Department of Energy
Albuquerque Operations
Los Alamos Area Office
Los Alamos, New Mexico 87544

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MAY 2 1988

Mr. Michael Burkhart, Director
New Mexico Environmental Improvement Division
P. O. Box 968
Santa Fe, New Mexico 87504-0968

2326 Reports

Dear Mr. Burkhart:

Enclosed for your information is a copy of the Environmental Survey Preliminary Report for Los Alamos National Laboratory, Los Alamos, New Mexico, conducted by the U. S. Department of Energy's Environment, Safety and Health Office of Environmental Audit. Also included are the technical comments for this report developed by reviewers at DOE/Albuquerque Operations Office and Los Alamos National Laboratory. The final report will be provided to your office after the environmental sampling results are obtained, reviewed, and incorporated.

Because of the complexity and detail found in these reports, I would like to suggest that after your staff has had time to review them, we meet with you and discuss any questions you may have. Should there be any questions concerning the above, please call Donna Lacombe (667-5288).

Sincerely,

Harold E. Valencia
Area Manager

2 Enclosures

cc w/enclosures:
Mr. Jim Highland, EPA, Dallas, TX

cc w/o enclosures:
John Themelis, EHD, AL
John Puckett, LANL, MS K491

LTP:JAP:0152

Jim Phoenix will send two additional copies for our regional review. Per 5/12/88 telecon.

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U.S. Department of Energy

Environment, Safety and Health
Office of Environmental Audit

Environmental Survey
Preliminary Report

Los Alamos National Laboratory
Los Alamos, New Mexico

January 1988

1.0 INTRODUCTION

The Environmental Survey is a one-time baseline inventory of existing environmental problems and environmental risks at U.S. Department of Energy (DOE) operating facilities. It will be conducted in accordance with the principles and procedures contained in the Draft DOE Environmental Survey Manual distributed on May 16, 1986.

The Environmental Survey is an internal management tool to aid the Secretary in identifying current and potential environmental problems in all of DOE's facilities and in prioritizing these problems for appropriate corrective actions.

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2.0 SURVEY IMPLEMENTATION

The Environmental Survey will be managed by the Team Leader, Richard Aiken, and the Assistant Team Leaders, Joseph Boda and Kenneth Farber. George Laskar will serve as the Albuquerque Operations Office representative on the Environmental Survey team. Technical support will be provided by the following NUS Corporation personnel:

Peter Alexandro	NUS Coordinator/RCRA and Radioactive Waste
Patrick Byrne	QA/TSCA
Andrew McClure	Surface Water
William Joyce	Radiation
Roger Andes	Air
Jennifer Clay	CERCLA
Kurt Sichelstiel	CERCLA
William Murray	Hydrogeology
Joseph English	Solid Waste Management/Underground Tanks

2.1 Pre-Survey Activities

Members of the Survey team began reviewing Los Alamos National Laboratory (LANL) environmental documentation available at the DOE Office of Environmental Audit in January 1987. From that review, a memorandum dated January 9, 1987, was sent to the Albuquerque Operations Office requesting additional information. Messrs. Aiken and Boda (DOE), Alexandro, Joyce, and Ms. Clay (NUS), and Mr. Crocket (Idaho National Engineering Laboratory), conducted a pre-Survey site visit on February 10-13, 1987, to become familiar with the site, to identify any potential environmental problems, and to coordinate plans for the upcoming Survey with DOE/LAAO and University of California personnel. During the pre-Survey visit, the team met with representatives of DOE/LAAO, University of California, Pan Am World Services, and officials of the U.S. Environmental Protection Agency (EPA) and state regulatory agencies. In addition, the team toured the facility and gathered documents assembled by site personnel in response to the information request memorandum. The bulk of the information being supplied in response to the January 9 memorandum was assembled by the University of California in Los Alamos

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National Laboratory. Additional information was requested and received from LAAO and University of California during the pre-Survey visit based on the review of the data sent by Los Alamos. This Survey plan is based on the information received by the Survey team as of the middle of March 1987.

2.2 On-Site Activities and Reports

The Environmental Survey of the LANL will be conducted from March 30 through April 17, 1987. The Survey will include the facilities operated by the University of California and Pan Am World Services located on the LANL site. The Agenda for this Survey can be found in Table B-1. Modifications to this agenda will be made during the conduct of the Survey. All modifications will be coordinated with the site officials designated as Survey contacts. The on-site activities of the Survey team will consist of interviews and consultations with, among others, environmental, safety, operations, waste management, purchasing, and warehousing personnel; a review of files and documents unavailable prior to the on-site portion of the Survey; and process-specific and area-specific tours of the facility.

A closeout briefing will be conducted on Friday, April 17, to describe observations and initial findings of the on-site activities. A Preliminary Report of the Survey will be prepared within 4 months from the conclusion of the Survey. Subsequently, an Interim Report will be prepared by the Survey team within 4 weeks of the completion of sample analyses. The Interim Report will have the data from the sample analyses incorporated into the report. The findings from each of the reports from all scheduled Surveys will be updated as appropriate and included in the Final Report to the Secretary, DOE, which is scheduled for completion in 1988.

2.3 Sampling and Analysis

Based on the results of the on-site portion of the Survey, the Survey team will identify any sampling needs. Sampling and analysis for the LANL Survey will be conducted by a team from the Idaho National Engineering Laboratory (INEL). Mr. Bob Lugar will be the INEL Sampling and Analysis team leader. Representatives of the INEL sampling team will be on-site during the third week of the Survey to

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TABLE B-1

LANL SURVEY SITE AGENDA

		AIR	RAD	WATER	RCRA	GW	CERCLA*	UST	TSCA/QA
Monday 3/30	AM	Introduction Site Process & Environmental Programs Briefing							
	PM	General Facility Tour							
Tuesday 3/31	AM	Air Sampling & Met Station	Record Review RAD Emissions	SPCC Review	Record Review	Air Photo Analysis	W/GW	SPCC Review w/water	W/Air
	PM		Computer Soil DB Soils	Areas G, L	W/Water	Air Photo Analysis	W/ GW	UST Program Overview Record Review	PCB TA-00 TA-2
Wednesday 4/1	AM	TA-3, 102 66, 29, 141	W/Air	Observe Sampling	W/Air	Finish Photos	A: TA-21 B: W/1	TA-21 w/CERCLA-1	TA-3 (PCB)
	PM	147 TA-48	W/Air	Record Review (Sampling)	W/Air	Meeting w/ Hydro personnel	TA-43, TA-7 TA-41, TA-29 TA-2	w/CERCLA-1	TA-3 (PCB)
Thursday 4/2	AM	TA-53	W/Air	TA-53 (Lagoons) TA-3, 40	W/Water	Observe Sampling (Pilot wells, Canyon Wells, Springs)	A: TA-33, B: TA-12	TA-3	W/Air
	PM	TA-16 Burn, 54, 205, Power Plant	W/Air	W/Air	W/Air		TA-39, TA-27 TA-49, TA-20	TA-35	W/GW
Friday 4/3	AM	TA-14 Burn Pads TA-15	W/Air	TA-16, 267, 450 410, 300-307, 342	W/Water	TA-54 Area G&L	A: TA-50, TA-42 TA-55, TA-4 B:	TA-16	Chem Purchase Storage TA-14 TA-15 TA-16
	PM	Revisit/Record Review	Revisit/Record Review	Revisit/Record Review	Revisit/Record Review	Revisit/Record Review	Revisit/Record Review	Revisit/Record Review	Revisit/Record Review

*CERCLA will be performed by an A & B team which will visit different sites

TABLE B-1

LANL SURVEY SITE AGENDA (Continued)

		AIR	RAD	WATER	RCRA	GW	CERCLA*	UST	TSCA/QA
Monday 4/6	AM	TA-50-1 TA-55	W/Air	TA-50-1	W/Air	Mortandad Canyon	A: TA-52, B: TA-5	TA-50 W/Water	Pesticide/Herb Storage
	PM	TA-50-37	W/Air	TA-51-(T + Pt)	50-69	Sandia Canyon	A: TA-46, TA-18, B: TA-1, TA-32	TA-18 TA-46 W/CERCLA-1	W/Air
Tuesday 4/7	AM	TA-41, 4, 47, 1	W/Air	Observe Sampling	W/Air	Fenton Hill	A: TA-36 B: TA-31, TA-45	TA-15 TA-53	W/Water
	PM	TA-2, 1, 63	W/Air	Potable Water Supply Review	TA-9	Fenton Hill	A: TA-14, TA-16, TA-11 B: TA-19	TA-6, TA-8 TA-22, TA-54	Pest/Herb Application
Wednesday 4/8	AM PM	Review	Review	Review	Review	Review	Review	Review	Review
Thursday 4/9	AM	TA-21 TA-33,86	W/Air W/Air	W/Air TA-3, 29	W/Air Area P	White Rock Canyon	A: TA-37, TA-38 B: TA-10	TA-33 W/Rad TA-49 W/Rad	Asbestos Records & Disposal
	PM	TA-3, 22	TA-49	W/Air	W/Rad	Record Review	A: TA-8, TA-9AE B: TA-13		Asbestos Records & Disposal
Friday 4/10	AM	TA-35, 7, 27, 124, 213	TA-3, 16, 40	NPDES Outfalls	Container Storage TA-22, 24, 96	Pajarito Canyon	A: TA-15 B: TA-25	TA-10, TA-42 TA-48	Analytical Lab (RAD) HSE-9
	PM	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation

*CERCLA will be performed by an A & B team which will visit different sites

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TABLE B-1

LANL SURVEY SITE AGENDA (Continued)

		AIR	RAD	WATER	RCRA	GW	CERCLA*	UST	TSCA/QA	SAMPLING
							A / B			
Monday 4/13	AM	TA-46, 31, 154	Record Review Maps/Drawings	Record Review Sewer Plans	W/Air	Acid/Pueblo Canyon	TA-6 TA-22 / TA006	TA00L DP Road Tank Farm, and Western Steam Plant	Observe Sampling NPDES	Logistics/ Health & Safety
	PM	TA-3, 34, 35, 39	Record Review	Sanitary Wst Trt. Plants	Area J, H	Revisits & Record Review	TA-40	TA00L Mortandad Canyon TA00L Bayo Canyon		w/Air & UST
							A / B			
Tuesday 4/14	AM	TA-36, 39, 40	W/Air	Cooling Water Trt. Practices	Disc W/ Waste Mgmt	Sampling Tour	TA-53 TA-3 / TA00L	TA00L Landfill Solid Waste Management	TA-28 (CERCLA) TA-46	Sampling Tour
	PM	Revisit	Revisit	Septic Tanks	Radwaste Certification	Sampling Tour	TA-59 TA-48 / TA00L	TA00L Landfill Solid Waste Management	TA-23 (CERCLA) TA-25 (CERCLA)	Sampling Tour
Wednesday 4/15	AM	Asphalt Plant	Laundry TA-43	W/Rad Photo Waste (TA-40, TA-8)	Revisits & Record Review	Sampling Tour	Revisits & Record Review	Revisits & Record Review	Analytical Lab (Inorgan) HSE-9	Sampling Tour
	PM	Document Review	TA-42 (CERCLA) TA-18 (CERCLA) TA-26 (CERCLA)	Revisits	Revisits & Record Review	Sampling Tour	Revisits & Record Review	Revisits & Record Review	Analytical Lab (Organic) HSE-9	Sampling Tour
Thursday 4/16	AM	Revisits & Record Review	Revisits & Record Review	Revisits & Record Review	Revisits & Record Review	Debrief	Debrief	Debrief	Debrief	Debrief
	PM	Debrief	Debrief	Debrief	Debrief Review	Revisits & Record Review	Revisits & Record Review	Revisits & Record Review	Revisits & Record Review	Debrief
Friday 4/17	AM	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out
	PM	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out

*CERCLA will be performed by an A & B team which will visit different sites

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initiate the planning for the LANL sampling effort. The INEL sampling team will draft a Sampling Plan based on the sampling needs identified by the Survey team.

The Assistant Team Leader, Kenneth Farber, will coordinate the review of this Sampling Plan with the Albuquerque Operations Office and EPA's Laboratory at Las Vegas, which has quality assurance (QA) responsibility for the Survey's sampling and analysis efforts. Sampling is projected to start in October 1987, and will take between 3 and 5 weeks to complete. Analysis of the samples will be conducted by the INEL following protocols provided in the Survey Manual, supplemented by the LANL Sampling Plan. Results of the Sampling and Analysis phase will be transmitted to the Survey Team Leader for incorporation into the Interim Report.

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3.0 AIR

3.1 Issue Identification

The air-related Survey activities will involve an assessment of the air emission sources in the facility, the administrative and technological emission controls applied to the sources, and the ambient air monitoring systems. The emphasis of the Survey will be on operational and procedural practices associated with the emission sources and the emission control equipment, fugitive sources of emission, both within and outside the process buildings, and mitigative procedures applied to fugitive emission sources.

The general approach to the Survey will include a review of existing air permits, applications pending, and standard operating procedures. Processes and control equipment will be inspected for compliance with DOE as-low-as-reasonably-achievable (ALARA) requirements for radionuclide emissions. The Survey will also review the nonradiological air contaminants from the different processes in the facility, evaluate any existing controls applied to the air contaminant emissions, and assess the need for additional monitoring or emission controls to characterize or reduce the environmental consequences of the emissions.

The existing ambient air monitoring system will be evaluated to assess if it is adequate to characterize environmental impacts of the air emissions from the facility. The activities involved in this part of the Survey will include the inspection of the ambient air quality samplers, a review of documentation applicable to the ambient air data acquisition, and an evaluation of the processing procedures used to ensure the accuracy of the data. The primary emphasis will be on an assessment of the use of these data to characterize the environmental impacts of plant operations and the defensibility of the reported data.

Areas of particular interest will include emissions of the criteria pollutants (i.e., particulates, sulfur oxides, nitrogen oxides, hydrocarbons, carbon monoxide, and lead) as well as regulated hazardous air pollutants (e.g., radionuclides, beryllium, asbestos, hydrogen fluoride, and mercury). Powerhouses, incinerators, burning grounds, and test firing sites will be of interest. In addition, the use of organic

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solvents will be assessed as a potential or actual source of emissions to determine if they are adequately characterized, monitored, and controlled. A focus of the organic emissions assessment will be those substances considered to be hazardous or toxic air contaminants.

Fugitive emissions from the resuspension of contaminated soils will be evaluated as a potential means of the airborne release of radionuclides and hazardous materials from the facility. Consideration will be given to historical and current operations to determine the potential for soils contamination and windborne releases.

3.2 Records Required

In addition to those documents reviewed prior to the Survey, the following records may be examined at the LANL:

- Air permits (Registrations, Installation, and Operation);
- Source and emissions inventories;
- Emission test data, emission calculations, etc.;
- Descriptive documentation on add-on emission controls;
- Standard operating procedures for process and control equipment;
- Correspondence between regulatory agencies relative to air issues;
- Reports on accidental releases of airborne substances;
- Ambient air monitoring program procedures relative to:
  - calibration procedures and records,
  - laboratory procedures and QA,
- Other records as determined on-site.

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4.0 RADIATION

4.1 Issue Identification

The radioactive portion of the Survey will involve an assessment of the facility- wide radioactive emissions, emissions controls, emissions effluent monitoring, and the associated impact on the environment. The assessment will include discharges to the atmosphere, surface water, groundwater, soils, and off-site disposal. The assessment will be conducted on a priority basis based on the quantity of emissions, the relative importance of reported impacts, and processes performed within a facility. For example, the Los Alamos Meson-Physics Facility (LAMPF) will be among the first to be visited since the atmospheric emissions and direct radiation from this facility reportedly contribute over 95 percent of the population dose.

The assessment will be based on observations of processes and operations within a given facility, effluent control and monitoring equipment, and waste disposal, along with discussions with operational and supervisory personnel. Operational reports, incident reports, records and other data associated with continuous, intermittent, and accidental releases will be reviewed. Also examined will be the radioactive dose assessment methodologies and biological pathway assessments. Of particular importance will be the potential of radioactive releases via unmonitored release pathways to the environment.

The computerized soil analytical data base will be examined. The environmental monitoring program will be reviewed using both observations of monitoring stations, sample collection, and analysis procedures and review of prior annual reports and other DOE reporting requirements.

The radiological Survey will be coordinated with the air, water, waste management, inactive waste site, and hydrogeology Surveys to ensure that potential direct radiation environmental problems are identified and radiation aspects of other Survey activities are coordinated.

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4.2 Records Required

In addition to those documents reviewed prior to the Survey, the following records will be examined at the LANL:

- Radionuclide environmental monitoring data (atmospheric, surface water, groundwater, solid, and vegetation);
- Radionuclide effluent monitoring system design, monitoring data, and reports;
- Radiological accident reports and data;
- Laboratory procedures and analytical methods;
- Dose assessment methodologies;
- Plot plans with monitoring locations;
- Radiological food pathway assessment strategies;
- Other records as determined on-site.

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5.0 SURFACE WATER/DRINKING WATER

5.1 Issue Identification

LANL process activities that generate wastewaters will be reviewed through a detailed process evaluation lasting several days. Discrete process liquid discharge points will be identified and evaluated to develop an inventory of wastewater sources. A review of the present condition of the wastewater collection and treatment systems will be made. Liquid waste treatment, process, collection, and handling equipment will be examined and records of operations will be reviewed. The objective of the review is to build a Survey information base for the identification of physical evidence of existing or potential environmental contamination.

Activities generating process wastewaters and other liquid wastes will be inspected. Site surface drainage features, including culverts and channels, will also be observed. Sampling of surface waters and plant wastewaters will also be observed.

