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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 21, 2012

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Pete Maggiore, Assistant Manager
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Michael J. Graham
Associate Director, Environmental Programs
Los Alamos National Security, L.L.C.
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RE: APPROVAL WITH MODIFICATIONS
2011 INTERIM FACILITY-WIDE GROUNDWATER MONITORING PLAN, REVISION 1
LOS ALAMOS NATIONAL LABORATORY
EPA ID#NM0890010515
HWB-LANL-11-058

Dear Messrs. Maggiore and Graham:

The New Mexico Environment Department (NMED) is in receipt of the United States Department of Energy (DOE) and the Los Alamos National Security (LANS), L.L.C.'s (collectively, the Permittees) document entitled *2011 Interim Facility-Wide Groundwater Monitoring Plan, Revision 1* (Revised Plan) dated December 2011 and referenced by EP2011-0375. The Revised Plan is a revision of the *2011 Interim Facility-Wide Groundwater Monitoring Plan* (Original Plan) dated August 2011 and referenced by EP2011-0273. The Permittees revised the Original Plan due to reprioritization of environmental work at Los Alamos National Laboratory (LANL) and budget constraints. The Revised Plan is an abbreviated version of the Original Plan and proposes a significant reduction in groundwater monitoring from that in the Original Plan.

Pursuant to Section III.M.2 of the March 1, 2005 Order on Consent (Consent Order), the NMED hereby issues this Approval of the Revised Plan with the following modifications and comments.

Part I: Modifications

The following modifications must be implemented as part of the Approved Revised Plan.

1. **Table 2.4-1, Interim Monitoring Plan for TA-21 Monitoring Group, pages 52-55:** Make the following changes to the proposed sampling locations, analytical suites and sampling frequencies:

    1. Add biennial (once every two years) sampling for metals, VOCs, and SVOCs at wells LADP-3, LAOI(a)-1.1, and R-6.
    2. Add annual sampling for metals and biennial sampling for VOCs and SVOCs at wells LAOI-3.2 and LAOI-3.2(a).
    3. Add biennial sampling for metals at well R-6i.
    4. Add biennial sampling for metals and annual sampling for VOCs and SVOCs at well TA-53i.
    5. Add quinquennial (once every five years) sampling for high explosives, PCBs, and dioxins/furans at all wells. The quinquennial sampling may be changed to sexennial (once every six years) for sampling locations that are sampled biennially or triennially for all other constituents.
    6. For characterization sampling, reduce the sampling frequency for high explosives to annual and add annual sampling for PCBs and dioxins/furans.
    7. Move wells LAOI-7, R-8 Screen 1 and Screen 2 (S1 and S2), R-9, and R-9i S1 and S2 from General Surveillance Monitoring to the TA-21 Monitoring Group. Add biennial sampling for VOCs and SVOCs at wells LAOI-7 and R-9, annual sampling for tritium at well R-9, and annual sampling for low-level tritium at well R-8 S1 and S2.

2. **Table 3.4-1, Interim Monitoring Plan for Chromium Investigation Monitoring Group, pages 56-61:**
    Make the following changes to the proposed analytical suites and sampling frequencies:

    1. Add biennial sampling for VOCs and SVOCs at wells SCI-1, SCI-2, R-11, R-35a, R-35b, R-43 S1 and S2, R-1, R-13, R-15, R-28, R-42, R-44 S1 and S2, R-45 S1 and S2, and R-50 S1 and S2.
    2. Increase the sampling frequency from annual to semiannual for metals and general inorganics at wells R-35a, R-35b, R-36, and R-13.
    3. Add annual sampling for VOCs and SVOCs at well R-36.
    4. Increase the sampling frequency from annual to semiannual for SVOCs at wells MCOI-4, MCOI-5, and MCOI-6.
    5. Increase the sampling frequency from annual to semiannual for metals, general inorganics, and perchlorate at well MCOI-5.

6. Add quinquennial sampling for high explosives, PCBs, and dioxins/furans at all wells. The quinquennial sampling may be changed to sexennial for sampling locations that are sampled biennially or triennially for all other constituents.
7. For characterization sampling, reduce the sampling frequency for high explosives to annual and add annual sampling for PCBs and dioxins/furans.

