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Date: August 6, 1998
Refer to: EM/ER:98-258

HSWA LANL 1/1114/3

Dr. Robert S. Dinwiddie
NMED-HRMB
P.O. Box 26110
Santa Fe, NM 87502

SUBJECT: RESPONSE TO RSI ON THE RFI REPORT FOR TA-3 PRSs (FORMER OU 1114, FU 1)

Dear Dr. Dinwiddie:

Enclosed is the Los Alamos National Laboratory's response to the New Mexico Environment Department Hazardous and Radioactive Materials Bureau's request for supplemental information (RSI) on the Resource Conservation and Recovery Act Facility Investigation (RFI) Report for Technical Area 3, Potential Release Sites 3-004(c) and (d), 3-007, 3-014(k), (l), and (o), 3-021, 3-049(a), 3-052(b), 3-056(k), and C-3-014. The RSI was received on July 7, 1998.

If you have any questions, please contact Roy Michelotti at (505) 665-7444 or Joe Mose at (505) 667-5808.

Sincerely,

Brad Martin for
Julie A. Canepa, Program Manager
LANL/ER Project

Sincerely,

for Joseph A. Mose
Theodore J. Taylor, Program Manager
DOE/LAAO

JC/TT/rfr

Enclosure Response to RSI on the RFI Report for TA-3 PRSs (Former OU 1114, FU 1)

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Response to
Request for Supplemental Information
TA-3 RCRA Facility Investigation Report
Los Alamos National Laboratory
NM0890010515

INTRODUCTION

To facilitate review of this response, the New Mexico Environmental Department's (NMED) comments are included verbatim. The comments are divided into general and specific categories as presented in the letter. Los Alamos National Laboratory's (LANL's) responses follow each NMED comment.

GENERAL COMMENTS

NMED Comment

1. *LANL failed to perform appropriate risk screening per NMED HRMB/EPA guidance: LANL should avoid using Multiple Chemical Evaluations, "risking away" constituents prior to a UTL/BV comparison.* [all PRSs]

   Regarding PRGs, EPA states that "...PRGs were established... to serve as a screening tool for determining if a contaminant release has occurred at a site, if the release requires further delineation, or if a site risk assessment should be conducted. These PRGs were calculated for both residential and industrial exposure scenarios. Although Region 9 PRGs correspond to a hazard quotient of 1.0 for noncarcinogens and a risk of 1x 10^{-6} for carcinogens, EPA did not intend for PRGs to be used to estimate risk at a site or be used as a shortcut to the risk assessment guidelines outlined in Risk Assessment Guidance for Superfund (RAGS)."

LANL Response

1. LANL recognizes that it is necessary to perform appropriate risk screening per NMED HRMB/EPA guidance for any given PRS. However, during the time this RFI investigation was conducted and the TA-3 RFI Report was written, September 1997, the multiple chemical evaluation was approved by EPA for use in human health risk screening by LANL. LANL has reviewed the screening assessments and has not identified any cases where PRS-related constituents were "risked away" prior to a UTL/BV comparison.

   At the time that this report was written, LANL was using the residential EPA Region 9 PRGs as human health SALs. The transmittal memo for the EPA Region 9 PRGs explains how these PRGs should be used. EPA Region 9 states:

   > "The original intended use of PRGs was to provide initial cleanup goals for individual chemicals given specific medium and land-use combinations (see RAGS Part B, 1991), however, risk-based concentrations have several applications. They can be used for:
   >
   > - Setting health-based detection limits for chemicals of potential concern;
   > - Screening sites to determine whether further evaluation is appropriate;
   > - Calculating cumulative risks associated with multiple contaminants."

   The EPA Region 9 PRG transmittal memo provides the equations to evaluate multiple chemical effects for carcinogens and non-carcinogens. As a point of clarification, LANL agrees that these PRGs calculations should not be confused with risk assessments.

However, such PRG comparisons represent valuable information that can be used in the uncertainty analysis of the human health screening assessment. Correct application of the PRGs also requires that a revised site conceptual model has been developed that includes an understanding of the nature/rate/extent of contamination associated with the PRS.

NMED Comment

2. *LANL failed to adhere to the approved RFI Workplan (WP) or Sampling and Analysis Plan (SAP). LANL should identify each variance from the approved RFI WP/SAP and, for each variance, provide the rationale for varying from the approved RFI WP/SAP and evaluate the impact of each variance on the integrity of the investigation.* [all PRSs]

LANL Response

2. LANL identified and described the rationale for variances from the approved RFI WP/SAP in sections labeled "Deviations" within sections 5.1.4 through 5.7.4 "Field Investigations" for each PRS discussed in this RFI Report. The objective for all PRSs within this RFI Report was to determine if a release occurred. LANL evaluated the impact of each variance on the integrity of the investigation and believes that using the typical biased sampling approach (supported by either process knowledge of site operations or field screening) was sufficient to meet this objective.

   Deviations from the approved sampling schemes for each PRSs can be located as described in Table 1 "Locations of Deviations for PRSs in TA-3 RFI Report." For convenience, the deviations for each PRS are presented verbatim as follows.

TABLE 1
LOCATIONS OF DEVIATIONS FOR PRSs IN TA-3 RFI REPORT

Section	PRS	Page Number
5.1.4	3-004(c,d)	37
5.2.4	3-007	51
5.3.4	3-014(k,l,o)	59
5.4.4	3-021	80
5.5.4	3-049(a)	88
5.6.4	3-052(b) & 3-056(k)	103
5.7.4	C-3-014	116

   The deviation sections suggest that the number of samples collected was reduced based on a statistical re-evaluation. The re-evaluation was not truly statistical, but rather was based on judgmental criteria such as information on site operations, field screening, and likely points of surface water drainage.

   The criteria used to evaluate nature and extent at the time the TA-3 RFI report was written was based on comparison to action levels (i.e.: SALs). LANL recognizes the need to evaluate ecological risk at these sites, which will be addressed when the methodology is approved by NMED (see general comment response number 6). Additional samples may be required to address more rigorous ecological risk criteria regarding nature and extent determination.

