Response to the Notice of Disapproval for the
Twomile Canyon Aggregate Area Investigation Work Plan
Los Alamos National Laboratory EPA ID No: NM0890010515, HWB-LANL-10-014
Dated March 24, 2010

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 notice of disapproval. Los Alamos National Laboratory's (LANL's or the Laboratory's) responses follow each NMED comment. This response contains data on radioactive materials, including source, special nuclear, and byproduct material. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with U.S. Department of Energy policy.

GENERAL COMMENTS

NMED Comment

1. Table 4.0-1, Summary of Proposed Samples and Analyses:

NMED Comment: *The table has a column labeled "Explosive Compounds (EPA SW-846:8321A_MOD)". There is no associated table in the Plan that lists which compounds can be analyzed by that method. NMED reminds the Permittees that the required compounds are listed in Table III-1 (page 37) of the March 1, 2005 Compliance Order on Consent (Order). Provide verification in the revised Plan that the proposed analytical method is appropriate for analyses of Composition A, Composition B and Baratol, in addition to the explosive compounds listed in Table III-1 of the Order. Unless otherwise noted, this comment is applicable to all Areas of Concern (AOCs) and Solid Waste Management Units (SWMUs) where the Permittees have proposed sampling and analysis of explosive compounds.*

LANL Response

1. The compounds listed in Table III-1 of the Compliance Order on Consent (the Consent Order) represent all the explosive compounds known to be processed or used at the Laboratory as well, as associated degradation products, for which there are approved analytical methods. Many of the explosives used at the Laboratory are mixtures of compounds listed in Table III-1 and are, therefore, detected by the proposed analytical methods, although they are not specifically listed in Table III-1. The formulation of these mixtures is presented in Appendix D of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan for Operable Unit (OU) 1082 (LANL 1993, 020948). Composition A consists of 91% to 98.5% RDX (hexahydro-1,3,5-trinitro-1,3,5 triazine) and 1.5% to 9% binders. Composition B consists of 60% RDX and 40% TNT (trinitrotoluene). Baratol consists of 76% barium nitrate and 24% TNT.

   The components of Composition A, Composition B, and Baratol are included in the analytical methods proposed in the Twomile Canyon Aggregate Area investigation work plan. RDX and TNT are included in the explosive compounds suite (modified U.S. Environmental Protection Agency [EPA] Method 8321A). Barium is included in the target analyte list (TAL) metals suite. The work plan

specifies analyzing samples from firing sites for nitrate. Binders consist of compounds such as plasticizers, polystyrenes, and waxes (LANL 1993, 020948, p. D-2). Those compounds are included in the semivolatile organic compounds (SVOCs) suite (EPA Method 8270C). Therefore, the analytical methods proposed in the work plan will detect the constituents associated with Composition A, Composition B, and Baratol.

The text in section 4.2.3.2 was revised to identify the formulations of Composition A, Composition B, and Baratol. The text in section 5.5 of the work plan (Laboratory Methods) was revised to clarify that the analytical methods proposed will detect the explosives historically used at the Twomile Canyon Aggregate Area sites.

NMED Comment

2. *For any AOC or SWMU that is categorized in the Plan as a firing site, firing pad, former firing site, inactive firing site, inactive firing pit, firing chamber, or any site which could be affected by firing activities of any kind (e.g., AOCs C-06-019 and 06-008), soil sample analyses must include perchlorate as part of the proposed analytical suite. In addition, these types of sites must include provisions for sampling and analyses of dioxins and furans. In the event radionuclides may have been handled at a given site, the Permittees must add tritium to the analytical suites as well. This comment also applies to sampling of any disposal pits or shafts associated with SWMU 06-005 and SWMUs 06-007(a-e), also known as (a.k.a.) Material Disposal Area (MDA) F. Revise Table 4.0-1 as needed to reflect the changes to the analyte suites at the affected sites.*

LANL Response

2. Perchlorate is a constituent in many propellants and energetic materials, but it is not a common constituent of high explosives. Appendix D of the RFI work plan for OU 1082 does not identify perchlorate as a constituent in the explosives processed or used at the Laboratory (LANL 1993, 020948, pp. D-3–D-4). Therefore, perchlorate is not a chemical of potential concern (COPC) at the Twomile Canyon Aggregate Area firing sites. However, perchlorate was included at all sites in Technical Area 06 (TA-06), TA-22, and TA-40, and former TA-07 to be consistent with other work plans. No revision to the work plan is necessary.

