



DEPARTMENT OF ENERGY

EMID-700161

Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

Mr. John E. Kieling
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303



DEC 20 2018

Dear Mr. Kieling:

Subject: Replacement Pages for the “Interim Facility-Wide Groundwater Monitoring Plan for the 2019 Monitoring Year, October 2018 to September 2019”

Enclosed please find two hard copies with electronic files of replacement pages for the “Interim Facility-Wide Groundwater Monitoring Plan for the 2019 Monitoring Year, October 2018 to September 2019.” Also enclosed is an electronic copy of a redline strikeout version of the appendix tables that were changed.

Replacement pages are enclosed for Appendix C, Table C-1, “Background Information and Objectives Used to Determine Sampling Frequencies and Analytical Suites for Area-Specific Monitoring Groups,” and Appendix E, Table E-1.0-1, “Watch List for Deep Monitoring Wells.” The replacement pages incorporate responses to New Mexico Environment Department (NMED) comments that were received on August 14, 2018 (comments and responses are included as Enclosure 2). Changes were discussed at a meeting with the NMED Hazardous Waste Bureau, the U.S. Department of Energy Environmental Management Los Alamos Field Office (EM-LA), and Newport News Nuclear BWXT – Los Alamos, LLC (N3B) on August 30, 2018.

If you have any questions, please contact Lori Huntoon at (505) 309-1363 (lori.huntoon@em-la.doe.gov) or Hai Shen at (505) 665-5046 (hai.shen@em.doe.gov).

Sincerely,

Arturo Q. Duran
Designated Agency Manager
Environmental Management
Los Alamos Field Office

Enclosures:

1. Replacement pages for the "Interim Facility-Wide Groundwater Monitoring Plan for the 2019 Monitoring Year, October 2018 to September 2019" (including a redline strikeout version on CD) (EM2018-0124)
2. Response to Draft Comments on the "Interim Facility-Wide Groundwater Monitoring Plan for the 2019 Monitoring Year, October 2018 to September 2019"

cc (letter and enclosure[s] emailed):

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**Table C-1
Background Information and Objectives Used to Determine
Sampling Frequencies and Analytical Suites for Area-Specific Monitoring Groups**

Monitoring Group	Background*	Proposed Frequency	Proposed Analyte Suites	Objectives
Technical Area 21 (TA-21)	<ul style="list-style-type: none"> Nature and extent of groundwater contamination generally understood No concentrations exceed screening values in regional groundwater 	<ul style="list-style-type: none"> Annual and biennial sampling of intermediate and regional wells 	<ul style="list-style-type: none"> Metals, radionuclides, tritium (or low-level tritium), and general inorganics analyses annually for most wells VOC and SVOCs sampled annually in select wells and biennially in other wells 	<ul style="list-style-type: none"> Focus on mobile constituents and radionuclides
Chromium Investigation	<ul style="list-style-type: none"> Nature and extent of groundwater contamination generally understood Chromium (Cr) concentrations in regional aquifer exceed New Mexico Groundwater Standard (NM GW STD) Cr concentrations are increasing at two plume-edge wells. Interim measure and plume-center characterization underway in support of pending CME. 	<ul style="list-style-type: none"> Quarterly sampling of intermediate and regional wells with Cr concentrations exceeding 25 µg/L (half the NM GW STD) Quarterly sampling of intermediate and regional wells with significant rate of change in Cr concentrations Monthly sampling at select Mortandad regional wells (R-35a, R-35b, R-44 S1 [screen 1] and S2, R-45 S1 and S2, R-50 S1 and S2, R-61 S1 and SIMR-2) Sampling of R-35a and R-35b will also provide “early warning” of possible contamination for supply well PM-3. 	<ul style="list-style-type: none"> The focus is on metals (Cr), and related contaminants; tritium, and general inorganics (nitrate, perchlorate, sulfate) for all samples Semiannual VOC and SVOC analysis for samples from Mortandad Canyon intermediate wells with consistently detected 1,4-dioxane Biennial analyses for VOCs and SVOCs in select regional wells and one Sandia Canyon intermediate well Annual analysis for radionuclides at intermediate wells; biennial for regional wells except new wells that undergo full suite for first year Analysis of monthly samples collected from select regional wells for metals and general inorganics and, in some cases, tracers 	<ul style="list-style-type: none"> Monthly sampling and analysis at select regional wells to assess interim measure performance Quarterly sampling at the remainder of the wells to monitor potential changes in the plume associated with ambient groundwater flow, and potential effects of Interim Measure and Plume Center Characterization activities

