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RECEIVED
JUL 1997

Date: July 18, 1997
Refer to: EM/ER:97-274

Mr. Benito Garcia
NMED-HRMB
P.O. Box 26110
Santa Fe, NM 87502

SUBJECT: RESPONSE TO NOD AND REQUEST FOR WORKPLAN MODIFICATION ON RFI REPORT DATED MAY 1996 FOR LANL LA-UR-96-278, FOR TA 15

Dear Mr. Garcia:

Enclosed please find Los Alamos National Laboratory's response to the Notice of Deficiency (NOD) and Request for Work Plan Modification of the RCRA Facility Investigation (RFI) Report dated May 1996 for Technical Area (TA) 15. We are concerned with the New Mexico Environment Department's (NMED's) comments.

Our staffs have reviewed the comments in the denial and have concurred with less than 20% of them. We believe that approximately 45% of NMED's comments are not justified on technical grounds. Another 35% of the comments are founded upon administrative processes or agreements which were not in place at the time the report was written.

Our interpretation of the appropriateness of these comments and how they derive from NMED reviews, re-emphasizes to us the necessity for holding preNOD meetings between our staffs. We are working towards that goal and believe that if such meetings are held, as a matter of course, resource savings will occur for everyone involved.

The attached response provides specific replies and we believe resolves a large number of issues raised in the NOD. However, several items such as references, figures, maps, etc., will be provided within approximately 45 working days from the date of this letter.

If you have any questions regarding the response to the NOD, or if your staff would like to set up a meeting to discuss these responses, please have them contact Dave McInroy at (505) 667-0819 or Joe Mose at (505) 667-5808.

Sincerely,

Jorg Jansen, Program Manager
LANL/ER Project

Sincerely,

Theodore J. Taylor, Program Manager
DOE/LAAO

JJ/TT:gmn

The University of California is an Equal Opportunity Ei

4198

Enclosures: (1) Response to NOD and Request for Workplan Modification for RFI Report for TA 15
(2) Certification

Cy (w/ encs.):
G. Allen, CST-7, MS E525
G. Gould, EES-15, MS G787
D. Griswold, AL-ERD, MS A906
J. Harry, EES-5, MS M992
J. Mose, LAAO, MS A316
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S. Dinwiddie, NMED-HRMB
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J. Vozella, LAAO, MS A316
K. Zamora, LAAO, MS A316
EM/ER File, MS M992

CERTIFICATION

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation.

Document Title: Response to NOD and Request for Work Plan Modification for RFI Report for TA 15

Name: _____ Date: _____

Jorg Jansen, Program Manager
Environmental Restoration Project
Los Alamos National Laboratory

or

Tom Baca, Program Director
Environmental Management
Los Alamos National Laboratory

Name: _____ Date: 7/18/97

Theodore J. Taylor, Program Manager
Joe Vozella,
Acting Assistant Area Manager of
Environment Projects
Environment, Safety, and Health Branch
DOE-Los Alamos Area Office

or

Theodore J. Taylor
Program Manager
Environment Restoration Program
DOE-Los Alamos Area Office

RESPONSE TO NOD FOR
RFI REPORT FOR POTENTIAL RELEASE SITES
IN TECHNICAL AREA 15

ATTACHMENT A - REQUEST FOR WORK PLAN MODIFICATION
RCRA Facility Investigation Report
Technical Area 15
May 1996

NMED Comment:

1. *LANL must obtain a representative number of samples to characterize the nature and extent of contamination at the PRS. One or two samples per PRS [e.g., 15-005(c) and 15-010(a)] are, in most cases, insufficient to support a NFA proposal.*

LANL Response:

In all cases, work plans and SAPs for RFI activities are submitted and approved before LANL begins field work. In general, LANL's approach has been to screen a larger number of samples and select those with obvious contamination (either from visual observation or screening results) for fixed laboratory analysis. Thus, Phase I results are biased toward the highest concentration of contaminants. LANL is confident that the samples, collected in accordance with the approved work plan, are sufficient to support NFA proposals. (1)

Table 10.2-3 of the approved work plan (2) specified that two surface samples would be collected from PRS 15-005(c). The first work plan NOD added an additional depth, for a total of four separate samples. During the Phase I investigation, four samples from two depths were collected and analyzed (Table 5.31.4.3-1, page 5-78), not one or two as is stated in the RFI NOD. Page 5-78 of the RFI report details that no COPCs were detected above background UTLs in any of the four samples. LANL is confident that four samples, collected in accordance with the approved work plan and all without COPCs above background, are adequate to support the NFA request.

The approved work plan for PRS 15-010(a) (3) reported that this tank had been removed before the onset of the ER Project. The first work plan NOD required sampling from a borehole at the location of the former tank at 2 and 7 ft depths. To LANL's surprise, the tank was located with a backhoe within the area called MDA-N during the field season. Because the tank was found and the backhoe exposed the tank and its contents, a field decision was made to collect the samples. Thus there was no rationale for installing boreholes. In addition, the top of the tank was found to have been crushed and the interior was now filled with sand/dirt. Instead of the borehole sampling, the field crew collected two samples of the sand in the tank. Both samples exhibited Hg above its SAL and no other COPCs.

Because it is impossible to tell whether the Hg in the septic tank resulted from the fill or was present in the tank when it was abandoned and because the integrity of the tank cannot be determined, LANL has adopted the conservative approach of a Phase II assessment. The Phase II sampling and analysis plan (SAP) proposes four additional samples in and around the location of the tank (Section 5.32.11). The RFI report does not request an NFA for this tank, as is stated in the NOD. Table ES-1 (page ii) of the RFI report requests a Phase II for this PRS.

NMED Comment:

2. *LANL shall obtain confirmatory samples at all PRSs where the HE spot test was used to determine the presence or absence of HE.*

LANL Response:

The HE spot test is a LANL operating group (DX) requirement for any field samples collected within TA-15, whether or not the ER Project has postulated in the work plan that HE is a COPC. The DX requirement states that a positive reading on the HE spot test mandates further fixed laboratory analysis to determine the percentage of HE present before shipping samples offsite. Samples with HE content greater than 5% cannot be shipped offsite without special packaging and precautions. The DX requirement is a safety requirement, not an environmental monitoring requirement.

LANL needs clarification of the NOD comment. If HRMB means that the use of the HE spot test to bias sampling locations for environmental analysis requires a certain percentage of fixed laboratory analysis (similar to the procedure for using XRF to bias sampling locations or samples for metals), then LANL is in agreement and has followed this procedure. However, the HRMB comment seems to imply that confirmatory samples must be collected at every TA-15 sampling location, which would result in hundreds of unnecessary HE analyses and a significant increase in costs. If this is what NMED is directing, LANL requests the technical basis for this request.

ATTACHMENT B - SUMMARY OF CONCLUSIONS
RCRA Facility Investigation Report
Technical Area 15
May 1996

PRS	LANL'S PROPOSED ACTION	DOES HRMB CONCUR?	HRMB'S RATIONALE
15-001	Deferred	No	Documentation of prior approval of deferred action required
15-002	NFA	No	Response to PRS-specific comments in Attachment B required
15-004(g)[1]	IA	No	Additional information required to determine if proposed action is appropriate (information not provided within RFI report)
15-004(h)	Deferred	No	Documentation of prior approval of deferred action required
15-005(b)	NFA	No	Response to PRS-specific comments in Attachment B required
15-005(c)	NFA	No	Response to PRS-specific comments in Attachment B required
15-006(c)	EC	No	Additional information required to determine if proposed action is appropriate (information not provided within RFI report)
15-006(d)	NFA	No	Response to PRS-specific comments in Attachment B required
15-007(a)	NFA	No	Response to PRS-specific comments in Attachment B required
15-008(c)	IA	No	Additional information required to determine if proposed action is appropriate (information not provided within RFI report)
15-008(g)	NFA	No	Response to PRS-specific comments in Attachment B required
15-009(a)	Deferred	No	Documentation of prior approval of deferred action required
15-009(l)	NFA	No	Interim Action recommended based on analytical results
15-009(i)	Deferred	No	Documentation of prior approval of deferred action required
15-009(k)	NFA	No	Interim action recommended based on analytical results
15-010(a)	Phase II	No	Additional information required to determine if proposed action is appropriate (information not provided within RFI report)
15-010(b)	NFA	No	Deviations from approved Workplan; additional sampling required
15-010(c)	NFA	No	Response to PRS-specific comments in Attachment B required
15-011(a)	NFA	No	Response to PRS-specific comments in Attachment B required
15-011(b)	NFA	No	PRS proposed for NFA based on Criteria #5[2] ; however, issues set for in General Comments 7 and 8 must be evaluated. See Specific Comments.

PRS	LANL'S PROPOSED ACTION	DOES HRMB CONCUR?	HRMB'S RATIONALE
15-011(c)	NFA	No	PRS proposed for NFA based on Criteria #5 ; however, issues set forth in General Comments 7 and 8 must be evaluated. See Specific Comments.
15-012(a)	NFA	Yes	PRS meets NFA Criteria #1
15-014(a)	NFA	No	PRS proposed for NFA based on Criteria #5 ; however, issues set forth in General Comments 7 and 8 must be evaluated. See Specific Comments.
15-014(b)	NFA	No	Hazard Index > 1; conduct risk assessment
15-014(d)	NFA	No	Response to PRS-specific comments in Attachment C required
15-014(e)	NFA	No	Response to PRS-specific comments in Attachment C required
15-014(g)	NFA	No	Response to PRS-specific comments in Attachment C required
15-014(h)	NFA	No	Response to PRS-specific comments in Attachment C required
15-014(i)	NFA	No	Response to PRS-specific comments in Attachment C required
15-014(j)	NFA	No	Additional information/sampling required
15-014(k)	NFA	No	Response to PRS-specific comments in Attachment C required
15-014(l)	NFA	No	Response to PRS-specific comments in Attachment C required
C-15-001	Phase I continued	No	Additional information required to determine if proposed action is appropriate (information not provided within RFI report)
C-15-005	NFA	No	Response to PRS-specific comments in Attachment C required
C-15-006	NFA	No	Response to PRS-specific comments in Attachment C required
C-15-007	Deferred	No	Documentation of prior approval of deferred action required
C-15-010	Phase II	No	Additional information required to determine if proposed action is appropriate (information not provided within RFI report)
C-15-011	NFA	No	Response to PRS-specific comments in Attachment C required

ATTACHMENT C - NOTICE OF DEFICIENCY COMMENTS
RCRA Facility Investigation Report
Technical Area 15
May 1996

NMED Comment:

GENERAL COMMENTS

Approach/Conceptual Model

1. *LANL must determine the source and extent of contamination for those Potential Release Sites (PRSs) whose analytical results exceeded background and Screening Action Levels (SALs). Under State and Federal regulations, LANL has the responsibility to investigate further to ensure that the rate, nature and extent of contamination has been determined.*

   The following is a summary of those PRSs with identified concerns which were investigated under this RCRA Facility Investigation (RFI):

COPCs >SALs	15-004(g), 15-008(c), 15-014(b), C-15-010
COPCs<SALs; MCE≥I	15-014(b), 15-009(f), 15-009(k)
COPCs<SALs Normalized COPC values>O. 1	15-002, 15-006(d), 15-007(a), 15-010(a), 15-011(b), 15-014(g), 15-014(j)

   PRS 15-014(b), which has contaminants of Potential Concern (COPCS) greater than SALS, is inappropriately proposed for no further action (NFA). PRSs 15-009(f) and 15-009(k), which have COPCs less than SALs but a Multiple Chemical Evaluation (MCE) greater than 1, are inappropriately proposed for NFA. In addition, all the PRSs with COPCs less than SALs but with normalized values greater than 0. I should be carried forward to a baseline risk assessment.

LANL Response:

Figure 1 in the Document of Understanding (DOU) shows that if PRS analytical results exceed SALs or background and if the remedy is obvious, then a VCA can be implemented. It has been LANL's policy when conducting simple VCAs to "over-screen/sample" during and after the remediation to ensure that all contamination has been remediated relative to the risk-based remediation goals. In this manner, the rate, nature, and extent of contamination is determined in a cost-effective, "sample-as-you-remediate" approach. This approach is outlined in Appendix G.4 of the DOU. The end result of this process is that there is no contamination left at the PRS above PRGs. As an example of this approach, the VCA for PRS 14-003 (plan presented to HRMB on January 29, 1997) utilized a 2-ft screening grid (238 locations) during the VCA, resulting in a total of 714 samples (3 depths per location) analyzed for 3 metals resulting in over 1,000 individual data points at this one PRS, which is estimated at roughly 100 ft on a side. Clearly, during the totality of the RFI process, the rate, nature, and extent of contamination are defined in great detail.

Areas of limited extent, such as a few yards of soil (e.g., PRS 14-003), which was discussed with HRMB in January 1997 and approved at the time), are proposed for VCA based on a limited data set, where LANL acknowledges that the exact extent of contamination has not been determined by exhaustive field sampling/testing, but where a few samples have indicated COPCs above SALs. In such situations, the extent of contamination can be inferred using best professional judgment (e.g., a berm is visible, a defined surface water flow path, etc.). Areas of more extensive contamination [e.g., E-F Firing Site (PRS 15-004(c) or R-44 Firing Site (PRS 15-006(c)] have been

more completely characterized to better define the extent of contamination. LANL believes that it has complied with the letter and spirit of the requirements in the most cost effective and technically sound manner.

The screening assessment begins with the identification of contaminants and environmental media of potential concern based on history and processes that occurred at a PRS (Dorries 1996, 1297). Additional environmental data are collected as necessary during the RFI Phase I sampling to determine the presence of any contamination. Sampling at TA-15 included extensive field screening as well as fixed analytical. The field screening was used to bias the samples collected for submission to the laboratories. At each PRS, the samples submitted for analyses were those samples that had the highest screening values. A comparison between the two analytical techniques (field screening and fixed analytical), as well as the field screening data from the PRSs, are included in Appendix D of the RFI report. The comparison demonstrated a positive correlation between the measurement techniques. The results obtained from the analytical laboratories are used in the screening assessment process to determine the COPCs at each site. The maximum detected concentration of a chemical is compared to a risk-based SAL to determine if a potential risk to human health exists at a site. If the chemical is an inorganic, it is initially compared to a site-wide background value before the SAL comparison stage of the screening assessment process. When all chemicals at a site do not exceed the SALs, it may be recommended for NFA because an unacceptable risk to human health does not exist. Chemicals exceeding both background and SALs fail the screening assessment, and the PRS requires further evaluation. The additional investigation at a site may involve a preliminary risk assessment, additional sampling in support of a baseline risk assessment, remediation, or an accelerated cleanup along with additional sampling to define extent. If enough data have been collected, a baseline risk assessment may be conducted to support an interim or final decision.

The SALs are obtained from the annual Environmental Protection Agency Region 9 preliminary remediation goals (PRGs) tables (EPA 1995, 1307; EPA 1996, 1351). The SALs used in the screening assessment are the EPA Region 9 residential PRGs listed in these tables. The risk-based values include the ingestion, inhalation, and dermal exposure pathways and use the latest verified toxicity information derived from the following sources:

- IRIS (EPA 1996, 1313).
- HEAST (EPA 1995, 1310).
- EPA's National Center for Environmental Assessment (NCEA) for each chemical.
- default exposure factors obtained from EPA documents (Cowherd et al. 1985, ER ID No. XXXX; EPA 1989, 0305; EPA 1991, 0746; EPA 1991, 0302; EPA 1992, 1012; and EPA 1996, ER ID No. XXXX).
- California EPA Guidance Manual (California EPA 1994, ER ID No. XXXX).

The values presented in the tables represent a hazard quotient of one for noncarcinogens or are associated with a one in one million (10^{-6}) lifetime excess cancer risk for carcinogens. The hazard quotient of one represents the level of exposure to a chemical from all significant pathways in a given medium above which there may be concern for potential health effects and below which it is unlikely for even sensitive populations to experience adverse health effects (EPA 1989, 0305; EPA 1991, 0302). The incremental cancer risk of 10^{-6} is at the lower end of EPA's target risk range of 10^{-4} to 10^{-6} (EPA 1990, 0559). If the cumulative carcinogenic risk is greater than 10^{-4} or the cumulative noncarcinogenic hazard index is greater than one, some sort of additional action at that site is warranted. If the cumulative cancer risk is within the range of 10^{-4} to 10^{-6}, the need for additional action is a site-specific decision. In general, if the cumulative cancer risk is less than

10^{-6} and the hazard index is less than one, no further action is warranted. This logic is consistent with the ER Project's screening assessment approach.

The multiple chemical evaluation (MCE) is used in the screening assessment to evaluate chemicals that were detected below their SALs and above background in order to address the possibility of adverse health effects from combined exposure. The MCE involves dividing the maximum detected concentration of each chemical by its respective SAL to obtain a "normalized" value, which is a fraction of the SAL. Because the SALs represent residential risk-based values, normalized values are similar to hazard quotients for individual noncarcinogens and are cancer risk values for carcinogens if multiplied by 10^{-6} for this scenario. Therefore, the individual normalized values and the sum of the normalized values less than one represent acceptable risk levels as defined by EPA (EPA 1990, 0559) and do not need further evaluation, e.g., a baseline risk assessment. For example, if the individual normalized values for a set of noncarcinogenic chemicals range from 0.01 to 0.5 and the sum is 0.7, the hazard index for a residential scenario is less than one and, therefore, not a concern for adverse health effects. Similarly, if the individual normalized values for a set of carcinogenic chemicals range from 0.01 to 0.5 and the sum is 0.7, the cancer risk level for a residential scenario is approximately 10^{-6} (7×10^{-7}) and, therefore, not a concern for human health. As a result, the statement that COPCs less than SALs but with normalized values greater than 0.1 should be carried forward to a baseline risk assessment is inappropriate unless the baseline risk assessment is the subsequent action for a PRS because of other COPCs detected above their SALs.

The table included in comment one suggests a change in protocol whereby sites will be screened to 10% (0. 1) of the SAL values. The final sentence of the comment says that PRSs with COPCs less than SALs but with normalized values greater than 0.1 should be carried forward to a baseline risk assessment. LANL is not aware of any recent technical documentation that supports such a shift in policy. The screening procedure, described above and consistent with EPA guidance as used by the ER Project, was agreed to by EPA in a joint meeting between EPA, LANL, and DOE on September 18-19, 1995. The agreements reached at that time are documented in a letter to Barbara Driscoll dated October 4, 1995 and signed by Jorg Jansen (LANL ER) and Theodore Taylor (DOE LAAO). The letter is quoted below.