   Dioxins and furans form when materials containing chlorine undergo combustion at certain temperatures and with low oxygen present. These conditions can apply when wastes are burned. The Laboratory routinely analyzes for dioxins and furans when investigating sites where wastes have been burned. Dioxins and furans are destroyed, however, at temperatures above 1400 ºF (http://www.epa.gov/apti/bces/module6/dioxins/dioxins.htm). The high temperatures and pressures resulting when explosives are detonated will not result in the formation of dioxins and furans. Detonation creates temperatures from 5400 °F to 9000°F, followed by afterburning at temperatures from 1300°F to 3100°F, and results in conversion of incomplete detonation/combustion products to stable, nontoxic products (Zellmer et al. 2004, 109233, pp. 64–65). Therefore, sampling for dioxins and furans is not appropriate at sites that were used only for detonating explosives and not for open burning. The work plan proposed sampling for dioxins and furans at two sites: AOC C-06-019, a former generator building destroyed by burning, and SWMU 06-007(f), a former surface disposal site where wastes may have been burned. All other sites associated with firing activities were used only for detonation. No revision to the work plan is necessary.

   Tritium was not identified as a radionuclide associated with firing site operations at the Twomile Canyon Aggregate Area (LANL 1993, 026068, p. 4-11). Most of the firing site operations at the

Twomile Canyon Aggregate Area involved detonators that do not contain or use tritium. The remainder of the operations, which were conducted during the Manhattan Project, involved nuclear material recovery. However, tritium was not used in weapons during that period. Therefore, there is no historical basis to include tritium at firing sites in the aggregate area. No revision to the work plan is necessary.

NMED Comment

3. For any firing site AOC or SWMU that is listed in Table IV-2 of the Order (Deferred Sites in Testing Hazard Zones), add dioxins, furans, and perchlorate to the site analytical suites if not already proposed in the Plan. In the event radionuclides may have been handled at a given site, add tritium to the analytical suites as well.

LANL Response

3. All the Twomile Canyon Aggregate Area sites listed in Table IV-2 of the Consent Order are being investigated and are not being deferred. Therefore, these sites were included with the sites to which the response to General Comment 2 applies.

SPECIFIC COMMENTS

TA-03

NMED Comment

1. Section 4.1.1.3, Proposed Activities, page 15:

The Permittees are proposing deferral of site characterization and investigation of AOC 03-001(e) until building 03-0030 is demolished. SWMU 03-010(a) is adjacent to AOC 03-001 and, historically, both sites have been studied concurrently since they are affected by the same contaminant source(s). The Plan is not clear regarding whether the Permittees are also proposing deferral of site characterization activities at SWMU 03-010(a). The Plan must be revised to address both sites.

LANL Response

1. The Laboratory concurs that the work plan is not clear regarding proposed activities for SWMU 03-010(a). The text in section 4.1.1.3 has been revised to indicate that Solid Waste Management Unit (SWMU) 03-010(a) is also proposed for delayed site characterization along with Area of Concern (AOC) 03-001(e) until building 03-0030 is demolished.

NMED Comment

2. Section 4.1.21.3, AOC 03-051(a), Proposed Activities, page 32:

Add Total Recoverable Petroleum Hydrocarbons (TRPH, SW-846 8440) to the analytical suite for soil samples at AOC 03-051(a) and revise Table 4.0-1 to reflect the change.

LANL Response

2. Total recoverable petroleum hydrocarbons (TRPH), analyzed by EPA Method SW-846 8440, is one of the analytical suites proposed for soil samples in the work plan. Table 4.0-1 in the work plan and NMED's comment refer to the same analytical method (SW-846 8440). However, the Laboratory did not include "recoverable" in the analytical method name in the work plan text and Table 4.0-1 and did not include the "R" in the acronym used in the work plan.

   The text in section 4.1.21.3 has been revised to add TRPH (EPA Method SW-846 8440) as an analytical suite for soil samples collected at AOC 03-051(a). Table 4.0-1 has also been revised to add "recoverable" to the method name.

NMED Comment

3. Section 4.1.22.3, AOC 03-051(b), Proposed Activities, page 32:

Based on discussions during a March 17, 2010 NMED site visit, NMED understands that the Permittees will add two sample locations to be placed approximately 40 feet east and approximately 80 feet east of the southeastern-most proposed sample location. One of the additional sample locations will be placed south of the fence located south of building 03-0102 and the other location will be placed on the north side of the same fence. Sample intervals and analytical suites for the soil samples must be the same as proposed for all other sample locations at the AOC. Add TRPH (SW-846 8440) to the analytical suite for all soil samples at AOC 03-051(b) and revise Figure 4.1-38 and Table 4.0-1 to reflect this change.

