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**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

November 19, 1997

Mr. G. Theodore Taylor, Project Manager
Los Alamos Area Office-Department of Energy
528 35th Street
Los Alamos, New Mexico 87544

Dr. Sigfried Hecker, Director
Los Alamos National Laboratory
P.O. Box 1663, MS-A100
Los Alamos, NM 87545

RE: Request for Supplemental Information for RCRA Facility Investigation Report for Potential Release Sites at TA-39: 39-001(a & b), 39-004(a-e), and 39-008 dated March 1997

Dear Mr. Taylor and Dr. Hecker:

The RCRA Permit Management Program (RPMP) of the New Mexico Environment Department has reviewed the aforementioned document and requests further information. Due to concerns the recommendation for "No Further Action" at PRSs 39-001(a & b) and deferral of 39-004(a-e) and 39-008 are not appropriate for petition at this time. Attachment A details the additional field work required to define nature, rate and extent and Attachments B and C list the deficiencies identified during the review of this document.

Los Alamos National Laboratory (LANL) must respond to the request for supplemental information (Attachments B and C) and prepare a revised sampling and analyses plan (Attachment A) for PRSs 39-001 (a & b) within thirty (30) calendar days of receipt of this letter. Should you have any questions, please feel free to contact Mr. John Kieling, RPMP's LANL Facility Manager, at (505) 827-1558.

Sincerely,

Robert S. ("Stu") Dinwiddie, Ph.D, Manager
RCRA Permits Management Program
Hazardous and Radioactive Materials Bureau

RSD:jry



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TU

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Attachments

cc (w/attachments):

J. Canepa, LANL EM/ER, MS-M992
B. Garcia, NMED HRMB
T. Glatzmaier, LANL DDEES/ER, MS-M992
M. Johansen, DOE LAAO, MS-A316
J. Kieling, NMED HRMB
M. Leavitt, NMED GWQB
H. LeDoux, DOE LAAO, MS A316
D. McInroy, LANL EM/ER, MS-M992
D. Neleigh, EPA, 6PD-0N
J. Parker, NMED DOE-OB
G. Saums, NMED SWQB
S. Yanicak, NMED DOE-OB, MS-J993
J. Young, NMED HRMB
File: LANL HSWA 2/1132/39/39-001(a&b), 39-004(a-e), 39-008
Track: LANL, 11/19/97 , n/a, DOE/LANL, HRMB/jry, RE, file

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ATTACHMENT A - REQUEST FOR WORKPLAN MODIFICATION
RCRA Facility Investigation Report
Technical Area 39
March 1997

1. The nature and extent of contamination has not been delineated at PRSs 39-001(a&b), 39-004(a-e), and 39-008. Elevated concentrations of contaminants were found at greater than 30 and 90 feet below the landfill areas suggesting probable contaminant migration and sampling of the stream channel was not appropriate to determine extent of possible downstream migration of contaminants. LANL shall submit a revised sampling and analysis plan (SAP) designed within 30 days of receipt of this request to define the nature and extent of contamination in the surface and subsurface.
2. LANL shall submit interim action plan(s) for removing debris and debris mounds and installing BMPs at 39-001(a&b), 39-004(a-e) and 39-008.

ATTACHMENT B - SUMMARY OF CONCLUSIONS
RCRA Facility Investigation Report
Technical Area 39
March 1997

PRS	LANL'S PROPOSED ACTION	DOES HRMB CONCUR?	HRMB'S RATIONALE
39-001(a)	NFA	No	Criterion 5, "...available data indicates that contaminants pose an acceptable level of risk...", has not been met. In addition, the extent of contamination has not been defined and the depth to groundwater is not known. Therefore, the AA denies the proposed NFA for these PRSs.
39-001(b)	NFA	No	
39-004(a)	Deferred	No	No corrective action determination can be made since data for this site is unreported. In addition, potential migration off-site requires investigation and mitigation of these PRSs. Therefore, the AA denies LANLs deferral of investigatory activities at these PRSs
39-004(b)	Deferred	No	
39-004(c)	Deferred	No	
39-004(d)	Deferred	No	
39-004(e)	Deferred	No	
39-008	Deferred	No	

ATTACHMENT C - COMMENTS
RCRA Facility Investigation Report
Technical Area 39
March 1997

