	0.47	0.6	0.38
SWMU 15-014(i)											
15-02387	1–1.5	0215-96-0703	ALLH	—	0.0092 (J)	—	—	—	—	—	—
SWMU 15-014(j)											
15-02554	1.33–1.67	0215-95-0142	ALLH	—	0.0132	—	0.0013 (J)	—	—	—	—
15-02556	2.5–3	0215-95-0146	ALLH	—	0.0455	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Acetone	Anthracene	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene
Decision-Level Data											
AOC C-15-007											
15-02576	1–1.5	0215-97-0079	FILL	—	—	—	—	0.17 (J)	0.23 (J)	0.18 (J)	—
15-02576	2–2.5	0215-97-0080	QBT2	—	—	—	—	0.095 (J)	0.13 (J)	0.12 (J)	0.045 (J)
15-02577	2.5–2.92	0215-97-0083	QBT2	—	—	—	—	—	—	—	—
15-02578	0.5–1	0215-97-0084	FILL	—	—	—	—	0.41 (J)	0.42 (J)	0.35 (J)	—
15-02579	0–0.5	0215-97-0089	ALLH	3	—	4.1	—	5.1	6	6.4	3
15-02579	1.25–1.75	0215-97-0085	ALLH	0.058 (J)	—	0.16 (J)	—	0.32 (J)	0.42	0.33 (J)	0.14 (J)
15-02579	1.25–1.75	0215-97-0090	ALLH	—	—	—	—	—	0.059 (J)	0.062 (J)	—
15-02579	2.5–3	0215-97-0091	QBT2	—	—	—	—	—	—	—	—
15-02580	0.5–1	0215-97-0086	ALLH	—	—	—	—	0.44 (J)	0.64 (J)	0.55 (J)	—
15-02581	1.25–1.75	0215-97-0087	QBT2	—	—	—	—	0.057 (J)	0.08 (J)	0.06 (J)	—
AOC C-15-010											
15-02517	0–0.25	0215-97-0040	FILL	—	—	—	—	0.69 (J-)	0.7 (J-)	—	—
15-02517	3–3.5	0215-97-0041	QBT2	—	—	2.1 (J-)	—	0.88 (J-)	0.89 (J-)	1.6 (J-)	—
15-02517	6–6.5	0215-97-0042	QBT2	—	—	—	—	—	—	—	—
15-02518	0–0.5	0215-97-0046	ALLH	0.41 (J-)	—	0.63 (J-)	—	1.3 (J-)	1.5 (J-)	2.6 (J-)	0.73 (J-)
15-02518	2.5–2.75	0215-97-0047	QBT2	7.2 (J-)	—	10 (J-)	—	12 (J-)	11 (J-)	18 (J-)	6.4 (J-)
15-02518	5–5.5	0215-97-0048	QBT2	—	—	—	—	—	—	—	—
15-02518	7.5–8	0215-97-0049	QBT2	—	—	—	—	—	—	—	—
15-02518	14.5–15	0215-97-0050	QBT2	—	—	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Acetone	Anthracene	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene
15-02518	24.5–25	0215-97-0051	QBT2	—	—	—	—	—	—	—	—
15-02518	39.5–40	0215-97-0044	QBT2	—	—	—	—	—	—	—	—
15-02518	49.5–50	0215-97-0045	QBT2	—	—	—	—	—	—	—	—
15-02518	54.5–55	0215-97-0097	QBT2	—	—	—	—	—	—	—	—
15-02519	0–0.5	0215-97-0052	FILL	—	—	—	—	0.64 (J-)	0.7 (J-)	1.2 (J-)	—
15-02519	3–3.5	0215-97-0053	FILL	—	—	—	—	0.48 (J-)	0.46 (J-)	0.84 (J-)	—
15-02519	9–9.5	0215-97-0055	QBT2	—	—	—	—	—	—	—	—
15-02519	10–10.5	0215-97-0054	QBT2	—	—	—	—	—	—	—	—
15-02519	17–17.5	0215-97-0056	QBT2	—	—	—	—	—	—	—	—
15-02519	22.5–23	0215-97-0057	QBT2	—	—	—	—	—	—	—	—
15-02519	32.5–33	0215-97-0043	QBT2	—	—	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Bromodichloromethane	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Carbazole	Carbon Tetrachloride
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	—	—	—	—	—	—	—	—
15-02552	1.5–2	0215-95-0138	ALLH	—	—	—	—	—	—	—	—
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	—	7.19 (J)	—	7.79 (J)	—	—	—	—
SWMU 15-011(b)											
15-02388	0.83–1.33	0215-96-0705	ALLH	—	—	—	—	—	—	—	—
SWMU 15-011(c)											
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	—	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	—	—	—	—	—
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0139	ALLH	—	0.59	—	—	—	—	—	—
SWMU 15-014(i)											
15-02387	1–1.5	0215-96-0703	ALLH	—	—	—	—	—	—	—	—
SWMU 15-014(j)											
15-02554	1.33–1.67	0215-95-0142	ALLH	—	—	0.00116 (J)	—	—	—	—	0.00156 (J)
15-02556	2.5–3	0215-95-0146	ALLH	—	—	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Bromodichloromethane	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Carbazole	Carbon Tetrachloride
Decision-Level Data											
AOC C-15-007											
15-02576	1–1.5	0215-97-0079	FILL	0.17 (J)	—	—	—	—	—	—	—
15-02576	2–2.5	0215-97-0080	QBT2	0.12 (J)	0.049 (J)	—	—	—	—	—	—
15-02577	2.5–2.92	0215-97-0083	QBT2	—	—	—	—	—	—	—	—
15-02578	0.5–1	0215-97-0084	FILL	0.46 (J)	—	—	—	—	—	—	—
15-02579	0–0.5	0215-97-0089	ALLH	3.2	—	—	—	—	—	1.8 (J)	—
15-02579	1.25–1.75	0215-97-0085	ALLH	0.42	0.043 (J)	—	—	—	—	—	—
15-02579	1.25–1.75	0215-97-0090	ALLH	—	—	—	—	—	—	—	—
15-02579	2.5–3	0215-97-0091	QBT2	—	—	—	—	—	—	—	—
15-02580	0.5–1	0215-97-0086	ALLH	0.56 (J)	—	—	—	—	—	—	—
15-02581	1.25–1.75	0215-97-0087	QBT2	0.064 (J)	0.059 (J)	—	—	—	—	—	—
AOC C-15-010											
15-02517	0–0.25	0215-97-0040	FILL	—	—	—	—	—	—	—	—
15-02517	3–3.5	0215-97-0041	QBT2	—	—	—	—	—	—	—	—
15-02517	6–6.5	0215-97-0042	QBT2	—	—	—	—	—	—	—	—
15-02518	0–0.5	0215-97-0046	ALLH	—	—	—	—	—	—	—	—
15-02518	2.5–2.75	0215-97-0047	QBT2	—	—	—	—	—	—	4 (J-)	—
15-02518	5–5.5	0215-97-0048	QBT2	—	—	—	—	—	—	—	—
15-02518	7.5–8	0215-97-0049	QBT2	—	—	—	—	—	—	—	—
15-02518	14.5–15	0215-97-0050	QBT2	—	—	—	—	7.5	2.4	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Bromodichloromethane	Butanone[2-]	Butylbenzene[n-]	Butylbenzene[sec-]	Carbazole	Carbon Tetrachloride
15-02518	24.5–25	0215-97-0051	QBT2	—	—	—	—	2.1	0.31 (J)	—	—
15-02518	39.5–40	0215-97-0044	QBT2	—	—	—	—	7.7	3	—	—
15-02518	49.5–50	0215-97-0045	QBT2	—	—	—	—	0.68 (J)	—	—	—
15-02518	54.5–55	0215-97-0097	QBT2	—	—	—	0.058	0.0055 (J)	—	—	—
15-02519	0–0.5	0215-97-0052	FILL	—	—	—	—	—	—	—	—
15-02519	3–3.5	0215-97-0053	FILL	—	—	—	—	—	—	—	—
15-02519	9–9.5	0215-97-0055	QBT2	—	—	—	—	9.2	2.6	—	—
15-02519	10–10.5	0215-97-0054	QBT2	—	—	—	—	6.8	1.8	—	—
15-02519	17–17.5	0215-97-0056	QBT2	—	—	—	—	8.1	2.8	—	—
15-02519	22.5–23	0215-97-0057	QBT2	—	—	—	—	4.4	1.9	—	—
15-02519	32.5–33	0215-97-0043	QBT2	—	—	—	—	6.3	2.2	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chlorobenzene	Chlorotoluene[2-]	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dichlorobenzene[1,4-]	Dichloroethene[cis-1,2-]
Screening-Level Data										
AOC C-15-010										
15-02551	1.5–2	0215-95-0137	ALLH	—	—	0.956	—	—	—	—
15-02552	1.5–2	0215-95-0138	ALLH	—	—	1.74	0.236 (J)	0.616	—	—
SWMU 15-009(a)										
15-02559	0–0	0215-95-0151	SLUDGE	24.2	—	—	—	—	—	—
SWMU 15-011(b)										
15-02388	0.83–1.33	0215-96-0705	ALLH	—	—	—	—	—	—	—
SWMU 15-011(c)										
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	—	—	—	—
AOC 15-014(g)										
15-02553	0–0.5	0215-95-0139	ALLH	—	—	0.51	—	—	—	—
SWMU 15-014(i)										
15-02387	1–1.5	0215-96-0703	ALLH	—	—	—	—	—	—	—
SWMU 15-014(j)										
15-02554	1.33–1.67	0215-95-0142	ALLH	—	—	—	—	—	0.00111 (J)	—
15-02556	2.5–3	0215-95-0146	ALLH	—	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chlorobenzene	Chlorotoluene[2-]	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dichlorobenzene[1,4-]	Dichloroethene[cis-1,2-]
Decision-Level Data										
AOC C-15-007										
15-02576	1–1.5	0215-97-0079	FILL	—	—	0.17 (J)	—	—	—	—
15-02576	2–2.5	0215-97-0080	QBT2	—	—	0.11 (J)	—	—	—	—
15-02577	2.5–2.92	0215-97-0083	QBT2	—	—	—	—	—	—	—
15-02578	0.5–1	0215-97-0084	FILL	—	—	0.45 (J)	—	—	—	—
15-02579	0–0.5	0215-97-0089	ALLH	—	—	6	0.77 (J)	2.1	—	—
15-02579	1.25–1.75	0215-97-0085	ALLH	—	—	0.37 (J)	0.057 (J)	—	—	—
15-02579	1.25–1.75	0215-97-0090	ALLH	—	—	—	—	—	—	—
15-02579	2.5–3	0215-97-0091	QBT2	—	—	—	—	—	—	—
15-02580	0.5–1	0215-97-0086	ALLH	—	—	0.5 (J)	—	—	—	—
15-02581	1.25–1.75	0215-97-0087	QBT2	—	—	0.067 (J)	—	—	—	—
AOC C-15-010										
15-02517	0–0.25	0215-97-0040	FILL	—	—	0.63 (J-)	—	—	—	—
15-02517	3–3.5	0215-97-0041	QBT2	—	—	0.85 (J-)	—	—	—	—
15-02517	6–6.5	0215-97-0042	QBT2	—	—	—	—	—	—	0.01
15-02518	0–0.5	0215-97-0046	ALLH	—	—	1.3 (J-)	—	—	—	—
15-02518	2.5–2.75	0215-97-0047	QBT2	—	—	9.5 (J-)	—	4.8 (J-)	—	—
15-02518	5–5.5	0215-97-0048	QBT2	—	—	—	—	—	—	—
15-02518	7.5–8	0215-97-0049	QBT2	—	—	—	—	—	—	—
15-02518	14.5–15	0215-97-0050	QBT2	—	—	—	—	7.4 (J)	—	0.31 (J)
15-02518	24.5–25	0215-97-0051	QBT2	—	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Chlorobenzene	Chlorotoluene[2-]	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dichlorobenzene[1,4-]	Dichloroethene[cis-1,2-]
15-02518	39.5–40	0215-97-0044	QBT2	—	—	—	—	—	—	—
15-02518	49.5–50	0215-97-0045	QBT2	—	—	—	—	—	—	—
15-02518	54.5–55	0215-97-0097	QBT2	—	—	—	—	—	—	—
15-02519	0–0.5	0215-97-0052	FILL	—	—	0.6 (J-)	—	—	—	—
15-02519	3–3.5	0215-97-0053	FILL	—	—	0.41 (J-)	—	—	—	—
15-02519	9–9.5	0215-97-0055	QBT2	—	—	—	—	5 (J-)	—	2.3
15-02519	10–10.5	0215-97-0054	QBT2	—	—	—	—	—	—	7.9
15-02519	17–17.5	0215-97-0056	QBT2	—	—	—	—	—	—	—
15-02519	22.5–23	0215-97-0057	QBT2	—	0.72 (J)	—	—	—	—	—
15-02519	32.5–33	0215-97-0043	QBT2	—	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dichlorodifluoromethane	Dichloroethene[cis-1,2-]	Dichloropropene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene	Hexachlorobutadiene	Hexanone[2-]
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	—	—	—	—	—	—	1.77	0.216 (J)
15-02552	1.5–2	0215-95-0138	ALLH	—	—	—	—	—	—	3.86	0.864
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	—	—	—	—	—	—	—	—
SWMU 15-011(b)											
15-02388	0.83–1.33	0215-96-0705	ALLH	0.0011 (J)	—	—	—	—	—	—	—
SWMU 15-011(c)											
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	—	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	—	—	—	—	—
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0139	ALLH	—	—	—	—	—	—	0.98	—
SWMU 15-014(i)											
15-02387	1–1.5	0215-96-0703	ALLH	—	—	—	—	—	—	—	—
SWMU 15-014(j)											
15-02554	1.33–1.67	0215-95-0142	ALLH	—	—	0.00124 (J)	0.00126 (J)	—	0.00126 (J)	—	—
15-02556	2.5–3	0215-95-0146	ALLH	—	0.0028	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dichlorodifluoromethane	Dichloroethene[cis-1,2-]	Dichloropropene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene	Hexachlorobutadiene	Hexanone[2-]
Decision-Level Data											
AOC C-15-007											
15-02576	1–1.5	0215-97-0079	FILL	—	—	—	—	0.32 (J)	—	—	—
15-02576	2–2.5	0215-97-0080	QBT2	—	—	—	—	0.2 (J)	—	—	—
15-02577	2.5–2.92	0215-97-0083	QBT2	—	—	—	—	0.056 (J)	—	—	—
15-02578	0.5–1	0215-97-0084	FILL	—	—	—	—	0.86 (J)	—	—	—
15-02579	0–0.5	0215-97-0089	ALLH	—	—	—	—	15	3.4	—	—
15-02579	1.25–1.75	0215-97-0085	ALLH	—	—	—	—	0.74	0.072 (J)	—	—
15-02579	1.25–1.75	0215-97-0090	ALLH	—	—	—	—	0.082 (J)	—	—	—
15-02579	2.5–3	0215-97-0091	QBT2	—	—	—	—	0.067 (J)	—	—	—
15-02580	0.5–1	0215-97-0086	ALLH	—	—	—	—	0.97 (J)	—	—	—
15-02581	1.25–1.75	0215-97-0087	QBT2	—	—	—	—	0.1 (J)	—	—	—
AOC C-15-010											
15-02517	0–0.25	0215-97-0040	FILL	—	—	—	—	1.4 (J-)	—	—	—
15-02517	3–3.5	0215-97-0041	QBT2	—	—	—	—	1.8 (J-)	—	—	—
15-02517	6–6.5	0215-97-0042	QBT2	—	—	—	—	—	—	—	—
15-02518	0–0.5	0215-97-0046	ALLH	—	—	—	—	2.8 (J-)	—	—	—
15-02518	2.5–2.75	0215-97-0047	QBT2	—	—	—	—	24 (J-)	7.4 (J-)	—	—
15-02518	5–5.5	0215-97-0048	QBT2	—	—	—	—	—	—	—	—
15-02518	7.5–8	0215-97-0049	QBT2	—	—	—	—	—	—	—	—
15-02518	14.5–15	0215-97-0050	QBT2	—	—	—	5.8	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Dichlorodifluoromethane	Dichloroethene[cis-1,2-]	Dichloropropene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene	Hexachlorobutadiene	Hexanone[2-]
15-02518	24.5–25	0215-97-0051	QBT2	—	—	—	0.98	—	—	—	—
15-02518	39.5–40	0215-97-0044	QBT2	—	—	—	7.1	—	—	—	—
15-02518	49.5–50	0215-97-0045	QBT2	—	—	—	—	—	—	0.68	—
15-02518	54.5–55	0215-97-0097	QBT2	—	—	—	—	—	—	—	0.014 (J)
15-02519	0–0.5	0215-97-0052	FILL	—	—	—	—	1.3 (J-)	—	—	—
15-02519	3–3.5	0215-97-0053	FILL	—	—	—	—	0.91 (J-)	—	—	—
15-02519	9–9.5	0215-97-0055	QBT2	—	—	—	6.4	—	6.3 (J-)	—	—
15-02519	10–10.5	0215-97-0054	QBT2	—	—	—	3.2	—	4.8 (J-)	—	—
15-02519	17–17.5	0215-97-0056	QBT2	—	—	—	7.5	—	—	—	—
15-02519	22.5–23	0215-97-0057	QBT2	—	—	—	1.7	—	—	—	—
15-02519	32.5–33	0215-97-0043	QBT2	—	—	—	3.7	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Phenol
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	0.465	—	—	0.00361 (J)	—	0.208 (J)	1.5	—
15-02552	1.5–2	0215-95-0138	ALLH	0.88	—	—	0.00744 (J)	0.353	0.999	3.01	—
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	—	—	—	1.14 (J)	—	—	—	26.3 (J)
SWMU 15-011(b)											
15-02388	0.83–1.33	0215-96-0705	ALLH	—	—	—	0.004 (J)	—	—	—	—
SWMU 15-011(c)											
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	0.00345 (J)	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	—	—	—	—	—
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0139	ALLH	—	—	—	—	—	—	0.73	—
SWMU 15-014(i)											
15-02387	1–1.5	0215-96-0703	ALLH	—	—	—	0.0028 (J)	—	—	—	—
SWMU 15-014(j)											
15-02554	1.33–1.67	0215-95-0142	ALLH	—	0.0054	—	0.00347 (J)	—	—	—	—
15-02556	2.5–3	0215-95-0146	ALLH	—	—	—	0.00388 (J)	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Phenol
Decision-Level Data											
AOC C-15-007											
15-02576	1–1.5	0215-97-0079	FILL	—	—	—	—	—	—	—	—
15-02576	2–2.5	0215-97-0080	QBT2	0.049 (J)	—	—	—	—	—	0.11 (J)	—
15-02577	2.5–2.92	0215-97-0083	QBT2	—	—	—	—	—	—	0.04 (J)	—
15-02578	0.5–1	0215-97-0084	FILL	—	—	—	—	—	—	0.62 (J)	—
15-02579	0–0.5	0215-97-0089	ALLH	3	—	—	—	1.6 (J)	5.9	17	—
15-02579	1.25–1.75	0215-97-0085	ALLH	0.15 (J)	—	—	—	—	—	0.57	—
15-02579	1.25–1.75	0215-97-0090	ALLH	—	—	—	—	—	—	0.045 (J)	—
15-02579	2.5–3	0215-97-0091	QBT2	—	—	—	—	—	—	0.061 (J)	—
15-02580	0.5–1	0215-97-0086	ALLH	—	—	—	—	—	—	0.56 (J)	—
15-02581	1.25–1.75	0215-97-0087	QBT2	0.048 (J)	—	—	—	—	—	0.062 (J)	—
AOC C-15-010											
15-02517	0–0.25	0215-97-0040	FILL	—	—	—	0.013 (J+)	—	0.0026 (J)	1.1 (J-)	—
15-02517	3–3.5	0215-97-0041	QBT2	—	—	—	0.0067	—	0.0036 (J)	2.1 (J-)	—
15-02517	6–6.5	0215-97-0042	QBT2	—	—	—	0.0088	—	—	—	—
15-02518	0–0.5	0215-97-0046	ALLH	0.58 (J-)	—	—	0.0067	—	—	3.2 (J-)	—
15-02518	2.5–2.75	0215-97-0047	QBT2	5.3 (J-)	—	—	0.008	3.6 (J-)	14 (J-)	33 (J-)	—
15-02518	5–5.5	0215-97-0048	QBT2	—	—	—	—	—	—	—	—
15-02518	7.5–8	0215-97-0049	QBT2	—	—	—	0.0052 (J)	—	—	—	—
15-02518	14.5–15	0215-97-0050	QBT2	—	1.4	2	1.9	10	26 (J)	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Phenol
15-02518	24.5–25	0215-97-0051	QBT2	—	—	2	2	—	4.2	—	—
15-02518	39.5–40	0215-97-0044	QBT2	—	2	2	1.4	52	19	—	—
15-02518	49.5–50	0215-97-0045	QBT2	—	—	—	0.92	2.3	1.9	—	—
15-02518	54.5–55	0215-97-0097	QBT2	—	—	—	0.01	0.046 (J)	0.021	—	—
15-02519	0–0.5	0215-97-0052	FILL	—	—	—	0.0059	—	0.0027 (J)	1.5 (J-)	—
15-02519	3–3.5	0215-97-0053	FILL	—	—	—	0.0088	—	—	1.3 (J-)	—
15-02519	9–9.5	0215-97-0055	QBT2	—	1.8	3	1.8	140 (J-)	31 (J-)	9.3 (J-)	—
15-02519	10–10.5	0215-97-0054	QBT2	—	0.81 (J)	3	4.1	71 (J-)	8.8 (J-)	—	—
15-02519	17–17.5	0215-97-0056	QBT2	—	2	2	1.7	60 (J-)	23	5.6 (J-)	—
15-02519	22.5–23	0215-97-0057	QBT2	—	0.71 (J)	2	2	40 (J-)	7.2	—	—
15-02519	32.5–33	0215-97-0043	QBT2	—	0.89 (J)	3	1.7	63 (J-)	17	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Propylbenzene[1-]	Pyrene	Tetrachloroethene	Toluene	TPH-DRO	Trichlorobenzene[1,2,3-]	Trichlorobenzene[1,2,4-]	Trichloroethane[1,1,1-]
Screening-Level Data											
AOC C-15-010											
15-02551	1.5–2	0215-95-0137	ALLH	—	1.84	—	—	—	—	—	0.00153 (J)
15-02552	1.5–2	0215-95-0138	ALLH	—	3.24	—	—	—	—	—	—
SWMU 15-009(a)											
15-02559	0–0	0215-95-0151	SLUDGE	—	—	—	326 (J)	—	—	—	—
SWMU 15-011(b)											
15-02388	0.83–1.33	0215-96-0705	ALLH	—	—	0.0042	0.0011 (J)	—	—	—	0.007
SWMU 15-011(c)											
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	—	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	—	—	—	—	—	—	—
AOC 15-014(g)											
15-02553	0–0.5	0215-95-0139	ALLH	—	0.9	—	—	—	—	—	—
SWMU 15-014(i)											
15-02387	1–1.5	0215-96-0703	ALLH	—	—	—	—	—	—	—	—
SWMU 15-014(j)											
15-02554	1.33–1.67	0215-95-0142	ALLH	—	—	0.0011 (J)	0.00177 (J)	—	—	—	—
15-02556	2.5–3	0215-95-0146	ALLH	—	—	—	—	—	—	—	0.00147 (J)