LANL Response

3. Two new proposed sampling locations will be positioned approximately 40 ft and 80 ft east of the southeastern-most proposed sampling location at AOC 03-051(b). One of the additional sampling locations will be positioned south of the fence located to the south of building 03-0102, and the other location will be positioned on the north side of the same fence. Figure 4.1-38 has been revised to show the two additional sampling locations. Sampling depth intervals and analytical suites for the soil samples to be collected from the two new sampling locations will be the same as proposed for all other sampling locations at AOC 03-051(b). The text in section 4.1.22.3 has been revised to describe the two additional sampling locations and to include TRPH (EPA Method SW-846 8440) for soil samples collected at AOC 03-051(b). Table 4.0-1 has also been revised to reflect these changes.

NMED Comment

4. Section 4.1.23.3, AOC 03-052(a), Proposed Activities, page 34:

Add TRPH (SW-846 8440) to the analytical suite for soil samples at CU 03-052(a)-00 and revise Table 4.0-1 to reflect the change.

LANL Response

4. The text in section 4.1.23.3 has been revised to include TRPH (EPA Method SW-846 8440) for soil samples collected at Consolidated Unit 03-052(a)-00. Table 4.0-1 has also been revised to reflect this change.

TA-06

NMED Comment

5. Section 4.2.1.3, SWMU 06-001(a), Proposed Activities, pages 36 and 37; and, Figure 4.2-2, Proposed sample locations at SWMU 06-001(a), page 137:

If the illustration of the drain line leaving former building 06-0001 accurately reflects the as-built construction of the line, an additional sample location must be proposed below the pipe bend located approximately ten feet east of the building where the line turns approximately 45 degrees to the northeast and toward the SWMU.

LANL Response

5. An additional sampling location has been added as described in NMED's comment. Samples from this location will be collected from the same depths as the other locations at SWMU 06-001(a) and analyzed for the same analytical suites. The text in section 4.2.1.3, Figure 4.2-2, and Table 4.0-1 have been revised to include this sampling location.

NMED Comment

6. Section 4.2.3.2 AOC C-06-005, Area of Potential Soil Contamination, Description and History and Proposed Activities, pages 41 - 43:

The Plan indicates that Composition A, Composition B and Baratol were used in detonators assembled in former building 06-0013. Table III-1 of the Order does not include these compounds (see also, General Comment 1 above). Analyses of potential contaminants, including explosive compounds, is proposed in the Plan. Explosives analyses must include those three compounds in addition to the compounds listed in Table III-1 of the Order. If analyses of barium and 2,4,6-trinitrotoluene (TNT) will provide essentially the same information as analyses of Baratol, include that information in the revised Plan. In the event the three compounds are not included in Modified Method 8321A, the revised Plan must include information on what analytical method(s) will be used for the analyses.

LANL Response

6. The text in section 4.2.3.2 was revised to identify the formulations of Composition A, Composition B, and Baratol. Samples collected at AOC C-06-005 are proposed for analysis of explosive compounds (modified EPA Method 8321A), TAL metals (EPA Methods 6010 and 6020), SVOCs (EPA Method 8270C), and nitrate (EPA Method 300). As described in the Laboratory's response to General Comment 1, these analytical methods will detect the constituents of Composition A, Composition B, and Baratol. The text in section 5.5 of the work plan has been revised to indicate the analytical methods included in the work plan are appropriate to detect the constituents of the explosives used at the Technical Area 06 (TA-06) firing sites.

NMED Comment

7. Section 4.2.4.1, SWMU 06-003(a), Firing Site, Proposed Activities, pages 43 and 44:

Include analyses of dioxins, furans, tritium, and perchlorate for all sediment samples collected from the bowl and filter pit. These analytes must also be included for confirmation swipe samples if their presence is suspected based on the analytical results of the sediment samples.

LANL Response

7. As described in the response to General Comment 2, dioxins/furans, perchlorate, and tritium are not associated with historical activities at this site and were not included for analysis of sediment samples. Although soil and tuff samples from SWMU 06-003(a) will be analyzed for perchlorate to be consistent with other investigations, the sediment is being sampled for waste characterization purposes only, and analysis for perchlorate is not necessary. Therefore, no revision to section 4.2.4.1 is needed.

NMED Comment

8. Section 4.2.4.2, AOC 06-008, Area of Potential Soil Contamination, Proposed Activities, pages 44 and 45:

Add TRPH (SW-846 8440) to the analytical suite for soil samples at AOC 06-008 and revise Table 4.0-1 to reflect this change

LANL Response

8. As stated in the Laboratory's response to Specific Comment 2, TRPH (EPA Method SW-846 8440) is one of the analytical suites for soil samples collected at AOC 06-008. Table 4.0-1 of the work plan and NMED's comment refer to the same analytical method (EPA Method SW-846 8440). However, the Laboratory did not include "recoverable" in the analytical method name in the work plan text and Table 4.0-1 and did not include the "R" in the acronym used in the work plan. The text in section 4.2.4.2 has been revised to indicate that TRPH (EPA Method SW-846 8440) is included in the analytical methods for samples to be collected at AOC 06-008. Table 4.0-1 has also been revised to add "recoverable" to the method name.