General Comments:

Approach/Conceptual Model

1. Los Alamos National Laboratory (LANL) must determine the extent of contamination for those Potential Release Sites (PRSs) whose analytical results exceed background and Soil 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.
2. LANL should base its SALs on US Environmental Protection Agency (USEPA) Region IX residential Potential Remediation Goals (PRGs). If LANL did not base its SALs on US Environmental Protection Agency (USEPA) Region IX residential Potential Remediation Goals (PRGs) LANL should 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 report.
3. For those SALs absent from the USEPA Region IX PRGs, LANL should calculate the SAL using toxicity data obtained from USEPA Region III risk-based concentration tables or the latest Integrated Risk Information System/Health Effects Assessment Summary Tables (IRIS/HEAST) data using USEPA Region IX default values applicable to the projected future land use.
4. LANL must perform a baseline risk assessment (BRA) for PRS 39-001(b) 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 10% of the total normalized sum of the maximum concentrations of all constituents.
5. LANL should carry forward to a BRA all COPCs whose concentrations exceed SALs, but are less than the background concentration.
6. LANL should consider the cumulative risk posed to human health from multiple, nearby PRSs. Many sites within Technical Area (TA) 39 present carcinogenic, non-carcinogenic, or radiological risks which, in total, may present an unacceptable human health or ecological risk.
7. LANL should assess ecological risk prior to recommending NFA for a PRS.
8. LANL should not significantly revise the scope of work performed after the approval of the RFI Workplan or subsequent approved modification requests, without obtaining approval from the AA.
9. LANL should revise the screening assessment section to replace the MCE concept with the outlined human health-based screening assessment described below. The screening assessment should compare the maximum concentration or activity of each contaminant at the site to a screening action level (SAL), which is a risk-based concentration calculated using a conservative target risk (use EPA Region 6 Human Health Media-Specific Screening Levels). SALs for carcinogens are calculated based on lower end of 1E-04 to 1E-06 "risk range" to account for multiple carcinogenic contaminants.

SALs for non-carcinogens do not account for chemical mixtures. Therefore, if more than one non-carcinogen is expected at the site, then the non-carcinogenic chemical SAL should be divided by 10. Contaminants can be screened out or eliminated from further evaluation as contaminants of potential concern (COPCs) if maximum detected concentrations or activities of contaminants, in a given medium, are below 1E-06 cancer risk SAL or below 0.1 hazard quotient SAL. Remaining contaminants should be carried through a risk assessment.

Supporting Documentation

1. LANL should 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 other pertinent log books.
2. LANL should provide a map indicating all springs/seeps, proposed and existing alluvial, intermediate, regional wells (e.g., R-28 from the Hydrogeologic Workplan dated 12/6/96; alluvial, intermediate, or regional wells) within the North Fork of Ancho Canyon and adjacent canyon systems that may affect or be affected by the PRSs being investigated within the RFI Report.

Reporting of Sampling, Analyses Results, and Other Activities

1. LANL should provide a statistical summary of all contaminant concentrations greater than background and greater than SALs. This summary shall include the analyte investigated, detection limit, number of samples analyzed, frequency of detection, minimum and maximum concentrations observed, arithmetic mean value, standard deviation value and 95% upper confidence limit of the mean concentration, if applicable.
2. For each PRS, LANL should provide a table summarizing the date(s) of the sampling event(s), number of samples obtained, types of analyses conducted (SW-846 Method), date(s) of analyses, detection limits, and type of laboratory that performed the analyses (fixed/mobile, on-site/off-site, etc.).
3. LANL should provide the number or percentage of media samples from each PRS that were analyzed by a fixed laboratory.
4. LANL should not use field instrumentation to determine the types of analyses to be conducted at investigations aimed at determining the extent and magnitude of contamination. When field instrumentation is used for screening, LANL should 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 (fixed lab) when using field screening to determine the presence or absence of contamination. Please indicate the percentage, number and which samples were sent for confirmatory sampling/analyses.
5. LANL should 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 problems encountered. [*Programmatic Issues from NODs* dated January 16, 1995]
6. LANL should provide summaries and illustrations (figures) of any radiation surveys conducted as part of this or previous investigations at all PRSs (add as appendix and reference in text).