Extensive reviews will also be made of possible undetected sources of contaminants flowing to the sanitary sewage systems. This will require review of most plant production schematic drawings, visits to the respective areas around production facilities, and a thorough tour of plant buildings, yard areas, and grounds, particularly areas where the ground surface is or was known to be contaminated.

Other information sources and visitation points that will be examined are

- Wastewater streams and treatment plant performance and/or effluent quality information; this will include observation of sample collection and analysis techniques used for the monitoring;

- Residuals (sludge and sediment) disposal from the wastewater treatment plants (both the technical and the administrative aspects);

- Spill protection provisions for fuels and hazardous materials storage units, including review of the Spill Prevention, Control, and Countermeasures

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(SPCC) Plan and of such physical controls as tank containment dikes and runon/runoff drainage control for potential contaminants;

- Water quality information concerning raw and treated domestic and process waters;

- Types of contaminants that may be in septic tank effluents;

- Potential or actual flooding problems during or immediately after heavy rainstorms;

- Equipment related to drinking water treatment and distribution.

5.2 Records Required

In addition to those documents reviewed prior to the Survey, the following records may be examined at the LANL:

- Detailed drawings of the process, storm, and sanitary sewer systems and the domestic and process water systems both within buildings and in yard areas;

- Detailed drawings of the process and sanitary wastewater treatment units;

- Detailed drawings of the domestic and process water supply treatment, storage, and distribution systems;

- Additional schematic diagrams and/or descriptions of all production processes;

- SPCC Plan for the site, covering all fuel and hazardous material storage units;

- Analytical data used for preparation of the surface water monitoring or similar reports;

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- Discharge monitoring reports and any problem area mitigation studies;
- Records of drinking water quality both on- and off-site;
- Operators logbooks and reports for wastewater treatment plant operations;
- Sampling logbooks and laboratory tracking reports;
- Treatment plant and monitoring equipment maintenance records and/or logs;
- Process reports and/or final reports for ongoing research and development (R&D) studies of wastewater control and treatment options;
- Internal memos and correspondence relating to surface water/drinking water problems;
- Other records as determined on-site.

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6.0 HAZARDOUS/RADIOACTIVE/SOLID WASTES

6.1 Issue Identification

The procedure for the hazardous/radioactive/solid waste Survey is to review known sources or activities and identify any additional sources or activities that have the potential to result in contamination of environmental media.

The waste portion of the Survey will concentrate on those facilities mentioned in LANL Part A&B Resource Conservation and Recovery Act (RCRA) notifications and the waste management site plans. Specifically, the radioactive and hazardous waste staging areas, burial sites, and explosive waste treatment areas will be examined. In addition, the team will devote a significant portion of the time on-site to a detailed process-by-process investigation of hazardous or mixed waste generation, treatment, storage, and release points.

Hazardous wastes that have been identified in existing documentation (e.g., high-explosive wastes, beryllium and lithium compounds, spent plating solutions) will be tracked through the system and waste-related site activities and records will be reviewed to develop an inventory of LANL waste management practices.

The review of radioactive and nonhazardous solid waste will proceed in a manner similar to that for hazardous wastes. Known waste stream generators, and handling activities such as the Radiochemistry Laboratory, the Sigma Building, CMR Building and waste certification processes will be a focus of the Survey. The detailed process tour described above will gather information on radioactive and nonhazardous solid wastes to delineate any previously unidentified sources of waste that have the potential to result in environmental contamination.

Discussions will be held with individuals knowledgeable of current and past waste management practices. This will be accomplished during the process tour, and in the process of reviewing facility records and documentation. The objective is to develop an understanding of past and existing waste management activities that may serve as the basis for problem identification by the Survey team.

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Existing documentation indicates the disposal of waste in many waste pits and shafts in Technical Area 54 (TA-54), TA-16, and other portions of the site. In particular, Areas G, L, P, H, and J will be subjected to a comprehensive waste management evaluation. The review of solid/hazardous/radioactive waste will be coordinated with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and hydrologic surveys to identify any possible releases that may pose a threat to the environment.

6.2 Records Required

In addition to those documents reviewed prior to the Survey, the following records will be reviewed at the LANL:

- Waste analysis plans and information regarding the use of the plan by facility generators;
- Any additional inspection documentation (state and Federal);
- Groundwater monitoring, sampling, and analytical documentation;
- Any release notification or occurrence documentation;
- Waste inventory documentation (quantities and sources);
- Any enforcement action documentation;
- Groundwater monitoring system construction documentation;
- Internal facility inspection documentation;
- RCRA manifests;
- Correspondence with regulatory agencies on solid waste;
- Records dealing with the reuse/recycling of wastes;

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- Records of on-site collection, transport, and storage systems;
- Records of waste oil management;
- Records of tank inspection; and
- Other records as determined on-site.

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7.0 HYDROGEOLOGY

7.1 Issue Identification

Preliminary review of the data available for the LANL indicates that the principal aquifer for the area occurs at substantial depth beneath the site. The current water table is approximately 800 to 1,200 feet below the land surface. The intervening unsaturated zone is composed primarily of the Bandelier Tuff, a volcanic ash and pumice deposit. The moisture content of the tuff is extremely low.

The LANL site is dissected by a series of canyons that were cut by intermittent streams. The floors of these canyons contain a layer of alluvial material that varies in thickness from the canyon head toward the discharge to the Rio Grande. A perched water zone occurs in the alluvial material. This perched water zone is fed seasonally by runoff and direct infiltration and, in some canyons, is fed year-round by LANL discharges from sanitary or industrial waste systems.

The Survey effort will focus on a number of uses, including evaluation of previous studies of site hydrogeology, assessment of the adequacy of the environmental monitoring program, evaluation of the potential for contamination from the waste disposal areas, and point source discharges; potential for transport of contaminants in the alluvial aquifers that occur in the canyons, and the potential effects of vapor phase transport in the vadose zone.

Waste disposal areas at the LANL have received solid, hazardous, and radioactive wastes generated by site operations since the 1940s. In some cases, the wastes were segregated but at other locations, they were not. Some liquid wastes were solidified by being mixed with cement before disposal. At some locations liquids were disposed of in pits and shafts. Both the liquid and vapor phases will be evaluated for transport of organics. During the Survey, the team's hydrogeologist will review studies that address interface transport throughout the site and in particular in TA-54.

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The potential for transport of contaminants in the perched water zones has been studied to some extent and water quality is monitored at some locations. A review of the monitoring and the previous studies will be undertaken as will be visual examinations of canyon areas to observe outfall locations, to identify seeps and springs, to locate potentially contaminated areas, and to observe environmental monitoring practices.

7.2 Records Required

In addition to those documents reviewed prior to the Survey, the following records will be examined at the LANL:

- Historic air photos - sets of photos for the entire site at a scale of 1" = 200' (if available) for every 4 years to be examined on March 31, 1987;
- Well and spring sampling procedures and schedules;
- Monitored parameters, data, and results;
- Current status of the groundwater monitoring Waiver Request and the Compliance Order studies relative to TA-54; and
- Other records as determined on-site.

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8.0 INACTIVE WASTE SITES AND RELEASES

8.1 Issue Identification

The Survey will identify environmental problems and potential risks associated with the historic handling, storage, and disposal of hazardous substances at the LANL. The Survey will focus on current and future risks related to past land disposal practices and past spills/releases.

The LANL is currently developing the draft Phase 1 Installation Assessment Report, prepared under the Comprehensive Environmental Assessment and Response Program (CEARP) for the facility. Based on information provided to date, the CEARP effort has identified over 300 sites or groups of sites that may be considered potential CERCLA or RCRA sites and could possibly result in a risk to public health or the environment.

As part of the LANL Environmental Survey, some of the background information sources used in developing the Phase 1 report will be reviewed, including the material gathered through interviews. Records indicating the types and quantities of materials disposed of in the inactive sites will be evaluated as well as the facility design and methods of waste containment. Copies of facility maps showing individual site locations have been requested from the LANL for each site in the Phase 1 Report. Information available through historic aerial photography will be assessed to identify disturbed land areas and to further define site locations and associated changes in appearance over time. Assistance from LANL staff will be required to ensure that adequate historic aerial photographs are available for review. The Survey team requests that the LANL assemble groups of photographs as described in Section 7.2 for team members to review at the onset of the Survey.

Sites that have undergone some type of remediation will also be addressed. Documentation of the cleanup measures taken at inactive sites will be reviewed, including the plan for cleanup/decontamination, analytical results of the materials removed, and concentration levels where remediation was accepted as sufficient. Also, inactive aboveground and belowground tanks or containers that

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may have held hazardous substances will be located and their status assessed as part of the review of chemical storage tanks, discussed in Section 9.0. Former storage areas and staging locations will be included in this effort. Visual inspections will be conducted for a number of sites included in the Phase 1 Report, in addition to any newly identified sites, to note surface features and to locate monitoring points. Sites will be evaluated in terms of the potential to cause a present or future risk to workers, the neighboring population, or the environment.

8.2 Records Required

In addition to those documents reviewed prior to the Survey, the following records will be reviewed at the LANL:

- Phase 1 Report;
- Information sources used to develop the Phase 1 Report;
- Maps depicting the specific location (or estimated location) for each site described in the Phase 1 Report;
- Historic aerial photographs (see Section 7.2);
- Historic files on past operations, substances used, and methods of handling and disposal;
- Files on past off-site waste handling and disposal;
- Records of facility expansion and building rubble disposal;
- Descriptions of corrective actions, including sketches, analytical results, and final destination of materials removed;
- Diagrams of inactive waste management facilities, including buried tanks and structures;

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- On-going CERCLA-related studies, particularly results of field sampling and analysis work referred to in the Phase 1 effort or planned in the next CEARP phases;

- Other records as determined on-site.

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9.0 TOXIC AND CHEMICAL SUBSTANCES AND QUALITY ASSURANCE

9.1 Issue Identification

The toxics survey will include all raw materials and process-related chemicals used on the LANL site. Use, handling, and disposal of polychlorinated biphenyls (PCBs), asbestos, pesticides, and hazardous substances will be within the scope of this effort. In addition, this Survey effort will include a review of active and inactive chemical storage tanks and drums.

All toxic and hazardous substances purchased, used, or manufactured on the site will be evaluated. Tracking, control, and management of these substances will be reviewed. Records of usage will be evaluated to determine the potential for environmental contamination.

The inventory of PCB and PCB-contaminated electrical equipment in use at the facility will be reviewed for completeness. The condition of this equipment, its potential for leakage, and the quantity of contaminated fluids will be identified. Disposal practices will be reviewed for current and past inventories to determine the method of disposal and location of disposal sites. Procedures for PCB analysis, removal, handling, and disposal will be reviewed. Inspection and reporting requirements for PCB transformers will be evaluated in an effort to focus the Survey team's attention on potential problem areas.

The use of asbestos as insulation at the LANL will be reviewed to identify pathways of contamination. Also, asbestos removal and disposal practices will be evaluated, and disposal sites visited, to define potential areas of concern.

Pesticides usage on the site will be reviewed, including application records, storage and disposal practices, and environmental monitoring, to assess the risk for environmental contamination.

The Survey will examine site information pertaining to LANL underground and aboveground storage tanks. The review will focus on tank volume, contents,

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construction, age, history, and leak detection capabilities. Similarly, the Survey will review chemical storage facilities to determine the potential for releases.

The QA Survey of the environmental program will be primarily an evaluation of the sampling and analytical capabilities at the LANL. The intent will be to verify and review the QA procedures for obtaining process/effluent and environmental samples, performing the analytical work to identify the concentration of pollutants, and the handling and reporting of data. All aspects of the QA program relating to environmental management at the LANL will be reviewed, including operator training, equipment and instrument calibration/maintenance, precision and accuracy studies, blank, split, and spike sample analyses, sample handling and chain-of-custody procedures, data reduction and validation, data reporting and documentation, and calculation and logbook reviews.

The procedures for sampling and analysis will be monitored to ensure proper implementation and conformance to accepted requirements. Quality assurance plans will be reviewed for the sampling and analytical activities, as well as for any internal QA audits that have been completed.

The QA programs currently in force at the LANL will be evaluated. QA procedures imposed on any outside sampling or analytical laboratories will also be reviewed in this study effort.

9.2 Records Required

In addition to those documents reviewed prior to the Survey, the following records will be examined at the LANL:

- Toxic substances labeling and tracking system;
- Procedures for handling, control, and management of toxic substances;
- Inventory of toxic chemicals and purchasing records of chemical substances;

PRELIMINARY

- PCB annual inventory documents (1978 to 1986);
- Inventory of current PCB-contaminated electrical equipment;
- PCB handling, storage, and disposal records and procedures;
- Locations of buildings containing asbestos, including usage;
- Asbestos use, handling, and disposal records, including method and location of disposal;
- Pesticide training, handling, storage, disposal records, and environmental monitoring;
- Analytical laboratory and environmental sampling QA plans and procedures manuals;
- QA audits and reports of laboratory and sampling program;
- QA results for prepared and analytical samples;
- Operator training records (laboratory and sampling);
- Instrument maintenance and calibration records (laboratory and sampling);
- Laboratory and sampling calculations and workbooks;
- Precision and accuracy studies; and
- Other records as determined on-site.

PRELIMINARY

APPENDIX C

SUMMARY OF SURVEY ACTIVITIES

PRELIMINARY

TABLE C-1

SUMMARY OF SURVEY ACTIVITIES

		AIR	RAD	WATER	RCRA	GW	CERCLA*	UST	TSCA/QA
Monday 3/30	AM	Introduction Site Process & Environmental Programs Briefing	Introduction Site Process & Environmental Programs Briefing	Introduction Site Process & Environmental Programs Briefing	Introduction Site Process & Environmenta l Programs Briefing	Introduction Site Process & Environmental Programs Briefing	Introduction Site Process & Environmental Programs Briefing	Introduction Site Process & Environmental Programs Briefing	Introduction Site Process & Environmental Programs Briefing
	PM	General Facility Tour	General Facility Tour	General Facility Tour	General Facility Tour	General Facility Tour	General Facility Tour	General Facility Tour	General Facility Tour
Tuesday 3/31	AM	Air Sampling & Met Station	Record Review - RAD Emissions	SPCC Review	Record Review	Air Photo Analysis	W/GW	SPCC Review w/water	W/Air
	PM		- Computer Soil DB - Soils	Areas G, L	W/Water	Air Photo Analysis	W/ GW	UST Program Overview Record Review	PCB Inventory TA-3
Wednesday 4/1	AM	TA-3, 35 66, 141, 147	W/Air	Observe Sampling	W/Air	Finish Photos	A: TA-21 B: W/1	TA-21 w/CERCLA-1	TA-0 (PCB)
	PM	TA-3-29 TA-48	W/Air	Record Review (Sampling)	W/Air	Meeting w/ Hydro personnel	A: TA-43, TA-41, TA-2 B: TA-7, TA-29	w/CERCLA-1	TA-2 (PCB) TA-53
Thursday 4/2	AM	TA-53	W/Air	TA-53 (Lagoons) TA-3, 40	W/Water	Observe Sampling (Prod. wells, Canyon Wells, Springs)	A: TA-33, TA-39, TA-27 B: TA-12	TA-3	W/Air
	PM	TA-16 Burn, 410, Power Plant	W/Air	W/Air	W/Air		TA-20	TA-35	W/GW
Friday 4/3	AM	TA-14 Burn Pads TA-15 TA-16-205	W/Air	TA-16, 267, 450 300-307, 342	W/Water	TA-54 Area G&L	A: TA-50, TA-35 B: TA-42, TA-4, TA-5	TA-16	Chem Purchase Storage TA-14 TA-15 TA-16
	PM	Revisit/Record Review TA-3-102	Revisit/Record Review Briefing on TA-49	Revisit/Record Review TA-3-102	Revisit/Record Review	Revisit/Record Review Briefing on TA-49	Revisit/Record Review	Revisit/Record Review	Revisit/Record Review

*CERCLA will be performed by an A & B team which will visit different sites

TABLE C-1

SUMMARY OF SURVEY ACTIVITIES (Continued)

		AIR	RAD	WATER	RCRA	GW	CERCLA*	UST	TSCA/QA
Monday 4/6	AM	TA-50-1 TA-55	W/Air	TA-50-1	W/Air	Mortandad Canyon	A: TA-52 B: TA-5	TA-50 W/Water	Pesticide/Herb Storage
	PM	TA-50-37	W/Air	TA-51-(T + Pt)	50-69	Sandia Canyon	A: TA-46, TA-18 B: TA-1, TA-32	TA-18 TA-46 W/CERCLA-1	W/Air
Tuesday 4/7	AM	TA-41, 4, 47, 1	W/Air	Observe Sampling	W/Air	Fenton Hill	A: TA-36 B: TA-31, TA-45	TA-15 TA-53	W/Water
	PM	TA-2, 1, 63	W/Air	Potable Water Supply Review	TA-9	Fenton Hill	A: TA-14, TA-16, TA-11 B: TA-19	TA-6, TA-8 TA-22, TA-54	Pest/Herb Application
Wednesday 4/8	AM PM	Review	Review	Review	Review	Review	Review	Review	Review
Thursday 4/9	AM	TA-21 TA-33,86	W/Air W/Air	W/Air TA-3, 29	W/Air Area P	White Rock Canyon	A: TA-37, TA-38 B: TA-10	TA-33 W/Rad TA-49 W/Rad	Asbestos Records & Disposal
	PM	TA-3, 22	TA-49	W/Air	W/Rad	Record Review	A: TA-8, TA-9AE B: TA-13		Asbestos Records & Disposal
Friday 4/10	AM	TA-35, 7, 27, 124, 213	TA-3, 16, 40	NPDES Outfalls	Container Storage TA-22, 24, 96	Pajarito Canyon	A: TA-15 B: TA-25	TA-10, TA-42 TA-48	Analytical Lab (RAD) HSE-9
	PM	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation	Sample Request Preparation Sampling Mtg	Sample Request Preparation Sampling Mtg	Sample Request Preparation	Sample Request Preparation

