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Date: July 17, 1998
Refer to: EM/ER:98-239

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

SUBJECT: RESPONSE TO REQUEST FOR SUPPLEMENTAL INFORMATION ON THE VCA REPORT FOR TAs-21 and -31 (FORMER OUs 1106 and 1079, 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 Voluntary Corrective Action Report for Technical Areas 21 and 31, Potential Release Sites 21-013(c), 21-013(d), 21-013(e), and 31-001. The RSI was received on June 18, 1998.

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

Sincerely,

Julie A. Canepa, Program Manager
LANL/ER Project

Sincerely,

Theodore J. Taylor, Program Manager
DOE/LAAO

JC/TT/rfr

Enclosure Response to Request for Supplemental Information on the VCA Report for TAs-21 and 31 (Former OUs 1106 and 1079)

Response to Request for Supplemental Information on Voluntary Corrective Action Report for Potential Release Sites 21-013(c), 21-013(d), 21-013(e), and 31-001

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) 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 shall submit all the RFI, VCA and confirmatory sample data with associated quality assurance/quality control data for each PRS. Provide the site map with the location of debris/soil piles at the site. The sample locations, depths, backgrounds, SALs and detection limits should also be included in the data.*

LANL Response

1. All Resource Conservation and Recovery Act (RCRA) facility investigation (RFI), voluntary corrective action (VCA), and confirmatory sample data (with associated quality assurance/quality control data) for each potential release site (PRS) are attached. Sample locations, depths, backgrounds, screening action levels (SALs), and detection limits are included. Site maps with the location of debris/soil piles are included below in the discussions for the appropriate PRSs.

SPECIFIC COMMENTS

PRS 21-013(c), Surface Disposal Area

NMED Comment

1. *Description, p.1. LANL should investigate the purpose of the excavated trench found on the site. Was it used for the disposal of liquid or solid wastes? Samples should have been taken from the bottom of the trench during the RFI and VCA sampling.*

LANL Response

1. The site feature referred to as an excavated trench in the VCA report has been researched further. Historical aerial photographs and site visits with a retired LANL employee who was involved in the early work at Technical Area (TA) 21 make it clear that the feature is a borrow trench at the edge of an area of regraded soil fill. This issue is addressed in the memorandum presented as Attachment 1. A cross section clarifying the feature is given in Figure 1. The west wall of the trench is 6 to 8 ft of fill. The bottom of the trench is exposed tuff bedrock with some thin soils (less than an inch) and sparse vegetation. At the east edge of the trench the terrain rises about 3 ft and is the original ground surface. The trench is about 100 ft long.

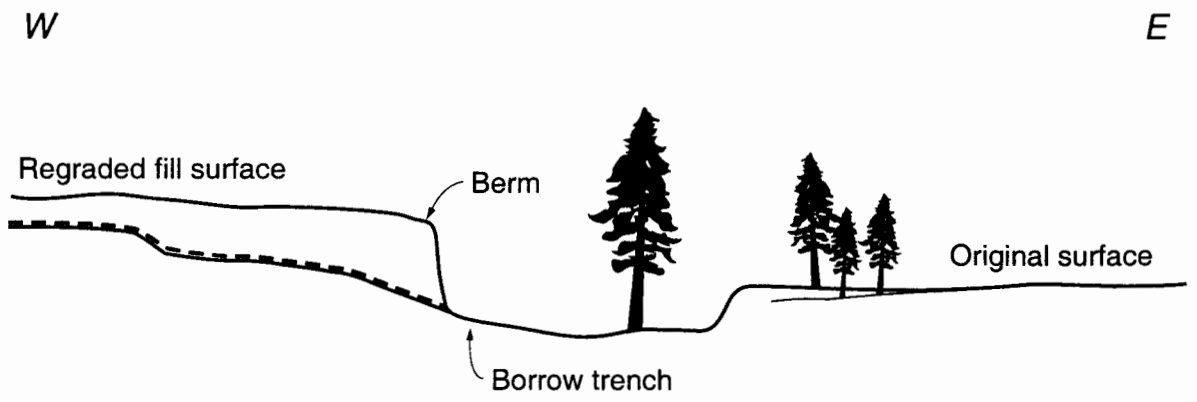

Figure 1. Cross section of east edge of regraded fill.

A review of historical photographs indicates the trench was constructed between 1946 and 1949. The photo record confirms that the trench has existed undisturbed since that time, with no evidence of waste disposal (Attachment 1). The surface debris piles that were defined as PRS 21-013(c) were associated with the soil fill to the west of the trench. Because there was no history of disposal in this area, and there were no debris piles in the trench, it was not included in the RFI investigation, the VCA debris removal activities, or the VCA confirmatory sampling. A copy of the set of aerial photographs is being made and could not be completed in time for the response submittal. The photographs will be provided when they are available (no later than August 15, 1998). Attachment 2 is reserved for the aerial photographs.

NMED Comment

2. *RFI History, p.1. The text states that sampling intervals were to be 0-to-6 in, 0-to-2.5 ft, 2.5-to-5.0 ft and 5.0-to-7.5 ft, clarify whether the samples (except the ones at 0-to-6 in depth) were composited. To determine the nature and extent of contamination LANL shall use discrete samples taken at various depths.*

LANL Response

2. The samples taken at the 0- to 2.5-ft, 2.5- to 5.0-ft, and 5.0- to 7.5-ft depths were not composited. The sampling practice is to use material starting from the deeper end of the core and working up until enough material is taken to fill the required sample containers. For the 2.5-ft intervals used in this investigation, it was typical for nearly all of the cored material to be used in filling a set of containers for a full suite analysis plus field and mobile laboratory screening. Although most of the core interval was consumed in sampling, this represents the smallest discrete sample that could be taken.

NMED Comment

3. *RFI History, p.2. The statement in paragraph 2, "The radiation survey was performed using alpha, beta/gamma, and low energy gamma radiation detection instruments. Detection levels were consistent with the local TA-21 background radiation levels.", contradicts the statement in paragraph 5, "All ten of the 0-to-6 in samples were shipped to an off-site analytical laboratory for a full suite of analyses because of a concern that elevated alpha radiation screening results from the radiation*

survey indicated possible airborne radioactive contamination from the nearby former filter building TA-21-153 that served facilities at DP east." Please explain the discrepancy.