7. LANL should clarify which samples, if any, were composite (perhaps incorporate this information into an existing table).
8. LANL should provide rationale (e.g. matrix interferences) as to why some data above the UTL/EQL is not qualified "U" while other data above the UTL/EQL is qualified "U". For example, Table 5.2.7-1 (page 5-17) indicates that 2,4,6-trinitrotoluene is detected at or above the EQL of 0.2 mg/kg in 21 of 24 analyses, yet it is only shown once (0.3 mg/kg) as unqualified and detectable.
 - A Also, clarify why "U" qualified data, that represents EQL/EDL, can have a greater concentration than unqualified data or UTL concentrations. For example, Table 5.1.5.1 - Uranium, illustrates a "U" qualified 18.5 mg/kg analysis (sample 39-1150), while samples 1151 - 1153 contain uranium concentrations an order of magnitude lower (5.5 - 6.0 mg/kg; UTL- 5.45 mg/kg) and are considered unqualified data. See the other data tables [both PRSs 39-001(a & b)] for other "U" qualified data having concentrations greater than EQLs, etc.
9. LANL should not only provide descriptions of the various statistical analyses used in data analyses (Slippage, bootstrapping, etc.), but should also include: formulas for each, number of samples included in each test (separate into unqualified, R, U, UJ, J, etc.), **biases for applicable qualified data (positive or negative)**, affects of the biases (including but not limited to how the uncertainties affect the risk-based screening assessment), and provide confidence limits for each statistical analyses and how many samples are required to achieve a upper 95% confidence limit if it is not achieved with the samples used. Also document if all the statistical analyses used in this report are EPA approved.
10. LANL should provide documentation describing the circumstances as to why many samples/batches exceeded holding times, had problems with blind QC samples, poor recoveries, etc. For example, holding times of 97 out of 152 samples (roughly 64%) were exceeded (more than twice the time allowed) for mercury and cyanide analyses. LANL should provide the AA with a data useability evaluation and with actions to be taken to obtain useable data.

TA-39 General Comments

1. LANL should evaluate the potential for contaminant transport offsite via erosion and other processes (e.g., dissolution, vapor-phase transport of organics, etc.) on all PRSs covered in this RFI Report.
2. LANL should design best management practices (BMPs) that will reduce or mitigate the potential for off-site (TA-39, below State Road 4) transport of contaminants/debris. Some concerns that should be addressed include but are not limited to the following:
 - A. BMPs must be designed or located so as to withstand continued operations at active firing and detonation sites.
 - B. Sandbags, straw bales, silt fence, etc. which are subsequently shredded by shrapnel and other debris, should be characterized and disposed of properly.
 - C. If not already accomplished, the AA recommends that all debris mounds including but not limited to those associated with firing sites 39-004(a, b, d, and e) and 39-008 be removed. The AA recommends that LANL submit Interim Action plans to the AA for these PRSs.

- D. Indicate if there are provisions for BMPs or engineered structures to stabilize the water course adjacent to the landfill areas. Due to the potential for large flood events and the location of the landfills in the water course, emplacement of rip-rap, gabion baskets, etc. should be considered.
3. LANL should provide any available data concerning storm water discharge analyses from Ancho Canyon/north fork of Ancho Canyon so that the AA may determine to what extent contaminants (mercury, PCBs, depleted uranium, etc.) are migrating offsite. LANL should include dates of analyses, flow rates, most recent discharge.
 4. LANL should replace all references to the "main aquifer" with "regional aquifer" for consistency within reports relative to LANL's Hydrogeologic Workplan dated 12/6/96.
 5. LANL should illustrate and document the proximity of PRSs 39-001(a & b), 39-004(a - e), and 39-008 to water courses with more detailed figures and descriptions.
 6. Prior approval of background concentrations by the AA must be acquired prior to the screening and assessment of risk can be accomplished. Currently, the AA is in the process of review and tentative approval with revisions of the *Natural Background Geochemistry, Geomorphology, and Pedogenesis of Selected Soil Profiles and Bandelier Tuff, Los Alamos, New Mexico* (LA-12913-MS). Upon AA approval of the background concentrations, LANL should proceed with the assessment and screening of risk.
 7. LANL should provide more accurate and complete descriptions and locations of the soil/sediment samples acquired (e.g. grain-size distribution analyses, soil pH, organic carbon content (if available), distance from disturbed areas (artificial fill/bulldozed areas) and geomorphological unit as described by Reneau, 1997). Also, LANL should reference the SOP used to collect the samples.
 8. Due to QA/QC concerns, LANL should provide the AA with standard operating procedures (SOPs)/other guidance documents regarding the contract laboratory program (on and off-site) for organic, inorganic and radiological analyses.
 9. According to the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (2/94), the definition of "R" qualified data is that the data is unusable. LANL should not use "R" qualified data in screening or risk assessments.