Agreements:

A. It is acceptable to base SALs on EPA Region 9 preliminary remediation goals (PRGs). . .

The screening approach, including the use of SALs and the MCE, was presented at Los Alamos in October of 1995 at a series of meetings between LANL-ER; SNL-ER; DOE-KAO, ABQ, and LAAO; EPA Region 6, and several representatives from HRMB. These meetings were followed by a jointly issued Risk-Based Corrective Action Process (RBCAP) by LANL and SNL that same month, which is based on EPA guidance. Comments were received in May of 1996 from both EPA Region 6 and HRMB on the RBCAP, including the screening and MCE approach. No reservations regarding the MCE approach were expressed at that time nor were criticisms expressed regarding the choice of SALs recommended for LANL. (The agreement of HRMB regarding the use of EPA Region 9 PRGs as SALs is confirmed in Comment 3 of this NOD.) Therefore, LANL is confused at the change in approach recommended in the first comment whereby COPCs present at 10% of their SAL value would be retained even if no values at the site exceed SALs and the MCE is less than unity. The LANL ER Project recognizes the need to protect against additive and multiplicative effects of chemicals when exposures to multiple chemicals might occur. However, LANL's procedure used in the MCE comparison will identify any additional constituents at the site that might occur below their SAL but present potential interactive effects. In addition, professional judgment is used to extend the MCE calculations in those instances where the exposure characteristics of the site suggest that a maximum sum of normalized constituents is more likely to represent a realistic exposure than the standard sum of normalized maximum

detected values. Finally, professional judgment is used to retain constituents present at greater than 10% of the SAL when evidence of potential toxic interactions with known COPCs exists. This approach is consistent with current scientific opinion on evaluation of chemical mixtures. At a recent symposium, the Toxicology Committee of the International Union of Pure and Applied Chemistry (IUPAC) concluded with the following statement on evaluation of chemical mixtures: "In setting exposure limits for individual chemicals, the use of an additional safety factor to compensate for potential increased risk due to simultaneous exposure to other chemicals, has no clear scientific justification. The use of such an additional factor is a political rather than a scientific choice" (Henschler et al., 1996, ER ID No. XXXX). This conclusion is echoed in a recent review on evaluating risks from chemical mixtures: "The introduction of a special safety factor of 10 for the standard setting for mixtures in addition to those normally used for deriving acceptable daily intakes, reference doses or minimal risk levels is not supported by data" (Bolt, 1996, ER ID No. XXXX). A recent search on toxicity of chemical mixtures indicated that when daily intakes of individual chemicals were below the health-based criteria such as the EPA reference doses, the potential for additive and multiplicative effects was unlikely to result in toxicity when multiple contaminants were present. Therefore, the uncertainty factors and modifying factors incorporated in the health-based standards, combined with the initially conservative exposure assumptions used in the residential screening scenario, the use of professional toxicological judgment, and the biasing of sampling to capture representative maximum contaminant concentrations, should result in identifying those contaminants that present health risks at a site without a need for additional conservatism.

The PRSs with COPCs greater than SALs include 15-004(g), 15-008(c), 15-014(b), and C-15-010. Three sites—PRSs 15-004(g), 15-008(c), and C-15-010—have been recommended for further sampling to better define the nature and extent of the contamination. PRS 15-014(b) is recommended for NFA because the COPCs are polycyclic aromatic hydrocarbons (PAHs), which the engineering plans for this PRS indicate drains the asphalt roof of Building TA-15-183 and are the source of the PAHs. In general, PAHs [e.g., benzo(a)pyrene, benzo(b)fluoranthene, pyrene, etc.) have been sporadically detected at many PRSs throughout LANL. It has been found that PAHs are associated with asphalt runoff (e.g., paved areas and roofs) as well as from incomplete combustion (e.g., incinerators, forest fires, or vehicle exhaust) (Clement International Corporation 1990, ER ID No. 55663; Bradley et al. 1994, 1144; Menzie et al. 1992, ER ID No. 55635; Butler et al. 1984, ER ID No. 55634; Edwards 1983, ER ID No. 55636). In most cases, these chemicals are detected in areas influenced by these types of non-PRS-related sources, e.g., storm water outfalls, ditches near paved driveways or roads, etc. The PAHs at 15-014(b) should, therefore, not be evaluated in the screening assessment and are eliminated, because only those chemicals believed or suspected of being associated with a release from a PRS as a result of site activities are retained and subjected to the screening assessment process.

The PRSs with COPCs less than SALs, but with MCEs greater than one, include PRSs 15-014(b), 15-009(f), and 15-009(k). The MCE calculations for PRSs 15-009(f and k), which are septic tanks, are inappropriate because the water SALs in use at the time of the report were based on drinking water maximum contaminant levels (MCLs) or groundwater standards, which are not risk-based values. Therefore, the normalized sum of the analytes detected in the septic tank does not represent a risk value, i.e., a hazard index. In addition, the detected concentrations of inorganics were below the concentrations identifying RCRA toxicity characteristics for wastes and, therefore, the material is not a hazardous waste. However, LANL is currently investigating the appropriate action for the septic tank, e.g., removal of the contents. The sum of normalized concentrations in the MCE for PRS 15-014(b) is primarily the result of PAHs. As indicated previously in this response, the source of the PAHs is the asphalt roof of Building TA-15-183. The MCE was incorrectly presented to include the PAHs. Because these analytes are not related to site activities, they should not be evaluated in the screening assessment. As a result, dibenzofuran is the only non-PAH analyte detected less than the SAL and, therefore, there are no COPCs retained that are the result of site activities.

The PRSs listed [15-002, 15-006(d), 15-007(a) 15-010(a), 15-011(b), 15-014(g), and 15-014(g)] as having COPCs less than SALs, but with normalized values greater than 0.1 have normalized sums of 0.4, 0.2, 0.7, 0.8, 0.5, 0.2, and 0.3, respectively, with no individual normalized value greater than 0.5. Because all of the MCEs were for noncarcinogens, the normalized values represent individual hazard quotients and the sums hazard indices for the sites based on a residential scenario. All of the hazard quotients and hazard indices are less than one indicating that it is unlikely for even sensitive populations to experience adverse health effects (EPA 1991, 0302). Therefore, PRSs 15-002, 15-006(d), 15-011(b) 15-014(g), and 15-014(j) are appropriately proposed for NFA based on human health. In addition, two of the PRSs [15-007(a) and 15-010(a)] have been recommended for further evaluation because the Phase I sampling was inadequate to make a final decision.

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Butler, J. D., V. Butterworth, S. C. Kellow, and H. G. Robinson, 1984. "Some Observations of the Polycyclic Aromatic Hydrocarbon (PAH) Content of Surface Soils in Urban Areas," *The Science of the Total Environment*, ER ID No. 55634, Vol. 33, pp. 75-85. (Butler et al. 1984, ER ID No. 55634)

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Cowherd, C., Muleski, G, Engelhart, P., and Gillete, D., 1985. Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination. EPA/600/8-85/002. Prepared for the EPA Office of Health and Environmental Assessment, Washington, D.C. (XXXX)

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EPA (US Environmental Protection Agency), March 8, 1990. "National Oil and Hazardous Substances Pollution Contingency Plan," Final Rule, 40 CFR Part 300, Federal Register, Vol. 55, No. 46, p. 8666. (EPA 1990, 0559)

EPA (US Environmental Protection Agency), March 25, 1991. 'Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors," Interim Final,' OSWER Directive 9285.6-03, Office of Emergency and Remedial Response, Toxics Integration Branch, Washington, DC. (EPA 1991, 0746)

EPA (US Environmental Protection Agency), December 1991. "Risk Assessment Guidance for Superfund, Volume I—Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)," Interim, EPA/540/R-92/003, Publication 9285.7-01B, Office of Research and Development, Washington, DC. (EPA 1991, 0302)

EPA (US Environmental Protection Agency), January 1992. "Dermal Exposure Assessment: Principles and Applications," Interim Report, EPA/600/8-91/011B, Office of Research and Development, Washington, DC. (EPA 1992, 1012)

EPA (Environmental Protection Agency), May 1995. "Health Effects Assessment Summary Tables, FY-1995 Annual," Office of Solid Waste and Emergency Response, 9200.6-303 (95-1), EPA/540/R-95/036, PB95-921199, Washington, DC. (EPA 1995, 1310)

EPA (US Environmental Protection Agency), September 1, 1995. "Region IX Preliminary Remediation Goals (PRGs) Second Half 1995," ER ID No. 53970, San Francisco, California. (EPA 1995, 1307)

EPA (US Environmental Protection Agency), August 1, 1996. "Region 9 Preliminary Remediation Goals (PRGs)," San Francisco, California. (EPA 1996, 1351)

EPA (US Environmental Protection Agency), 1996. "Integrated Risk Information System (IRIS)," Office of Science and Technology, National Technical Information Service, Springfield, Virginia. (EPA 1996, 1313)

EPA (Environmental Protection Agency) 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128. Office of Remedial Response, Washington, D.C. (XXXX)

Henschler, D., H. M. Bolt, D. Jonkers, M. N. Pieters, and J. P. Groten, 1996. "Experimental Designs in Risk Assessment in Combination Toxicology: Panel Discussion," Food Chem. Toxicol., November - December 34 (11-12), 1183-1185.

Menzie, C.A., B. B. Potocki, and J. Santodonato, 1992. "Exposure to Carcinogenic PAHs in the Environment," *Environmental Science and Technology*, ER ID No. 55635, Vol. 26, No. 7, pp. 1278-1284. (Menzie et al. 1992, ER ID No. 55635)

NMED Comment:

2. *LANL shall not significantly revise the scope of work performed after the approval of the RFI Workplan without obtaining approval from the Administrative Authority (AA). At PRSs 15-009(f and k) and 15-010(b), LANL deviated from the approved RFI Workplan by reducing the number of samples obtained for analyses. Homogeneity of septic tank liquids and sludges cannot be assumed [see PRS 0-30(g) (catholic church septic tank)]. LANL shall perform the sampling as agreed upon in the approved RFI Workplan.*

LANL Response:

The changes in question were made in response to a project-wide initiative to attempt to reduce the number of redundant samples. The septic tanks in question were visually inspected and found to be without baffles, chambers, etc., and homogeneity was assumed as best professional judgment because little or no sludge was present so the samples were of the liquid in the tank. They are identified as a matrix "sludge" because they contained suspended particles. They are more properly identified as septic tank liquid. This is quite different than the materials sampled in the Catholic Church septic tank.

NMED Comment:

3. *LANL shall base its SALs on US Environmental Protection Agency (USEPA) Region 9 residential Potential Remediation Goals (PRGs). LANL may, in addition to performing the MCE based on residential risk, present an evaluation of risk based on projected future land use. 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 within this RFI Report.*

LANL Response:

The SALs used in the screening assessment for the PRSs discussed in this RFI report are based on the EPA Region 9 residential PRGs from 1995 (EPA 1995, 1307). The RFI format used to present the information in this report inadvertently did not indicate that the SALs were based on this source. As a result, the second paragraph of Section 3.5.1 is modified to read as follows:

The purpose of this decision step is to determine whether chemicals should be retained as COPCs or eliminated from further consideration based on comparisons with SALs. This is the last step in the screening assessment process for human health concerns. If COPCs remain after this step, then further action may be proposed. If no COPCs remain after this step, then NFA may be proposed based on human health concerns. SALs are medium-specific concentrations that are calculated using chemical-specific toxicity information and conservative, default exposure assumptions. *The SALs for nonradioactive chemicals are based on EPA Region 9 preliminary remediation goals (PRGs) for residential soil.* ~~A complete description of "methods used to generate SALs is provided in "Risk Based Corrective Action Process"~~ (Dorries 1996, 1297). For those chemicals for which SALs are available, each observed concentration datum is compared with the chemical's SAL. If a chemical has a reported concentration greater than its SAL, then that chemical is retained as a COPC pending further analysis. If a chemical does not have a reported concentration greater than its SAL, then that chemical is generally removed from further consideration. If more than one chemical is present at the site, this decision is deferred pending the results of the multiple chemical evaluation (described below). The decision to retain a chemical as a COPC when a SAL is not available is made on a case-by-case basis, taking into account the availability of process knowledge and toxicological information.

Because the SALs used in the RFI report are based on the EPA Region 9 residential PRGs, a table of revised SALs and a discussion of differences are not needed.

References:

Dorries, A. M. (Ed.), June 1,1996. "Risk-Based Corrective Action Process," Revision 1, Los Alamos National Laboratory Report LA-UR-96-2811, Los Alamos, New Mexico. (Dorries 1996, 1297)

EPA (US Environmental Protection Agency), September 1, 1995. "Region IX Preliminary Remediation Goals (PRGs) Second Half 1995," ER ID No. 53970, San Francisco, California. (EPA 1995, 1307)

NMED Comment:

4. *For those SALs absent from the USEPA Region 9 PRGS, LANL shall calculate the SAL using toxicity data obtained from USEPA Region III risk-based concentration tables or the latest Integrated Risk Information System/Health Effects Summary Tables (IRIS/HEAST) data using USEPA Region 9 default values applicable to the projected future land use.*

LANL Response:

Some chemicals do not have values on the EPA Region 9 PRG table because adequate and verified toxicity data are not available for these compounds. The toxicity data used to calculate the Region 9 and Region 3 PRGs are obtained from the latest information from IRIS, HEAST, or EPA's National Center for Environmental Assessment. Therefore, it is not possible to calculate SALs for certain compounds (e.g., benzo(g,h,i)perylene, 2-methylnaphthalene, and phenanthrene) because inadequate toxicity information is available. At the time this report was written one year ago, the screening assessment approach was to indicate which chemicals did not have SALs, but to not include them unless a risk assessment was performed for the site. This approach has been revised so that currently if a SAL is not available because of a lack of toxicity data, a surrogate SAL is used based on similarity of structure. The basis for this is that the known toxicity of a chemical may be used to estimate the toxicity of another chemical that is structurally related (EPA 1989, 0305).

For this RFI report three organics (benzo(g,h,i)perylene, 2-methylnaphtalene, and phenanthrene) were detected at several PRSs, but did not have SALs. According to the current screening assessment approach, benzo(g,h,i)perylene would be compared to the SAL for pyrene (1,900 mg/kg), 2-methylnaphthalene would be compared to the SAL for naphthalene (1,000 mg/kg), and phenanthrene would be compared to the SAL for anthracene (18,000 mg/kg), based on similarity of chemical structure. The SAL comparisons for one or all of these chemicals at PRSs 15-014(g), C-15-010, and 15-014(b) found the detected concentrations to be more than two orders of magnitude below their surrogate SALs. In addition, the normalized concentrations (maximum detected concentration at SAL) were less than 0.01 and, as a result, are not evaluated further.

References:

EPA (US Environmental Protection Agency), December 1989. "Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)," Interim Final, EPA 540/1-89/002, Office of Emergency and Remedial Response, Washington, DC. (EPA 1989, 0305)

NMED Comment:

5. *LANL must perform a baseline risk assessment (BRA) for those PRSs where one or more COPCs exceed a SAL. These evaluations must also include those COPCs which did not exceed SALS, but had normalized values that exceeded 0.1. The PRSs which must be further evaluated include the following: 15-009(f), 15-009(k), and 15-014(b).*

LANL Response:

The Installation Work Plan for Environmental Restoration (LANL 1995, 1275), the Risk-Based Corrective Action Process (Dorries 1996, 1297), and Subpart S (EPA 1990, 0432) clearly state that exceedance of a SAL indicates only that a problem may exist at a site and that further evaluation is warranted. It does not necessitate the performance of any particular action including a baseline risk assessment. The performance of a baseline risk assessment is one form that the further action may take. The other actions include a preliminary risk assessment, further sampling to be used to support a BRA, an NFA, a CMS, a cleanup, an accelerated cleanup under certain conditions, or stabilization under certain conditions. The subsequent action is determined on a case-by-case basis. In addition, chemicals with normalized concentrations greater than 0. 1 would only be included in a BRA if they were in the same effects category as the COPCs above SAL, i.e., noncarcinogenic, carcinogenic, or radionuclide. In general, if there are no chemicals above SAL and the sum of the normalized concentrations in the MCE is less than 1.0, the screening assessment methodology dictates that all chemicals, regardless of whether the normalized concentration is less than or greater than 0. 1, are eliminated from further evaluation because there is not an unacceptable risk to human health, i.e., cancer risk is less than 10^{-6}, hazard index is less than 1.0, or dose limit is less than 15 mrem/yr.

The three PRSs mentioned in the comment [15-009(f), 15-009(k), and 15-014(b)] do not warrant the performance of a BRA. The PRSs 15-009(f and k) are septic tanks that contain inorganics that are below SALs, below water quality standards, and are below RCRA toxicity characteristic levels. Although the sum of the normalized concentrations in the MCES, which are inappropriate for liquid septic tank contents because the SALs are based on non-risk based water quality standards, are approximately 1.0 or greater (1.5), this does not necessarily mean that a BRA should be conducted. An appropriate action being considered involves the removal of the tank contents and subsequent filling of the tank with concrete to prevent any potential introduction of materials into the tank. The PRS 15-014(b) has several COPCs detected in the surface soil. However, the COPCs are polycyclic aromatic hydrocarbons (PAHs) benzo(a)pyrene, benzo(b)fluoranthene, pyrene, etc.),which have been sporadically detected at many PRSs throughout LANL. It has been found that PAHs are associated with asphalt runoff (e.g., paved areas and roofs) as well as from incomplete combustion (e.g., incinerators, forest fires, or vehicle exhaust) (Clement International Corporation 1990, ER ID No. 55663; Bradley et al. 1994, 1144; Menzie et al. 1992, ER ID No. 55635; Butler et al. 1984, ER ID No. 55634; Edwards 1983, ER ID No. 55636). In most cases, these chemicals are detected in areas influenced by these types of non-PRS-related sources, e.g., storm water outfalls, ditches next or near paved driveways or roads, etc. As mentioned in the RFI report, the engineering plans indicate that the outfall at this PRS drains the asphalt roof of Building TA-15-183, which is the source of the PAHs. No other source exists at this PRS that would contribute PAHs to the outfall area. Because only those chemicals believed or suspected of being associated with a release from a PRS as a result of site activities are retained and subjected to the screening assessment process, the PAHs are, therefore, eliminated. As a result, an NFA, based on human health, is the appropriate recommendation for PRS 15-014(b) because no other chemicals were detected above SALs and the MCE (without PAHs) is less than one.