3. **Table 4.4-1, Interim Monitoring Plan for MDA C Monitoring Group, pages 62-63:**
Make the following changes to the proposed analytical suites and sampling frequencies:
   1. Add biennial sampling for metals at well R-14.
   2. Add semiannual sampling for metals at well R-46.
   3. Increase the sampling frequency from annual to semiannual for general inorganics at well R-46.
   4. Add biennial sampling for perchlorate at all wells.
   5. Add quinquennial sampling for high explosives, PCBs, and dioxins/furans at all wells. The quinquennial sampling may be changed to sexennial for sampling locations that are sampled biennially or triennially for all other constituents.

4. **Table 5.4-1, Interim Monitoring Plan for TA-54 Monitoring Group, pages 64-70:**
Make the following changes to the proposed analytical suites and sampling frequencies:

   1. Add biennial sampling for perchlorate at all wells, with the exception of well R-40 S1.
   2. Increase the sampling frequency from semiannual to quarterly for VOCs and low-level tritium at wells R-37 S1 and S2, R-56 S1, R-39, R-41, and R-57 S1.
   3. For characterization sampling, reduce the sampling frequency for high explosives to annual and add annual sampling for PCBs and dioxins/furans.
   4. Add quinquennial sampling for high explosives, PCBs, and dioxins/furans at all wells, with the exception of well R-40 S1. The quinquennial sampling may be changed to sexennial for sampling locations that are sampled biennially or triennially for all other constituents.

5. **Table 6.4-1, Interim Monitoring Plan for TA-16 260 Monitoring Group, pages 71-75:**
Make the following changes to the proposed sampling locations, analytical suites and sampling frequencies:

   1. Add biennial sampling for perchlorate and SVOCs at all wells and springs that are not already sampled for this constituent, with the exception of well R-25 (all screens).

2. For characterization sampling, add annual sampling for PCBs and dioxins/furans. All other constituents, with the exception of radionuclides, must be sampled quarterly. Radionuclides may be sampled annually.
3. Conduct quarterly characterization sampling at well CdV-16-4ip S1 until S2 is abandoned and a permanent sampling system is installed at S1. After the permanent sampling system is installed at S1, conduct one additional quarterly characterization sampling at S1 and compare the analytical results with previous data to determine the appropriate sampling frequency for future monitoring of S1.
4. Add biennial sampling for low-level tritium at wells CdV-37-1(i), R-18, R-47i, and R-48.
5. Increase the sampling frequency from annual to semiannual for metals, VOCs, high explosives, and general inorganics for well R-25b.
6. Move Bulldog Spring from General Surveillance Monitoring to the TA-16 260 Monitoring Group and sample the spring in the same manner as the other springs in the Group.
7. Add quinquennial sampling for PCBs and dioxins/furans at all wells and springs. The quinquennial sampling may be changed to sexennial for sampling locations that are sampled biennially or triennially for all other constituents.

6. **Table 7.4-1, Interim Monitoring Plan for MDA AB Monitoring Group, pages 76-77:**
Make the following changes to the proposed analytical suites and sampling frequencies:

1. Add biennial sampling for perchlorate at all wells.
2. Add quinquennial sampling for PCBs and dioxins/furans at all wells. The quinquennial sampling may be changed to sexennial for sampling locations that are sampled biennially or triennially for all other constituents.

7. **Table 8.3-1, Interim Monitoring Plan for General Surveillance Monitoring, pages 78-88:**
Make the following changes to the proposed analytical suites and sampling frequencies:

1. Add biennial sampling for VOCs and SVOCs at all wells that are not already sampled for these constituents, with the exception of wells R-19 (all screens) and R-31 S4 and S5.
2. Reduce the sampling frequency for VOCs and SVOCs to biennial at well R-3i.
3. Add biennial sampling for low-level tritium at wells R-3, R-4, R-24, R-10a, R-10 S1, R-33 S1, R-34, PCI-2, and R-17 S1.
4. Reduce the sampling frequency for tritium to biennial at well 03-B-13.
5. Reduce the sampling frequency for perchlorate to biennial at wells R-12 S1 and S2, CDBO-6, 18-MW-18, PCAO-8, 03-B-13, R-19 (all screens), PCI-2, WCO-1r, and R-31 S4 and S5.

