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**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**

February 24, 1997

Mr. G. Thomas Todd, Area Manager  
Los Alamos Area Office  
Department of Energy  
528 35th Street  
Los Alamos, New Mexico 87544

**RE: Notice of Deficiency**  
**RCRA Facility Investigation Report**  
**Technical Areas 18 and 27**  
**Los Alamos National Laboratory**  
**NM0890010515**

Dear Dear Mr. Todd:

The Hazardous and Radioactive Materials Bureau (HRMB) of the New Mexico Environment Department has conducted an extensive review of the RCRA Facility Investigation (RFI) Report for Technical Area (TA) 18 dated October 1995 and referenced by EM/ER:95-606 and found it to be deficient. LANL must respond to the deficiencies noted in Attachments A and B within 30 days of the receipt of this letter.

HRMB reviewed all Potential Release Sites presented in the RFI report; however, the information presented on many Areas of Concern (AOCs) was found to be deficient. Therefore, HRMB was not able to discern those AOCs which should be added to the permit. Once additional information regarding these AOCs is provided, HRMB will determine which AOCs, if any, should be added to the Hazardous and Solid Waste Amendments (HSWA) portion of the RCRA Operating Permit.

As a result of this report and various other on-going activities at TA 18, it has become apparent that significant and systemic groundwater contamination exists in the shallow alluvial ground water. In accordance with Task III of Module VIII of LANL's RCRA Operating Permit, HRMB requires that LANL perform a comprehensive ground water

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TRACK: LANL, 2/24/97, NIA, DOE HRMB/TA 18 RE.  
FILE: LANL, HSWA FU 2/OU 1093/TA 18 027

72

Mr. G. Thomas Todd  
February 24, 1997  
Page 2

investigation; the study area should include all of TA 18 and extend down Pajarito Canyon to State Road 4. This investigation must focus on the delineation of contamination in and interconnection of the various modes of ground water. LANL's investigation must include sampling of springs and seeps within the study area which contribute to the shallow alluvial aquifer.

Should you have any questions regarding this letter, please contact me or Mr. John Kieling, HRMB's LANL Facility Manager, at (505) 827-1558.

Sincerely,

Benito J. Garcia, Chief  
Hazardous and Radioactive Materials Bureau

BJG:kth

attachments

cc: T. Davis, NMED HRMB  
R. Dinwiddie, NMED HRMB  
T. Glatzmaier, DDEES/ER, MS M992  
J. Jansen, LANL ER, MS A316  
M. Johansen, LAAO, MS A316  
M. Leavitt, NMED GWQB  
D. McInroy, EM/ER, MS M992  
D. Neleigh, EPA, 6PD-N  
J. Parker, NMED DOE OB  
G. Saums, NMED SWQB  
T. Taylor, DOE LAAO, MS A316  
S. Yanicak, NMED DOE OB, MS J993  
File: LANL HSWA FU 2/OU 1093/TAs 18 & 27 and Reading File

**ATTACHMENT A - SUMMARY OF CONCLUSIONS**  
**RCRA Facility Investigation Report**  
**Technical Areas 18 and 27**  
**October 1995**

PRS	LANL'S PROPOSED ACTION	DOES HRMB CONCUR?	HRMB'S RATIONALE
18-002(a)	NFA <sup>1</sup>	No	Discreet samples not obtained; holding times exceeded for contaminants of concern; additional information/sampling required
18-002(b)	NFA	No	Discreet samples not obtained; holding times exceeded for contaminants of concern; additional information/sampling required
18-002(c)	NFA	No	Discreet samples not obtained; holding times exceeded for contaminants of concern
18-003(a)	AC <sup>2</sup>	Yes	Contaminants of Potential Concern (COPCs) > Screening Action Levels (SAL)s; no baseline risk assessment conducted; additional information/sampling required
18-003(b)	AC	Yes	COPCs > SALs; no baseline risk assessment conducted; additional information/sampling required
18-003(c)	AC	Yes	COPCs > SALs; no baseline risk assessment conducted; additional information/sampling required
18-003(d)	AC	Yes	COPCs > SALs; no baseline risk assessment conducted; additional information/sampling required
18-003(e)	NA	NA	Not Applicable: accelerated cleanup performed August 1995
18-003(f)	NFA	No	COPCs > SALs; no baseline risk assessment conducted; additional information required
18-003(g)	AC	No	COPCs > SALs; no baseline risk assessment conducted; additional information/sampling required
18-003(h)	NFA	No	Site inadequately characterized
18-004(a)	NFA	No	Additional information/sampling required
18-004(b)	NFA	No	Site inadequately characterized; additional information/sampling required
18-005(a)	NFA	No	Additional information/sampling required
18-008	NFA	No	NFA proposed based on PRS not located; PRS recently located
18-010(b)	NFA	No	Additional information/sampling required
18-010(c)	NFA	No	Additional information/sampling required
18-010(d)	NFA	No	PAHs > SALs
18-010(e)	NFA	No	PAHs > SALs
18-010(f)	NFA	No	Additional information/sampling required
18-011	NFA	No	Additional information/sampling required
18-012(a)	NFA	No	Additional information/sampling required
18-012(b)	NFA	No	PAHs > SALs; additional information/sampling required
18-012(c)	NFA	No	Site inadequately characterized; additional information/sampling required
18-013	NFA	No	COPCs > SALs; used industrial PRGs as SALs; no baseline risk assessment conducted
27-002	NFA	No	Discreet samples not obtained; holding times exceeded for contaminants of concern; additional information/sampling required