NMED Comment

3. *LANL failed to identify constituents above background UTLs or detection limits and failed to identify those constituents which were identified above UTLs and exceeded Screening*

Action Levels (SALs). RPMP evaluated the analytical data provided in Appendix A and found that LANL failed to identify or mis-identified constituents for many of the PRSs. [all PRSs]

Therefore, LANL should perform a re-evaluation of the analytical data and provide an explanation why the constituents identified in Table A (attached) were not presented within the tables of the RFI Report. In addition, LANL should perform this re-evaluation comparing COPC concentrations with the verbally agreed-upon background values (written confirmation is forthcoming) instead of the UTLs as presented in the RFI Report.

LANL Response

3. LANL does not consider it appropriate to re-evaluate data in a1997 RFI Report using an approach that was not available at the time the report was written. However, in response to mis-identifying all constituents exceeding background UTLs/SALs, LANL has reviewed Appendix A and has verified that all constituents greater than background UTLs and/or SALs have been identified and reported per the UTLs that were used during the time this document was written. Additionally, LANL followed the agreed upon report format and guidance that were in place during the time this document was written. Refer to Table 2 "Summary of 1997 UTLs by Media for Inorganic Chemicals" and Table 3 "Summary of 1997 UTLs by Media for Radionuclides" for a comprehensive list of 1997 UTLs.

TABLE 2
SUMMARY OF 1997 UTLS BY MEDIA FOR INORGANIC CHEMICALS[a]

Analyte	Soil	Qbt 3	Qbt 4
Aluminum	38700	3700	6200
Antimony	1	0.4	<0.03
Arsenic	7.82	5	2
Barium	315	28	42
Beryllium	1.95	1.53	1.8
Cadmium	2.6	NA	NA
Calcium	6120	1520	1800
Chromium	19.3	2.1	5.4
Cobalt	19.2	27.4	25
Copper	15.5	2	1.6
Iron	21300	9040	12000
Lead	23.3	16.2	4
Magnesium	4610	628	1700
Manganese	714	426	370
Mercury	0.1	NA	NA
Nickel	15.2	2.6	<2
Potassium	3410	735	1600
Selenium	1.7	NA	NA
Silver	NA	1.9	<1
Sodium	915	1940	390
Thallium	1	1.7	<0.3

Vanadium	41.9	4.01	9.5
Zinc	50.8	55.5	47
a. Units are in mg/kg.			

TABLE 3
SUMMARY OF 1997 UTLS BY MEDIA FOR RADIONUCLIDES[a]

Analyte	Soil	Qbt 3	Qbt 4
Plutonium-238	0.023	0.05	0.05
Plutonium-239	0.054	0.05	0.05
Strontium-90	1.31	1	1
Thorium	2.33	2.33	2.33
Uranium[b]	5.45	4.37	2.93
Uranium-234	1.94	1.55	1.04
Uranium-235	0.084	0.067	0.045
Uranium-238	1.82	1.46	0.98
Tritium	0.76[c]	MDA[d]	MDA

a. Units are in pCi/g.
b. Units are in mg/kg.
c. Units are in pCi/ml soil moisture. To convert to pCi/g, use the following equation: UTL (per unit mass) = UTL (per unit moisture)*m/(100-m), where m = %soil moisture of sample.
d. Minimum detectable activity.

NMED Comment

4. *LANL should provide reference to the source(s) of the SALs used in the report.*

LANL Response

4. The reference for SALs used in the TA-3 RFI Report is as follows: EPA (US Environmental Protection Agency), August 1, 1996, "Region 9 Preliminary Remediation Goals (PRGs)," memorandum from S. J. Smucker, Regional Toxicologist (H-9-3), Technical Support Team, San Francisco, California.

NMED Comment

5. *LANL failed to locate duplicate samples appropriately. Because field QC "duplicate" samples are designed to check both laboratory and field procedures, LANL should ensure that future duplicate samples are obtained from areas which are known to be or are most likely to be contaminated.* [no response required]

LANL Response

5. No response required.

NMED Comment

6. *LANL should perform an ecorisk screening evaluation at all PRSs with contaminant concentrations greater than background or above detection limits.* [all PRSs].

LANL Response

6. For reports that were prepared prior to FY98, LANL will perform ecological risk screening evaluations involving all PRSs once draft methodology is approved by NMED. The PRSs

presented in this RFI Report are not contiguous within TA-3. In order to perform ecological risk screening evaluations for these PRSs, these PRSs will need to be aggregated with other PRSs within TA-3, which are not addressed in this RFI Report. For reports prepared in FY98, a management decision by LANL/DOE was made to use the proposed ecological methodology.

NMED Comment

7. *LANL should present the UTLs for all analytes and all matrices (Qbt_3, Qbt_4, soil, etc.) differentiated in the RFI Report in one comprehensive table.*

LANL Response

7. LANL has provided comprehensive tables for the UTLs that were used in 1997 for both inorganic chemicals and radionuclides as discussed in LANL's response to Comment #3. Refer to "Table 2: Summary of 1997 UTLs by Media for Inorganic Chemicals" and "Table 3: Summary of 1997 UTLs by Media for Radionuclides."

NMED Comment

8. *LANL should present and define the "Minimum detectable activities" and measurement uncertainties for radionuclides within the text of the RFI Report such that the elimination of radionuclides from further consideration can be reproduced.* [all PRSs where applicable]

LANL Response

8. LANL agrees that it is necessary to define "minimum detectable activities" (MDA) and measurement uncertainties for radionuclides within the text of the TA-3 RFI Report. However, it is not feasible to present all of the MDAs and measurement uncertainties for each radionuclide. While some analytical laboratories report generic MDAs (which are of limited use), most laboratories report MDAs and measurement that are sample specific.

   The 1998 RFI Report Annotated Outline includes tables of the target analytes and detection limits in Appendix D-1.0 "Target Analytes and Detection Limits." Appendix D-2.0 "RFI Analytical Results," provides hardcopy and electronic tables that include the LANL data validation qualifier that is applied when the radionuclides result is compared with the MDA or measurement uncertainty. The guidelines used for the LANL routine validation process are given below.

   <u>Guidelines for Radionuclide Detection</u>

   - For samples where the result is less than the reported sample MDA or estimated quantitation limit (EQL), it is confirmed that the MDA of each reported analyte in each sample and blank is less than EQL (if one exists).

   - When the MDA is less than the EQL or no EQL is available:
     a) Samples are qualified as <u>U</u> for those that have results less than the MDA; or
     b) If sample results are greater than the MDA but less than the EQL, uncertainty checks to determine detection status is used (see below for guidelines).