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Propylbenzene[1-]	Pyrene	Tetrachloroethene	Toluene	TPH-DRO	Trichlorobenzene[1,2,3-]	Trichlorobenzene[1,2,4-]	Trichloroethane[1,1,1-]
Decision-Level Data											
AOC C-15-007											
15-02576	1–1.5	0215-97-0079	FILL	—	0.32 (J)	—	—	—	—	—	—
15-02576	2–2.5	0215-97-0080	QBT2	—	0.16 (J)	—	—	—	—	—	—
15-02577	2.5–2.92	0215-97-0083	QBT2	—	0.046 (J)	0.01	—	—	—	—	—
15-02578	0.5–1	0215-97-0084	FILL	—	0.84 (J)	—	—	—	—	—	—
15-02579	0–0.5	0215-97-0089	ALLH	—	13	—	—	—	—	—	—
15-02579	1.25–1.75	0215-97-0085	ALLH	—	0.58	—	—	—	—	—	—
15-02579	1.25–1.75	0215-97-0090	ALLH	—	0.079 (J)	—	—	—	—	—	—
15-02579	2.5–3	0215-97-0091	QBT2	—	0.066 (J)	—	—	—	—	—	—
15-02580	0.5–1	0215-97-0086	ALLH	—	0.81 (J)	—	—	—	—	—	—
15-02581	1.25–1.75	0215-97-0087	QBT2	—	0.1 (J)	—	—	—	—	—	—
AOC C-15-010											
15-02517	0–0.25	0215-97-0040	FILL	—	1.9 (J-)	—	0.01	40	—	—	—
15-02517	3–3.5	0215-97-0041	QBT2	—	2.6 (J-)	—	0.01	17	—	—	—
15-02517	6–6.5	0215-97-0042	QBT2	—	—	0.0038 (J)	0.01	2200	—	—	0.2
15-02518	0–0.5	0215-97-0046	ALLH	—	4.5 (J-)	—	—	23	—	—	—
15-02518	2.5–2.75	0215-97-0047	QBT2	—	35 (J-)	—	—	160	—	—	—
15-02518	5–5.5	0215-97-0048	QBT2	—	—	—	—	6.2	—	—	—
15-02518	7.5–8	0215-97-0049	QBT2	—	—	—	—	670	—	—	0.0033 (J)
15-02518	14.5–15	0215-97-0050	QBT2	2.7	—	—	1.4	13000	—	—	—
15-02518	24.5–25	0215-97-0051	QBT2	0.35 (J)	—	—	—	10000	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Propylbenzene[1-]	Pyrene	Tetrachloroethene	Toluene	TPH-DRO	Trichlorobenzene[1,2,3-]	Trichlorobenzene[1,2,4-]	Trichloroethane[1,1,1-]
15-02518	39.5–40	0215-97-0044	QBT2	3.5	—	0.88 (J)	1.7	12000	1.4	—	—
15-02518	49.5–50	0215-97-0045	QBT2	—	—	—	—	2200	—	0.68	—
15-02518	54.5–55	0215-97-0097	QBT2	—	—	—	—	56	—	—	—
15-02519	0–0.5	0215-97-0052	FILL	—	2 (J-)	—	—	11	—	—	—
15-02519	3–3.5	0215-97-0053	FILL	—	1.4 (J-)	—	0.01	—	—	—	—
15-02519	9–9.5	0215-97-0055	QBT2	3.1	—	—	4.3	14000	—	—	—
15-02519	10–10.5	0215-97-0054	QBT2	—	—	—	0.77 (J)	12000	—	—	40
15-02519	17–17.5	0215-97-0056	QBT2	3.5	—	—	1.9	12000	—	—	—
15-02519	22.5–23	0215-97-0057	QBT2	0.73 (J)	—	—	—	7400	—	—	—
15-02519	32.5–33	0215-97-0043	QBT2	1.3 (J)	—	1.2 (J)	0.85 (J)	19000	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Screening-Level Data										
AOC C-15-010										
15-02551	1.5–2	0215-95-0137	ALLH	0.006	—	—	—	—	—	—
15-02552	1.5–2	0215-95-0138	ALLH	—	—	—	—	—	—	—
SWMU 15-009(a)										
15-02559	0–0	0215-95-0151	SLUDGE	—	—	—	—	—	—	—
SWMU 15-011(b)										
15-02388	0.83–1.33	0215-96-0705	ALLH	0.01	—	—	—	—	—	—
SWMU 15-011(c)										
15-02557	2.5–3	0215-95-0148	ALLH	—	—	—	—	—	—	—
15-02558	1.5–2	0215-95-0150	ALLH	—	0.00157 (J)	—	—	—	—	—
AOC 15-014(g)										
15-02553	0–0.5	0215-95-0139	ALLH	—	—	—	—	—	—	—
SWMU 15-014(i)										
15-02387	1–1.5	0215-96-0703	ALLH	—	—	—	—	—	—	—
SWMU 15-014(j)										
15-02554	1.33–1.67	0215-95-0142	ALLH	0.00158 (J)	—	—	—	0.00236 (J)	0.00108 (J)	—
15-02556	2.5–3	0215-95-0146	ALLH	0.008	—	—	—	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Decision-Level Data										
AOC C-15-007										
15-02576	1–1.5	0215-97-0079	FILL	—	—	—	—	—	—	—
15-02576	2–2.5	0215-97-0080	QBT2	—	—	—	—	—	—	—
15-02577	2.5–2.92	0215-97-0083	QBT2	—	—	—	—	—	—	—
15-02578	0.5–1	0215-97-0084	FILL	—	—	—	—	—	—	—
15-02579	0–0.5	0215-97-0089	ALLH	—	—	—	—	—	—	—
15-02579	1.25–1.75	0215-97-0085	ALLH	—	—	—	—	—	—	—
15-02579	1.25–1.75	0215-97-0090	ALLH	—	—	—	—	—	—	—
15-02579	2.5–3	0215-97-0091	QBT2	—	—	—	—	—	—	—
15-02580	0.5–1	0215-97-0086	ALLH	—	—	—	—	—	—	—
15-02581	1.25–1.75	0215-97-0087	QBT2	—	—	—	—	—	—	—
AOC C-15-010										
15-02517	0–0.25	0215-97-0040	FILL	—	—	—	—	—	—	—
15-02517	3–3.5	0215-97-0041	QBT2	—	—	—	—	—	—	—
15-02517	6–6.5	0215-97-0042	QBT2	—	—	—	—	—	—	—
15-02518	0–0.5	0215-97-0046	ALLH	—	—	—	—	—	—	—
15-02518	2.5–2.75	0215-97-0047	QBT2	0.006	—	—	—	—	—	—
15-02518	5–5.5	0215-97-0048	QBT2	—	—	—	—	—	—	—
15-02518	7.5–8	0215-97-0049	QBT2	0.009	—	—	—	—	—	—
15-02518	14.5–15	0215-97-0050	QBT2	0.35 (J)	—	17	3.9	—	—	—
15-02518	24.5–25	0215-97-0051	QBT2	—	—	2.4	1.4	—	—	—

Table 10.8-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
15-02518	39.5–40	0215-97-0044	QBT2	0.87 (J)	—	19	4.4	—	7.3	—
15-02518	49.5–50	0215-97-0045	QBT2	—	—	1.2	—	0.29	—	—
15-02518	54.5–55	0215-97-0097	QBT2	—	—	0.007	0.0026 (J)	—	—	—
15-02519	0–0.5	0215-97-0052	FILL	—	—	—	—	—	—	—
15-02519	3–3.5	0215-97-0053	FILL	—	—	—	—	—	—	—
15-02519	9–9.5	0215-97-0055	QBT2	—	—	25	6.1	—	7	12
15-02519	10–10.5	0215-97-0054	QBT2	28	—	18	5	—	5.6	7.7
15-02519	17–17.5	0215-97-0056	QBT2	—	—	20	4.6	—	5	11
15-02519	22.5–23	0215-97-0057	QBT2	—	—	7.5	2.3	—	—	2.3
15-02519	32.5–33	0215-97-0043	QBT2	2.5	—	20	5.8	—	6.1	7.2

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is not detected.

Table 10.9-1
Subaggregate 9 Summary of Historical
Samples Collected in Sludge from Septic Systems at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Request Number				
				High Explosives	Inorganic Chemicals	SVOC	Uranium	VOC
SWMU 15-009(f)								
15-02541	0–0	0215-95-0155	SLUDGE	71042	71501	71377	70999	71522
SWMU 15-009(k)								
15-02542	0–0	0215-95-0157	SLUDGE	71042	—*	71377	70999	71522
15-02542	0–0	0215-96-0706	SLUDGE	—	82538	—	—	—

*— = The analysis was not requested.