<sup>1</sup> No Further Action

<sup>2</sup> Accelerated Cleanup

**ATTACHMENT B - NOTICE OF DEFICIENCY COMMENTS**  
**RCRA Facility Investigation Report**  
**Technical Areas 18 and 27**  
**October 1995**

**1. GENERAL COMMENTS**

- a. Approach/Conceptual Model
  - i. LANL shall treat Potential Release Sites (PRSs) within close proximity of one another and affecting the same media as non-isolated units. For instance, information gathered for one PRS should be used in the assessment of other nearby PRSs. [Concept similar to collective drainage approach]
  - ii. NMED has a regulatory interest not only in the PRSs themselves, but also in any potential ground water contamination beneath them. This RCRA Facility Investigation (RFI) report recommends no further action for many PRSs based on the observation that the PRS being investigated is not the source of identified contaminant concentrations in ground water. New Mexico Environment Department (NMED) cannot support the No Further Action (NFA) recommendation proposed for these sites without adequate commitment from LANL to assess the cumulative risk to ground water.
  - iii. LANL must determine the source and extent of contamination for those PRSs whose analytical results exceeded background and Screening Action Levels (SALs). The New Mexico Water Quality Control Commission (WQCC) regulations, among others focus on presence of contaminants rather than on specific PRSs. Under these regulations, LANL has the responsibility to investigate further to ensure that no other areas of significant contaminant concentrations exist.

CONTAMINANTS EXCEEDING BACKGROUND AND SALs	PRSs ADDRESSED IN THIS RFI REPORT
High Explosives	2(a)
Inorganics	3(a-c, f),
Organics	3(a-c, d, g), 10(d-e), 12(b-c), 13
COPCs < SALs based on this RFI	HSWA: 2(b-c), 3(h), 4(a), 5(a), 27-002 NON-HSWA: 4(b), 8, 10(b-c, f), 11, 12(a)

- iv. LANL shall recalculate upper tolerance limits based on the **95th confidence level of the 95th percentile of distribution**. LANL shall respond to this comment by providing a summary of the newly calculated Upper Tolerance Limits (UTLs), the former UTLs, and any effects it has on the data comparisons made in this report.
- v. LANL shall clarify which land use scenarios were used to generate SALs for each of the Multiple Chemical Evaluations (MCEs) performed in this report. LANL shall base its SALs on US Environmental Protection Agency (USEPA) Region IX residential Potential Remediation Goals (PRGs). LANL may, in addition to performing the MCE based on residential risk, present an evaluation of risk based on a most likely exposure scenario. In response to this Notice of Deficiency (NOD) comment, LANL shall submit a table of revised SALs, SALs applied in the RFI report, and discuss any resulting differences which may affect the decisions made in this RFI report. For those SALs absent from the USEPA Region IX PRGs, LANL shall calculate the SAL using Subpart S guidance. LANL shall provide an explanation of the methodology and the calculations used to derive the SALs.
- vi. LANL must perform a baseline risk assessment (BRA) for those PRSs where contaminant concentrations exceed SALs. The potential for human health or ecological risk due to additive inputs from multiple, nearby sources should be considered; many sites within TA 18 may

present carcinogenic, noncarcinogenic, or radiological risks which, in total, may present an unacceptable human health or ecological risk. Consideration should be given to whether additive effects will be sufficiently evaluated either within an ecological risk assessment or within the Watershed Management Plan, or by some other means. See comment 1.a.iii above.

- vii. LANL obtained unfiltered inorganic ground water samples for this RFI report using the procedures set out in Section 3.2.2 Comparison with Screening Action Levels/Other Standards:

"For surface water or groundwater, the SALs are based on regulatory levels...The SALs for surface water and groundwater are maximum contaminant levels (MCL) promulgated under the Safe Drinking Water Act...the State of New Mexico Water quality regulations (which take precedence over the Clean Water Act) stipulate that filtered samples shall be used for the comparison of inorganic concentrations against state water quality standards. In accordance with this, only the organic results from filtered samples were used in the SAL comparison for surface water and groundwater samples."