Specific Comments:

1.1 General Site History

1. Please document when the landfills and material disposal areas were created and list operational dates of each, types (e.g., liquid or solid, firing site generated debris, construction, office waste, etc.) and estimated volume of wastes.
2. LANL should omit the last paragraph in this section that begins with "~~Although radionuclides are regulated by the DOE and are not regulated under RCRA,...~~".

1.3 Field Activities

1. ICF Kaiser has provided the AA with documentation of the geophysical surveys conducted at 39-001(a & b). LANL should place in an appendix and reference in the text of this RFI Report.

2. LANL should provide the following information of the water encountered "...in the dead space between the well screen and the bottom plug of one of the wells..." (origin/hydrostratigraphic unit, depth to the water, amount of water, is the water still present, and what unit is/was the water encountered).
3. LANL should reference the associated figure(s) and table(s) with the locations of borings, all sampling locations, and borehole data/bore log (depth, depth below ground surface, units encountered, depth to saturation etc.).
4. Identify which drill holes were completed as monitoring wells and provide the following additional information:
 - A. Construction schematics for the all monitoring wells.
 - B. Identification of the well that was advanced to 126 feet (5 feet into basalt).
5. The text indicates that samples were taken in each test pit at 3, 6, and 12 feet; however, only one sample was actually obtained from several test pits. LANL should, clarify the discrepancy.

2.2.2.1 Geomorphology of the Canyon Bottom at TA-39

1. The Hydrogeologic Workplan (12/96) indicates that in 1991, roads and buildings at TA-39 were damaged by an intense thunderstorm. LANL should document what damage occurred (e.g., erosion of road beds and firing sites, etc.), and provide any available surface water analyses from this storm event.

2.3.2 Groundwater

1. Although clarified to the AA during a site visit, LANL should document the geologic/geomorphologic lithology and depth where saturated conditions were found in AZC-15, -16, and -18. LANL should also indicate the frequency the wells are monitored.
 - A. If the wells have not been monitored within the last 3 months, LANL should check the status of water in the wells by the time the response to the information is are returned to the AA.
2. The depth to intermediate or regional groundwater and interconnectedness of the surface water and groundwater occurrences is unknown and elevated, relative to background, contaminant concentrations are found below PRSs 39-001(a&b). LANL should determine nature and extent by sampling further beneath and around these PRSs.

3.3.1 Risk due to Naturally Occurring Chemicals in Soils (Background)

1. Please clarify whether chromium is trivalent or hexavalent (indicate methodology used in determinations), Table 3.3.1-1 lists chromium in the trivalent state, however; the RCRA Facility Investigation (RFI) Operable Unit 1132 Workplan (TA-39), lists chromium VI as a Material of Concern.

4.0 Results of QA/QC Activities

1. Over 60% of the data presented for PRSs 39-001(a & b) is qualified, not 10.6% as indicated in this section. LANL should revise the text to reflect this.

2. Provide rationale how estimated undetected (UJ) or estimated (J) qualified data can quantify analyte concentrations. Please remove all statements in this RFI Report that say "UJ" and "J" qualified data quantify the concentrations of contaminants identified in the samples.

5.1.1 History

1. Clarify "anecdotal information" used in the opening sentence of this section.
2. Clarify and provide documentation as to whether the landfill 39-001(a) is an estimated 10 feet deep (p. 1-1) or 15 to 16 feet (page 5-23).