Table 10.9-2
Subaggregate 9 Historical Analytical Results of
Inorganic Chemicals Detected in Sludge from Septic Systems at TA-15 West: Screening-Level Data

Part 1														
Location ID	Depth (ft bgs)	Sample ID	Media	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead
SWMU 15-009(f)														
15-02541	0–0	0215-95-0155	SLUDGE	1680	4.49 (J)	92.8	0.138 (J)	0.172 (J)	77800	1.48 (J)	5.01 (J)	3.51 (J)	1200	2 (J)
SWMU 15-009(k)														
15-02542	0–0	0215-95-0157	SLUDGE	—*	—	—	—	—	—	—	—	—	—	—
15-02542	0–0	0215-96-0706	SLUDGE	37.6 (J)	5.79 (J)	15.8	0.0196 (J)	—	104000	—	7.75 (J)	—	375	—

Part 2													
Location ID	Depth (ft bgs)	Sample ID	Media	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Uranium	Vanadium	Zinc
SWMU 15-009(f)													
15-02541	0–0	0215-95-0155	SLUDGE	8110	70.2	0.159 (J)	15.5	36100	1.44 (J)	34600	0.92	3.6 (J)	29.8
SWMU 15-009(k)													
15-02542	0–0	0215-95-0157	SLUDGE	—	—	—	—	—	—	—	0.91	—	—
15-02542	0–0	0215-96-0706	SLUDGE	8660	84	0.097 (J)	18.5	54600	—	85400	—	0.693 (J)	84.2

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is less than background value.

Table 10.9-3
Subaggregate 9 Historical Analytical Results of Organic Chemicals Detected in Sludge from Septic Systems at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Methylene Chloride
SWMU 15-009(f)				
15-02541	0–0	0215-95-0155	SLUDGE	1.03 (J)
SWMU 15-009(k)				
15-02542	0–0	0215-95-0157	SLUDGE	1 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

Table 10.10-1
Subaggregate 9 Summary of Historical Samples Collected in Soil at Outfalls at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Screen Type	Request Number		
					Inorganic Chemicals	SVOC	VOC
SWMU 15-014(a)							
15-02531	0–0.5	0215-95-0159	ALLH	AN95	71387	70384	—*
15-02531	2.17–2.67	0215-95-0160	ALLH	AN95	71387	70384	70809
15-02532	0–0.5	0215-95-0161	ALLH	AN95	71387	70384	—
15-02532	1.67–2.17	0215-95-0162	ALLH	AN95	71387	70384	70809
15-02533	0–0.5	0215-95-0163	ALLH	AN95	71387	70384	—
15-02533	0.5–0.83	0215-95-0164	ALLH	AN95	71387	70384	70809
15-02534	0–0.5	0215-95-0165	ALLH	AN95	71387	70384	—
SWMU 15-014(b)							
15-02535	0–0.5	0215-95-0167	ALLH	AN95	70317	70235	—
15-02535	2.5–3	0215-95-0168	ALLH	AN95	70317	70235	70446
15-02536	0–0.5	0215-95-0169	ALLH	AN95	70317	70235	—
15-02536	2.5–3	0215-95-0170	ALLH	AN95	70317	70235	70446
15-02537	0–0.33	0215-95-0171	ALLH	AN95	70317	70235	—
15-02537	0.75–1.25	0215-95-0172	ALLH	AN95	70317	70235	70446
15-02538	0–0.5	0215-95-0173	ALLH	AN95	70317	70235	—
15-02538	2.5–3	0215-95-0174	ALLH	AN95	70317	70235	70446
15-02539	0–0.41	0215-95-0175	ALLH	AN95	70317	70235	—
15-02539	0.83–1.25	0215-95-0176	ALLH	AN95	70317	70235	70446
15-02540	0–0.5	0215-95-0177	ALLH	AN95	70317	70235	—
15-02540	1.83–2.08	0215-95-0178	ALLH	AN95	70317	70235	70446

*— = The analysis was not requested.

Table 10.10-2
Subaggregate 9 Historical Analytical Results of Inorganic Chemicals Greater Than Background Values in Soil at Outfalls at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Antimony	Cadmium	Copper	Nickel	Silver	Thallium	Zinc
Soil Background Value				**0.83**	**0.4**	**14.7**	**15.4**	**1**	**0.73**	**48.8**
SWMU 15-014(a)										
15-02531	2.17–2.67	0215-95-0160	ALLH	—*	—	—	—	3.67	—	—
15-02532	0–0.5	0215-95-0161	ALLH	—	—	17.4	—	107 (J)	—	—
15-02532	1.67–2.17	0215-95-0162	ALLH	—	—	—	—	3.56	—	—
15-02533	0–0.5	0215-95-0163	ALLH	—	—	—	18.9	6.2	—	—
15-02533	0.5–0.83	0215-95-0164	ALLH	—	—	—	—	1.1	—	—
SWMU 15-014(b)										
15-02535	0–0.5	0215-95-0167	ALLH	—	0.422 (J)	—	—	—	0.935 (U)	—
15-02535	2.5–3	0215-95-0168	ALLH	—	—	—	—	—	0.917 (U)	—
15-02536	0–0.5	0215-95-0169	ALLH	—	0.519	14.8	—	—	0.99 (U)	315
15-02536	2.5–3	0215-95-0170	ALLH	—	—	—	—	—	0.971 (U)	—
15-02537	0–0.33	0215-95-0171	ALLH	—	—	—	—	—	0.935 (U)	52
15-02537	0.75–1.25	0215-95-0172	ALLH	0.99 (U)	—	—	—	—	0.99 (U)	—
15-02538	0–0.5	0215-95-0173	ALLH	—	0.561	—	—	—	0.943 (U)	141
15-02538	2.5–3	0215-95-0174	ALLH	—	—	—	—	—	0.935 (U)	—
15-02539	0–0.41	0215-95-0175	ALLH	—	—	—	—	—	0.926 (U)	—
15-02539	0.83–1.25	0215-95-0176	ALLH	—	0.522	—	—	—	0.926 (U)	—
15-02540	0–0.5	0215-95-0177	ALLH	—	—	—	—	—	0.943 (U)	—
15-02540	1.83–2.08	0215-95-0178	ALLH	0.962 (U)	—	—	—	—	0.962 (U)	—

Source: Background values from LANL (1998, 59730, Table 6.0-1, p. 44).
Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
*— = If analyzed, sample result is less than background value.

Table 10.10-3
Subaggregate 9 Historical Analytical Results of
Organic Chemicals Detected in Soil at Outfalls at TA-15 West: Screening-Level Data

Location ID	Depth (ft bgs)	Sample ID	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Butanone[2-]	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dichlorobenzene[1,3-]
SWMU 15-014(a)													
15-02531	2.17–2.67	0215-95-0160	ALLH	—*	0.0194	—	—	—	—	—	—	—	—
15-02532	1.67–2.17	0215-95-0162	ALLH	—	0.0128	—	—	—	—	—	—	—	0.00101 (J)
15-02533	0.5–0.83	0215-95-0164	ALLH	—	—	—	—	—	—	—	—	—	—
SWMU 15-014(b)													
15-02535	0–0.5	0215-95-0167	ALLH	8.74	—	18.3	27.3	55.4	—	—	5.44	5.3	—
15-02535	2.5–3	0215-95-0168	ALLH	—	0.0123	—	1.31 (J)	0.849 (J)	—	0.967 (J)	—	—	—
15-02536	0–0.5	0215-95-0169	ALLH	2.05 (J)	—	3.17 (J)	8.43	12.3	—	11.7	—	—	—
15-02536	2.5–3	0215-95-0170	ALLH	—	0.00598 (J)	—	—	—	—	—	—	—	—
15-02537	0–0.33	0215-95-0171	ALLH	—	—	—	0.199 (J)	0.328 (J)	—	0.291 (J)	—	—	—
15-02537	0.75–1.25	0215-95-0172	ALLH	—	0.0444	—	—	—	—	—	—	—	—
15-02538	0–0.5	0215-95-0173	ALLH	—	—	—	0.52	1	—	—	—	—	—
15-02538	2.5–3	0215-95-0174	ALLH	—	0.0201	—	—	—	—	—	—	—	—
15-02539	0–0.41	0215-95-0175	ALLH	—	—	—	—	0.322 (J)	—	0.217 (J)	—	—	—
15-02539	0.83–1.25	0215-95-0176	ALLH	—	0.0768 (J)	—	—	—	0.00237 (J)	—	—	—	—
15-02540	1.83–2.08	0215-95-0178	ALLH	—	0.0113 (J)	—	—	—	—	—	—	—	—

Table 10.10-3 (continued)

Location ID	Depth (ft bgs)	Sample ID	Media	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Naphthalene	Phenanthrene	Pyrene	Toluene	Xylene (Total)
SWMU 15-014(a)												
15-02531	2.17–2.67	0215-95-0160	ALLH	—	—	—	0.00353 (J)	—	—	—	0.00107 (J)	—
15-02532	1.67–2.17	0215-95-0162	ALLH	—	—	—	0.00291 (J)	—	—	—	—	0.00107 (J)
15-02533	0.5–0.83	0215-95-0164	ALLH	—	—	—	—	—	—	—	—	0.00112 (J)
SWMU 15-014(b)												
15-02535	0–0.5	0215-95-0167	ALLH	76	8.74	17.5	—	5.01	63.1	64.2	—	—
15-02535	2.5–3	0215-95-0168	ALLH	2.21	—	—	—	—	1.75	1.7	—	—
15-02536	0–0.5	0215-95-0169	ALLH	20.8	—	5.72	—	—	16	18.3	—	—
15-02536	2.5–3	0215-95-0170	ALLH	—	—	—	—	—	—	—	—	—
15-02537	0–0.33	0215-95-0171	ALLH	0.427	—	0.169 (J)	—	—	0.208 (J)	0.377	—	—
15-02537	0.75–1.25	0215-95-0172	ALLH	—	—	—	—	—	—	—	—	—
15-02538	0–0.5	0215-95-0173	ALLH	1.05	—	0.386	—	—	0.534	1.02	—	—
15-02538	2.5–3	0215-95-0174	ALLH	—	—	—	—	—	—	—	—	—
15-02539	0–0.41	0215-95-0175	ALLH	0.467	—	—	—	—	0.237 (J)	0.398	—	—
15-02539	0.83–1.25	0215-95-0176	ALLH	—	—	—	0.00328 (J)	—	—	—	—	—
15-02540	1.83–2.08	0215-95-0178	ALLH	—	—	—	—	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

*— = If analyzed, sample result is not detected.

Table 10.11-1
Subaggregate 9 Proposed Samples in Soil and Tuff at TA-15 West

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)
Firing Site G: SWMU 15-008(c) and AOC C-15-001										
1 and 2 (Figure 10.11-1)	SWMU 15-008(c), footprint of surface disposal area (post-removal)	Define nature and extent of potential contamination in the mound matrix and beneath the mound	Mound surface	Soil	—[b]	—	—	x	x	—
			Midpoint of mound profile	Soil	—	—	—	x	x	x
			0–0.5 (beneath mound)	Soil	—	—	—	x	x	x
			1–1.5 (beneath mound)	Soil	—	—	—	x	x	x
			1.5–2 (into tuff)	Tuff	—	—	—	x	x	x
3 and 4 (Figure 10.11-1)	AOC C-15-001, footprint of surface disposal area (post-removal)	Define nature and extent of potential contamination in the mound matrix and beneath the mound	Mound surface	Soil	—	—	—	x	x	—
			Midpoint of mound profile	Soil	—	—	—	x	x	x
			0–0.5 (beneath mound)	Soil	—	—	—	x	x	x
			1–1.5 (beneath mound)	Soil	—	—	—	x	x	x
			1.5–2 (into tuff)	Tuff	—	—	—	x	x	x
MDA Z Landfill: SWMU 15-007(b)										
1–5 (Figure 10.11-2)	SWMU 15-007(b), surface drainage	Sampling to define nature and extent of potential contamination within the drainage channel	0–0.5	Soil	x	x	x	x	x	—
			1–1.5	Soil	x	x	x	x	x	x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	x
6–13 (Figure 10.11-2)	SWMU 15-007(b), footprint of materials disposal area	Post-removal sampling to confirm that contaminated material has been removed and to verify lack of contamination within the disposal area footprint	0–0.5	Soil	—	—	—	x	x	—
			1–1.5	Soil	—	—	—	x	x	x
			1.5–2 (into tuff)	Tuff	—	—	—	x	x	x
			2.5–3 (into tuff)	Tuff	—	—	—	x	x	x
Debris Disposal Area: SWMU 15-008(d)										
1–4 (Figure 10.11-3)	SWMU 15-008(d), surface drainage	Sampling to define nature and extent of potential contamination within the drainage channel	0–0.5	Soil	x	x	x	x	x	—
			1–1.5	Soil	x	x	x	x	x	x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	x

Table 10.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)
5–8 (Figure 10.11-3)	SWMU 15-008(d), footprint of debris disposal area	Post-removal sampling to confirm that contaminated material has been removed and to verify lack of contamination within the disposal area footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	— — — —	— — — —	— — — —	x x x x	x x x x	— x x x
9–12 (Figure 10.11-3)	SWMU 15-008(d), samples from trench	Waste characterization sample for the residual soil	Midpoint of each trench profile	Soil	—	—	—	x	x[c]	—
The Hollow: Consolidated Unit 15-009(a)-00, AOC 15-014(g), AOC C-15-007, and AOC C-15-010										
1–10[d] (Figure 10.11-4)	SWMU 15-009(a), septic tank; AOC C-15-010, former UST; SWMU 15-011(a), trench drains; SWMU 15-011(b), dry well; AOC C-15-007, soil contamination area	Sampling to define nature and extent of potential contamination site-wide beneath the Hollow Minimum 5 samples per borehole. Maximum 9 samples per borehole.	TBD[e]	Tuff	—	x[f]	—	x	x	x
11–14 (Figure 10.11-4)	SWMU 15-011(b), drainage channel and SWMU 15-011(c) outfall	Sampling to define nature and extent of potential contamination along drainage channel and at former outfall	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	TBD
15 (Figure 10.11-4)	SWMU 15-014(i), drains	Sampling to define nature and extent of potential contamination at outfall location	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	— — — —	x x x x	TBD

Table 10.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)
16 and 17 (Figure 10.11-4)	SWMU 15-014(j), outfalls and trench drain	Sampling to define nature and extent of potential contamination at outfall location and former drain	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	TBD
18 and 19 (Figure 10.11-4)	SWMU 15-014(k) and SWMU 15-011(a), trench drains	Sampling to define nature and extent of potential contamination along former drain	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	TBD
20 (Figure 10.11-4)	AOC 15-014(g), outfall	Sampling to define nature and extent of potential contamination at outfall location	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	TBD
Septic Systems: Consolidated Unit 15-009(f)-00, SWMU 15-009(i)										
1 (Figure 10.11-5)	SWMU 15-009(f), former septic tank	Confirmatory sampling to define nature and extent of contamination beneath tank	5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Tuff Tuff Tuff	x x x	x x x	x x x	x x x	x x x	TBD
2 (Figure 10.11-5)	SWMU 15-009(k), former septic tank	Confirmatory sampling to define nature and extent of contamination beneath tank	5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Tuff Tuff Tuff	x x x	x x x	x x x	x x x	x x x	TBD
3 and 4 (Figure 10.11-5)	SWMU 15-009(f), former septic tank	Sampling to define nature and extent of contamination within potential leach field or drainage	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— TBD
5 and 6 (Figure 10.11-5)	SWMU 15-009(k), former septic leach field	Sampling to define nature and extent of contamination within potential leach field or drainage	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	x x x x	— TBD

Table 10.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	pH (SW-846 9045C)	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method SW-846 6850)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)
5 (Figure 10.11-1)	SWMU 15-009(i), former septic tank	Sampling to define nature and extent of contamination beneath tank	5–5.5 (into tuff)	Tuff	x	x	x	x	x	TBD
			10–10.5 (into tuff)	Tuff	x	x	x	x	x	
			15–15.5 (into tuff)	Tuff	x	x	x	x	x	
6–11 (Figure 10.11-1)	SWMU 15-009(i), former outfall	Sampling to define nature and extent of contamination within drainage channel	0–0.5	Soil	x	x	x	x	x	—
			1–1.5	Soil	x	x	x	x	x	TBD
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	
Outfalls, Building 15-183: Consolidated Unit 15-014(a)-00										
7–11 (Figure 10.11-5)	SWMU 15-014(a), outfall	Sampling to define nature and extent of contamination at outfall location and along surface drainage	0–0.5	Soil	x	x	x	x	x	—
			1–1.5	Soil	x	x	x	x	x	x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	x
12–16 (Figure 10.11-5)	SWMU 15-014(b), outfalls	Sampling to define nature and extent of contamination at outfall location and along surface drainage	0–0.5	Soil	x	x	x	x	x	—
			1–1.5	Soil	x	x	x	x	x	x
			1.5–2 (into tuff)	Tuff	x	x	x	x	x	x
			2.5–3 (into tuff)	Tuff	x	x	x	x	x	x

