

TA 21



Environmental Programs
TA-21 Closure Project
P.O. Box 1663, MS C349
Los Alamos, New Mexico 87545
(505) 231-0727/FAX (505) 606-1526



National Nuclear Security Administration
Los Alamos Site Office, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
(505) 667-5808/FAX (505) 667-5948

Date: February 9, 2007
Refer To: EP2007-0039

Mr. James P. Bearzi
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505 - 6303

Subject: Submittal of the Response to the Notice of Disapproval for the Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21

Dear Mr. Bearzi:

Enclosed please find two hard copies with electronic files of the "Response to the Notice of Disapproval for the Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21."

If you have questions, please contact Ron Rager at (505) 231-7834 (rrager@lanl.gov) or Woody Woodworth at (505) 665-5820 (lwoodworth@doeal.gov).

Sincerely,

Andrew K. Phelps, Associate Director
Environmental Programs
Los Alamos National Laboratory

Sincerely,

David R. Gregory, Federal Project Director
Department of Energy
Los Alamos Site Office



AKP/DRG/RER:jk

Enclosure: Two hard copies with electronic files – “Response to the Notice of Disapproval for the Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21” (EP2007-0071)

Cy: (w/ enc)

L. Woodworth, DOE LASO, MS A316 (w/CD)

R. Rager, EP-TA21, MS C349 (w/CD)

M. Thacker, EP-TA21, MS C349 (w/CD)

EP-TA21 File, MS C349 (w/CD)

RPF, MS M707 (w/CD)

Public Reading Room, MS J591 (w/CD)

Cy: (Letter and CD only)

L. King, EPA Region 6

P. Reneau, EP-ERSS, MS M992

Cy: (w/o enc)

D. Gregory, DOE/LASO, MS A316

T. Skitbiski, NMED-OB

A. Phelps, ADEP, MS J591

C. Mangeng, ADEP, MS J591

A. Chaloupka, EP-TA21, MS C349

B. Criswell, EP-TA21, MS C349

A. Dorries, EP-ERSS, MS M992

IRM-RMMSO, MS A150

ADEP File

**Response to the “Notice of Disapproval for the Investigation Report for
Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21,
Los Alamos National Laboratory, EPA ID #NM0890010515, HWB-LANL-06-021,”
Dated January 8, 2007**

INTRODUCTION

This submittal is the response by Los Alamos National Laboratory (LANL or the Laboratory) to the “Notice of Disapproval for the Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21, Los Alamos National Laboratory, EPA ID #NM0890010515, HWB-LANL-06-021,” issued by the New Mexico Environment Department (NMED) Hazardous Waste Bureau on January 8, 2007, and received by LANL on January 11, 2007 (NMED 2007, 094854). The investigation report was submitted by LANL to NMED on October 31, 2006 (LANL 2006, 094361.4).

To facilitate review of this response, NMED’s comments are included verbatim. LANL’s responses follow each NMED comment.

This response contains data on radioactive materials, including source, special nuclear, and by-product 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 (DOE) policy.

SPECIFIC COMMENTS

1. Section 5.3 SWMU 21-013(b) and AOC 21-013(g), Slope Debris Removal, page 27, paragraph 5:

Permittees’ Statement

1. *“This final slope grading was performed after grid sampling was completed (section 3.4.1) but before the spot removals, described above, were conducted. Because location 21-24650, where benzo(a)anthracene exceeded the residential SSL, is situated on the upper portion of the western half of the slope, it is possible that it was affected by the regrading. The extent to which location 21-24650 was affected by the regrading, and therefore the efficacy of the removal action, is not known.”*

NMED Comment

1. *The Permittees attempted to remove the soil contaminated above residential SSLs; however, the removal occurred after regrading of the slope. The Permittees did not complete any additional sampling following the removal action and therefore have no way of knowing whether the contaminated soil in question was ever actually removed. NMED cannot grant a “Corrective Action Complete Without Controls” if the residential cleanup goals were not achieved. The Permittees must complete additional surface sampling in the area where benzo(a)anthracene was originally detected to confirm that the residential SSLs have been achieved. In the response to NOD, the Permittees must propose for NMED review and approval, locations and depths for the additional sampling.*

LANL Response

1. Additional sampling will be performed at and around location 21-24650 to confirm the removal of benzo(a)anthracene in soil to concentrations below the NMED 2006 residential soil screening level (SSL) (NMED 2006, 92513). Additional sampling will include resampling location 21-24650 and sampling at three new locations downgradient of 21-24650 where colluvium from location 21-24650 may have been moved during slope stabilization activities. Revised Figure 1.2-2 of Attachment 1 presents proposed sampling locations, and the attachment's Table 1 summarizes the proposed sampling depths. All samples will be analyzed for semivolatile organic compounds (SVOCs) using U.S. Environmental Protection Agency (EPA) Method 8270. The results of the additional sampling will be included in the revised investigation report.