References:

Bradley, L. J. N., B. H. Magee, and S. L. Allen, 1994. "Background Levels of Polycyclic Aromatic Hydrocarbons (PAH) and Selected Metals in New England Urban Soils," in Journal of Soil Contamination, Vol. 3(4), p. 349. (Bradley et al. 1994, 1144).

Butler, J. D., V. Butterworth, S. C. Kellow, and H. G. Robinson, 1984. "Some Observations of the Polycyclic Aromatic Hydrocarbon (PAH) Content of Surface Soils in Urban Areas," *The Science of the Total Environment*, ER ID No. 55634, Vol. 33, pp. 75-85. (Butler et al. 1984, ER ID No. 55634)

Clement International Corporation, August 1995. "Toxicological Profile for Polycyclic Aromatic Hydrocarbons," prepared under Contract No. 205-88-0608 for Agency for Toxic Substances and Disease Registry, ER ID No. 55663, US Public Health Service, Washington, DC. (Clement International Corporation 1990, ER ID No. 55663)

Dorries, A. M. (Ed.), June 1,1996. "Risk-Based Corrective Action Process," Revision 1, Los Alamos National Laboratory Report LA-UR-96-2811, ER ID No. 52290, Los Alamos, New Mexico. (Dorries 1996, 1297)

Edwards, N. T., 1983. "Polycyclic Aromatic Hydrocarbons (PAHs) in the Terrestrial Environment — A Review," *Journal of Environmental Quality*, ER ID No. 55636, Vol. 12, No. 4, pp. 427-441. (Edwards 1983, ER ID No. 55636)

EPA (US Environmental Protection Agency), July 27, 1990. "Corrective Action for Solid Waste Management Units (SWMUs) at Hazardous Waste Management Facilities," proposed rule, Title 40, Parts 264, 265, 270, and 271, Federal Register, Vol. 55., pp. 30798-30884 (EPA 1990, 0432)

LANL (Los Alamos National Laboratory), November 1995. "Installation Work Plan for Environmental Restoration," Revision 5, Los Alamos National Laboratory Report LA-UR-95-4048, Los Alamos, New Mexico. (LANL 1995, 1275)

Menzie, C.A., B. B. Potocki, and J. Santodonato, 1992. "Exposure to Carcinogenic PAHs in the Environment," *Environmental Science and Technology*, ER ID No. 55635, Vol. 26, No. 7, pp. 1278-1284. (Menzie et al. 1992, ER ID No. 55635)

NMED Comment:

6. *LANL shall carry forward to a BRA all COPCs whose concentrations exceed SALS, but are less than the background concentration.*

LANL Response:

As stated in the response to General Comments: Approach/Conceptual Model 5, the exceedance of any SAL does not indicate that a BRA must be conducted. It is only one of several further actions that may be warranted. For those few analytes that have SALs below the background UTLs, the Installation Work Plan for Environmental Restoration (LANL 1995, 1275) states that if they are not indistinguishable from background they will not be identified as COPCs. In order to provide information on the level of risk associated with the background UTLs, the ER Project agreed with EPA Region 6 to present an estimate of the background risk in the RFI report. However, the RFI format in use at the time the TA-15 report was written did not address the issue of risk due to background. Subsequent to this report, the background risk information was provided in the RFI reports as part of Chapter 3, as agreed to with EPA Region 6. The following section dealing with risk due to background and as presented under the current RFI format will be added to Chapter 3 of the RFI report.

3.5.1.1 Risk Due to Naturally Occurring Inorganic Chemicals in Soils (Background)

Risk is associated with exposure to inorganic chemicals naturally occurring in soil. Calculation of background risks using the same methodology as site risk estimates provides a frame of reference for risk levels calculated at a site. This information provides a basis for determining risk-based remediation goals, which in some circumstances may be set at target risks comparable

to background rather than default values, i.e., a cancer risk of 10^{-6} or a hazard index of 1. Background risks can also affect decisions at sites that have chemicals for which there is a toxicity threshold. For some inorganic chemicals, background intakes may be near a toxicity threshold such that incremental intakes associated with contamination may be unacceptable.

Background risk estimates provided in Table 3.5.1.1-1 were calculated using the same exposure assumptions by which SALs are calculated. SALs are based on health-protective assumptions for a residential scenario (EPA 1995, 1307). For soil exposure, the pathways include incidental soil ingestion, inhalation of resuspended dust, and dermal contact with soil. The background soil data used for these calculations were collected from several soil horizons at geographically diverse locations. Background risks are estimated for two statistics. One statistic is the median, which represents the midpoint in the concentration range (technically, the medium is the concentration value that divides the results into two equal groups or where half of the data are above and half are below this value). The second statistic represents the upper range on background concentration values, and is either a calculated UTL or a maximum concentration value.

The background risks based on the LANL SAL residential exposure model are provided in Table 3.5.1.1-1. Risks due to background concentration are presented for both noncarcinogenic and carcinogenic outcomes. The potential for adverse noncarcinogenic health effects is estimated by a hazard quotient. A chemical intake leading to a hazard quotient of up to 1 is not associated with adverse health effects. None of the median background concentrations result in hazard quotients greater than 1. The hazard quotient of the concentration for manganese exceeds 1 (1.9). However, the exposure to naturally occurring manganese is not expected to have significant health consequences because of the unlikely occurrence of the UTL concentration over an entire exposure area, the conservative assumptions used in the exposure assessment, and the margin of safety incorporated into the reference dose.

Three of the background inorganic chemicals provided in Table 3.5.1.1-1 are also carcinogens. Applying the default exposure assumptions used for SALs, the lifetime cancer risks due to residential soil exposure to background concentrations (UTL column) are estimated at approximately 1 excess case of cancer in 100,000 people for beryllium, 2 in 100,000 for arsenic, and 2 in 1,000,000,000 for cadmium (carcinogenic only by inhalation). EPA uses a range of 1 excess case of cancer in 10,000 people to 1 in 1,000,000 as a guidance for an acceptable range of cancer risk (EPA 1990, 0559).

These background risk estimates provide a frame of reference for risk-based screening assessment and site decisions. If a site-specific risk assessment is necessary to further evaluate risks, background risks can also be calculated using site/scenario-specific assumptions to assist in any remedial action decisions for the site.

TABLE 3.5.1.1-1
RISK DUE TO BACKGROUND CONCENTRATIONS OF INORGANIC CHEMICALS IN SOIL ASSUMING A RESIDENTIAL SCENARIO[a]

Inorganic Chemical	Background Soil Concentration[b] mg/kg		Hazard Quotient		Lifetime Cancer Risk	
	Median	UTL	Median	UTL	Median	UTL
Aluminum	10,000	38,700	0.1	0.5	NC[c]	NC
Antimony	0.6	1[d]	0.02	0.03	NC	NC
Arsenic	4	7.82	0.2	0.4	$1x10^{-5}$	$2x10^{-5}$
Barium	130	315	0.03	0.06	NC	NC
Beryllium	0.895	1.95	0.003	0.006	$6x10^{-6}$	$1x10^{-5}$
Cadmium[e]	0.2	2.6[d]	0.005	0.07	$2x10^{-10}$	$2x10^{-9}$
Chromium[f]	8.6	19.3	0.00009	0.0002	NC	NC
Cobalt	6	19.2	0.001	0.004	NC	NC
Copper	5.75	15.5	0.002	0.01	NC	NC
Lead[g]	12	23.3	0.03	0.06	NC	NC
Manganese	320	714	0.1	0.2	NC	NC
Mercury	0.05	0.1[d]	0.002	0.004	NC	NC
Nickel	7	15.2	0.005	0.01	NC	NC
Selenium	0.3	1.7[d]	0.0008	0.005	NC	NC
Thallium	0.2	1[d]	0.03	0.2	NC	NC
Uranium	0.9	1.87	0.004	0.008	NC	NC
Vanadium	21	41.9	0.04	0.08	NC	NC
Zinc	30.7	50.8	0.001	0.002	NC	NC

a. Risk estimates are based on reference doses, slope factors, and EPA Region 9 default exposure assumptions effective April 1996.
b. Background concentrations taken from a LANL report (Longmire et al. 1995, 1142).
c. NC = noncarcinogen.
d. Maximum detected background value.
e. Cancer risks for cadmium are based solely on inhalation of resuspended dust.
f. Naturally occurring chromium is assumed to exist in a trivalent state.
g. Hazard quotient based on biokinetic uptake model.

References:

EPA (US Environmental Protection Agency), March 8, 1990. "National Oil and Hazardous Substances Pollution Contingency Plan," Final Rule, 40 CFR Part 300, Federal Register, Vol. 55, No. 46, p. 8666. (EPA 1990, 0559)

EPA (US Environmental Protection Agency), September 1, 1995. "Region IX Preliminary Remediation Goals (PRGs) Second Half 1995," ER ID No. 53970, San Francisco, California. (EPA 1995, 1307)

LANL (Los Alamos National Laboratory), November 1995. "Installation Work Plan for Environmental Restoration," Revision 5, Los Alamos National Laboratory Report LA-UR-95-4048, Los Alamos, New Mexico. (LANL 1995, 1275)

Longmire, P., S. Reneau, P. Watt, L. McFadden, J. Gardner, C. Duffy, and R. Ryti, January 1995. "Natural Background Geochemistry, Geomorphology, and Pedogenesis of Selected Soil Profiles and Bandelier Tuff, Los Alamos, New Mexico," (draft) Los Alamos National Laboratory Report LA -12913-MS, Los Alamos, New Mexico. (Longmire et al. 1995, 1142)

NMED Comment:

7. *LANL shall consider the cumulative risk posed to human health and the environment from multiple, nearby PRSs. Many sites within Technical Area (TA) 15 present carcinogenic, noncarcinogenic, or radiological risks which, in total, may present an unacceptable human health or ecological risk.*

LANL Response:

The screening assessment methodology used in the Phase I investigations generally focuses on the individual PRS. In most cases, this approach is sufficient to determine the potential human health concerns as a result of site activities. However, LANL recognizes the appropriateness of the comment pertaining to potential cumulative risk for sites that may influence other PRSs, e.g., drainage channels that merge to form a larger channel. In these instances it would be appropriate to determine the overall risk associated with the area. LANL currently does not have a methodology in place to address this issue. In order to consider cumulative risk in a consistent and approved manner, LANL will develop this procedure and incorporate it into the Risk-Based Corrective Action Process. In addition, the proposed ecological risk assessment methodology for LANL does look at risk across PRSs and will deal with cumulative risk once the methodology is implemented.

NMED Comment:

8. *The use of tolerance intervals is an alternate approach to the analysis of variance in determining the presence of statistically significant contamination. A tolerance interval is constructed from data obtained from (uncontaminated) background soil locations. The concentrations from the site investigations are then compared with the tolerance interval. If the site constituent concentrations fall outside the tolerance interval, statistically significant contamination is evinced. Tolerance intervals may be used for determining statistically significant contaminant concentrations; however, the following criteria must be met and documented:*

- *The presence of homogeneous soil types must be verified. "The use of Upper Tolerance Limits (UTLs) is appropriate for sites that overlie extensive homogeneous geologic deposits (e.g., thick homogeneous lacustrine clays) that do not naturally display geochemical variations.*
- *The tolerance interval must be calculated using an adequate data set (minimum of 8 data points).*
- *Calculated UTLs must be compared to human health and ecological screening values to determine their relevance.*
- *For adequate review, the Administrative Authority (AA) must be provided the entire data set (including non-detectable concentrations) used to perform the statistical analysis and the type of statistical analysis performed.*
- *For adequate review, the AA must be provided all background data points.*
- *Variability within each data set must be defined (i.e., minimum and maximum constituent concentrations, average constituent concentration value and the standard deviation).*
- *A normality test must be applied to the data set prior to the derivation of an UTL.*
- *The data set must be inspected for outliers (i.e., unusually high or low values) and their identity and source (such as analytical laboratory transcription errors) should be documented.*

If these criteria are met, LANL must recalculate UTLs based on the 95 percent confidence level of the 95th percentile of distribution [USEPA, 1989, Statistical Analysis of Ground- Water Monitoring Data at RCRA Facilities - Interim Final Guidance, NTIS PB89-151047]. If these criteria cannot be met, LANL must calculate the background concentration based on the 95 percent upper confidence level of the arithmetic average concentration.

LANL Response:

LANL has documented both the background data and the approach taken to determine if PRS data exceed background in two main documents. These documents have been provided to both EPA and NMED regulators for their review and comment. One document is titled "Natural Background Geochemistry and Statistical Analysis of Selected Soil Profiles, Sediments, and Bandelier Tuff, Los Alamos, New Mexico" (LA-UR-95-3486) (Longmire et al. 1995, 1266), which contains a description of the soil, sediment, and tuff background sample locations, analytical methods, and data analysis. The other document is titled "Application of LANL Background Data to ER Project Decision-making, Part 1: Inorganics" (LA-UR-96-1534) (Ryti et al. 1996, 1298), which describes how the appropriate background data are selected and the relevant statistical tests and graphical data interpretation are used.

We have summarized the list of issues below and have provided references to specific pages in the two documents listed above that address each comment.

1) The presence of homogeneous soil must be verified. The use of upper tolerance limits (UTLs) is appropriate for sites that overlie extensive homogeneous geologic deposits (e.g., thick homogeneous lacustrine clays) that do not naturally display geochemical variations.

Pages 31-40 of the soils chapter in LA-UR-95-3486 evaluate differences spatially and by soil horizon for several of the key inorganic chemicals. Major differences were observed between soil horizons, but not locations (or soil types), thus UTLs were calculated by individual soil horizon and for all soil horizons. The background UTLs used in this RFI report were those for all soil horizons because the individual soil horizons (A, B, and C) were not identified during the Phase I sampling. See page 4 in LA-UR-96-1534 to see how subsets of the LANL background data are selected.

2) The tolerance limit must be calculated using an adequate data set (minimum of 8 data points).

Pages 25-28 in LA-UR-95-3486 present summary statistics, including the count of samples by soil horizon.

3) **Calculated UTLs must be compared to human health and ecological screening values to determine their relevance.**

   Pages 23-24, 42 of the soils chapter in LA-UR-95-3486 discuss the relationship between background concentrations and screening action levels for several inorganics. In addition, this comparison is also made on pages 10-11 of LA-UR-96-1534.

4) **For adequate review, the AA must be provided all background data points.**

   LANL has done this previously for EPA and NMED, and LANL will be happy to provide it again, if necessary.

5) **Variability within each data set must be defined (i.e., minimum and maximum constituent concentrations, average constituent concentration value and the standard deviation).**

   The statistical analysis of the LANL background soils samples is discussed on pages 23-76 of the soils chapter in LA-UR-95-3486. Averages, minima, and maxima by soil horizon are presented on pages 25-28 of the soils chapter in LA-UR-95-3486, and summary statistics of the final background data set are presented on pages 53-58 of the soils chapter in LA-UR-95-3486.

6) **A normality test must be applied to the data set prior to the derivation of an UTL.**

   Statistical distributions of the inorganics are presented in Table 20 on page 52 of the soils chapter in LA-UR-95-3486, and the associated text is on pages 49-50.

7) **The data set must be inspected for outliers (i.e., unusually high or low values) and their identity and source (such as analytical laboratory transcription errors) should be documented.**

   The process for evaluating outliers is presented on pages 41-42 of the soils chapter in LA-UR-95-3486, and the results of this analysis are presented on pages 42-49.

   LANL believes that the criteria listed by NMED in General Comment No. 8 have been met, and hence, that the current background based on 95% confidence intervals of the 95th percentiles of the background concentration distributions are appropriate for use by the ER Project.

References:

Longmire, P. A., D. E. Broxton, and S. L Reneau (Eds.), October 1995. "Natural Background Geochemistry and Statistical Analysis of Selected Soil Profiles, Sediments, and Bandelier Tuff, Los Alamos, New Mexico," Los Alamos National Laboratory Report LA-UR-95-3486, Los Alamos, New Mexico. (Longmire et al. 1995, 1266)

Ryti, R., P. Longmire, and E. McDonald, March 29, 1996. "Application of LANL Background Data to ER Project Decision-Making, Part I: Inorganics," Los Alamos National Laboratory Report LA-UR-96-1534, ER ID No. 54585, Los Alamos, New Mexico. (Ryti et al. 1996, 1298)

NMED Comment:

9. LANL shall assess ecological risk prior to recommending NFA for a PRS.

LANL Response:

To date, the RFI reports submitted to NMED recommend NFA for a PRS based only on human health concerns. LANL has developed an ecological risk assessment methodology that will address the ecological concerns over a larger ecological exposure unit. The ecological risk of the PRSs within TA-15 will be addressed once the methodology has been implemented.

NMED Comment:

10. *LANL shall revise and resubmit the Phase II Sampling and Analysis Plans (SAP) for PRSs C-15-010 and 15-010(a). The information presented within the Phase II SAP is not adequate to determine the effectiveness of the proposed sampling.*

LANL Response:

LANL requests clarification of "The information presented within the Phase II SAP is not adequate to determine the effectiveness of the proposed sampling." Page 6 of the "RCRA Facility Investigation Report" annotated outline contained within Annex N of the DOU states: "Should additional sampling, continued monitoring be necessary, include a brief discussion of the proposed sampling and analysis scheme." The DOU further suggests a page count of 2 to 3 pages for such a SAP. The Phase II SAP for PRS C-15-010 consists of two pages, while the Phase II SAP for PRS 15-010(a) consists of two pages of text and a proposed sampling location map. Each SAP outlines the problem; the COPCs; the sampling and analysis design; the types and methods of analysis; a table of depths, numbers of samples and whether they are for field screening or fixed laboratory analysis, and the parameters to be analyzed; a plan for implementation; and plan for sample handling, data collection, and reporting. These Phase II SAPs, coupled with the results of the Phase I RFI (presented in the pages immediately preceding the Phase II SAP), and the original RFI work plan constitute all that is known and planned for these PRSs. Clarification is needed from HRMB regarding what is lacking or deficient in these plans.