6. Reduce the sampling frequency for metals and general inorganics to biennial at wells R-12 S2, CDBO-6, R-19 (all screens), and WCO-1r.
7. Reduce the sampling frequency for high explosives to biennial at well R-19 S2 and to quinquennial at wells 18-MW-18, PCAO-8, 03-B-13, R-19 S3 and S4, WCO-1r, and R-31 S4 and S5. Add quinquennial sampling for high explosives at all wells that are not otherwise scheduled to be sampled for this constituent. The quinquennial sampling may be changed to sexennial for sampling locations that are sampled biennially or triennially for all other constituents.
8. Add quinquennial sampling for PCBs and dioxins/furans at all wells and springs. The quinquennial sampling may be changed to sexennial for sampling locations that are sampled biennially or triennially for all other constituents.
9. The Permittees may, at their own discretion, reduce the sampling frequency for radionuclides to biennial at wells POI-4, R-3i, TW-2Ar, R-2, R-3, R-4, R-24, R-12 S1 and S2, CDBO-6, 18-MW-18, PCAO-8, PCI-2, R-17 S1 and S2, WCO-1r, R-19 (all screens), and R-31 S4 and S5.

8. **Table 8.3-2, Interim Monitoring Plan for White Rock Canyon and Rio Grande Watershed, pages 89-94:**
Make the following changes to the proposed analytical suites and sampling frequencies:

1. Discontinue sampling for pesticides at all locations that are not subject to the MOU with the San Ildefonso Pueblo.
2. Reduce the sampling frequency for metals, VOCs, general inorganics, perchlorate, and suspended sediment to biennial at all base-flow locations that are not subject to the MOU with the San Ildefonso Pueblo.
3. Discontinue sampling for suspended sediment and reduce sampling frequency for SVOCs and high explosives to biennial at all springs that are not subject to the MOU with the San Ildefonso Pueblo.
4. The Permittees may, at their own discretion, reduce the sampling frequency for radionuclides to biennial at all base-flow locations that are not subject to the MOU with the San Ildefonso Pueblo.
5. The Permittees may, at their own discretion, reduce the sampling frequency for radionuclides to triennial (once every three years) at all springs that are not subject to the MOU with the San Ildefonso Pueblo.

9. **Appendix B, B-2.0 Protocol for Selecting Screening Levels for Groundwater Data, second paragraph, page B-3:**
The protocol for selecting screening levels for groundwater data must match the procedure described in Section 11.4.1, Groundwater Cleanup Levels, of the LANL Hazardous Waste Permit (Permit) and the Consent Order. If no EPA MCL or WQCC water quality standard exists for an analyte, use the most recent version of NMED Tap Water Screening Levels. In the absence of an NMED tap water screening level, use EPA Regional Screening Levels for tap water multiplied by a factor of ten.

10. **Appendix C, C-4.0 Analytical Methods – Groundwater Analytical Suites, pages C-9 and C-10:**
Section IX.C of the Consent Order and Section 11.10.2 of the Permit state that the detection limits for each analytic method for chemical analyses of environmental samples must be less than applicable background, screening and regulatory cleanup levels. Furthermore, the same sections state that analytical methods used by the Permittees must be approved by NMED.

The following VOC and SVOC contaminants have been routinely analyzed by the Permittees using analytical methods with detection limits that were consistently equal to or exceeding the corresponding regulatory cleanup levels at all groundwater (and/or, in some instances, base-flow) sampling locations (Group A Contaminants): azobenzene, benzidine, benzo(a)pyrine (only base-flow sampling), bis(2-chloroethyl)ether, dibenz(a,h)anthracene, 3,3'-dichlorobenzidine, 4,6-dinitro-2-methylphenol, hexachlorobenzene (both groundwater and base-flow sampling), n-nitrosodiethylamine, n-nitrosodimethylamine, n-nitroso-di-n-butylamine, n-nitroso-di-n-propylamine, n-nitrosopyrrolidine, pentachlorophenol, acrolein, acrylonitrile, 2-chloro-1,3-butadiene, 1,2-dibromo-3-chloropropane, 1,2-dibromoethane, methacrylonitrile, and 1,2,3-trichloropropane.