*CERCLA will be performed by an A & B team which will visit different sites

PRELIMINARY

TABLE C-1

SUMMARY OF SURVEY ACTIVITIES (Continued)

		AIR	RAD	WATER	RCRA	GW	CERCLA*	UST/RAD	TSCA/QA	SAMPLING
							A / B			
Monday 4/13	AM	Pan Am TA-3	TA-5, 3, 39, 40	Record Review Sewer Plans	W/Air	Acid/Pueblo Canyon	TA-6 TA-22 / TA-006	TA-00L DP Road Tank Farm, and Western Steam Plant	Observe Sampling NPDES	Logistics/ Health & Safety
	PM	TA-3, 34, 102, 39	TA-48, GMR	Sanitary Wst Trt. Plants	Area J, H	Revisits & Record Review	TA-40	TA-00L Mortandad Canyon TA-00L Bayo Canyon		w/Air & UST
							A / B			
Tuesday 4/14	AM	Ambient Sampling Locs	W/Air Records TA-36, 39, 40	Cooling Water Trt Practices	Disc W/ Waste Mgmt	Sampling Tour	TA-53 / TA-00L TA-3	TA-00L Landfill Solid Waste Management	TA-28 (CERCLA) TA-46	Sampling Tour
	PM	Air	Revisit w/Air	Septic Tanks	Radwaste Certification	Sampling Tour	TA-59 / TA-00L TA-48	TA-00L Landfill Solid Waste Management	TA-23 (CERCLA) TA-25 (CERCLA)	Sampling Tour
Wednesday 4/15	AM	Document Review	Laundry TA-43	W/Rad Photo Waste (TA-40, TA-8)	Revisits & Record Review	Sampling Tour	Revisits & Record Review	Revisits & Record Review	Analytical Lab (Inorgan) HSE-9	Sampling Tour
	PM	Document Review	TA-42 (CERCLA) TA-18 (CERCLA) TA-26 (CERCLA)	Revisits	Revisits & Record Review	Sampling Tour	Revisits & Record Review	Revisits & Record Review	Analytical Lab (Organic) HSE-9	Sampling Tour
Thursday 4/16	AM	Revisits & Record Review	Revisits & Record Review	Revisits & Record Review	Revisits & Record Review	Debrief	Debrief	Debrief	Debrief	Debrief
	PM	Debrief	Debrief	Debrief	Debrief Review	Revisits & Record Review	Revisits & Record Review	Revisits & Record Review	Revisits & Record Review	Debrief
Friday 4/17	AM	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out
	PM	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out	Close-out

*CERCLA will be performed by an A & B team which will visit different sites

FINAL

APPENDIX D

POLLUTION SOURCES AND CONTROL TABLES FOR INACTIVE WASTE SITES AND RELEASES SECTION 4.5

PRELIMINARY

Table	Title	Tab
D-1	Former Liquid Waste Disposal Sites with Waste Characteristics and Current Condition, LANL	1
D-2	Spills and Unplanned Releases with Waste Characteristics and Current Condition, LANL	2
D-3	Open Dumps and Boneyards with Waste Characteristics and Current Condition, LANL	3
D-4	Inactive Landfills with Waste Characteristics and Current Condition, LANL	4
D-5	List of Inactive Firing Sites with Information on Contaminants and Current Condition, LANL	5
D-6	List of Contaminated Structures Still Standing with Information on Contaminants and Current Condition, LANL	6
D-7	List of Contaminated Structures that Have Been Removed with Information on Contaminants and Current Condition, LANL	7
D-8	List of Miscellaneous Inactive Waste or Release Sites with Waste Characteristics and Current Condition, LANL	8

PRELIMINARY

TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 2						
No #	Trap in the effluent line of the TA-2 reactor known as the Water Boiler	1944-1974	Radionuclides	Unknown	NV Drain trap was located in pit SE of the reactor. Status unknown.	1950: 25 R/hr in effluent; 1954: 100 R/hr in effluent draining from trap.
TA-2-19, -32, -35, 43, 48, 62; lines 117, 118, 119; and 2 delay tanks	Exterior equipment associated with gaseous effluent (stack) line	1944-1974	Alpha and beta/gamma radionuclides, including Cs-137*	970 m^3 of low-level radioactive waste removed	V Structures and contaminated soils removed in an SFMP-funded project conducted in 1985 and 1986.	Surface and subsurface soil samples taken during cleanup.
Area A	Suspected leachfield	No Date	Potentially received waste from chemical waste treatment shack containing radionuclides, uranyl nitrate, and perchloric acid	Unknown	NV Area cleaned up in 1985-1986 decommissioning project funded under SFMP. Soil remaining after cleanup contained 53-67 Ci/g of beta/gamma emitters, with no alpha emitters. Area backfilled.	1985: U235 fuel detected during cleanup; initial activity found was 2-4 nCi/g in soil.

* Date given is either period of operation or date of reference indicating that contamination was present.

** V, DOE Survey team representative(s) visited site; NV, DOE Survey team representative(s) did not visit site.

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Two

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 2 (Continued)						
Area C	Secondary pit	1985-1986	Radioactively contaminated wet soil from cleanup of another hotspot area (Area B) that had readings of 4 mR/hr	Unknown	V Area cleaned up in the 1985-1986 decommissioning project funded under SFMP. Soil allowed to drain dry in this pit, prior to removal to TA-54. Pit bottom was scraped out. Remaining soil contained 40-87 pCi/g of beta/gamma emitters. Area backfilled.	See Status
No #	Discharge from Omega Site to stream	1954	Beta and/or gamma emitters	Unknown	NV Location and specific source of discharge not identified.	1954: Soil samples from stream with above-background rad readings.
No #	Overflow from septic tank	1957	Laboratory drains, photographic developing wastes, laboratories	Unknown	NV Location not specified. In mid-1970s, Omega Site sanitary system was connected to TA-41 Treatment Plant; therefore this septic tank is assumed to be inactive. Uncertain if it is still in place.	None Known
No #	Discharge from Omega Site to stream	1961	Sodium-24	Unknown	NV Point of discharge not reported	None Known
No #	Deionizer system effluent discharge to stream	Pre-1963	All radioactive liquid effluent from deionizer system	More than 6 years-rate unknown	NV Point of discharge not reported. Practice has been discontinued	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Five

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV**	Current Status or Condition	Previous Sampling
TECHNICAL AREA 3 (Continued)							
TA-3-15	Septic tank for Van de Graaff Laboratory	Pre-1975	Radionuclides, darkroom wastes, and general laboratory wastes	Unknown	NV	In 1975, tank was connected to industrial waste lines. Prior to this time, tank may have discharged to the canyon on the south side.	None Known
TA-3-45	Cesspool for Van de Graaff Laboratory	Pre-1964	Sanitary waste	Unknown	NV	Removed in 1964.	None Known
TA-3-689	Septic tank near TA-3-282	1964	Unknown	Unknown	NV	Present status not known.	None Known
TA-3-141	Drains leading to area S of building	No Date	Uranium	Unknown	V	Soils in seepage area may be contaminated due to use of uranium in building.	None Known
No #	Power plant blowdown	1950-1970s	Hexavalent chromium in blowdown	128,000 - 288,000 gpd	NV	Blowdown discharged to Sandia Canyon.	1972: 34 ppm hexavalent chromium in discharge; 1968: average 10-15 ppm total chromium in stream.

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PRELIMINARY

TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Six

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 3 (continued)						
TA-3-66	Pit used to contain leak from chilled water system at Sigma Building	1972	Fluoride	Pit capacity was 200,000 gallons	NV Pit was used to precipitate fluoride from solution. Closure process for pit was not reported.	None Known
No #	Lined lagoon on Sigma Mesa	?-1987	Treated effluent from TA-50 containing small quantity of radionuclides	Unknown; lagoon capacity was 25,000 gal	V Lagoon is fenced and contained rainwater/snowmelt. Synthetic liner is underlain with sand/bentonite mixture. Lagoon was used in an experiment. At time of use, no leakage detected. No further plans exist to use lagoon; lagoon no longer monitored.	None Known
No #	Open pit on E end of Sigma Mesa	No Date	Drilling mud	Unknown	V Pit remains open. Drilling mud has dried.	None Known
No #	Pit S of Building TA-3-271	Pre-1987	Asphalt, sealant, possibly solvents	Unknown	V Period of operation unknown. Pit located near edge of mesa and has been covered with soil.	None Known

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PRELIMINARY

TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Seven

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 4						
TA-4-17	Latrine	Mid-1940s	Sanitary wastes	Unknown	V Remains inactive.	None Known
TECHNICAL AREA 5						
TA-5-13	Acid septic tank	1945	Toxic chemical and HE contamination	Unknown	V Unknown; in 1959 it was reported to be free of radioactivity but listed as having toxic/chemical contamination. However, the tank was not found during LASCP's site cleanup activities, which included removal of soils.	1959, 1985 (LASCP)
TA-5-8	French drain from storage building	Mid-1940s	Uranium	Unknown	V Remains inactive. During cleanup, soils surrounding French drain were removed.	1985 (LASCP)
TECHNICAL AREA 6						
No #	Sump and drain for TA-6-10	Mid-Late 1940s	PETN	Unknown	V Remains inactive. Recommended for removal; unknown if removed when TA-6-10 was D&D'd.	Excavated at two points in 1950- no trace of nitrates.
TA-6-41	Septic tank	Mid-Late 1940s	PETN	Unknown	V Remains inactive. Sludge vacuumed out and buried at Mesa del Buey. Tank removed, washed, and placed at Area P with other debris from TA-6.	1965: Sludge sample contained HE.

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Eight

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
			TECHNICAL AREA 6 (Continued)			
TA-6-20	Ladies Lavatory	Mid-Late 1940s	Sanitary wastes	Unknown	NV Remains inactive. Removed in 1955, slight depression at former location.	None Known
TA-6-40	Septic tank serving Bldgs. 1 and 3	Mid-Late 1940s	Possible chemical and HE contaminants	Unknown	V Remains inactive but in place.	None Known
TA-6-43	Septic tank serving Bldg. 6	Mid-Late 1940s	Possible chemical and HE contaminants	Unknown	V Still actively used for sanitary discharges from Bldg. 6; however, possible contamination resulted from past discharges when Bldg. 6 was used for a laboratory and shop. It is presently used for offices and storage.	None Known
			TECHNICAL AREA 8			
GT Site	Drains from buildings	1967	Water-miscible solvents, acids, and caustics	Unknown	NV Locations not specifically identified.	None Known
TA-8-22	Discharge into open outfall leading into woods N of building	Since 1950	Photoprocessing wastes, including silver	Unknown	V Discharge still active; however, a silver recovery unit is currently used.	None Known
TA-9-81	Septic tank	1970	Drain from Isotope Building (TA-8-24)	Unknown	NV Abandoned in 1970. Not located during Survey.	None Known
TA-8-59, 67	Septic tanks	? - 1971	Potentially received toxic materials from Laboratory Building (TA-8-1)	Unknown	V Manhole of abandoned tank TA-8-59 was located - overflow may enter into a storm drain. TA-8-67 not located.	None Known
TA-8-64	Septic tank	1949	Potentially received high explosives and radionuclide contaminants from operations performed in nearby buildings (TA-8-1, 2, 3)	Unknown	NV Abandoned in 1949. Not located during Survey.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Nine

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 8 (Continued)						
No #	Two sumps outside Bldg. TA-8-3	1972	High explosive contaminants	Unknown	NV Building is inactive. Location of sumps uncertain.	None Known
TECHNICAL AREA 9AE						
No #	Disposal field	No Date	Unknown	Unknown	NV Reportedly a seepage pit. Use and location are unknown but TA has been D&D'd.	None Known
TECHNICAL AREA 10						
No #	Discharge from TA-10-1, the Radiochemistry Building	1945-1963	Strontium-90; nitric, hydrochloric, hydrofluoric, and sulfuric acids; lanthanum, barium, cadmium, platinum, benzene, and possibly other organic and inorganic contaminants	Unknown	V Received liquid wastes from drain of Bldg. TA-10-1 and flowed into tank farm.	None Known
No #	Disposal pit NE of TA-10-21	1945-1963	Strontium-90; nitric, hydrochloric, hydrofluoric, and sulfuric acids; lanthanum, barium, cadmium, platinum, benzene, organic and inorganic contaminants	Unknown	V Received liquid wastes from drain of Bldg. TA-10-1 and flowed into tank farm.	None Known
TA-10-41, 42, 43	Tank farm acid and contaminated materials pits	1945-1963	Strontium-90; nitric, hydrochloric, hydrofluoric, and sulfuric acids; lanthanum, barium, cadmium, platinum, benzene, organic and inorganic contaminants	Unknown	V Pits drained through outlet pipe and into soil.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Ten

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
			TECHNICAL AREA 10 (Continued)			
TA10-50, 51	Tank farm acid sewer manholes	1945-1963	Strontium-90; nitric, hydrochloric, hydrofluoric, and sulfuric acids; lanthanum, barium, cadmium, platinum, benzene, organic and inorganic contaminants	Unknown	V Pits drained through outlet and into soil. Also at TA 10- 50 a pipe ran to creek bed.	None Known
TA-10-39	Tank farm acid septic tank	1945-1963	Strontium-90; nitric, hydrochloric, hydrofluoric, and sulfuric acids; lanthanum, barium, cadmium, platinum, benzene, organic and inorganic contaminants	Unknown	V Wastes periodically discharged directly into stream channel by applying pressure to tanks.	Tank removed 1963; soil removed between pits 39 and 50
No #	Decontamination holes near leachfield	1945-1963	Nitric acid and hydrochloric acid	Unknown	V Acids were poured into these holes.	None Known
No #	Three unknown pits found in 1963	1945-1963	Radioactive chemicals, acids, organics and inorganics	Unknown	V One pit 12-inch-diameter 2 ft S of pit 42; second pit 2 ft square, 40 ft N of pit 41; third pit 6 ft S of acid sewer manhole	1976: Rad 10-20 mR/hr
No #	Common clay drain between pits 41, 42, and 43; 10 ft below ground surface	1945-1963	Radioactive chemicals, acids, organics and inorganics	Unknown	V Drain located 10 ft below grade and removed during cleanup of TA.	1976: 20 mR/hr
No #	Leachfield below acid pit 43	1945-1963	Radioactive chemicals, acids, organics and inorganics	Unknown	V Leachfield located under acid pit 43. During cleanup, excavation extended to 20 ft, but it was uncertain whether entire leachfield was removed.	1976: D&D'd.

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Eleven

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 10 (Continued)						
TA10-24, 25	Source wash area and liquid discharge near structure	1945-1963	Radioactive source wash and liquid discharge	Unknown	V Free of contamination to 4 ft.	Bldg. D&D'd.
TA10-48	Board-lined pits 25 ft square, 10 ft deep	1945-1963	Gloves, bottles, lab equipment and strontium-90 "soup"	117 Ci into pits and tank farm	V Excavated to 26 ft to remove radioactive contamination; however, levels above background were found at a depth of 30 ft below grade.	D&D'd.
TA-10-38, 40	Sanitary septic tanks	1945-1963	Sanitary waste	Unknown	V Wastes periodically discharged directly into stream channel by applying pressure to tanks; removed 1963.	None Known
No #	Leachfield near TA 10-41 and streambed	1945-1963	Strontium-90; nitric, hydrochloric, hydrofluoric, and sulfuric acids; lanthanum, barium, cadmium, platinum, benzene, organic and inorganic contaminants	Unknown	V It is unknown whether leachfield was removed.	None Known
No #	Pipes between acid pits 42 and 43	1945-1963	Radioactive chemicals, acids, organics and inorganics as above	Unknown	V Removed in 1963.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twelve

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 11						
TA-11-20	Septic tank	? - 1987	Possible photoprocessing wastes	Unknown	NV Active. Tank overflow allowed to seep into surrounding soil.	None Known
TA-11-43	Septic tank	? - 1987	Unknown	Unknown	NV Unknown.	None Known
TECHNICAL AREA 13						
TA-13-12	Septic tank with drainfield	Pre - 1951	Unknown	Unknown	NV Removed in 1951. Documentation on removal not available. Uncertain whether drainfield was also removed.	None Known
TECHNICAL AREA 14						
No #	Outfall	Present	HE and photoprocessing chemicals	Unknown	V Active flows from septic tank 1a from Bldg. 6	None Known
TECHNICAL AREA 15						
No #	Sanitary drain or outfall from Bldg. 92	1958	Chemicals or HEs	Unknown	V No evidence of drain location noted around Bldg. 92	None Known
No #	Dry well serving Bldg. 194	1978	Degreasers, sulfuric acid, chromates, and hydrochloric acid	Unknown	V Reportedly 4 ft diam. and 50 ft deep. Currently covered with soil.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Thirteen

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 15 (Continued)						
No #	Sump or ditch from Bldg. 50	1960s	Acids	Unknown	NV Bldg. 50 is a machine shop and laboratory. Drain/sump status reportedly inactive but still in place.	None Known
No #	Outfall from Bldg. 40	No Date	Photoprocessing and printing circuit operations waste	Unknown	NV Unknown.	None Known
TA-15-63	Septic tank with outfall for Bldg. 40	1958	Unknown. Operations in building included photoprocessing and printed circuit work.	Unknown	NV Unclear if this outfall is the same as mentioned above. Tank listed on 1983 engineering drawing.	None Known
TA-15-147	Septic tank serving Bldg. 8	1958	High explosives from Shop Bldg.	Unknown	NV Inactive, but still in place.	None Known
No #	Discharge area for floor drains in Bldg. 20	1950 - ?	High explosives	Unknown	NV Location unknown.	None Known
TA-15-51	Septic tank with drainfield for Bldg. 20	No Date	Unknown	Unknown	NV Status unknown. Tank listed on 1983 engineering drawing.	None Known
TA-15-72	Septic tank with outfall for Bldg. 27	1958	Unknown. Building was control room for Firing Points E and F	Unknown	NV Firing points inactive. Tank listed on 1983 engineering drawing.	None Known

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** V, DOE Survey team representative(s) visited site; NV, DOE Survey team representative(s) did not visit site.