Because these samples were unfiltered, the concentrations of contaminants were deemed "NC" or not comparable with the New Mexico WQCC standards. LANL, however, did not continue the evaluation by comparing the concentrations with any other standard applicable to unfiltered samples, such as the Safe Drinking Water Act's (SDWA) Maximum Contaminant Levels (MCLs). LANL must, at a minimum, compare the unfiltered samples to SDWA MCLs and Region IX PRGs.

- viii. This RFI report does not include an assessment of ecological risk. An evaluation of risk posed to ecological receptors must be assessed prior to recommending No Further Action (NFA) for a PRS.
- b. Supporting Documentation
- i. LANL shall include pertinent information such as a tabulated summary of Photo Ionization Detector/Flame Ionization Detector (PID/FID) readings, auger logs, boring logs, well construction diagrams, well development methodology, and log books in the RFI report.
  - ii. LANL shall provide a checkplot presenting a compilation of all the sampling locations (including site-specific background sampling locations) and additional information including, but not limited to, the following:
    - all springs, wells, and seeps within the same canyon system(s) or within a 1-mile radius of any PRS within the RFI;
    - all contaminant concentrations greater than background, greater than SALs, and greater than SALs and less than USEPA Region IX PRGs;
    - types of analyses conducted at each location;
    - exposure scenario for the PRG standards; and
    - site-specific background concentrations.
  - iii. LANL shall provide a checkplot and table summarizing all the site-wide background sampling locations and results.
  - iv. LANL shall provide supporting documentation in defense of eliminating Contaminants of Potential Concern (COPCs) attributed to sources (asphalt paving, etc.) other than site activities or eliminated using "process information" or other such "knowledge" such as 18-010(b).

- v. LANL shall present a complete view of the site including site history, process knowledge, site conditions such as improvements, etc. within the RFI report so that it can be presented as a "stand-alone" document.
  - c. Sampling and Analyses
    - i. LANL shall provide a separate and distinct discussion of the variances from the approved RFI Workplan within the RFI report.
    - ii. LANL shall not use composite sampling for determining the presence or absence of contaminants or for determining the nature and extent of contamination. As a result of this lack of adequate and useable data, LANL shall resample at PRSs 18-002(a-c) and 27-002.
    - iii. LANL shall not use field instrumentation to determine the types of analyses to be conducted at investigations aimed at determining the presence or absence of contamination. When field instrumentation is used for screening, LANL shall provide assurances (such as detection limits and calibration records) that appropriate Quality Assurance/Quality Control criteria were adhered to. In addition, LANL must obtain confirmatory samples when using field screening to determine the presence or absence of contamination.
    - iv. LANL did not address EPA's comment on the RFI Workplan requiring 4 out of 32 wetland samples be obtained from a depth of 1 to 6 inches. [Letter from Honker (USEPA Region VI) to Vozella dated May 7, 1994]
    - v. LANL shall provide the number or percentage of media samples from each PRS that were analyzed by a fixed laboratory and indicate whether the laboratory was off-site or on-site. HRMB requires 20% of the samples collected for fixed laboratory analysis be analyzed by an off-site laboratory.
  - d. Typographical and Reporting Errors
    - i. PRS numbers were not indicated on several figures (Figures 4-2 through 4-5; and Figures 4-9 through 4-12).
    - ii. Names of wells and buildings were inconsistently used. For example, Building 18-32 is often indicated as Criticality Building or Facility on the figures.
  - e. Appendices
    - i. LANL must conduct TCLP analyses for waste characterization and present the results in the RFI report when offsite disposal of wastes is proposed. [*Programmatic Issues from NODs* dated January 16, 1995]
    - ii. LANL shall provide documentation indicating that appropriate Quality Assurance/Quality Control (QA/QC) samples were obtained and analyzed per EPA guidance. To substantiate that the appropriate QA/QC samples were obtained, a discussion of the QA/QC samples obtained and analyzed must be presented along with a description of QA/QC problems encountered. [*Programmatic Issues from NODs* dated January 16, 1995]
    - iii. LANL shall provide an explanation of the fields and comments of the analytical results in Appendix D.
    - iv. LANL shall provide a summary of all analytical data in Appendix D regardless of non-detectable concentrations.
    - v. It is not clear if the analytical results presented in Appendix D were obtained from a mobile analytical laboratory, an on-site fixed laboratory, an off-site fixed laboratory, or a combination. LANL shall revise the appendix to provide this information.
- 2. SPECIFIC COMMENTS**
- a. Background Data Assessment
    - i. Section 3.2.1 Background Data Comparison: LANL shall use a 95th confidence level of the 95 percentile of distribution to compute the UTL. See comment 1.a.iv. [*Agreements and*

*Action Items from Joint Environmental Protection Agency, Department of Energy, and University of California Meeting Held on September 18-19, 1995; EM/ER:95-541, dated October 4, 1995]*