In addition, the following SVOC contaminants have been routinely analyzed by the Permittees using analytical methods with detection limits that were frequently equal to or exceeding the corresponding regulatory cleanup levels at multiple groundwater sampling locations (Group B Contaminants): atrazine, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and 2,2'-oxybis(1-chloropropane).

In order for NMED to approve the continuing use of the current analytical methods for the aforementioned groundwater contaminants, the Permittees must first demonstrate that these contaminants do not occur at concentrations that would constitute a potential threat to human health and the environment. By the end of the calendar year 2013, the Permittees must analyze all Group A Contaminants at all relevant sampling locations at least once by analytical methods with detection limits that are lower than the corresponding regulatory cleanup levels. Correspondingly, by the end of the calendar year 2013, the Permittees must analyze, in a similar manner, those Group B Contaminants at those sampling locations that have not been analyzed with proper detection limits at least once since January 1, 2010.

Preference in the selection of analytical methods must be given to the EPA-approved methods; however, if an EPA-approved method that can achieve the required detection limit for a particular contaminant is not available, the Permittees may choose any industry-accepted analytical method that attains the required detection limit or, if such method is not offered by any North American analytical laboratory,

the method that provides the lowest achievable detection limit. If, for a particular Group A or Group B contaminant and a particular sampling location, the Permittees select an analytical method that has practical quantitation limit (PQL) no greater than the corresponding regulatory cleanup level (or, if such method is not available, a method with the lowest achievable PQL), and none of the detectable analytical results, including J-flagged results, exceeds one-half of the regulatory cleanup level, then the Permittees must use this, or equivalent, analytical method at least quinquennially (sexennially for sampling locations that are sampled biennially or triennially for all other constituents). If, for a particular Group A or Group B contaminant and a particular sampling location, the Permittees select an analytical method that has PQL greater than the corresponding regulatory cleanup level (unless this is the method with the lowest achievable PQL), and none of the detectable analytical results, including J-flagged results, exceeds one-half of the regulatory cleanup level but one or more of U-flagged results exceeds one-half of the regulatory cleanup level, then the Permittees must use this, or equivalent, analytical method at least triennially (quadrennially [once every four years] for sampling locations that are sampled biennially for all other constituents); however, if none of the U-flagged results exceeds one-half of the regulatory cleanup level, then the Permittees may use this, or equivalent, analytical method at least quinquennially (sexennially for sampling locations that are sampled biennially or triennially for all other constituents). If, for a particular Group A or Group B contaminant and a particular sampling location, any detectable analytical result, including any J-flagged result, exceeds one-half of the regulatory cleanup level, then the Permittees must propose to NMED a sampling protocol for this contaminant at the particular sampling location that is protective of human health and the environment.

11. **Table F-1.0-1, page F-5:**
    1. Add well R-64 to the watch list. The well produces significant amounts of fine-grained suspended solids with a chemical signature typical of annular-fill bentonite.
    2. Add wells R-55i and R-53 S1 to the watch list. Field data and trace-metal analytical results suggest that water samples from these wells are likely not representative of aquifer conditions.
    3. Add well R-29 to the watch list. Turbidity and water chemistry data indicate possible impacts from drilling fluids. The well must be purged ten (10) casing volumes before sampling or until dissolved oxygen concentrations (DO) are within 10% of average DO at nearby well R-30, whichever comes first.

Part II: Comments

Resolve the following comments and concerns in future Plans, beginning in May 2012.

1. Due to reduction in groundwater monitoring by the Permittees caused, in part, by budgetary constraints, NMED may decide to collect and analyze a number of

groundwater samples at its own cost. To facilitate sample collection by NMED, the Permittees must provide notification to NMED of upcoming groundwater sampling events at least 15 calendar days before commencing each event in accordance with Permit Section 11.3.6 and Consent Order Section IX.

