ERID-524778

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

RYAN FLYNN
Cabinet Secretary

BUTCH TONGATE
Deputy Secretary

TOM BLAINE. P.E.
Director
Environmental Health Division

EP2014-5104

IRM-RMS, LANL
U1401360

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

April 25, 2014

Peter Maggiore
Assistant Manager, Env. Projects Office
Los Alamos Site Office, DOE
3747 West Jemez Rd, MS A316
Los Alamos, NM 87544

Jeffrey D. Mousseau, Associate Director
Environmental Programs
Los Alamos National Security, L.L.C.
P.O. Box 1663, MS M991
Los Alamos, NM 87545

RE: APPROVAL WITH MODIFICATIONS
INTERIM FACILITY-WIDE GROUNDWATER MONITORING PLAN FOR THE 2014 MONITORING YEAR, OCTOBER 2013 – SEPTEMBER 2014
LOS ALAMOS NATIONAL LABORATORY
EPA ID#NM0890010515
HWB-LANL-13-030

Dear Messrs. Maggiore and Mousseau:

The New Mexico Environment Department (NMED) is in receipt of the United States Department of Energy (DOE) and the Los Alamos National Security, L.L.C.'s (collectively, the Permittees) document entitled "Interim Facility-Wide Groundwater Monitoring Plan for the 2014 Monitoring Year, October 2013 – September 2014" (Plan) dated May 2013 and referenced by EP2013-0080. The Report was received on May 30, 2013. NMED bas reviewed the Plan and hereby issues this approval with the following comments and modifications.

Specific Comments:

1. **1.6 Approach to Monitoring Network Design, page 6, fifth paragraph.**
The Permittees state, *"However, R-61 (screens 1 and 2) was rehabilitated in September and October 2012 and will be considered a "new well" and will follow the characterization suite and sampling frequency for newly installed wells."*

NMED Comment
NMED has evaluated all available data collected at R-61, including data collected after redevelopment efforts conducted in September and October, 2012. Results from NMED's evaluation strongly suggest that R-61 (screen 1 and screen 2) do not provide representative groundwater samples even at purge volumes exceeding 744 gal or 12-casing volumes and 1032 gal or 17-casing volumes. Therefore, any water-quality data collected from R-61 will not be considered acceptable for use, except for tritium. NMED does not recommend expending additional resources for rehabilitation and/or sampling at R-61. The Permittees must continue monitoring water levels at R-61 so that hydraulic responses from pumping at production wells PM-4 and PM-5, monitoring well R-28 or other wells can be recorded and evaluated in conjunction with water-level data collected at other nearby monitoring wells such as R-50 and R-44.

2. **2.2 Background, Contaminant Sources and Distributions, page 10, first paragraph.**
The Permittees state, *"The primary sources of contaminants near the TA-21 monitoring group includes SWMU-21-011(k), the adsorption beds and disposal shafts at MDA T, DP West, and waste lines and sumps."*

NMED Comment
Other significant sources of contamination associated with the Technical Area 21 (TA-21) monitoring group include SWMU 02-005, the Omega West Reactor cooling-tower and outfall where large quantities of hexavalent chromium were released to the canyon-bottom aquifer between 1956 and 1973, and MDA U where hazardous and radioactive liquid wastes were discharged to subsurface trenches from 1948 to 1968. Add these two sites to the list of primary contaminant sources for the TA-21 monitoring group.