- ii. Section 3.2.1 Background Data Comparison: All RFI reports submitted after October 1, 1996 shall use laboratory-wide background data for screening and risk-based decisions and show the comparison to background using the most current, revised background data. [*Programmatic Issues from NODs dated January 16, 1995*]
  - iii. Section 3.2.1: No reference material or discussion is provided regarding where site-specific background soil samples were obtained and how the site-specific values were determined for comparison. See comment below.
  - iv. Section 3.2.1: Because the RFI report is a "stand-alone" document, a tabulated summary of concentrations, a checkplot showing the sampling locations, and a concise overview of the methodology for determining the UTL and SAL shall be provided for the both the site-wide and site-specific background information. See comments 1.b.i and 1.b.ii.
  - v. Table 3-1, page 3-5: For comparison purposes, LANL should include SALs on Table 3-1.
  - vi. Section 3.2.1, Background wells: The close proximity of all three background groundwater monitoring wells in Pajarito Canyon fails to provide a true characterization of the alluvial ground water system within the canyon. The well placement focused only on a small area with limited opportunity for natural variability.
  - vii. Section 3.2.2 Comparison with Screening Action Levels/Other Standards: LANL shall base its SALs on USEPA Region IX preliminary remediation goals for a residential scenario. See comment 1.a.v.
- b. Section 4.1 Septic Systems
- i. General
    - (1) For those septic systems and associated lines where hazardous constituents were identified above background in both the septic settling or holding tank and in the subsurface, LANL shall evaluate the integrity of the septic system drain lines.
    - (2) For those septic systems and associated lines where hazardous constituents were identified above background in the septic settling or holding tanks, LANL shall perform interim measures to prevent further discharge into the environment.
    - (3) For each inactive septic tank, LANL shall remove or, at a minimum, backfill the tank with a solid, non-porous material (such as flow crete). However, any action other than removal of the tank and associated lines may not be considered as a final disposition appropriate for NFA. See following site-specific comments.
  - ii. Section 4.1.1 18-003(a-b) - Settling Pit, Septic Tank, and Drainfield: *These active PRSs are proposed for accelerated cleanup which includes the removal of the septic tanks' contents and pressure-rinsing of the septic tanks.*
    - (1) The Settling Pit [18-003(a)] was found to contain elevated concentrations of Volatile Organic Compounds (VOCs) and Polyaromatic Hydrocarbons (PAHs); no VOC or Semivolatile Organic Compound (SVOC) analyses were conducted at the Septic Tank [18-003(b)]. Groundwater samples obtained southwest of the Drainfield and at MW-3 (sample location 18-2015) were found to contain concentrations of 1,2-dichloroethane (DCA) greater than SALs. 1,2-DCA is attributable to site activities and, can possibly be related to septic activities at PRSs 18-003(a) and 18-003(b).
    - (2) LANL shall conduct further investigations to determine the integrity of the drainlines associated with these PRSs, confirm or eliminate 18-003(b) as a potential alternate source by performing the proper analyses (including SVOCs), and determine the nature

- and extent of the resulting groundwater contamination. All groundwater wells within this vicinity should also be analyzed for high explosive (HE) compounds using SW-846 Method 8330 to provide a comprehensive site-wide survey of these constituents and to determine if these PRSs may have contributed to the overall degradation of the alluvial ground water system.
- (3) It is recommended that sampling locations and analytical results from the LACEF wells, and any other pertinent sampling locations, be presented concurrently with these PRSs. This would provide additional data by which a more comprehensive evaluation could be made of this PRSs.
- iii. Section 4.1.2 18-003(c) - Septic Tank and Drainfield: *This active PRS is proposed for accelerated cleanup which includes the removal of the septic tank's contents and pressure-rinsing of the septic tank.*
- (1) LANL shall conduct further investigations at this PRS in order to determine the following: the presence or absence of VOCs in the septic tank; the presence or absence of contaminants in the subsurface between the drainfield and the nearest surface water body; the integrity of the drainlines associated with the PRS; the source of the groundwater contamination (at a minimum, eliminate the septic tank and its associated drainlines and drainfield as a potential source); and the nature and extent of the identified groundwater contamination.
- (2) LANL shall obtain or provide analytical results for sediment samples at the following locations in Threemile Canyon: upgradient of Threemile Springs 3A and 3B; downgradient of Threemile Springs 3A and 3B and upgradient of the influence of the firing sites, 18-002(b, c); downgradient of the firing sites [18-002(b, c)] and upgradient of TA-18 Spring; and downgradient of TA-18 Spring. These samples shall be analyzed for 40 Code of Federal Regulations Appendix IX constituents including HE using SW-846 Method 8330.
- iv. Section 4.1.3 18-003(d) - Septic Tank and Drainfield: *This active PRS is proposed for accelerated cleanup which includes the removal of the septic tank's contents and pressure-rinsing of the septic tank.*
- (1) The septic tank [18-003(d)] was found to contain elevated concentrations of VOCs and solvents. A groundwater sample obtained north of the drainfield was found to contain concentrations of 1,2-DCA greater than its SAL. 1,2-DCA is attributable to site activities and, possibly to PRS 18-003(d).
- (2) LANL shall conduct further investigations to determine the integrity of the drainlines associated with the PRS, confirm or eliminate the septic tank as a potential source of the groundwater contamination, and determine the nature and extent of the groundwater contamination.
- (3) LANL shall provide in its NOD response clarification to the following issue: The analytical results as indicated on Figure 4-4 for sample AAA5827, sample location 1044, differ from the Appendix D analytical results spreadsheet to Table 4.1: 1,1-DCA is greater than SALs in Appendix D. In addition, Table 4-1 does not indicate that the sludge samples were analyzed for VOCs and SVOCs as shown in Figure 4-4.
- v. Section 4.1.4 18-003(f) - Septic Tank: *This inactive PRS is proposed for NFA based on the absence of hazardous constituents above action levels.*
- (1) LANL shall conduct further investigations to determine the integrity of the drainlines associated with the PRS, confirm or eliminate the septic tank as a potential source of the groundwater contamination, and determine the nature and extent of the groundwater contamination.