   - When the MDA is greater than the EQL:
     a) Samples are qualified as <u>U</u> for those sample and blank results less than both the MDA and the EQL; or

b) Samples are qualified as U for those sample and blank results less than the MDA but greater than the EQL.

- All detected radioisotopes in all samples are qualified for those samples that have one of the above conditions where the results are less than either the MDA or the EQL.

Guidelines for Detection with Respect to Reported Uncertainty

This is a more conservative test of detection than simply considering the MDA or the EQL because the sample results, which are greater than both the EQL and the MDA, may still be qualified when using this test.

- Samples are qualified as U for those results that are less than three times the reported 1-sigma uncertainty; or

Samples are qualified as U for those results that are less than 1.5 times the reported 2-sigma uncertainty or less than the reported 3-sigma uncertainty.

SPECIFIC COMMENTS

NMED Comment

9. *Section 3.3.1, Risk Due to Naturally Occurring Inorganic Chemicals in Soils*
The assumptions used to conduct exposure assessments and estimate the reference dose for manganese are the same as for any other inorganic chemical. Those assumptions, along with the fact that manganese background UTL exceeds a hazard quotient of 1.0, will be taken into consideration if a contaminant release is discovered at a site and the need for a corrective action remedy is assessed. LANL should not minimize the risk due to naturally occurring background concentrations.

LANL Response

9. LANL agrees that risks due to naturally occurring background concentrations should not be minimized. It is noted that the risk due to background will be discussed, where applicable, in a PRS-specific context in future reports that are written following the March 1998 approved RFI Report format.

For clarification regarding the manganese hazard quotient calculation, it is noted that the risk results presented in Section 3.3.1 "Risk Due to Naturally Occurring Inorganic Chemicals in Soil" of the TA-3 RFI Report are based on an old toxicity value for manganese (EPA Region 9 PRGs, 1995). The current SAL for manganese (based on a hazard quotient of 1) is 3100 mg/kg (EPA Region 9, 1998). This SAL value is approximately a factor of 10 greater than the SAL used as the basis for the background manganese hazard quotient calculation. Using the SAL ratio method to estimate the revised hazard quotient, an approximate hazard quotient for manganese at a background value concentration is 0.22, such that:

$$\mathbf{HQ = BV/SAL = 671/3100 = 0.22}$$

where: HQ = hazard quotient
BV = background value (mg/kg)
SAL = screening action level (mg/kg)

Thus, the apparent background risk for manganese is less than that suggested in the TA-3 RFI Report. LANL also recognizes that risk due to existing background levels must be considered as an important part of the risk management decision for a PRS, and should never be downplayed.

NMED Comment

10. Section 4.3.2, Organic Analysis
LANL multiplies all contaminants found in the laboratory blank by 10 in order to obtain a concentration at which those constituents are considered to be detected. Once the "10 times" rule was applied to bis(2-ethylhexyl)phthalate (DEHP) and di-n-butylphthalate data, the concentrations at which these two constituents were deemed detect were relatively high: 2.3 and 2.2 ppm, respectively. For this reason, the concentration of DEHP in sample 0103-97-0030 (0.84 ppm) may actually denote a contaminant release but was considered non-detect. Furthermore, results from di-n-butylphthalate are completely omitted from the report. LANL should include those constituents found in the laboratory blanks, regardless of whether they are considered detect or non-detect.

LANL Response

10. LANL follows standard industry practice with regard to the "10 times" rule as it applies to common laboratory contaminants. This practice is described in Section 3.1.2 "Laboratory Contaminants" of the RFI Report and is in accordance with both the Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A), Interim Final, 12/99 (RAGS); and the USEPA CLP National Functional Guidelines for Organic Data Review, 2/94 (Functional Guidelines). The practice as quoted from the RAGS is:

> "...if the blank contains detectable levels of common laboratory contaminants, then the sample results should be considered as positive results <u>only</u> if the concentrations in the sample exceed <u>ten times the maximum amount detected in any blank</u>. If the concentration of a common laboratory contaminant is less than ten times the blank concentration, then conclude that the chemical was not detected in the particular sample and, in accordance with EPA guidance, consider the blank-related concentrations of the chemical to be the quantitation limit for the chemical in that sample. Note that if all samples contain levels of a common laboratory contaminant that are less than ten times the level of contamination noted in the blank, then completely eliminate that chemical from the set of sample results."

Therefore, bis(2-ethylhexyl)phthalate and di-n-butyl phthalate were not detected at PRS 3-014(o) and were not presented in the RFI Report.

NMED Comment

11. 3-004(c)

a. Methylene chlorine and acetone were identified in both the laboratory method blank and in sample 0103-97-0277. Because these two constituents were identified in the method blank, LANL applied the "10 times" rule which indicated that the concentrations identified in sample 0103-97-0277 should be considered non-detected. LANL should include those constituents found in the laboratory blanks, regardless of whether they are considered detect or non-detect.

b. Table A-3

If only two out of the five analyses are useable, then LANL should evaluate if the useable data is sufficient to meet the data quality objectives of the investigation.

LANL Response

11a.

Refer to LANL's response to Comment #10, regarding the use of qualifiers for common laboratory contaminants detected in blanks. The classification of a common laboratory contaminant as undetected based on the "10 times" rule as previously stated does not constitute a lost data point generated under routine analytical conditions. Rather, it is an acknowledgment that the laboratory environment is such that contamination is, or is very likely, infiltrating field samples. The blank is used as evidence of this infiltration and the contaminant in question is considered to be not detected. With infiltration of contamination at the analytical laboratory, no analyte could be reported at concentration levels less than that contributed by the laboratory contamination in each sample.

For selected chemicals such as acetone, methylene chloride, toluene, methyl ethyl ketone, and phthalate ester that are in wide use throughout environmental analytical laboratories, contamination is a relatively common occurrence, hence the institution of rules such as the "10 times" rule. The "10 times" rule is a tacit acceptance of the current state of routine analytical technology.

The EPA national functional guidelines extend the "10 times" rule to other laboratory contaminants with modification. The modification of the "10 times" rule is the institution of a "5 times" rule which applies a 5-fold multiplier to any contaminant not on the common laboratory contaminant list presented above, that is detected in a blank during analysis.