NMED Comment

9. Section 4.2.7.3, SWMU 06-003(f), Firing Site, Proposed Activities, page 47:

Add an additional soil sampling location to be placed approximately 50 feet east of the circular pad. The collection sample depth intervals must be the same as the other six sample locations. Collected samples must be analyzed for the same analytical suites proposed for the other six sample locations. The additional sample location must be placed in an area that is topographically lower than the pad area.

LANL Response

9. An additional sampling location has been added at a topographically lower area as described in NMED's comment. Samples from this location will be collected from the same depths as at the other

locations at SWMU 06-003(f) and will be analyzed for the same analytical suites. The text in section 4.2.7.3, Figure 4.2-20, and Table 4.0-1 have been revised to include this sampling location.

NMED Comment

10. Section 4.2.8.3, SWMU 06-003(h), Firing Site, Proposed Activities, pages 48 and 49:

Verify that Baratol will be included as part of the explosives suite, or that indirect means will be used to assess the possible presence of Baratol such as analyses of barium and TNT.

LANL Response

10. The text in section 4.2.3.2 has been revised to identify the formulations of Composition A, Composition B, and Baratol. As explained in the Laboratory's response to General Comment 1, the components of Baratol, which are barium, nitrate, and TNT, are included in the analytical methods identified in the work plan. The text in section 5.5 of the work plan has been revised to indicate the analytical methods in the work plan are appropriate to detect the constituents of the explosives used at the TA-06 firing sites. No revision to section 4.2.8.3 is necessary.

NMED Comment

11. Section 4.2.10.1, SWMU 06-005, Pit, (a.k.a. MDA F), Proposed Activities, page 50:

There is some uncertainty concerning how the pit was abandoned and the depth of backfill used during abandonment. Add language to the discussion indicating that step-out sample locations may be advanced and sampled at depths greater than ten feet if field observations indicate the depth of backfill within the pit foot print exceeds eight feet. Additionally, discussion must be added to address what will be done with the timbers (e.g., sample and leave in place, remove and sample prior to disposal) that were used to line the pit if records indicate they were not removed during the abandonment process in 1952.

LANL Response

11. The text in section 4.2.10.1 has been revised to indicate the depth of the backfill will be determined during sampling and the deepest samples from the stepout locations will be 9–10 ft below ground surface (bgs) or 1–2 ft below the bottom of the backfill, whichever is deeper.

    The text in section 4.2.10.1 has also been revised to indicate soil will be excavated to determine if the timbers are still in place and to assess their condition. No sampling of the timbers is proposed at this time. Recommendations for additional corrective actions at this site, including sampling and/or removal of the timbers, will be made based on the results of the investigation.

NMED Comment

12. Section 4.2.10.2, SWMUs 06-007(a-e), (a.k.a. MDA F), Proposed Activities, page 51:

The exact locations, shapes and depths of the SWMUs are not known. Include an estimate of the number of borings that will be placed "…around the boundaries of the disposal units…"

LANL Response

12. Based on the current understanding of the number and size of the units comprising Material Disposal Area (MDA) F (Figure 4.2-25), it is estimated that 15 boreholes will be drilled. Four boreholes will be drilled around each of the two pits comprising SWMU 06-007(a), and four boreholes will be drilled around SWMU 06-007(b). One borehole will be drilled next to each of the pits comprising SWMUs 06-007(c), 06-007(d), and 06-007(e). The text in section 4.2.10.2 and Table 4.0-1 have been revised to provide an estimate of the number of boreholes that will be drilled at MDA F.

NMED Comment

13. Section 4.2.12.3 SWMU 06-007(g), Area of Potential Soil Contamination, Proposed Activities, page 53:

Include tritium in the analytical suite proposed for this SWMU.

LANL Response

13. As indicated in the response to General Comment 2, tritium was not used at SWMU 06-007(g) and was, therefore, not included for analysis of samples. No revision to the work plan is necessary.

TA-07

NMED Comment

14. Section 4.3.1.1 SWMU 07-001(a), Inactive Firing Pit, Proposed Activities, page 55:

Include Composition B in the explosive compounds analytical suite proposed for this SWMU. The Plan indicates pellets of unexploded plastic-bonded explosive (PBX) were found at the site in the late 1950s. It is NMED's understanding that PBX usually contains pentaerythritol tetranitrate (PETN), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX, or cyclonite), octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX), or 2,4,6-trinitro-1,3,5-benzenetriamine (TATB) as the base explosive. In the event the base explosive included other explosives not listed in Table III-1 of the Order, the revised Plan must identify the compound(s) used and include the compound(s) in the explosives analytical suite for the site.