LANL Response

3. The two quotes from Page 2 of the VCA Report do appear to be in conflict. The second sentence of the first quotation could have been more accurately written as follows: Detected radiation levels were consistent with the local TA-21 baseline radiation levels. Surface soils in the central area of TA-21 are known to exhibit radioactivity above LANL site-wide background levels, as documented in the RFI work plan (LANL 1991, 7529, p. 13-18, Paragraph 2) and in reports on the mesa-wide surface soil sampling (LANL 1994, 26073.1, Chapter 2; LANL 1995, 52350.1, Chapter 1 and Table 1.3-1; Ryti 1997, 58239). This has resulted in the development of radioactivity baseline levels for some radionuclides (Ryti 1997, 58239) (to be used in particular areas of TA-21) to distinguish the presence of PRS-specific contamination from the general TA-21 mesa-wide contamination (i.e., local *background*). PRS 21-013(c) falls within two of the areas [Process Area and the Tritium Systems Test Assembly (TSTA) Special Impact Area] for which special baseline surface soil radionuclide comparison values apply (LANL 1994, 26073.1, Map 2). The intent of the first quotation in the comment above is to say that the radiation survey did not identify any areas of PRS 21-013(c) that were elevated above the radiation levels expected to be found in this part of TA-21.

   The submission of additional surface samples for full-suite analysis because of "elevated alpha screening results" is related to the *greater than general LANL background* levels normally expected in parts of TA-21 (in this case, the Process Area and the TSTA Special Impact Area). It was intended to provide more detailed information for comparison to those generally elevated levels. Additional samples were submitted because alpha screening results from the mobile laboratory were not reliable (LANL 1996, 54320.1, p. 2). Although the need for the full suite of analyses is probably more expansive than actually required, this decision provided more sample analysis results than were proposed in the RFI work plan, which called for only 25% of the samples to be sent for off-site analyses (LANL 1996, 54320.1, p. 1).

   The primary source of airborne radioactivity releases, which created the generally elevated surface soil radioactivity conditions near the eastern end of TA-21, was the filter building, TA-21-153, which was decommissioned and removed in 1978. The area this building occupied is a separate PRS [21-020(b)]. The results of the investigation of this PRS were previously reported (LANL 1994, 26073.1, Chapter 4). Airborne releases from operations in TA-21-153 are inseparable from releases from other filter houses and stacks included in PRS 21-019(a–m) and are combined with the mesa-wide surface soil contamination from airborne emissions designated as PRS 21-021.

   As long as the radionuclide concentrations at PRS 21-013(c) are less than the baseline values for the TA-21 Process Area, contamination should not be attributed specifically to PRS 21-013(c). Table 1 gives a summary of the radionuclide data for PRS 21-013(c) and the relevant comparison values. From the table, it is apparent that concentrations of some radionuclides exceed LANL site-wide background levels. However, they are less than the TA-21 Process Area baseline values (Ryti 1997, 58239). Thus, the radionuclide contamination of the surface soils is judged to be associated with general TA-21 contamination levels and not specifically with PRS 21-013(c). (The surface soil radioactivity levels above background will be included in the assessment of the TA-21 mesa-wide PRS 21-021 to determine the appropriate action for the surface soils of the mesa as a whole.)

TABLE 1
PRS 21-013(c) VCA RADIONUCLIDE DATA

	Americium 241	Plutonium 238	Plutonium 239	Strontium 90	Tritium	Uranium (total)
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg
SAL 1996 VCA RPT	17.00	20.0000	18.000	5.90	810	—
SAL CURRRENT	22.00	—	27.000	4.40	260	29
LANL BKGD VCA RPT	—	0.0140	0.052	1.00	—	—
LANL BKGD RYTI 8/97	0.01	0.0230	0.054	1.31	—	5.45
LANL BKGD CURRENT	0.01	0.0230	0.054	1.31	.08*	5.4
Process Area Baseline	0.82	0.4500	15.500	0.77	1.1	10.7

Location ID	Sample ID	Depth (ft)	Americium 241	Plutonium 238	Plutonium 239	Strontium 90	Tritium	Uranium (total)
21-1908	AAB7101	0-0.5	<0.16	0.0042	0.041	0.09	0.06	2.25
21-1908	AAB7102	0-2.5	<0.17	0.0007	0.053	-0.20	0.08	2.14
21-1909	AAB7105	0-0.5	<0.19	0.0036	0.011	-0.13	0.16	1.61
21-1909	AAB7106	0-2.5	<0.16	0.0041	0.055	0.56	0.14	2.13
21-1910	AAB7109	0-0.5	<0.15	0.0198	0.091	0.02	0.00	3.37
21-1910	AAB7110	0-2.5	<0.19	0.0009	0.002	0.09	0.10	1.84
21-1911	AAB7113	0-0.5	<0.15	0.0055	0.024	0.00	0.29	1.88
21-1911	AAB7114	0-2.5	<0.21	0.0003	0.093	0.01	0.23	2.71
21-1912	AAB7117	0-0.5	<0.16	0.0029	0.093	0.03	0.19	2.15
21-1912	AAB7118	0-2.5	<0.21	-0.0002	0.015	0.14	0.10	2.74
21-1913	AAB7121	0-0.5	<0.23	0.0026	0.224	0.22	0.08	2.96
21-1913	AAB7122	0-2.5	<0.15	-0.0002	0.000	-0.09	0.20	4.35
21-1914	AAB7125	0-0.5	<0.18	0.0011	0.005	0.37	0.16	2.56
21-1914	AAB7125	0-0.5	<0.23	—	—	—	—	—
21-1914	AAB7126	0-2.5	<0.16	-0.0009	0.000	0.59	0.17	2.78
21-1915	AAB7129	0-0.5	<0.21	0.0046	0.164	0.34	0.19	2.18
21-1915	AAB7130	0-2.5	<0.15	0.0046	0.007	0.13	0.19	1.98
21-1915	AAB7130	0-2.5	—	0.0020	0.001	—	—	—
21-1916	AAB7133	0-0.5	<0.17	0.0029	0.066	0.09	0.17	1.85
21-1916	AAB7134	0-2.5	<0.23	0.0026	0.01	0.06	0.10	2.12
21-1917	AAB7137	0-0.5	<0.14	0.0095	0.223	0.11	0.15	2.18
21-1917	AAB7138	0-2.5	<0.21	-0.0009	0.013	0.13	0.25	2.28
21-1917	AAC0082	0-0.5	<0.16	-0.0039	0.216	0.09	0.11	2.16
21-1917	AAC0082	0-0.5	<0.22	0.0024	0.211	1.03	0.12	3.68

* Assuming 10% moisture.