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Fourteen

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV**	Current Status or Condition	Previous Sampling
TECHNICAL AREA 16							
No #	Overflow line from Bldg. 195	1989	Oil	Unknown	NV	Discharge point was in an open area SE of building. No record of cleanup provided.	None Known
No #	Sumps serving 200, 300, and 400 process areas and sumps that served buildings which are now torn down	No Date	High explosives	Unknown	NV	Some sumps in these process areas are inactive and potentially contaminated. Total number and location of these inactive sumps were not specifically reported. Sumps are usually located in the front of the buildings. No record of cleanup provided.	None Known
No #	Four ponds W of Bldgs. TA-16 through 34	1940s	High explosives	Unknown	V	Ponds received wastewater from the HE machining buildings. They have been backfilled with soil. No report documenting the ponds' closure available.	None Known
No #	Tank or pond W of Bldgs. TA-16-89 through 93	1970	Trace gross beta emitters	Unknown	V	Tank or pond received liquid from floor drains of buildings and has been removed. No record of procedures used was available.	1970: Gross beta found in liquid.

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Fifteen

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV**	Current Status or Condition	Previous Sampling
TECHNICAL AREA 16 (Continued)							
No #	Pond E of Bldgs. TA-16-89 through 93	1950s	HE, potentially received electroplating wastes also	Unknown	V	Pond received wastewater from HE process Bldgs. 89, 90 and 91; and possibly wastes from Bldgs. 92 and 93 that were used for electroplating. Pond contained water at the time of Survey, but can be dry based on the season.	1986: HE detected in sediment.
No #	Discharge from Bldg. TA-16-92	1950	Electroplating wastes	Unknown	V	Drains from buildings existed to the north. A drainage swale exists N of the buildings but no visual signs of contamination were noted.	None Known
No #	Possible liquid waste disposal area around Bldg. TA-16-450	1952	Electroplating wastes	Unknown	NV	Building was once used for electroplating. Method of liquid waste disposal unknown.	None Known
No #	Possible liquid waste disposal around Bldg. TA-16-10	1960	Hydrochloric acid, sodium chloride, ferrous chloride, and chromic acid	Unknown	NV	Building was used to clean copper-clad steel plates. Method of liquid waste disposal unknown.	None Known
TECHNICAL AREA 18							
No #	All acid drains in TA-18	No Date	Uranium-233 and 235, beryllium, mercury, possibly some organics, photoprocessing chemicals, and acids	Unknown	V and NV	An acid waste holding pit next to Bldg. 30 has been removed but status of other drains in the TA is unknown.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 18 (Continued)						
TA-18-39, 42, 105, 120	Septic tanks serving Kivas 1, 2, and 3	No Date	Radionuclides, oil	Unknown	V and NV Systems still active. Tank 39, serving Kiva 1, reportedly has associated drainfield. Perched groundwater exists in this canyon in addition to a surface stream that runs along the SW side of Kiva 1. Potential for contamination from these tanks and drainfield has not been addressed. Only Tank 120 has specifically been reported to contain oil.	None Known
TA-18-40, 41, 43, 152	Sanitary septic tanks serving Bldgs. 1, 28, 31, and 31	No Date	Unknown	Unknown	NV Systems potentially contaminated based on past operations in buildings. Tanks inactive but still in place.	None Known
TA-18-168	Kinglit reactor solution	No Date	Enriched uranyl sulfate solution	Unknown	V Reactor is no longer present. Its solution was stored in a 6-inch-diameter pipe buried next to Bldg. 168. Solution has been removed and pipe was flushed with approximately 200 gal of water. Pipe remains in place.	None Known
TECHNICAL AREA 19						
TA-19-6	Septic tank	1944-1962	Sanitary waste	Unknown	V Remains inactive. Possibly a drainfall also exists, as indicated by surface disturbance. No record indicating removal of tank.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
			TECHNICAL AREA 20			
TA-20-27	Septic tank	No Date	Unknown	Unknown	V Removed prior to 1985.	None Known
			TECHNICAL AREA 21			
No #	Gravel seepage pit N of main DP West facilities	1947	Plutonium	28 µg/day	NV Duration of use believed to be at least 2 years. Location not specified.	None Known
No #	Gravel seepage pit on S side of DP West	1947	4,000 L/day fluorine containing 0.18 µg/L of plutonium	See Type	NV Duration of use believed to be at least 2 years. Location not specified.	None Known
No #	Pit located 15 ft outside door of Rm. 322 in Bldg. TA-21-3	1947	Plutonium, ethylene glycol, phosphoric acid	1.8 mgd of plutonium	NV Duration of use believed to be at least 2 years. No visual evidence of pit location currently exists.	None Known
No #	Underground pit between TA-21-2 and 3	1978	Plutonium	Unknown	V Pit may have received wastewater from washing containers from Hanford that were contaminated with plutonium. Location not further specified. Area was visited during the Survey but there was no visual evidence of a pit. Uncertain whether pit has been cleaned up.	None Known
TA-21-55, 56, 106, 123, 121	Septic tanks with outfalls to S Canyon rim	Mid-1950s	Radionuclides	Unknown	NV Tanks were abandoned in mid-1960s.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 21 (Continued)						
TA-21-163	Septic tank with outfalls to N Canyon rim	Mid-1950s	Radionuclides	Unknown	NV Tank abandoned in 1966.	None Known
TA-21-53, 125	Septic tanks (no outfall)	Mid-1950	Potential for contamination unknown	Unknown	NV Tanks abandoned in 1966.	None Known
TA-21-62, 142	Septic tanks (no outfall)	Mid-1950	Potential for contamination unknown	Unknown	NV Tanks removed in 1965.	None Known
TA-21-143	Cooling tower outfall for Bldgs. 4 and 5	1950s - 1970s	Plutonium-contaminated cooling water, also possibly contained chromates	Rate ranged from 30,000 - 150,000 gpw	V Cooling tower removed. Unclear whether surface soils were addressed during the removal of the tower.	1970: 30cpm/mL in discharge.
TA-21-70	Acid pit	1957	Concentrated acid used to digest classified paper	Unknown	NV Pit removed in 1967.	None Known
No #	Five liquid waste wells on NE corners of Buildings TA-21-2, 3, 4, 5, 150	1966	Assumed to be radioactively contaminated	Unknown	NV Wells removed during major cleanup of TA-21 (1978-1981). Extent of residual contamination unknown.	None Known
No #	Sump pumps on S end of Bldgs. 2 and 3	1979	Assumed to be radioactively contaminated	Unknown	NV Status unknown.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
			TECHNICAL AREA 21 (Continued)			
No #	Various sumps	1974	Assumed to be radioactively contaminated	Unknown	NV Locations not specified.	None Known
No #	Steam plant dry wells	1982	Unknown	Unknown	NV Reportedly no longer used.	None Known
No #	Inactive industrial waste liner and drains	No Date	Radionuclides	Unknown	NV Locations uncertain. Possible leaks have not been thoroughly studied. Some lines or portions of lines removed.	None Known
MDA-T	4 absorption beds used to dispose of process wastewater	1945-1967	Trenches received 14 million gal of untreated process wastewater from 1945 to 1952 that contained plutonium and fluoride (avg. conc. 160 ppm). From 1952-1967, trenches were periodically used to dispose of several hundred gal of treated wastewater, Americium, TRU wastes, and 10,500 gal of ammonium-citrate-contaminated effluent also disposed of in this area.	See Type	V The four trenches are 115 ft and 20 ft x 4 ft deep. Americium wastes were placed in shafts 20 to 65 ft deep and 4 to 8 ft in diameter. TRU wastes mixed with cement were placed in 158 buried corrugated metal pipes that were removed in FY86. Area is fenced with some surface stabilization. Stormwater drainage currently directed over the top of area. Erosion noted along N side of area.	Extensive.
MDA-U	2 absorption beds used to dispose of Filter Building effluent	1948-1968	Actinium-227, polonium -210	Unknown	V Trenches are approximately 100 ft long, 20 ft wide, depth unknown. Some contaminated soil removed in 1985 but removal was incomplete. Depth of excavation marked with a plastic sheet and area back filled. Site is fenced.	Assumed during limited cleanup.

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 21 (Continued)						
MDA-V	Three absorption beds used to dispose of laundry washwater	1945-1963	3 Ci strontium-90, barium-140, lanthanum-140, unknown quantity strontium-90, plutonium-239, and polonium	Unknown	V Pits were reportedly 25 ft x 200 ft (depth unknown) and are known to have overflowed in the past. Area has been fenced with some surface stabilization in 1985. Piles of sewage sludge present on top of a portion of the area. Erosion gullies noted on S side of MDA-V along fenceline and down canyon side.	None Known
TECHNICAL AREA 22						
TA-22-25	Process Bldg. outfall	Mid-1950s	PETN; acetone solvents	Unknown	V Inactive outfall; area was restricted due to possibility that recrystallized PETN is in area soils; building not used for many years.	None Known
TA-22-52	Shops Bldg.	1953-1984	HE, beryllium, perchloric acid, sodium thiosulfate, gold, hydrogen peroxide, ferric chloride, lead; sulfuric, hydrochloric, chromic, hydrofluoric, and phosphoric acids; thallium, sodium carbonate; cyanide, nickel, copper, zinc, cadmium	Unknown	V Etching and plating operations moved from Bldg. 52 in 1984; therefore outfall also inactive.	1986: CEARP soils sampled along drainage.
TA-22-77	Contaminated wash pad	No Date	Potential high explosives and unknown contaminants	Unknown	NV Use unknown.	None Known
TA-22-50	Septic tank with outfall/drain-tile system(s) from HE processing in Building 34. Outfall and septic tank in marsh area.	Late 1950s-Early 1970s	High explosives, solvents, and inorganic contaminants	Unknown	V Inactive. One drain-tile system may still be actively used under NPDES permit.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twenty-One

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 22 (Continued)						
No #	Outfall from TA-22-1	1950s?	High explosives	Unknown	V Inactive. Lush growth on hillside S of Bldg. 10 and dead Typha plants at shallow depression at bottom of hillside.	None Known
No #	Two dry wells	1984-?	Organics, hydrochloric acid, copper, ferric chloride, sodium carbonate, sodium hydroxide	Each 25 ft deep., 6-ft diameter	NV Assumed to be inactive. Tank received effluent from Bldg. 91.	None Known
TA-22-42	Septic tank	1945-mid-1950s	High explosives	Unknown	V Inactive.	None Known
TA-22-51	Septic tank with drainfield	1945-1973	High explosives	Unknown	V Inactive. Lush growth on slope S of Bldg. 1 received effluent from Bldgs. 32, 4, 5 and Bldg. 1.	None Known
TECHNICAL AREA 24						
TA-16-507	Chemical sump pit	1959	High explosives, various chemicals	Unknown	V Removed in 1960; area looks like an open field.	None Known
TA-16-504	Septic tank	1945-1963	Potential photoprocessing wastes, beryllium residue, and/or spent solvents such as amyl acetate, ethylene dichloride, and dioxane	Unknown	V Removed in 1963; area looks like an open field.	None Known
TECHNICAL AREA 25						
TA-16-526, 527	Septic tank and pump pit serving V-Site	1972	High explosives	Unknown	NV Inactive. A 1972 reference reports that tank was suspected to be contaminated with HEs. Possible contaminants in pit 526 unknown.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twenty-Two

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 25 (Continued)						
TA-16-793 through 799	Industrial waste system serving V-Site and portions of TA-16	1970	High explosives	Unknown	NV Structures still present.	1970: No detectable radioactive contamination found.
TECHNICAL AREA 26						
TA-26-5	Septic tank	1946-1965	Uranium-233 and 235; tritium	Unknown	V Inactive tank that received vault drainage. Tank believed to have been removed.	1986: LASCP phoswich survey.
TA-26-6	Settling sump	1946-1965	Uranium-233 and 235; tritium	Unknown	V Inactive sump that received drainage from a vault believed to have been removed.	1986: LACSP phoswich survey.
TECHNICAL AREA 29						
TA-29-4	Latrine	1951-1957	Sanitary waste	Unknown	V Reportedly removed in 1957.	None Known
TECHNICAL AREA 31						
TA-0-7	Septic tank	1945-1954	Potential petroleum or toxic chemicals	Unknown	V Inactive. Located on small bench near edge of canyon side and is accessible to public. Tank contained some liquid during Survey visit.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
			TECHNICAL AREA 32			
TA-32-7, 8	Septic tanks	1945-1954	Radioactive	5'x 8' x 6'	V Still in place, western tank has standing water; and center of eastern tank is caved; no outfalls observed.	None Known
			TECHNICAL AREA 33			
TA-33-32, 74	Sanitary septic tank, drain, unnumbered industrial waste liner, and tilefield serving Bldg. 21	1951-1960	Plutonium and beryllium (released in a 1960 accident); potentially uranium	See Status	V The building and an estimated 2.5m^3 of soil contaminated with plutonium (80 pCi/g gross alpha) associated with industrial waste tilefield removed in 1974 and taken to TA-54. Cleanup was based on rad only. No cleanup measures taken down the side of the canyon wall at the point of the outfalls.	See Status
TA-33-31, 78, tile field (No #)	Sanitary septic tank, drain, and unnumbered tilefield serving Bldgs. 19, 20, 39, 113, and 114	1947 - ?	Mercury, uranium (depleted and natural), tritium, trichloroethylene, benzene, beryllium, lead	Unknown	V Tilefield (90 ft x 80 ft) is located in NE section of Area 6 - drainage would flow SE. Whether this is inactive is uncertain.	None Known
No #	Two drains from Bldg. 39	No Date	Uranium, lead, organics	Unknown	NV Status unknown.	None Known
No #	Drain from Bldg. 20	No Date	Uranium, beryllium	Unknown	NV Status unknown.	None Known

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3-17-97

TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twenty-Four

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 33 (Continued)						
No #	Drain from Bldg. 16	1951 - ?	Coolant from cutting operations, potential radionuclides, barium titrate, $PbZnO_3$ mixed with $PbTiO_3$, epoxy resins	Unknown	V Building still exists. No cleanup in area of drainage reported.	None Known
No #	Sump or settling tank from Bldg. TA-33-23, Trim Building	No Date	High explosives	Unknown	V Trim Building has been decontaminated and is used by a researcher. Cleanup measures taken at the sump are unknown.	None Known
No #	Drains from TA-33-26 X-unit chamber and from firing pad	No Date	Uranium, beryllium in runoff	Unknown	V Drainage pathway is distinctive and flows down canyon wall.	1985: Soil samples contained uranium.
No #	Drains from firing sites TA-33-24, 25	1950s-1960s	Uranium in runoff	Unknown	V Drains daylight at canyon wall. No record of cleanup.	None Known
No #	Drains from TA-33-86 X-unit chamber	1947 - ?	Radionuclides, possibly including uranium	Unknown	V Drains daylight at White Rock Canyon wall. No record of cleanup.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twenty-Five

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 33 (Continued)						
No #	Septic tank with tilefield and two other unnumbered drains serving Bldg. 87	1947	Unknown	Unknown	V Building is listed as a laboratory. Two drains daylight near a gun mount. Septic system tilefield flow is near MDA-D, used for underground tests.	None Known
TECHNICAL AREA 35						
No #	Two stormwater collection basins	No Date	Potentially runoff contaminated with PCBs, radionuclides, or beryllium	Unknown	V Basins are located on edge of mesa top. One discharges directly to the canyon.	None Known
TA-35-8, 9, 12, 22, 28, 31, 36, 41, 78, 96, 97, lines 49, 70, 71, 90, 91, 92	Tanks, sumps, pits, and waste lines	Variable	Radionuclides	Unknown	NV Structures removed. At some locations, contaminated subsurface soil is known to remain.	At time of removal, samples were collected at some locations.
TA-35-10	Building housing waste tanks	1951-1984	Radionuclides	Unknown	V Building and waste hold-up tanks removed in 1984. Excavated to18-20 ft below grade. Remaining soil contained 356 pCi/g gross beta prior to backfill. Location remains unvegetated and shows signs of soil erosion.	See Status

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twenty-Six

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 35 (Continued)						
No #	Outfall from Bldg. TA-35-10	1951-1963	1951-1954: 2.2 Ci (radionuclide not specified). 1956-1963: 0.123 Ci Sr-90, 9.039 Ci unidentified beta-gamma emitters (decayed through 12/81). Other spills and accidental releases are known to have occurred but are not quantified	See Type	V Inactive outfall that discharged to Mortandad Canyon. Extent of area affected estimated in 1980 to be 10,000 m^2 - accuracy of estimate unknown. Elevated rad reading noted during Survey at one location in vicinity of former outfall.	1952-1970: Direct radiation measure-ments and limited soil sampling.
No #	Bldg. 25 outfall to canyon	1950s	Nonradioactive discharge from the Sodium Building	Unknown	NV Unknown.	None Known
No #	Bldg. 34 outfall to canyon	1950s	Sodium testing building condensate return line - nonradioactive. Other unknown	Unknown	NV Unknown.	None Known
TA-35-14, 76	Septic tanks	1950s-1975	Sanitary waste. Other unknown	Unknown	NV Abandoned in 1975.	None Known
No #	Bldg. 26 drain to canyon	No Date	Unknown	Unknown	NV Drain partially removed in 1985. No radioactive contamination identified.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twenty-Seven