5.1.4.4 Deviations

1. LANL should reference the request for modification 8/15/95 (EM/ER:95-401) that was approved by the Environmental Protection Agency (EPA) (8/23/95) for 39-001(a & b).
 - A. LANL should provide the rationale for the additional deviations from the EPA-approved modifications as indicated in the above-referenced request for modification. LANL should indicate if these modifications were granted prior approval by the AA.
2. Although clarified during a site visit, LANL should document in the response to this supplement information request, the rationale why only the deepest samples were collected in test pits 39-1388, -89, and -90. Please indicate whether the test pits were actually moved closer to the landfills.
 - A. If no waste materials were present in the test pits and the exact location of the landfills is not known, LANL should provide the rationale why "hits" would be expected in the test pits. It is also described that the test pits only extended to depths of 12 to 13 feet while the estimated depth of the landfills is 15 to 16 feet (page 5-23, TA-39 RFI Report).
3. The the locations sampled in North Fork of Ancho Canyon (unapproved) are inadequate to define the extent of contaminant migration for the PRSs addressed in this RFI Report. LANL should re-investigate the current and historical contaminant migration within the North Fork of Ancho Canyon following rationale/procedures discussed in the Core Document for Canyons Investigations (4/97).

5.1.5 Evaluation of Inorganic Chemicals

1. Please reference in the text the figure which illustrates the monitoring well(s) location(s).
2. The RFI fails to adequately demonstrate that the thorium and other contaminants found at levels greater than background at >29 ft and >90 ft in boreholes adjacent/below the PRS are not related to 39-001(a). Although data from test pits located near the PRS indicate no lateral migration, the test pits are only 12 - 13 ft in depth and the presumed depth of the landfill(s) are 15 -16 feet. Regardless, it is highly probable that the source of thorium and other constituents is the landfill, as they are COPCs found at the PRS.
 - A. LANL should document potential alternate point sources for thorium and uranium. LANL should address the contaminant migration.
 - B. LANL should include analyses for thorium in all applicable evaluations and assessments.
3. Some of the referenced data (39-1152 and 39-1155) was omitted from Table 5.1.5-1.

5.1.6 Evaluation of Radionuclides

1. Please provide rationale for omitting U-234 and U-238 from the analyses of 39-001(a).
2. Include the calculations used to derive the SALs for the radionuclides.
3. Present available radionuclide analytical results for all surface soil samples at 39-001(a). Figure 5.1.5-2 indicates uranium-235 was detected at the surface location (#39-1121:0526). Please provide the data concerning this sample and other surface soil samples as they are not presented in Table 5.1.6-1.

5.1.7 Evaluation of Organic Chemicals

1. The statement "~~...eliminated...because there was no source for this analyte...~~", should be omitted because 2-butanone, a solvent, could potentially be present at the PRS (solvents were listed as a material of concern in the OU 1132 RFI Workplan, page ES-2) and was identified as a laboratory contaminant in any of the laboratory QC samples or blanks.
 - A. LANL should include 2-butanone in all applicable evaluations and assessments.

5.1.8 Risk-Based Screening Assessment

1. LANL should present the results of the radiation risk assessment in two ways: as the estimate of the lifetime excess cancer risk and as the estimate of radiation dose equivalent.
 - A. LANL should estimate risks from radionuclide exposures in the manner analogous to that used for chemical contaminants (i.e., the estimates of lifetime intake/exposure from exposure assessment should be combined with the appropriate slope factors for each radionuclide and exposure pathway). Only excess cancer risk should be considered for radionuclides. The sum of the risks from all radionuclides and all exposure pathways will yield the lifetime excess cancer risk attributed to radiation exposure. The lifetime excess cancer risk from radionuclide exposure should be used to compare with EPA's target risk range of 1 in 10,000 to 1 in 1,000,000 life time excess cancer risk for clean-up. Estimates of radiation dose equivalent resulting from site-related exposures may be used for comparison with DOE radiation protection standards and dose limits.

5.2 MDA Y

1. LANL should clarify the use of "MDA Y" and "landfill" in this section of the RFI Report.

5.2.4 Field Investigations

1. LANL should indicate which borehole was used to determine whether migration of contaminants has occurred and present the data acquired from the study.

5.2.4.2 Sampling

1. LANL should clarify the rationale behind the statement, "Because no evidence of waste or soil discoloration was observed in the excavated materials from test pits 39-1391 and 39-1394, a sample from only the deepest region of these pits was collected".