NMED Comment

4. *RFI History, p.2. "The assessment of the field and mobile radiation screening results of the deeper samples indicated that there was no significant change in radiation levels from the 0-to-2.5 ft, 2.5-to-5.0 ft, and 5.0-to-7.5 ft intervals", this would be applicable to radiochemicals but not be applicable to the non-radioactive chemicals, which might not be co-distributed with the radio-chemicals. Was any investigation done to assess the distribution of non-radioactive chemicals at different depths?*

LANL Response

4. In addition to radioactivity field screening, samples from all depths from PRS 21-013(c) were field screened for volatile organic compounds, with no indication of their presence. No field screening was done for other nonradioactive chemicals.

   The sampling plan called for selection of samples for laboratory analysis to be biased based on field screening (LANL 1991 Chapter 14 pg. 14-72), but no indications for biasing were found. A total of 20 samples was submitted for analysis for nonradioactive chemicals, i.e., metals and volatile and semivolatile organic compounds. For the 0 to 6-in. and the 0 to 2.5-ft interval all 10 samples collected in each interval were analyzed. For the 2.5 to 5-ft and the 5 to 7.5-ft intervals, no samples were submitted for analysis. The rationale for selecting only the upper intervals was to bias the analyses to the surface materials, where evidence of releases would most likely be detected. Only the upper intervals contained soil materials. In all sample locations, the deeper intervals (2.5 to 5 ft and 5 to 7.5 ft) were composed of tuff bedrock.

   In the evaluation of the mesa-wide surface sample results for TA-21 (which delineated the localized areas of elevated radioactivity discussed in Response 3), nonradioactive chemicals were also assessed, and none were identified as being systematically elevated in any area of the mesa (LANL 1994, 26073.1, Chapter 2; LANL 1995, 52350.1, Chapter 1 and Table 1.3-1; Ryti 1997, 58239). Thus, the appropriate basis for comparison of nonradioactive chemicals is the LANL site-wide background data set. The evaluation of the results was presented in the VCA report (LANL 1996,54320.1, p. 3 and Appendix A) and found to be consistent with site-wide background levels.

   To clarify the nature of the area of this PRS and the nature of the scattered debris addressed in the VCA, some before and after photographs are provided in Attachment 3. Figure 2, which shows the area, the parts of the area investigated, and the parts excavated, is reproduced here from the VCA report. The photographs give a sense of the nature of the scattered debris. It is re-emphasized that this was considered to be a housekeeping VCA, which was driven by construction debris and not by the presence of contaminants. Annexes 1 and 2 in this report contain the field and analytical data related to the RFI and VCA activities at PRS 21-013(c).

PRS 21-013(d), Surface Disposal Area

NMED Comment

1. *Description p.11. Provide explanation for the term "cold dump" and what was the nature of material scraped and removed from it prior to the VCA. LANL shall determine the nature of the constituents of the "cold dump" material (e.g. whether RCRA regulated constituents, radiochemicals, etc.), and analyze for those contaminants in the confirmatory samples.*

LANL Response

1. Additional research has been done concerning the designation *cold dump*. A memorandum has been prepared by a retired LANL employee involved with the cold dump describing the use of the site (Attachment 4). The material removed from the area before the VCA occurred was construction debris, as described in the memorandum. Based on this new documentation, it is concluded that no hazardous chemicals or radioactive materials were disposed of or should be expected at PRS 21-013(d), the cold dump. This information conflicts with the description presented in the work plan

(LANL 1991, 7529, p. 14-65). However, this latest information is considered authoritative and should override the concerns stated in the work plan.