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 35 (Continued)						
No #	Cooling tower outfall to canyon	No Date	Unknown	Unknown	NV Cooling tower inactive. Discharge mentioned in old NPDES permit.	None Known
No #	Former lagoon	No Date	Unknown	Unknown	V Former lagoon location is currently under N end of Bldg. TA-35-85. No information on lagoon removal.	None Known
TECHNICAL AREA 36						
TA-36-61	Septic tank at IJ Firing Point	No Date	Potential HEs and residual uranium	Unknown	NV IJ is considered active, therefore, presumably tank still exists.	None Known
TA-36-17, No #	Septic tank at Bldg. 1 and unnumbered drains	1957-1987	Potential photolab wastes, uranium-238, solvents, hydrochloric acid, and metal machine shop wastes	Unknown	NV Origin of drains emptying off cliff unknown. Septic tank assumed to be active.	None Known
TA-36-49	Sump pit at Bldg. 48	No Date	Zinc chloride, acids, glue	Unknown	V Still exists. Covered by wooden boards.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twenty-Eight

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 39						
Unnumbered sump identified during Survey	Sump that received Bldg. 4 wastes	Pre-1986	High explosives from Trim Building	Unknown	V Sump (approximately 16 ft²) removed in May-June 1986, including gravel, pipes, and traps. Material contaminated with HEs burned at firing site. Remaining soils tested and explosives not detected.	See Status
TECHNICAL AREA 41						
TA-41-11	Septic tank	1986	Radionuclides	Unknown	V Inactive, but still exists and is considered contaminated.	None Known
TA-41-7	Sanitary Treatment Plant tank and outfall	1955	Radionuclides	216-244 dh/i	NV In 1955, effluent was sampled and found to contain 216-244 dpm/L gross alpha. Plant is active.	See Status
TECHNICAL AREA 42						
TA-42-2	Ash residue tank	1951-1978	Lanthanum-140 ashes from offgas cleanup of incinerator; dry sludge with 130 nCi/g plutonium-239	140,000-L tank; 2,600 L dry sludge	V Inactive. Sludge disposed of at TA-54; details on disposal of tanks, foundations, and soils removal are lacking.	1979 (sludge)
TA-42-3	Ash residue tank	1951-1978	Lanthanum-140 ashes from offgas cleanup of incinerator; wet sludge with 1,000 nCi/g plutonium-237	140,000-L tank; 2,600 L wet sludge	V Inactive sludge mixed with cement, then disposed of at TA-54; details on disposal of tanks, foundations, and soils removal are lacking.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 42 (Continued)						
TA-42-4	Septic tank	1951-1978	Radioactive wastes	Slurry: $>1x10^6$cpm/L gross alpha; $>1x10^6$cpm/L gross beta; $39x10^3$ cpm/L gross gamma	V Inactive. Slurry liquid drained to filter trench and on to outfall.	1978 after D&D.
No #	Filter trench and outfall	1951-1978	Radioactive wastes	Unknown	V Inactive contaminated liquids flowed into Mortandad Canyon; soils surrounding trench (1,200 m^3) were excavated and disposed of at TA-54; up to 400 pCi/g soil remains at depth. Excavation backfilled.	1978 after D&D.
TECHNICAL AREA 45						
TA-45-1	Wash rack	1951-1966	Vehicle decontamination waste liquids	Unknown	V Inactive; 516 truckloads of debris and soils removed during D&D of this and ancillary lines, manholes, etc.	1967, 1982
TA-45-2	Wastewater Treatment Plant system	1951-1966	Radioactive liquid wastes from TAs 1, 3, 48: plutonium and fission products high in gross beta and gamma	Unknown	V Inactive. See above D&D activity. D&D completed July 1967 and area transferred to Los Alamos County - -present occupant is County Roads Dept.	1967, 1982

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 45 (Continued)						
No #	Treated waste outfall	1951-1966	Low-level plutonium	Unknown	V Inactive. Canyonside/cliff comprised of tuff was jackhammered -- debris removed via 94 truckloads.	1967, 1982
No #	Untreated waste outfall	Pre -1951	Plutonium	Unknown	V Inactive.	None Known
TA-45-3	Lift station overflow outfall	1951-1956	Plutonium	Unknown	V Inactive. Overflow was to acid canyon.	1967, 1982
TA-45-5, 6	Manholes	1951-1966	Radioactive waste	Unknown	NV Inactive. LASL memo of 1966 states they should be removed. Current status unknown.	None Known
No #	Acid canyon	1951-1966	Plutonium	Unknown	NV Further cleanup performed in 1982. Subsurface contamination remains in areas of TA-45 where influent waste lines were once located.	1982
TECHNICAL AREA 46						
No #	Drain from Bldg. 24	1958	50% hydrochloric acid 50% nitric acid	Unknown	NV Drain reportedly went to a storm drain that emptied over mesa rim.	None Known
TA-46-61	Acid sump manhole	1960	Bldg. 31 acid wastes	Unknown	NV Assumed to still exist.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Thirty-One

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 46 (Continued)						
TA-46-81	Open concrete tank N of Bldg. 31	1963-1973	Water used to clean metal containers	Unknown	NV Potentially discharged to Canyon del Buey. Removed in 1973.	None Known
No #	Effluent from Bldg. 1, Rm. 8	1965	Metallurgical polishing effluent containing uranium	Unknown	NV Disposal location unknown.	1965: Effluent contained 24-49 mg total uranium.
No #	Effluent from Arc Jet Facility	1969	Lithium hydroxide	50-100 lb/yr lithium	NV Discharge location unknown.	None Known
TA-46-53	Septic tank near Bldg. 31	1974	Plutonium potentially contaminated with uranium, organics, and beryllium	Unknown	V Tank reportedly pumped out twice in 1974. Tank still exists.	1973: 21,822 dpm/L gross alpha.
TA-46-8, 22, 49, 66, 94	Septic tanks	Pre-1973	Potential radioactive contamination, organics, and beryllium	Unknown	NV Abandoned in 1973. Tank 94 backfilled.	None Known

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TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Thirty-Two

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 46 (Continued)						
TA-46-69, 70	Sumps	Pre-1973	Potential uranium, organics, and general chemicals	Unknown	V Located on the edge of a mesa near a laboratory used in Rover Program. A few dead trees noted downgradient, but there is no information regarding an overflow from these sumps. Abandoned in 1973.	None Known
TA-46-149	Pit	1973	Battery acid that was possibly neutralized with lime	25,000-gal capacity	NV Unable to locate during Survey.	None Known
No #	Pond	? - 1987	Salt solution	Unknown	NV Lined pond still contains salt solution but is no longer used for tests.	None Known
TECHNICAL AREA 50						
Lines 44, 45, 45A, 46, 47, 48, 48A, 49, 54, 55, 67	Waste lines	Pre-1981	Radioactively contaminated waste	Unknown	NV Lines removed in 1981 and 1984 (2 projects) and disposed of in Area G.	During removal operations.

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PRELIMINARY

TABLE D-1 FORMER LIQUID WASTE DISPOSAL SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 53						
No #	Disposal pit	No Date	Thick brownish liquid of unknown origin	Unknown	V Inactive. Formerly located SE of TA-53-2 but has been removed and backfilled. Location of final disposal unknown.	None Known
TECHNICAL AREA 57						
No #	Disposal areas for geothermal investigations	1973 - ?	Drilling mud and cuttings from Fenton Hill Site	Unknown	V Disposal in borrow pits on Forest Service land and on private property.	None Known
No #	Drilling mud pits	1973 - ?	Drilling mud and cuttings which may include arsenic, cadmium, boron, lithium, and fluorine	Unknown	V Mud pits are typically removed following drilling operations; however, the degree of cleanup and the residual contamination are unknown.	None Known
TECHNICAL AREA 59						
TA-59-4	Septic tank and drainfield	Mid-1960s-1979	Sanitary, photographic wastes	Unknown	V Inactive; was located 115 ft SW of Bldg. 1; removed in 1979 when facility was hooked up to TA-50 Wastewater Treatment Plant.	Unknown if surrounding soils were tested during removal.

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TABLE D-2. SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 2						
TA-2-49	Cooling tower drift loss	1971	Hexavalent chromium	.05 lb/hr of operation	V Cooling tower is active but no longer uses potassium dichromate. No visual signs of contamination.	None Known
TECHNICAL AREA 3						
TA-3-66	Leak in chilled water system of Sigma Building	1972	Soluble fluoride	600-700 lb	NV Release flowed into Sandia Canyon. Some degree of cleanup conducted.	1972 High of 48 ppm fluoride in liquid
TA-3-218, 253	Former capacitor storage area near buildings	No Date	PCBs	Unknown	NV Potential location of past spills or leaks. All of the PCB-marked capacitors and many of the others removed.	None Known
TA-3-287	Drum and capacitor storage area outside building	? - 1987	Oil-like stains on ground, possible PCB contamination	Unknown	V Drums and capacitors still present.	None Known
TA-3-282	Capacitor, transformer, equipment storage area outside building	1986	PCBs	Unknown	NV Leaks observed in 1986. Since that time, most or all PCB-contaminated capacitors reportedly removed along with several inches of soil.	None Known
TA-3-316	High-Voltage Test Facility with a Marx generator	1969	Possible PCB contamination	Unknown	NV A fire occurred and dielectric oil was lost. It is unknown if the oil contained PCBs or if other toxic materials were formed as a result of the combustion.	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Two

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 3 (Continued)						
TA-3-382	Storage area near building	1986	Oil, others unknown	Unknown	NV Stains observed in 1986. Current status unknown.	None Known
TA-3-38, 383, 446	Possible spills and leaks	No Date	Unknown	Unknown	NV Warehouse complex where spills potentially occurred in the past. Buildings still active.	None Known
TA-3-22	Steam/power plant	No Date	Chromate drift loss	Unknown	NV Status unknown. Assume that a chromate-based corrosion inhibitor is no longer used.	None Known
No #	Past spills/leaks around Pan Am Buildings	No Date	Possibly oils, PCBs, lead and acid from batteries	Unknown	NV Spills potentially occurred in the past from storage of drums, transformers, and batteries. Locations not specified but some cleanup reportedly has taken place.	None Known
TA-3-25, 58, 127, 156, 187, and 285	Cooling towers	No Date	Blowdown and/or drift loss from cooling towers contaminated with hexavalent chromium and some radionuclides	Unknown	NV Cooling towers still active.	None Known
TECHNICAL AREA 5						
TA-5-5	Shop and darkroom spills	1945-1959	Metals, HEs, radionuclides, cesium	Unknown	V Building was D&D'd during LASCP (1985); no observable evidence of residual soil contamination noted during Survey.	1959: no rad, only HE in building; none known on soils

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Three

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 6						
No #	Possible dumping ground	Mid-late 1940s	Flammable liquids and toxic solvents from barrels	Unknown	NV Inactive; old safety order required collecting these wastes in barrels, then dumping them in an area reportedly halfway between TA-6 & TA-22.	None Known
TECHNICAL AREA 8						
TA-8-10	Main Ranch House	1950	Radioactive materials may have been stored in the house and that potentially released.	Unknown	V House removed in 1950 - general location visited. No rad readings above background. No visual signs of contamination.	None Known
No #	Spill at "Main Building"	1951	Plutonium	Unknown	NV Building number not provided.	None Known
TA-8-24	Spills at Isotope Building	1954 and 1955	Strontium-90 spilled at loading dock	Unknown	NV Building still in use. Strontium-90 spill cleaned up but potential exists for residual contamination to be present at loading dock.	None Known
TECHNICAL AREA 10						
No #	Spills near laboratory buildings	1945-1963	Strontium-90; nitric, hydrochloric, hydrofluoric, and sulfuric acids; lanthanum, barium, cadmium, platinum, benzene, and carbon tetrachloride; other organic and inorganic contaminants	Unknown	V Inactive. Laboratory wastes were occasionally spilled near laboratory buildings.	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Four

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 15						
TA-15-183	Broken capacitor	1961	PCBs	Unknown	NV No information on cleanup provided.	None Known
No #	Spill	No Date	Vacuum pump oil	Unknown	NV Location not specified.	None Known
No #	Spill next to PHERMEX	No Date	Oil	Unknown	V Occurred in a ditch outside PHERMEX that actively receives cooling water.	None Known
Identified during Survey	Spill NE of Bldg. 185	1987	Dark-stained, oil-like spill	Unknown	V Dark stained soil in drainage ditch next to a high-voltage amplifier and transport boxes noted during Survey.	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Five

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 16						
No #	Various spills and releases around process buildings in TA-16	No Date	High explosives, such as composition B, TNT, A-3 TNT, pentolite, barium nitrate, ammonium nitrate, and Cyclotol 70/30; carbon tetrachloride; thallium and thallium compounds; phosgene; lithium fluoride; toluene; fluoride; toluene diisocyanate; uranium/niobium alloy; methyl ethyl ketone; beryllium; perchloroethylene; mercury; chloromaleic anhydride; boric acid; boracatol; ammonium picrate; trinitrostilbene; alpha-nitronaphthalene; anthracene; butyl acetate; dinitrotoluene; "potting compound" plastics; phenolic resins; butyl phthalate; trimethyl phenol; and lead powder	Unknown	NV Locations not specified. Contaminants listed are not specific spills but rather materials used in the TA.	None Known
TA-16-28, 189, 262	Cooling towers	See Status	Drift loss containing chromates	Unknown	NV Cooling towers removed in 1968, 1960, and 1957, respectively.	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Six

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 18						
No #	Transformer at TA-18-136	1982	PCBs	See Status	NV Spill cleaned up in 1982. Approximately 50 m^3 contaminated soil was disposed of in Area G. No information on PCB levels remaining in soil reported.	Assumed during cleanup.
No #	Stream running through TA-18	1963	Unknown	Unknown	NV Location of where wastes were reportedly occasionally released to stream not specified.	None Known
TECHNICAL AREA 21						
TA-21-223	Pumping station	Pre-1970	Radionuclides	Unknown	NV Occasionally the station overflowed and contaminated liquids were released down the canyon. No record of cleanup provided.	None Known.
MDA-T and MDA-V	Overflow of seepage pits	1956	Radionuclides	Unknown	V When in use, these liquid waste disposal sites occasionally overflowed.	None Known
TA-21- 152, 166, 167, 220	Cooling towers	Pre-1970s	Drift loss from towers, contaminants unknown	Unknown	V and NV Current status is unknown.	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Seven

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 21 (Continued)						
No #	Spill	1972	Radioactively contaminated oil	Unknown	NV Spill occurred at an incinerator used for burning batch waste. Measurements of up to 20,000 cpm alpha were recorded. No information on cleanup provided.	See Status
TA-21-5	Release from a fire	1959	Assumed to be radioactively contaminated	Unknown	NV No information on cleanup provided.	None Known
TA-21-35	Waste tank leak on W side of Bldg. 35	1955	Assumed to be radioactively contaminated	Unknown	NV No information on cleanup provided.	None Known
TA-21-2, 3	Paved surfaces between N sides of building	1955	Assumed to be radioactively contaminated	Unknown	V Area cleaned up and repaved. No visual signs of contamination noted.	Assumed during cleanup.
TA-21-257	Area around building	1972	Assumed to be radioactively contaminated	Unknown	V No report of cleanup provided at time contamination was found.	None Known
TA-21-257	Spill	1976	Radioactively "retrievable paste"	Unknown	NV Reportedly, area was decontaminated.	Assumed during cleanup.
TA-21-2 or 257	Area around building	1977	Americium-241	Unknown	V Contamination occurred as a result of a transport trailer leak. Levels up to 50,000 cpm/100 cm^2 were noted. Records indicate plans to clean up but no information available to document that it was completed.	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Eight

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 21 (Continued)						
TA-21-257	Leak from tank vent	1982	Plutonium, americium, uranium	Unknown	NV Contamination reportedly cleaned up.	Assumed during cleanup.
No #	Stack emissions from DP Site	1945-1978*	Plutonium-239	Unknown	NV Soil samples from TA-21 contain elevated levels of Pu-239. A 1980 report indicates that area of contamination is 300,000 m^2.	See Status
TECHNICAL AREA 22						
No #	Random disposal of solvents and flammables	1949-?	Toxic solvents and wastes, flammables	Unknown	NV Inactive. Common practice was to empty liquids daily into barrels. When these barrels were full they were dumped on ground between TA-22 and TA-6. Practice has been discontinued for many years.	None Known
TECHNICAL AREA 33						
No #	Accidental releases, predominantly in TA-6	Varied	Radionuclides	Unknown	NV Numerous past releases have occurred. Total environmental contamination not quantified.	None Known
No #	Spill/release	1960s	Beryllium, beryllium oxide	Unknown	NV Releases occurred as a result of three malfunctioned tests. Elevated levels of beryllium found in soil and on equipment. Locations not specified. No information on cleanup.	See Status