2. Section 9.0 Recommendations, page 34:

Permittees' Statement

2. *"Based on the results, no restrictions on future land use are necessary. Neither additional corrective action nor further characterization is warranted at Consolidated Unit 21-018(a)-99. The Laboratory recommends that the four SWMUs and one AOC within the Consolidated Unit 21-018(a)-99 boundary [SWMU 21-018(a), 21-018(b), 21-013(b), 21-023(c), and AOC 21-013(g)] be designated as "Corrective Action Complete without Controls."*

NMED Comment

2. *Due to potentially unsuccessful spot removal of benzo(a)anthracene at SWMU 21-013(b) and AOC 21-013(g) and the lack of any evaluation of vapor intrusion as an exposure pathway, NMED cannot grant a "Corrective Action Complete without Controls" for MDA V. Once the risk assessment has been revised to include vapor intrusion, and additional sampling is completed on the slope to confirm that residential SSLs have been achieved, the Permittees may resubmit their request for a "Corrective Action Complete without Controls" designation for MDA V.*

LANL Response

2. Additional sampling is proposed to confirm the success of the removal action of benzo(a)anthracene and confirm that residential SSLs have been met on the slope of Solid Waste Management Unit (SWMU) 21-013(b) and Area of Concern (AOC) 21-013(g) (see response to Comment 1). Also, potential human health risk from volatile organic compound (VOC) vapors will be evaluated for the site using the Johnson and Ettinger vapor intrusion model based on a potential residential scenario, as recommended in EPA's "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (EPA 2002, 094114) (see responses to Comments 6 and 9).

The results of the additional sampling, the results of the modeling of potential health risk from organic vapor intrusion, and the request for "Corrective Action Complete without Controls," if appropriate, will be included in the revised investigation report.

3. Section 8.1.1 SWMUs 21-018(a) and 21-018(b), page 31:

Permittees' Statement

3. *"The results of sampling indicate that the vertical and lateral extent of contamination of inorganic chemicals, radionuclides, and organic chemicals have been defined."*

NMED Comment

3. *NMED concurs that the lateral and vertical extent of inorganic and organic contamination is defined; however, the vertical extent of radionuclides is not defined, specifically vapor phase tritium. In the second round of pore-gas sampling (2006) at MDA V, tritium was detected in borehole 21-24524 (BH-1) at a concentration of 132,100 pico-curies per liter (pCi/L) at a depth of 379-380 feet -- 2 times higher than the concentration of 64,700 pCi/L reported at a depth of 14-15 feet in the same borehole. Similar conditions were observed in borehole 21-24538 (BH-11), where tritium was detected at a concentration of 1500 pCi/L at a depth of 14-15 feet and 17,400 pCi/L at a depth of 54-55 feet. An increase in tritium concentrations with depth suggests the likelihood of preferential pathways for downward transport of contaminants beneath the site that may result in more rapid contaminant transport toward the regional water table. The Permittees must therefore return to borehole BH-1 or advance a new borehole at the same location and define the extent of vapor-phase VOC and tritium contamination. The Permittees must collect a pore-gas sample in the Cerro Toledo interval (310 feet to 360 feet) and at the depth of the deepest detected contamination in the original borehole (380 feet), in addition to defining the extent. The results of the additional pore-gas sampling must be included in the revised Report.*

LANL Response

3. NMED and LANL agree that the lateral and vertical extent of inorganic and organic contamination is defined. The tritium pore gas measurements are inconclusive to define the trend of tritium with depth in the subsurface of Consolidated Unit 21-018(a)-99. In light of the high mobility of tritium and potential for other sources of tritium, LANL and DOE have determined that tritium will be evaluated within the larger data set being compiled for DP (Delta Prime) Mesa. Although subsurface tritium does not pose an immediate concern to groundwater, the need for additional characterization and/or monitoring of tritium in the subsurface is being evaluated. In accordance with DOE policy, the results of the evaluation will be voluntarily provided to NMED as new information becomes available.
4. **Figure 7.6-4, Pore-gas tritium detected in borehole locations collected in 2006 Investigation at Consolidated Unit 21-018(a)-99, page 55:**