LANL Response

14. The text in section 4.2.3.2 was revised to identify the formulations of Composition A, Composition B, and Baratol. As described in the Laboratory's response to General Comment 1, Composition B consists of a mixture of 60% RDX and 40% TNT, both of which are included in the analytical method for explosive compounds.

    The text in section 4.3.1.1 has been revised to identify the base explosives in plastic-bonded explosive (PBX) historically used at the Laboratory. Historically, pentaerythritol tetranitrate (PETN) is not a component of PBX used at the Laboratory (although PETN is a component of non-PBX explosives used at the Laboratory). Appendix D to the RFI work plan for OU 1082 indicates that the PBX formulations used at the Laboratory contain RDX; HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); or TATB (2,4,6-trinitro-1,3,5-benzenetriamine) as the base explosive (LANL 1993, 020948, p. D-3–D-4). All these explosives are included in Table III-1 of the Consent Order, and all are included in the analytical method for explosive compounds (modified EPA Method 8321A). The text in

section 5.5 of the work plan has been revised to indicate the analytical methods included in the work plan are appropriate to detect the constituents of the explosives used at the TA-07 firing sites.

NMED Comment

15. Section 4.3.1.2 SWMU 07-001(b), Inactive Firing Pit, Proposed Activities, pages 55 and 56:

Include Composition B in the explosive compounds analytical suite proposed for this SWMU if site records indicate it may have been present at the site.

LANL Response

15. The text in section 4.2.3.2 has been revised to identify the formulations of Composition A, Composition B, and Baratol. As described in the Laboratory's response to General Comment 1, Composition B consists of a mixture of 60% RDX and 40% TNT, both of which are included in the analytical method for explosive compounds. If Composition B had been used at this site, residual components of Composition B will be detected by the analytical method. The text in section 5.5 of the work plan has been revised to indicate the analytical methods included in the work plan are appropriate to detect the constituents of the explosives used at the TA-07 firing sites. No revision to the text in section 4.3.1.2 is necessary.

NMED Comment

16. Section 4.3.1.3 SWMU 07-001(c), Inactive Firing Site, Proposed Activities, pages 56 and 57:

Include Composition B in the explosive compounds analytical suite proposed for this SWMU if site records indicate it may have been present at the site.

LANL Response

16. The text in section 4.2.3.2 has been revised to identify the formulations of Composition A, Composition B, and Baratol. As described in the response to General Comment 1, Composition B consists of a mixture of 60% RDX and 40% TNT, both of which are included in the analytical method for explosive compounds. If Composition B had been used at this site, residual components of Composition B will be detected by the analytical method. The text in section 5.5 of the work plan has been revised to indicate the analytical methods included in the work plan are appropriate to detect the constituents of the explosives used at the TA-07 firing sites. No revision to the text in section 4.3.1.3 is necessary.

NMED Comment

17. Section 4.3.1.4 SWMU 07-001(d), Inactive Firing Site, Proposed Activities, page 57:

Include Composition B in the explosive compounds analytical suite proposed for this SWMU if site records indicate it may have been present at the site. The Plan indicates the site may have been "…the location of a one-time 'celebratory shot' fired in 1945 after the Japanese surrender…" If records are available, confirm that the shot involved use of only conventional explosives.

LANL Response

17. The text in section 4.2.3.2 has been revised to identify the formulations of Composition A, Composition B, and Baratol. As described in the response to General Comment 1, Composition B consists of a mixture of 60% RDX and 40% TNT, both of which are included in the analytical method for explosive compounds. If Composition B had been used at this site, residual components of Composition B will be detected by the proposed analytical method. The text in section 5.5 of the work plan has been revised to indicate the proposed analytical methods are appropriate to detect the constituents of the explosives used at the TA-07 firing sites. No revision to the text in section 4.3.1.4 is necessary.

    As indicated in section 4.3.1.4 of the work plan, the statement about the "celebratory shot" is based on anecdotal information, and no records concerning this event are available. There is no reason to believe this shot would have involved anything other than the conventional high explosives used at the Laboratory at that time. No revision to the work plan is necessary.

TA-22

NMED Comment

18. Section 4.4.1.3, Proposed Activities, SWMU 22-010(a), Septic System, pages 58 and 59:

NMED noted that a 1997 soil sample (ID 22-06063) collected from a location west-northwest of the SWMU's outfall and topographically higher than the outfall contained elevated metal concentrations and some organic compounds. The sample location has not been proposed for re-sampling in the Plan as a proposed activity for this SWMU. However, the Plan also indicates that that location and several other topographically up- and down-slope locations (relative to the estimated outfall location) will be sampled as proposed for SWMUs 22-014(a), 22-014(b) and 22-015(a). Data from those locations will be helpful in assessing site risks for all four SWMUs.