NMED Comment:

11. *On several occasions, LANL makes reference to the NFA criteria. LANL shall include an explanation of these criteria and provide reference to the Environmental Restoration Document of Understanding.*

LANL Response:

The five NFA criteria are contained in Annex B of the DOU and presented in Figure 1.2-1, page 1-5, of the RFI report.

NMED Comment:

12. *Section 3.3 implies that screening of other radionuclides occurred; however, samples from many PRSs [e.g. 15-014(g)] were analyzed for uranium only. Please clarify the methodology used.*

LANL Response:

Section 3.3 presents a generic discussion of how radionuclide data is evaluated once the results are obtained from the analytical laboratory. It does not describe any of the field screening or sample collection procedures as the comment implies. The statement at issue is assumed to be

related to the statement in paragraph four of Section 3.3, which discusses the comparison of natural radioactive decay series and how the isotopes can be "screened out," i.e., eliminated from further consideration, unless their activity levels are unusually different from background. In order to clarify this statement and to avoid confusion, the paragraph will be modified as follows:

Isotopes in the three existing natural radioactive decay series (uranium, thorium, and actinium) are compared with background and can be ~~screened out~~ *eliminated from further evaluation* unless their activity levels or isotopic ratios are significantly different from those found in naturally occurring radionuclides.

NMED Comments:

Supporting Documentation

1. *LANL shall provide the following pertinent information in an addendum to the RFI Report: a tabulated summary of field screening instrumentation readings, calibration records, and detection limits, auger logs, boring logs, and log books.*

LANL Response:

All this information is provided by the field team to LANL's Record Processing Facility (RPF) and is available to NMED and to the public. Although its absence is not a "deficiency," LANL will provide this information to HRMB within approximately 45 working days.

NMED Comment:

2. *LANL shall provide a map indicating all springs, wells, and seeps within the same canyon system(s) or within a 1-mile radius of the PRSs being investigated within the RFI Report.*

LANL Response:

This information is available in the Hydrogeologic Work Plan.

NMED Comment:

3. *For PRSs that are underground storage tanks, LANL shall contact the Underground Storage Tank (UST) Bureau to obtain a certified closure statement or documentation indicating that the UST is exempt from the State UST regulations.*

LANL Response:

This TA-15 RFI report has two former USTs—PRSs C-15-010 and -011. PRSs C-15-010 and -011 are being researched by LANL's FSS personnel to obtain the necessary records. LANL will provide the requested documentation within approximately 45 working days.

NMED Comment:

Reporting of Sampling and Analyses Results and Activities

1. *LANL shall submit a table detailing the variances from the approved RFI Workplan (on a PRS-by-PRS basis) and their rationale.*

LANL Response:

Section 5.x.4.3 of the RFI report presents the deviations from the work plan on a PRS-by-PRS basis, as well as the rationale for such deviations. This information is already contained within the RFI report.

NMED Comments:

2. *LANL shall provide a checkplot and table summarizing the all sampling locations and analytical results for the site-wide and the site-specific (if any) background studies.*

LANL Response:

In accordance with the approved RFI work plan, there were no site-specific background studies performed for this RFI. Site-wide background data, tables, and maps are provided in two LANL reports (Longmire et al. 1995, 1142; Longmire et al, 1995, 1266), which have been provided to NMED.

References:

Longmire, P., S. Reneau, P. Watt, L. McFadden, J. Gardner, C. Duffy, and R. Ryti, January 1995. "Natural Background Geochemistry, Geomorphology, and Pedogenesis of Selected Soil Profiles and Bandelier Tuff, Los Alamos, New Mexico," (draft) Los Alamos National Laboratory Report LA - 12913-MS, Los Alamos, New Mexico. (Longmire et al. 1995, 1142)

Longmire, P. A., D. E. Broxton, and S. L Reneau (Eds.), October 1995. "Natural Background Geochemistry and Statistical Analysis of Selected Soil Profiles, Sediments, and Bandelier Tuff, Los Alamos, New Mexico," Los Alamos National Laboratory Report LA-UR-95-3486, Los Alamos, New Mexico. (Longmire et al. 1995, 1266)

NMED Comment:

3. *LANL shall provide a checkplot presenting a compilation of all the sampling locations (including site-specific background sampling locations).*

LANL Response:

LANL has already provided HRMB with several types of maps: site-specific sampling locations and results in the RFI on an expanded scale (e.g., page 5-88); PRS location maps in the work plan (e.g., page E-5); and building number maps, also in the work plan (e.g., page E-6). LANL provided HRMB with a site tour and briefing booklet of requested PRSs on December 19, 1996. These maps, briefing booklet, and tour provide a detailed representation of the sampling locations. To comply with the HRMB request to post all this information on one large plot will require approximately 45 working days. LANL respectfully suggests that such a plot will be almost unusable because of the level of detail that will be posted and the large number of PRSs covered. LANL subsequently suggests HRMB's request be reconsidered.

NMED Comment:

4. *LANL shall provide a statistical summary of all contaminant concentrations greater than background and greater than SALs.*

LANL Response:

LANL requests clarification of this request and how the information will be used in order to respond appropriately in the future. The wording implies that all results should be grouped together, regardless of PRS type. Thus, this request would group septic tanks with surface soil, which may not be a meaningful grouping. Furthermore, is field screening data to be included or only fixed laboratory data? LANL can comply with this request, but it constitutes additional material outside the scope of the DOU and the approved RFI format, and its absence does not constitute a "deficiency."

Section 5.x.4.3 of the RFI report indicates what samples were sent to offsite fixed laboratories. For this report, 100% of the analytical samples were sent to an offsite fixed laboratory.

NMED Comment:

5. *For each PRS, LANL shall provide a table summarizing the date(s) of the sampling event(s), number of samples obtained, types of analyses conducted, analytical methods utilized, date(s) of analyses, and type of laboratory that performed the analyses (fixed/mobile, on-site/off-site, etc.).*

LANL Response:

This information is available from FIMAD. The DOE OB has access to FIMAD and can supply this information to HRMB. This request constitutes additional material outside the scope of the DOU and the approved RFI format and does not constitute a "deficiency."

NMED Comment:

6. *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. The AA requires 20% of the samples collected for fixed laboratory analysis be analyzed by an off-site laboratory.*

LANL Response:

This information is available from FIMAD. The DOE OB has access to FIMAD and can supply this information to HRMB. This request, although not required, constitutes additional material outside the scope of the DOU and the approved RFI format and its absence does not constitute a "deficiency."

NMED Comment:

7. *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 (QA/QC) criteria were adhered to. In addition, LANL must obtain confirmatory samples when using field screening to determine the presence or absence of contamination.*

LANL Response:

Throughout the TA-15 work, field screening for radiation, HE, and/or metals was used to either bias sampling locations or to "over sample" and then send a set percentage of samples (based upon the highest readings) to a fixed laboratory for analysis. In no cases were the field screening/instruments used to determine the types of analyses to be conducted. The types of analyses were based on historical knowledge and/or site process knowledge and were identified in the approved work plan. These kinds of analyses are conveniently summarized in the work plan on page E-11.

LANL will provide the QA/QC results for the field screening and the SOPs for using the screening within approximately 45 working days.

Confirmatory samples (i.e., samples sent for fixed laboratory analysis) were obtained in all cases where field screening took place, at the frequency specified in the approved work plan. Field confirmation samples are described in Sections 5.x.4.3 (e.g., RFI report, Section 5.13.4.3, page 5-11): "Of the 22 samples collected, 13 were submitted to an offsite laboratory in accordance with the approved work plan.") Table D-1 presents the comparison between XRF screening results and fixed laboratory analyses, so "confirmatory" samples were analyzed. This same pattern was followed throughout the work at TA-15, with the exception of PRSs where field screening was not required.

NMED Comment:

8. *LANL must conduct Toxicity Characteristic Leachate Procedure (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 l6,1995]*

LANL Response:

When a VCA is proposed that will generate waste, TCLP is one of the waste characterization procedures utilized by ER Project personnel on a routine basis. In accordance with the DOU, the VCA plan and VCA report serve as the RFI report, and thus the TCLP concerns will be addressed properly therein.

NMED Comment:

9. *LANL shall provide documentation indicating that appropriate (rate and frequency of) QA/QC samples were obtained and analyzed per USEPA 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 problemsencountered. [Programmatic Issues from NODs dated January l6,1995]*

LANL Response:

According to the statement of work for analytical services, analytical methods used were SW-846 and the full data package included all QC data (calibration data, blanks, laboratory duplicates, matrix spike/matrix spike duplicates, surrogates, and laboratory control samples) per analytical batch (approximately 20 samples per batch). The frequency of laboratory QC samples was based on the EPA SW-846 methods and closely parallels the EPA Contract Laboratory Program (CLP). In general, surrogates and internal standards were analyzed with every sample scheduled for

organic analysis, while matrix spike/matrix spike duplicates, laboratory duplicates, and laboratory control samples were analyzed per analytical batch (approximately 20 samples per batch). A discussion of the QA/QC problems associated with the laboratory QC samples is presented by PRS in Chapter 4 and are summarized in Table B-1 of Appendix B of the RFI report (as per agreement with EPA and noted in programmatic issues from NODs dated January 16, 1996).

Field QA/QC samples were also collected during the sampling at TA-15. These samples included field blanks, equipment rinsate blanks, trip blanks, field duplicates, and performance evaluation (PE) samples. The blanks were used to determine the potential for reagent and field contamination of environmental samples, to evaluate decontamination procedures, and to determine the potential for contamination of environmental samples during shipping. The field duplicates were used to evaluate reproducibility of sampling and the PE samples were used as blind checks of the analytical laboratory performance. A total of three field blanks, three rinsate blanks, seven trip blanks, six field duplicates (four for the data presented in the report), and two PE samples were submitted to the laboratory for analyses. Although the frequency of QC field samples does not subscribe to the traditional frequency of one per 20 samples, the field QC sample allocation is designed to circumvent some of the limitations inherent in the generic approach and focuses on supporting screening assessment and other environmental cleanup decisions. The allocation is emphasized at sites that are expected to contain COPCs at measurable concentrations rather than at sites where no detectable concentrations are expected. By doing so, it reduces the chances of collecting and analyzing samples that yield nondetects and consequently providing information of limited value, except when verifying the lack of cross contamination. This approach is presented in Appendix IV of the ER Quality Assurance Project Plan Requirements for Sampling and Analysis (QAPP) (LANL 1996, 1292), which is based on the Interim Final EPA Requirements for Quality Assurance Project Plans (EPA 1994, 1206).

The data from the field blanks indicates low level methylene chloride (6.5 µg/L) and copper (0.03 µg/L) contamination, the rinsate blanks indicate low level copper (0.03 µg/L) and uranium-235 (54 pCi/L) contamination, and the trip blanks indicate acetone (50.6 µg/L or less) and methylene chloride (26.6 µg/L) contamination. The detections in the blanks indicate that there is some cross contamination either during sampling, shipping, or at the laboratory. The low level of copper in the blanks was not a concern because the copper detected in the samples were more than 5X blank values. Based on guidance from EPA's Functional Guidelines for Inorganic Data Review (EPA 1994, ER ID No. XXXX), this indicates that the copper in the samples were valid detects and not due to blank contamination. The contamination of uranium-235 in the blank did not affect data usability because whenever this radionuclide was detected in a sample, uranium-238 was also detected. Because uranium consists primarily of uranium-238 and to a lesser extent uranium-235, the detection of uranium-235 in a sample is accompanied by detection of uranium-238. Therefore, despite the fact that the detected values of uranium-235 in the samples were less than 5X the blank value, the presence of uranium-235 in the samples was considered to be valid detects. Acetone and methylene chloride were detected in a number of samples which may have been due to contamination. The detected values of these analytes were not a concern because they were well below the decision criteria and their presence was unlikely based on site activities. Therefore, the blanks results did not affect the usability of the analytical data for these analytes because the concentrations detected were below detected levels in the field samples and/or well below decision criteria.

In general, the field duplicates had relative percent differences (RPDs) of 35% or less, which are within EPA's control limits for soil as presented in functional guidelines (EPA 1994, 1206). The exception to this was mercury, which had RPDs of 50% or more. This difference may reflect soil heterogeneity or may be the result of a loss of mercury from the samples during the analysis.

Two PE samples (Sample IDs 0215-95-0307 and 0215-95-0319) were submitted to the analytical laboratory. Sample 0215-95-0307 was requested to be analyzed for inorganics and uranium, while Sample 0215-95-0319 was requested to be analyzed for inorganic, SVOCs, HE, and uranium. The analytical results for Sample 0215-95-0307 indicated that, except for mercury, the sample values were within the acceptance limits and often close to the certified value. Sample 0215-950319 was apparently analyzed incorrectly for inorganics and SVOCs. The hard copy data report indicated that the SVOC analysis for this sample was not conducted because of "laboratory error" despite the fact that the data printout presents the SVOC results as being undetected. A review of the hard copy data package revealed that there are no chromatographs or other GC/MS data that would accompany routine SVOC analysis. Although it is unclear what the error was, it would appear that the SVOC sample was inadvertently analyzed for inorganics and subsequently no sample was available for SVOC analysis. The inorganic data for this sample are comparable to the certified background values for the blank soil used to make up the certified samples. In addition, the SVOC sample bottle that was returned to LANL following analysis was empty, indicating that the sample was analyzed by the analytical laboratory. The HE results for 2,4dinitrotoluene (reported incorrectly as 2,6-dinitrotoluene) and 2,4,6-trinitrotoluene are close to the certified value (within <1 mg/kg), while the result for p-nitrotoluene is approximately 50% of the certified value. The uranium result was also close to the sample concentration. In addition, the data printout indicates that VOCs and pesticides were analyzed for this sample, although these suites were not requested. Because the hard copy data package does not contain any analytical information about these analyses, it is assumed that the printout reported these sample results as undetected in error. Because of an oversight, the samples were not resubmitted to the analytical laboratory. As a result, there are no PE sample data for SVOCs and the sample data for inorganics, although not spiked at expected concentrations, are in agreement with the soil background values. All of the sample data were, however, analyzed by the laboratory with the appropriate laboratory QA/QC samples (i.e., surrogates, internal standards, matrix spikes, spikes, laboratory control samples, and method blanks).

In summary, the EPA guidance and requirements (EPA 1994, 1187) concerning frequencies of QC sample collection and analysis requires that those frequencies support the associated environmental decisions. All analytical QC samples were analyzed at frequencies consistent with the prescribed standard analytical methodologies used for analysis of the samples from these sites, and those frequencies are judged sufficient to support the decisions. Because there are no contaminants at many of these sites that are present at concentrations of concern, the number of field QC blanks collected and analyzed actually exceeds any frequency required to support the conclusion of no unacceptable risk at a site. The conclusion of no unacceptable risk posed at a site would be unchanged even if no field blanks of any sort had been collected and analyzed. This is because, when no contaminants are detected at levels of concern in the field samples, there can be no possibility of significant contamination from field or laboratory activities. Field duplicate results are consistent with historical data and are within the acceptance criteria presented in the EPA "National Functional Guidelines For Inorganic Data Review" (EPA 1994, 1206). These duplicate results serve to demonstrate that sample heterogeneity is consistent with what would be expected at a site and the frequency of field duplicate collection and analysis is thus judged acceptable. The use of PE samples is not required by EPA; they are used as an additional check on laboratory performance beyond the EPA requirements.

The results of the field and laboratory QC samples will be presented, along with the sample analytical results in the printout from FIMAD, of all analytical results that will be provided in response to Specific Comments: Report Format 1.a.

References:

EPA (US Environmental Protection Agency), January 1994. "EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations," EPA QA/R-5, Interim Final, Washington, DC. (EPA 1994, 1186)

EPA (US Environmental Protection Agency), February 1994. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," EPA540/R-94/013, Washington, DC. (EPA 1994, 1206)

EPA (US Environmental Protection Agency), September 1994. "Guidance for the Data Quality Objectives Process," EPA QA/G-4, Final, Washington, DC. (EPA 1994, 1187)

LANL (Los Alamos National Laboratory), March 1996. "Quality Assurance Project Plan Requirements for Sampling and Analysis," Los Alamos National Laboratory Report LA-UR-96-441, ER ID No. 53450, Los Alamos, New Mexico. (LANL 1996, 1292)

NMED Comment:

SPECIFIC COMMENTS

Report Format

1. *Appendices*
   (a) *LANL shall provide a summary of all analytical data in Appendix A including non-detectable concentrations.*

LANL Response:

This information is available in FIMAD. The DOE OB has access to FIMAD and can supply this information to HRMB. If HRMB still requests a hard copy of this information, please clarify.

NMED Comment:

(b) *In Appendix D (page D-1), concentrations of lead and uranium (132,000 and 45,000 ppm, respectively) are eliminated from the data set as outliers. LANL shall provide an explanation of the criteria it used to eliminate these data from the data set.*

LANL Response:

LANL utilized the 'Q-Test' for rejection of outlier data (Skoog and West, Analytical Chemistry 4th ed., 859 pgs, Philadelphia, Saunders College Publishers). The results were as follows: for Pb, the largest laboratory value was 132,000 ppm, the next largest was 907 ppm, and the smallest was 3.3 ppm. Q experimental is then 0.993152 and Q critical for N=30 (the highest N reported in the table) is 0.31 at the 99% confidence interval (CI). Thus Qexp>Q crit, so rejection of the data point is warranted. In addition, this 132,000 ppm data point is at least two orders of magnitude greater than the next higher point, which would bias the accompanying graph (Figure D-1) and regression coefficients in favor of a better correlation between field and laboratory measurements. LANL chose to be conservative in presenting this graphical and regression analysis.

For U, the same approach was used. The highest U laboratory value was 45,000 ppm. The next largest was 2,180 ppm and the smallest was 0.66 ppm. Applying the Q test, Q experimental was

0.951570, Q critical with N=30 is 0. 3 1, thus Q exp> Q crit at the 99% CI and rejection of the data point is warranted. In addition, this 45,000 ppm data point is at least 10 times greater than the next higher point which would bias the accompanying graph (Figure D-2) and regression coefficients in favor of a better correlation between field and laboratory measurements. LANL chose to be conservative in presenting this graphical and regression analysis.

NMED Comment:

(c) LANL shall provide axis labels for the graphs in Appendix E.

LANL Response:

The first page of Appendix E provides descriptions of the graphical displays presented in this appendix. The definitions of the axes are specifically provided as well in order to facilitate understanding of the graphs.