- vi. Section 4.1.5 18-003(g) - Septic Tank: *This active PRS is inappropriately proposed for NFA based on the following deficiencies:*
  - (1) LANL eliminated a COPC (1,1,2-trichloro-1,2,2-trifluoroethane) based on "no reasonable pathway" for human exposure. The rationale for eliminating this COPC is inappropriate. LANL has yet to obtain basic information necessary to conclude that interconnection between the shallow alluvial aquifer and the regional aquifer does not exist. LANL must use SALs based on Region IX PRGs or calculate a SAL using Subpart S guidance. See comment 1.a.v.
  - (2) LANL shall clarify the rationale for locating sample 18-1275 at such a great distance from the potential source. The reviewer questions the representativeness of the sample.
  - (3) The analytical results for sample location 18-1275 (samples AAB4696, 0218-95-0256, and 0218-95-0257) are not addressed in the text. LANL must provide a discussion of these analytical results.
  - (4) Table 5-1 indicates that the tank sludge was not sampled for uranium (U) or plutonium (Pu) even though the RFI Workplan specifies that they are COPCs at the PRS. LANL must provide an explanation why these constituents were not analyzed for.
- vii. Section 4.1.7 18-003(h) - Septic Tank: *This active PRS is inappropriately proposed for NFA based on the following deficiencies:*
  - (1) No ground water samples appear to have been obtained downgradient of the PRS. LANL must ensure that ground water has not been adversely affected by the PRS.
  - (2) Building 18-152 (as indicated in the text on p. 4-58) is not located on Figures 1-2 or 4-6. LANL must revise the text and/or the figure.
  - (3) Locations of the attempted borings (Section 4.1.7.2) are not indicated on the corresponding figure in the RFI report. LANL must revise the figure.
  - (4) Sample location (18-1285) is not located near the PRS and may not be physically or statistically representative of the PRS. LANL must either obtain additional samples or provide assurances that the sample obtained adequately characterizes the PRS.
  - (5) The tank liquids, soil, and ground water were not sampled for inorganic constituents even though the RFI Workplan (Table 5-1) cites beryllium, uranium, silver, and plutonium as potential contaminants of concern. LANL must clarify why the samples were not analyzed for these constituents and sample the tanks, soil, and ground water for them.
- c. Section 4.2 Sumps, Drains, and Tanks
  - i. Section 4.2.1 18-004(a-b) - Industrial Drainline, Collection Tanks: *This inactive PRS is inappropriately proposed for NFA based on the following deficiencies:*
    - (1) LANL must provide the analytical results for the wipe samples obtained for this PRS; they were not found in Appendix D.
    - (2) Table 4-28 of the RFI report indicates that the wipes were only sampled for U and gross alpha/beta/gamma, although the RFI Workplan indicates that the solvents and acids were also utilized at the PRS. LANL must provide the rationale for not sampling for solvents and acids at this PRS.
    - (3) Subsurface soils and ground water were not adequately (none were obtained) sampled and characterized at this PRS. LANL must ensure that subsurface soils and ground water have not been adversely affected by this PRS.
  - ii. Section 4.2.2 18-012(a) - Outfall: *This non-Hazardous and Solid Waste Amendment (HSWA) active PRS should be retained for further evaluation based on the following deficiency:*