LANL Response

18. Comment noted.

NMED Comment

19. Section 4.4.2.1, SWMU 22-014(a), Sump System, Description and History, page 59, Section 4.4.2.3, Proposed Activities, pages 59 and 60, and Section 8.1, References, page 82:

*The Plan describes the seepage pit at this SWMU as being four feet in diameter and 40 feet deep. The reference cited in Section 4.4.2.1 for these dimensions is shown as "(LANL 1993, **026028**, p. 5-25)." NMED is unable to verify this reference. The Plan identifies a similar reference in Section 8.1, page 82, listed as follows: "LANL (Los Alamos National Laboratory), August 1993. "RFI Work Plan for Operable Unit 1111," Los Alamos National Laboratory document LA-UR-93-2166, Los Alamos, New Mexico. (LANL, 1993, **026068**)". Page 5-25 of the second reference listed above includes a generic drawing (Figure 5-7. Cross section of a dry well.) of a dry well four feet in diameter with a depth of 40 feet (emphases added).*

The Plan proposes placement of a soil boring adjacent to the seepage pit that would be advanced to a depth of 30 feet below the bottom of the seepage pit. Whether this proposed depth is appropriate or not depends in part on the accuracy of the dimensions shown on the generic drawing of the "Cross

section of a dry well." The Plan indicates the sump system has been operating since 1985, implying it may have been constructed in 1985 or at some time prior to 1985. If as-built drawings are available for the seepage pit, dimensions of the pit from those drawings must be used to determine an appropriate depth for the proposed soil boring. The revised Plan must clarify the reference discrepancy discussed above and briefly summarize the Permittees' efforts to locate as-built plan sets for the seepage pit. Absent the availability of as-built drawings of the seepage pit, the Permittees must propose an alternate means of determining the actual depth of the pit.

The Plan indicates "…the seepage pit surface infrastructure [will be] removed and backfilled." The revised Plan must provide more detailed information concerning which parts of the pit will be removed and the anticipated depth and source(s) of backfill that will be used after infrastructure removal.

LANL Response

19. The depth of the seepage pit associated with SWMU 22-014(a) is referenced as *36* ft deep in engineering drawing ENG C-44842 sheet 6 (LANL 1985, 109184). Section 4.4.2.1 has been revised to remove the reference to "LANL 1993, 026028, p. 5-25" from the text, to include the reference to this engineering drawing (ENG C-44842), and to indicate the seepage pit is 36 ft deep. Section 4.4.2.3 has been revised to indicate the borehole next to the seepage pit will be advanced to a total depth of 70 ft bgs.

    Section 4.4.2.3 has also been revised to indicate the seepage pit surface infrastructure includes a manhole structure and a filter basket that extend 6 ft bgs (LANL 1985, 109183). Excavation will continue until all associated components are removed, and the excavation reaches the gravel fill within the seepage pit. The excavation will be backfilled with clean fill material.

NMED Comment

20. Section 4.4.4.3, SWMU 22-015(a), Seepage Pits, Proposed Activities, pages 62 and 63:

Sample locations must be added to the right angle drain line bends located approximately 30 feet from the south and east sides of building 22-0091. Sampled intervals and analytical suites must be the same as those proposed for other sample locations along the drain line. Provide verification that the portion of the drain line located south of building 22-0091 (see Figure 4.4-12) and running below building (or former building) 22-0169 was not, and is not currently, connected to 22-0169. If the line has been or is connected to building 22-0169, additional sample locations must be placed at the inlets and outlets of those connections.

LANL Response

20. The text in section 4.4.4.3, Figure 4.4-12, and Table 4.0-1 have been revised to include two additional sampling locations at each of two locations where the drainlines from building 22-0091 bend at a right angle. Samples will be collected at the same depth intervals and analyzed for the same analytical suites as proposed for samples from other portions of the drainlines.

    Figure 4.4-12 has also been revised to indicate structure 22-0169 is a transportainer and is not tied into any facility drainlines.

TA-40

NMED Comment

21. Sections 4.5.1.1 and 4.5.1.3, SWMU 40-001(b), Septic System, Description and History and Proposed Activities, pages 64 and 65 and Figure 4.5-2, Proposed sampling locations at SWMU 40-001(b), page 188:

The revised Plan must include more detailed information and discussion concerning the nature and extent of planned seepage pit infrastructure removal and indicate the anticipated depth and source(s) of backfill that will be used after infrastructure removal.

An inconsistency was noted concerning whether or not an outfall is or may be present; the second sentence of the first paragraph in Section 4.5.1.1 indicates the system includes an outfall, while language in the second paragraph of Section 4.5.1.3 indicates "The existence of an outfall from the drain field is not known…." Edit the figure or the text as needed for consistency.