NMED Comment:

PRS Types

1. *Septic Systems*
   (a) Hazardous constituents were identified above background concentrations in the shallow subsurface near septic or settling tanks. LANL shall conduct further investigations at those PRSs to determine the integrity of the tank and drain lines.

LANL Response:

Septic or settling tanks discussed in this RFI report included the following: PRSs 15-009(a); 15-009(f); 15-009(i); 15-009(k); 15-010(a); and 15-010(b). PRSs 15-009(a and i) are active. PRS 15-010(a) is recommended for a Phase II investigation. PRSa 15-009(f and k) have been sampled and have no COPCs retained. Only one was specified (in the approved work plan) to have surface or subsurface samples collected near the tanks to investigate drain lines—PRS 15-010(b). The three soil samples collected in the outfall area were analyzed by a fixed laboratory and no contaminants were detected at all. Thus, this NOD comment is in error and, in fact, no hazardous constituents were identified above background in the shallow subsurface near septic or settling tanks.

NMED Comment:

(b) Hazardous constituents were identified above background in the septic settling or holding tanks at PRSs 15-009(f and k). HRMB recommends that LANL perform interim measures at these PRSs to mitigate potential releases to the environment.

LANL Response:

The contents of both of these septic tanks were liquid and, therefore, no background values are available for this medium. The concentrations of inorganics detected in the tank were below the RCRA toxicity characteristics for wastes and is, therefore, not hazardous waste. In addition, the concentrations of inorganics are below the SALs used at the time of this report as well as below the current water quality standards, except for mercury's wildlife habitat standard (0.012 µg/L) and the manganese drinking water standard (50 µg/L).

NMED Comment:

(c) *LANL shall ensure that seals have been emplaced such that flow into and out of all inactive septic tank PRSs has been eliminated. Each inactive septic tank should be removed or, at a minimum, be backfilled 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 in the future as a final disposition of the PRS.*

LANL Response:

For these inactive septic tanks, LANL will investigate the appropriateness of the action. LANL requests clarification as to why concrete structures should be removed from the subsurface if they present no risk.

NMED Comment:

2. *Firing Sites*
   (a) *LANL shall not use the High Explosive (HE) spot test to determine the presence or absence of HE. LANL may only use the HE spot test to bias Phase I sampling locations [letters from W. Honker to T. Taylor dated April 19, and June 19, 1995].*

LANL Response:

See response No. 2 to Attachment A.

NMED Comment:

3. *Outfalls*
   (a) *In order to address Water Quality Control Commission concerns, LANL shall plug outfall piping at the origin and remove all associated piping.*

LANL Response:

LANL does not recognize any PRSs in this report that are affected. LANL requests HRMB to clarify this issue.

NMED Comment:

Potential Release Sites

1. *15-001 Storage Area*
   (a) *LANL shall obtain approval to defer the investigation of a PRS prior to the performance of the RFI which was originally intended to investigate it. LANL shall provide documentation that this PRS received deferral approval by the AA prior to the implementation of the RFI Workplan.*

LANL Response:

This PRS was proposed for sampling in the work plan. Samples were collected from this area. While in the field, however, personal observations showed that this area is still active, as stated in the RFI report. Thus, it was not possible to notify the AA in advance, and the sampling results are not relevant because the site is active. This site is, therefore, requested for deferred status. A

project-wide policy on requesting deferred action is being formulated and will be forwarded to HRMB for comment/approval.

NMED Comment:

2. 15-002 Pit

(a) The RFI Report is a stand-alone document. LANL shall present the information referenced from the RFI Workplan in the RFI Report (Section 5.12.1).

LANL Response:

The DOU Annex N, Section 5.1.1, page 4 states, "Provide a brief history of the unit referencing the RFI work plan for a detailed history." The information presented in the RFI report fulfills the DOU intent. This should not be a deficiency.

NMED Comment:

(b) LANL shall clarify the dimensions of the bermed area (Section 5.12.2).

LANL Response:

Field measurements on July 8, 1997 confirm that the berm is 30 x 32 ft, with an interior of roughly 12 x 15 ft and is 4 ft high.

NMED Comment:

(c) LANL shall explain the rationale for not analyzing samples obtained from a "...HE burn area..." (Section 5.12.1) for HE.

LANL Response:

The approved RFI work plan specified samples to be analyzed only for total U, metals, VOCs, and SVOCs. It specified that the area be screened for rad, U, Be, Pb, HE, and VOCs. This was done. All results are presented in the RFI report. No positive HE spot tests were obtained. LANL will resample for HE and report the results in an addendum.

NMED Comment:

(d) LANL shall clarify the number of samples obtained at this PRS; the number of samples found in the two paragraphs of Section 5.12.4.3 conflict.

LANL Response:

Two sample locations were sampled at two depths for a total of four individual laboratory samples, in accordance with the approved work plan. The first paragraph of Section 5.12.4.3 states, ". . .the two sample locations. . ." The second paragraph states, "All four samples. . ." Figure 5.12.4.3-1 lists the locations and depths of sampling. LANL does not see a conflict with the number of samples collected from this location.

NMED Comment:

(e) *LANL shall provide the PRS-specific calculations and concentrations used to determine that the distribution of the uranium concentrations were not statistically different from background (Section 5.12.5)*

LANL Response:

The uranium concentrations observed at this site are 2.24, 3.15, 5.94, and 3.18 mg/kg. The background UTL for uranium is 5.45 mg/kg. One observed value is slightly above the UTL, so background distributional tests were performed to determine if the site data are statistically different from background. As stated in Section 3.2, Gehan, Quantile, and Slippage tests were conducted. The purposes of these tests are described in more detail in *Application of LANL Background Data to ER Project Decision-Making Part 1: Inorganics* (Ryti et al. 1996, 1298), which NMED has been provided. The actual formulas are available in the referenced materials (Gehan, 1965, 1296; Gilbert and Simpson 1992, 0974; Gilbert and Simpson 1990, 0972) or in the SPlus code through which the tests were actually run. The p-values from these tests are presented in Section 5.12.5 of the RFI report.

References:

Gehan, E. A., 1965. "A Generalized Wilcoxan Test for Comparing Arbitrarily Singly-Sensored Samples," *Biometrika,* Vol. 52, Nos. 1 and 2, pp. 203-223. (Gehan 1965, 1296)

Gilbert , R. O., and J. C. Simpson 1990. "Statistical Sampling and Analysis Issues and Needs for Testing Attainment of Background-Based Cleanup Standards at Superfund Sites," in *Proceedings of The Workshop on Superfund Hazardous Waste: Statistical Issues in Characterizing a Site: Protocols, Tools, and Research Needs,* Environmental Protection Agency, Arlington, Virginia. (Gilbert and Simpson 1990, 0972)

Gilbert, R. O., and J. C. Simpson 1992. "Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 3: Reference-Based Standards for Soils and Solid Media," Pacific Northwest Laboratory, Richland, Washington. (Gilbert and Simpson 1992, 0974)

Ryti, R., P. Longmire, and E. McDonald, March 29, 1996. "Application of LANL Background Data to ER Project Decision-Making, Part I: Inorganics," Los Alamos National Laboratory Report LA-UR-96-1534, ER ID No. 54585, Los Alamos, New Mexico. (Ryti et al. 1996, 1298)

NMED Comment:

(f) *LANL shall revise Figure 5.12.4.3-1 such that it more clearly indicates the sampling locations.*

LANL Response:

LANL will provide this figure within approximately 45 working days.

NMED Comment:

(g) *LANL shall revise the sample identification numbers on either the "Sample ID" column of Table 5.12.5-1 or Figure 5.12.4.3-1 to directly correlate with one another. For example, sample 0215-95-0205 (as indicated in the table) cannot be found (as such) on the figure (sample 15-2560 205).*

LANL Response:

The figure reference is by location ID (15-2560) and sample ID (205). The sample ID was abbreviated from the reference on the table in an effort to make the figure less busy and easier to read. Because the table and figure are correlated and are consistent with the format of the other tables and figures in the report, LANL believes revisions are not warranted.

NMED Comment:

(h) LANL shall show the calculations used to determine the normalized concentrations in Table 5.12.7.1-1. Perhaps LANL could revise the table to include additional columns and a legend showing the formula used.

LANL Response:

The multiple chemical evaluation (MCE) procedure is presented in Section 3.5.1 of the RFI report. The normalized concentration for the analytes detected below their respective SALs is derived by dividing the maximum detected concentration by the SAL. These normalized values are then added together for each effects category (i.e., noncarcinogenic, carcinogenic, or radionuclide) to obtain a normalized sum. The following equation is used for calculating the normalized sum:

$$M_{PRS} = \sum_i [\max_j (C_{i,j}) / SAL_i)] \text{ where:}$$

M_{PRS}	=	sum of maximum normalized concentrations from all samples at a PRS;
i	=	COPC index;
j	=	site index;
C_i	=	concentration of COPC i at site j; and
SAL_i	=	chemical-specific SAL for the ith COPC.

The table for the MCE was presented in accordance with the RFI report format in use at the time. The current RFI report framework policy (Project Consistency Team, 1210) has revised the table format to include additional columns for location IDs, sample IDs, and soil SALs. LANL does not believe it is appropriate to revise all tables according to a format that was not available at the time this RFI report was written. In addition, the data comparison tables for each PRS presents the relevant information for the analytes submitted to the MCE, i.e., location IDs, sample IDs, detected concentrations, and soil SALs.

References:

Project Consistency Team. "Project Consistency Team (PCT) Policy Memo Notebook," (Controlled), Environmental Restoration Project, Los Alamos National Laboratory, Los Alamos, New Mexico. (Project Consistency Team, 1210)

NMED Comment:

3. 15-004(g) Inactive Firing Site

(a) LANL shall provide the rationale (including analytical data, when available) for the further action recommendation at this PRS within the RFI Report.

LANL Response:

This site is proposed for an IA because visible depleted uranium is on the ground. LANL policy is to include all data and recommendations for further remediation in the IA and/or VCA plans for a site and not to include this information twice (i.e., not in the RFI and in the VCA/IA).

NMED Comment:

4. *15-004(h) Inactive Firing Site*
   (a) *LANL shall obtain approval to defer the investigation of a PRS prior to the performance of the RFI which was originally intended to investigate it. LANL shall provide documentation that this PRS received deferral approval by the AA prior to the implementation of the RFI Workplan.*

LANL Response:

While in the field, and after collecting samples, using group personnel stated to the field team their personal observations that this area would be within the hazard radius of PHERMEX, as stated in the RFI report. Thus, it was not possible to notify the AA ahead of time and the sampling results are not relevant because the site continues to receive contamination from PHERMEX operations. This site is requested for deferred status and will be resampled when PHERMEX is no longer active. A project-wide policy on requesting deferred action is being formulated and will be forwarded to HRMB for comment/approval.

NMED Comment:

5. *15-005(b) Container Storage Area*
   (a) *LANL shall explain the rationale for not analyzing samples obtained from an "...active container storage area for HE..." (Section 5.30) for HE.*

LANL Response:

Samples were collected and analyzed for COPCs in accordance with the approved work plan. Table 10.2-3 of the approved work plan specifies collection of two samples and analysis for U, Be, and Pb. LANL will sample this area for HE and will submit the results in an addendum.

NMED Comment:

   (b) *LANL utilized the HE spot test at two different locations 2 inches distant. One result was positive and the other result was negative. The HE spot test is a screening tool used to bias sampling; however, LANL chose to obtain a sample for analyses from the location with the negative result. LANL shall clarify its choice of sampling locations.*

LANL Response:

Because samples with a positive result of the HE spot test cannot be sent for offsite laboratory analysis until a full HE analysis is performed by DX Division, a field decision was made to locate the sample away from the positive HE result, facilitating laboratory analysis for U, Be, and Pb. LANL will sample this area for HE and will submit the results in an addendum.

NMED Comment:

(c) *LANL shall indicate where the surface sample (0215 -95 -0181) was analyzed, the method used, and the analytical results for this sample.*

LANL Response:

Results are available in FIMAD, including the laboratory performing the analysis, the methods, and the results. The laboratory was General Engineering Laboratory, Methods were EPA6010A for metals except Hg, Method EPA7471 for Hg, and ASTM Method D-5174 for U. The results are as follows (all units mg/kg): U, 3.65; Hg, 0.0601; Ag, 0.472; Al, 7510; As, 2.87; Ba, 141; Be, 0.713; Ca, 1700; Cd, 0.293; Co, 5.55; Cr, 6.65; Cu, 7.76; Fe, 9270; K, 1370; Mg, 1420; Mn, 384; Na, 40.3; Ni, 6.18; Pb, 12.2; Sb, 0.113; Se, 0.236; Tl, 0.472; V, 18.2; Zn, 25. As can be seen, nothing is above background, which is why it wasn't presented.

NMED Comment:

(d) *LANL shall obtain confirmatory samples to adequately document the presence or absence of HE. See Specific Comments: PRS Types 2(a).*

LANL Response:

Samples will be collected in FY 98 and submitted in an addendum to the RFI report.

NMED Comment:

6. *15-005(c) Container Storage Area*
   (a) *LANL shall explain the rationale for not analyzing samples obtained from an "...active container storage area for HE..." for HE.*

LANL Response:

See Comment Response 5.a above.

NMED Comment:

(b) *LANL shall obtain confirmatory samples to adequately document the presence or absence of HE. See Specific Comments: PRS Types 2(a).*

LANL Response:

See Response 5d.

NMED Comment:

7. *15-006(c) Inactive Firing Site*
   (a) *LANL shall provide the rationale (including analytical data, when available) for the further action recommendation at this PRS within the RFI Report.*

LANL Response:

As is stated in the RFI report, Section 5.35, sample results show U, Be, Pb, As, and RDX present above PRGs, and a VCA is recommended. The remediation rationale is based on the screening assessment results that identified COPCs are present and above PRGs. This remediation is currently proposed for implementation in FY 99. Stabilization activities for runon and runoff control will be implemented as necessary. Analytical data are available in FIMAD and will be further documented in the VCA plan.

NMED Comment:

8. *15-006(d) Inactive Firing Site*
   (a) *LANL shall explain the rationale for submitting only 24 out of 54 samples obtained to an offsite laboratory for analyses (Table 5.36.4.3-1) and clarify how the actions taken were in accordance with the RFI Workplan.*

LANL Response:

The comment from HRMB is not correct. The approved SAP for this site is dated September 18, 1995. The SAP and NOD revisions specify the following numbers of samples would be collected and field screened: surface soil samples from 2 firing points (total 2); surface soil samples from 15 randomly chosen locations (total 15); surface soil from 2 locations at the optical diagnostic shot center (total 2); 8 surface soil samples from drainages (total 8); 2 depth samples from each of the firing points and the random locations (total 34); and 1 depth sample from each of the 2 locations of the optical diagnostic shot (total 2). The grand total of all samples collected was thus specified to be at least 63. As stated in the text in Section 5.36 and from a count of Table 5.36.4.3-1, 67 samples were actually collected in the field based upon field screening results.

The approved SAP stated the following requirements for fixed laboratory analyses: a minimum of 10 surface samples (total 10); a minimum of 20% of the depth samples (20% of 36 = 7.2 rounded to total 8); and 50% of the 8 drainage samples (total 4). The grand total of all the fixed laboratory samples was thus at least 22. As stated in the text in Section 5.36, and from a count of Table 5.36.4.3-1, 24 samples were submitted for offsite laboratory analysis, 14 from surface samples and drainage channels and 10 from the subsurface. Thus the numbers, frequency, and depths of sampling fulfilled the requirements of the SAP.

NMED Comment:

   (b) *LANL shall provide additional discussions and accompanying figures to explain the distribution of contaminants in the surface and subsurface (Section 5.36.4.3).*

LANL Response:

Figure 5.36.4.3-1 shows in detail the locations where (a) samples were collected and their depths relative to the site and (b) concentrations of analytes were above background. Note that in accordance with the RFI format, no sample COPC names are underlined, reflecting the fact that no COPCs were detected above SALs. In addition, as stated in the text, no HE was detected (Section 5.36.6) and only U and Cu were detected above their UTLs (Section 5.36.5). Cu and U were subjected to an MCE (Section 5.36.7.1), and the score of 0.2250 indicated they need not be retained as COPCs.

NMED Comment:

(c) *LANL shall show the calculations used to determine the normalized concentrations in Table 5.36.7.1-1. As an improvement to the report, LANL could revise the table to include additional columns for the calculations and a legend for the formula(s) used.*

LANL Response:

See response to Specific Comments: Potential Release Sites 2h.

NMED Comment:

(d) *LANL shall clarify the collection rate and frequency of QA/QC samples such as duplicates. It appears that only one field duplicate was obtained for 24 samples.*

LANL Response:

As shown in Figure 5.36.4.3.-I, four field duplicates were collected. This is in accordance with LANL-ER-SOP-1.05, which specifies a collection frequency of field duplicates as 1 per 20 samples. A total of 67 samples (43 field screening only and 24 submitted for fixed analytical) were collected at PRS 15-006(d). Of these 67 total samples, 4 samples were field duplicates. Only one of the field duplicates was submitted for fixed analytical, while the other three were field screened for metals, HE, and total uranium. The rationale for fixed laboratory analysis was to submit only samples having the highest field screening values. Therefore, although the frequency of field duplicates submitted to the laboratory was 1 per 24 samples (slightly less frequent than 1 per 20 samples), the overall frequency of field duplicates collected at this site is 1 per approximately I7 samples. See also response to General Comments: Reporting of Sampling and Analyses Results and Activities 9.

NMED Comment:

9. *15-007(a) Landfill*
   (a) *The RFI Report is a stand-alone document. LANL shall present the information referenced from the RFI Workplan in the RFI Report (Section 5.13.1).*

LANL Response:

See response to Potential Release Site Comments 2.a.

NMED Comment:

(b) *LANL shall explain the function of R-Site and detail its associated COPCs (Section 5.13.1).*

LANL Response:

TA-15, which is commonly called R-Site, is explained in detail in Section 1.4, page 1-10 of the approved RFI work plan and in Section 2 of the same document, where approximately 10 pages of information is presented under the following headings: Location, History, Prehistoric Use, Early Uses and Laboratory Acquisition, Historical Development, Environmental Monitoring, Hazard Ranking, Past Waste Management Practices, Firing Site Experiments, Sanitary Wastes, Cleanup

Wastes, Current Conditions, Local Populations, Sources of Information, and References. Potential contaminants are described in detail in Chapters 5-10 of the work plan.