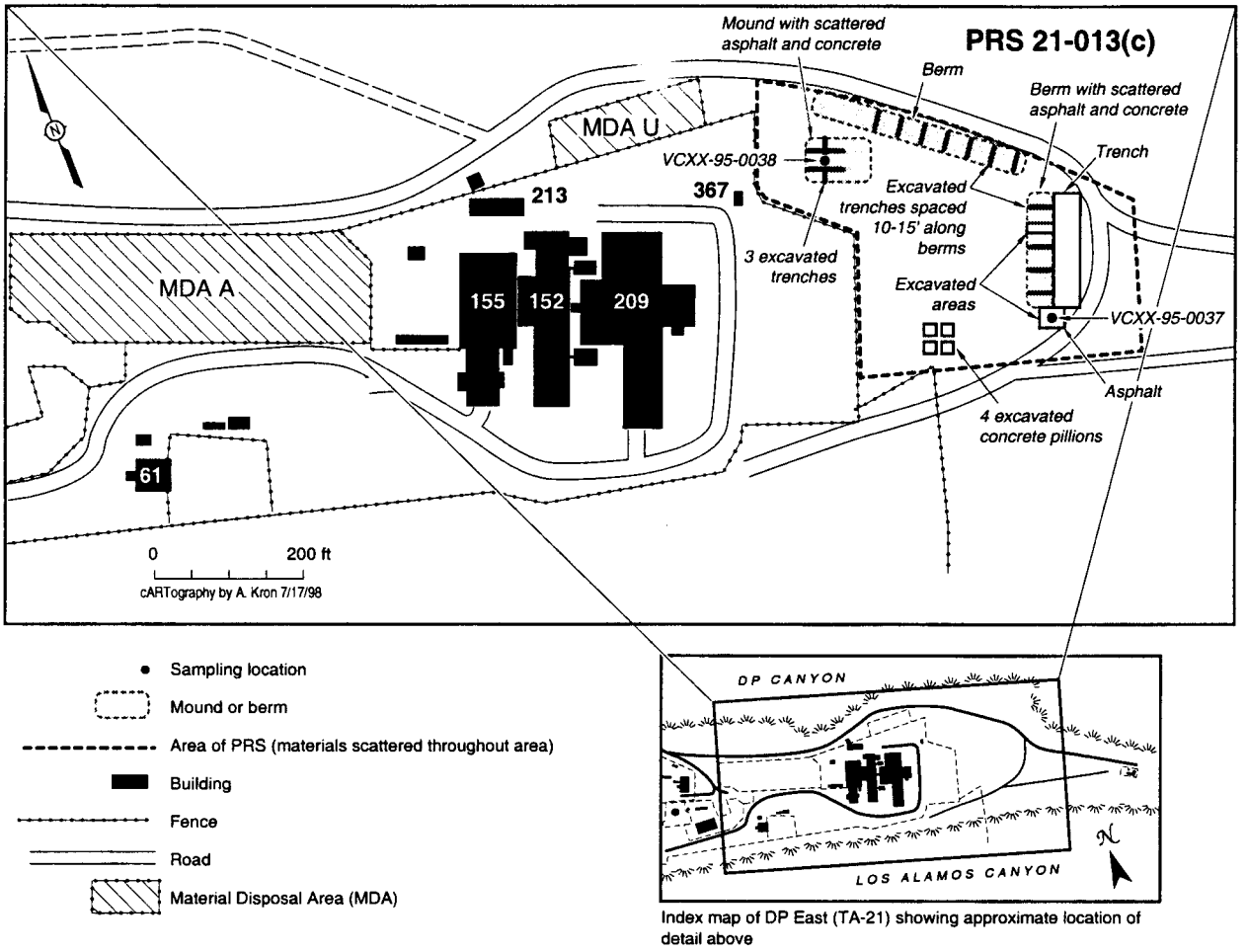

Figure 2. Excavation and confirmatory sampling locations for PRS 21-013(c).

NMED Comment

2. *RFI History, p.11. If the samples taken at 0-to-2.5 ft, 2.5-to-5.0 ft and 5.0-to-7.5 ft were composited, then LANL shall resample these locations and take discrete samples at different depths to characterize the nature and extent of contamination.*

LANL Response

2. The samples taken at the 0- to 2.5-ft, 2.5- to 5.0-ft, and 5.0- to 7.5-ft depths were not composited. The sampling practice is to use material starting from the deeper end of the core and work up the core until enough material is taken to fill the required sample containers. For the 2.5-ft intervals used in this investigation, it was typical for nearly all of the cored material to be used in filling a set of containers for a full suite analysis plus field and mobile laboratory screening. Although most of the core interval was consumed in sampling, this represents the smallest discrete sample that could be taken.

NMED Comment

3. *RFI History, p.12. LANL states that due to the location of PRS 21-013(d) and PRS 21-013(e), the sampling plan was combined and redrawn for the two PRSs and a new grid with 26 sections was laid out. Out of the 26 grid sections only 18 were sampled. Provide the selection criteria used for these 18 sample locations.*

LANL Response

3. The 26 grid sections covered the area where scattered debris was found. Only five discrete piles of debris existed; most of the area contained only scattered items of debris such as pieces of concrete or asphalt pavement, lumber, cans, paper, and plastic trash. Nothing indicating the disposal of chemical wastes was present. The general signature for contaminated materials at TA-21 is the presence of radioactivity, and the RFI work plan was prepared on the premise that radioactivity would be used as a flag for the presence of contamination. By the time the RFI investigations were completed and the VCA activities were planned, the time on site had made it clear that these areas were compoed only of uncontaminated construction debris.

   Radiation surveys and site walkovers identified no indications of radioactive materials or the disposal of chemical wastes. No stained soils, abandoned drums, or other suspicious containers were found. In the location of the cold dump, the area had clearly been scraped, and no evidence of any disposal trenches was present. The work plan called for 18 sections to be sampled, and there was no indication of the need for any additional sampling; therefore, completing the characterization work on 18 of the 26 grid sections was considered to be sufficient. The 18 sections sampled were those in which the major debris piles were found. In the absence of any indications for biasing the sampling, placement of the locations according to a grid, as approved in the work plan, was maintained.

NMED Comment

4. *RFI History, p.12. LANL states that "The additional eight grid sections would only be sampled if radiation survey results indicated the presence of contamination." According to the work plan the site was used for disposal of non-radioactive chemicals and/or materials; therefore, the radiation survey would not identify the presence of these chemicals. Additionally, any localized spills or discarded chemicals would not be detected.*

LANL Response

4. The additional information on the nature of the cold dump described above and in Attachment 4 should alleviate concern that the site was used for disposal of nonradioactive chemicals. The walkover surveys included observation of the presence of debris or stained earth as additional indicators of areas to be addressed. Nothing indicating disposal of chemical waste was present, i.e., no stained soil, abandoned drums, or other suspicious containers were found.

NMED Comment

5. *RFI History, p.13. Provide explanation for deviating from the work plan and not doing the field survey for organic vapors when historical information indicated that non-radioactive chemicals were disposed off (sic) at the site. The approval to drop the survey was not obtained from the Administrative Authority. Additionally, LANL states that " Elevated organic vapor readings noted during sample*

collection were attributed to organic matter that was encountered during the drilling." Provide rationale for this statement when field survey for organic vapors was not done. Describe what type of organic matter was found and at what concentrations.