NMED Comment

4. *Figure 7.6-4 shows a TD of 55 feet at borehole location 21-24538 (BH-11); however, the figure also shows a tritium pore-gas sample was obtained at 84-85 feet. Additionally, Table 3.1-1 provides a summary of samples collected in each borehole and the deepest sample obtained at BH-11 was from 53-55 feet. NMED assumes that this is an editorial error (54-55 feet, rather than 84-85 feet), but the Permittees must nevertheless explain this discrepancy.*

LANL Response

4. Figure 7.6-4 contains an error. The deepest sample from BH-11 was taken at 54–55 ft (confirmed with sample collection logs and borehole logs; the borehole logs were provided in Appendix D of the investigation report). The revised Figure 7.6-4 will be included in the revised investigation report.

5. Section B-5.1.2, Radionuclides, page B-15, paragraph 3:

Permittees' Statement

5. *"A sample was collected for analysis of radionuclides and inorganic chemicals, but as of the publication of this report, the laboratory data are not available for review. Further investigation and, if necessary, remediation of this area will be undertaken as part of the DP Aggregate Investigation."*

NMED Comment

5. *NMED concurs that any additional investigation or remediation of the area of elevated radioactivity (south of location 21-02523 and north of absorption bed 3) will be addressed under the DP Site Aggregate Area Investigation. However, NMED cannot grant a "Corrective Action Complete without Controls" until the residential SSLs/SALs have been achieved. Also see Comment # 2.*

LANL Response

5. Data have been received for the assessment of radiological constituents. Target Analyte List (TAL) metals could not be run because analytical difficulties in the radiological analyses consumed all the sample aliquots. The additional data will be collected under the DP Site Aggregate Area investigation. The radiological data indicate plutonium and americium above residential screening action levels (SALs). The area south of location 21-02523 and north of absorption bed 3 will be sampled and evaluated for hazardous constituents and radionuclides in conjunction with the DP Site Aggregate Area investigation activities. LANL will transmit the sampling data to NMED under separate cover and discuss future actions at the locations, as appropriate, based on the data results.

6. Section H-3.1, Receptors and Exposure Pathways, page H-6, paragraph 2:

Permittees' Statement

6. *"Pathways from subsurface contamination to potential human receptors are complete only if contaminated soil or tuff is excavated and brought to the surface."*

NMED Comment

6. *Soil pore gas data were not considered in the identification of potential exposure pathways. No justification is provided for excluding the vapor intrusion pathway. Several VOCs were detected in pore gas at SWMUs 21-018(a) and 21-018(b) (See Table 2.5-1 Summary of COPCs at SWMUs 21-018(a) and 21-018(b) by Media, on page B-108 and -109 of Appendix B), indicating vapor intrusion to be a potentially complete exposure pathway. It is possible to model pore gas data and evaluate the vapor intrusion pathway for the migration of VOCs from pore gas into buildings. The "vapor migration into indoor air" pathway should be identified as a complete exposure route and evaluated using available guidance, such as USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Soil Vapor Intrusion*

Guidance) EPA 530-F-02-052, Office of Solid Waste and Emergency Response, Washington, D.C. This guidance provides default shallow and deep soil gas screening levels that are protective of indoor air. In addition, the guidance references the use of a spreadsheet model, such as the Johnson and Ettinger model. The Permittees must provide additional evidence for determining that the pore gas data are not applicable to the risk assessment as a source for indirect exposure via inhalation, or the data should be used in a quantitative evaluation of this pathway.

LANL Response

6. LANL will evaluate VOCs listed in Table B-2.5-1 in Appendix B for SWMUs 21-018(a) and 21-018(b) for the potential vapor intrusion pathway using EPA's "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (EPA 2002, 094114). The evaluation of the vapor intrusion pathway will be included in the revised investigation report.