NMED Comment:

(c) *LANL shall tabulate the results of the field screening including instrument detection limits and calibration readings (Section 5.13.4). See General Comments: Reporting of Sampling and Analyses Results and Activities 7.*

LANL Response:

Field screening results are tabulated in Appendix D, along with precision and accuracy determinations. Instrument detection limits and calibration readings will be provided to HRMB within approximately 45 working days.

NMED Comment:

(d) *LANL shall clarify how radiological screening was used to determine samples for offsite laboratory submittal based on metals content (Section 5.13.4.2).*

LANL Response:

This statement refers to the fact that U, a metal, is a COPC at TA-15, and rad screening, which will detect radiation from U, in combination with XRF, is used to select samples for fixed laboratory analysis. LANL agrees that the last phrase of this sentence "on the basis of metals content" is misleading and will be deleted.

NMED Comments:

(e) *LANL shall explain the rationale for submitting only 9 out of the 22 samples collected to an offsite laboratory for analyses (Section 5.13.4.3 and Table 5.13.4.3-1); and how this was this in accordance with the RFI Workplan.*

LANL Response:

The HRMB comment is not correct. Table 9.1-1 of the work plan specified 4 fixed laboratory analyses out of 7 sampling locations at both surface and depth for a total of 14 collections and 8 fixed laboratory analyses. In the work plan NOD, EPA stated, "If the vertical depth of disposal is more than 2 ft, LANL will have to take deeper sampling intervals." LANL agreed and revised the table to indicate seven additional samples collected and four additional fixed laboratory analyses, presuming that the vertical depth of disposal would be clear. Thus, the new totals would be 21 samples and 12 fixed laboratory analyses. As stated on page 5-11, Section 5.13.4.3 of the RFI report and in Table 5.13.4.3-1, 21 samples were collected (1 field duplicate) and 13 were sent to the fixed laboratory (includes the 1 field duplicate). Thus, LANL complied with the approved work plan (and the work plan NOD). In addition, because the field team does not believe the sampling locations to have been optimal, based upon the difficulty with interpreting the original geophysical measurements, additional Phase II work is planned, and, as stated, additional geophysical work will precede the Phase II to further delineate the landfill (if possible).

NMED Comment:

(f) *LANL shall revise Figure 5.13.4.3-1 to indicate the location of the roads as discussed in Section 5.13.2.*

LANL Response:

This will be provided within approximately 45 working days.

NMED Comments:

(g) *LANL shall revise the sample identification numbers on either the "Sample ID" column of Table 5.13.5-1 or Figure 5.13.4.3-1 to directly correlate with one another.*

LANL Response:

See response to Specific Comments: Potential Release Sites 2g.

NMED Comment:

(h) *LANL shall provide sample identification numbers and analyte concentrations in text discussions. For example, in Section 5.13.5 Radionuclides: "Uranium [sample identification number(s)] was detected at a concentration above its background UTL..."*

LANL Response:

The paragraph on radionuclides in Section 5.13.5 is modified as follows:

Uranium was detected at a concentration *of 5.8 mg/kg (Sample ID 0215-95-0222), which is* above its background UTL *(5.45 mg/kg),* but was found not to be statistically different from background (see Inorganics). Therefore, uranium is not retained as a radionuclide COPC. The other radionuclides that were undetected or less than background UTLs were not retained as COPCs.

NMED Comment:

(i) *LANL shall clarify if acetone is considered to be a COPC for this PRS: Section 5.13.6 indicates that acetone was not retained as a COPC, but Section 5.13.8 indicates that it is considered for ecological assessment.*

LANL Response:

Acetone is not considered to be a COPC at this PRS based on human health or ecological risk because it is a common laboratory contaminant and was detected in several QC blanks.

NMED Comment:

10. 15-008(c) Surface Disposal

(a) *LANL shall provide the rationale (including analytical data, when available) for the further action recommendation at this PRS within the RFI Report.*

LANL Response:

As stated in Section 5.3, this site is proposed for an IA to remove any visible pieces of surface depleted uranium. LANL policy is to include all data and recommendations for further remediation in the IA and/or VCA plans for a site and not to include this information twice (i.e., not in the RFI and in the VCA/IA).

NMED Comment:

11. 15-008(g) Surface Disposal

(a) The RFI Report is a stand-alone document. LANL shall present the information referenced from the RFI Workplan in the RFI Report (Section 5.37.1).

LANL Response:

See PRS 2a response.

NMED Comment:

(b) LANL shall provide additional information pertaining to the quantity and dimension(s) of the sand bags and the surface area which they cover (Section 5.37).

LANL Response:

As specifically pointed out to NMED on the tour of December 19, 1996, there are approximately 30 to 40 sand bags present. The pile of bags measures 6.5 x 5 x 3 ft high. A typical sand bag measures 2 ft x 1 ft x 3 in. thick. The area covered is roughly 6.5 x 5 ft.

NMED Comment:

(c) LANL does not provide adequate information for evaluating this PRS. LANL shall present all of the information available regarding this PRS within the RFI Report.

LANL Response:

Information about this PRS is presented in the approved work plan, the approved SAP, and in the RFI report. These documents constitute the sum total of information about this site. HRMB has access to all of these documents. In addition, HRMB has been on a tour of the area to visually inspect this PRS. If HRMB would clarify the additional information required by specific requests, LANL will try to be responsive to any reasonable request.

NMED Comment:

12. 15-009(a) Active Septic System

(a) LANL shall obtain approval to defer the investigation of a PRS prior to the performance of the RFI which was originally intended to investigate it. LANL shall provide documentation that this PRS received deferral approval by the AA prior to the implementation of the RFI Workplan.

LANL Response:

This PRS was proposed for sampling in the NOD to the work plan. While collecting samples from this PRS, it became apparent that the tank is still active (as stated in the RFI report) and the sampling results are not pertinent because the site is active. Thus, it was not possible to notify the AA ahead of time. This site is requested for deferred status. A project-wide policy on requesting deferred action is being formulated and will be forwarded to HRMB for comment/approval.

NMED Comment:

13. 15-009(f) Active Septic System

(a) The AA recommends that LANL perform an Interim Action to remove contaminated sludge from this PRS.

LANL Response:

See response to GENERAL COMMENTS, Approach/Conceptual Model No. 1. Because there are no COPCs at this site, LANL will return this tank to control of the using group for decommissioning.

NMED Comment:

(b) LANL shall present the information referenced from the RFI Workplan in the RFI Report (Section 5.28.1).

LANL Response:

See PRS Response 2a.

NMED Comment:

(c) LANL shall not reduce the scope of the RFI Workplan without consent from the AA (Section 5.28.4.3). See General Comments: Approach/Conceptual Model 2.

LANL Response:

See response to General Comments: Approach/Conceptual Model No. 2.

NMED Comment:

(d) LANL shall remove the following statement from p. 5-67 of the text: "In addition, the exposure pathway for the septic tank contents is ingestion of water, which is extremely conservative and unlikely under any circumstance." Section 5.28.7.1

LANL Response:

The paragraph in Section 5.28.7.1 under the Multiple Chemical Evaluation discussion will be modified as follows:

The MCE included 14 analytes in the noncarcinogenic effects category (Table 5.28.7.1-1). The sum of the maximum normalized concentrations is 1.1985, which is greater than the target value of 1.0. This would indicate possible additive effects for the inorganics detected in the septic tank. However, nine of the analytes submitted to the MCE were detected below the MDLs and are J qualified. These data have a high degree of uncertainty, and should be used with caution in the data comparison (Section 4.14.1). ~~In addition, the exposure pathway for the septic tank contents is ingestion of the water, which is extremely conservative and unlikely under any circumstance. As a result of these factors,~~ The inorganics detected in the septic tank are not retained as COPCS.

NMED Comment:

(e) LANL shall evaluate the bias of the estimated (J'd) analytical data and provide a summary of the evaluation in response to these comments.

LANL Response:

The J qualified data for this PRS have been evaluated and a summary presented in Section 4.14.1 as well as in Table B-1 of Appendix B of the RFI report. The data are qualified as J because the analytes were detected below the method detection limits (MDLs) and, therefore, cannot be accurately quantified. The analytes are definitely present, but the reported values are estimated and the bias is unknown because the values are at the lower end of the linear range of the instrument.

NMED Comment:

14. 15-009(i) Active Septic System

(a) LANL shall obtain approval to defer the investigation of a PRS prior to the performance of the RFI which was originally intended to investigate it. LANL shall provide documentation that this PRS received deferral approval by the AA prior to the implementation of the RFI Workplan.

LANL Response:

This PRS was listed as active in the approved work plan. While in the field, the field team verified that it is still active, as stated in the RFI report. This site is requested for deferred status. A project-wide policy on requesting deferred action is being formulated and will be forwarded to HRMB for comment/approval.

NMED Comment:

15. 15-009(k) Active Septic System

(a) Based on a Hazard Index (HI) approaching 1 (0.9753) and the characteristics of identified contaminants, the AA recommends that LANL conduct an Interim Action to remove contaminated sludge from this PRS.

LANL Response:

The MCE calculations for the septic tank contents are inappropriate because the water SALs in use at the time of the report were based on drinking water maximum contaminant levels (MCLs) or groundwater standards, which are not risk-based values. Therefore, the normalized sum of the analytes detected in the septic tank does not represent a risk value, i.e., a hazard index. In

addition, the detected concentrations of inorganics were below the RCRA toxicity characteristics for wastes and, therefore, the material is not a hazardous waste.

NMED Comment:

(b) LANL shall present the information referenced from the RFI Workplan in the RFI Report (Section 5.29.1).

LANL Response:

See Response 2(a) under "Potential Release Sites."

NMED Comment:

(c) LANL shall not reduce the scope of the RFI Workplan without explicit written consent of the AA (Section 5.29.4.3). See General Comments: Approach/Conceptual Model 2.

LANL Response:

See Response 2 under General Comments: Approach/Conceptual Model

NMED Comment:

(d) LANL shall clarify when the metals aliquot was sampled and analyzed (Section 5.29.4.3).

LANL Response:

The sample for metals analysis collected from PRS 15-009(k) was collected on March 22, 1996 and submitted to the LANL Sample Management Office on the same day. According to the offsite laboratory results the sample was analyzed on March 29, 1996.

NMED Comment:

16. 15-010(a) Inactive Septic System

(a) LANL shall provide the rationale (including analytical data, when available) for the further action recommendation at this PRS within the RFI Report.

LANL Response:

Analytical data are presented on pages 5-79 to 5-83. The rationale for recommending a Phase II investigation is presented on page 5-83. The Phase II SAP is presented on pages 5-84 to 5-86.

NMED Comment:

(b) LANL shall clarify if the top or bottom of the tank was approximately 4 feet below grade (Section 5.32.2).

LANL Response:

Field investigations found that the tank, measuring approximately 5 ft wide by 8 ft long by 3 ft deep, had not been removed, but was left in place and backfilled with sand. The tank was found by using a backhoe. The top of the tank had been broken and was in pieces within the tank. The top of the tank is approximately 4 ft below grade.

NMED Comment:

(c) *LANL shall clarify why samples were obtained at depths of 83 and 84 inches when the tank was located 4 feet (48 inches) below grade (Table 5.32.4.3-1).*

LANL Response:

See paragraphs 2 and 3 of Section 1 "Attachment A - Request for Work Plan Modification." The samples were collected at 83 and 84 in. from the base of the interior of the tank.

NMED Comment:

(d) *Since the sludges from this septic system exceeded the SAL for mercury, LANL shall either conduct an interim action to remove the tanks contents or perform a BRA for mercury and include those COPCs that exceeded a normalized value of 0. I (chromium and lead). See General Comments: Approach/Conceptual Model 1.*

LANL Response:

The mercury detected above SAL was not in the sludge, but rather in the sand used to backfill the tank. LANL recognizes the need for further evaluation of this PRS because of the mercury concentrations above SAL and, therefore, has recommended in the RFI report (Section 5.32.10) that Phase II sampling be conducted in order to evaluate extent and correct sufficient data for decision-making purposes. The Phase I sampling only involved two samples, which are insufficient to conduct a BRA or to determine the extent of the contamination. The data obtained from the proposed Phase II sampling will be used to determine what action is warranted (e.g., NFA, voluntary corrective action, BRA, or interim action).

NMED Comment:

(e) *LANL shall clarify the relationship between the USATHMA high-performance liquid chromatography (Section 5.32.11.4) and the SW-846 Method 8330.*

LANL Response:

Method 8330 should be substituted for the USATHMA method.

NMED Comment:

17. 15-010(b) Inactive Septic System

(a) *LANL shall not reduce the scope of the RFI Workplan without explicit written consent of the AA (Section 5.33.4.3). Obtaining one sample from the heterogeneous sludges of a septic tank is unacceptable. See General Comments: Approact/Conceptual Model 2.*

LANL Response:

See Response 2 under General Comments: Approach/Conceptual Model.

NMED Comment:

(b) LANL shall revise Figure 5.33.4.3-1 or submit an additional figure which details the location of the inactive septic tank.

LANL Response:

This revised figure will be forwarded to the HRMB within approximately 45 working days.

NMED Comment:

(c) LANL shall explain the rationale behind sampling at the surface (0-6 inches) and shallow subsurface (20-24 inches) when the bottom of the inactive septic tank is located 5 feet (60 inches) below grade (Section 5.33.2).

LANL Response:

The samples in question are required to be collected from the drainline/outfall area, not from the tank area. Page 10-25 of the RFI work plan describes collection of four samples, two of the tank contents, "one where the drainline empties at the outfall, and one 20 ft from the first point inline of the potential effluent (or at the first point of major sediment deposition)." The NOD response to the work plan added two additional samples, each at 3 ft depth, at the outfall locations quoted above. As described in the RFI report, Section 5.33.4.3, "Three soil samples were collected instead of the four required by the RFI work plan because tuff was reached at 4 in. in one auger hole and deeper sampling was prohibited."

NMED Comment:

18. 15-010(c) Inactive Septic System

(a) LANL shall provide documentation in the RFI Report demonstrating that this PRS was never utilized for the management of RCRA solid or hazardous wastes and/or constituents, or CERCLA hazardous substances.

LANL Response:

This documentation is presented in the RFI work plan, page 8-26. As stated in the RFI report and as seen by NMED on the December 19, 1996 tour, this PRS is a drainline, not a septic system.

NMED Comment:

19. 15-011(a) Sump

(a) LANL shall provide documentation for the number of trenches and dimension(s) of the trench(es). The discussion would be much improved by the inclusion of photo documentation.

LANL Response:

The drain was measured on July 8, 1997. It is approximately 33 ft long, 1 ft wide, and 11 in. deep. There is only one drain. Figure 10.1-3 of the approved RFI work plan shows a schematic of the drain. In addition, this site was toured by NMED on December 19, 1996.

NMED Comment:

20. 15-011 (b) Sump[3]

(a) LANL shall consider this PRS in evaluating the cumulative risk posed to human health and the environment from multiple, nearby PRSs: See General Comment: Approach/Conceptual Model 7.

[3] HRMB performed a MCE for the grouping of PRSs within The Hollow [15-011(b and c), and 15-014(g, i, and j)]. The calculated MCE (defined by the highest concentrations of copper, lead, mercury, zinc, antimony, and silver found at The Hollow divided by their corresponding SALs) failed to exceed unity.

LANL Response:

As mentioned in the response to General Comment: Approach/Conceptual Model 7, the screening assessment methodology used in the Phase I investigations generally focuses on the individual PRS. In most cases, this approach is sufficient to determine the potential human health concerns as a result of site activities. However, LANL recognizes the appropriateness of the comment pertaining to potential cumulative risk for sites that may influence other PRSs, e.g., drainage channels that merge to form a larger channel. In these instances, it would be appropriate to determine the overall risk associated with the area. LANL currently does not have a methodology in place to address this issue. In order to consider cumulative risk in a consistent and approved manner, LANL will develop this procedure and incorporate it into the Risk-Based Corrective Action Process.

In response to this comments cumulative risk evaluation may be appropriate for the PRSs that contribute to the drainage channel at PRSs 15-011(b an c). A cumulative risk is addressed quantitatively by looking at hazard quotients for individual compounds and hazard indices for each PRS. (Please note: the methodology presented here is site specific only and should not be considered a project-wide solution to evaluating cumulative risk. As mentioned above, LANL will develop a procedure for evaluating cumulative human health risk. The PRSs that may contribute to the overall risk include 15-011(b), 15-011(c), 15-014(i), 15-014(g), and 15-014(j). PRSs 15-014(i), 15-014(g), and 15-014(j) are drainages from several buildings that eventually merge into the drainage channels at PRSs 15-011(b) and 15-011(c). The analytes detected and their maximum detected concentrations per PRS are presented in the following table. The PRSs are arranged from left to right as the furthest upgradient PRS to the end of the drainage.

SUMMARY OF MAXIMUM DETECTED CONCENTRATIONS OF ANALYTES FROM GROUPED PRSs AT TA-15

Analyte	SAL (mg/kg)	Concentrations by Contributing PRS (mg/kg)				
		15-014(g)	15-014(j)	14-014(i)	15-011(b)	15-011(c)
Antimony	31	not detected	0.6	2.1	0.9	0.3
Copper	2,800	24.5	155	97.8	117.4	6.5
Lead	400	60.1	101	38.3	197	15.3
Mercury	23	0.26	3	0.02	*0.15*	0.18
Silver	380	not detected	1.9	2.5	0.6	not detected
Zinc	23,000	127	1640	79.2	116.3	32.2

The overall trend from the most upgradient PRS [15-014(g)] to the end of the drainage channel [15-011(c)] is one of decreasing concentrations of all analytes. The hazard quotient for each analyte is obtained by dividing the maximum concentration by its 1995 EPA Region 9 PRG for the appropriate land use scenario, i.e., industrial for these PRSs. The hazard quotients are presented in the following table. The industrial scenario is appropriate because the PRSs are in the middle of a heavily used area by LANL and are inside a secured area.