- (1) Page 4-67 states that "benzo(a)pyrene [which is an Appendix VIII constituent]...is retained as a COPC..." however, page 4-69 states that "...no COPCs...were retained..." LANL must clarify this issue and revise the text as necessary.
- iii. Section 4.2.3 18-012(b) - Outfall: *This non-HSWA active PRS should be retained for further evaluation based on the following deficiencies:*
  - (1) LANL compares COPCs which are greater than SALs to industrial PRGs. LANL must compare COPCs which exceed SALs to USEPA Region IX **residential** PRGs, or when PRGs are unavailable, SALs calculated from Subpart S guidance. See comment 1.a.v.
  - (2) LANL must provide supporting documentation to support the elimination of COPCs based on the presence of potential alternate source(s). See comment 1.b.iv.
- iv. Section 4.2.4 18-012(c) - Outfall: *This non-HSWA active PRS should be retained for further evaluation based on the following deficiencies:*
  - (1) LANL shall conduct further investigations at this PRS to address the following concerns: obtaining one sample at the apex of the drain line is inadequate to identify a release and no samples were obtained from the nearby drainage-way.
  - (2) The RFI Workplan indicates that the sump was eliminated from sampling due to the lack of contaminants of concern (process information). If no COPCs were anticipated, LANL must explain the rationale leading to the sampling of this drain line.
- v. Section 4.2.5 18-013 - Waste Tank: *This non-HSWA inactive PRS should be retained for further evaluation based on the following deficiency:*
  - (1) LANL compares COPCs which are greater than SALs to industrial PRGs. LANL must compare COPCs which exceed SALs to USEPA Region IX residential PRGs, or when PRGs are unavailable, SALs calculated from Subpart S guidance. See comment 1.a.v.
- vi. Section 4.3.1 18-008 - Underground Storage Tank: *This non-HSWA inactive PRS is proposed for no further action because it could not be located.*
  - (1) Since the completion of this RFI report, this tank has been located and is, therefore, not appropriate for NFA recommendations until investigations have been completed. The tank should be investigated and remediated under the State of New Mexico's Underground Storage Tank regulations.
- d. Section 4.4 Firing Sites
  - i. General
    - (1) LANL failed to investigate the potential for release to ground water for these sites. No attempt was made to determine if the firing sites contribute to HE concentrations in ground water.
    - (2) LANL obtained composite samples at these firing sites. Composite samples are inappropriate for determining the nature and extent of contamination. LANL must resample these sites using discreet grab sampling methodologies. See comment 1.c.ii.
    - (3) LANL's analytical laboratory consistently exceeded holding times for HE samples. LANL must resample these sites to obtain useable data.
  - ii. Section 4.4.1 18-002(a) - Firing Site in Pajarito Canyon: *This inactive PRS is inappropriately proposed for NFA based on the following deficiencies:*
    - (1) LANL did not ascertain if this PRS adversely impacted the ground water. See comment 2.d.i.(1).
    - (2) LANL obtained composite samples for determining the nature and extent of contamination. See comment 2.d.i.(2).
    - (3) The laboratory exceeded the holding times for the HE samples. See comment 2.d.i.(3).

- (4) LANL inappropriately compares COPCs greater than SALs to industrial and recreational PRGs. See comment 1.a.v.
- iii. Section 4.4.2 18-002(b-c) - Firing Sites, Drop Tower in Threemile Canyon: *These inactive PRSs are inappropriately proposed for NFA based on the following deficiencies:*
  - (1) LANL did not ascertain if this PRS adversely impacted the ground water. See comment 2.d.i.(1).
  - (2) LANL obtained composite samples for determining the nature and extent of contamination. See comment 2.d.i.(2).
  - (3) The laboratory exceeded the holding times for the HE samples. See comment 2.d.i.(3).
- iv. Section 4.4.3 27-002 - Firing Site: *This inactive PRS is inappropriately proposed for NFA based on the following deficiencies:*
  - (1) LANL did not ascertain if this PRS adversely impacted the ground water. See comment 2.d.i.(1).
  - (2) LANL obtained composite samples for determining the nature and extent of contamination. See comment 2.d.i.(2).
  - (3) The laboratory exceeded the holding times for the HE samples. See comment 2.d.i.(3).
- e. Section 4.5 Sites with Potentially Contaminated Soil
  - i. General
    - (1) The RFI report did not provide a "Sampling and Analysis Plan" table for the PRSs with potentially contaminated soil. LANL shall revise the RFI report to include such table.
  - ii. Section 4.5.1 18-005(a) - Magazine Site: *This inactive PRS is inappropriately proposed for NFA based on the following deficiencies:*
    - (1) LANL failed to obtain samples from within the PRS's bermed area. LANL shall obtain the additional samples.
    - (2) LANL sampled subsurface soils at a depth of one foot followed by a sample every other foot. LANL must explain the rationale for this sampling interval.
  - iii. Section 4.5.2 18-011 - Building 18-22 Site: *This non-HSWA inactive PRS should be retained for further evaluation based on the following deficiencies:*
    - (1) Surface soil sampling that was conducted for this PRS inadequately characterizes the site. LANL sampled the surface soils (0 to 6 inches) at the site. Since Section 4.5.2.2 states that the building's foundation is covered with approximately two feet of soil, then potential contamination is anticipated to be approximately two feet below ground surface and not in surface soils. LANL must resample this PRS at a depth corresponding with the building's foundation.
    - (2) LANL indicates within the RFI report that the mercury spill has been remediated by the Health Division; however, LANL does not provide supporting documentation as evidence of this remedial activity. LANL must provide this additional documentation. See comment 1.b.v, et alia.
- f. Section 4.6 Storm Drains
  - i. Section 4.6.1 18-010(b) - Storm Drain Outfall: *This non-HSWA active PRS should be retained for further evaluation based on the following deficiencies:*
    - (1) LANL does not provide supporting documentation to support eliminating the COPCs based on "process information." See comment 1.b.iv.
    - (2) Although the RFI Workplan anticipated that solvents had been utilized at the PRS, no samples were obtained or analyzed for VOCs. LANL shall provide sampling documentation that VOCs are not present at this PRS.