LANL Response

5. The field survey (a walkover survey) for organic vapors was not conducted because it was judged by field measurement specialists to be inappropriate and was expected to be ineffective for two reasons. First, it was believed that the presence of residual volatile organic compounds in surface soils would be unlikely after many years of exposure to the environment, making the usefulness of the survey very limited. Second, it was judged that hand-held volatile organic vapor field monitoring instruments would not be capable of detecting small organic vapor releases from the ground because of atmospheric dilution. Instead, the investigation relied on field screening of core samples during sample collection activities and field laboratory measurement of organic vapors, using a headspace measurement method, on collected samples. The results of field screening were recorded on sample collection logs; the laboratory measurements were reported by the mobile laboratory usually within 24 hours of sample collection. It is correct that no approval for dropping the surface survey for organic vapors was obtained from the Administrative Authority. In accordance with the protocol of the time, the deviation from the work plan was documented in the report on the activity, i.e., the VCA report (LANL 1996, 54320.1, p. 13).

   The statement, "Elevated organic vapor readings noted during sample collection," refers to the field screening of core samples as the core barrel was opened. This is a standard health and safety practice intended to identify to field personnel the presence of volatile organic compounds.

   For the 27 core intervals screened in relation to PRS 21-013(d) (9 coring locations with 3 sample intervals at each location, 0–2.5 ft, 2.5–5 ft, and 5–7.5 ft), there was only 1 sample for which an organic vapor screening result above instrument background was reported. This was in the 0–2.5 ft sample (AAB-7174) at location 21-1926. The field organic vapor analyzer measurement result was 9.6 ppm; background on the instrument is typically 0.0 ppm. A note on the sample collection log states, "0-9.6 ppm on core when core is broken at a layer that is filled with clay and roots." The sample submitted to the mobile laboratory for headspace VOC analysis showed no detected VOCs. No sample was submitted for fixed laboratory VOC analysis. The field sample collection logs, field screening results, and other data related to the RFI at PRS 21-013(d) are provided in Annex 3 to this document. The identified organic matter was tree roots. This location is in a mixed pine and oak forest. The soil surface is largely covered with forest floor detritus. The elevated organic vapor readings noted during sample collection are attributed to volatiles associated with pine tree roots.

NMED Comment

6. *RFI History, p.13. LANL states that "RFI data was collected prior to remediation, and did not include the areas beneath the waste piles (the focus of the VCA effort)." The areas underneath the waste piles should be investigated. Also provide a figure showing the location of waste piles at the site.*

LANL Response

6. Although the RFI characterization data did not address the areas beneath debris piles, the VCA confirmation samples were taken from areas that had been beneath debris piles. The results of these analyses were described in the VCA report (LANL 1996, 54320.1). Figure 3 identifies the areas where debris piles were excavated and where confirmation samples were taken. This same figure

appeared in the VCA report, with the exception that the dots indicating the locations for the confirmation sampling were corrected to show them falling inside the footprint of the removed debris piles. It is unclear why they had originally been shown outside the debris pile excavation areas, but it has been confirmed that they were within those areas. The number of asphalt-containing debris pile excavation areas shown on the figure is correct; only two were present and removed. The remaining materials collected for disposal were scattered individual pieces of debris.

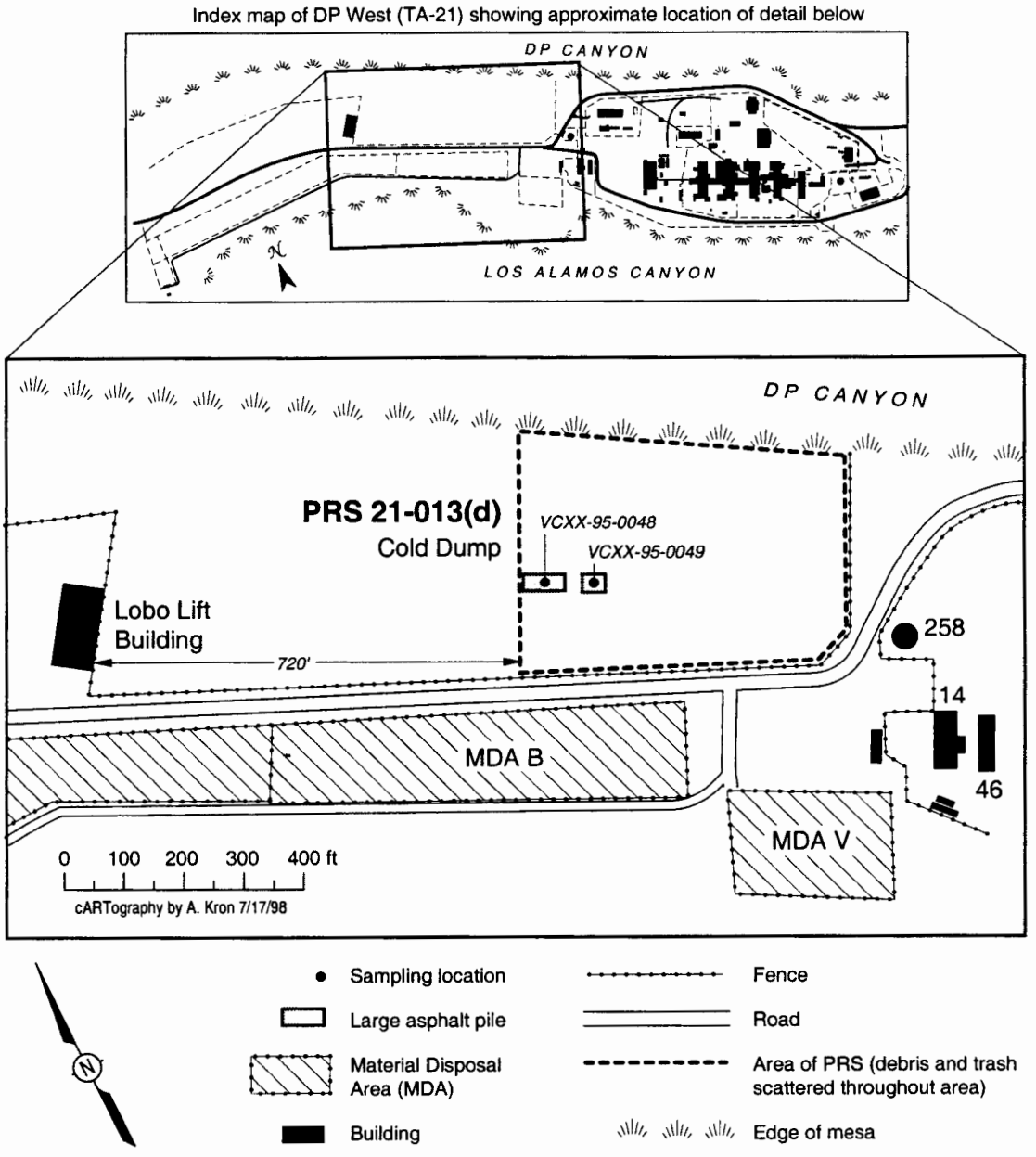

Figure 3. Excavation and confirmatory sampling locations of PRS 21-013(d), cold dump.