Table 10.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	PCBs (SW-846 8082)	Alpha Spectroscopy (HASL 300)[g]	Gamma Spectroscopy (EPA Method 901.1)[g]	Explosive Compounds (SW-846 8321A)
Firing Site G: SWMU 15-008(c) and AOC C-15-001										
1 and 2 (Figure 10.11-1)	SWMU 15-008(c), footprint of surface disposal area (post-removal)	Define nature and extent of potential contamination in the mound matrix and beneath the mound	Mound surface Midpoint of mound profile 0–0.5 (beneath mound) 1–1.5 (beneath mound) 1.5–2 (into tuff)	Soil Soil Soil Soil Tuff	x x x x x	— — — — —	— — — — —	TBD	TBD	x x x x x
3 and 4 (Figure 10.11-1)	AOC C-15-001, footprint of surface disposal area (post-removal)	Define nature and extent of potential contamination in the mound matrix and beneath the mound	Mound surface Midpoint of mound profile 0–0.5 (beneath mound) 1–1.5 (beneath mound) 1.5–2 (into tuff)	Soil Soil Soil Soil Tuff	x x x x x	— — — — —	— — — — —	TBD	TBD	x x x x x
MDA Z Landfill: SWMU 15-007(b)										
1–5 (Figure 10.11-2)	SWMU 15-007(b), surface drainage	Sampling to define nature and extent of potential contamination within the drainage channel	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	TBD	TBD	TBD	x x x x
6–13 (Figure 10.11-2)	SWMU 15-007(b), footprint of materials disposal area	Post-removal sampling to confirm that contaminated material has been removed and to verify lack of contamination within the disposal area footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	TBD	TBD	TBD	TBD
Debris Disposal Area: SWMU 15-008(d)										
1–4 (Figure 10.11-3)	SWMU 15-008(d), surface drainage	Sampling to define nature and extent of potential contamination within the drainage channel	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	x x x x

Table 10.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	PCBs (SW-846 8082)	Alpha Spectroscopy (HASL 300)[g]	Gamma Spectroscopy (EPA Method 901.1)[g]	Explosive Compounds (SW-846 8321A)
5–8 (Figure 10.11-3)	SWMU 15-008(d), footprint of debris disposal area	Post-removal sampling to confirm that contaminated material has been removed and to verify lack of contamination within the disposal area footprint	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	x x x x
9–12 (Figure 10.11-3)	SWMU 15-008(d), samples from trench	Waste characterization sample for the residual soil	Midpoint of each trench profile	Soil	x[h]	—	—	TBD	TBD	x
The Hollow: Consolidated Unit 15-009(a)-00, AOC 15-014(g), AOC C-15-007, and AOC C-15-010										
1–10[d] (Figure 10.11-4)	SWMU 15-009(a), septic tank; AOC C-15-010, former UST; SWMU 15-011(a), trench drains; SWMU 15-011(b), dry well; AOC C-15-007, soil contamination area	Sampling to define nature and extent of potential contamination site-wide beneath the Hollow Minimum 5 samples per borehole. Maximum 9 samples per borehole.	TBD[e]	Tuff	x	x[i]	—	TBD	TBD	—
11–14 (Figure 10.11-4)	SWMU 15-011(b), drainage channel and SWMU 15-011(c) outfall	Sampling to define nature and extent of potential contamination along drainage channel and at former outfall	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	TBD
15 (Figure 10.11-4)	SWMU 15-014(i), drains	Sampling to define nature and extent of potential contamination at outfall location	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	TBD

Table 10.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	PCBs (SW-846 8082)	Alpha Spectroscopy (HASL 300)[g]	Gamma Spectroscopy (EPA Method 901.1)[g]	Explosive Compounds (SW-846 8321A)
16 and 17 (Figure 10.11-4)	SWMU 15-014(j), outfalls and trench drain	Sampling to define nature and extent of potential contamination at outfall location and former drain	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	TBD
18 and 19 (Figure 10.11-4)	SWMU 15-014(k) and SWMU 15-011(a), trench drains	Sampling to define nature and extent of potential contamination along former drain	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	TBD
20 (Figure 10.11-4)	AOC 15-014(g), outfall	Sampling to define nature and extent of potential contamination at outfall location	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	TBD
Septic Systems: Consolidated Unit 15-009(f)-00, SWMU 15-009(i)										
1 (Figure 10.11-5)	SWMU 15-009(f), former septic tank	Confirmatory sampling to define nature and extent of contamination beneath tank	5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Tuff Tuff Tuff	x x x	— — —	— — —	TBD	TBD	TBD
2 (Figure 10.11-5)	SWMU 15-009(k), former septic tank	Confirmatory sampling to define nature and extent of contamination beneath tank	5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Tuff Tuff Tuff	x x x	— — —	— — —	TBD	TBD	TBD
3 and 4 (Figure 10.11-5)	SWMU 15-009(f), former septic tank	Sampling to define nature and extent of contamination within potential leach field or drainage	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	TBD
5 and 6 (Figure 10.11-5)	SWMU 15-009(k), former septic leach field	Sampling to define nature and extent of contamination within potential leach field or drainage	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	TBD

Table 10.11-1 (continued)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	PCBs (SW-846 8082)	Alpha Spectroscopy (HASL 300)[g]	Gamma Spectroscopy (EPA Method 901.1)[g]	Explosive Compounds (SW-846 8321A)
5 (Figure 10.11-1)	SWMU 15-009(i), former septic tank	Sampling to define nature and extent of contamination beneath tank	5–5.5 (into tuff) 10–10.5 (into tuff) 15–15.5 (into tuff)	Tuff Tuff Tuff	x x x	— — —	— — —	TBD	TBD	TBD
6–11 (Figure 10.11-1)	SWMU 15-009(i), former outfall	Sampling to define nature and extent of contamination within drainage channel	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	TBD
Outfalls, Building 15-183: Consolidated Unit 15-014(a)-00										
7–11 (Figure 10.11-5)	SWMU 15-014(a), outfall	Sampling to define nature and extent of contamination at outfall location and along surface drainage	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	x x x x
12–16 (Figure 10.11-5)	SWMU 15-014(b), outfalls	Sampling to define nature and extent of contamination at outfall location and along surface drainage	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— — — —	— — — —	TBD	TBD	x x x x

[a] Depth intervals may be extended if additional sample volume is required.

[b] — = Analysis is not required.

[c] TCLP metals will also be analyzed.

[d] Based on field screening, the upper 20 ft of BH#4 may not be sampled as it will be initiated on a bluff above the Hollow.

[e] TBD = To be determined.

[f] Nitrates will be analyzed in BH#1 and BH#10 only.

[g] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[h] TCLP SVOCs will also be analyzed.

[i] TPH will be analyzed in BH#2 only.

Table 11.7-1
Subaggregate 10 Proposed Samples in Soil and Tuff at SWMU 16-030(a)

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	Nitrates (EPA Method 300.0)	Cyanide (SW-846 9012A)	Perchlorate (EPA Method 314.0 and SW-846 8321A)	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	PCBs (SW-846 8082)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]	Explosive Compounds (SW-846 8321A)
1–4	Within bermed area	Sampling to define nature and extent of contamination from the drains of former building 16-344	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x	— — — —	 TBD[c] 	 TBD 	x x x x
5–12	Downgradient of bermed area	Sampling to define nature and lateral extent of contamination downgradient of the bermed area	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	x x x x	x x x x	x x x x	— x x x	x x x x	— — — —	 TBD 	 TBD 	x x x x

[a] Depth intervals may be extended if additional sample volume is required.

[b] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[c] TBD = To be determined.

Table 11.7-2
Subaggregate 10 Proposed Samples in Soil and Tuff at AOC C-16-075

Location ID	Location Description	Sampling Justification	Depth[a] (ft bgs)	Media	TAL Metals (SW-846 6010B)	VOCs (SW-846 8260B)	SVOCs (SW-846 8270C)	TPH (SW-846 8015M)	Alpha Spectroscopy (HASL 300)[b]	Gamma Spectroscopy (EPA Method 901.1)[b]
1	Center of AOC boundary	Sampling to define depth of contamination from former spill	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— x x x	x x x x	x x x x	TBD[c]	TBD
2	North of center	Sampling to define lateral extent of contamination from former spill	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— x x x	x x x x	x x x x	TBD	TBD
3	West of center	Sampling to define lateral extent of contamination from former spill	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— x x x	x x x x	x x x x	TBD	TBD
4	East of center	Sampling to define lateral extent of contamination from former spill	0–0.5 1–1.5 1.5–2 (into tuff) 2.5–3 (into tuff)	Soil Soil Tuff Tuff	x x x x	— x x x	x x x x	x x x x	TBD	TBD

[a] Depth intervals may be extended if additional sample volume is required.

[b] Analysis for radionuclides using alpha and gamma spectroscopy will be performed only if radiological screening indicates presence of radionuclides.

[c] TBD = To be determined.

Table 12.0-1
Summary of Field SOPs and QPs

Procedure	Title	Summary
SOP-01.01	General Instructions for Field Investigations	This SOP provides an overview of instructions regarding activities to be performed before, during, and after field investigations. It is assumed that field investigations involve standard sampling equipment, personal protective equipment, waste-management, and site-control equipment/materials. The procedure covers premobilization activities, mobilization to the site, documentation and sample collection activities, sample media evaluation, surveying, and completing lessons learned.
SOP-01.02	Sample Containers and Preservation	This SOP describes the specific requirements/process for sample containers, preservation techniques, and holding times as specified by field regulations and guidance documents. The use of specific types of sample containers and preservation techniques is mandatory for hazardous site investigations because the integrity of any sample is diminished over time. Physical factors (light, pressure, temperature, etc.), chemical factors (changes in pH, volatilization, etc.), and biological factors may alter the original quality of the sample. Because the various target parameters are uniquely altered at varying rates, distinct sample containers, preservation techniques, and holding times have been established to maintain sample integrity for a reasonable and acceptable period of time. The procedure covers documenting SOP deviations, using proper sample containers and preservatives, performing data entry, implementing containment procedures, preserving samples, implementing holding times, completing documentation, implementing post-operation activities, and performing lessons learned.
SOP-01.03	Handling, Packaging and Transporting Field Samples	This SOP directs field team members in the preparation of environmental and waste characterization samples for transportation to the Laboratory's SMO or an approved radiation screening laboratory. In general, samples collected are expected to have a low concentration of potential contaminants, although higher concentrations will be present in some cases. These low-concentration samples that do not satisfy the DOT hazard-class definitions are classified as environmental samples and are not subject to DOT regulations. Historical data, knowledge of processes, and field-screening results will assist the team members in making decisions as to whether a sample can be designated as "environmental" or needs to be treated as a DOT-regulated material. The procedure covers transportation of environmental and DOT-regulated samples.
SOP-01.04	Sample Control and Field Documentation	This SOP describes the process for documenting samples collected using sample control and field documentation, specifically, container labels, sample collection logs, chain-of-custody/request for analysis forms, and daily activity log forms or field notebooks. The procedure covers performing request notification, generating sample control and field documentation, completing sample collection logs, using field chain-of-custody forms, delivering samples to the SMO, delivering samples to another analytical laboratory, using custody seals, collecting the samples, completing sample control and field documentation, completing field investigation summaries, and performing field closeouts.
SOP-01.05	Field Quality Control Samples	This SOP describes the requirements for the collection of field QC samples to ensure the reliability and validity of field and laboratory data. Field QC samples shall be collected as described in this procedure and taken to the Laboratory's SMO with the regular field samples for subsequent chemical and physical testing. The procedure covers pre-operation activities, collecting, and preparing each type of QC sample including equipment rinsate blank, field duplicate, and trip blank.

Table 12.0-1 (continued)

Procedure	Title	Summary
SOP-01.06	Management of Environmental Restoration Project Wastes	This SOP describes the process for managing waste generated during corrective action activities. This procedure outlines the preparation, approval, and retention of all required documents associated with waste generation. The procedure covers waste identification and characterization, waste minimization/recycling, waste generation/storage, segregation, waste treatment, authorized release limits, packaging/transportation, disposal options, and specific policies, including area of contamination policy, environmental media, and contained-in policy.
SOP-01.08	Field Decontamination of Drilling and Sampling Equipment	This SOP describes the process for the general field decontamination of drilling and sampling equipment. It is intended to help ensure the integrity of soil, sediment, rock, water, and other samples collected from potentially contaminated sites and to minimize the potential for cross-contamination between sampling locations. Implementation of this procedure will help protect site and community personnel, requiring that equipment not be removed from a controlled area without proper decontamination. The procedure covers setup of dry and wet decontamination areas, drilling/excavation equipment decontamination, and sampling equipment decontamination.
SOP-01.10	Waste Characterization	This SOP describes the development of a strategy for characterizing wastes generated during projects performed at the Laboratory. Specifically, the SOP identifies the steps involved in waste identification and characterization as delineated by Laboratory requirements, and provides instructions for completing a WCSF. A WCSF is required for projects that include (but are not limited to) site investigations, corrective actions, drilling, closures, and decommissioning projects.
SOP-02.01	Surface Water Site Assessments	This SOP describes the process for determining whether a site has the potential to adversely affect surface-water quality. The procedure identifies responsible participants and provides a detailed checklist to evaluate the erosion potential at a site that does not meet the criterion for no further action. SWMUs with highest priority are those adjacent to drainages and canyon systems or those with an erosion matrix score greater than 40 based on an evaluation of erosion/sediment transport potential. Erosion matrix scores range from 1 to 100 and are qualitatively determined based on a systematic assessment of the site. The assessment involves an evaluation of the site setting, examination of the site for evidence of runoff and erosion, and documentation of structures and/or operations that are directing stormwater onto the site.
SOP-03.11	Coordinating and Evaluating Geodetic Surveys	This SOP describes the methodology for coordinating and evaluating geodetic surveys and establishing QA and QC for geodetic survey data. The procedure covers evaluating geodetic survey requirements, preparing to perform a geodetic survey, performing geodetic survey field activities, preparing geodetic survey data for QA review, performing QA review of geodetic survey data, and submitting geodetic survey data.
SOP-04.01	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 can pass through the center of the hollow-stem auger sections for collection of discrete samples from desired depths. Hollow-stem augers are used as temporary casings when setting wells to prevent cave-ins of the borehole walls.

Table 12.0-1 (continued)

Procedure	Title	Summary
SOP-04.04	Contract Geophysical Logging	This SOP states the responsibilities and describes the general process for obtaining borehole logging data of acceptable quality regardless of logging system or logging contractor, to meet site-characterization and/or subsurface-sampling requirements of the investigation. Borehole-logging techniques are used in situ to determine physical, chemical, geological, and hydrological conditions in an open borehole. The procedure covers pre-contract considerations, pre-operation activities, borehole geophysical logging activities, and post-operation activities. The primary concerns during logging activities are monitoring the logging equipment as it emerges from the borehole or before it leaves the work site for contamination, verifying field calibration both immediately before, and immediately after, a logging run or runs with a logging tool, and ensuring that the logging equipment is decontaminated between sampling events.
SOP-05.07	Operation of LANL Owned Borehole Logging Trailer	This SOP describes the process for operation and maintenance of the borehole video/geophysics logging trailer. The procedure covers running the borehole video camera system, running the borehole caliper tool, running the borehole conductivity/resistivity (induction) tool, running the gamma tool, and running the borehole spontaneous potential/single point resistance tool.
SOP-06.09	Spade and Scoop Method for the Collection of Soil Samples	This SOP describes the process for spade-and-scoop collection of shallow (i.e., typically 0 to 12 in.) soil samples. The spade-and-scoop method involves digging a hole to the desired depth, as prescribed in the sampling and analysis plan, and collecting a discrete grab or portion of a composite sample. The procedure covers pre-sampling activities, sampling activities, and post-sampling activities.
SOP-06.10	Hand Auger and Thin-Wall Tube Sampler	This SOP states the responsibilities and describes the process for collecting surface and subsurface (up to about 15 in.) soil samples with a hand auger and thin-wall tube sampler. This procedure describes the selection and use of sampling methods and equipment at sites that may include contamination with hazardous or radioactive materials. The procedure covers pre-sampling activities, sampling activities, collecting field duplicates, and post-sampling activities.
SOP-06.24	Sample Collection from Split-Spoon Samplers and Shelby-Tube Samplers	This SOP states the responsibilities and describes the process for collecting soil and sediment samples using either split-spoon samplers or Shelby-tube samplers. A split-spoon sampler is used to collect subsurface soil or sediment samples by forcefully driving the sampler into the soil or sediment at the bottom of a borehole. The Shelby tube is a similar type of sampling apparatus. The split spoon is a multipiece sampler; the Shelby tube is a single-piece metal tube of thinner gauge. The procedure covers pre-sampling activities, sampling activities, and post-sampling activities.
SOP-06.26	Core-Barrel Sampling for Subsurface Earth Materials	This SOP describes the process for collecting core-barrel samples of subsurface earth materials and is limited to sampling of subsurface sediments for radionuclides (including tritium), metals, PCBs, TPH, VOCs, and SVOCs. The field team may sample for other constituents under this SOP (or modifications thereof) at the discretion of the field team leader and project leader. The procedure covers pre-sampling activities, sampling activities, and post-sampling activities.