The national functional guidelines go further still and state that:

> "Additionally, there may be instances where little or no contamination was present in the associated blanks, but qualification of the sample is deemed necessary. If the reviewer determines that the contamination is from a source other than the sample, he/she should qualify the data."

LANL implements this guidance because it is common industry practice with a sound technical foundation. At the same time, LANL data validators are aware of extenuating circumstances that could exist when implementing the "10 times" and "5 times" rules, and they use their best professional judgment in their implementation. Use of professional judgment is encouraged by the national functional guidelines and LANL supports the use of professional judgment because it helps to prevent the blind application of simple validation rules to a wide variety of circumstances.

Therefore, methylene chloride and acetone were not detected at PRS 3-004(c) and were not presented in the RFI Report.

11b.

The data in Table A-3 are all useable according to the qualifiers presented in the table and the text in Section 5.1.7 "Evaluation of Organic Chemicals for PRS 3-004(c)." LANL has explained how 'useable data' is determined in Section 3.1.2 "Data Validation," in that TA-3 RFI Report, which states that:

> "Baseline data validation produced validation reports with data qualifiers designating potential deficiencies for affected results. Each data qualifier is accompanied by a reason code that provides information about the deficiency

which lead to the qualification of the data. The validation reports were used in the decision-making process and to direct the focused validations required to evaluate the usability of the data for this report."

The LANL data qualifiers are defined in Section 3.1.2 "Data Validation." There are four LANL qualifiers that may indicate the data are unusable or require further evaluation before use.

1) "RPM signifies that without further review of the raw data, the sample results are unusable due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. Presence or absence cannot be verified. Any results qualified as RPM must be evaluated for relevance to data use."

2) "P signifies that professional judgment should be applied to using the data in decision-making."

3) "PM signifies that professional judgment should be applied to using the data in decision-making. A manual review of raw data is recommended to determine if the defect impacts data use for decision-making.

4) "R signifies that the data are rejected as a result of major problems with quality assurance/quality control (QA/QC) parameters.

The data in this report were not qualified with any of the above qualifiers, indicating that all of the data were useable.

NMED Comment

12. 3-004(d)

a. LANL should tentatively identify the source/contributor of carbazole.

b. Table A-5
If only three out of the twelve analyses are useable, then LANL should evaluate if the useable data is sufficient to meet the data quality objectives of the investigation.

LANL Response

12a. Due to site operations at PRS 3-004(d), it is believed that carbazole, a three-ringed PAH that naturally occurs in heavy petroleum products, is associated with the surrounding asphalt pavement and not the PRS specifically (ATSDR 1997). LANL incorrectly stated in Section 5.1.10 "Evaluation of Organic Chemicals for PRS 3-004(d)" that carbazole is not a PAH. Carbazole was detected in one sample at PRS 3-004(d). This same sample (0103-97-0264) had numerous other PAHs detected and was collected from beneath the asphalt pavement. All of these detected concentrations were J qualified because they were detected between the instrument detection limit and the EQL.

12b. The data in Table A-5 "Organic Data Results for PRS 3-004(d)" are all useable according to the qualifiers presented in the table and the text in Section 5.1.10 "Evaluation of Organic Chemicals for PRS 3-004(d)." LANL has explained how 'useable data' is determined in Section 3.1.2 "Data Validation." In the TA-3 RFI Report. (Refer to LANL's response to Comment #11b for details).

NMED Comment

13. 3-007

a. *LANL should clarify if Table 5.2.7-1 (0.71) or Table A-8 (710 J ppm) presents that appropriate concentration of benzoic acid.*

b. *LANL should improve Figure 5.2.4-1 to include drainage pathways.*

c. *LANL should clarify what is meant by "standard analytical suite."*

d. *LANL should resolve the discrepancy between the number of samples obtained in Table 5.2.4-1 (4 samples) and the text (5 samples).*

e. *LANL should explain why thorium-228, -230 & -232 were not included in Table 5.2.6-1.*

LANL Response

13a.

Upon review, LANL found that the reported values for all samples in Table A-8 "Organic Data Results for PRS 3-007" were presented incorrectly. The values were presented in *ppb* or *ug/kg*, and as a result were three orders of magnitude higher than the true values. Table 5.2.7-1 "Detected Organic Concentrations at PRS 3-007" presents the correct reporting units for benzoic acid (the only chemical reported) which are *mg/kg*. The following table has been revised with the correct values for all analytes detected at PRS 3-007. LANL apologizes for submitting incorrect values in this RFI report.

TABLE A-8 (REVISED)
ORGANIC DATA RESULTS FOR PRS 3-007[a]

SAMPLE ID	0103-97-0221	0103-97-0222	0103-97-0223	0103-97-0224	0103-97-0225
ANALYTE					
Acetone	0.015 U[b]	Non-detect	Non-detect	0.009 U	0.004 J[c]
Benzoic Acid	Non-detect	Non-detect	0.71 J	Non-detect	Non-detect
Methylene Chloride	.040 U	Non-detect	Non-detect	0.023 U	0.005 U

a. Units are in mg/kg.
b. U = Signifies that the analyte was not positively identified in the sample, and the associated value is the sample-specific EQL/EDL.
c. J = Signifies that the analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.

13b.

Upon review, LANL found that the description (Section 5.2.2 "Description", page 50) for PRS 3-007 does not correctly define the site characteristics and should be clarified. The revised version of Figure 5.2.4-1 is attached at the end of this document. Section 5.2.2 should be rewritten as follows.

> "PRS 3-007 is located within the security fence at the Sigma Complex. Wash down water from within structure TA-3-159 was released from engineered gaps between the concrete floor and structure walls to the environment (soil immediately surrounding the building). The rinse water drained into small drainage pathways and catchment areas that eventually migrated into a thin sheet flow exiting into Mortandad Canyon."

13c.

Upon review, LANL found that the description for sample analysis conducted for Sample ID 03-03313 at PRS 3-007 was misleading and confusing. "Standard analytical suite" refers to all of the suites of analysis being performed for all samples at this site, which included VOCs, SVOCS, high explosives, TAL metals, and isotopic thorium. The text should read as follows on page 50, paragraph 6:

> "...In addition, the sample collected from Location ID 03-03313 was submitted for fixed laboratory analysis of gross alpha and beta radiation and gamma spectroscopy after exhibiting slightly elevated field screening readings. ...."