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Nine

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 33 (Continued)						
No #	Potential spill	1958	Radioactive oil, PCBs	Unknown	NV A vacuum pump, believed to have been SE of Bldg. 21, was damaged during a test and may have leaked.	None Known
TECHNICAL AREA 35						
No #	Spills or releases on S side of TA-35	1956	Alpha emitters, uranium, strontium-89, strontium-90	Unknown	NV Contaminated soil identified on S side of TA-35. No further information available.	Limited
No #	Spills or releases E of Bldg. 10	Pre-1983	Cesium-137, strontium-90, plutonium-238 and 239, and uranium	Unknown	V Contaminated soil identified in 1983 on E side of former Bldg. 10 that held radioactive wastes.	Limited
No #	Pond overflow S of Bldg. 125	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
No #	Spill in culvert S of Bldg. 125	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
No #	Spills at oil storage area near Tank 153	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
No #	Storm drain outfall with stained soil located S of Bldg. 86 (E of Bldg. 207)	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION. LANL
Page Ten

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 35 (Continued)						
No #	Canyon side S of Bldg. 207 with numerous areas of stained soil	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
No #	Stormwater basin and erosion path S of Bldg. 34	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
No #	Stained soils at capacitor/drum storage area S of Bldg. 67	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
No #	Stained soils around two oil storage tanks on W side of Bldg. 29	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
No #	Potential spills from rusting capacitors stored under trailer on E side of Bldg. 29	1987	PCB-contaminated oil, other unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
No #	Stained soil (black and yellow) in drainage ditch on SE corner of Bldg. 29	1987	Unknown	Unknown	V No cleanup measures had been performed at time of Survey.	None Known
TECHNICAL AREA 36						
No #	Occasional dumping	No Date	Dithekite (nitric acid, nitrobenzene, water mixture)	Unknown	NV Locations supposed to be not less than 100 ft from buildings or roads, but not otherwise specified	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Eleven

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 39						
TA-39-55	Former incinerator location	1955-1960	Classified waste, potentially a few magnesium shavings	Unknown	V Incinerator located S of Bldg. 2 removed in 1977. No visual signs of contamination. Location of ash disposal unknown.	None Known
Identified during Survey	Spills near TA-39-2	Pre-1978	Solvents, alcohol	Unknown	V Potentially small quantities of waste solvents or alcohols were spilled or dumped outside buildings. Parking area now paved. No visual signs of contamination.	None Known
TECHNICAL AREA 40						
TA-40-9	Oil and solvent spill	No Date	Gun cleaning oil and solvents (trichloroethane, 1,1,1-trichloroethane)	4' x 8' surface area	V Inactive. Bare patch of soil is approximately 4' x 8'.	None Known
No #	Beryllium release	1958	Beryllium	Unknown	NV Inactive. An operator worked a small piece of beryllium with no local exhaust ventilation.	None Known
TECHNICAL AREA 42						
TA-42-1	Incinerator	1951-1978	Low-level plutonium-contaminated waste burned	Unknown	V Reportedly, incinerator never worked properly. Stack effluents were high in radioactivity. In 1978, incinerator was D&D'd.	1977 prior to D&D; post-D&D in 1978

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Twelve

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 46						
No #	Ditch SW of Bldg. 1	1964	Cesium metal and oxide	Unknown	V Location visited, no elevated rad readings noted.	None Known
No #	Cooling tower for Bldg. 1	1971	Drift loss containing corrosion control additives - reportedly biodegradable and nontoxic	10,500 gpy	NV Still exists (1986 photo).	None Known
No #	Cooling tower for Bldg. 87	1971	Drift loss containing corrosion control additives - reportedly biodegradable and nontoxic	453,000 gpy	NV Assumed to still exist.	None Known
No #	Spill east of Manifold 71	1987	Oil-like substance	Unknown	V Dark stains around approx. 15 drums. Runoff goes to a ditch and then to the edge of the canyon.	None Known
No #	Spill next to Shed 197	1987	Oil-like substance	Unknown	V Storage shed with 2 pieces of electrical equipment leaking - stains evident leading to a storm drain.	None Known
No #	Spill near Bldg. 158	1987	Oil-like substance	Unknown	V Dark stains in a ditch, drainage eventually leads off mesa edge.	None Known

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Thirteen

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 46 (Continued)						
No #	Spill	1957	Mercury	Unknown	NV Location not identified.	1957: 10-15 times permissible levels.
No #	Spills N of Bldg. 31	1987	Oil-like substances, other unknown	Unknown	V Numerous stained surface soil areas. Runoff flows over edge of mesa.	None Known
No #	Spills S of Bldg. 31	1987	Unknown	Unknown	V Green stains on surface soils next to loading dock noted during Survey. Stained area very small.	None Known
TA-46-36	Spills or leaks on E and W side of Bldg. 36	1987	Oil-like substance, drums labeled chloroethane and Shell Oil	Unknown	V Dark stained surface soil noted adjacent to electrical parts and approximately five drums. Runoff drains to a ditch that leads to the edge of the mesa. Markings on tape placed on drums indicate that they may have been sampled in 1986 (e g , Sample #8605225).	Uncertain, See Status

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TABLE D-2 SPILLS AND UNPLANNED RELEASES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Fourteen

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 50						
No #	Sump overflow	1975	Radionuclides	50,000 pCi gross alpha	NV Sump LD-2 overflowed and contaminants followed drainage path into Ten-Site Canyon. Soil sampled in canyon drainage; mid-section found to have 300 pCi/g gross alpha. Bottom of canyon found to have a high of 70 pCi/g. Unclear whether area was cleaned up.	See Status
TA-50-1	Spill NE side of TA-50-1	No Date	Radionuclides	Unknown	NV Spill reportedly cleaned up; low levels of activity remain.	Assumed during cleanup.

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TABLE D-3 OPEN DUMPS AND BONEYARDS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 0						
MDA-M	Surface dump N of TA-9AE	1947 - 1987	Paint and solvent cans, clear glass bottles containing liquids, pipes, and debris with asbestos exposed, pieces of concrete and rubble, potentially items contaminated with uranium and/or HEs	3.2 acres	V Open dump with no cover, no control of runon/runoff, and no fencing to control access.	None Known
TECHNICAL AREA 3						
No #	Pan Am boneyard and storage areas on Sigma Mesa	? - 1987	Transformers, electrical equipment, metal joints, asphalt debris, ~150 used empty drums, utility poles, cable, insulators, other equipment	See Type	V Storage areas are located along an unpaved road on the end of Sigma Mesa. Drums are side-stacked inside a locked, fenced area. Remaining areas are open.	None Known
No #	Dumping on canyon rim near head of Sandia Canyon	No Date	Concrete, building material, friable asbestos- covered pipe	Unknown	V Some cleanup has taken place.	None Known
No #	Dump S of Bldg. 40 along edge of Twomile Canyon rim	?-1987	Building rubble	Unknown	NV Dump is visible on 1964 aerial photograph.	None Known
No #	Dump at end of road across Twomile Canyon bridge	?-1987	Soil, rubble	Unknown	V Numerous piles of soil and scattered pieces of debris. No elevated rad readings noted.	None Known

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TABLE D-3 OPEN DUMPS AND BONEYARDS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Two

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 4						
No #	Dumping of firing site debris	Mid-1940s	Natural and depleted uranium, aluminum or steel contaminated with uranium, also possibly beryllium and HEs	Unknown	V Radioactive contaminants above background levels cleared from area during 1985 cleanup.	See Status
TECHNICAL AREA 8						
Identified during Survey	Surface debris	? - 1987	Metal fragments	Unknown	V Small area with debris exposed on ground; no other information available.	None Known
TECHNICAL AREA 10						
No #	'Up-canyon dump'	1957	HE wastes from firing sites	Unknown	NV During 1957, wastes were burned and ashes removed and disposed of at MDA-C. Area not used after 1957.	None Known
TECHNICAL AREA 11						
No #	Open dump S of Bldg. 4	? - 1987	Concrete, building debris	Unknown	V Debris is exposed on surface at head of a canyon.	None Known
No #	Boneyard near former Target Area	? - 1987	Pieces of iron, a gun, other equipment	Unknown	V Potential for contamination unknown.	None Known

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TABLE D-3 OPEN DUMPS AND BONEYARDS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Three

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 13						
No #	Canyon shelf NE of firing site	1947	HEs and/or radionuclides	Unknown	V Mounds of debris (concrete, metal) along edge of canyon. No radiation readings above background. Uncertain whether canyon shelf was ever cleaned up relative to HE and rad contamination.	None Known
TECHNICAL AREA 14						
No #	Canyon rim dump near Bldg. Q-34	? - 1987	HEs, other unknown	Unknown	V Dumping of sandbags and several 55-gal drums over rim edge behind Bldg. Q-34.	None Known
Identified during Survey	Boneyard	? - 1987	Guns, cannons, metal, radionuclides, sodium	Unknown	V Boneyard contained open-top, contorted, 55-gal drums filled with liquid. Uncertain whether liquid was waste or water collected from precipitation. Metal debris noted with 4,500 cpm rad reading.	None Known
TECHNICAL AREA 15						
Identified during Survey	Open pit at Firing Point G	1987	Uranium, other firing site debris	Unknown	V Small, rectangular pit across road from TA-15-28 with elevated rad readings. No other information available.	None Known
No #	Two surface burning areas	1980	Oil-soaked uranium turnings	Unknown	NV Potentially two areas used for burning oil/uranium mixtures. One was 100-150 yd W of E-F, the other on E-F Site proper.	None Known

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TABLE D-3 OPEN DUMPS AND BONEYARDS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Four

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 15 (Continued)						
No #	Dumping along edge of canyon S of Firing Points E and F	1985	Radioactively contaminated soil, metal frames and boxes contaminated with 300-500 cpm alpha, and site is the location where a concrete chamber exploded. The chamber was contaminated with 1mR/hr beta-gamma and 7,000 cpm alpha.	Unknown	V An old roadbed leading to edge of mesa is evident. Rad-contaminated shrapnel noted during Survey. Extent of contamination unknown.	See Type
MDA-Z	Open dump off road leading to Firing Point G and PHERMEX	?-1987	Uranium, lead, beryllium	Unknown	V Dump contains approximately 15 blast mats with elevated rad readings, concrete debris, and sandbags. Up to 20,000 cpm noted in area.	None Known
TECHNICAL AREA 16						
No #	Burning ground	1948 - ?	Unknown	Unknown	NV Area located W of Anchor Ranch Road. Area apparently was used for at least 10 years. LANL personnel noted that there is no visual evidence of site remaining.	None Known
MDA-R	Burning ground	Pre-1965	High explosives	Unknown	V Site is 3.27 acres located N of Bldg. 260. In the 1960s, area was graded and debris was disposed of over edge of canyon. At time of Survey, snow cover limited field observations.	None Known
No #	Surface dumping E of West James Road and NW of Bldg. 540	? - 1987	Concrete and other debris	Unknown	NV Status unknown.	None Known

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TABLE D-3 OPEN DUMPS AND BONEYARDS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Five

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 21						
No #	Canyonside dumping	? - 1987	Concrete, asphalt, and building debris	Unknown	V Materials have been pushed off edge of canyon. Erosion is evident.	None Known
TECHNICAL AREA 33						
No #	Surface dump near Area 6 in TA-33	?-1975	100 capacitors containing PCBs, uranium, beryllium, and other metals	6,500 ft^2 in size	NV Excavated in 1974 and 1975 and disposed of in TA-54. Post-cleanup rad survey in 1975 showed no contaminants remaining at dump location. Uncertain whether cleanup extended down canyon side and along runoff pathways.	See Status
No #	Two canyonside dumps at Gun Mount Area	? - 1987	Foam, wooden debris, wires potentially contaminated with uranium and/or beryllium	Unknown	V Debris scattered down the canyonside.	None Known
TECHNICAL AREA 35						
No #	Open dump on N side of TA-35	? - 1987	Concrete, asphalt, conduits, reinforcing rods, soil	Unknown	V Surface debris scattered in wooded area near edge of canyon.	None Known

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TABLE D-3 OPEN DUMPS AND BONEYARDS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Six

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 36						
No #	Boneyard near Minie Firing Site	?-1987	Witness plates, collimeters, empty Freon containers, 10 full 5-gal cans of isopentane, 2 test chambers, 20-25 empty sealant cans, and assortment of other equipment	Unknown	V Equipment found with up to 14,000 cpm reading. Storage conditions do not prevent deterioration of containers or possible migration of contaminants.	None Known
TECHNICAL AREA 40						
No #	Canyonside dumping	pre-1966	HEs with wood and other debris	Unknown	V Materials disposed of below canyon rim, S of TA-40-15 Firing Site. No information available regarding cleanup.	None Known
TECHNICAL AREA 46						
No #	Boneyard E of Bldg. 158	?-1987	Lead and cement bricks, 12 oil drums, miscellaneous equipment	See Type	V Open storage area with stained soil noted during Survey.	None Known
TECHNICAL AREA 53						
No #	Lead bricks	? - 1987	Lead	12 bricks	V Bricks randomly scattered S of TA-53-2. Site reportedly inactive.	None Known

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TABLE D-3 OPEN DUMPS AND BONEYARDS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Seven

Structure Number	Description	Date*	Waste Characteristics		V/NV**	Previous Sampling
			Type	Quantity	Current Status or Condition	
TECHNICAL AREA 00L						
TA-00L-3	Airport incinerator ash/debris	? - 1987	Ash, metal scrap, and cans from incinerated materials of unknown origin	150' x 50' x~5' thick	V Ash and residual metal scrap from incinerator dumped from mesa rim onto canyon side. Wastes remain on canyon side.	None Known
TA-00L-13	Surface dump off East Jemez Road	1948	Building debris	Unknown	V Debris dumped into canyon. No information available regarding cleanup.	None Known

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PRELIMINARY

TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 0						
MDA-C	Landfill with 7 pits and 107 shafts	1948-1974	Radioactive contaminants including U-233, 234, 235, 236 and 238; Pu-239; Am-241; H-3; Na-22; Co-60; Sr-90/Y-90; fission products and induced activity. Chemicals including pyrophoric metals, hydrides, powders, vessels containing sodium-potassium alloys or compressed gases; di- or triethylbenzene, and nickel carbonyl	49, 682 Ci decayed through 1-1-73. Chemicals-unknown	NV MDA-C is monitored for radioactivity but no chemical studies have been performed. MDA-C was found to be a source of tritium contamination to honeybees via vegetation in 1973. In 1976, 26 hot spots of gamma activity were found on surface soils. Surface stabilization work was conducted in 1984.	See Status
TECHNICAL AREA 2						
No #	Burn pit	1945	Combustible wastes	Unknown	NV Location unknown.	None Known
TECHNICAL AREA 3						
No #	Possible landfill E of TA-3-41, Fire Station No.1	No Date	Potentially contains remains of old TA-3 buildings destroyed in 1949	Unknown	NV Reportedly, concrete and wire are exposed on surface.	None Known
Possibly TA-3-12, along with others not designated	Burn pits (total number uncertain)	1945	HEs and nonexplosive, combustible materials	Unknown	NV Locations not specified. 1940s photograph shows possible burn pit near trailer court on East Jemez Road.	None Known
No #	Potential landfill near water tower	No Date	Unknown	Unknown	NV Reportedly, debris and wire are exposed on surface	None Known

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TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Two

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 6						
No #	Disposal pit	1947	Classified objects, large metal parts, 5 lb uranium, blocks of HE and primacord	70' x 40'	NV Location on Twomile Mesa - possibly 850 ft NW of concrete saucer.	None Known
MDA-F	Landfill	1947-1949	Classified objects, large metal parts; tuballoy; HE; primacord; casings and equipment from a plutonium implosion weapon known as "Fatman"; and other metal debris	Fenced areas ~45 ft². One pit may be 40' x 20' x 10'	V Two fenced areas depict location of landfill. However, initial geophysical survey data indicate presence of additional burial areas outside the two fences.	Mag. and GPR surveys; A411 study boreholes
No #	Disposal pit	1950	Weapon components and classified material	6' x 6' x 6'	V Area is between MDA-F and Twomile Mesa Road.	None Known
No #	Two disposal pits	1951-1952	Defective weapon components contaminated with Cs-137	2' x 2' x 4'	V Reportedly located near disposal pit used in 1950 and may contain up to 236 weapon components.	None Known
Possibly part of MDA-F	Disposal pit	1957	Classified units	Unknown	V Location of pit uncertain, possibly within fenced area of MDA-F.	Mag and GPR surveys and A411 study boreholes.
Identified during Survey	Three depressions suspected to be waste burial areas south of Twomile Mesa Road	No Date	Unknown - possibly radioactively contaminated weapon components, classified objects, and/or HE	See Status	V Three depressions were noted during the Survey, one approximately 10 ft in diameter, the other two approximately 20 ft. Based on the numerous accounts of small pits used for waste disposal in TA-6, these depressions are suspected of being areas of subsidence as a result of waste disposal.	None Known

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TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Three

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 7						
No #	Burial pit(s)	1944-1949	Unknown	Unknown	V Shallow depressions -- possibly three pits, some debris exposed on surface.	None Known
TECHNICAL AREA 8						
No #	Pit W of Bldg. TA-8-21	No Date	Potentially received uranium	Unknown	NV Location uncertain.	None Known
MDA-Q	Small pit S of Bldg. TA-8-1	Pre-1964	Gun barrels, 80 inert projectiles, 50 steel blocks, with 3" projectiles, 3" and 6" expended casings; bomb parts	See Type	V Location marked by a wooden stake. Pit is reportedly approximately 30 ft^2 in size. No visual signs of surface contamination.	1964: Metal detector used to locate site 1984: Surveyors located site.
TECHNICAL AREA 9AE						
No #	Burn pit	1949	Classified materials	Unknown	NV Pit was reportedly 20 ft x 40 ft x 3 ft deep Location unknown.	None Known
No #	Waste pit	No Date	Unknown	Unknown	NV Location described as being on "high side" of TA-9; remains unclear.	None Known