Table 12.0-1 (continued)

Procedure	Title	Summary
SOP-06.31	Sampling of Subatmospheric Air	This SOP describes the process of sampling subatmospheric air from vapor ports in monitoring wells and boreholes. The procedure covers pre-sampling activities, Brüel and Krajer sampling to detect and quantify gaseous organic concentration in air, SUMMA sampling (a passive collection and containment system of laboratory-quality air samples), adsorbent column sampling, sampling through the packer system (a sampling system that uses inflatable bladders to seal off a desired interval in an open borehole, or at the end of drill casing, to obtain a sample from a discrete section), and post-sampling activities.
SOP-06.33	Headspace Vapor Screening with a Photoionization Detector	This SOP describes the process for screening headspace vapor for VOCs in soil samples with a PID. The PID is a portable, nonspecific, vapor/gas detector employing the principle of photoionization to detect and measure real-time concentrations of a variety of chemical compounds, both organic and inorganic, in air. The procedure covers performing field calibration, operating, and post-operating activities.
SOP-07.05	Subsurface Moisture Measurements Using a Neutron Probe	This SOP describes the process of collecting subsurface moisture measurements using a neutron probe, which is used to measure the subsurface moisture with a probe containing a source of high-energy neutrons and a slow neutron detector. The procedure covers performing a daily field standard count, preparing instrument for field measurements, taking a field measurement, and documenting the results of the field measurement.
SOP-10.01	Screening of Polychlorinated Biphenyls in Soil	This SOP describes the process for using test kits to screen for PCBs in soil while conducting field activities. To determine the effectiveness of a PCB field-screening kit, initially a split of 10% of the samples must be submitted for fixed-base laboratory analysis using EPA-approved methods. This analysis determines whether the specific PCB field-screening kit that was chosen is appropriate for the site-specific conditions. It also helps determine whether the matrix being analyzed or other contaminants that are present could cause interference and detection problems with the particular kit being used. Once an acceptable correlation has been made between the concentrations found at the site (as measured by approved methods) and those being measured by the kit, the percent of samples submitted for fixed-base laboratory analysis can be reduced or even eliminated. If possible, the process of reducing the number of splits that undergo fixed-base analysis should be described in such planning documents as a field implementation plan or voluntary corrective action plan, as reduction decisions are based on how a kit is being used. If a kit is being used to help guide a cleanup effort, for example, and if that kit has been demonstrated to have a good performance record, additional fixed-base laboratory splits may be eliminated with the justification that all cleanup verification samples are going to be submitted for fixed-base laboratory analysis. The decision must be documented according to either SOP-01.04, Sample Control and Field Documentation, or QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities.
SOP-10.08	Operation of the Spectrace 9000 Field-Portable X-Ray Fluorescence Instrument	This SOP describes the process for operating and using the Spectrace 9000 field-portable XRF analyzer to screen for hazardous or potentially hazardous inorganic materials. The data that are generated allow for rapid evaluation of the extent of contamination. Samples are analyzed for elements of atomic number 13 (aluminum) through 92 (uranium), with proper x-ray source selection and instrument calibration. Environmental applications include measuring elemental metals in soil and on filters and measuring lead in paint.

Table 12.0-1 (continued)

Procedure	Title	Summary
SOP-10.14	Performing and Documenting Gross Gamma Radiation Scoping Surveys	This SOP describes the process for performing and documenting gross gamma radiation scoping surveys in buildings and soil. Scoping surveys are conducted after an assessment of the site history is completed and consist of judgmental measurements based on historical site information and data. If the scoping survey locates contamination, a characterization survey is typically performed.
SOP-12.01	Field Logging, Handling, and Documentation of Borehole Materials	This SOP prescribes the specific borehole material management methods to be followed and documentation to be prepared during handling and field logging of selected borehole materials identified in the site guidance documents and WCSF. This procedure is limited to the activities necessary to take custody of core and cuttings from drill rig personnel; conduct field-screening tests; remove time-sensitive analytical samples and subsamples for preliminary characterization; complete photograph documentation when necessary; perform field structural and lithologic description; and mark, package, and temporarily store the borehole materials at a drill site borehole material storage trailer. This procedure describes the handling of the subset of borehole materials to be curated from the time they are withdrawn from the borehole to the time they are ready to be transported to the Field Support Facility for curating and archiving. For the purposes of this SOP, borehole material may also refer to other solid materials, such as drive samples or augured materials. The procedure covers borehole material staging, temporary packaging of time sensitive analytical samples, measurement and determination of material loss, marking core (depth notation and stripes), core photography, core logging, removal of analytical samples (core), and core box loading and storing.
QP-2.2	Personnel Training Management	This QP describes the responsibilities and process for managing personnel training and integrates the criteria of the Environmental Programs Quality Management Plan. The procedure discusses site-specific training, subcontractor personnel training requirements, Laboratory personnel training requirements, documenting procedural training, processing completed training documentation forms, and performing work.
QP-5.2	Control of Measuring and Test Equipment	This QP describes the process for identifying, maintaining, and managing measuring and test equipment. Use of this mandatory procedure and its attachments ensures individual measuring and test equipment accuracy by determining proper status of the equipment before use. This procedure does not include calibration instructions for measuring and test equipment.
QP-5.7	Notebook Documentation for Environmental Restoration Technical Activities	This QP describes the responsibilities and process for properly documenting EP technical activities and defines the requirements for documenting field activities including those for notebooks, notebook entries, notebook attachments, notebook data evaluation, technical review of notebooks, Quality Integration and Improvement review of notebooks, and notebook submission as a record.
QP-10.3	Stop Work and Restart	This QP describes the responsibilities and process for issuing and controlling formal Stop Work and Restart processes. All personnel have the authority and the responsibility to stop work if adverse work conditions are identified. Supervisors must be included in any stop-work action to ensure that a greater hazard is not created by stopping work. The procedure also describes the method for following up and/or resuming work activities after a stop-work action.

Table 12.3-1
Analytical Methods for Chemical Analyses

Analytical Method	Analytical Description	Analytical Suite
Inorganic Methods		
EPA Method 300	Ion chromatography	Anions (nitrates)
EPA SW-846: 9045C	Electrometric	pH
EPA SW-846: 9012A	Colorimetric	Cyanide
EPA SW-846: 6010B/6020	Inductively Coupled Plasma Emission Spectrometry—Atomic Emission Spectroscopy	Aluminum, antimony, arsenic, barium, beryllium, boron, calcium, cadmium, cobalt, chromium, copper, iron, lead, lithium, magnesium, manganese, nickel, potassium, selenium, silicon, sodium, silver, thallium, titanium, uranium, vanadium, and zinc (TAL metals)
EPA SW-846: 6850	Liquid Chromatography/ Mass Spectrometry	Perchlorate
EPA SW-846:7471A	Cold Vapor atomic absorption	Mercury (TAL metal)
Organic Methods		
EPA SW-846:8321A	Liquid Chromatography/ Mass Spectrometry	Explosives
EPA SW-846:8270C	Gas Chromatograph/ Mass Spectrometry	SVOCs
EPA SW-846:8260B	Gas Chromatograph/ Mass Spectrometry	VOCs
EPA SW-846:8082	Gas Chromatograph	PCBs
EPA SW-846:8081A	Gas Chromatograph	Organochlorinated pesticides
EPA SW-846:8310C	Liquid Chromatography/ Mass Spectrometry	PAHs
EPA SW-846:8015B	Gas Chromatograph	TPH-DRO
Radionuclide Methods		
EPA 901.1	Gamma Spectroscopy	Gamma-emitting radionuclides (e.g., cesium-137)
HASL-300	Chemical Separation/Alpha Spectroscopy	Isotopic plutonium, isotopic uranium, americium-241
EPA 906	Liquid Scintillation	Tritium

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Appendix A

Acronyms and Abbreviations, Glossary,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS

AK	acceptable knowledge
amsl	above mean sea level
AOC	area of concern
ASTM	American Society for Testing and Materials
bgs	below ground surface
BH	borehole
BMP	best management practice
BV	background value
cm/sec	centimeter(s) per second
COPC	chemical of potential concern
CREAP	Comprehensive Environmental Assessment and Response Program
CSM	conceptual site model
CST	Chemical Science and Technology
D&D	decontamination and decommissioning
DL	detection limit
DNT	dinitrotoluene
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DRO	diesel range organic
EP	Environmental Programs (Laboratory Directorate)
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ERSS	Environment Remediation Support Services
ERDB	ER Database
FV	fallout value
GIS	geographic information system
GPS	global-positioning system
HE	high explosives
HEWTF	High Explosive Water Treatment Facility
HIR	historical investigation report
HMX	high-melting explosive (also 1,3,5,7-tetranitro-1,3,5,7-tetrazocine)
HSA	hollow-stem auger

HWA	Hazardous Waste Act [NM]
HWFP	Hazardous Waste Facility Permit
IDW	investigation-derived waste
LANL or the Laboratory	Los Alamos National Laboratory
LIR	Laboratory implementation requirement
MDA	material disposal area
MDL	method detection limit
NaI	sodium iodide
NFA	no further action
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
NOD	notice of deficiency
NPDES	National Pollutant Discharge Elimination System
OB	open burn
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PETN	pentaerythritol tetranitrate
PHERMEX	Pulse High Energy Radiographic Machine Emitting X-Rays
PID	photoionization detector
PPE	personal protective equipment
QA	quality assurance
QC	quality control
QP	quality procedure
RCRA	Resource Conservation and Recovery Act
RDX	research department explosive (hexahydro-1,3,5-trinitro-1,3,5-triazine)
RFI	RCRA facility investigation
RPF	Records Processing Facility
RQD	rock quality designation
SAL	screening action level
SCL	sample collection log
SMA	site-monitoring area
SMO	Sample Management Office
SOP	standard operating procedure

SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit
SWSC	Sanitation Wastewater Systems Consolidation Plant
TA	technical area
TAL	target analyte list
TBD	to be determined
TCLP	toxicity characteristic leaching procedure
TD	total depth
TNT	2,4,6-trinitrotoluene
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
UST	underground storage tank
VCA	voluntary corrective action
VCP	vitrified clay pipe
VOC	volatile organic compound
WAC	waste acceptance criteria
WCSF	waste characterization strategy form
wSAL	storm water screening action level
WWII	World War II
XRF	x-ray fluorescence

A-2.0 GLOSSARY

Department of Energy (DOE)—Federal agency that sponsors energy research and regulates nuclear materials for weapons production.

Environmental Protection Agency (EPA)—Federal agency responsible for enforcing environmental laws. While state regulatory agencies may be authorized to administer some of this responsibility, the EPA retains oversight authority to ensure protection of human health and the environment.

groundwater—Water in a subsurface saturated zone; water beneath the regional water table.

migration—The movement of inorganic and organic species through unsaturated or saturated materials.

model—A mathematical approximation of a physical, biological, or social system.

polychlorinated biphenyls (PCBs)—Any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances containing such substances. PCBs are colorless, odorless compounds that are chemically, electrically, and thermally stable and have proven to be toxic to both humans and animals.

quality assurance (QA)—All those planned and systematic actions necessary to provide adequate confidence that a facility, structure, system, or component will perform satisfactorily in service.

quality control (QC). (1) All those actions necessary to control and verify the features and characteristics of a material, process, product, or service to specified requirements. QC is the process through which actual quality performance is measured and compared with standards. (2) All methods and procedures used to obtain accurate and reliable results from environmental sampling and analysis. Includes rules for when, where, and how samples are taken; sample storage, preservation and transport; and the use of blanks, duplicates, and split samples during the analysis.

radionuclide—A nuclide (species of atom) that exhibits radioactivity.

RCRA facility investigation (RFI)—The investigation that determines if a *release* has occurred and the nature and extent of the contamination from such a release at a hazardous waste facility. The RFI is generally equivalent to the remedial investigation portion of the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA) process.

regional aquifer—Geologic material(s) or unit(s) of regional extent whose saturated portion yields significant quantities of water to wells, contains the regional zone of saturation, and is characterized by the regional water table or potentiometric surface.

release—Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous waste or hazardous constituents into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles that contain any hazardous wastes or hazardous constituents).

Resource Conservation and Recovery Act (RCRA)—The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976. (40 CFR 270.2)

sample—A portion of a material (e.g., rock, soil, water, air), which, alone or in combination with other samples, is expected to be representative of the material or area from which it is taken. Samples are typically sent to a laboratory for analysis or inspection or are analyzed in the field. When referring to samples of environmental media, the term “field sample” may be used.

screening action level (SAL)—Medium-specific concentration level for a chemical derived using conservative criteria below which it is generally assumed that there is no potential for unacceptable *risk* to human health. The derivation of a SAL is based on conservative exposure and land-use assumptions. However, if an applicable regulatory standard exists that is less than the value derived by risk-based computations; it will be used as the SAL.

sediment—(1) A mass of fragmented inorganic solid that comes from the weathering of rock and is carried or dropped by air, water, gravity, or ice; or a mass that is accumulated by any other natural agent and that forms in layers on the earth’s surface such as sand, gravel, silt, mud, fill, or loess. (2) A solid material that is not in solution and either is distributed through the liquid or has settled out of the liquid.

soil screening level (SSL)—Medium-specific concentration level for a chemical corresponding to a human health carcinogenic risk level of one-in-one hundred thousand (1E-05) or a noncarcinogenic hazard quotient of 1. SSLs are derived for residential and industrial land use scenarios using conservative default exposure parameters.

standard operating procedure (SOP)—A document that details the method for an operation, *analysi*s, or action with thoroughly prescribed techniques and steps, and is officially approved as the method for performing certain routine or repetitive tasks.

target analyte—An element, chemical, or parameter, the concentration, mass, or magnitude of which is designed to be quantified by use of a particular test method.

technical area (TA)—The Laboratory established technical areas as administrative units for all its operations.

topography—The physical configuration of the land surface in an area.

tuff—A compacted deposit of volcanic ash and dust that contains rock and mineral fragments accumulated during an eruption.

U.S. Department of Energy (DOE)—Federal agency that sponsors energy research and regulates nuclear materials for weapons production. [Already listed under DOE]

U.S. Environmental Protection Agency (EPA)—Federal agency responsible for enforcing environmental laws. While state regulatory agencies may be authorized to administer some of this responsibility, the EPA retains oversight authority to ensure protection of human health and the environment. [Already listed under EPA]

vadose zone—The unsaturated zone. Portion of the subsurface above the water table in which pores are not fully saturated.

A-3.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain US 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-4.0 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

Descriptions of SWMUs
and AOCs Recommended for
No Further Investigation or Corrective Action

B-1.0 INTRODUCTION

This appendix presents descriptions of each of the sites in the Cañon de Valle Aggregate Area of Los Alamos National Laboratory (LANL or the Laboratory) for which the Cañon de Valle Aggregate Area investigation work plan proposes no further action. Upon approval of the work plan, certificates of completion will be requested for these sites. Table B-1.0-1 lists each of these sites and the basis for concluding that no further investigation is required. Plate B-1 shows the locations of these solid waste management units (SWMUs) and areas of concern (AOCs), with the exceptions of AOCs 16-037 and C-16-072, tanks that were never installed and that have no location; AOC C-14-002, a control building whose exact location has not been identified; and SWMU 15-004(i), a firing site whose exact location has not been identified.