The Plan proposes placement of soil borings adjacent to the seepage pits which would be advanced to a depth of 30 feet below the bottom of each seepage pit; however, the depth(s) of the seepage pits is either not known or the information is not provided in the Plan. If as-built drawings are available for the seepage pits, the dimensions of the pits from those drawings must be used to determine an appropriate depth(s) for the proposed soil borings. Absent the availability of as-built drawings of the seepage pits, the Permittees must propose an alternate means of determining the actual depth of the pits.

Figure 4.5-2 shows two drain line segments entering/leaving building 40-0001 and two proposed borings are indicated where the line enters/leaves the building. The text in Section 4.5.1.3 indicates one boring will be placed "…from one location where it exits building 40-0001…." The revised Plan must clarify whether there are one or two lines entering/exiting the building. Additionally, if there are two lines entering the building, two additional borings must be placed at the 90 degree junction of the building lines with the main line running on the north side of the building, subject to underground utility constraints. If there is only one line entering the building, a single boring must be proposed at the 90 degree junction with the main drain line. The figure indicates a line segment (approximately 25 feet long) runs north (from the main line) to former building 40-0019. No sample location is proposed in the area where the line entered the former building. The revised Plan must include a boring location where the line entered the former building.

All additional required sample locations discussed in this comment must be sampled at the same depth intervals and for the same analytical suites as proposed for other portions of the drain line.

LANL Response

21. No as-built engineering drawing, other drawing, or additional information depicting the construction of the seepage pits associated with SWMU 40-001(b) could be found in a search of Laboratory archives. The construction details of seepage pit surface infrastructure are therefore not known. The text in section 4.5.1.3 has been revised to indicate the following:

    - seepage pit surface infrastructure excavation will include removing all surface infrastructure to a depth where seepage-pit fill material is encountered beneath any existing lateral drainlines entering and exiting the seepage pits;

- existing drainlines will be removed from within the excavation, and any remaining drainline entering or exiting the excavation will be plugged; and
- the excavation will be backfilled with clean fill material.

The inconsistency regarding the outfall has been resolved. The text in section 4.5.1.1 has been revised to remove the discussion of "an inactive outfall" and to indicate that the presence of an outfall is not known. The text in section 4.5.1.3 has been revised to indicate that ground-penetrating radar will be used to determine the location of the drain field and confirm the presence of an outfall.

Because no as-built drawing is available, the text in section 4.5.1.3 has been revised to indicate that following excavation of the seepage pit surface infrastructure, a borehole will be advanced in each of the two seepage pits to determine the depth of the seepage pits. Each borehole will be advanced until native tuff is encountered beneath the seepage pits.

The text in section 4.5.1.3 was incorrect and has been revised to indicate sampling will occur at two locations, rather than one, where drainlines exit building 40-0001. The text in section 4.5.1.3 has also been revised to indicate samples will be collected at each of two locations: (1) where the drainlines exiting building 40-0001 tie into the east-west drainline and (2) at the location where the drainline exited former building 40-0019. Samples from these new locations will be collected at the same depth intervals and analyzed for the same analytical suites proposed for samples from other portions of the drainline. Figure 4.5-2 and Table 4.0-1 have been revised to include the new sampling locations.

NMED Comment

22. Section 4.5.3.3, AOC 40-007(e), Storage Area, page 67:

The boring locations for this AOC may be appropriate as presented in the Plan. In the event one or more sides of building 40-0041 has features, such as doors or loading areas that might serve as favored, potential release routes from the building, one or more of the boring locations must be moved to areas most likely to have been impacted by historical site activities.

LANL Response

22. This site was inspected during a March 17, 2010, site visit with NMED. No features were noted that might serve as favored potential release routes from the building, and the Laboratory and NMED concurred that the proposed sampling locations, along with those of adjacent SWMU 40-005, were appropriate to detect potential releases from this building. No revision to the work plan is necessary.

TA-59

NMED Comment

23. AOC 59-004, Outfall, Sections 4.7.1.1, Description and History, page 68, 4.7.1.3, Proposed Activities, pages 68 and 69, and Figure 4.7-2, Proposed sampling locations at AOC 59-004, page 197:

Additional discussions, along with appropriate figure revision(s), are needed to evaluate proposed sampling locations at this AOC. The text indicates the outfall received wastewater from building 59-0001 and cooling tower blowdown from building 59-0010. The figure shows a structure (illustrated as being a storm drain) that is approximately 210 feet long, running northwest to southeast

approximately 30 feet from the southwest corner of building 59-0001 and approximately 300 feet west of building 59-0010. It is not clear from the text discussion or the figure illustrations how wastes from either building were routed for subsequent discharge to the associated outfall and additional sampling locations are needed to evaluate the route(s).