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PRELIMINARY

TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Four

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 10						
No #	Burn pit, suspected to be in a small depression observed during the survey	1956	Unknown combustible material possibly contaminated with radioisotopes	Unknown	V Residual ash and noncombustibles were reportedly removed for disposal to radioactive disposal site. TA-10 has been D&D'd and is now owned by Los Alamos County. Whether sampling occurred in this specific area is uncertain.	See Status
TECHNICAL AREA 12						
No #	Burn area	1962	Excelsior and kerosene added to HEs	Unknown	V High explosives found in 1962 and burned at a location 150-200 ft E of firing pit/structure TA-12-4. Radiation readings of 50-80 µR/hr detected in a small pit E of TA-12-4 during Survey.	1962: See Status
TECHNICAL AREA 13						
No #	Burn pits	1951	Unknown	Unknown	NV Location unknown.	None Known
TECHNICAL AREA 15						
MDA-N	Pit	No Date	Remnants of several structures that had been exposed to explosives and chemicals; suspected chemical waste disposal	Unknown	V Covered landfill. Boundaries not marked by fencing.	1985 or 1986: Geophysical survey; report pending
TECHNICAL AREA 16						
No #	Buried metal	1965	Assumed to be contaminated with HEs, based on nature of operations in TA-16	One object	NV Location S43 00 W51 00. Object removed and disposed of at MDA-P.	1965: Object removed

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TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Five

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
			TECHNICAL AREA 18			
No #	Burial 1.5 miles N of Kiva 1	1946	M1A1 Tank with no elevated radioactive readings and no ammunition	One tank	NV Tank reportedly buried 6 ft below land surface. Uncertain whether area was marked with a sign or fence.	None Known
			TECHNICAL AREA 20			
No #	Disposal pit Area 1	1945	Uranium, beryllium, HEs, and radioactively contaminated metal scrap	5 ft deep	V Records unclear as to whether wastes have been removed. Preliminary geophysics data did not include likely location of the pit.	1986: Soils and geophysics.
No #	Disposal pit Area 2	1945	Uranium, beryllium, HEs, and gun barrels	Bulldozed trench	V Preliminary geophysics data indicate anomalous conditions.	1986: Soils and geophysics.
No #	Disposal pit Area 3	1945	Uranium, beryllium, HEs, three to five gun barrels, and radioactive material contaminated by Dumbos.	Bulldozed trench	V Preliminary geophysics data indicate anomalous conditions.	1986: Soils and geophysics.
			TECHNICAL AREA 21			
MDA-B	Landfill on W end of TA-21	1945-1950	Solid wastes contaminated with plutonium, polonium, uranium, americium, curium, and actinium	See Status	V MDA-B is a 6-acre landfill and is either one large pit or numerous small pits. Chemical wastes were placed on E end; radioactively contaminated wastes were placed in remaining area. Site is fenced, about 1/3 is paved; other 1/3 has been re-covered and seeded. MDA-B is scheduled for additional CEARP Phase 2 study.	None Known

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TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Six

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 21 (Continued)						
No #	Burial of ash from incinerators	1960s-1970s	Radioactively contaminated ash (average 53,750 cpm/g gross alpha)	Unknown	NV Location not specified, current status unknown.	None Known
MDA-A	Four disposal pits in addition to liquid waste disposal	1977	Waste contaminated with plutonium, polonium, and other radionuclides	See status	V Some surface stabilization performed at MDA-A in 1985. Solid waste pits are on E end of area and are estimated to be 172 x 134 x 22 ft. MDA-A is scheduled for additional CEARP Phase II study.	None Known
No #	Suspected landfill	pre-1954	Nonradioactive and chemical wastes	Unknown	V Bare to sparsely vegetated area with shallow depressions that may be indicative of waste burial.	None Known
TECHNICAL AREA 22						
No #	Disposal pit	1946	Classified objects, shapes, and possible radioactive materials	Unknown	V Survey observed general area; exact location not found.	None Known
TECHNICAL AREA 27						
No #	Burial pit	1945	Uranium gun assemblies and ammunition	Unknown	V Exact location unknown; should be near base of cliff, possibly under highway/road fill.	1964: Metal detector; 1986: Mag. survey.

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TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Seven

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 33						
MDA-E, TA-33-59	MDA-E consists of 6 pits and 1 destroyed underground chamber. Only Pit 3 is included under landfills because it apparently received waste, whereas the other pits were used for testing purposes (see also Table D-8).	1949-1960s	Pit 1: Polonium/beryllium fired targets (240 Ci); Pit 2: Po-210 (60 Ci); Pit 3: Can of beryllium dust immersed in kerosene; Pit 4: Unspecified radionuclides; Pits 5 and 6: Unknown - may not have been used; Underground Chamber: HE, polonium Total: Several hundred kilograms of uranium.	See Type	V Pits and chamber have been covered and are fenced but there is a potential that one pit remains outside fence. Two partially filled underground test chambers are located outside fence and are not considered part of MDA-E because they were reportedly never used.	Monitored for rad under IWMP; elevated tritium found in soil moisture.
No #	Burn pit	1950s	Potentially used to burn black powder and propellant powders. Propellants used at TA-33 included LA-14B and LA-24B. LA-14B was a mixture of potassium perchlorate, fluorocarbon, TMT (tetramethylammonium perchlorate), fluorel, and 680 Halon (TFE), which was dissolved in methyl ethyl ketone, partly dried, and extruded. LA-24B consisted of potassium perchlorate epoxy, a binder made up of Epon 872, PNDA, and maleic anhydride; sodium fluoride; and acicular aluminum.	Unknown	NV Location unknown.	None Known

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TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Eight

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
			TECHNICAL AREA 33			
No #	Two burial pits	1985	Nonradioactive sawdust, vermiculite, transformer shell, building debris, telephone poles, and fencing that had been used in firing site areas and may be contaminated with beryllium.	Unknown	V One pit is on South Mesa, the other on East Mesa. Dimensions not reported. Pits were used in 1985 cleanup operation and are now inactive.	None Known
No #	Suspected landfill at Tower Area	No Date	Radionuclides, beryllium and other metals, firing site debris	Unknown	V Landfill is on edge of mesa S of TA-33-26 and W of MDA-E. Debris is exposed on top and face of landfill. Runoff flows down canyon side.	None Known
			TECHNICAL AREA 35			
MDA-X	Covered pit S of TA-35-2	No Date	Gold-lined pressure vessel that contained plutonium nitrate solution	Unknown	V Location not specifically marked. Pit contains LAPRE II defueled reactor vessel and fuel storage reservoir. No other information on residual contamination available, but environmental dosimetry records in 1985 indicate that Cs-137 in MDA-X is causing radiation levels in its vicinity to be about 60% above local background levels.	See Status
MDA-W	Buried steel cylinders	1972	Sodium coolant with traces of fission products (sodium-22, cesium-137, cobalt-58, tantalum-182) and plutonium-239	500-650 lb. (approx. 80 gal) of sodium and sodium potassium. Pu-239 estimated less than 1 ppm	V Stainless steel tubes 4 inches in diameter and 120 ft long, cased in steel and buried. Site is marked by concrete monument.	None Known

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TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Nine

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 36						
No #	Pit at Lower Slobbovia	Late 1950's	Used to explode detonators with nitromethane.	248 cans of detonators	NV Location uncertain.	None Known
No #	Burning pit across road from Minie Firing Site	1959	Pit received ash from burning combustibles at Minie Firing Site. Uranium and HEs were possibly used at firing site and thus may be in pit.	Unknown	NV Possibly used in 1959. Site not found by CEARP personnel.	None Known
MDA-AA	Burning pit at Lower Slobbovia	? - 1987	Pit received ash from burning combustibles at firing site. Uranium and HEs were possibly used at firing site and thus may be in pit.	Unknown	V Three inactive burning pits reportedly exist. They are covered and not marked. One active pit also exists.	None Known
No #	Two pits near Bldg. 12	1956	Ash from burning tuballoy.	Unknown	NV Location is uncertain but suspected to be in vicinity of MDA-AA. Pits used in 1956.	None Known
No #	Burial Area near Bldgs. 9 and 10	?-1986	Unknown	Unknown	NV Site not located by CEARP personnel.	None Known
TECHNICAL AREA 39						
No #	Two covered pits	No Date	Packing boxes, laboratory benches and shelves, firing site debris, general trash. Suspect chemicals.	Unknown	V Reportedly 2 pits were used. One is located under Bldg. 69 and the driveway; the other under a volleyball court. A streambed is adjacent to volleyball court area. No visual evidence of pit locations was noted.	None Known
Inactive portion of MDA-Y	Covered pit	No Date	Firing site debris, cables, test stand remains, office-type trash, packing boxes. Suspect chemicals.	Dimensions illegible in CEARP	V Location of covered pit not marked but CEARP reports it is N of an active pit, which is also named MDA-Y. Based on 1986 aerial photograph, a disturbed area is located N of the active pit. A streambed (dry at time of Survey) runs immediately E of these pits.	None Known

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TABLE D-4 INACTIVE LANDFILLS WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Ten

Structure Number	Description	Date*	Waste Characteristics		V/NV**	Previous Sampling
			Type	Quantity	Current Status or Condition	
TECHNICAL AREA 46						
No #	Suspected landfill	Pre-1987	Asphalt, concrete, other unknown	Unknown	V Fill is located on edge of mesa, and surface debris is exposed; drainage flows into Canyon del Buey.	None Known
TECHNICAL AREA 00L						
TA-00L-4	Airport Landfill	1940s - 1980s	Municipal, "noncontaminated" LANL D&D debris, uranium, oils, and HEs	100 lb uranium	V Operations taken over by Los Alamos County in 1966.	None Known
TA-00L-8	North Mesa Gun Mount	1946	Uranium-contaminated, bolt-down Navy-style gun mount	One	NV Exact location unknown - buried on North Mesa.	None Known
TA-00L-12	DP Road small disposal pits	No Date	Paper towels, chemical waste, and plastics from D Building	30' x 30', depth unknown	V Reportedly, disposal pits are in Knights of Columbus parking lot and are covered with concrete. Uncertain whether wastes were removed prior to pits being covered.	None Known

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TABLE D-5 LIST OF INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Previous Sampling
			Type	Quantity	Current Status or Condition	
TECHNICAL AREA 4						
TA-4-10	Firing site	Mid-1940	Natural and depleted uranium, beryllium, and other heavy metals; terbium and terbium oxide; and HEs	0.5 to 1,000 lb shot ≈ 6 per day.	V Firing pit and support structures removed during cleanup activities under LASCP	1985 (LASCP): Soils during and after cleanup activities
No #	Firing areas (total number uncertain)	Pre-1949	PETN, azide, detonator testing	<0.5 lb HE per test	NV Locations not specified. Old TA-3 demolished.	None Known
TECHNICAL AREA 5						
TA-5-7, 9, 15	Firing pits, X-unit chamber, and steel barricades	Late 1940s	Natural or depleted uranium, beryllium, cadmium, uranium-contaminated aluminum and steel, and HEs	Unknown	V D&D activities under the 1985 LASCP involved cleanup of depleted uranium in soils on mesa surface and in subsurface soils. Mortandad Canyon side not cleaned or sampled.	See Status
TECHNICAL AREA 6						
TA-6-37	Firing site on concrete saucer	1944-?	Natural uranium and PETN	Unknown	V Within saucer structure there are standing water and cattails. No detectable levels of radioactivity around perimeter of area observed during Survey.	1978 Phoswich Survey-results negative

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TABLE D-5 LIST OF INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Two

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 6						
No #	Firing site on an asphalt pad	Mid-late 1940s	Uranium and PETN	Unknown	V Asphalt pad with sump still intact. Sump has radioactivity levels slightly above background (180 cpm).	1978 phoswich survey-results negative.
No #	"Jumbino": shot containment vessel	Mid-late 1940s	Radioactive contaminants	Unknown	V Location of vessel when in use is unclear, but may have been West of concrete saucer and North of Twomile Mesa Road.	None Known
TECHNICAL AREA 7						
No #	Firing Pits 1 and 2	1944-1945	Short-lived radionuclides, PBX, Comp B, and TNT	Unknown	V Berm around pits is intact.	None Known
TECHNICAL AREA 8						
No #	Gun firing sites and ballistic test sites	1943	Uranium, dural, boron carbide	Unknown	V Structures have been removed, so locations were estimated from remaining concrete bases. No radiation readings above background noted. No visual signs of contamination.	None Known
Identified during Survey	Suspect firing site	No Date	High explosives, radionuclides	Unknown	V A mounded area surrounded by trenches was observed during Survey. According to LANL personnel, site may have been used for several hundred test shots. No other information available.	None Known

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Three

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 9AE						
TA-9AE-4, 5	Two firing sites known as Far Point	1944-1959	Steel, torpex, tamped tetryl, Comp B, bentolite	Unknown	NV Abandoned in 1959 and removed in 1963. No further information on possible residual contamination available.	None Known
No #	Recovery pit located NE of Far Point	1944-1960	High explosives	Unknown	NV Hexagonal steel-lined pit with a roof was used for firing charges. Abandoned in 1960, removed in 1963. No further information on possible residual contamination available.	None Known
TECHNICAL AREA 10						
Firing Points 1 and 2, TA-10-13, 14, 22 through 25	Southeast Firing Area and ancillary structures including X-unit chambers, electronic chambers, control buildings, and battery buildings	? - 1963	Radioactive lanthanum, natural and depleted uranium, Sr-90, lead, aluminum, and beryllium	Available inventory (CEARP file): 3,380 kg depleted U; 7,000 kg natural U; 39.6 Ci Sr, total release from both SE and NW Firing Areas	V Sweep and washdown of firing pads was standard operational procedure - washwater flowed into natural drainage. Structures removed in 1963. In 1976, the asphalt pads and contaminated soil removed under FUSRAP. Site currently belongs to Los Alamos County.	1976 FUSRAP

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 10						
Firing Points 3 & 4, TA-10-15, 16, 26 through 29	Northwest Firing Area and ancillary structures including X-unit chambers, control buildings, and battery buildings	1945-1963	Radioactive lanthanum, natural and depleted uranium, strontium-90, lead, aluminum, and beryllium	Available inventory (CEARP file): 3,380 kg depleted U; 2,000 kg natural U; 39.6 Ci Sr total release from both SE and NW Firing Areas	V Sweep and washdown of firing pads was standard operating procedure - washwater flowed into natural drainage. Structures removed in 1963. In 1976, asphalt pads and contaminated soil were removed under FUSRAP. Site currently belongs to Los Alamos County.	1976 FUSRAP
TECHNICAL AREA 11						
No #	Firing chamber between TA-11-2 and 3	1945	HEs, natural uranium, and aluminum	Up to 200 lb shots	V Structure no longer exists.	None Known
TA-11-14	Firing pit	1957	Potential HE contamination	Unknown	NV Location uncertain. One reference states that it was removed in 1956; another reference reports that it was abandoned in place in 1963.	None Known

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Five

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 11						
No #	Firing chamber between TA-11-2 and [illegible]	1945	HEs, natural uranium, and aluminum	Up to 200 lb shots	V Structure no longer exists.	None Known
TA-11-14	Firing pit	1957	Potential HE contamination	Unknown	NV Location uncertain. One reference states that it was removed in 1956; another reference reports that it was abandoned in place in 1963.	None Known
No #	Target area S of Bldg. 24	1959	Unknown	Unknown	V Targets used in firing projectiles from an air gun. Also used as launch impact areas for large (155 mm) projectiles. Some targets still present.	None Known
Identified During Survey	Target area N of Bldg. 24	Pre-1965	Unknown	Unknown	NV Nature of former uses/tests performed in this area was not clear. Cleared area still present. Potential for residual contamination uncertain.	None Known
TECHNICAL AREA 12						
TA-12-4	Large bridgelike steel firing pit	1947-mid-1950s	HE contamination	Unknown	V Firing structure still in place. No radioactivity observed on structure.	None Known
No #	Firing site E of large steel pit	1947-mid-1950s	High explosives	Charges up to 200 lb	V Structures associated with firing site burned in 1960. Noncombustible materials remain. No record of cleanup available.	None Known

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TABLE D-5 LIST OF INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 13						
TA-13-3, 4	"Battleship" bunkers used in test shots	1947	HEs, polonium	Unknown	V Steel bunkers still present and used for worker protection during current machining operations.	None Known
TA-13-6	Experimental chamber	1948	Possible HE contamination	Unknown	NV Building removed by 1950. No documentation on removal or possible residual contamination.	None Known
TECHNICAL AREA 14						
TA-14-12	Instrument chamber and firing point	1944-1952	Pentolite, torpex, tamped tetryl, Comp B, TNT, Baronal	Unknown	V Inactive.	None Known
TA-14-17	Firing pedestal	1944-1952	Pentolite, torpex, tamped tetryl, Comp B, TNT, Baronal	Unknown	V Inactive.	None Known
TA-14-2	Closed firing chamber	1944-1973	Pentolite, torpex, tamped tetryl, Comp B, TNT, Baronal, and uranium	Unknown	V Chamber burned in 1973 and noncombustibles taken to radioactive disposal pit at TA-54 and MDA-G; minimal radioactively contaminated material went to MDA-P and MDA-J.	1973: Walls, floors, ceiling between 1,000-12,000 dpm/60cm^2
TA-14-5	Open firing chamber	1944-Present	Pentolite, torpex, Comp B, TNT, Baronal, tamped tetryl, RaLa, strontium, cyanogen, hydrogen cyanide	Unknown	V Presently used for control equipment storage. No record of cleanup available, although in 1959 structure was found to be contaminated with HEs.	1959: No rad, but HE detected.