In addition to the confirmation samples collected from the soil where the debris piles had been removed, samples for waste characterization analysis were also taken of the debris materials. These

data have been included in the data package prepared as Annex 4 to this report, which contains all the data for the VCA activities at PRS 21-013(d)

NMED Comment

7. *Corrective Action, p.13. Specify what agency approved the VCA plan for PRS 21-013(e), on basis of which VCA plan for PRS 21-013(d) was prepared.*

LANL Response

7. The US Department of Energy, Los Alamos Area Office, approved the VCA plans for PRSs 21-013(d and e). Under protocol of that time period, VCA plans were not submitted for approval to the Environmental Protection Agency or NMED. Attachment 5 provides a copy of the approval memorandum.

NMED Comment

8. *Corrective Action, p.13. Provide all field screening results to support the statement "Field Screening did not indicate the presence of radioactivity or volatile organic vapors above background levels." Include the detection limits of instruments and backgrounds used for each chemical.*

LANL Response

8. Annex 4 contains copies of field records for field screening during the VCA activities. Annex 3 contains comparable information for the RFI activities.

   Field radiation monitoring instruments were Ludlum Model 2221 with Ludlum Model 44-9 Beta detector and Ludlum Model 2221 with Eberline Scintillation Probe Assembly. Documentation of a field RAD walkover survey is attached in Annex 4.4. These instruments were used in a qualitative manner to detect readings greater than background; therefore, the detection limit was not included in the survey.

   The field screening for volatile organic chemicals was conducted for worker health and safety during confirmation sampling. Photoionization detector measurements of 0.4 ppm were observed for samples VCXX-95-0048 and VCXX-95-0049. Results from field VOC measurements were not used in decision making for the VCA. Analytical results from the fixed laboratory for the confirmation samples are in Annex 4.

NMED Comment

9. *Table 2, p.18. Provide rationale for collecting confirmatory samples for this particular PRS at the depth of 0-to-3 in when 0-to-6 in has been used in the past. This was not specified in the work plan. Are the samples 0-to-3 in from where the soil was removed?*

LANL Response

9. Sample collection logs for the VCA confirmatory samples at PRS 21-013(d) were reviewed. The samples were taken from the areas where debris piles had been removed. The sample was constrained to approximately 3 in. because of the limited depth of soil present at these locations. Copies of the logs are provided in Annex 4.

NMED Comment

10. Table 2, p.18, 19. Two analytes Benzo(a)pyrene and Dibenzo(a,h)anthracene are above their respective PRGs in sample # VCXX-95-0049, but the text (p.14) states that "Evaluation of the confirmatory analytical data confirmed that there was no detectable residual contamination above PRGs present at the site." Please explain.

LANL Response

10. The detection limit achieved for sample VCXX-95-0049 for benzo(a)pyrene and dibenzo(a,h)anthracene (3.5 mg/kg) was above the preliminary remediation goal (PRG) for these analytes (0.784 mg/kg for both analytes). However, neither compound was detected in this sample; thus no detected contamination was found above the PRGs. Additionally, benzo(a)pyrene and dibenzo(a,h)anthracene are chemicals of the class of polychlorinated aromatic hydrocarbons (PAHs). PAHs are found in conjunction with other PAHs, as they are all produced by the same process, incomplete combustion of fuel. Other PAHs, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, and fluorene, that were analyzed for were not detected in sample VCXX-95-0049. Finally, no PAHs were detected in the other surface sample less than 100 feet away (sample VCAXX-95-0048).

PRS 21-013(e), Surface Disposal Area

NMED Comment

1. RFI History, p.22. If the samples taken at 0-to-2.5 ft, 2.5-to-5.0 ft and 5.0-to-7.5 ft were composited, then LANL shall resample these locations and take discrete samples at different depths to characterize the nature and extent of contamination.

LANL Response

1. The samples taken at the 0- to 2.5-ft, 2.5- to 5.0-ft, and 5.0- to 7.5-ft depths were not composited. The sampling practice is to use material starting from the deeper end of the core and work up the core until enough material is taken to fill the required sample containers. For the 2.5-ft intervals used in this investigation, it was typical for nearly all of the cored material to be used in filling a set of containers for a full suite analysis plus field and mobile laboratory screening. Although most of the core interval was consumed in sampling, this represents the smallest discrete sample that could be taken.

NMED Comment

2. RFI History, p.23. The report states that debris piles were scattered in the site. Were these piles sampled and included in the 18 grid sections investigated? The debris piles have the potential of containing contaminated waste and should be investigated. The area beneath the waste piles should also be investigated. Provide a site map with locations and outlines of debris piles.

LANL Response

2. The debris piles were not sampled individually as part of the RFI characterization but were contained within the 26 grid sections investigated. Of the 26 grid sections, 18 were sampled, as described in our response to Comment 3 on PRS 21-013(d). There were three discrete debris piles labeled as asphalt piles in Figure 4 and a wooden ramp in the area designated as PRS 21-013(e). The remaining debris picked up for disposal consisted of scattered individual items, such as pieces of concrete or asphalt pavement, lumber, cans, paper, and plastic trash. Figure 4 is the same figure that appeared in the VCA report, with the exception that the dots indicating the locations for the confirmation sampling were corrected to show them falling inside the footprint of the removed debris piles. It is unclear why they had originally been shown outside the debris pile excavation areas, but it has been confirmed that they were within the footprint of those areas. The number of debris pile excavation areas shown on the figure is correct; only three (plus the wooden ramp) were present and removed. The VCA confirmation samples were taken from the areas beneath debris piles.