2. In future Plans, the Permittees must follow the expanded document format established in the Original Plan.

3. In future Plans, the Permittees must include maps of groundwater contaminants, similar to Plates 5 to 7 in *2011 General Facility Information* (EP2011-0070). The maps must be created separately for alluvial, intermediate and regional aquifers, and must show the following information:

    1. boundaries of area-specific monitoring groups;
    2. all monitoring wells in the corresponding aquifer, with well names;
    3. wells on the watch list, which must be identified by different color scheme, highlight, or font;
    4. contaminant information text boxes for wells where contaminant detection(s) occurred during any of the two most recent sampling events for that well and contaminant (regardless of sampling frequency). Contaminant detection means a validated concentration (including J-flagged results) greater than one-half of applicable groundwater cleanup level. A contaminant information box must include the following items: well name, depth, contaminant name (can be abbreviated), dates (month and year) and contaminant concentrations for the two most recent sampling events for the contaminant (including J-flag where applicable), concentration units, and proposed frequency of sampling for the contaminant. Contaminant concentrations greater than the corresponding groundwater cleanup levels must be emphasized by using bold or different color font (for example, RDX 3/11 9/11 5.9 **10.7** µg/L S). If the amount of information would make a map difficult to read, the Permittees must create separate maps for different classes of contaminants.

4. **Section 2.2, Background, Contaminant Sources and Distributions, last paragraph, page 11:**
Well R-6i is not located near the confluence of DP and Los Alamos Canyons. It is located in DP Canyon, approximately half-way between the confluence and TA-21. Correct this inaccuracy.

5. **Section 6.2, Background, Contaminant Sources and Distributions, first paragraph, page 11:**
The Permittees incorrectly identified one of VOC contaminants as tetrachloroethane. The correct contaminant name is tetrachloroethene (PCE). In addition, the Permittees failed to mention that low-level concentrations of RDX have been detected in the

regional aquifer well R-63. Correct the error and provide information on RDX detections in R-63.

6. **Tables 1.6-2 and 1.6-3, pages 44 – 47:**
   If sampling at a specific location for a specific analytical suite is performed at two or more different frequencies, all sampling frequencies must be listed in the tables.

7. **Table 1.8-1, page 48:**
   Expand the table (or create a separate table) to provide the next anticipated sampling time (year and quarter) for biennial, triennial, and lower-frequency sampling that is not included in the sampling schedule for the upcoming monitoring year.

8. **Appendix B, B-1.0 Overview, second bullet list, page B-2:**
   The description of column headings for Tables B1-1 and B1-2 contains inaccuracies. For example, contrary to the information in the bullet list, Tables B1-1 and B1-2 do not include 'Number of Nondetects' column, and include 'Avg' column instead of 'Mean'. Correct all inaccuracies.

9. **Appendix D, Table D-1, page D-3:**
   The Background column for Chromium Monitoring Group contains inconsistent information. First, the Permittees state that "Cr concentrations in regional aquifer exceed New Mexico Groundwater Standard", and then, in the same table cell, they state that "[n]o constituent concentrations exceed standards or SLs in regional aquifer." Correct the discrepancy.

10. **Appendix F, F-2.0 Deep Wells with Limited Purge Volumes, page F-1:**
    The Permittees omitted, from their discussion, wells with non-purgeable Westbay systems. Include Westbay wells in future listings and discussions of wells with limited purge volumes.

11. **Plate 1, Monitoring Group Overview:**
    Boundaries of some area-specific monitoring groups are incorrect. Ensure that the Plate properly represents the area-specific monitoring groups.

This Revised Plan, as modified, will be in effect until the 2012 Plan is approved by NMED.

Do not resubmit the Revised Plan. Incorporate the corrections and changes requested in this Approval into the 2012 Plan.

Should you have any questions, please contact Jerzy Kulis or Michael Dale of my staff at (505) 476-6038 or (505) 661-2673, respectively.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

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Responsible Office:	PADCAP
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