7. Section H-3.3, Environmental Fate and Transport, Inorganic Chemicals, page H-8, paragraph 1:

Permittees' Statement

7. *"Lithium was only analyzed for in three samples, the concentrations detected are probably naturally occurring levels, and its extent was defined."*

NMED Comment

7. *Generalized assertions cannot be used to exclude chemicals as representative of representative of a release. Rather, specific references to background comparison tables or figures are required. While supporting information for contaminants is provided throughout the report, this information is not provided within Appendix H. The Permittees must revise the human health screening assessment to substantiate the exclusion of specific inorganics and radionuclides as constituents of potential concern (COPCs).*

LANL Response

7. The Permittee's statement quoted above is part of the discussion of fate and transport and is not related to the identification of chemicals of potential concern (COPCs) for any of the SWMUs and AOC at Consolidated Unit 21-018(a)-99. The identification of COPCs follows the process described in Appendix B, section B-1.2. The COPCs for each SWMU and AOC as evaluated in the risk assessment are summarized in Table H-2.0-1 in Appendix H. The criteria to identify COPCs are as follows:

- If at least one value of the detected data or a detection limit for an analyte is greater than the background value and at least one value exceeds the range of background concentrations, then the analyte is retained as a COPC.
- If the analyte is detected in at least one sample and has no background value associated with it, that analyte is retained as a COPC. For organic chemicals all detected analytes are retained as COPCs.
- If at least one value of the detected data for an analyte is greater than the background value, but all of the detected values and detection limits fall within the range of background data, then the analyte is not retained as a COPC.

- If all of the detected values and detection limits of undetected values of an analyte are less than the background value, then the analyte is not retained as a COPC.

Inorganic chemicals and radionuclides without background or fallout values (second bullet) were retained as COPCs for the SWMUs and AOC in Consolidated Unit 21-018(a)-99. This includes the inorganic chemicals lithium, nitrate, perchlorate, and strontium; the fallout radionuclides cobalt-60 and sodium-22 in soil; and all fallout radionuclides in tuff. The COPCs for each SWMU and AOC are summarized in Table H-2.0-1 in Appendix H. In addition, the human health risk screening assessment tables for each SWMU and AOC include the inorganic chemicals and radionuclides without background or fallout values if they were detected in the appropriate depth intervals (Tables H-4.1-4, H-4.1-5, H-4.1-7, H-4.1-8, H-4.1-10, and H-4.1-11). Therefore, the hazard indices and total doses calculated for each SWMU and AOC include the contributions of these inorganic chemicals (including lithium) and radionuclides. No revision to the human health screening assessment is necessary.

8. Section H-4.2.2, Exposure Assessment, Similarity to Background, page H-18:

NMED Comment

8. *Throughout the human health risk screening assessment, arsenic is highlighted as the primary risk driver for carcinogenic risk (i.e., contributing greater than 70% of the carcinogenic risk). However, the uncertainty analysis indicates that arsenic is “similar to background.” This conclusion is not substantiated by citations or references to relevant sections in the report, which demonstrate that the arsenic concentrations are not significantly different from background. While arsenic is likely to be representative of background conditions, a reference to the relevant sections in the report that verify this conclusion must be provided. The Permittees must revise the text where appropriate.*

LANL Response

8. Reference to other sections of the document is not relevant because this is the only section that discusses this uncertainty relative to the human health risk screening assessment. The text on the similarity of arsenic exposure point concentrations to background is related to the calculated 95% upper confidence limits (UCLs) for arsenic at each of the SWMUs and AOC at Consolidated Unit 21-018(a)-99. The 95% UCLs for arsenic (3.33 milligrams per kilogram [mg/kg], 3.26 mg/kg, and 2.95 mg/kg), which represent the levels of exposure for a residential receptor across the site, are similar to the concentrations of arsenic used to calculate the background values for soil and tuff (arsenic background concentrations range from 0.3 mg/kg to 9.3 mg/kg for soil and 0.25 mg/kg to 5 mg/kg for Quarternary-age Bandelier Tuff [Qbt] 2, 3, and 4). The discussion on the similarity to background in section H-4.2.2 in Appendix H will be revised to include the citation of the LANL background document (LANL 1998, 59730), the ranges of arsenic background concentrations for soil and tuff, and the 95% UCLs calculated for arsenic. This information plus additional text will more clearly substantiate the similarity of the arsenic 95% UCLs to the arsenic background concentrations.