   In addition to the confirmation samples collected from the soil where the debris piles had been removed, samples for waste characterization analysis were also taken of the debris materials. Annex 5 provides all RFI data for PRS 21-013(e), and Annex 6 contains all the data for the VCA activities at PRS 21-013(e), including the waste characterization samples of the debris materials.

NMED Comment

3. *RFI History, p.24. Thorium-228 exceeded its SAL, but according to the report the sample value is considered to fall within background levels. LANL shall use Alpha spectroscopy to detect the presence of thorium-228 instead of gamma spectroscopy which would reduce the large uncertainty associated with results.*

LANL Response

3. Gamma spectrometry is not an appropriate method for determination of environmental levels of thorium-228 because the detection limit is insufficient to resolve background levels or the SAL. Radiochemical separation and alpha spectrometry is the appropriate method when the presence of thorium-232 and its decay series (including thorium-228) are suspected.

   There is no reason to suspect the elevated presence of this naturally occurring decay series at this (or any other) site. Typically the thorium-232 decay series (Kocher 1981, 58238) occurs naturally in the range of 1 to 2 pCi/g. There are other radionuclides in the decay series that can be measured by gamma spectrometry in this range, and two of them are also reported in the gamma spectrometry results for the sample for which thorium-228 was reported (AAB-7226 at location 21-1939 at 0-2.5 ft). Lead-212 was reported at 1.6 pCi/g. Thallium-208 was reported at 0.6 pCi/g, which corresponds to 1.7 pCi/g of lead-212 when corrected for branching of the decay series. The best estimate for the thorium-228 concentration is thus in the range of 1.6 or 1.7 pCi/g, which is an appropriate background level. This estimate, based on the physics of the decay series equilibrium, is better than the gamma spectrometry measurement result for thorium-228. (It should be noted that the SAL of 1.5 pCi/g is within the typical background range for this decay series.)

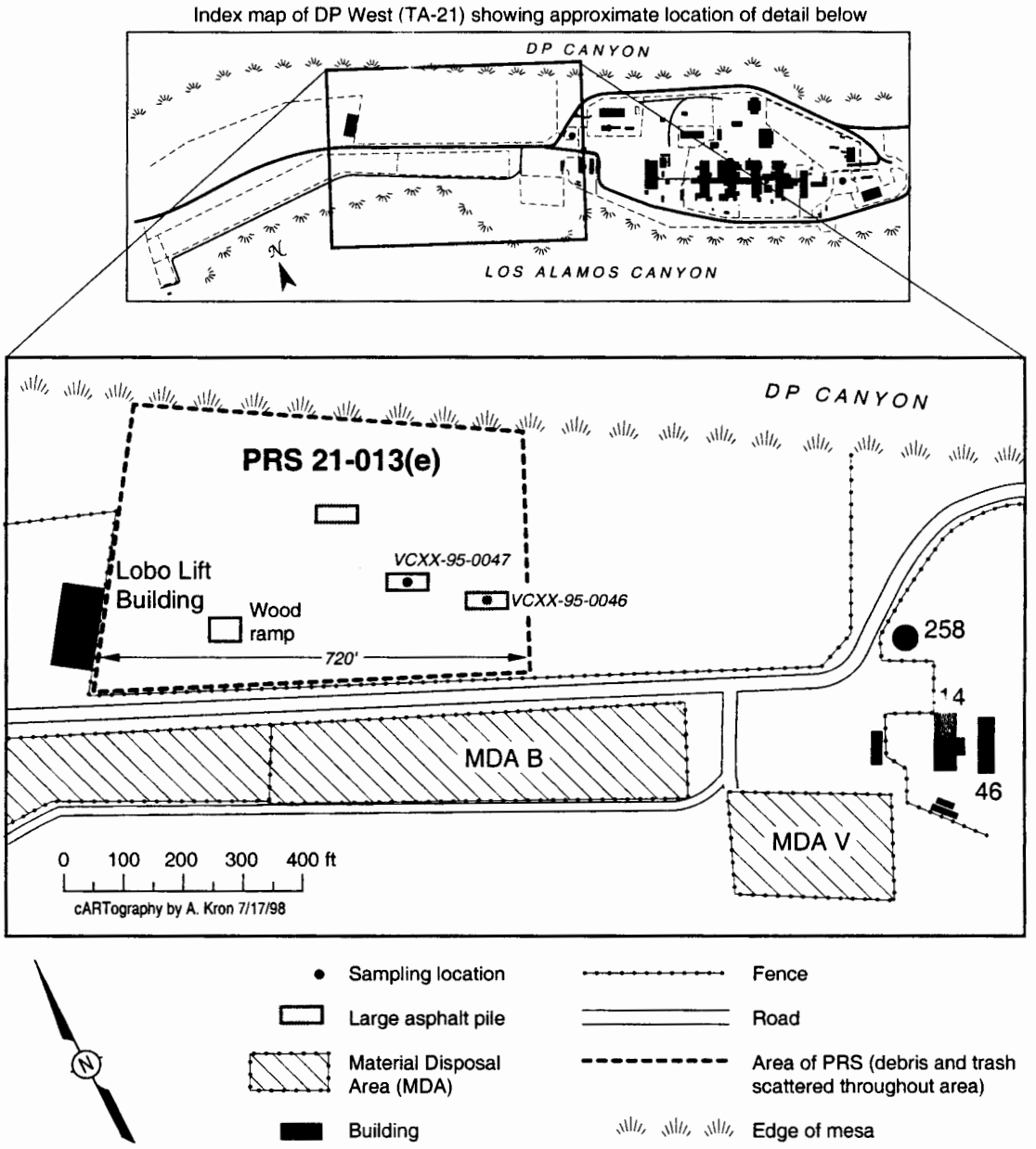

Figure 4. Excavation and confirmatory sampling locations of PRS 21-013(e).