Table C-1 (continued)

Monitoring Group	Background*	Proposed Frequency	Proposed Analyte Suites	Objectives
Material Disposal Area (MDA) C	<ul style="list-style-type: none"> • Current data sufficient to support remedy selection for MDA C CME, submitted to NMED in 2012 (LANL 2012, 222830) • No concentrations of constituents exceed screening values in regional groundwater • Determination that groundwater is protected is supported by vapor-phase VOC sampling conducted to date 	<ul style="list-style-type: none"> • Annual sampling of all wells 	<ul style="list-style-type: none"> • Annual metals, VOC, SVOC, PCB, radionuclides, low-level tritium, and general inorganics analyses for all samples • Quinquennial analysis for high explosives (HEXP analytical suite) at all locations 	<ul style="list-style-type: none"> • Focus highest frequency analysis for mobile constituents known to be present beneath MDA C
TA-54	<ul style="list-style-type: none"> • CMEs for MDAs G, H, and L submitted to NMED in 2011 (LANL 2011, 205756; LANL 2011, 206319; LANL 2011, 206324) and DOE withdrew the three CMEs in 2016 (DOE 2016, 601899). No constituent concentrations exceed screening values in regional groundwater • Determination that groundwater is protected is supported by vapor-phase VOC sampling conducted to date 	<ul style="list-style-type: none"> • Annual sampling of most intermediate and regional wells for metals, SVOCs, radionuclides, and general inorganics • Semiannual sampling for VOCs and low-level tritium at key wells located downgradient of MDAs • Semiannual monitoring of VOCs and low-level tritium at R-55 S1 and R-23, located downgradient of MDAs at Los Alamos County boundary 	<ul style="list-style-type: none"> • Semiannual sampling for VOCs and low-level tritium at key wells located down-gradient of MDAs (R-23, R-37 S1 and S2, R-39, R-41 S2, R-55 S1, R-56 S1, and R-57 S1) • Semiannual VOC and low-level tritium analyses for most other wells • Semiannual SVOC analysis for R-37 S1 (1,4-dioxane consistently detected) • VOCs and low-level tritium analysis only at R-40 S1 because of low yield • Annual metals, SVOCs, radionuclides, and general inorganics for all other locations • Quinquennial analysis for PCBs and HEXP at most locations 	<ul style="list-style-type: none"> • Focus highest frequency analysis for mobile constituents known to be present beneath TA-54 MDAs

Table C-1 (continued)

Monitoring Group	Background*	Proposed Frequency	Proposed Analyte Suites	Objectives
TA-16 260	<ul style="list-style-type: none"> • Nature and extent of groundwater contamination generally understood • RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine) concentrations exceed the NMED tap water screening level in intermediate groundwater • RDX concentrations exceed the NMED tap water screening level in regional groundwater 	<ul style="list-style-type: none"> • Semiannual monitoring at most TA-16 260 monitoring group locations to support CME 	<ul style="list-style-type: none"> • Metals, VOC, HEXMOD, and general inorganics analyses semiannually for most locations • Quarterly analysis for HEs and RDX degradation products (i.e., HEXMOD) and tracers (naphthalene sulfonate compounds and bromide) in select wells • Biennial analysis for radionuclides and SVOCs for most locations; annual analysis for low-level tritium in springs and in intermediate and regional wells • Quinquennial sampling for PCBs and dioxins/furans at shallow sampling locations (base flow, springs, and alluvial wells) 	<ul style="list-style-type: none"> • Collect data to support TA-16 260 CME and to further refine site conceptual model
MDA AB	<ul style="list-style-type: none"> • No constituent concentrations exceed screening values in regional groundwater 	<ul style="list-style-type: none"> • Annual sampling of intermediate and regional wells • Annual sampling of regional wells R-29 and R-30 to monitor MDA AB 	<ul style="list-style-type: none"> • Metals, VOC, SVOC, radionuclide, low-level tritium, and general inorganics analyses for all samples (HEs also included for R-29 and R-30) 	<ul style="list-style-type: none"> • General analyte suite for constituents that may have been released from MDA AB