3. **2.2 Background, Contaminant Sources and Distributions, page 10, fourth paragraph.**
The Permittees state, *"This observation is also supported by the absence of tritium activity in the regional aquifer in R-7, although the absence of nitrate and perchlorate detections at this location is not conclusive because of reducing conditions in the screened interval that may be attributed to residual organic drilling products."*

NMED Comment
The absence of tritium at well R-7, and low or tritium-free groundwater in other regional wells, may not necessarily suggest the lack of contamination. For example, groundwater at regional well R-43 screen 1 does not contain any measurable tritium (<1 pCi/L), but clearly shows contamination as noted by detections of dissolved chromium at about 50 μg/L. Other examples where contamination is present but tritium activities are very low or absent include R-44 screen 1, R-45 screen 2, and R-

62. Furthermore, the absence of tritium at R-7 screen 3 may simply be related to the presence of stagnant water at the Westbay screened interval, similar to that found at R-22 screen 5 where tritium was detected for many years as part of a stagnant water column but was later removed by pumping.

4. **5.2 Background, page 18, first paragraph.**
The Permittees state, *"At well R-37, relic regional groundwater may have become disconnected or stranded from the current regional groundwater as drawdown associated with water-supply production has occurred."*

NMED Comment
The Permittees' conceptual model that groundwater at R-37 screen 1 may be regional aquifer groundwater that has become disconnected does not fit the hydrologic and hydrochemical characteristics of the zone. Hydraulic-pumping test data and the presence of contamination indicate that the zone is perched and is actively recharged from shallower recharge sources. During routine sampling, the perched zone at R-37 screen 1 discharges at a rate of 0.8 gpm with about 1 ft of drawdown within an approximate 4-hour pumping period. During well-screen development and aquifer testing at screen 1, substantial amounts of groundwater were removed from the well with a notable 35 ft of drawdown during one 24-hour pumping test. Recovery of water levels took place within about one day, indicating that the zone is hydraulically active with respect to recharge. The presence of contamination such as tritium and 1,4–dioxane also indicates that the perched zone is recharged from shallower saturated zones through the vadose zone.

5. **6.2 Background, page 20, third paragraph.**
The Permittees state, *"The vadose zone at TA-16 is approximately 1000 ft to 1300 ft thick and is recharged by mountain-front precipitation and subsequent infiltration along the Pajarito fault zone east of TA-16 and along canyons (e.g., infiltration along upper Cañon de Valle)."*

NMED Comment
The Permittees should note that the Pajarito fault zone is located west of TA-16, not east. Several small graben-related faults have been mapped at TA-16 near MDA P in Cañon de Valle.

6. **Table 2.4-1 Interim Monitoring Plan for TA-21 Monitoring Group, pages 53 to 54.**

NMED Comment
The Permittees must increase the monitoring/sampling frequency at regional aquifer wells R-6, R-64, and R-66 from annual to semiannual to improve contaminant detection beneath, and downgradient from the TA-21 contaminant sources. The

analytical suite for the additional sampling event at each well must be that proposed in the Plan for these particular wells.

7. Table 3.4-1 Interim Monitoring Plan for Chromium Investigation Monitoring Group, pages 55 to 57.

NMED Comment
The Permittees must increase the monitoring/sampling frequency at regional aquifer wells R-35a, R-35b, R-44 S1, and R-44 S2 from semiannual to quarterly to protect (provide early warning) public-water supply well PM-3 and improve contaminant detection at and near the hexavalent chromium plume. The analytical suite for the additional sampling events must be that proposed in the Plan for these particular wells.

The Permittees propose sampling well R-61 S1 and S2 on a quarterly basis. As described in NMED Comment #1, sampling results obtained from R-61 are not acceptable for uses such as determining the presence or absence of a specific contaminant or the concentration of any such contaminant, except for tritium. Collecting and analyzing water level data at R-61 screens 1 and 2 are acceptable to the NMED.

8. Table 5.4-1 Interim Monitoring Plan for TA-54 Monitoring Group, pages 58 to 59.

NMED Comment
Contaminant detection and groundwater monitoring downgradient of TA-54 material disposal areas H, L, and G and the facility boundary with Los Alamos County must include, at a minimum, quarterly monitoring at all regional wells located along or near the facility boundary. Increase the monitoring/sampling frequency for regional aquifer wells R-55 S1 and R-23 from semiannual to quarterly. The analytical suite for the additional sampling events must be that proposed in the Plan for these particular wells.