13d.

Regarding the discrepancy in the number of surface and subsurface samples collected at PRS 3-007 on page 50, paragraph 6, the text should read as follows:

> "**Surface and Subsurface Sampling.** Based on site drainage and topography, four biased locations (Location IDs 03-03311 through 03-03314) and one collocated sample (Location ID 03-03315) were selected for sampling. A total of five samples were collected at PRS 3-007 (Figure 5.2.4-1). ...."

13e.

Thorium-228, -230, and -232 were analyzed by alpha spectroscopy. These thorium isotopes were compared to sediment background UTLs and eliminated from further consideration, as stated in Section 5.2.6 "Evaluation of Radionuclides" (page 54). Table 5.2.6-1 "Radionuclides Detected From Gamma Spectroscopy Analysis From Samples Collected at PRS 3-007" presents the detected radionuclides reported by gamma spectroscopy only for sample 0103-97-0223. Therefore, thorium-228, -230, and -232 were not included in Table 5.2.6-1.

NMED Comment

14. Section 5.3.4, PRSs 3-014(k-l & o)
LANL should clarify why one sample location per bed was adequate to characterize and detect contamination if it exists.

LANL Response

14. LANL believes that one sample location per sludge drying bed was adequate to characterize each PRS [PRSs 3-014(k, l, & o)] based on the following specific design and operating principles of the beds, which allowed for relatively uniform contaminant distribution across each bed.

- Each drying bed is constructed of a sand/gravel filter consisting of a fine-to-coarse grain sand layer underlain by a gravel layer covering an open pipe underdrain system. The drying beds were used for de-watering purposes via two major processes: 1) evaporation, and 2) percolation through the sludge and underlying media. Following a batch application, the sludge was allowed to drain and dry until it caked and cracked. Dried sludge was removed from the beds between batch applications. Because the sludge batch, sand/gravel filter, evaporation rate, and percolation rate remain constant at any point in time in each bed, contaminants (if present) will be distributed uniformly within each bed.

- To detect contamination (if present), the sample location in each bed was biased near the inlet pipe and near the underdrain system. The inlet pipe and associated splash pad (apron) were designed to 1) uniformly distribute sludge over the cross section of the entire bed, 2) prevent sludge from scouring the sand/gravel filter, and 3) minimize any large-scale turbulence. If the sludge entering was somewhat turbid, the greatest depth of sludge would accumulate near the inlet end of the drying bed. Additionally, the greatest depth of solids would be associated with the underdrain system because the bottom of the bed is sloped toward the underdrain system. If the sludge entering a bed was not turbid, accumulation sludge would occur in a uniform manner across each drying bed.

NMED Comment

15. 3-014(k)
LANL should clarify why uranium and tritium are not identified as present at this PRS although they were detected and presented in Table A-10.

LANL Response

15. The uranium isotope (uranium-234, -235, and -238) concentrations were compared to their respective background UTLs and were not detected above their UTLs at PRS 3-014(k). Therefore, even though isotopic uranium was detected in these samples, the data are not presented in Section 5.3.6 "Evaluation of Radionuclides for PRS 3-014(k)" because the uranium isotopes were not retained as COPCs for PRS 3-014(k).

    LANL reported the laboratory duplicate data incorrectly for tritium in Table A-10 "Organic Data Results for PRS 3-014(k)." Sample 0103-97-0012 did not have a laboratory duplicate concentration reported for tritium. Sample 0103-97-0013 had a laboratory duplicate result reported at a concentration of 0.04 (U qualified) pCi/g. Therefore, no detects of tritium were reported for PRS 3-014(k). Refer to Table A-10 (Revised) "Radionuclides Data Results for PRS 3-014(k)" for corrections.

TABLE A-10 (REVISED)
RADIONUCLIDES DATA RESULTS FOR PRS 3-014(k)[a]

SAMPLE ID	0103-97-0011	0103-97-0012	0103-97-0013	0103-97-0012D
ANALYTE				
Plutonium-238	-0.016 U[b]	0.005U	0.004 U	NA[c]
Plutonium-239	0.009 U	0.007 U	0 U	NA
Stronitum-90	-0.28 U	-0.46 U	-0.42	NA
Tritium	0.02 U	0.06 U	0.04	NA
Uranium-234	0.501	0.36	0.37	NA
Uranium-235	0.0151	0.024	0.018	NA
Uranium-238	0.56	0.34	0.38	NA

a. Units are in pCi/g.
b. U = Signifies that the analyte was not positively identified in the sample, and the associated value is the sample-specific EQL/EDL.
c. Not available.

NMED Comment

16. 3-014(m)
LANL should present the analytical data and other information gathered during this investigation which led to the decision to conduct a VCA/M.

LANL Response

16. The rationale for a voluntary corrective action at PRS 3-014(m) was based on the sample results collected in July 1997, during this RFI. Soil samples were collected from location ID 03-03266 within the sludge drying bed, PRS 3-014(m). Samples were collected from the filter sand at the surface of the drying bed (0 - 2 in.), at the pea gravel/tuff interface (9 - 21 in.), and in the underlying tuff (21 - 33 in.).

    Review of the analytical data indicated that Aroclor-1254, was detected at 6.5 mg/kg (below the EPA Region 9 industrial PRG) within the surface soil sample (0 - 2 in.). PAHs including dibenzo(a)anthracene, benzo(a)anthracene, chrysene, benzo(b&k)flouranthene, benzo(a)pyrene, and indeno(1,2,3-c,d)pyrene were detected above their respective industrial PRGs levels within the surface sample. Refer to Table 4 "Detected Organic Concentrations at PRS 3-014(m)."

    A qualitative human health risk assessment was conducted, and it was determined that the compounds greater than EPA Region 9 industrial PRGs should be carried forward as COPCs. Based on this evaluation and the planned decontamination and decommissioning (D&D) of the WWTP sludge beds as a whole, PRS 3-014(m) was proposed for a VCA.