Table C-1 (continued)

Monitoring Group	Background*	Proposed Frequency	Proposed Analyte Suites	Objectives
General Surveillance and White Rock Canyon	<ul style="list-style-type: none"> • Number of outfalls significantly reduced and remaining outfalls have improved water quality • Nature and extent of groundwater contamination generally understood • Canyons investigations are complete and show contribution to risk from surface water is low and within acceptable limits • Constituent concentrations generally below screening values • Decades of annual monitoring at springs in White Rock Canyon show little evidence of Laboratory contaminants. • Focused monitoring around MDAs and areas of known groundwater contamination along with generally low groundwater velocities support proposing a biennial sampling frequency at White Rock Canyon springs. 	<ul style="list-style-type: none"> • Annual monitoring at key alluvial monitoring wells, springs, and base-flow locations to capture unexpected near-surface conditions • Annual sampling of all intermediate and regional wells • Semiannual monitoring at R-10a to monitor groundwater at Laboratory boundary • Annual sampling at select White Rock Canyon springs and base-flow locations to monitor groundwater at Laboratory boundary • Biennial sampling at other White Rock Canyon base-flow locations and springs 	<ul style="list-style-type: none"> • Metals, radionuclide, and general inorganics analyses for most locations • HEXP analysis for southern watersheds • VOC analysis semiannually, annually, or biennially and SVOC analysis semiannually, annually, biennially, or triennially at most locations • Low-level tritium analysis annually or biennially at select base-flow and well locations and annually at all springs • Quinquennial sampling for PCBs and dioxins/furans at base-flow locations and alluvial wells • Annual sampling for metals, VOCs, SVOCs, radionuclides, low-level tritium, and general inorganics at all White Rock Canyon springs; annual, biennial, or triennial sampling for HEXP at all White Rock Canyon springs 	<ul style="list-style-type: none"> • Focus highest frequency analysis for mobile constituents known to be present in particular watershed • Limit monitoring in the alluvial groundwater because of limited contamination • Focus on intermediate and regional locations for groundwater protection

* Constituents discussed in this column do not include detections of spurious organic constituents, naturally occurring constituents, or constituents related to well corrosion or to potential drilling effects.

Note: Monthly sample collection and analyses are completed as Chromium Plume Control Interim Measure performance monitoring activities.

**Table E-1.0-1
Watch List for Deep Monitoring Wells**

Location	Monitoring Group	Watch List Rationale	Description of Condition	Action
Limited Water Volume				
MCOI-4	Chromium Investigation	Limited water volume	Well no longer yields sufficient water for sampling.	Monitor water levels only.
SCI-1	Chromium Investigation	Limited water volume	Limited volume of water and extremely low recovery rate. Field parameters do not stabilize.	Collect samples in accordance with the prioritized sampling suite list for SCI-1 after 1 CV plus drop-pipe volume is purged regardless of field parameter stability.
R-26 PZ-2	TA-16 260	Limited water volume	Sampled with bailer. Insufficient water available to bail more than 1 CV. High turbidity.	Purge (by bailing) 1 CV or until dry, allow for recharge, and collect a prioritized analytical suite the same day regardless of field parameter stability.
R-63i	TA-16 260	Limited water volume	Formation has limited yield.	Initiated sampling and analysis in MY2018. Bail dry at the beginning of sampling campaign and monitor recharge behavior. Collect a prioritized sample suite as necessary as soon as possible after well recharges. Code analytical results as "screening level" in database. Measure and record one set of field parameter data prior to sample collection.
R-40 Screen 1 (S1)	TA-54	Limited water volume	Extremely low yield and recovery rate. Approximately 2 wk required to recover water levels after 1 CV purge.	Sample for VOCs, low-level tritium, metals and general inorganics. Collect samples after 1 CV plus drop-pipe volume is purged regardless of field parameter stability. Semiannual sampling for metals and general inorganics supports the tertiary validation process for reducing conditions.
R-25b	TA-16 260	Tracers persist in monitoring well.	Samples collected from monitoring well R-25b continue to show the presence of the tracers introduced into the well in November 2015 (LANL 2017, 602161), indicating that sampling and analysis data for R-25b are not representative of surrounding groundwater chemistry.	Collect samples in accordance with ER-SOP-20032. Code analytical results as "screening level" in database until the geochemistry provides representative samples.