B-2.0 AOC 14-001(a), FIRING SITE (ELECTRICAL PULL BOX), SUBAGGREGATE 8

AOC 14-001(a) is a small (26 in. long × 32 in. wide × 32 in. deep) steel "pull box" located in the ground and covered with a metal lid. Pull boxes are associated with firing sites and are used for detonator and diagnostic electrical hookups. They are not used to manage solid or hazardous wastes and their use does not involve discharge or release of contaminants. AOC 14-001(a) is associated with an active firing site at Technical Area (TA) 14 and was used to hold capacitor discharge units. The site was visually inspected during a 1995 Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) and found to be clean and well sealed by the protective lid, with no evidence of contaminant releases within or outside the pull box (LANL 1996, 54086, pp. 5-35–5-36).

AOC 14-001(a) is not listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit (HWFP). No further investigation of this site is proposed because the site was never used for management of solid or hazardous wastes, and no discharges or release of contaminants has occurred.

B-3.0 AOC 14-001(b), FIRING SITE (ELECTRICAL PULL BOX), SUBAGGREGATE 8

AOC 14-001(b) is a small (26 in. long × 32 in. wide × 32 in. deep) steel pull box located in the ground and covered with a metal lid. Pull boxes are associated with firing sites and are used for detonator and diagnostic electrical hookups. They are not used to manage solid or hazardous wastes, and their use does not involve discharge or release of contaminants. AOC 14-001(b) is associated with an active firing site at TA-14 and was used to hold capacitor discharge units. The site was visually inspected during a 1995 RFI and found to be clean and well sealed by the protective lid, with no evidence of contaminant releases within or outside the pull box (LANL 1996, 54086, pp. 5-35–5-36).

AOC 14-001(b) is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-4.0 AOC 14-001(c), FIRING SITE (ELECTRICAL PULL BOX), SUBAGGREGATE 8

AOC 14-001(c) is a small (26 in. long × 32 in. wide × 32 in. deep) steel pull box located in the ground and covered with a metal lid. Pull boxes are associated with firing sites and are used for detonator and diagnostic electrical hookups. They are not used to manage solid or hazardous wastes, and their use does not involve discharge or release of contaminants. AOC 14-001(c) is associated with an active firing site at TA-14 and was used to hold capacitor discharge units. The site was visually inspected during a

1995 RFI and found to be clean and well sealed by the protective lid, with no evidence of contaminant releases within or outside the pull box (LANL 1996, 54086, pp. 5-35–5-36).

AOC 14-001(c) is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-5.0 AOC 14-001(d), FIRING SITE (ELECTRICAL PULL BOX), SUBAGGREGATE 8

AOC 14-001(d) is a small (26 in. long × 32 in. wide × 32 in. deep) steel pull box located in the ground and covered with a metal lid. Pull boxes are associated with firing sites and are used for detonator and diagnostic electrical hookups. They are not used to manage solid or hazardous wastes, and their use does not involve discharge or release of contaminants. AOC 14-001(d) is associated with an active firing site at TA-14 and was used to hold capacitor discharge units. The site was visually inspected during a 1995 RFI and found to be clean and well sealed by the protective lid, with no evidence of contaminant releases within or outside the pull box (LANL 1996, 54086, pp. 5-35–5-36).

AOC 14-001(d) is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-6.0 AOC 14-001(e), FIRING SITE (ELECTRICAL PULL BOX), SUBAGGREGATE 8

AOC 14-001(e) is a small (26 in. long × 32 in. wide × 32 in. deep) steel pull box located in the ground and covered with a metal lid. Pull boxes are associated with firing sites and are used for detonator and diagnostic electrical hookups. They are not used to manage solid or hazardous wastes, and their use does not involve discharge or release of contaminants. AOC 14-001(e) is associated with an active firing site at TA-14 and was used to hold capacitor discharge units. The site was visually inspected during a 1995 RFI and found to be clean and well sealed by the protective lid, with no evidence of contaminant releases within or outside the pull box (LANL 1996, 54086, pp. 5-35–5-36).

AOC 14-001(e) is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-7.0 CONSOLIDATED UNIT 14-002(a)-99, SUBUNIT AOC C-14-008, FORMER FIRING SITE (MAGAZINE), SUBAGGREGATE 8

AOC C-14-008, former structure 14-11, is a subunit of Consolidated Unit 14-002(a)-99. AOC C-14-008 is the site of a former magazine that was located about 75 ft northeast of the current magazine (structure 14-30) in the west complex and that stored packaged high explosives (HE). It was constructed of wood and measured 5 ft long × 5 ft wide × 5 ft high, with an earthen berm on three sides and the top. The former magazine was built in 1945 and removed in 1952. The former site of the building was cleared and scraped, and dirt was heaped in a long, low pile along the northern edge of the pavement. No sign of structure 14-11 remains, and the site has been contoured to drain toward the north ditch that borders the entrance road to the site (LANL 1994, 34755, p. 5-3-5).

AOC C-14-008 was investigated as part of an RFI conducted at TA-14 during 1995 (LANL 1996, 54086, pp. 5-32–5-35). The results of this RFI are summarized in section 9.2.1.5 of the historical investigation

report (HIR) for the Cañon de Valle Aggregate Area (LANL 2006, 91697) and indicated that no release of contaminants from AOC C-14-008 had occurred.

AOC C-14-008 is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because previous sampling indicated no release of contaminants.

B-8.0 AOC C-14-001, FORMER BUILDING (MAGAZINE), SUBAGGREGATE 8

AOC C-14-001 is the former site of a decommissioned magazine (structure 14-1) that was built in 1944 to serve the TA-14 firing sites. The magazine stored packaged HE. Structure 14-1 was located in a wooded area 300 ft west of the western complex at TA-14. Constructed of wood, it measured 11 ft long × 9 ft wide × 8 ft high, with a soil berm on three sides and the top. It was burned and destroyed in 1963 (LANL 1996, 54086, p. 5-93).

AOC C-14-001 was investigated as part of an RFI conducted at TA-14 during 1995 (LANL 1996, 54086, pp. 5-93–5-97). The results of this RFI are summarized in section 9.6.1.5 of the HIR (LANL 2006, 91697) and indicated that no release of contaminants from AOC C-14-001 had occurred.

AOC C-14-001 is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because previous sampling indicated no release of contaminants.

B-9.0 AOC C-14-002, CONTROL BUILDING, SUBAGGREGATE 8

AOC C-14-002 is a former control building (structure 14-3) for firing chamber 14-2 [SWMU 14-002(a)]. It was built in 1944 and removed in 1952, along with a 2-ft-thick concrete pad. The wood-frame building measured 14 ft long × 8 ft wide × 8 ft high, with an attached addition that was 6 ft wide × 6 ft long × 8 ft high. This structure was located in the western portion of TA-14, approximately 50 ft east of magazine 14-30. This location is currently beneath the paved access road to the western portion of TA-14. Although activities associated with explosives or other hazardous constituents are not known to have occurred at AOC C-14-002, the RFI work plan for Operable Unit (OU) 1085 (LANL 1994, 34755) indicated that residual contamination may be present at this site based on its location near the firing sites in the western portion of TA-14.

AOC C-14-002 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the control building would not have contained explosives or other hazardous materials. In addition, if any releases had occurred, they would be characterized by the investigations of the Subaggregate 8 firing sites because AOC C-14-002 is located within the footprint of these other sites.

B-10.0 AOC C-14-009, FORMER BUILDING (MAGAZINE), SUBAGGREGATE 8

AOC C-14-009 is the site of a former magazine (structure 14-13), which was built in 1945 to temporarily store explosives for use at the two firing pads at building 14-5. The magazine stored packaged HE. The site is located at the eastern end of TA-14, about 50 ft northeast of building 14-5. Constructed of wood, it was 4 ft long × 3 ft wide × 3 ft high, with a soil berm on three sides and the top. Structure 14-13 was used until the firing pads were deactivated in the mid-1950s and it was burned in 1960 (LANL 1996, 54086, pp. 5-97–5-98).

AOC C-14-009 was investigated as part of an RFI conducted at TA-14 during 1995 (LANL 1996, 54086, pp. 5-97–5-100). The results of this RFI are summarized in section 9.6.1.5 of the HIR (LANL 2006, 91697) and indicated that no release of contaminants from AOC C-14-009 had occurred.

AOC C-14-009 is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because previous sampling indicates no release of contaminants.

B-11.0 SWMU 15-004(i), GULCH FIRING SITE, SUBAGGREGATE 9

The Gulch Firing Site consists of one SWMU, SWMU 15-004(i), an inactive firing site that was reportedly used to conduct two test explosions in 1944. This site was identified in a historical document (LANL, 1993, 20946, p. 5-13) and was referred to as "The Gulch." The location of this site was described as approximately 1 mi below R-Site, but the precise location is unknown (LANL 1993, 20946, p. 5-13). The test explosions used up to 300 lb of HE and 500 lb of ammonium picrate (LANL 1990, 07512, 15-004 summary), each of which was detonated approximately 10 ft from a canyon wall to observe the damage done to the canyon wall.

Field reconnaissance was conducted on February 10, 2006, in an attempt to locate SWMU 15-004(i). The team entered a tributary to Cañon de Valle at the Hollow and walked along the canyon bottom down to the confluence with Water Canyon, a distance of approximately 1 mi. The search for the location of SWMU 15-004(i) focused on exposed cliff-forming tuff on both sides of the canyon adjacent to, or visible from, the canyon bottom. No signs of explosives testing (e.g., cratering in the canyon wall) were observed during the field reconnaissance (Wirth 2006, 91692).

SWMU 15-004(i) is listed in Module VIII of the Laboratory's HWFP. No investigation of SWMU 15-004(i) is proposed because the site cannot be located using the best available historical information and field reconnaissance.

B-12.0 SWMU 16-016(b), LANDFILL, SUBAGGREGATE 4

SWMU 16-016(b) is the site of a former surface disposal area at TA-16 (LANL 1993, 20948, p. 5-202). The area consisted of several mounds of soil containing asphalt, concrete, and other construction debris, located about 500 ft north of the TA-16 steam plant (structure 16-540). The debris was believed to have been deposited at the site between 1948 and 1958. Although the site was outside the HE corridor at TA-16, potential contaminants include undetonated HE, HE-degradation products, barium, uranium, and metals (LANL 1990, 07512; LANL 1993, 20948, p. 5-202). The 1987 Comprehensive Environmental Assessment and Response Program field survey revealed traces of HE contamination in the landfill (LANL 1993, 20948, p. 5-202).

A voluntary corrective action (VCA) was conducted in 1995 that removed the debris and was followed with confirmatory sampling (LANL 1996, 54326). The cleanup involved excavating the soil mounds and associated debris, which were taken to the TA-16 gravel pits and staged pending confirmatory sampling results. The results indicated that the soil was free of contamination. Once determined to be clean, the soil and debris were used as construction fill at the gravel pits. The site was restored by regrading and allowing native grasses to revegetate the area. No erosion control was necessary because the site is relatively level (LANL 1996, 54326, p. 1). The results of the confirmatory sampling are summarized in section 5.8.1.5 of the HIR (LANL 2006, 91697) and indicate that no contaminants remain at this site.

SWMU 16-016(b) is listed in Module VIII of the Laboratory's HWFP. No further investigation of SWMU 16-016(b) is proposed because the site underwent a VCA and no residual contamination remains.

B-13.0 AOC 16-024(c), FORMER MAGAZINE, SUBAGGREGATE 6

AOC 16-024(c) is a former magazine used to store raw HE or HE components during intermediate processing stages in the production of HE lenses for weapons. AOC 16-024(c) was constructed of wood with a concrete floor, measured 17.5 ft long × 12 ft wide × 8 ft high, and was bermed on three sides and the top. It had no plumbing and was located within the 30s Line. Structure 16-30 was built in 1946 to store HE in transit to the machining buildings (buildings 16-31, -32, and -33). HE normally was held in magazines and rest houses between operations. Spillage of raw HE occasionally occurred in the magazines and rest houses; however, structure 16-30 had a concrete floor and no plumbing that would have provided a pathway to the environment. The structure was burned in 1960 and the slab was removed (LANL 1994, 39440, pp. 5-356–5-357).

AOC 16-024(c) was investigated as part of an RFI conducted at TA-16 during 1997 (LANL 1997, 56660, pp. 38–44). The results of this RFI are summarized in section 7.2.1.5 of the HIR (LANL 2006, 91697) and indicated that no release of contaminants from AOC 16-024(c) had occurred.

AOC 16-024(c) is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because previous sampling indicates no release of contaminants.

B-14.0 AOC 16-024(f), FORMER MAGAZINE, SUBAGGREGATE 5

AOC 16-024(f) is the site of a former HE magazine (structure 16-493), located at T-Site. The HE magazine was constructed in 1945 and located northeast of building 16-490 [SWMU 16-034(b)] (LANL 1994, 39440, p. 5-480). The HE magazines were used to store packaged and finished HE products before and after processing; no HE processing occurred in the magazines (LANL 1997, 56660, p. 51). A former site worker described an incident that occurred in 1950 in which a large chunk of baratol was dropped in the building (LANL 1994, 39440, p. 5-481). The building contained no sumps or plumbing (LANL 1997, 56660, p. 51). Before being abandoned in 1959 and burned in 1960, the building was found to be contaminated with HE (LANL 1994, 39440, p. 5-481; LANL 1997, 56660, p. 51). Structure 16-493 was of wood-frame construction with a wood floor, and it measured 6 ft long × 6 ft wide × 7 ft high with earthen berms on three sides and the top (LANL 1997, 56660, p. 51). Radionuclide and HE contamination on building surfaces was confirmed during building surveys, but most structures were burned in 1960 and the debris was cleaned up in 1966 (LANL 1994, 39440, p. 5-481).

AOC 16-024(f) was investigated as part of an RFI conducted at TA-16 during 1997 (LANL 1997, 56660, pp. 51–56). The results of this RFI are summarized in section 6.2.1.5 of the HIR (LANL 2006, 91697) and indicated that no release of contaminants from AOC 16-024(f) had occurred.

AOC 16-024(f) is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because previous sampling indicates no release of contaminants.

B-15.0 AOC 16-024(g), FORMER MAGAZINE, SUBAGGREGATE 5

AOC 16-024(g) is the site of a former HE magazine structure (structure 16-494), located at T-Site. The HE magazine was located northeast of building 16-490 [SWMU 16-034(b)] and constructed in 1945 (LANL 1997, 56660, p. 57). The HE magazines were used to store packaged and finished HE products before and after processing (LANL 1997, 56660, p. 57). No HE processing took place in such magazines (LANL 1997, 56660, p. 57). Structure 16-494 was of wood-frame construction with a wood floor, and it measured 6 ft long × 6 ft wide × 7 ft high with earthen barricades on three sides and the top (LANL 1997,

56660, p. 57). Before being abandoned in 1959 and burned in 1960, the building was found to be contaminated with HE (LANL 1994, 39440, p. 5-481).

AOC 16-024(g) was investigated as part of an RFI conducted at TA-16 during 1997 (LANL 1997, 56660, pp. 56–62). The results of this RFI are summarized in section 6.2.1.5 of the HIR (LANL 2006, 91697) and indicated that no release of contaminants from AOC 16-024(g) had occurred.

AOC 16-024(g) is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because previous sampling indicates no release of contaminants.

B-16.0 AOC 16-024(h), FORMER MAGAZINE, SUBAGGREGATE 5

AOC 16-024(h) is the location of potentially contaminated surface soil within the footprint of a decommissioned HE magazine (structure 16-497). Structure 16-497 was of wood-frame construction with a concrete foundation and floor (LANL 1994, 39440, pp. 5-477, 5-482). It measured 40 ft long × 15 ft wide × 9 ft high, with earthen barricades on three sides and the top. Structure 16-497 had no sumps or drains to the external environment. During the 5 yr following World War II, radiographic inspections at T-Site were expanded to include materials other than HE. Sources containing radioactive lanthanum (half-life 1.7 days) were used for radiography of steel and contained strontium-90 as an impurity (LANL 1994, 39440, p. 5-480). A radioactive lanthanum source had broken open at structure 16-497 and contaminated the building with strontium-90 (LANL 1994, 39440, p. 5-482). The building was burned in 1960 (LANL 1994, 39440, p. 5-481), and the debris was removed from the site in 1966 (LANL 1994, 39440, p. 5-481).