5.2.4.4 Deviations

1. Although partially clarified during site visit, LANL should provide rationale for sampling twice (2 total) in test pits when the EPA-approved modification request (8/15/95, EM/ER:95-401) states that 3 samples will be collected at *each* test pit (a cross section of each test pit may aid clarification).
 - A. Provide the sample identification number or data, if not presented, for the collocated quality assessment samples required in the approved modification.
2. Describe where sampling of the stream channels occurred relative to bulldozed areas and areas designated "artificial fill and disturbed area" on the geomorphological maps (Appendix E) of Reneau (1997). Either accomplish with a figure/plate or describe the unit in which the samples were taken.

5.2.5 Evaluation of Inorganics

1. LANL should omit "~~Of the 159 samples collected in 1994 and 1996 from angled cores, vertical cores, surface samples, and test pits at this site and analyzed for inorganics, one to six samples detected...ten to fifteen samples had concentrations of copper, mercury, and zinc above UTLs, and 44 and 6 samples had detected concentrations of cyanide and silver, respectively.~~" This statement is misleading because it fails to describe the actual number of non-biased data, and therefore, does not accurately illustrate the QA/QC problems associated with many of the analyses.

The statement should be replaced with "Of the 159 samples collected in 1994 and 1996, 97 of 150 samples analyzed for Hg and cyanide, exceeded allowed holding times. Of the remaining 53 samples, 10 to 15 had concentrations greater than the maximum values detected (0.1 mg/kg) for Hg in a background study of LANL (LA-12913-MS). Also, 14 of 53 samples had detectable concentrations of cyanide."

2. LANL should provide the data (inorganic, organic, and radionuclide) for AAB0599 and AAB0600 (stream channel samples) which were omitted from the tables.

5.2.6 Evaluation of Radionuclides

1. LANL should clarify how samples "...analyzed with detection limits that exceeded the background UTL..." can be considered "non-detects". Please provide documentation how detection limits can exceed background UTLs. The selected analytical methods (SW-846) detection limit should be less than background and the appropriate SALs.
2. LANL should provide data for sample 39-1401 which was omitted from Table 5.2.6-1.
3. LANL should provide the uranium-238 concentrations referenced in the first paragraph on page 5-57 as Table 5.2.6-1 does not list uranium-238.

5.2.7 Evaluation of Organics

1. See comment 1, section 5.1.7, Evaluation of Organics.

5.2.8 Risk-Based Screening Assessment

1. LANL should clarify the last paragraph on page 5-65 which eliminates some of the PAHs (lowSALs) identified. The paragraph appears to support the inclusion, not the omission, of the PAHs in the MCE.
2. LANL should include 2-Amino-4,6-dinitrotoluene in all applicable evaluations/assessments.

Multiple Chemical Evaluation:

3. According to the Risk-Based Corrective Action Process (10/16/95, Working Draft) regarding the calculation of MCEs, "Constituents that exceed background, but are below SALs/ALs are screened for potential additivity by summing the normalized maximum observed (maximum concentration divided by respective SAL/AL) for all constituents in this group within a given PRS".
 - A. LANL should use the normalized maximum observed concentration not the highest maximum normalized sum in the MCE.
 - B. LANL should retain all COPCs for further evaluation without subjecting the COPC to subjective interpretations.
4. Clarify the EQL for Aldrin. The text indicates the EQL is 0.004 mg/kg while Table 5.2.7-1 indicates the EQL for aldrin is 0.0007 mg/kg. Please clarify how the EQLs were determined.
5. Please re-evaluate the validity of the normalized values for uranium used in the MCE calculations listed in Table 5.2.8-2. Using data from Table 5.2.5-1, the AA calculates normalized MCE values of 2.34 and 0.14 for uranium in all samples and sample 0239-96-0461 respectively.

5.2.9.1 Review of COPCs and Extent of Contamination

1. Clarify the RESRAD parameters utilized and ensure that the parameters used are site-specific (TA-39). If site-wide parameters are utilized, please provide rationale for their use.