PRS 31-001, Septic System Outfall

NMED Comment

1. *LANL shall delineate the contamination under the former septic system and in the outfall area to the point where the canyon's investigation begins.*

LANL Response

1. LANL will delineate the contamination under the former septic system and in the outfall area to the point where the canyons investigation begins. LANL anticipates that a sampling and analysis plan will be submitted to NMED in September 2000 to address the additional field work.

NMED Comment

2. *VCA Report, Corrective Action, p.33. Please submit all previously-obtained site characterization data including RFI and VCA field screening results for RCRA regulated chemicals.*

LANL Response

2. Annex 7 includes all previously obtained RFI site characterization data. The RFI report is dated May 5, 1995 (LANL 1995, 58085.1). Annex 8 includes all VCA field screening results for RCRA-regulated chemicals.

NMED Comment

3. *Response to Comments regarding Response to Additional Information Request, PRS 31-001, Nov. 14,1997;EM/ER:97-481, p. 1&2. The RFI report (p.1) states "It is not documented which chemicals were received and stored at TA-31... but an undocumented spill may have released chemicals into the septic system". In the response letter LANL states that "These PAHs were not retained as COPC because there was no evidence that they were produced by Laboratory operations at the site." Clarify the discrepancy in these statements.*

   The nature and extent of contamination for polycyclic aromatic hydrocarbons (PAHs) has not been defined. LANL states that "PAHs were most likely removed during excavation." This statement is not supported by any data since confirmatory samples were not analyzed for PAHs. Additionally, PAHs were found above their SAL values in sample # AAA4679. LANL's argument that since this sample was located 6.8 ft below ground surface, there would be no exposure pathways to the recreational user, and is not valid since no other samples were taken (e.g. at surface and different depths) to determine the lateral and vertical extent of contamination. LANL shall do additional sampling to define the extent of contamination under the former septic system line and shall perform confirmatory sampling for PAHs detected during the RFI.

LANL Response

3. The statement, "It is not documented which chemicals were received and stored at TA-31...but an undocumented spill may have released chemicals into the septic system" was made in a paragraph of the RFI report discussing the history of PRS 31-001. It is a rephrasing of a statement from the May 1992 work plan (LANL 1192, 7668.1, p. 3-67), which read "There is no documentation of accidental spills having occurred at building TA-31-7, but it is possible that any chemicals stored in the warehouse may have entered the septic system." This is a preinvestigation statement speculating on what might have happened in the past at a site.

   The statement, "These PAHs were not retained as COPCs because there was no evidence that they were produced by Laboratory operations at the site" was made approximately 5 years after the first statement. In the intervening 5 years, it became evident through sampling and analysis of soil at

different sites that the chemicals including the PAH class of chemicals were being detected at many locations across LANL. Research into the origin of PAHs indicated that common sources are incomplete combustion of wood, fuel, and crude oil. PAHs are produced by forest fires, wood-burning stoves, and motor vehicles, as well as runoff from asphalt parking lots. PAHs are not chemicals that would be warehoused, such as at the TA-31 supply warehouse. Because Los Alamos has been subjected to the smoke from fires in the surrounding forest, wood-burning stoves, and motor vehicle exhaust, and there was an asphalt parking lot at TA 31-001, the PAHs detected were attributed to these sources and not the PRS 31-001 septic system.

In response to the statement, "The nature and extent of contamination of polycyclic aromatic hydrocarbons (PAHs) has not been defined," LANL concurs, as PAHs are ubiquitous in an urban setting.

In response to the statement, "LANL states that 'PAHs were most likely removed during excavation.' This statement is not supported by any data since confirmatory samples were not analyzed for PAHs." This statement reflected the fact that all the soil was removed from the outfall and only rock remained.

LANL will do additional sampling (in conjunction with sampling proposed in the Comment 1 response) to define the extent of contamination under the former septic system line and will perform confirmatory sampling for PAHs detected during the RFI.

NMED Comment

4. *RFI Report, Background Comparison, p.15. Please provide a copy of the study on which urban background for PAH were based for this site.*

LANL Response

4. The report, "Background Levels of Polycyclic Aromatic Hydrocarbons (PAH) in Urban Soils" by L.N.J. Bradley is provided in Attachment 6.

NMED Comment

5. *RFI Report, Screening Action Levels Comparison, p.29 and Figure 4, p.14. Lead should not have been eliminated based on an average value but retained as a COPC based on the maximum value reported (e.g. 460 mg/kg) as shown in Fig. 4. Since lead was found to be below background values in the confirmatory samples, this issue does not need any further consideration. However, lead and mercury detected in samples underneath the former septic tank and line should be considered in risk evaluation.*

LANL Response

5. Lead and mercury values detected in samples underneath the former septic tank and line will be considered in any future risk evaluation of these areas. This risk evaluation will be conducted based on the HRMB-approved risk-based decision tree.

NMED Comment

6. *RFI Report, Screening Action Levels Comparison, p.29. LANL shall investigate the vertical and lateral extent of tetrachloroethylene (PCE) contamination found under the former septic system line and delineate the contamination. The presence of degradation products of PCE should also be investigated.*

LANL Response

6. LANL will investigate and delineate the vertical and lateral extent of tetrachloroethylene (PCE) found at TA-31 in conjunction with the proposed sampling in the Comment 1 response. The presence of degradation products will also be investigated.

NMED Comment

7. *Human health and ecological risk evaluation for all contaminants shall be performed based on HRMB approved Risk Based Decision Tree.*

LANL Response

7. Future human health and ecological risk evaluations will be performed based on HRMB-approved risk-based decision tree.

References

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LANL (Los Alamos National Laboratory), February 26, 1996. "Voluntary Corrective Action Completion Report for Potential Release Sites 21-013(c), 21-013(d), 21-013(e), 31-001," Los Alamos National Laboratory report LA-UR-96-259, Los Alamos, New Mexico. (LANL 1996, ER ID 54320.1)

Ryti, R., August 19, 1997. "Technical Position Paper on Use of TA-21 Process Area Baseline Data for RFI Reports," Los Alamos National Laboratory report LA-UR-97-3393, Los Alamos. New Mexico. Ryti 1997, ER ID 58239)