- ii. Section 4.6.2 18-010(c) - Storm Drain Outfall: *This non-HSWA active PRS should be retained for further evaluation based on the following deficiencies:*
  - (1) LANL does not provide supporting documentation to support eliminating the COPCs based on "process information." See comment 1.b.iv.
  - (2) Although the RFI Workplan anticipated that solvents had been utilized at the PRS, no samples were obtained or analyzed for VOCs. LANL shall provide sampling documentation that VOCs are not present at this PRS.
- iii. Section 4.6.3 18-010(d) - Drainage Collection Area: *This non-HSWA active PRS should be retained for further evaluation based on the following deficiencies:*
  - (1) LANL does not provide supporting documentation to support eliminating the COPCs based on "process information." See comment 1.b.iv.
  - (2) Although the RFI Workplan anticipated that solvents had been utilized at the PRS, no samples were obtained or analyzed for VOCs. LANL shall provide sampling documentation that VOCs are not present at this PRS.
  - (3) Figure 4-24 does not clearly identify those areas which are paved and unpaved.
- iv. Section 4.6.4 18-010(e) - Storm Drain Outfall: *This non-HSWA active PRS should be retained for further evaluation based on the following deficiencies:*
  - (1) LANL does not provide supporting documentation to support eliminating the COPCs based on "process information." See comment 1.b.iv.
  - (2) Although the RFI Workplan anticipated that solvents had been utilized at the PRS, no samples were obtained or analyzed for VOCs. LANL shall provide sampling documentation that VOCs are not present at this PRS.
  - (3) Sample locations 18-1732 and 18-1733 as shown on Figure 4-25 indicate "(BCP)" and "(BaP)," respectively. LANL must clarify what these notations mean.
  - (4) LANL must indicate the name of the creek the outfall drains into.
  - (5) When describing locations in the text, LANL must use reference points clearly located on the corresponding figure. For example, Building 18-30 is cited in the text, but is not located in the corresponding figure, Figure 4-25. LANL must revise the text accordingly.
- v. Section 4.6.5 18-010(f) - Storm Drain Outfall: *This non-HSWA active PRS should be retained for further evaluation based on the following deficiencies:*
  - (1) Although the RFI Workplan anticipated that solvents had been utilized at the PRS, no samples were obtained or analyzed for VOCs. LANL shall provide sampling documentation that VOCs are not present at this PRS.
- g. Section 4.7 Groundwater Sampling
  - i. General
    - (1) Drill logs, well construction, and sampling methodology are not presented in the RFI report. LANL must provide this information within the RFI report. See comment 1.b.i.
    - (2) Available historical ground water data obtained from nearby wells, springs, and seeps should be included in the evaluation of this technical area.
    - (3) The statement that "No significant additional input is occurring within TA-18..." is an improper statement to make in this RFI report. The lack of understanding of the modes of ground water occurrence and the interplay of these modes, coupled with the lack of sufficient monitoring wells, makes such a statement tentative at best. The affect TA 18 has had and continues to have on the ground water cannot be determined with confidence at this time.
    - (4) LANL does not specify the objectives of the ground water sampling. From that standpoint, it is difficult to derive the value from the investigation as it relates to TA 18.

LANL must provide language which defines the objectives of the ground water sampling so that a proper review of the information can be made.