9. Section H-5.4.6, Population Area Use Factors, page H-25:

Permittees’ Statement

9. *“If the maximum detected concentration is used rather than the 95% UCL (1.51 mg/kg), the HQs for the deer mouse and shrew are approximately 0.5 and 0.7, respectively.”*

NMED Comment

9. *This statement indicates that the ecological screening assessment utilized the 95% upper confidence level of the mean (UCL95), even if the UCL95 was higher than the maximum concentration. Standard risk assessment practice (USEPA, 2002) uses the lower of the UCL95 or maximum concentration, if adequate samples have been collected to estimate a population mean. The approach taken was more conservative. However, in future risk assessments, the maximum concentration should be used if the UCL95 is predicted to be higher than the maximum concentration when adequate samples are collected to estimate a population mean.*

LANL Response

9. LANL follows the rule that if the 95% UCL exceeds the maximum concentration of the data set, the maximum concentration is used as the exposure point concentration for that COPC in the risk screening assessments. As depicted in Table H-3.5-4 in Appendix H, the maximum concentration for benzoic acid in the 0–5-ft depth interval is 30.3(U) mg/kg, which is a nondetect and exceeds the calculated 95% UCL (1.51 mg/kg). Appendix H's section H-5.4.6 is related to the maximum detected concentration (0.676 mg/kg), which is less than the 95% UCL, and not the maximum concentration in the benzoic acid data set.

10. Figure H-3.1-1, Conceptual site model flow diagram for Consolidated Unit 21-018(a)-99, page H-33:

NMED Comment

10. *The soil pore gas data indicate detections of a number of volatile organic compounds (VOCs). However, the conceptual site model does not address the presence of vapors in the subsurface as a potential source contributing to the vapor intrusion exposure pathway. The Permittees must revise the figure to include inhalation exposure from subsurface vapors and revise the text to include rationale for including/excluding this pathway from further analyses.*

LANL Response

10. The appendix will be revised to discuss the rationale for including the air exposure pathway. Figure H-3.1-1 will be modified to add the vapor intrusion exposure pathway, and the results of the evaluation will be included in the revised investigation report.

SCHEDULE

LANL will provide the revised investigation report within 90 days of the completed field work. Because of winter weather, access to the hill slope for the additional sampling is anticipated in late March or early April 2007. Under this scenario, the revised investigation report would be submitted in approximately July 2007. LANL will provide NMED with a 15-day notification prior to the additional sampling. This proposed schedule assumes that NMED accepts this response to comments without modifications that could significantly alter LANL's ability to perform any additional requirements.

REFERENCES

The following list includes all documents cited in this response. Parenthetical information following each reference provides the author(s), publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the DOE–Los Alamos Site Office; the EPA, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

EPA (U.S. Environmental Protection Agency), November 2002. "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils," subsurface soil vapor intrusion guidance, Environmental Protection Agency document EPA 530-F-02-052, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 2002, 094114).

LANL (Los Alamos National Laboratory), September 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," draft, Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 059730)

LANL (Los Alamos National Laboratory), October 31, 2006. "Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21," Los Alamos National Laboratory document LA-UR-06-6609, Los Alamos, New Mexico. (LANL 2006, 094361.4)

NMED (New Mexico Environment Department), June 2006. "Technical Background Document for Development of Soil Screening Levels, Version 4," New Mexico Environment Department document, Hazardous Waste Bureau and Groundwater Quality Bureau, Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2006, 092513)

NMED (New Mexico Environment Department), January 8, 2007. "Notice of Disapproval for the Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21, Los Alamos National Laboratory, EPA ID #NM0890010515, HWB-LANL-06-021," New Mexico Environment Department notice from J.P. Bearzi (Chief, NMED-HWB) to D. Gregory (Federal Project Director, DOE-LASO) and D. McInroy (Remediation Services Deputy Project Director, LANL), Santa Fe, New Mexico. (NMED 2007, 094854)