SUMMARY OF HAZARD QUOTIENTS AND HAZARD INDICES FOR AN INDUSTRIAL SCENARIO

Analyte	PRG (mg/kg)	Hazard Quotients by Contributing PRS (mg/kg)				
		15-014(g)	15-014(j)	14-014(i)	15-011(b)	15-011(c)
Antimony	680	not detected	0.001	0.003	0.001	0.0004
Copper	63,000	0.0004	0.002	0.002	0.002	0.0001
Lead	1000	0.06	0.1	0.04	0.2	0.02
Mercury	510	0.0005	0.006	0.00004	0.0003	0.0004
Silver	8500	not detected	0.0002	0.0003	0.00007	not detected
Zinc	100,000	0.001	0.02	0.0008	0.001	0.0003
Hazard Index		0.06	0.1	0.05	0.2	0.02

The individual hazard quotients demonstrate an overall decreasing trend by the end of the drainage channel as does the hazard index per PRS. The hazard index for all the PRSs (adding up the highest hazard quotient for each analyte) is 0.2. All of the hazard quotients and hazard indices for the industrial scenario are 0.2 or less and well below the hazard value of 1.0, which is the level of exposure from all significant pathways in a given medium below which it is unlikely for even sensitive populations to experience adverse health effects.

Based on this preliminary evaluation of cumulative risk across several PRSs, it appears that there is no adverse health effects from the concentrations of analytes detected.

NMED Comment:

(b) *LANL shall re-evaluate the UTLs used to compare the analytical results per General Comment: Approacb/Conceptual Model 8.*

LANL Response:

The UTLs used in this analysis meet the criteria set forth by NMED as described in LANL's response to General Comment: Approach/Conceptual Model 8; hence, LANL believes that the UTLs used for this analysis are appropriate.

NMED Comment:

21. 15- 011(c) Sump

(a) *LANL shall consider this PRS in evaluating the cumulative risk posed to human health and the environment from multiple, nearby PRSs. See General Comment: Approach/Conceptual Model 7.*

LANL Response:

See response to Specific Comments: Potential Release Sites 20a.

NMED Comment:

(b) *LANL shall re-evaluate the UTLs used to compare the analytical results per General Comment: Approach/Conceptual Model 8.*

LANL Response:

The UTLs used in this analysis meet the criteria set forth by NMED as described in LANL's response to General Comment: Approach/Conceptual Model 8; hence, LANL believes that the UTLs used for this analysis are appropriate.

NMED Comment:

22. 15-012(a) Operational Release

LANL Response:

No NMED comment was provided.

NMED Comment:

23. 15-014(a) Outfall

(a) *EPA administers the National Pollutant Discharge Elimination System not the Non Pollutant Discharge Elimination System as stated in Section 5.26.1. LANL shall revise the text accordingly.*

LANL Response:

Agreed.

NMED Comment:

(b) LANL shall consider this PRS in evaluating the cumulative risk posed to human health and the environment from multiple, nearby PRSs. See General Comment: Approach/Conceptual Model 7.

LANL Response:

The drainage channel at PRS 15-014(a) does not have any other nearby PRSs that would influence the potential hazard associated with this PRS. The closest PRS is PRS 15-014(b), which is another drainage approximately 150 ft northeast of PRS 15-014(a). These two drainages do not merge and are not influenced by the same sources. PRS 15-014(a) is an outfall from drains in Building TA-15-183, while PRS 15-014(b) drains the asphalt roof of Building TA-15-183. The analytes detected at these two PRSs were different, indicating that different sources drain into each outfall. In addition, the sampling results demonstrated a decrease in concentrations of the analytes detected as the distance from the outfall increases. As a result, an evaluation of cumulative risk is not appropriate for this PRS.

NMED Comment:

(c) LANL shall re-evaluate the UTLs used to compare the analytical results per General Comment: Approach/Conceptual Model 8.

LANL Response:

The UTLs used in this analysis meet the criteria set forth by NMED as described in LANL's response to General Comment: Approach/Conceptual Model 8; hence, LANL believes that the UTLs used for this analysis are appropriate

NMED Comment:

24. 15-014(b) Ouifall (obliterated)

(a) Since the MCE calculation for this PRS exceeded unity, LANL shall propose a method by which the COPCs at this PRS will be addressed.

LANL Response:

The sum of normalized concentrations in the MCE for this PRS is primarily the result of PAHs. As indicated in the RFI report, the source of the PAHs is the asphalt roof of Building TA-15-183. The MCE was incorrectly presented to include the PAHs. Because these analytes are not related to site activities, they should not be evaluated in the screening assessment. As a result, dibenzofuran is the only non-PAH analyte detected and it is less than 0.1 of the SAL. Therefore, there are no COPCs retained that are the result of site activities.

Section 5.27.7.1, Screening Assessment, will be modified as follows to reflect the above information.

5.27.7.1 Screening Assessment

Eight organic analytes [acenaphthene, anthracene, chrysene, dibenzofuran, fluoranthene, fluorene, naphthalene, and pyrene] were detected below their respective SALs. ~~, and all but chrysene, the only carcinogen, were submitted to an MCE (Table 5.27.7.1-1).~~ *All of the organics, except dibenzofuran, are PAHs and are not submitted to an MCE because they are not related to site activities (see below).* Because dibenzofuran is the only analyte remaining, an MCE does not need to be conducted. As a result, dibenzofuran is not retained as a COPC because it is less than SAL.

Four organic analytes [benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrenel were detected above their SALs ~~and retained as COPCs~~ (Table 5.27.7.1-2). Phenanthrene was also detected in several soil samples (Table 5.27.6-1) ~~and is retained as a COPC because it~~ but does not have a SAL.

~~Multiple Chemical Evaluation~~

~~The MCE included seven analytes only had one analyte, dibenzofuran, in the noncarcinogenic effects category. (Table 5.27.7.1-1) The sum of the maximum normalized concentrations for sample 0215-95-0167 (the sample with the maximum normalized sum) is 1.1046, which is above the target value of 1.0. Anthracene was the only analyte retained as a COPC because it contributed more than 0.1 to the sum. The other organic analytes were not retained as COPCs.~~

~~An MCE for carcinogens was *also* not performed because only one carcinogens, chrysene, was detected below its SALs. Therefore, chrysene was not retained as a COPC.~~

~~TABLE 5.27.1-1~~
~~MULTIPLE CHEMICAL EVALUATION - PRS 15-014(b)~~

~~Analytes~~	~~Maximum Normalized Concentrations~~
~~SOIL NONCARCINOGENIC~~	~~Maximum Sample 0215-95-0167~~
~~Acenaphthene~~	~~0.0243~~
~~Anthracene~~	~~0.9632~~
~~Dibenofuran~~	~~0.0204~~
~~Fluoranthene~~	~~0.0292~~
~~Fluorene~~	~~0.0291~~
~~Naphthalene~~	~~0.0063~~
~~Pyrene~~	~~0.0321~~
~~TOTAL~~	~~1.1046~~

In general, polycyclic aromatic hydrocarbons (PAHs) have been sporadically detected at many PRSs throughout the Laboratory. There is typically no specific source of PAHs attributable to the process activities at these PRSs. It has been found that PAHs are associated with asphalt runoff (e.g., paved areas and roofs) as well as from incomplete combustion (e.g., incinerators, forest fires, or vehicle exhaust) (Clement International Corporation 1990, ER ID No. 55663; Bradley et al. 1994, 1144; Menzie et al. 1992, ER ID No. 55635; Butler et al. 1984, ER ID No. 55634; Edwards 1983, ER ID No. 55636). In most cases, these chemicals are detected in areas influenced by these types of non-PRS-related sources, e.g., storm water outfalls, ditches next or near paved driveways or roads, etc. The PAHs are eliminated based on available site information, because only those chemicals believed or suspected of being associated with a release from a PRS as a result of site activities are retained and subjected to the screening assessment process.

The RFI work plan for OU 1086 (LANL 1993, 1087) indicates that the outfalls at PRS 15-014(b) drained some of the floors, sinks, and asphalt roof, which is probably the source of the PAHs. In 1992, the drains from the building were connected to the Sanitary Waste Collection System (SWCS) and, thus, they no longer drain into the PRS. However, the area sampled, which includes the outfalls, have been inadvertently disturbed to accommodate a new building. This has resulted in soil removal and redistribution, the result of which is that the PRS no longer exists at its former location. Because the area sampled no longer exists and the outfalls do not receive any drainage or PAHs, and the site cannot now be located, we recommend NFA for this PRS under NFA Policy Criterion 1.

References:

Bradley, L. J. N., B. H. Magee, and S. L. Allen, 1994. "Background Levels of Polycyclic Aromatic Hydrocarbons (PAH) and Selected Metals in New England Urban Soils," in Journal of Soil Contamination, Vol. 3(4), p. 349. (Bradley et al. 1994, 1144).

Butler, J. D., V. Butterworth, S. C. Kellow, and H. G. Robinson, 1984. "Some Observations of the Polycyclic Aromatic Hydrocarbon (PAH) Content of Surface Soils in Urban Areas," *The Science of the Total Environment*, ER ID No. 55634, Vol. 33, pp. 75-85. (Butler et al. 1984, ER ID No. 55634)

Clement International Corporation, August 1995. "Toxicological Profile for Polycyclic Aromatic Hydrocarbons," prepared under Contract No. 205-88-0608 for Agency for Toxic Substances and Disease Registry, ER ID No. 55663, US Public Health Service, Washington, DC. (Clement International Corporation 1990, ER ID No. 55663)

Edwards, N. T., 1983. "Polycyclic Aromatic Hydrocarbons (PAHs) in the Terrestrial Environment — A Review," *Journal of Environmental Quality*, ER ID No. 55636, Vol. 12, No. 4, pp. 427-441. (Edwards 1983, ER ID No. 55636)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1086," Los Alamos National Laboratory Report LA-UR-92-3968, Los Alamos, New Mexico. (LANL 1993, 1087)

Menzie, C.A., B. B. Potocki, and J. Santodonato, 1992. "Exposure to Carcinogenic PAHs in the Environment," *Environmental Science and Technology*, ER ID No. 55635, Vol. 26, No. 7, pp. 1278-1284. (Menzie et al. 1992, ER ID No. 55635)

NMED Comment:

25. 15-014(d) Outfall

(a) LANL shall provide documentation in the RFI Report demonstrating that this PRS was never utilized for the management of RCRA solid or hazardous wastes and/or constituents, or CERCLA hazardous substances.

LANL Response:

The information in question is provided in Section 5.3.4.3, page 5-8, of the approved RFI work plan.

NMED Comment:

26. 15-014(e) Outfall

(a) Although this PRS is a permitted outfall (presumably under the NPDES program), it is not exempt from investigation under the HSWA Module of the RCRA permit. The NPDES program does not have provisions for Corrective Action or requirements for the remediation of contaminated areas. LANL shall investigate all PRSs known or suspected to have managed RCRA solid or hazardous wastes and/or constituents, or CERCLA hazardous substances.

LANL Response:

As described in the RFI report, Section 5.10, the approved RFI work plan, Section 5.3.4.4, and the NOD response to the RFI work plan No. 6.b, this PRS is a yard drain that received once-through cooling water and wash drains into floor drains. There are no chemicals added to the water. This PRS was recommended for NFA in the approved work plan. As stated in the work plan, "Because no hazardous materials are expected in this outfall, NFA is recommended." EPA did not disagree with this recommendation.

NMED Comment:

27. 15-014(g) Outfall

(a) LANL shall provide within the text the results of the HE spot test & DX-2 conducted at this PRS. See General Comments: Supporting Documentation 1.

LANL Response:

Within Section 5.22.4.2, the results for the HE spot tests are clearly stated as positive, and the DX-2 results are clearly stated as not detectable. LANL is unclear regarding what HRMB does not understand.

The HE spot test is either positive or negative. LANL conducted five tests for HE in five different locations within 12 in. of the sample point. All five were positive. DX-2 analytical results did not detect any HE. Subsequent to this, a sample was submitted to a fixed analytical laboratory and was found to contain no detectable HE.

NMED Comment:

(b) *LANL shall clarify how sampling could have been conducted in accordance with the RFI Work Plan as described in Section 5.22.4.3. The response to the NOD (Taylor to Honker dated August 30, 1994) indicated that a surficial and three foot-depth sample would be obtained from the same location at the outfall. LANL shall also explain why only surficial samples were obtained.*

LANL Response:

LANL was incorrect in stating that the samples were collected in accordance with the approved work plan. Only surface sampling is possible at this PRS, because, as stated in Section 5.22.2, the PRS is a drainage channel that is lined with asphalt. A depth sample could not be obtained.

NMED Comment:

(c) *LANL shall revise the text in order to complete the second paragraph in Section 5.22.6.*

LANL Response:

The missing fragment of text should read as follows:

The following fragment will be added on the text in Section 5.22.6, page 5-42, last sentence: . . . therefore, are not retained as COPCs.

NMED Comment:

28. 15-014(h) Outfall

(a) *LANL shall revise Table 5.34.4.3-1 to include a column for "distance from actual outfall" and revise Figure 5.34.4.3-1 or provide an additional figure which more accurately demonstrates the locations of the samples relative to each of the three, labeled outfalls.*

LANL Response:

LANL will provide the requested additional figure in approximately 45 days.

NMED Comment:

(b) *LANL shall explain why samples 0215-95-0191 through -0194 were not submitted for offsite laboratory analyses (Table 5.34.4.3-1); and explain how this in accordance with the RFI Workplan.*

LANL Response:

The RFI work plan, Section 10.3.1.4, page 10-22, specified collection of four surface samples (two from each separate outfall), screening of all, and analysis of only one sample from each outfall by a fixed laboratory. The NOD response (No. 46) to the work plan changed the surface sampling to subsurface (3 ft) sampling. As shown in Table 5.34.4.3-1 of the RFI report, a total of eight samples (four surface, with one duplicate and four subsurface) samples were collected, more than fulfilling the requirements of the work plan. Four of the total of nine samples were submitted for fixed laboratory analysis, more than the required two. The samples were submitted for offsite analysis

after screening, and the four samples with the highest metals readings from XRF and VOC screening were sent, all in accordance with the work plan.

NMED Comment:

(c) LANL shall provide the PRS-specific calculations and concentrations used to determine that the distribution of the lead concentrations were not statistically different from background (i.e., Gehan, Quantile, and Slippage tests).

LANL Response:

The lead concentrations observed at this site are 37.2, 8.72, 16.6, and 9.07 mg/kg. The background UTL for lead is 23.3 mg/kg. One observed value is above the UTL, so background distributional tests were performed to determine if the site data are statistically different from background. As stated in Section 3.2, Gehan, Quantile, and Slippage tests were conducted. The purposes of these tests are described in more detail in *Application of LANL Background Data to ER Project DecisionMaking Part 1: Inorganics* (Ryti et al. 1996, 1298), which has been provided to NMED. The actual formulas are available in the referenced materials (Gehan, 1965, 1296; Gilbert and Simpson 1992, 0974; Gilbert and Simpson 1990, 0972), or in the SPlus code through which the tests were actually run. The p-values from these tests are presented in Section 5.34.5.

References:

Gehan, E. A., 1965. "A Generalized Wilcoxan Test for Comparing Arbitrarily Singly-Sensored Samples," *Biometrika,* Vol. 52, Nos. 1 and 2, pp. 203-223. (Gehan 1965, 1296)

Gilbert , R. O., and J. C. Simpson 1990. "Statistical Sampling and Analysis Issues and Needs for Testing Attainment of Background-Based Cleanup Standards at Superfund Sites," in *Proceedings of The Workshop on Superfund Hazardous Waste: Statistical Issues in Characterizing a Site: Protocols, Tools, and Research Needs,* Environmental Protection Agency, Arlington, Virginia. (Gilbert and Simpson 1990, 0972)

Gilbert, R. O., and J. C. Simpson 1992. "Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 3: Reference-Based Standards for Soils and Solid Media," Pacific Northwest Laboratory, Richland, Washington. (Gilbert and Simpson 1992, 0974)

Ryti, R., P. Longmire, and E. McDonald, March 29, 1996. "Application of LANL Background Data to ER Project Decision-Making, Part I: Inorganics," Los Alamos National Laboratory Report LA-UR-96-1534, ER ID No. 54585, Los Alamos, New Mexico. (Ryti et al. 1996, 1298)

NMED Comment:

(d) The RFI Workplan indicates that samples will be obtained and analyzed from each of the outfall locations; however, samples from locations 15-2380 and -2381 were not submitted for offsite laboratory analyses. LANL shall explain this deviation from the approved RFI Workplan.

LANL Response:

This was an oversight. The field crew sent the four samples with highest screening values to the fixed laboratory, and this resulted in no samples being submitted from location 15-2380 and 15-2381. However, the fact that the four samples with the highest screening values did not have corresponding fixed laboratory COPCs lends credence to the NFA request at both locations.

NMED Comment:

29. 15-014(i) Outfall

(a) LANL shall explain why HE was analyzed for (Section 5.20.4.3) when it was not considered a COPC (Section 5.20.2) or positively identified using the HE spot test.

LANL Response:

This was an oversight, but constitutes additional data to support the NFA request.

NMED Comment:

30. 15-014(j) Outfall

(a) The following sentence excerpted from 5.21.4.3 misleads the reader into thinking that all samples, including surficial soil samples, were analyzed for Volatile Organic Compounds (VOCs): "The samples were analyzed for TAL metals, uranium, VOCs, and SVOCs." LANL shall revise this sentence to indicate that surface soil samples were not analyzed for VOCs.

LANL Response:

The new sentence should read: "All samples were analyzed for TAL metals, uranium, and SVOCs. In addition, deep soils were also analyzed for VOCs."

NMED Comment:

(b) One of the VOC duplicate samples exceeded holding times. LANL shall clarify which sample (sample number) exceeded holding times and provide the analytical results.

LANL Response:

The sample for which the VOC laboratory duplicate exceeded holding time by one day was sample number 0215-95-0146. The original sample did not exceed holding times. The analytical data for this sample will be included with the printout of all analytical results in response to Specific Comments: Report Format Number 1a.

NMED Comment:

(c) In Section 4.9.2, the report states that ". . .the sample was properly stored (cooled at 4 C and preserved to a pH of 2). . ." LANL shall reference the Standard Operating Procedure (SOP) requiring that organic analytical samples be preserved to a pH of 2 and provide the appropriate pertinent pages of that SOP as a response to this comment.