AOC 16-024(h) was investigated as part of an RFI conducted at TA-16 during 1997 (LANL 1997, 56660, pp. 62–68). The results of this RFI are summarized in section 6.2.1.5 of the HIR (LANL 2006, 91697) and indicated that no release of contaminants from AOC 16-024(h) had occurred.

AOC 16-024(h) is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because previous sampling indicates no release of contaminants.

B-17.0 AOC 16-027(a), TRANSFORMER (POLYCHLORINATED BIPHENYL-ONLY SITE), SUBAGGREGATE 7

AOC 16-027(a) is a leak from a transformer (PCB [polychlorinated biphenyl] identification [ID] #5607, 5608) located in equipment room 110 within building 16-260, an HE-processing building. At the time of the 1990 SWMU report (LANL 1990, 07512), the transformer was estimated to be 31 to 35 yr old and contained 100 to 500 gal. of PCB-containing dielectric oil listed at concentrations greater than 500,000 ppm (LANL 1990, 07512). On May 17, 1990, a high-concentration spill, characterized as a nonreportable release, from the transformer occurred within the building. Materials contaminated with the oil were nonimpervious solid surfaces and consisted of the concrete floor, a concrete sump, and a metal sump cover. A cleanup in accordance with Toxic Substances Control Act (TSCA) requirements was initiated immediately, using the double-wash/double-rinse method. The cleanup was completed on the following day using the scabbler concrete removal system. Subsequent cleanup efforts were performed at four other times in 1990. These cleanup efforts employed Penetone as a double-wash/double-rinse method and the Capsum foam method. Final cleanup occurred on November 13, 1990 (Sandoval 1994, 52964.614, pp. 1211–1231).

AOC 16-027(a) is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because the spill was located in, and contained within, a building, and no release to the

environment occurred. In addition, the spill was cleaned up in accordance with applicable TSCA regulatory requirements.

B-18.0 AOC 16-027(b), TRANSFORMER (PCB-ONLY SITE), SUBAGGREGATE 4

AOC 16-027(b) is a leak from a transformer (PCB ID #5020) located on the second floor of building 16-0540, a steam plant. The transformer contained 100 to 500 gal. of PCB-containing dielectric oil listed at concentrations greater than 500,000 ppm. The 1990 SWMU report (LANL 1990, 07512, 16-027 summary) characterized the transformer as 31 to 35 yr old and having a moderate leak (LANL 1990, 07512, 16-027 summary). According to a memorandum from the Laboratory's Environmental Protection Group (Environment, Safety, and Health-8), the transformer at this location had a slow leak, which was contained with a metal can. No spills occurred onto surfaces that required cleanup (Sandoval 1994, 52964.614, pp. 1211–1231). The transformer was retrofilled on July 15, 1988, and was reclassified as non-PCB-containing on September 6, 1990. Disposal of the PCB-containing and retrofill fluids was documented (Sandoval 1994, 52964.614, pp. 1211–1231).

AOC 16-027(b) is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because the spill was located in, and contained within, a building, and no release to the environment occurred.

B-19.0 AOC 16-037, ABOVEGROUND TANK, SUBAGGREGATE 4

AOC 16-037 was listed in the 1990 SWMU report (LANL 1990, 07512) as an industrial waste tank (structure 16-0215). The existence of this tank was investigated extensively during preparation of addendum 2 of the RFI work plan for OU 1082 (LANL 1995, 57225), and it appears that the tank was never installed. Engineering records show that this structure number was proposed in 1982; however, no job numbers or work orders for its installation were found. In 1983, the tank was mentioned on structure location index sheet ENG-R 5111, but no information about the structure is available (LANL 1995, 57225, p. 6-27). Interviews with former site workers provided no further information.

AOC 16-037 is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because the site was found to not exist.

B-20.0 AOC-C-16-001, BUILDING (ABOVEGROUND PLATFORM), SUBAGGREGATE 3

AOC C-16-001 was a T-shaped, elevated, crossover platform (structure 16-0384) that ran across the three HE slurry drain troughs [SWMUs 16-010(h), 16-010(m), 16-010(n)] coming out of building 16-390 at the TA-16 Burning Ground. The platform was constructed of steel with an open, crosshatched floor and measured approximately 7 ft long $\times$ 9 ft wide $\times$ 3 ft high. The platform was constructed in 1962 to allow workers to cross over the trough area instead of walking around it. Laboratory records indicate that the structure was intended for removal in 1970 (Russo 1970, 05786; Blackwell 1983, 05823), and engineering records confirm it was removed, although the removal date is not available. A former site worker identified the structure as not being associated with hazardous materials (Blackwell 1983, 05823). Because of the nature of the site and its function, no release of contaminants is associated with this site.

AOC C-16-001 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-21.0 AOC C-16-009, BUILDING (MESS HALL), SUBAGGREGATE 4

AOC C-16-009 is a former mess hall, structure 16-0134, that was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. The building, which was constructed in 1944 and removed in 1955, measured 52 ft long × 32 ft wide × 10 ft high. This building was located west of West Road, the only entrance to S-Site before 1951. Because no unpackaged HE was allowed west of West Road, the building was not associated with activities that handled unpackaged HE. A 1983 memorandum included this structure in a list of structures that had no association with hazardous materials (Blackwell 1983, 05823).

AOC C-16-009 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-22.0 AOC C-16-015, BUILDING (HOSE HOUSE), SUBAGGREGATE 4

AOC C-16-015 is a former hose house, structure 16-0143, that was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. The building, which was constructed in 1945 and removed in 1955, measured 55 ft long × 12 ft wide × 10 ft high. This building was located west of West Road, the only entrance to S-Site before 1951. Because no unpackaged HE was allowed west of West Road, this building was not associated with activities that handled unpackaged HE. A 1983 memorandum included this structure in a list of structures that had no association with hazardous materials (Blackwell 1983, 05823).

AOC C-16-015 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-23.0 AOC C-16-018, ABOVEGROUND TANK (WATER), SUBAGGREGATE 4

AOC C-16-018 is a former 30,000-gal. water tank (structure 16-0172) that was 48 ft long × 10.5 ft in diameter. It was located along Jemez Road across from the current entrance to TA-16, approximately 125 ft north of water tank 16-171 and 100 ft west of water tank 16-247. This tank was used from 1945 until 1959, when it was moved to TA-49 and renumbered TA-49-66. The tank was never used for the managing hazardous waste or hazardous materials (LANL 1995, 57225, p. 6-22).

AOC C-16-018 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-24.0 AOC C-16-036, SEPTIC SYSTEM (LATRINE), SUBAGGREGATE 4

AOC C-16-036 is a former latrine, structure 16-145, that was part of a cluster of buildings used by the Zia Company for utilities maintenance at S-Site. The septic system, which was constructed in 1945 and removed in 1955, measured 7 ft long × 7 ft wide × 9 ft high (LANL 1995, 57225, p. 6-30). This building was located west of West Road, which was the only entrance to S-Site before 1951. Because no unpackaged HE was allowed west of West Road, this building was not associated with activities that handled unpackaged HE. A 1983 memorandum included this structure in a list of structures that had no association with hazardous materials (Blackwell 1983, 05823). According to the RFI work plan,

addendum 2, the historical use of this structure is well documented, and no hazardous materials release occurred at this location (LANL 1995, 57225, p. 6-31). Furthermore, this building was physically isolated from work involving HE.

AOC C-16-036 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes.

B-25.0 AOC C-16-041, BUILDING (HOSE HOUSE), SUBAGGREGATE 4

AOC C-16-041, a former hose house (structure16-198) was located on the driveway into the old burning area along Anchor Ranch Road, north of the S-Site administration area. The structure was a wooden building, constructed in 1945, that measured 6.5 ft long × 3.5 ft wide × 7.5 ft high. It was used to store and protect lengths of fire hose and was not used to manage solid or hazardous wastes. The building tested free of radioactive contamination in 1967 (Buckland 1967, 05342) and, according to a 1983 memorandum, was not associated with hazardous materials (Blackwell 1983, 05823). Engineering records indicate the structure was removed in 1958.

AOC C-16-041 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-26.0 AOC C-16-044, MANHOLE (STEAM), SUBAGGREGATE 4

AOC C-16-044 was a steam manhole, structure 16-1079, made of reinforced concrete with a wooden cover (LANL 1994, 57225, p. 6-25). It was located along Anchor Ranch Road near the decommissioned fire station (AOC C-16-016). The manhole was built in 1945, decommissioned at an unknown date, and then filled with gravel. The manhole is believed to have contained only pipes that carried distilled steam vapor or cool condensate water from, and to, the steam plant. Reportedly, no hazardous materials were associated with the manhole (Blackwell 1983, 05823).

AOC C-16-044 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-27.0 AOC C-16-061, BUILDING (LATRINE), SUBAGGREGATE 3

AOC C-16-061, a former latrine (16-0396) for the TA-16 Burning Grounds, was located approximately 80 ft east of structure 16-0390, the central basket wash facility for the TA-16 Burning Ground. Structure 16-0396 was constructed in 1951, removed in 1968, and disposed of at Material Disposal Area P (SWMU 16-018). The structure was of wood-frame construction, measured 4 ft long × 4 ft wide × 7.5 ft high, and contained no plumbing. No evidence of the building remains. No hazardous materials were associated with this structure (Blackwell 1983, 05823).

AOC C-16-061 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes.

B-28.0 AOC C-16-070, UNDERGROUND TANK (PROPANE), SUBAGGREGATE 3

AOC C-16-070 is an underground propane tank (structure 16-0391) that was installed at the TA-16 Burning Ground in 1951. The tank was 24 ft long and 5 ft in diameter and had a capacity of 3063 gal. It was located approximately 50 ft northeast of structure 16-0390. Engineering drawings ENG-C 1098 and ENG-R 790 show that the tank had a manhole from which to access tank valves and a 6-in. corrugated metal drain (LANL 1994, 57225, p. 6-34). The tank was used to provide fuel for heating and drying the sand in the filter tanks [SWMUs 16-010(e) and 16-010(f)] before the sand was burned to remove HE (Martin and Hickmott 1994, 52964.594, pp. 1171–1175). The tank was abandoned in place in 1970 and was later removed, although no record exists of the removal. Facility staff recalled that the tank was removed sometime during 1989–1990 (Paige 1994, 52964.607, p. 1197). The tank was not associated with the use of hazardous materials (other than propane) (Blackwell 1983, 05823) and had been shown to be free of HE and radioactive contamination (Brooks 1970, 05785; Buckland 1970, 05788).

AOC C-16-070 is not listed in Module VIII of the Laboratory's HWFP. No investigation of this site is proposed because the site was never used for managing solid or hazardous wastes, and no discharges or release of contaminants have occurred.

B-29.0 AOC C-16-072, TANK, SUBAGGREGATE 4

AOC C-16-072 is identified in the 1990 SWMU report (LANL 1990, 07512) as a fuel tank (structure 16-216). Archival information reviewed during preparation of the RFI work plan for OU 1082, Addendum 2 (LANL 1994, 57225), including engineering records and site interviews, confirmed that the structure had never been constructed. The tank is referred to on the 1983 engineering drawing ENG-R 5111 structure location index as not shown (LANL 1994, 57225, p. 6-19). Other structure indexes from earlier years list the area as reserved. The historical structure list in ENG-7 shows structure 16-216 as proposed (LANL 1994, 57225, p. 6-19). Interviews with site personnel indicated no location for the tank. Evidence indicates that the tank was never installed.

AOC C-16-072 is not listed in Module VIII of the Laboratory's HWFP. No further investigation of this site is proposed because the site was found not to exist.

B-30.0 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 number. This information is also included in text citations. ER ID numbers 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; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; 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.

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Table B-1.0-1
Cañon de Valle Aggregate Area Consolidated Units,
SWMUs, and AOCs Proposed for No Further Investigation or Corrective Action

Site Number	Subunit	Description	Subaggregate	Basis for No Further Investigation
AOC 14-001(a)	n/a*	Firing site (electrical pull box)	8	Never used for management of solid or hazardous waste; no release of contaminants.
AOC 14-001(b)	n/a	Firing site (electrical pull box)	8	Never used for management of solid or hazardous waste; no release of contaminants.
AOC 14-001(c)	n/a	Firing site (electrical pull box)	8	Never used for management of solid or hazardous waste; no release of contaminants.
AOC 14-001(d)	n/a	Firing site (electrical pull box)	8	Never used for management of solid or hazardous waste; no release of contaminants.
AOC 14-001(e)	n/a	Firing site (electrical pull box)	8	Never used for management of solid or hazardous waste; no release of contaminants.
Consolidated Unit 14-002(a)-99	AOC C-14-008	Former firing site (magazine)	8	No release of contaminants.
AOC C-14-001	n/a	Building (magazine)	8	No release of contaminants.
AOC C-14-002	n/a	Building (control building)	8	Never used for management of solid or hazardous waste. Colocated with other sites and will be addressed by investigation of those sites.
AOC C-14-009	n/a	Building (magazine)	8	No release of contaminants.
SWMU 15-004(i)	n/a	The Gulch firing site (inactive)	9	Cannot be located using historical records and site reconnaissance.
SWMU 16-016(b)	n/a	Landfill	4	Site was previously cleaned up; no residual contamination.
AOC 16-024(c)	n/a	Magazine	6	No release of contaminants.
AOC 16-024(f)	n/a	Magazine	5	No release of contaminants.
AOC 16-024(g)	n/a	Magazine	5	No release of contaminants.
AOC 16-024(h)	n/a	Magazine	5	No release of contaminants.
AOC 16-027(a)	n/a	Transformer (PCB-only site)	7	No release of contaminants; site cleaned up in accordance with other regulatory requirements.
AOC 16-027(b)	n/a	Transformer (PCB-only site)	4	No release of contaminants.
AOC 16-037	n/a	Aboveground tank	4	Site does not exist.
AOC C-16-001	n/a	Building (aboveground platform)	3	Never used for management of solid or hazardous waste; no release of contaminants.

Table B-1.0-1 (continued)

Site Number	Subunit	Description	Subaggregate	Basis for No Investigation
AOC C-16-009	n/a	Building (mess hall)	4	Never used for management of solid or hazardous wastes; no release of contaminants.
AOC C-16-015	n/a	Building (hose house)	4	Never used for management of solid or hazardous wastes; no release of contaminants.
AOC C-16-018	n/a	Aboveground tank (water)	4	Never used for management of solid or hazardous wastes; no release of contaminants.
AOC C-16-036	n/a	Septic system (latrine)	4	Never used for management of solid or hazardous wastes.
AOC C-16-041	n/a	Building (hose house)	4	Never used for management of solid or hazardous wastes; no release of contaminants.
AOC C-16-044	n/a	Manhole (steam)	4	Never used for management of solid or hazardous wastes; no release of contaminants.
AOC C-16-061	n/a	Building (latrine)	3	Never used for management of solid or hazardous waste.
AOC C-16-070	n/a	Underground tank (propane)	3	Never used for management of solid or hazardous wastes; no release of contaminants.
AOC C-16-072	n/a	Tank	4	Site does not exist.

*n/a= Not applicable.

Appendix C

Management Plan for Investigation-Derived Waste

C-1.0 INTRODUCTION

This appendix describes the management of investigation-derived waste (IDW) generated during the investigation and remediation of sites comprising the Cañon de Valle Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). This waste is generated during field-investigation activities and it may include, but is not limited to, drill cuttings; contaminated soil; contaminated personal protective equipment (PPE), sampling supplies, and plastic; fluids from the decontamination of PPE and sampling equipment; and all other waste that has potentially come into contact with contaminants. In addition, IDW includes remediation waste generated during removal actions planned in conjunction with site characterization. This remediation waste includes, but is not limited to, septic tank structures and drainlines, underground storage tanks, debris, and contaminated soil and sludge.

C-2.0 INVESTIGATION-DERIVED WASTE

All IDW generated during the Cañon de Valle Aggregate Area field-investigation activities will also be managed in accordance with applicable standard operating procedures (SOPs). These SOPs incorporate the requirements of all applicable U.S. Environmental Protection Agency (EPA) and New Mexico Environment Department regulations, U.S. Department of Energy (DOE) orders, and Laboratory implementation requirements (LIRs). Two SOPs are applicable to the characterization and management of IDW:

- SOP-01.06, Management of Environmental Restoration Project Waste, and
- SOP-01.10, Waste Characterization.