Based on discussions during a March 17, 2010 NMED site visit, NMED understands that the Permittees will review available engineering plans and drawings to determine the location(s) of waste lines that were used for routing wastes from buildings 59-001 and 59-0010 to the outfall and/or the storm drain shown on Figure 4.7-2. The proposed borings must be placed to evaluate potential contaminants below the transmission line(s) in areas where the line(s) exits the building(s), including areas indicating a change in piping direction so that soils below apparent pipe joints can be sufficiently evaluated as potential contaminant sources. The Permittees must add additional sample locations to areas of the waste transmission line(s) in order to characterize possible contaminants at the AOC. The Plan text indicates the outfall discharged to a 50 foot long, rock-lined, drainage channel which is not shown on the figure. If present, the channel (or former channel) must also be evaluated as a potential contaminant source by collection of soil samples from within and beneath the channel. The text also indicates two sample locations will be placed "…in the drainage downgradient of the outfall…" but the locations are not shown on the figure. Presumably, those locations will be placed somewhere south of five other down-slope locations which are shown on the figure. Alternatively, the Plan text may be revised to remove references to the two locations if the Permittees determine the locations are not needed to characterize the AOC.

Provide additional text discussions and edit the figure as needed to respond to this comment.

LANL Response

23. Four sampling locations along the drainlines have been added between the buildings and the outfall. Locations were added where the drainlines exited the buildings, at the bend in the drainline from building 59-0001, and at the approximate midpoint of the drainline from structure 59-0010. Samples will be collected 0 to 1 ft and 3 to 4 ft below the drainlines and analyzed for the same analytical suites proposed for the other sampling locations at AOC 59-004. A discussion of the four additional sampling locations has been added to the text in section 4.7.1.3, and the locations have been added to Table 4.0-1. Figure 4.7-2 has been revised to show the locations of drainlines exiting building 59-0001 and structure 59-0010 that discharged to SWMU 59-004 and to show the new sampling locations.

    In addition, the text in section 4.7.1.1 has been revised to indicate that the 50-ft-long rock-lined drainage channel was partially removed from the site when a sanitary sewer line was installed. Section 4.7.1.3 and Table 4.0-1 have been revised to indicate the first sampling location proposed downgradient of the outfall will be sampled from within the remaining portion of the rock-lined drainage channel at the site.

    The text in section 4.7.1.3 has also been revised to remove any references to the two sampling locations "in the drainage downgradient of the outfall." These locations were incorrectly identified in the text. The proposed locations below the outfall extend to the toe of the slope, and no additional downgradient samples are necessary.

NMED Comment

24. Section 7.0, Schedule, page 78:

Permittees' Statement: "*The scheduled notice date for NMED to approve this investigation work plan is February 28, 2010."*

NMED Comment: *The most recent public-noticed Master-Task Table (June 18, 2008) indicates the current notice date for the Plan is June 15, 2010. Revise the text to match the correct notice date for the Plan and revise the anticipated submittal date for the Twomile Canyon Aggregate Area investigation report as appropriate.*

LANL Response

24. The text in section 7.0 has been revised to indicate the current notice date for the Twomile Canyon Aggregate Area investigation work plan is June 15, 2010, and the anticipated submittal date for the Twomile Canyon Aggregate Area investigation report is August 15, 2012.

REFERENCES

LANL (Los Alamos National Laboratory), February 8, 1985. "New Detonator Facility, TA-22, Civil, Utilities Plan, Revision 1," Engineering Drawing ENG C-44842, sheet number 6 of 120, Los Alamos, New Mexico. (LANL 1985, 109184)

LANL (Los Alamos National Laboratory), February 8, 1985. "New Detonator Facility, TA-22, Civil, Seepage Pit Detail, Revision 1," Engineering Drawing ENG C-44842, sheet number 15 of 120, Los Alamos, New Mexico. (LANL 1985, 109183)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1082," Los Alamos National Laboratory document LA-UR-93-1196, Los Alamos, New Mexico. (LANL 1993, 020948)

LANL (Los Alamos National Laboratory), August 1993. "RFI Work Plan for Operable Unit 1111," Los Alamos National Laboratory document LA-UR-93-2166, Los Alamos, New Mexico. (LANL 1993, 026068)

Zellmer, L.A., T.L. Boggs, E.D. Erickson, and A.P. Chafin, October 19, 2004. "Treatment of Energetic Hazardous Waste by Open Detonation at the Naval Air Weapons Station, China Lake, California," *Federal Facilities Environmental Journal,* pp. 61-78. (Zellmer et al. 2004, 109233)