LANL Response:

Upon further investigation of the preservation of soil samples, it has been found that the statement made in Section 4.9.2 is incorrect. The preservation erroneously stated in the report is for water samples, while storage at 4C is for soil samples. Subsequent conversations with the analytical laboratory indicated that the samples were not preserved to pH 2, but were received and stored at 4C. However, the usability of the data is still unaffected for the same reasons, i.e., proper preservation/storage and holding time were not grossly exceeded. As a result, the paragraph in which the statement was made in Section 4.9.2 will be modified as follows:

All the VOC laboratory duplicates for one sample are qualified as UJ because the 14-day holding time was exceeded by one day. The sample results are usable because the sample was properly stored (cooled at 4C ~~and preserved to a Ph of 2~~) and the holding time was not grossly exceeded (more than two times the holding time).

NMED Comment:

31. 15-014(k) Outfall

(a) The statement, "Any contaminants transported from the site would have been detected in the 15-011(c) investigation, but none were found," is inaccurate. Several COPCs greater than background, but less than SALs, were identified.

LANL Response:

Only mercury, not several analytes as the comment states, was detected at PRS 15-011(c) above background. The concentration detected, 0.18 mg/kg, was only slightly higher than the mercury concentration detected upchannel at PRS 15-011(b) (0.15 mg/kg). PRS 15-014(k) merges with the drainage channel below 15-011(b) and the other PRSs that drain into the channel. If PRS 15-014(k) was contributing significant amounts of materials to the drainage channel, higher concentrations and additional analytes would have been detected at 15-011(c). However, the second paragraph of Section 5.23 will be modified as follows:

Upon investigation, it was found that the open trench drains are concrete, containing no sampling medium, so sampling was not possible. The drain lines did not contain any visible evidence of cracks. The outfall eventually drains to PRS 15-011(c), which was sampled (see Section 5.19). ~~Any contaminants transported from the site would have been detected in the PRS 15-011(c) investigation but none were found.~~ We recommend NFA for this site under NFA Policy Criterion 1.

NMED Comment:

32. 15-014(i) Outfall

(a) LANL shall provide documentation in the RFI Report demonstrating that this PRS was never utilized for the management of RCRA solid or hazardous wastes and/or constituents, or CERCLA Hazardous substances.

LANL Response:

(Though the text indicates that this PRS is 15-014(i), LANL believes that 15-014(l) is meant, because PRS 15-014(i) is discussed in No. 29, above.)

Documentation was provided to EPA in the response to the NOD to the work plan. EPA did not disagree with the NFA recommendation.

NMED Comment:

33. C-15-001 Soil Pile

(a) LANL shall provide the rationale (including analytical data, when available) for the further action recommendation at this PRS within the RFI Report.

LANL Response:

Section 5.5 provides the rationale for the further action recommendation. The area is scheduled to be sampled in the summer of 1997. The results and conclusions from this sampling will be reported as an addendum to this RFI report.

NMED Comment:

34. C-15-005 Building TA-15-1

(a) LANL shall provide a more thorough discussion of the thorium contamination and substantiate remedial activities that took place at TA-15-1.

LANL Response:

The reference to thorium contamination is provided in the approved work plan, Section 9.1.1, page 9-2, paragraph 3. The cited references are available to HRMB, which has received a copy of the work plan, and to the public in the Records Processing Facility (RPF).

NMED Comment:

(b) LANL shall explain why only 3 out of the 4 samples prescribed in the RFI Workplan were obtained and submitted for offsite laboratory analyses (Table 5.14.4.3-1).

LANL Response:

Section 9.1.5 and Table 9.1-1 of the approved RFI work plan specified that a total of six samples (three surface and three depth) were to be collected from the two PRSs C-15-005 and C-15-006, and that four would be sent for fixed laboratory analysis. Because PRS C-15-005 is approximately twice as large as PRS C-15-006 (see RFI report Figures 5.14.4.3-1 and 5.15.4.3-1), a field decision was made to collect samples from two separate locations from PRS C-15-005 (as presented in Table 5.14.4.3-1 of the RFI report) and from one location at PRS C-15-006 (as presented in Table 5.15.4.3-1 of the RFI report). Thus, three of four samples from PRS C-15-005 and one of two samples from PRS C-15-006 (for a total of four, in accordance with the approved work plan) were submitted to fixed laboratories.

NMED Comment:

(c) LANL shall clarify why samples were obtained from depth intervals of 0 to 6 and 18 to 24 inches (Table 5.14.4.3-1).

LANL response:

This is in accordance with the approved work plan, page 9-5, Table 9. 1-1 which specifies surface and subsurface (24 in.) samples.

NMED Comment:

(d) LANL shall explain why the SAL for manganese is not provided (Table 5.14.5-1).

LANL Response:

The 1995 EPA Region 9 residential PRG for manganese was 380 mg/kg, which is less than the background UTL of 714 mg/kg. The screening assessment methodology stipulates (LANL 1995, 1275) that if the background UTL is greater than the SAL, the background UTL is the decision criteria. This is because any corrective action would not result in remediation of a site below background. If the maximum detected concentration is above the background UTL, further evaluation of the site would be required despite the SAL value. It should be noted that the 1996 EPA Region 9 residential PRG for manganese is 3,200 mg/kg, which is above the maximum detected concentration of manganese at this site. If this latter PRG is used, all analytes are less than SALs, the sum of normalized concentrations in the MCE is 0.4, and all analytes are eliminated from further evaluation.

References:

LANL (Los Alamos National Laboratory), November 1995. "Installation Work Plan for Environmental Restoration," Revision 5, Los Alamos National Laboratory Report LA-UR-95-4048, Los Alamos, New Mexico. (LANL 1995,1275)

NMED Comment:

(e) LANL shall revise the assessment of risk (Section 5.14.7.2) to include the evaluation of risk based on a residential land use scenario. See General Comments: Approach/Conceptual Model 3.

LANL Response:

The residential land use scenario is inappropriate for this PRS because the site is in the middle of a heavily used area by LANL and is inside a secured area. Release of this site to the public in the future is highly unlikely. However, a bounded estimate of the residential risk can be obtained by dividing the maximum detected concentration and the average detected concentration at the sampling location by the 1995 EPA Region 9 residential PRG for manganese (380 mg/kg). The maximum detected concentration divided by the 1995 EPA Region 9 residential PRG results in a hazard index of 1.9, which is the same as the risk due to background presented in the response to General Comment: Approach/Conceptual Model 6. The average concentration (460 mg/kg) divided by the 1995 EPA Region 9 residential PRG results in a hazard index of 1.2, which is below the risk due to background presented in the response to General Comment: Approach/Conceptual Model 6.

It should be noted that if the 1996 EPA Region 9 residential PRG for manganese (3,200 mg/kg) is used to calculate a bounded estimate of the residential risk, the hazard indices are 0. 1 for the average concentration and 0.2 for the maximum detected concentration.

NMED Comment:

35. C-15-006 Building TA-15-7

(a) LANL shall explain why only I of the 4 samples prescribed in the RFI Workplan were obtained and submitted for offsite laboratory analyses (Table 5.15.4.3-1).

LANL Response:

See Response 34.b (above).

NMED Comment:

(b) LANL shall provide documentation supporting the remediation of the mercury contamination at Building TA-15-7 (Section 5.15.3).

LANL Response:

The reference to mercury is provided in the approved work plan, Section 9.1.1, page 9-2, paragraph 3. The cited references are available to HRMB, which has received a copy of the work plan, and to the public in the Records Processing Facility (RPF).

NMED Comment:

(c) LANL shall revise the text to indicate which of the two samples obtained were sent to an offsite laboratory for analyses (Section 5.15.4.3).

LANL Response:

As shown in Table 5.15.4.3-1, sample 0215-95-0234 was submitted to an offsite laboratory.

NMED Comment:

36. C-15-007 Oil Stain (investigation pending removal of overlying temporary building)

(a) LANL shall obtain approval to defer the investigation of a PRS prior to the performance of the RFI which was originally intended to investigate it. LANL shall provide documentation that this PRS received deferral approval by the AA prior to the implementation of the RFI Workplan.

LANL Response:

As stated in the approved work plan, a temporary building is positioned over the site. This site is, therefore, requested for deferred status. A project-wide policy on requesting deferred action is being formulated and will be forwarded to HRMB for comment/approval.

NMED Comment:

37. C-15-010 Former UST

(a) LANL shall provide the rationale (including analytical data, when available) for the further action recommendation at this PRS within the RFI Report.

LANL Response:

Section 5.25 of the RFI report presents approximately seven pages of results, data, and conclusions regarding this PRS, and concludes that Phase II sampling is necessary because the extent of contamination has not been determined. Accordingly, Section 5.25.11 contains the SAP for this site. Thus the rationale and data for the further action are available and are presented in the RFI report.

NMED Comment:

(b) LANL shall explain why SALs for benzo(g, h, i)perylene; 2-methylnaphthalene; and phenanthrene are not available (Table 5.25.7.1).

LANL Response:

The SALs for the organics, benzo(g,h,i)perylene, 2-methylnaphtalene, and phenanthrene, are not presented in the table because adequate and verified toxicity data are not available to calculate values for these compounds. The toxicity data used to calculate the Region 9 PRGs and SALs in general are obtained from the latest toxicity information in IRIS, HEAST, or EPA's National Center for Environmental Assessment. One year ago at the time this report was written, the screening assessment approach was to indicate which chemicals did not have SALs, but to not include them unless a risk assessment was performed for the site. This approach has been revised so that currently if a SAL is not available because of a lack of toxicity data, a surrogate SAL is used based on similarity of structure. The basis for this is that the known toxicity of a chemical may be used to estimate the toxicity of another chemical that is structurally related (EPA 1989, 0305).

For this RFI report three organics (benzo(g,h,i)perylene, 2-methylnaphtalene, and phenanthrene) were detected at several PRSs, but did not have SALs. According to the current screening assessment approach, benzo(g,h,i)perylene would be compared to the SAL for pyrene (1,900 mg/kg), 2-methylnaphthalene would be compared to the SAL for naphthalene (1,000 mg/kg), and phenanthrene would be compared to the SAL for anthracene (18,000 mg/kg) based on similarity of chemical structure. The SAL comparisons for one or all of these chemicals at PRSs 15-014(g), C-15-010, and 15-014(b) found the detected concentrations to be more than two orders of magnitude below their surrogate SALs. In addition, the normalized concentrations (maximum detected concentration ÷ SAL) were less than 0.01 and as a result are not evaluated further.

References:

EPA (US Environmental Protection Agency), December 1989. "Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)," Interim Final, EPA 540/1-89/002, Office of Emergency and Remedial Response, Washington, DC. (EPA 1989, 0305)

NMED Comment:

(c) LANL shall revise the assessment of risk (Section 5.25.7.2) to include the evaluation of risk based on a residential land use scenario.

LANL Response:

The residential land use scenario is inappropriate for this PRS because the site is in the middle of a heavily used area by LANL and is inside a secured area. Release of this site to the public in the future is highly unlikely. However, a bounded estimate of the residential risk can be obtained by dividing the maximum detected concentrations and the average detected concentrations at the sampling location by the 1995 EPA Region 9 residential PRG for the PAHs involved. The maximum detected concentrations divided by the 1995 EPA Region 9 residential PRGs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene results in a cancer risk of 4×10^{-5}. The average concentrations divided by the 1995 EPA Region 9 residential PRGs results in a cancer risk of 3×10^{-5}. The cancer risk values are in the middle of EPA's target risk range of 10^{-4} to 10^{-6} (EPA 1990, 0559) indicating that there is no unacceptable risk to human health under the residential scenario.

In addition, a review of the risk assessment section for PRS C-15-010 (Section 5.25.7.2) found that the the risk under the industrial land use scenario was incorrectly represented. A hazard index for the carcinogens, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene, was calculated rather than the cancer risk. LANL would like to take this opportunity to correct the preliminary risk assessment and modify the paragraph as follows:

The site-specific preliminary remediation goals (PRGs) for the COPCs retained by the screening assessment were calculated to determine if the detected concentrations warranted corrective action. Calculation of the PRGs were based on an intrusive industrial exposure scenario (samples were taken at 18 to 24 in.) and a risk factor of 10^{-6} (Appendix C). The PRGs were calculated to be 50 mg/kg for benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene, and 5.0 mg/kg for benzo(a)pyrene. *The cancer risk for each COPC was calculated by dividing the maximum detected concentration by the respective intrusive industrial PRG.* In addition, the cumulative risk was calculated by adding together the fractional contribution of each chemical to determine if ~~a hazard~~ *an unacceptable risk to human health* may exist (Appendix C). *The individual cancer risks were 4×10^{-8}, 4×10^{-7}, 6×10^{-8}, and 2×10^{8} for benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene, and benzo(a)pyrene, respectively.* The multiple chemical PRG analysis resulted in a ~~hazard index~~ *estimated cumulative cancer risk* of ~~0.45~~ *5×10^{-7}*, which is ~~below the target value of 1.0~~ *EPA's target risk range of 10^{-4} to 10^{-6} (EPA 1990, 0559), indicating that there is no unacceptable risk to human health under the industrial scenario.* ~~The detected concentrations of these COPCs were, therefore, below the PRGs and less than a hazard index of 1.0.~~

Despite the acceptable risk, additional sampling is proposed for this site because the extent of the potential contamination from the diesel fuel tank has not been determined.

References:

EPA (US Environmental Protection Agency), March 8, 1990. "National Oil and Hazardous Substances Pollution Contingency Plan," Final Rule, 40 CFR Part 300, Federal Register, Vol. 55, No. 46, p. 8666. (EPA 1990, 0559)

NMED Comment:

(d) LANL shall present the information referred from the RFI Workpan in the RFI Report (Section 5.25.11.1). See General Comments: Improvements for Future RFI Reports 4.

LANL Response:

LANL was not provided the above General Comments section.

NMED Comment:

(e) [Sampling and Analysis Plan] Total Petroleum Hydrocarbons (TPH) and Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) are not RCRA related analyses. LANL should explain the need to conduct TPH analyses as shown in Table 5.25.11.4-1.

LANL Response:

These analytes are included because this area was a site of a former UST which held diesel fuel, and TPH (and by inference BTEX) is of CERCLA concern. In addition, the presence of benzene could render the soil a characteristic waste, which is of RCRA concern.

NMED Comment:

(f) LANL shall clarify why samples were obtained at a depth of 18 to 24 inches below ground surface at this PRS.

LANL Response:

Page 10-9, Table 10.1-1, of the approved work plan specifies collection and analysis of two samples at 24-in. depth from this PRS. Because the length of the hand auger sampler is 6 in., it is necessary to collect an interval of soil during its use. It is not possible to collect a discrete sample at 24 in. Thus, the interval 18 to 24 in. is utilized of necessity in the field.

NMED Comment:

(g) [Sampling and Analysis Plan] LANL shall investigate the potential presence of piping entering or exiting the tank (Section 5.25.11.3).

LANL Response:

Conversations with LANL personnel indicate that the UST piping (surface inlet for filling the tank, surface exit for pumping fuel out) was attached in a vertical sense, that this piping was removed when the tank was excavated, and that no piping exists to sample.

NMED Comment:

(h) [Sampling and Analysis Plan] Table 5.25.11.4-1 does not clearly indicate the units of the numbers presented in each of the columns. It is assumed that these numbers indicate the number of samples to be obtained. See General Comments: Improvements for Future RFI Reports 3.

LANL Response:

See response to Comment 37d. The units are numbers of samples. This format is the same as used in the approved work plan. There is no section of this NOD titled "General Comments: Improvements for Future RFI Reports 3."

NMED Comment:

(i) [Sampling and Analysis Plan] LANL shall expound upon the "...required field data..." (Section 5.25.11.6) by listing its components. (Sampling and Analysis Plan)

LANL Response:

The field data in question include readings from the PID and the rad meters.

NMED Comment:

(j) [Sampling and Analysis Plan] LANL shall explain what the "EP Project" is in Section 5.25.11.6.

LANL Response:

This is a typographical error. Replace "EP" Project with "ER" Project.

NMED Comment:

(k) LANL shall provide a summary of field screening results within the text of the RFI Report.

LANL Response:

Field screening is summarized in Section 5.25.4.2 of the RFI report.

NMED Comment:

38. C-15-011 Former UST

(a) LANL shall clarify what type of fuel, and therefore, what associated COPCs, were stored in the tank (Section 5.7).

LANL Response:

LANL is attempting to locate the reference Francis 1992, 10-0002 referenced in the approved work plan, page 8-26, to determine whether the type of fuel is listed. It is not listed in the work plan. The work plan lists the tank as a former fuel storage tank. Documentation obtained from LANL's FSS division on July 9, 1997 indicates it held gasoline. LANL will respond to this request and attempt to obtain the reference "Francis 1992" within approximately 45 working days.

NMED Comment:

(b) LANL shall provide documentation substantiating that the tank was removed as stated in 1987 and if the removal met the New Mexico Environment Department's Underground Storage Tank Bureau's remediation requirements (5.7.1).

LANL Response:

LANL's FSS division is reviewing records to determine the date of the UST removal. This information will be provided within approximately 45 working days.

NMED Comment:

(c) LANL shall clarify the locations of the samples in reference to the tank's location (distance and depth) and provide the analytical data, including QA/QC samples (Section 5.7.4.3).

LANL Response:

As presented in Section 5.7.2 of the RFI report, drilling was conducted at the center of the tank location, and samples were collected from 6 and 9 ft. The tank had been reported by a former employee, who had removed the tank, to have been at bottom at 6 ft. Analytical data are presented in FIMAD along with the QA/QC data.

NMED Comment:

(d) LANL shall revise Figure 5.7.4.3-1 to provide sufficient detail and scale to determine the locations of the samples and to demonstrate the adequacy of the sampling.

LANL Response:

A revised figure will be prepared within approximately 45 working days.

NMED Comment:

(e) LANL shall tabulate the results of the field screening including instrument detection limits and calibration readings (Section 5.7.4.2). See General Comments: Reporting of Sampling and Analyses Results and Activities 7.

LANL Response:

This information will be provided within approximately 45 working days.

NMED Comment:

(f) LANL shall discuss the presence or absence of groundwater monitoring in the PRS's vicinity and any available analytical results (Section 5.7.3).

LANL Response:

There is no groundwater monitoring in the vicinity of PRS C-15-011. Figures 2-7 and 2-8 of the Draft LANL Hydrogeologic Work Plan (December 6, 1966) show main aquifer test well DT-10 (the closest well shown on the maps) as being over one mile away, and any alluvial wells as being on the order of 2 miles away.