TABLE 4
DETECTED ORGANIC CONCENTRATIONS AT PRS 3-014(m)[a]

SAMPLE ID	0103-97-0017	0103-97-0018	0103-97-0019
Depth	0 - 2 inches	9 - 21 inches	21 - 33 inches
ANALYTE			
Aroclor 1254	6.5	Non-detect	Non-detect
1,4-Dichlorobenzene	1.4 J[b]	Non-detect	Non-detect
Naphthalene	0.94 J	Non-detect	Non-detect
Acenaphthene	2.3 J	Non-detect	Non-detect
Chrysene	9.3	Non-detect	Non-detect
Dibenzo(a,h) anthracene	1.1 J	Non-detect	Non-detect
Benzo(b&k) fluoranthene	15	Non-detect	Non-detect
Benzo(a)pyrene	8.3	Non-detect	Non-detect
Indo(1,2,3-cd)pyrene	4.6	Non-detect	Non-detect
Dibenzofuran	1.2 J	Non-detect	Non-detect
Fluorene	2.0 J	Non-detect	Non-detect
Phenanthrene	22.0	Non-detect	Non-detect
Fluoranthene	24.0	Non-detect	Non-detect
Benzo(g,h,l)perylene	5.6	Non-detect	Non-detect
Pyrene	32.0	Non-detect	Non-detect

a. Units are in mg/kg.
b. J = Signifies that the analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.

NMED Comment

17. 3-014(o)

a. LANL should submit a process schematic which explains why the westernmost bed of PRS 3-014(o) is suspected to contain the greatest amount of contamination.

b. *LANL should also discuss how sludge was transported from the treatment facility to the drying beds.*
c. *Five constituents from the westernmost bed of 3-014(o) were found in concentrations either above SALs or Region 9 industrial PRGs. In addition, the modified phthalate detection level (from application of the "10 times rule") was unduly elevated. LANL should conduct further characterization of this bed including a human health and ecological risk assessment.*

LANL Response

17a.

LANL recognizes that clarification should be provided to properly describe why the western most bed of PRS 3-014(o) is expected to contain the greatest amount of contamination. All three drying beds of PRS 3-014(o) were equipped with a flow control gate and could be opened separately to control the amount of sludge released into each bed. When the four upper drying beds [PRSs 3-014(k, l, m & n)] reached their maximum capacity, the remaining sludge was piped to the lower drying beds [PRS 3-014(o)]. The western most bed of PRS 3-014(o) was the first on the main overflow pipe and in effect, received the majority of the sludge. As a result, the western most bed would contain the greatest amount of contamination (if present), since it was full more often then the other two drying beds. Refer to the engineering drawing for piping system of drying beds attached at the end of this document.

17b.

Upon entering the wastewater treatment facility, raw sewage is metered, passed through a comminutor (to shred large articles such as rags and other solids), and into the Imhoff tanks where settleable solids are removed. Resulting sludge collected in the bottom of the Imhoff tanks while the wastewater flowed into the processing area of the facility. Sludge collected in the bottom of the Imhoff tanks and was stabilized by anaerobic digestion for several months. When the amount of sludge in the bottom of the tanks reached a certain level, it was siphoned to the upper sludge drying beds, PRSs 3-014(k, l, m, and n) via an underground steel pipe. The underground steel pipe were connected to each of the upper drying beds (in series); control valves controlled the amount of sludge added to each bed. A batch of sludge was siphoned first to the upper four drying beds, with any overflow sludge being pumped to the three lower drying beds via an underground pipe. The western-most lower bed was first on-line and received the majority of the overflow sludge.

17c.

The potential human health effects of COPCs measured at PRS 3-014(o) were evaluated in Appendix C of the TA-3 RFI Report. The methodology used in Appendix C is consistent with the multiple chemical evaluation equation presented in the EPA Region 9 PRG transmittal memo. The PRG calculations presented in Appendix C are better characterized as part of the uncertainty analysis in the human health screening assessment. In future reports, LANL will more clearly indicate that PRG calculations are not risk assessments. However, LANL proposes that such PRG calculations provide useful information for making risk management decisions.

Please refer to the response to question #10 on the apparently elevated phthalate concentrations.

Please refer to LANL's response to Comment #6 for LANL's position on the need for ecological risk evaluations for these PRSs. Per the guidance in place when this report was written, a qualitative human health risk evaluation was appropriate under these circumstances.

NMED Comment

18. 3-049(a)

a. LANL should revise Table 5.5.6-1 to include samples 0103-97-0063, -0064, -0068 & -0091 which, in Table A-19, identify constituents above background and/or SALs.

b. LANL should identify the UTLs for uranium-234, -235 & -238 and their source.

c. LANL should explain why the cyanide results for samples 0103-97-0096 through -0098 were qualified as non-detect even though the concentrations are high.

d. LANL should compare the total chromium analytical results with the total chromium SAL of 210 ppm rather than comparing it to the trivalent chromium SAL.

LANL Response

18a.

Table 5.5.6-1 "Radionuclides With Concentrations Exceeding Background Screening Values at PRS 3-049(a), Sediment Catchment Basins" presents radionuclide data above UTLs, while Table A-19 "Inorganic Data Results for PRS 3-049(a)" presents inorganic data results. All samples with uranium isotopes above the UTL are presented in Table 5.5.6-1in the TA-3 RFI Report.

18b.

The UTLs for uranium isotopes are derived from the total uranium soil UTL (5.45 mg/kg as stated in Longmire et al, 1995, and are also presented in LANL's response to Comment #3). LANL applied the same conversion factors that have been approved to estimate the activity of naturally occurring uranium isotopes in the tuff (or isotopic uranium tuff background values).

18c.

Samples 0103-97-0096 through -0098 are water samples and the detection limits for water samples are different than soil samples. The detection limits for these three water samples did not have any quality problems [refer to Section 4.5.1 "Inorganic Analysis for PRS 3-049(a)"], meet the CRQL for water samples, and are acceptable to indicate that cyanide was not detected in the water.

18d.

Upon review, LANL found that the report data tables do not clearly show that both total chromium and hexavalent chromium data were generated for soil samples at this PRS. Sample 0103-97-0098 is a rinsate sample used for QC purposes. The other water samples represent grab sample of surface water collected at the outfall. The correct units for all of the water samples are ug/L. Table 5.5.4-1 "Summary of Samples Collected at PRS 3-049(a)" does show that both hexavalent and total chromium results were obtained from the soil samples. LANL applied the trivalent chromium SAL to the total chromium results and the hexavalent chromium SAL to the hexavalent chromium results. This approach was viewed to be appropriate, as chromium speciation data were available for this PRS. We also note that all of the hexavalent chromium results were non-detects, at a detection limit of 20 mg/kg.