5.2.9.2 Exposure Assessment

1. Contaminant infiltration to groundwater and surface water exposure to site workers is of concern to the AA. The screening assessment is inadequate: Surface and ground water pathways should be evaluated as potential exposure media prior to elimination.
 - A. LANL should consider in the exposure assessment, on-site workers in contact with contaminated surface water. During 1991, a severe thunderstorm occurred that damaged buildings and roads (Hydrogeologic Workplan, 12/6/96, page 4-63) at TA-39. LANL should document if personnel were on-site during this event for regular operations and repairs.
 - B. Due to the presence of thorium/other contaminants at depths greater than 24 feet at 39-001(a&b), and the unknown depth to ground water, infiltration of contaminants to the ground water is of concern to the AA. Unless a viable alternative mechanism/source for the thorium is delineated,

infiltration to groundwater should be included as a release mechanism at all PRSs addressed in this RFI and TA-39 in general.

- C. LANL should evaluate groundwater in the exposure assessment. Exclusion of groundwater from further evaluation "because the current drinking water sources for the receptors of concern are not from the area" is inadequate and does not incorporate potential future groundwater needs. The Hydrogeologic Workplan (12/6/96) suggests possible water resource development in this region of the lab is being considered (well R-28). In addition, the saturated conditions encountered at boreholes AZC-15, -16, and -18 indicate that groundwater may be present periodically and springs and the Rio Grande may be affected by the contamination at TA-39.
- D. A discussion of exposure to external radiation should be included in this section and Table 5.2.9-1.

Determination of Exposure Point Concentrations

- 2. LANL should include all applicable COPCs to achieve the most credible, yet conservative assessment. Whether contaminants were encountered or are likely to be encountered in a small or large trench is subjective and is not appropriate in these assessments.
 - A. For example, Table 5.2.9-2 indicates that Dieldrin was not detected in the large trench at a concentration of concern. LANL should retain Dieldrin and all other applicable contaminants in the calculation of intakes unless LANL can demonstrate the distribution of all contaminants throughout the landfill areas in a 3-D model. Contaminants are likely to be heterogeneously distributed throughout the landfills, 39-001(a & b), and should therefore, be considered in all applicable calculations.
 - B. Provide rationale for using concentrations identified in the test pits and not the maximum concentrations for the entire PRS as the exposure point concentrations (EPCs).
- 3. LANL should document how the most likely exposure (MLE) and reasonable maximum exposure (RME) are calculated/determined.
- 4. LANL should define the dimensions of small and large trenches.
- 5. The reasonable maximum exposure (RME) scenario should be used in evaluating what is necessary to achieve protection against risk to human health (Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual, EPA OERR Publication EPA/54011-891002, 12/89). The most likely exposure (MLE) estimate may be used for informational purposes only in discussing uncertainties. However, in calculating the MLE exposure estimates at 95% UCL of the arithmetic mean, contaminant concentrations should be used. The mean contaminant concentration should not be used to represent the exposure point concentration because the uncertainty associated with estimating the true average concentration at a site. The 95% UCL provides reasonable confidence that the true site average will not be underestimated (Supplemental Guidance to RAGS: Calculating the Concentration Term, EPA OSWER Publication #9285.7-081, 5/92).
- 6. LANL should include measurement units in all appropriate tables in Appendix C.
- #### **Quantification of Exposure and Dose**
- 7. LANL should document if constituents listed as carcinogenic also have non-carcinogenic effects to ensure that they are considered in all applicable risk calculations. If constituents have both carcinogenic and non-carcinogenic effects, then they should be considered in both evaluations.

8. LANL should all pertinent tables (e.g., Table 5.2.9-5) in this section, illustrating that nephrotoxicity (kidney toxicity) has not been determined following exposure to uranium through inhalation.
9. The text on page C-28 refers to Table C-13 for suggested plant uptake factors, but Table C-13 illustrates exposure parameters for dermal contact with soil. Table C-18 suggesting plant uptake factors should be referenced.
10. LANL should include in Table C-18 all relevant COPCs (inorganics and radionuclides) and address not only organic COPCs, but also inorganic and radionuclide COPCs. Provide references for the values listed in the table.
11. LANL should replace 95th with 95% in the footnotes labelled "a" for Tables C-12, C-13, C-15 and C-16 as they incorrectly identify the 95% UCL of mean concentrations as the 95th UCL of mean concentrations.

5.2.9.3 Toxicity Assessment

1. LANL should revise the toxicity assessment subsection based on the re-assessment of the COPCs, etc.
2. LANL should discuss and present radionuclide cancer slope factors established by the U.S. EPA.