Location	Monitoring Group	Watch List Rationale	Description of Condition	Action
CdV-R-37-2 S2	TA-16 260	Reducing conditions	Water-quality and field parameter data indicate CdV-R-37-2 S2 does not produce representative samples, even with extended purging. Elevated iron and manganese are present.	Collect samples in accordance with ER-SOP-20032. Sample for low-level tritium, high explosives, metals, and general inorganics annually. Code analytical results for constituents other than tritium as "screening level" in database. Annual sampling for metals and general inorganics support continued assessment of well conditions.
R-40 Si (formerly R-40i)	TA-54	Reducing conditions	Samples showed residual drilling foam and reducing conditions. Elevated iron and manganese present. Recent data suggest improving trends, with increasing DO and decreasing iron and manganese concentrations.	Collect samples in accordance with ER-SOP-20032. Sample only for low-level tritium, general inorganics, and metals. Code analytical results for constituents other than tritium as "screening level" in database.
R-54 S1	TA-54	Reducing conditions	Reducing conditions appear to persist from residual drilling lubricants. Elevated iron and manganese are present.	Sample for low-level tritium only.
R-55i	TA-54	Reducing conditions	Reducing conditions appear to persist from residual drilling lubricants. Elevated iron and manganese are present.	Sample for low-level tritium only.
R-12 S1	General Surveillance (Sandia Watershed)	Reducing conditions	Reducing conditions appear to persist from residual drilling fluids as indicated by low DO and elevated iron and manganese. Reducing conditions yield nonrepresentative data.	Sample for low-level tritium only.
R-61 S1	Chromium Investigation (Chromium Plume Control Interim Measure performance monitoring)	Historically reducing conditions	Historical data showed the presence of reducing conditions associated with residual hammer oil in the aquifer immediately surrounding the well screen.	Collect samples in accordance with ER-SOP-20032. Focus on field parameter stability. Extended purge may be conducted, if necessary, to achieve representative data.

**Response to Draft Comments on the “Interim Facility-Wide Groundwater Monitoring Plan for the
2019 Monitoring Year, October 2018 to September 2019,”
Dated August 14, 2018**

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department’s (NMED’s) comments are included verbatim. The U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office responses follow each NMED comment.

GENERAL COMMENTS

NMED Comment

1. *The MY2018 IFGMP included a table describing analytes, field preparation, and analytical methods for Screening Samples. Why was it not included in the MY2019 IFGMP?*

DOE Response

1. This section is deleted, along with the table titled “Analytical Methods, PQLs, and MDLs for Analytes Reported by GGRL” because the Geochemistry and Geo-Materials Research Laboratories (GGRL) is no longer used for sample analyses as of September 2018. The page numbers for this section have been renumbered accordingly.

NMED Comment

2. *NMED personnel have recently observed the field sampling team collecting VOC samples at spring and baseflow locations by pumping water into a 1-L glass amber bottle, then decanting the water into amber VOAs. This technique may volatilize any VOCs present in the sample and produce unrepresentative data. In the future, the field team should collect samples directly from the peristaltic pump to minimize the potential to volatilize VOCs.*

DOE Response

2. This method is specified in the current standard operating procedure (SOP), which is in the process of being revised to reflect collection of samples with the peristaltic pump. DOE will continue to ensure that sampling procedures are being followed according to the relevant and most current SOP.

SPECIFIC COMMENTS

NMED Comment

3. 3.3 MONITORING OBJECTIVES, page 16

Please include a description of which wells will be monitored as part of the TA-50 Discharge Permit.

DOE Response

3. Wells sampled under the Technical Area 50 (TA-50) Discharge Permit include MCOI-6, R-1, R-14 S1, R-46, R-60, SCA-3, and SCI-1. These locations are included in the Interim Facility-Wide Groundwater Monitoring Plan (IFGMP).

NMED Comment

4. Table 3.4-1, page 55

Due to the uncertainty with data collected from R-61, it should be flagged as screening level data in this table.