NMED Comment

19. 3-052(b)

LANL should either present the constituents identified above background and/or SALs in samples 0103-97-0163 through -0177 (Table A-22) in Table 5.6.5-1 or provide rationale why they were not included.

LANL Response

19. LANL has compared the 3-052(b) inorganic chemical data presented in Table A-22 "Inorganic Data Results for PRS 3-052(a)" to the background UTLs used in the TA-3 RFI Report. LANL has presented all constituents greater than background and/or SALs in Table 5.6.5-1 "Inorganic Chemicals with Concentrations Exceeding Background Screening Values at PRS 3-056(k)."

NMED Comment

20. 3-056(k)

a. LANL should either present the detected radionuclides from samples 0103-97-0154, -0173 & -0171 in Table 5.6.9-3 or provide rationale why they were not included.

b. LANL should revise either the units or measure in Table A-27 or Table 5.6.10-1. The same concentrations of the same constituents in the same sample were presented with variance of three orders of magnitude.

LANL Response

20a.

Table 5.6.9-3 "Radionuclides in Asphalt with Concentrations Exceeding Minimum Detectable Activity at PRS 3-056(k)" includes all asphalt samples that were collected at this site; these samples include 0103-97-0151, -0154, -0157, and -0160. Samples 0103-97-1071 and -0173 are not included in Table 5.6.9-3 because they are soil samples and are included in Table 5.6.9-1 "Radionuclides in Soil with Concentrations Exceeding Background Screening Values at PRS 3-056(k)." Refer to page 108 for Table 5.6.9-1.

20b.

Upon review, LANL found that all reported values for sample 0103-97-0153 in Table A-27 "Organic Data Results for PRS 3-056(k)" were presented incorrectly. The values were presented in ppb or ug/kg, and as a result were three orders of magnitude higher than the true values. The following table, Table A-27 (Revised) "Organic Data Results for PRS 3-056(k)," has been revised to show the correct values. LANL apologizes for submitting incorrect values in this RFI report.

TABLE A-27 (REVISED)
ORGANIC DATA RESULTS FOR PRS 3-056(k)

SAMPLE ID	0103-97-0153
ANALYTE NAME	
2-Butanone	0.006 J
Acetone	0.0049 U
Carbon Disulfide	0.004 J
Methylene Chloride	0.0062 U

U = Signifies that the analyte was not positively identified in the sample, and the associated value is the sample-specific EQL/EDL.
J = Signifies that the analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for the analysis.
Units are in mg/kg.

NMED Comment

21. Appendix A

a. The middle table on page A-26 is duplicative of the first table on the page.

b. The last table on page A-26 is mis-titled and should be headed "A-xx" not "2-24."

LANL Response

21a.

LANL concurs that the middle table on page A-26, "Table 2-24: Organic Data Results for PRS 3-052(b)" is duplicative of the previous table, "Table A-23 (continued): Radionuclide Data Results for PRS 3-052(b)." This table should be deleted from text.

21b.

LANL realizes that the heading "A-xx" on the last table of page A-26, is an editorial mistake. This table should read, "Table A-24: Organic Data Results for PRS 3-052(b)."

NMED Comment

22. Appendix B

The sample matrices identified in Appendix B do not directly correlate with the sample matrices identified in the tables within the text ("Summary of Samples Collected at PRS X-XXX").

LANL Response

- LANL agrees that there is some discrepancy between the sample matrix types described in Appendix B and the sampling media in Table 5.4.4-1 "Summary of Samples Collected at PRS 3-021" presented in text. Five samples within Table B-4 "Summary Table of Quality Control Results for PRS 3-021" have incorrect matrix descriptions. Sample ID numbers 0103-97-0243, -0245, -0246, -0250, and -0251 have matrix descriptions of "soil/tuff" and all five of them should be corrected to "tuff."

  In addition, LANL would like to note that "TABLE A-20: Radionuclides Data Results for PRS 3-049(a)," and "TABLE B-6: Summary Table of Quality Control Results for PRS 3-056(k)" have some incorrect sample ID numbers. Table A-20, page A-23, the sample ID number 0103-97-0061D is incorrect and should be Sample ID number 0103-97-0091D. In Table B-6, page B-10, the Sample ID numbers 0103-97-0053 and 0103-97–0064 are both incorrect and should be Sample ID numbers 0103-97-0153 and 0103-97-0164, respectively. Additionally, Table B-6 (Continued), page B-11, is actually a repeat of Table B-6 on page B-10, and should be deleted from text.