These SOPs are available at http://erproject.lanl.gov/documents/procedures.html.

Investigation activities will be conducted in a manner that minimizes the generation of waste. Waste minimization will be accomplished by implementing the requirements of the Environmental Programs Directorate's portion of the "Los Alamos National Laboratory Hazardous Waste Minimization Report" (LANL 2005, 91291). This report is updated annually to meet a requirement of Module VIII of the Laboratory's Hazardous Waste Facility Permit, which was issued by the EPA on May 23, 1990, and modified on May 19, 1994 (EPA 1990, 01585; EPA 1994, 44146).

The waste streams that will be generated and managed during the field investigation and removal actions at the Cañon de Valle Aggregate Area sites are described below.

C-2.1 Drill Cuttings

The drill cuttings waste stream will consist of cuttings from boreholes that will be drilled in, and around, Cañon de Valle Aggregate Area sites. Drill cuttings will be collected and placed in containers at the point of generation (i.e., at the drill rig) and temporarily stored at the site. The drill cuttings waste stream will be characterized using analytical results from core samples and augmented by direct sampling of the containerized cuttings, if necessary. Potential contaminants of concern include radionuclides, inorganic chemicals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and high explosives (HE). The maximum detected concentrations of radionuclides will be compared with the background or fallout values. If the maximum concentrations exceed these values, the drill cuttings will be designated as low-level radioactive waste. Maximum concentrations of toxicity characteristic leaching procedure (TCLP) constituents will be compared with 20 times the TCLP regulatory level. If the concentrations are less than 20 times the regulatory level, the drill cuttings will be designated nonhazardous waste by characteristic. If the concentrations exceed

20 times the regulatory level, the drill cuttings will be sampled and analyzed using the TCLP to determine whether it is hazardous waste by characteristic. If potential EPA-listed hazardous waste constituents are detected, the Laboratory will conduct a review of historical records and data to determine whether the source of each constituent was a listed hazardous waste at its point of generation. If the source is determined to be a listed hazardous waste, the cuttings will be managed as hazardous or mixed waste (depending on the levels of radioactivity). Based on the results of previous investigations, the Laboratory expects the majority of these drill cuttings to be designated as nonhazardous, nonradioactive waste that will be either used for cover material at Technical Area (TA)-54 or disposed of at an off-site disposal facility permitted for the disposal of solid waste. Potentially, some drill cuttings may be designated as low-level radioactive or mixed waste at several of the sites because of the presence of depleted uranium, metals, and/or HE. Low-level waste will be disposed of on-site at TA-54 or off-site at a licensed facility. Mixed waste will be sent to an off-site facility permitted for treating and/or disposing of mixed waste.

C-2.2 Tank Structures, Drainlines, and Debris

Waste from the demolition and removal of septic tanks will consist of concrete reinforced with steel rebar and vitrified clay pipe or steel pipe. Waste will be placed into 20-yd^3 rolloff containers, secured, and temporarily stored at the site. Potential contaminants of concern include radionuclides, inorganic chemicals, VOCs, SVOCs, PCBs, and HE. The concentrations of radionuclides detected on swipe samples will be compared with DOE radiological release criteria. If the concentrations exceed release criteria, the waste will be designated as low-level radioactive waste. Determination of whether the waste is hazardous will be based on acceptable knowledge (AK) using characterization data from the tank contents or media where the tank contents were released. Based on the results of previous investigations, the Laboratory expects these wastes to be designated as nonhazardous, nonradioactive waste that will be disposed of at an off-site disposal facility permitted for the disposal of solid waste.

C-2.3 Soil

Soil will be placed into containers appropriate to the waste volume generated (drums and/or rolloff containers), secured, and temporarily stored at the site. Potential contaminants of concern include radionuclides, inorganic chemicals, VOCs, SVOCs, PCBs, and HE. The maximum detected concentrations of radionuclides will be compared with the background or fallout values. If the maximum concentrations exceed these values, the soil will be designated as low-level radioactive waste. Maximum concentrations of TCLP constituents will be compared with 20 times the TCLP regulatory level. If the concentrations are less than 20 times the regulatory level, the soil will be designated nonhazardous by characteristic. If the concentrations exceed 20 times the regulatory level, the waste will be sampled and analyzed using the TCLP to determine whether it is hazardous by characteristic. If potential EPA-listed hazardous waste constituents are detected, the Laboratory will conduct a review of historical records and data to determine whether the source of each constituent was a listed hazardous waste at its point of generation. If the source is determined to be a listed hazardous waste, the soil will be managed as hazardous or mixed waste (depending on the levels of radioactivity). Based on the results of previous investigations, the Laboratory expects these wastes to be designated as nonhazardous, nonradioactive waste that will be either used for cover material at TA-54 or disposed of at an off-site disposal facility permitted for the disposal of solid waste. Potentially, some soil may be designated as low-level radioactive or mixed waste at several of the sites because of the presence of depleted uranium, metals, and/or HE. Low-level waste will be disposed of on-site at TA-54 or off-site at a licensed facility. Mixed waste will be sent to an off-site facility permitted for the treatment and/or disposal of mixed waste.

C-2.4 Septic Tank Contents

The contents of the septic tank will probably consist of a soil or sludge material and will be characterized and managed in the same manner as soil IDW. Disposal of sludge may require the sludge to be dewatered or dried first if the disposal facility is not permitted to accept waste containing free liquids.

C-2.5 Spent PPE

The spent PPE waste stream will consist of PPE that has come into contact with contaminated environmental media (e.g., core and/or drill cuttings) and cannot be decontaminated. The bulk of this waste stream will consist of protective clothing such as coveralls, gloves, shoe covers, and (if required) respirator cartridges. Spent PPE will be collected in containers at personnel decontamination stations, secured, and temporarily stored at the site. Characterization of this waste stream will be performed through AK of the waste materials, the methods of generation, and the levels of contamination observed in the associated environmental media. The Laboratory expects spent PPE to be designated as nonhazardous, nonradioactive waste that will be disposed of at an off-site disposal facility permitted for the disposal of solid waste.

C-2.6 Disposable Sampling Supplies

The disposable sampling supplies waste stream will consist of all equipment and materials that are necessary for collecting samples and that have come into direct contact with contaminated environmental media and cannot be decontaminated. This waste stream also includes residues associated with field test kits and wastes associated with dry decontamination activities. The latter will consist primarily of paper and plastic items collected in bags at the sampling location and transferred to accumulation drums. Characterization of this waste stream will be performed through AK of the waste materials, the methods of generation, and the levels of contamination observed in the associated environmental media. The Laboratory expects disposable sampling supplies to be designated as nonhazardous, nonradioactive waste, with the exception of residues from some field test kits, which will be deemed hazardous. Nonhazardous wastes will be disposed of at an off-site disposal facility permitted for the disposal of solid waste; hazardous wastes will be sent to an off-site facility permitted for the treatment and/or disposal of hazardous waste.

C-2.7 Decontamination Fluids

The decontamination fluids waste stream will consist of liquid wastes from decontamination activities (e.g., decontamination solutions and rinse waters). Following waste-minimization practices, the Laboratory employs dry decontamination methods to the extent possible. If dry decontamination cannot be performed, liquid decontamination wastes will be collected in containers at the point of generation and transferred to accumulation drums. Decontamination fluids will be accumulated in drums, temporarily stored at the site, and characterized using analytical results from direct sampling of the containerized waste. The Laboratory expects that the majority of decontamination fluids will be designated as nonhazardous, nonradioactive liquid waste. A potential exists for some decontamination rinsate to be designated as low-level radioactive or mixed waste at several of the sites because of presence of radionuclides, metals, and/or HE. Nonhazardous and radioactive liquid wastes may be treated and disposed of at several on-site treatment facilities, provided the waste meets the facility's waste acceptance criteria (WAC). Mixed waste and waste that do not meet the WAC of Laboratory treatment facilities will be sent to permitted off-site treatment facilities.

C-3.0 WASTE MANAGEMENT

All wastes will be managed in accordance with applicable federal, state, DOE, and Laboratory requirements. The IDW waste streams, expected waste types, estimated waste volumes, and other data are listed in Table C-3.0-1. Table C-3.0-2 presents the estimated waste volumes for each subaggregate. Table C-3.0-3 lists the waste streams, expected waste types, estimated waste volumes, and other data for waste generated as a result of corrective actions.

All waste drums and containers (rolloff bins) will remain on-site until analytical results have been received and waste characterization has been completed.

Before field-investigation activities begin, a waste characterization strategy form (WCSF) will be prepared and approved as required by the current version of SOP-01.10. The WCSF will provide detailed information about IDW characterization, management, containerization, and potential volume generation for each subaggregate.

The IDW will be characterized through existing data and/or documentation, direct sampling of the IDW, or sampling of the media being investigated (e.g., surface soil, subsurface soil). If sampling is necessary, the procedures will be described in a sampling and analysis plan that will be developed in conjunction with the WCSF.

Some wastes will be characterized on the basis of AK rather than direct waste analysis. The AK characterization will consist of the results of analyzing the environmental media associated with each waste stream. For example, spent PPE and disposable sampling supplies that have potentially come into contact with contaminated media will be characterized based on the analytical results for samples of that media. Similarly, borehole drill cuttings will be characterized by the analytical results for the core samples from that borehole. If decontamination fluids are to be sent off-site for disposal, they will be sampled to demonstrate compliance with the WAC of the receiving facility.

C-4.0 WASTE CONTAINERS AND TRANSPORTATION

The selection of waste containers will be based on both the appropriate U.S. Department of Transportation (DOT) requirements and the type and amount of IDW anticipated to be generated. Immediately following containerization, each waste container will be individually labeled to identify the waste classification, the item identification number, its radioactivity (if applicable), and the date of generation. Waste containers will be managed in clearly marked and appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on IDW type and classification. Container and storage requirements will be detailed in the WCSF, based on requirements outlined in the most recent versions of LIR 404-00-03, Hazardous and Mixed Waste Requirements; LIR 404-00-04, Managing Solid Waste; LIR 404-00-05, Managing Radioactive Waste; and LIR 405-10-01, Packaging and Transportation. Before the waste is generated, the WCSF will be approved by the process detailed in SOP-01.10, Waste Characterization.

Transportation of IDW will comply with appropriate DOT requirements. Transportation and disposal requirements will be detailed in the WCSF and approved prior to the generation of waste.

C-5.0 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 number. This information is also included in

text citations. ER ID numbers 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; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; 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), April 10, 1990. "Module VIII of RCRA Permit No. NM0890010515, EPA Region 6, issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990," EPA Region 6, Hazardous Waste Management Division, Dallas, Texas. (EPA 1990, 01585)

EPA (U.S. Environmental Protection Agency), April 19, 1994. "Module VIII of RCRA Permit No. NM0890010515, EPA Region 6, new requirements issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 19, 1994," Hazardous Waste Management Division, EPA Region 6, Dallas, Texas. (EPA 1994, 44146)

LANL (Los Alamos National Laboratory), November 2005. "Los Alamos National Laboratory Hazardous Waste Minimization Report," Los Alamos National Laboratory document LA-UR-05-8650, Los Alamos, New Mexico. (LANL 2005, 91291)

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Table C-3.0-1
Estimated Investigation Waste
Generated and Its Management for Cañon de Valle Aggregate Area

Waste Stream	Expected Waste Type	Estimated Volume*	Characterization Method	On-Site Management	Expected Disposition
Drill Cuttings	Solid waste, nonhazardous, nonradioactive	170 yd^3	Analytical results from waste samples and core samples	Accumulation in 55-gal. drums, covered rolloff containers, or cubic-yard soft-sided containers	LANL, TA-54, Area G (cover material) or permitted off-site disposal facility
Drill Cuttings	Solid waste, low-level radioactive or mixed waste	13 yd^3	Analytical results from waste samples and core samples	Accumulation in 55-gal. drums, covered rolloff containers, or cubic-yard soft-sided containers	LANL, TA-54, Area G; permitted off-site treatment or disposal facility
Soil and Debris*	Solid waste, nonhazardous, nonradioactive	8 yd^3	Analytical results from waste samples	Accumulation in covered rolloff containers	Permitted off-site disposal facility
Spent PPE and Disposable Sampling Supplies	Solid waste, nonhazardous, nonradioactive	93 yd^3	AK	Accumulation in 55-gal. drums	Permitted off-site disposal facility
Decontamination Fluids	Liquid waste, nonhazardous or low-level radioactive	211 gal.	Analytical results from waste samples	Accumulation in 55-gal. drums	On-site treatment facility for which waste meets waste acceptance criteria
Decontamination Fluids	Liquid waste, mixed waste	58 gal.	Analytical results from waste samples	Accumulation in 55-gal. drums	Permitted off-site treatment or disposal facility

*Sample depths, numbers, and/or locations are yet to be determined.

Table C-3.0-2
Estimated Investigation Waste Generated for
Individual Cañon de Valle Aggregate Area Subaggregates

Cañon de Valle Aggregate Area Subaggregate	Waste Stream						
	Solid Waste (yd^3)				Liquid Waste (gal.)		
	Total Number of Proposed Samples	Drill Cuttings[a] (Nonhazardous, Nonradioactive)	Drill Cuttings[a] (Low-Level Radioactive Or Mixed Waste)	Trench Soil and Debris[a]	Spent PPE and Disposable Sampling Supplies	Decontamination Fluids (Nonhazardous Or Low-Level Radioactive)	Decontamination Fluids (Mixed Waste)
1: TA-16 220 Complex	104	n/a[b]	n/a	n/a	4.96	8.64	n/a
2: MDA R[c]	116	12.96	n/a	7.67	5.55	14.52	n/a
3: TA-16 Burning Ground	197	n/a	7.85	n/a	9.86	n/a	22
4: TA-16 Admin Area	526	28.18	0.78	n/a	22.44	35.88	16.8
5: T-Site	64	n/a	n/a	n/a	5.06	11.52	n/a
6: WWII GMX-3 Area	242	12.17	n/a	n/a	10.73	22.96	n/a
7: TA-16 280/260 Outfalls	84	26.58	n/a	n/a	8.77	25.28	n/a
8: TA-14 Firing Site[c]	172	n/a	4.18	n/a	7.73	n/a	15.16
9: TA-15 West	350	90.10	0.2	n/a	14.54	87.42	4.3
10: TA-16 340 Complex	64	n/a	n/a	n/a	3.21	3.84	n/a

[a] IDW will require characterization before disposal.

[b] n/a = Not applicable.

[c] Sample depths, numbers, and/or locations are yet to be determined.

Table C-3.0-3
Estimated Corrective Action Waste
Generated and Its Management for Cañon de Valle Aggregate Area

Waste Stream	Expected Waste Type	Estimated Volume	Characterization Method	On-Site Management	Expected Disposition
Concrete	Solid waste, nonhazardous, nonradioactive	29 yd^3	AK	Accumulation in covered rolloff containers	Permitted off-site disposal facility
Soil and Debris	Solid waste, nonhazardous, nonradioactive	1676 yd^3	Analytical results from waste samples	Accumulation in covered rolloff containers	Permitted off-site disposal facility
Soil and Debris	Solid waste, low-level radioactive	87 yd^3	Analytical results from waste samples	Accumulation in covered rolloff containers or 55-gal. containers	LANL TA-54, Area G, or licensed off-site disposal facility
Soil and Debris	Solid waste, mixed waste	5100 yd^3	Analytical results from waste samples	Accumulation in covered rolloff containers	Permitted off-site disposal facility
Steel Tanks	Solid waste, nonhazardous, nonradioactive	4 yd^3	AK	Accumulation in covered rolloff containers	Off-site recycling
Septic Tank Sludge	Solid waste, nonhazardous, nonradioactive	5 yd^3	Analytical results from waste samples	Accumulation in 55-gal. containers	Permitted off-site disposal facility
Septic Tank Sludge	Solid waste, hazardous	6 yd^3	Analytical results from waste samples	Accumulation in 55-gal. containers	Permitted off-site disposal facility
Tank Fluids	Liquid waste, nonhazardous	1941 gal.	Analytical results from waste samples	Accumulation in poly drums	On-site treatment facility
Tank Fluids	Liquid waste, hazardous	5397 gal.	Analytical results from waste samples	Accumulation in poly drums	Permitted off-site disposal facility

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