

**Response to Approval with Modifications, Interim Facility-Wide Groundwater Monitoring Plan for
the 2016 Monitoring Year, October 2015–September 2016,
Los Alamos National Laboratory, EPA ID No. NM0890010515, HWB-LANL-15-025,
Dated November 9, 2015**

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. The comments are divided into general and specific categories, as presented in the approval with modifications. Los Alamos National Laboratory's (LANL's or the Laboratory's) responses follow each NMED comment.

MODIFICATIONS

NMED Comment

1. 3.0 Interim Monitoring Plan for Chromium Investigation Group, Table 3.4-1 (continued), page 55.

Past field measurements and analytical results collected at regional aquifer well R-62 indicate that the well must be purged for an extended period of time to obtain representative samples and associated analytical water-quality results. For example, samples collected at the end of three and up to approximately ten casing volumes during past sampling events have yielded dissolved chromium concentrations ranging from approximately 120 to 150 micrograms per liter ($\mu\text{g/L}$). Review of the Permittees' field parameters collected during these sampling campaigns indicate that stabilization of dissolved oxygen was never achieved, suggesting that the well was likely not producing representative samples. Between May 13, 2014 and July 30, 2014, the Permittees conducted an extended purge test at R-62 that resulted in dissolved chromium concentrations ranging from approximately 200 to 260 $\mu\text{g/L}$ (see: <http://www.intellusnmdata.com/>). In addition, after well completion in September 2011, R-62 was purged continuously, for well-development purposes, between January 27, 2012 and January 31, 2012. Review of field-parameter data collected during this well development event provided evidence that stabilization of field parameters was achieved after approximately 40 hours of purging at 1.8 gallons per minute, or about 4,320 gallons of total purge volume. Based on these data, NMED requires that at least one extended purge event be conducted at R-62 during the 2016 monitoring year with the intent to obtain representative groundwater samples and analytical results.

LANL Response

1. R-62 Sample Representativeness

Samples collected from R-62 for the Interim Facility-Wide Groundwater Monitoring Plan (the Interim Plan) are collected in accordance with the requirements of the Laboratory's Groundwater Sampling procedure, ER-SOP-20032, which requires purging 3 to 6 casing volumes (CVs) and stabilization of field parameters before sampling. A review of field-parameter data from the four most recent sampling events at R-62 (Figure 1) indicates that all of the required stability criteria were met during each sampling round. In each case, the field parameters stabilize within 3 to 6 CVs of purging, indicating that samples collected are representative of groundwater conditions in the vicinity of the well. It is therefore recommended to continue sampling R-62 in accordance with the procedure for

collecting routine Interim Plan groundwater samples (i.e., collect samples after purging 3 to 6 CVs and after field parameters have stabilized).

Chromium Concentration versus Purge Volume

Higher chromium concentrations have been detected at R-62 during extended purging (i.e., purging more than 3 to 6 CVs). For example, chromium concentrations increased from 0.091 mg/L to 0.236 mg/L during the initial phase of a pump test conducted at R-62 in May 2014 (Table 1). To further investigate the potential stratigraphic and long-term temporal variability in chromium concentrations within aquifer strata in the vicinity of R-62, an extended purge event was performed at R-62 on February 19, 2016. Specifically, R-62 was purged continuously for approximately 8 h before the required Interim Plan samples were collected. During this extended purge, time-series samples were collected at increasing purge volumes during the day. The time-series samples were submitted to the Geochemistry and Geomaterials Research Laboratories (GGRL) for analysis for metals, anions, and alkalinity/pH. The results of this extended purge (Table 2) showed the same overall behavior as was observed in the May 2014 pump test with increasing chromium concentrations during the purge although stability in field parameters had otherwise been met much earlier in the purge.

These data suggest that extended purging at R-62 may increasingly draw water from strata within the screened/filter pack interval that has higher concentrations of chromium than the zone that is accessed using the standard 3- to 6-CV purge protocol. As part of ongoing monitoring of transients of chromium (and related constituents such as nitrate) within the chromium plume area, a 1-d extended purge will be conducted annually during the second monitoring quarter (January–March). This approach is presented in the Watch List table in the 2017 Interim Plan.