DOE Response

4. Table E-1.0-1, "Watch List for Deep Monitoring Wells," on page E-6 has been revised to add R-61 S1 (screen 1).

NMED Comment

5. Table C-1, page C-5

The proposed sampling frequency for the Chromium Investigation row in this table lists wells R-35a, R-35b, R-44 S1 and R-44 S2 under quarterly monitoring for metals. As part of the Chromium Plume Control Interim Measure (IM) Performance Monitoring Work Plan, these wells are to be sampled monthly for metals. In addition, this table did not include all the wells to be sampled monthly as part of the IM Performance Monitoring. Please correct this table to reflect the sampling schedule prescribed for the IM Performance Monitoring.

DOE Response

5. Table C-1, "Background Information and Objectives Used to Determine Sampling Frequencies and Analytical Suites for Area-Specific Monitoring Groups," has been revised in the Proposed Frequency column to reflect the full list of wells included in the monthly sampling schedule; wells R-35a and R-35b were added. Because they are on the monthly sampling list, R-44 S1 and R-44 S2 will not be sampled quarterly. A table note is added at the bottom of Table C-1 to confirm that monthly sample collection and analysis is part of Chromium Plume Control Interim Measure performance monitoring activities.

NMED Comment

6. Table E-1.0-1

Due to the uncertainty with data collected from R-61, it should be added to the Watch List for Deep Monitoring Wells.

DOE Response

6. Table E-1.0-1, "Watch List for Deep Monitoring Wells," on page E-6 has been revised to add R-61 S1.

COMMENTS ON SAMPLING FREQUENCY

NMED Comment

TA-16 260, 16-61439

- *Elevated barium concentrations are rising. MY 2019 IFGMP proposes semiannual monitoring. NMED believes quarterly monitoring for barium is warranted.*
- *Elevated RDX are rising. MY 2019 IFGMP proposes semi-annual monitoring. NMED believes quarterly monitoring for RDX is warranted*

DOE Response

Semiannual sampling and analyses of 16-61439 (alias: PRB Alluvial Seep) will continue on a semiannual basis for metals, volatile organic compounds (VOCs), HEXMOD (including Royal Demolition Explosive [RDX] and its degradation products), and general inorganics. Elevated barium and RDX concentrations are discussed in the "First Annual Long-Term Monitoring and Maintenance Report for the Corrective Measures Implementation at Consolidated Unit 16-021(c)-99" (EM2018-0033) submitted on September 27, 2018, and will be discussed in subsequent annual long-term monitoring and maintenance reports. Results of future sample analyses will determine if increased sampling frequency is warranted in monitoring year (MY) 2020.

NMED Comment

TA-16 260, All base flow and spring locations

Are these locations proposed for semi-annual monitoring only due to seasonal fluctuations?

DOE Response

Semiannual monitoring is conducted at base flow and spring locations based on seasonal fluctuations.

NMED Comment

TA-54, R-23i S3

Cyanide was detected (0.0193 mg/L) on 10-19-17. MY 2019 IFGMP proposes annual monitoring. NMED believes semi-annual monitoring is warranted.

DOE Response

Cyanide monitoring will continue on an annual basis. Results of the MY 2019 quarter 1 sampling will determine if increased sampling frequency is warranted.

NMED Comment

TA-54, R-39

Elevated tritium from non-detect (ND) to 131 pCi/L on 10-25-17. Tritium was not proposed for monitoring in the MY2019 IFGMP. NMED believes semiannual monitoring for tritium is warranted.

TA-54, R-53 S2

Elevated tritium from ND to 67.8 pCi/L on 10-27-17. Tritium was not proposed for monitoring in the MY2019 IFGMP. NMED believes semi-annual monitoring for tritium is warranted.

TA-54, R-56 S1

Elevated tritium from ND to 85.6 pCi/L on 10-26-17. Tritium was not proposed for monitoring in the MY 2019 IFGMP. NMED believes semi-annual monitoring for tritium is warranted.

DOE Response

Laboratory analysis for low-level tritium is performed on samples collected from multiple sites, including R-39, R-53 S2, and R-56 S1, on a semiannual basis, as provided in Table H-4, "Crosswalk for the MY2018 versus MY2019 Interim Monitoring Plans for the TA-54 Monitoring Group," of the MY 2019 IFGMP. Concentrations reported in MY 2018 were validated and are assumed to be a laboratory contaminant; this will be noted in the Environmental Information Management System.