5.2.9.4 Risk and Dose Characterization

1. LANL should re-calculate the human health risks from chemical and radionuclide COPCs for the reasonable maximum exposure scenarios utilizing the data acquired from the required sampling RFI activities (see Attachment A) and re-evaluation of existing data.

Non-radiological Risk

2. LANL should provide rationale why "Risk estimates for the large and small trenches are separate because the exposure areas were different for PAHs and dieldrin". By design the risk estimate should be conservative, include all pertinent COPCs found at a given site, and not be driven by speculation. Any and all risk should be discussed separately in uncertainty analysis section.

A. Also, LANL should provide rationale as to why only PAHs and dieldrin are used for either large or small trenches in this assessment. These assessments should be conservative and include all applicable constituents.

3. LANL should define and document "exposure area".

Radiological Dose

4. LANL provide documentation describing the selection process and determination of the distribution coefficient parameters used in the RESRAD program (Appendix F).

A. In addition, LANL provide documentation as to where the menu items RO13 through RO19, etc., data originate (Appendix F, RESRAD parameters). Document what data is site specific and which are LANL wide.

5. Because thorium-232 is a COPC at the sites, LANL should clarify whether the inhalation of Radon-220

(thorium-232 daughter) in the dose contribution table (Table 5.2.9-13). If Radon-220 is not considered in the dose calculation, provide the rationale for its exclusion.

Uncertainties in the Human Health Risk Assessment

6. LANL should include a detailed discussion of the effect of uncertainties incorporated in this investigation (e.g., biased qualified data; unknown SALs; see also comment 3A, Toxicological Data) associated with the chemical analytical and radiochemical results and radiological exposure calculations on the risk estimates.

Toxicological Data

7. LANL should omit the following statement "~~The assumptions used here provide a rough but plausible estimate of the upper limit of risk, i.e., it is not likely that the true risk would be much more than the estimated risk, but it could be considerably lower, even approaching zero.~~" This statement is misleading given the undocumented biases and the non-conservative nature of the screening, assessments and evaluations determined in this report. In addition, it is highly speculative and is contradicted in a later sentence (see *comment 3A, this section*).
8. Based on the re-assessment, and as these assessments are designed to determine conservative additive affects, LANL should include all applicable chemicals previously mentioned in the risk assessment calculations.
9. LANL should add to the statement "In addition, several chemicals...do not have any toxicity criteria so that the potential risks associated with exposures to these chemicals were not quantitatively evaluated and as such, will be discussed among the risk assessment uncertainties because they potentially could add to the total risk"
 - A. In addition, the following statement "~~Exclusion of these chemicals is not anticipated to result in significant underestimates of risk.~~" should be omitted because it is speculative.

5.2.11 Conclusions and Recommendations

1. LANL should address the potential for a major flood event (100-year flood) affecting the landfill PRSs because it is not adequately addressed in this report.
 - A. Although the "North Fork" of Ancho Canyon may be geomorphologically stable or metastable(?). LANL should document that it precludes any potential movement of sediments/contaminants off-site, lateral migration of the channel, net erosion, etc. when surface water is present in the stream course.

PRSs 39-004(a-e) Firing Sites and PRS 39-008 Gas Gun

The PRSs 39-004(a-e) and 39-008 requests for deferral are denied based on the following deficiencies:

1. LANL must receive prior consent from the AA before requesting deferral of any site.
2. LANL should provide to the AA a document concerning sample analyses and survey results (e.g., geophysics, radiation) acquired at 39-004(a-e) and 39-008. Other information such as site histories, sample locations, data, data evaluation, etc.) should also be included with the requested documentation. This information needs to be provided before the afore mentioned PRSs can be evaluated for NFA by the AA.

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3. LANL should also provide the status of the excavated materials dumped roughly 1,500 feet southeast of 39-004(e). Include distance to a water course, estimated volume of excavation, likely contaminants, any analytical results from investigations, geophysical and radiological surveys, refuse/debris present.
 - A. LANL should provide similar information for the debris mound at PRS 39-008.
 - B. LANL should indicate if there are any other debris mounds associated with the PRSs addressed in this report.
4. LANL should provide information as to future activities at the firing/detonation sites 39-004(a-e) and 39-008.