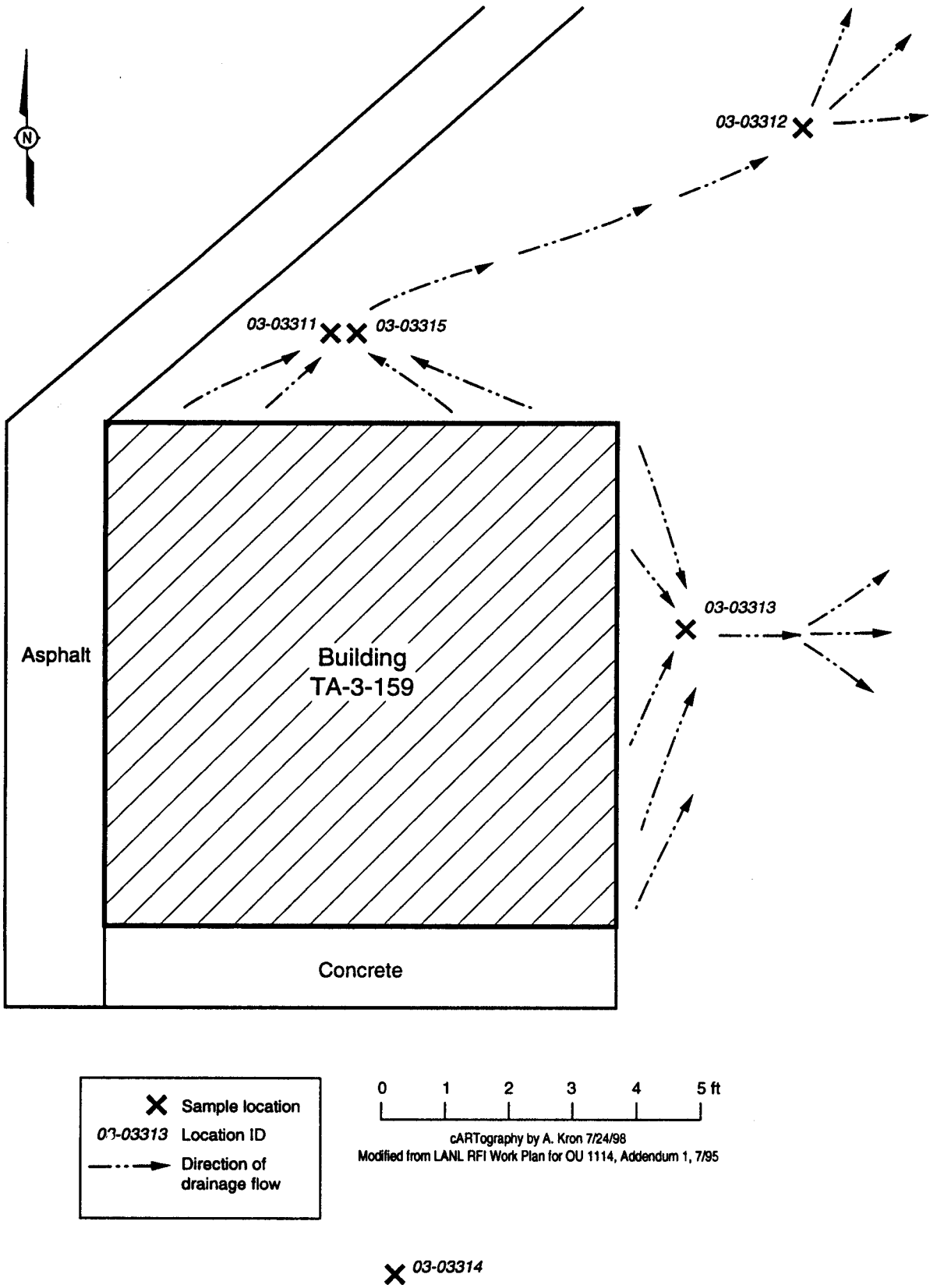
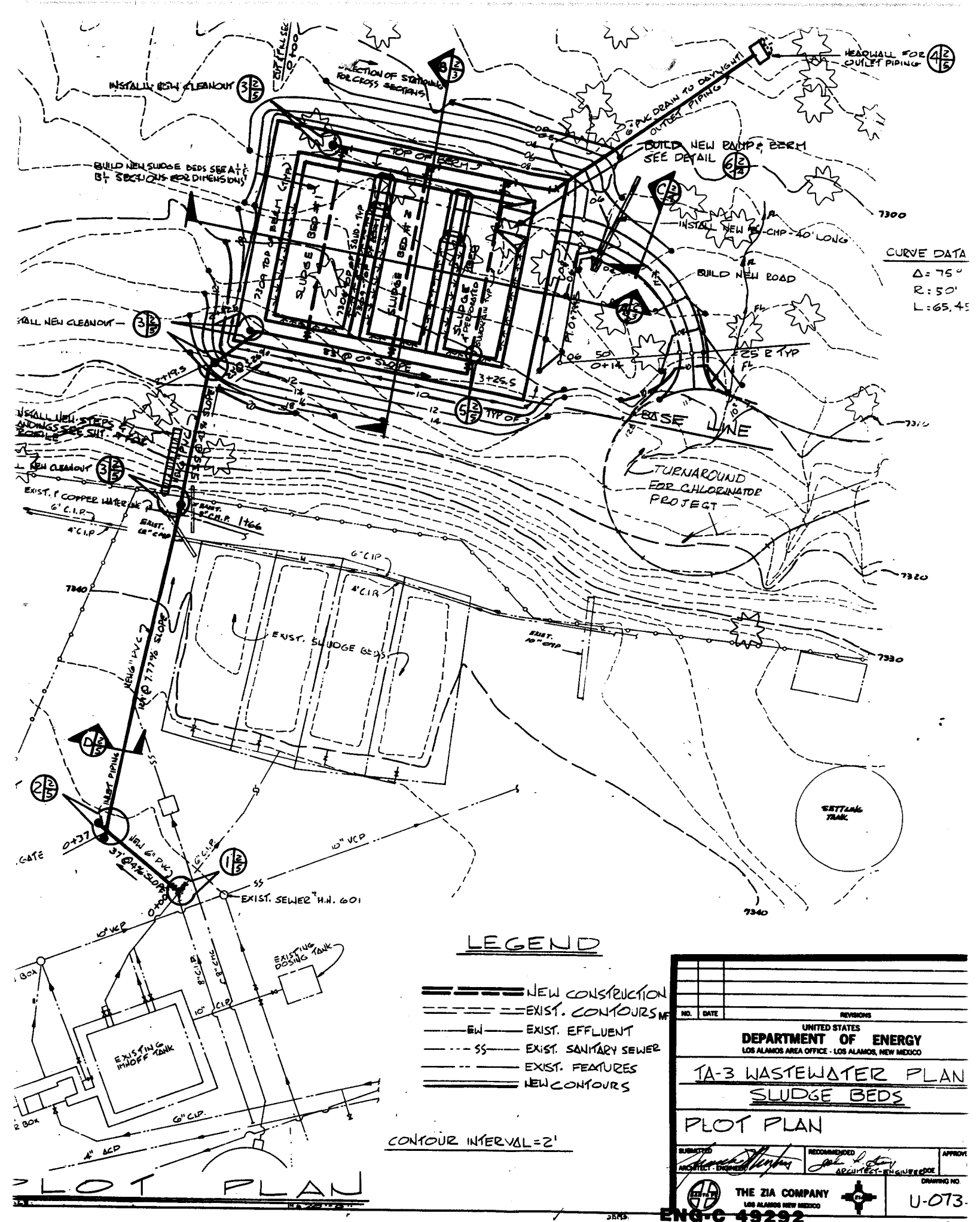


Fig. 5.2.4-1 Locations of samples collected at PRS 3-007.



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