NMED Comment

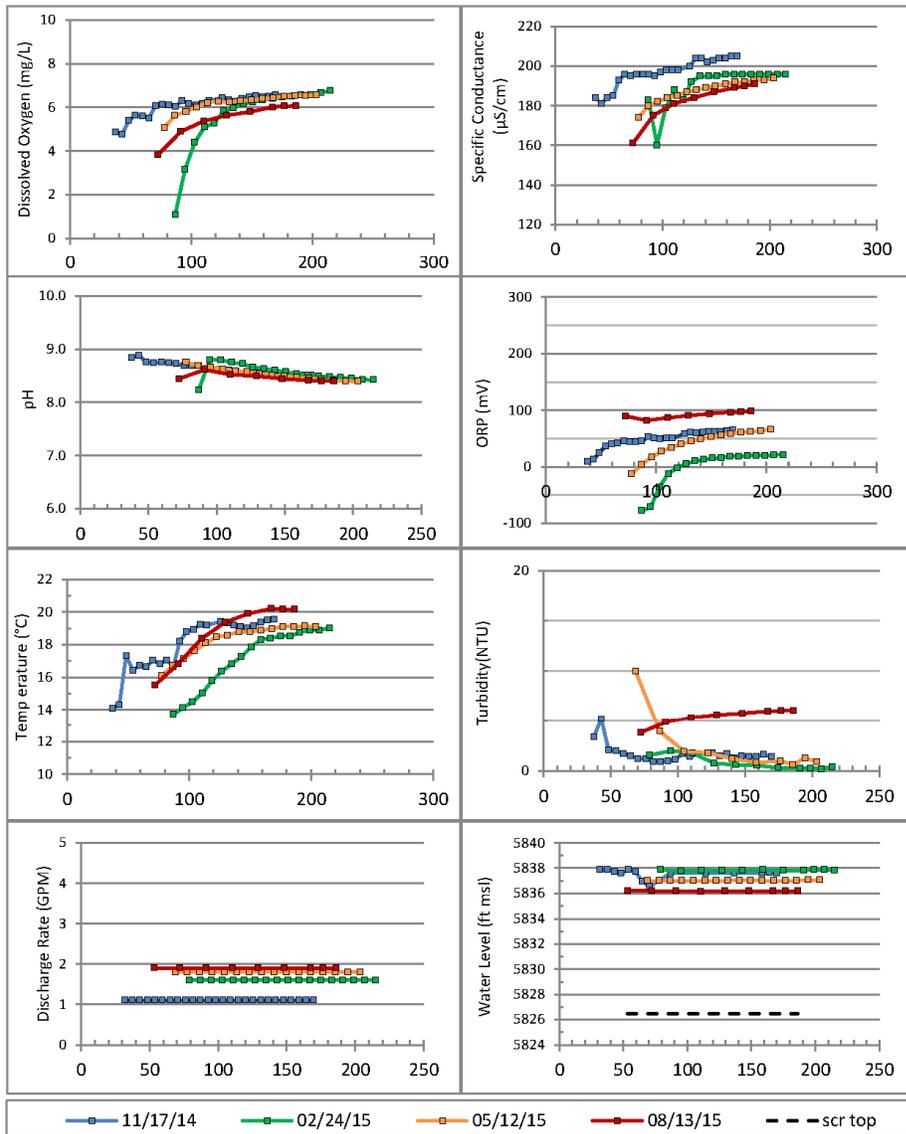
2. 8.0 Interim Monitoring Plan for General Surveillance and White Rock Canyon, Table 8.3-1 (continued), pages 64 - 65.

As shown in Table 8.3-1 of the Plan, the Permittees propose to collect water-quality samples annually at 15 of the 20 White Rock Canyon springs, with the remaining five springs to be sampled biennially, beginning October 1, 2016, which is the start of the 2017 monitoring year. The five springs sampled biennially include Springs 3, 3A, 5A, 6A, and 8A. These springs represent complex groundwater-flow pathways with potential contaminant input and mixing from up-gradient sources. In the case of Springs 3, 3A, and 5A, slightly elevated levels of major solutes such as chloride and the presence of tritium indicate some contaminant mixing is occurring from sources likely in Pajarito and/or Water canyons. Springs 6A and 8A do not show contamination; however, nearby contaminant sources are positioned up-gradient in Ancho Canyon at TA-39 and mesa-top sources at TA-33, respectively. To gain better groundwater contaminant detection associated with these sources and monitoring coverage along White Rock Canyon, as well as to increase the overall efficiency of the sampling campaign, the Permittees must sample all 20 springs on an annual basis beginning October 1, 2016, which corresponds to the start of the 2017 monitoring year.

LANL Response

2. The Laboratory acknowledges NMED's request and will begin sampling all springs in White Rock Canyon on an annual basis, beginning in October 2016, which corresponds to the start of the 2017 monitoring year.

R-62	Top of Screen: 1158.4 ft bgs	Formation: Tjfp	
Volumes (gal) (approx):	1CV = 44.55	3CV+DP= 182.42	DP = 48.77
Install Date: 10/3/2011			



x-axis = cumulative volume purged (gals.) including drop pipe

Figure 1 Field parameters measured at well R-62 for Interim Plan sampling events from November 2014 to August 2015

Table 1
Chromium Concentrations Detected
during May 2014 Pump Test at R-62

Date	Time	Chromium (mg/L)
5/13/2014	10:35	0.091
5/13/2014	13:20	0.127
5/13/2014	16:15	0.236
5/14/2014	15:07	0.209
5/15/2014	13:57	0.254
5/16/2014	12:40	0.229
5/17/2014	07:35	0.161
5/18/2014	11:24	0.235
5/19/2014	13:55	0.230
5/20/2014	14:10	0.258
5/21/2014	11:09	0.257
5/22/2014	14:21	0.264

Table 2
Chromium Concentrations Detected
during February 2016 Extended Purge at R-62

Date	Time	Chromium (mg/L)
2/19/2016	10:25	0.183
2/19/2016	11:44	0.191
2/19/2016	13:28	0.204
2/19/2016	15:38	0.213
2/19/2016	17:48	0.220