9. Table 6.4-1 Interim Monitoring Plan for TA-16 260 Monitoring Group, page 60.

NMED Comment
Due to the continued increase in detected concentrations of RDX and the presence of tetrachloroethene and trinitrobenzene[1,3,5-] at regional aquifer well R-18, the Permittees must increase the sampling frequency at this well from semiannual to quarterly. Additional data derived from this sampling will help refine the flow and transport characteristics of RDX and other contaminants (e.g., HE degradation products, VOCs) from TA-16 contaminant sources. The analytical suite for the additional sampling events must be that proposed in the Plan for this particular well.

Well CdV-R-37-2 screen 2 does not provide representative groundwater samples, based on the presence of elevated concentrations of dissolved iron and manganese and low concentrations of dissolved chromium compared to regional aquifer background. The observed water quality of groundwater samples collected from CdV-R-37-2 S2 supports the presence of residual drilling fluid products and reducing conditions with respect to manganese, chromium, and iron. Concentrations of dissolved oxygen are also low compared to other regional wells not impacted by residual drilling fluid products such as EZ-MUD, QUIK-FOAM, and AQF-2. An effective pumping method must be proposed for CdV-R-37-2 S2 to attempt to provide representative samples from the well.

10. Table 7.4-1 Interim Monitoring Plan for MDA B Monitoring Group, page 62.

NMED Comment

Annual sampling of regional wells R-29 and R-30, as proposed in the Plan, is not protective of groundwater with respect to contaminant-detection monitoring from known subsurface releases from MDA AB. The groundwater monitoring network for MDA AB is limited to these two wells. Therefore, the Permittees must increase the monitoring frequency at these two wells from annual to semiannual. The analytical suite for the additional sampling events must be that proposed in the Plan for these particular wells.

11. Table 8.3-1 Interim Monitoring Plan for General Surveillance Monitoring, page 64.

NMED Comment

The offsite migration of contamination, as detected at well R-10a, should be monitored at a greater frequency than once per year. Groundwater at R-10a contains elevated concentrations of chloride, perchlorate, nitrate, uranium, and other contaminants. The nature and extent of this contamination has not been addressed. The Permittees must increase the sampling frequency for R-10a from annual to semiannual. The analytical suite for the additional sampling events must be that proposed in the Plan for this particular well.

12. Table 8.3-2 Interim Monitoring Plan for White Rock Canyon, pages 67 to 68.

NMED Comment

Many of the White Rock Canyon springs are located downgradient of known contaminant release sites (e.g., TA-33 and TA-39) and contaminated regional and perched groundwater positioned west of the Rio Grande. Therefore, the Permittees must increase the monitoring frequency to once per year at springs Ancho, 1, 3A, 5, 5B, 6, 9, and 9A. The analytical suite for the additional sampling event at these particular springs may be reduced to contaminants of potential concern, specifically volatile organic compounds, high explosive compounds and tritium. In addition, the sampling frequency for high explosive compounds and tritium at Spring 4A must be increased to once per year.

General Comment:

13. Appendix E, Protocols for Assessing the Performance of Deep Groundwater Monitoring Wells, Table E-1.0-1, Preliminary Watch List of Deep Monitoring Wells (pages E-5 to E-7).

An analysis by NMED of all available data, both laboratory and field measurements, show that the following additional wells or well screens must be included in the Permittees' Table E-1.0-1: CdV-R-37-2 (see NMED Comment #9), R-12 S2, R-16 S4, R-43 S2, and R-62.