Attachment 1

**Summary of Proposed Additional Sampling
for SWMU 21-013(b) and AOC 21-013(g)**

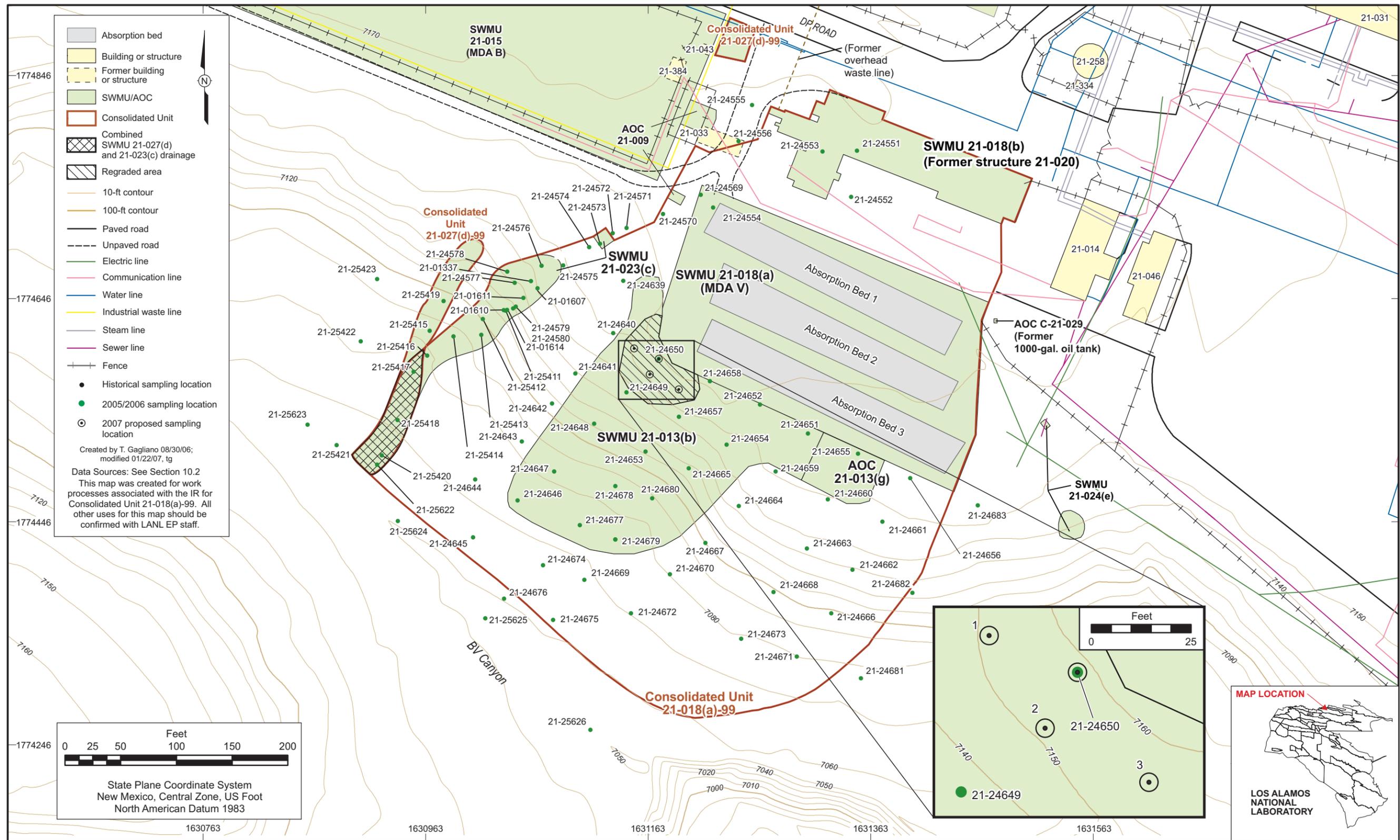


Figure 1.2-2. Proposed locations of surface and shallow-subsurface samples to be collected at Consolidated Unit 21-018(a)-99 in 2007

Table 1
Proposed Surface and Shallow-Subsurface Sampling in 2007

Proposed Sampling Location	Sampling Depth(s) (ft below ground surface)	Sampling Justification
21-24650	0-0.5 1.5-2.0	Verification of removal action
1	0-0.5 1.5-2.0	Supplemental sampling for determining extent of SVOCs downgradient of 21-24650
2	0-0.5 1.5-2.0	Supplemental sampling for determining extent of SVOCs downgradient of 21-24650
3	0-0.5 1.5-2.0	Supplemental sampling for determining extent of SVOCs downgradient of 21-24650

Note: All samples will be analyzed for SVOCs using EPA Method 8270.