- ii. Section 4.7.1 PCO Wells
  - (1) Section 4.7.1.1: As mentioned, the PCO-series wells have been monitored on an annual basis as part of the Environmental Surveillance program. Presumably, additional analytical data is available from these previous sampling events. LANL must present the historical data for these wells within this RFI report to provide a more complete synopsis of ground water degradation near TA 18.
  - (2) Section 4.7.1.3.1, Inorganics: LANL must revise the text to indicate which samples exceeded holding times. It is recommended that the corresponding figures also somehow indicate which samples exceeded holding times.
  - (3) Section 4.7.1.3.1, Organics: The text does not indicate which samples had detectable concentrations of 1,3-dinitrobenzene (DNB) and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX). LANL must revise the text to show these corrections.
  - (4) Section 4.7.1.3.1, Organics: LANL does not provide supporting documentation necessary to eliminate the COPCs based on the contaminants relative insolubility in water. See comment 1.b.iv.
- iii. Section 4.7.2 LACEF Monitoring Wells
  - (1) Based on the primary objective of this RFI report (which is to investigate those PRSs located at TA 18), ground water monitoring wells should also be located near the drain field at 18-003(b) or southeast of Buildings 18-168 and 18-23.
  - (2) Ground water from sample location 18-1135 was obtained during the investigation of 18-003(b), but was not analyzed for high explosives. All groundwater wells within this vicinity should also be analyzed for HE using SW-846 Method 8330 to provide a comprehensive site-wide survey of these constituents and to determine if these PRSs may have contributed to the overall degradation of the alluvial groundwater system.
- h. Section 4.8 Wetlands
  - i. Section 4.8.2, Field Investigation: Based on drill log and water chemistry data, Springs 3A and 3B are suspected of discharging from the volcanic units of the Tshirege Member of the Bandelier Tuff. Since these springs feed into the alluvial deposits and wetlands of Threemile Canyon, background samples obtained from these wetlands (WL-1 and WL-3) may not be truly representative of background alluvial conditions. LANL shall investigate the springs and seeps which may contribute contaminants to the alluvial aquifer in Pajarito and Threemile Canyons and LANL shall investigate the alluvial conditions upgradient of the influence of these springs, including TA-18 spring.
  - ii. Figure 4-30, page 4-187 and associated text: If potential sources are located upstream of TA-18 in Pajarito Canyon, LANL shall obtain, where possible, background wetlands samples from Pajarito Canyon upgradient of its confluence with Threemile Canyon.
  - iii. Table 4-81, page 4-195: Site-wide background values (as represented by the UTL) should also be provided for comparison purposes. See comments 1.b.ii and 1.b.iii.
  - iv. Section 4.8.2: An evaluation of historical information, such as aerial photographs, should have been used to determine if the drainage and wetlands were present at the time of potential contaminant discharge. From the information provided, it is uncertain whether the background samples obtained for this RFI report are unbiased representations of the wetland/alluvial conditions in the canyon. LANL shall provide an evaluation of the historical information to determine if these locations were suitable to meet the objectives of this RFI.

- v. Section 4.8.3.4, paragraph 1: The following statement is misleading and inappropriate for a RFI report: "Because the concentrations either were less than the SALs or did not have a SAL; human health risk is not a concern." This statement leads the reader to believe that a health risk is not a concern. The evaluation of risk to human health and the environment is paramount to our mission as environmental professionals. The statement intends to say that the concentrations were such that a risk assessment was unnecessary. LANL shall revise the statement to read "Because..., human health risk was not evaluated."
- vi. Figure 4-33, page 4-190: Does not include a notation that o-nitrotoluene exceeded background concentrations at sample location 36-2001, sample identification AAA5902, as shown in Table 4-83 on page 4-196. LANL shall revise the text and figure, as necessary.
- vii. Section 4.8.4, Human Health Risk: 2,4,6-trichlorophenol was identified as being a COPC unrelated to activities conducted at TA 18. It is unclear if an evaluation was performed to determine if this constituent is attributable to other LANL-related activities. The question of attribution must be evaluated on a site-wide or systemic basis. LANL shall clarify this issue.
- viii. Section 4.8.3.1, Organics: The detection limit for various VOCs and SVOCs exceeded SALs. LANL shall provide a listing of all instances at TA 18 where detection limits exceed SALs and provide an explanation.
- i. Appendix B Hydrogeology
  - i. Springs and seeps are not addressed or sampled as part of this RFI report. See comment 2.g.i.(2).
  - ii. All figures within this report should include the locations of "the inventory of monitoring wells" as listed in Table B-1 and any other wells within 1 mile of any PRS or within the canyon system. LANL shall revise all figures to reflect this comment.
  - iii. The RFI report incorrectly states that "...no perched aquifers have been observed between the shallow alluvial aquifer and the main aquifer..." LANL shall revise this statement or strike it from the report. The following items directly conflict with the previous statement:
    - Springs 3A, 3B, and TA-18 appear to discharge from a perched zone within the Tshirege Member of the Bandelier Tuff; and
    - during the drilling of PM-2 a perched, saturated zone within the Otowi Formation was encountered at an elevation of 6380 feet (approximately 500 feet above the **regional** aquifer).
  - iv. Page B-4, paragraph 6: "Groundwater elevations were measured ...in the PCO well." LANL shall clarify which PCO well is referred to and revise the text accordingly.
  - v. Water Chemistry: The general chemistry analytical results should be summarized and compiled into a table for easy reference and readability. A table would eliminate the burden on the reader to discern which constituents were below detection limits, what those detection limits were, why the PCO-2 well does not have a corresponding Stiff diagram, and why there is no cation/anion balance for PCO-3 on page B-6. LANL shall make revisions to address this comment.