Data for R-12 S2 indicate residual effects from drilling fluids as indicated by the presence of elevated concentrations of dissolved manganese, low dissolved chromium, and low dissolved oxygen. During 2006 and 2007, R-12 was converted from a no-purge Westbay well to a purgeable dual-screen well. During conversion and redevelopment activities at screen 2, several pumping events were conducted, including one specific-capacity test on October 1, 2006. During the test, 2,376 gallons of water were purged, and time-series samples were collected and analyzed (see LANL, 2006, LA-UR-07-1640/EP2007-0102). At the conclusion of the test, dissolved chromium and manganese concentrations approached near-stabilization at about 3 and 10 µg/L, respectively, and the dissolved oxygen concentration was 5.63 mg/L. These data are considered to be approximate baseline conditions for sample representativeness. The most recent sampling results for R-12 S2, obtained from sampling on July 22, 2013, produced dissolved chromium at less than 2 µg/L, dissolved manganese at 31.2 µg/L, and the dissolved oxygen concentration of 4.92 mg/L. These recent results, in comparison to the 2006 baseline data, indicate that the perched zone at R-12 S2 might require additional purging to obtain more representative samples. Design a purging sequence that will produce representative samples.

R-16 was initially completed as a multi-port Westbay well and later rehabilitated and converted to a dual-screen well in 2009. Screens 2 (S2) and 4 (S4) are now purged before sample collection. Field measurements and analytical results for S4 indicate that the screen does not produce representative groundwater samples. Dissolved-oxygen concentrations and ORP values measured during the 12-casing volume purge event on July 25, 2013 did not stabilize, suggesting that the sampled groundwater was not representative. The Permittees should also take note that when R-16 was being constructed, the placement of the filter pack at S4 was inhibited because the annular space between S4 and the borehole was filled with slough. The slough material at S4 likely contained a variety of drilling additives such as EZ-Mud, Liqui-Trol, N-Seal, and soda ash that were used during drilling. Soon after the well was constructed in

September 2002, screens 2, 3, and 4 were treated with acid solutions including phosphoric acid. Since late 2002, very high concentrations of phosphorus (or phosphate) have been, and continue to be, observed at S4. It is apparent that conditions at R-16 S4 warrant additional purging prior to sampling; therefore, design a purging sequence at R-16 S4 that will produce representative samples.

Field measurements and analytical data collected at well screens R-43 S2 and R-62 indicate that groundwater samples were collected from the screens before stabilization criteria were reached. The non-stable conditions observed at these two screens appear to be related to the physical mixing of groundwater derived from low- and high-permeable strata positioned along the screen and filter-pack intervals. This is based on comparing data collected during well development and aquifer testing where large volumes of groundwater were purged from the wells. A review of these data indicates that stability at R-43 S2 occurs after purging 6,000 to 7,000 gallons of groundwater or about 70 hours of purging at 1.5 gallons per minute. For R-62, well development data suggest that groundwater from the screen reaches stability at about 3,000 gallons of purging. Design a purging sequence that will produce samples from R-43 S2 and R-62 that meet the stabilization criteria.

Should you have any questions, please contact Michael Dale of my staff at (505) 661-2673.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
B. Wear, NMED HWB
J. Kulis, NMED HWB
M. Dale, NMED HWB
J. Schoeppner, NMED GWQB
S. Yanicak, NMED DOE OB, MS M894
P. Longmire, NMED DOE OB, MS M894
L. King, EPA 6PD-N
R. Martinez, San Ildefonso Pueblo
J. Chavarria, Santa Clara Pueblo
J. McCann, EP-CAP, MS M992
H. Shen, DOE-LASO, MSA316

File: Reading and LANL 2014, IFGMP 2014 MY

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

7013 0600 0001 8657 06

Hasler
04/29/2014
US POSTAGE

FIRST-CLASS MAIL
$06.69º
ZIP 87505
011D11641177

Mr. Jeffrey D. Mousseau
Associate Director
Environmental Programs
Los Alamos National Security, LLC
PO Box 1663, Mail Stop ~~M994~~ A150
Los Alamos, New Mexico 87545

4/30/14 · 1:15

NAME Deborah Herrera
Z# 082963
DATE 4/30/14