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 14 (Continued)						
TA-14-14	Firing chamber	1944-1957	Pentolite, torpex, Comp B, TNT, Baronal tamped tetryl, RaLa, strontium, cyanogen, hydrogen cyanide	Unknown	V Inactive.	None Known
TA-14-15	Firing chamber	1944-1957	Pentolite, torpex, Comp B, TNT, Baronal, tamped tetryl, RaLa, strontium, cyanogen, hydrogen cyanide	Unknown	V Inactive.	None Known
TA-14-25 through 29	Pull boxes with associated firing pad	1944-1987	Pentolite, Baronal, TNT, tamped tetryl, Comp B, torpex	Unknown	V Inactive.	None Known
TECHNICAL AREA 15						
No #	Blast test in "The Gulch" 1 mile below R Site	1944	Charges of up to 300 lb of Comp B and 500 lb of ammonium picrate	See Type	NV Location unclear, status unknown.	None Known
TA-15-17, 177	Firing platforms	Pre-1947	HEs (charges up to 50 lb)	See Type	NV Locations unknown. Abandoned in 1947.	None Known

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 15 (Continued)						
TA-15-14, 74	Firing Points A and B	1947-1957	Uranium	Unknown	NV No structures remain. No further documentation of cleanup available.	1965: HE and rad not detected in soils.
TA-15-34, 35	Firing Points C and D	1947-mid-1950s	High explosives	Unknown	NV Locations uncertain. Reportedly no structures remain and areas could not be defined during the Survey. No cleanup documentation.	None Known
TA-15-26, 36	Firing Points E and F	1940s - 1980s	Steel, aluminum, lithium hydride, uranium, mercury, lead, beryllium, boron, cadmium, gold, tritium, HMX, RDX, TNT, PETN, Cyclotol, Baratol, thorium	Over 10,000 kg uranium fired in test shots	V Two mounds of soil remain along with control bunker. Mounds of soil are known to be contaminated with uranium and metals.	1985: Be slightly elevated; elevated lead, and uranium in ppt range in surface soils.
TA-15-28	Firing Point G	1949-1967	Uranium and HEs	Unknown	V Inactive; control bunker still exists. No documentation on cleanup.	None Known
TA-15-17	Firing Point H	1949-late 1950s	Uranium and HEs	Unknown	V Inactive; control bunker remains. Signs of animal intrusion which has exposed soil with elevated radiation readings (25,000-30,000 cpm)	None Known

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 18						
No # and TA-18-5	Firing site and associated battleship structure	1944-?	Natural uranium, aluminum, marble, copper, lead, cadmium, HEs	Unknown	NV Firing site designed for small charges consisting of a few pounds each, located on W wing of canyon. No information available on potential residual soil contamination.	None Known
No # and TA-18-2	Firing site and associated battleship structure	1944-?	Natural uranium, aluminum, marble, copper, lead, cadmium, HEs	Unknown	V Firing site designed for charges of up to 2 tons, located on E wing of canyon. Drop tests and ballistics tests may also have been conducted, one of which scattered HE. No information available on potential residual soil contamination.	None Known
No #	Firing site	1944-?	High explosives	Unknown	NV Firing site designed for charges of several hundred pounds, located on S wing of canyon. No information available on potential residual soil contamination.	None Known
TECHNICAL AREA 20						
TA-20-6	Steel lined pit	Mid-1940s	HEs, beryllium, uranium	25 or 200 lb charges 2-3 tons/week	V Survey team observed approximate location. Pit had been removed and buried in either TA-2 or 3.	CEARP 1986: soils phoswich
TA-20-2	Navy gunfiring site	Mid-1940s	HEs, beryllium, uranium	Unknown	V Fixed into steel plates mounted on cliffs in N spur of canyon.	CEARP 1986: soils phoswich

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Ten

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 20 (Continued)						
No #	Dumbos	Mid-1940s	HEs, beryllium, uranium	Unknown	NV Exact location of use not clear. These were shot containment vessels. Number of tests conducted uncertain.	None Known
TA-20-13	20-mm gun for initiator timing tests	Mid-1940s	High explosives	Unknown	NV Location unknown.	None Known
TA-20-32 thru 43	Pull boxes		Unknown	Unknown	V Removed in Sept. 1985.	None Known
TECHNICAL AREA 23						
No #	Deep firing pit	1945-1952	Unknown	Unknown	NV All of this TA is within confines of present TA-9. LANL personnel stated that there is no visual evidence of the old firing pit. No record of cleanup available	None Known
TECHNICAL AREA 27						
No #	5 firing pits	1944-1947	Uranium and Comp B	Unknown	V Pits 1, 4, and 5: Uranium detected in soil at background levels. Pits 2 and 3: detected at levels 2 to 10 times background Uranium.	1985: Soils tested- see Status

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 33						
No #	Test shot	1954	Tritium	10,000 Ci	NV Location not specified.	1954: No positive findings detected by following cloud.
No #	Test shots (2)	1952	Polonium	Unknown	NV Location not specified. Cleanup initiated after shots.	None Known
TA-33 -25, 26, 85, 146	South Mesa test shot areas - Tower area	1947 - ?	HEs, beryllium, beryllium oxide, polonium, uranium from test firing for Kiwetok shots, Navy gun penetrator testing, and initiator implosion shots	Shots ranged from 700-2,500 lb HE	V In 1985, LANL conducted limited cleanup in area for radionuclides. Small shrapnel fragments, cable tray, wire, and debris remain at site. Only half-scale shots were conducted on this mesa.	1986: Soil samples collected; results pending.
TA-33 -89, 97, 98, 116, 117, 118, 127, 130, 135, 136	East Mesa test shot area - Gun Firing Area	1947 - ?	HEs, beryllium from a 1966 malfunctioning gun test, beryllium oxide, polonium, and uranium	Largest shot was 5,000 lb HE	V In 1985, LANL conducted limited cleanup in area for radionuclides. Site has been abandoned. Full-scale shots for initiation development were conducted on this mesa.	1986: Soil samples collected; results pending.
TA-33-61, 62, 64, 65	Test shot area near TA-6	1947 - ?	HEs, radionuclides, beryllium	Unknown	V In 1985, LANL conducted limited cleanup in area for radionuclides only. Site is abandoned.	None Known

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Twelve

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 36						
TA-36-36	Drop tower	1953	U-238	Unknown	V No longer used; located at Lower Slobbovia, an active firing site.	None Known
Identified during Survey	Possible firing site	No Date	Depleted uranium, HEs, and metals	Unknown	V Radioactively contaminated surface soil (400-600 cpm) noted during Survey. Site is near IJ Firing Points.	None Known
TECHNICAL AREA 39						
TA-39-7	Firing site	Early 1950s-?	Beryllium, mercury, aluminum, copper, brass, iron, lead, stainless steel, thallium, cadmium, chromium, thorium, RDX, HMX, Baratol, PETN, TATB, Comp B, Cyclotol	Unknown	V Inactive. Dry streambed near firing site. Located at base of canyon wall.	1957: 0.8 µg/g Be in soil.
TA-39-8	Firing site	Early 1950s-?	Beryllium, mercury, aluminum, copper, brass, iron, lead, stainless steel, thallium, cadmium, chromium, thorium, RDX, HMX, Baratol, PETN, TATB, Comp B, Cyclotol	Unknown	V Inactive. Runoff drainage pathway from firing site is evident. Elevated rad readings in surface soil. Piece of depleted uranium noted on firing pad.	1957: 1.0 µg/g Be in soil.
TECHNICAL AREA 40						
No #	Firing pit	1950-?	High explosives	Unknown	V Inactive. This was a detonator firing site with a 1'-2'-deep depression surrounded on NW side by 20'-high rock face.	1985: Soils for As, Ba, Cd, Cr, Pb, Hg, Se and Ag - all below detection limits.

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TABLE D-5 INACTIVE FIRING SITES WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics		V/NV**	Previous Sampling
			Type	Quantity	Current Status or Condition	
TECHNICAL AREA 00L						
TA-00L-1	Townsite firing range	1940s - 1970s	Lead from bullets	Unknown	V Inactive. Buildings removed; concrete steps, slabs, and dirt catchment mounds not removed. Lead shots possibly not removed.	None Known
TA-00L-7	Barranca Mesa	1966	Ordnance material	Unknown	V Ordnance-type material recovered and removed from an old cistern in 1965.	None Known
TA-00L-11	Impact areas, ordnance activities	1944-1948	HEs, ammunition	Unknown	V Inactive. Military activities at: • Rendija Canyon (impact zone, not well marked for restricted access) • Barrancas (impact, restricted access) • 37mm cannon (unknown use) • TA-20 (tank practice during war years) • TA-27 (impact zone) • Pajarito Canyon (impact zone)	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 2						
No #	Water Boiler Reactor Vessel in Building TA-2-1	1944-1987	Uranyl sulfate, beryllium, uranyl nitrate solution	Unknown	NV Reactor was defueled in 1974. External structures have been decommissioned but the reactor vessel remains at the TA.	None Known
TA-2-1	Omega West Reactor	1956-1987	Enriched uranium	Unknown	V Still in operation.	None Known
TECHNICAL AREA 3						
TA-3-16, 17, 18	Van de Graaff Laboratory	1950s-1987	Tritium, induced activity, lead, nickel, cadmium, teflon, hafonum, selenium, indium	Unknown	NV Extent of interior contamination unknown. 1986 reference reports that tritium and induced activity are the contaminants. Other substances are known to have been used in the building. Building is still actively used.	None Known
TA-3-29	CMR Laboratory	1950s-1987	Plutonium, uranium, transuranics, fission products, induced activity, tritium, other radionuclides, beryllium salt, beryllicin, germanium hydride, lithium hydride, various acids and solvents, and chemical carcinogens	Unknown	NV Specific areas and extent of contamination unknown. 1986 reference reports radioactive contaminants are present. Other substances are known to have been used in the building. Building is actively used.	None Known
TA-3-31	Chemical Warehouse	1953	Beryllium nitrate	Leaks from 5 lb bottles	NV No information on cleanup of these leaks. Warehouse also handled natural uranium. Building is still in use.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 3 (Continued)						
TA-3-39, 102	Shop/Fabrication Building	1953-1987	Cadmium, beryllium, thallium, antimony, bismuth, lead, lithium fluoride, enriched uranium, depleted uranium, 235-U, 238-U, lithium hydride	Unknown	NV No specific information on spills inside the building is available. Buildings are in use.	None Known
TA-3-40	Physics Building	1954-1987	Beryllium, plutonium, mercury, tritium, transuranics, fission products, activation radionuclides, trichloroethylene, darkroom wastes, spray booth wastes, epoxy resins, soldering and plating wastes, printed circuit shop that used HCl, ferric chloride, nickel, copper, gold, pyrophosphate solutions, HBF, and PB Sn fluoborate	Unknown	NV Plutonium and mercury spills reportedly cleaned up. 1986 reference reports that building is contaminated with various radionuclides. Extent of interior contamination is unknown. Numerous activities have occurred in building. Building is in use.	None Known
TA-3-43	Administration Building	1956	231-protoactinium	Unknown	NV Early activities involved various solvents, chemicals, metals, and tests (including combustion) of PCB-contaminated oils. Only one spill reported to have occurred in the building (1956: 231-protoactinium) and it was cleaned up. No other information available. Building is in use.	None Known
TA-3-35	Fabrication/Press Building	Mid-1950s - 1984	Uranium-235	Unknown	NV Contamination of building is assumed due to history of operations. Further information is not available.	None Known
TA-3-66	Plating, foundry, milling, ceramics and powder metallurgy, and fabrication building	Mid-1950s - 1987	235-U, normal U, tritium, lead, PbO, Nb_2O_5, Ta_2O_5, Fe_2O_3, ZrO_2, HfO_2; chromium, nickel, copper and cyanide plating solutions; trichloroethylene, toluene, diisocyanate, methyl chloroform, and benzene	Unknown	NV Contamination of building is assumed due to history of operations. Further information is not available.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Three

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 3 (Continued)						
TA-3-141	Rolling Mill Building	1950s-1987	Uranium	Unknown	NV Contamination of building is assumed due to history of operations. No further information is available.	None Known
TA-3-216	Weapons Test Support Facility	1960s	Polystyrene and arsenic crystal growing	Unknown	NV No specific information on spills that occurred inside the building is available. Building is still present.	None Known
TA-3-159, 160, 161	Explosive forming facility, firing chamber, and bunker	1960s	High explosives were used in small indoor firing chamber	Unknown	NV Structures still present. Status of potential contamination is unknown.	None Known
TECHNICAL AREA 5						
TA-5-20	Underground Calibration Structure	1960s - 1987	Unknown	Unknown	V Inactive. Structure remains in place, underground, and partially backfilled with soil.	None Known
TECHNICAL AREA 6						
TA-6-1	Carpenter Shop	Mid-1940s - ?	Unknown	Unknown	V Active. Intact; used for storage. Ground surface erosion observed underneath building.	None Known
TA-6-3	Laboratory and Storage	Mid-1940s - ?	High explosives and chemical contamination	Unknown	V Currently used for storage.	None Known
TA-6-6	Assembly Facility (Laboratory and Shop)	Mid-1940s - ?	High explosives and chemical contamination	Unknown	V Building is still present.	None Known
TA-6-9	Laboratory	Mid-1940s - ?	High explosives testing	Unknown	V Inactive, yet remains intact.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Four

Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 7						
No #	Weapons stockpile roofs (five)	1944-1945	Unknown	Unknown	V Inactive, roofs lying on ground randomly throughout field.	None Known
TECHNICAL AREA 8						
TA-8-1	Laboratory Building	1945 - ?	Materials handled included high explosive, "terphenyl & alpha naphtyl phenyl oxazole," styrene, methyl chloroform, thallium iodide	Unknown	V Still present, inactive. Warning signs posted indicating that the building may contain contaminants. Ducts and exhaust fans may have been removed.	None Known
TA-8-2	Process Building	1945 - ?	High explosives	Unknown	V Still present, inactive. Warning signs posted indicating that the building may be contaminated.	None Known
TA-8-3	Laboratory Building	1945 - ?	High explosives	Unknown	V Still present, inactive. Warning signs posted indicating that the building may be contaminated.	None Known
TA-8-21, 22, 23, 24, 26, 27, 31, 32, 70	Radiographic Facilities	1956 - 1987	Materials handled included high explosives, plutonium, uranium, various other materials including arsenic, beryllium, lithium hydride, titanium oxide, and lead	Unknown	NV Buildings are actively used and were not visited. A 1985 reference states that Building 23 is contaminated with medium levels of induced activity, fission products, transuranics, and uranium; Buildings 24 and 26 are suspected of being contaminated; and Building 70 is contaminated with low levels of uranium.	1954: 10,000 cpm in Building 24 1979: 200-500 cpm in Building 21

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Page Five

Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 11							
TA-11-24	Air Gun Building	No Data	Barium	Unknown	V	Data are lacking on contamination	None Known
TECHNICAL AREA 14							
TA-14-6	Control Building, Shop and Darkroom	1944-Present	Unknown	Unknown	V	Building is still present and may be used for storage.	None Known
TA-14-23	Control Building	Early 1950s-Present	Unknown	Unknown	NV	Actively used for storage of HE scrap. Less than 55 gallons are stored at any one time.	None Known
TA-14-38	Camera Building	1960-Present	Unknown	Unknown	V	Active.	None Known
TA-14-40	Instrumentation Building	1960-Present	Unknown	Unknown	NV	Active.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 15						
TA-15-233	Former Betatron Building	1969	Beryllium	Unknown	NV Spill was reportedly cleaned up in 1969.	None Known
TA-15-50	Shop and Laboratory Building	1961	Beryllium-contaminated oil in diffusion pumps	Unknown	NV No information on cleanup provided.	None Known
TECHNICAL AREA 18						
TA-18-129	Reactor Sub-assembly Building	No Date	Beryllium used in building	Unknown	NV No specific information on spills inside building. Building is still present.	None Known
TA-18-141	Ultrasonic Cleaning Building	1966	Beryllium used in building	Unknown	NV No specific information on spills inside building. Building is still present.	None Known
TA-18-23, 32, and 116	Kivas 1,2, and 3 (Assembly Buildings)	1955-1957	Plutonium, uranium -233 and -235	Unknown	V and NV Occurrences of contamination reported in Kivas 1 and 2 in 1955, 1956, and 1957. Reports of cleanup are not available. Kivas are still in use.	None Known
TA-18-26,30,119,122, 129, 168	Vault, laboratory and office, storage buildings, reactor sub-assembly building, and dynamic critical assay facility	1962 and 1984	Assumed to be contaminated with radionuclides	Unknown	V and NV These buildings have been listed as contaminated (some in 1962, others in 1984). No other information is available.	None Known

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Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 21							
TA-21-150, 2, 3, 4, 5	DP West Buildings	1945-1978	Plutonium and transuranic elements	Unknown	V In 1978-1981 a project known as the Los Alamos DP West Plutonium Facility Decontamination Project took place involving a $4.4 million cleanup. The sides of Buildings 3 & 4 were not decontaminated because uranium recovery work was still ongoing. The buildings are still standing and are secured within a special fence due to potential radioactive contamination. Entry inside the buildings is restricted because of contamination and thus buildings were not entered during the Survey. The DP West facility will be further addressed under Phase II of CEARP.	See Status
TA-21-286	Storage for plutonium solutions	Post-1972	Plutonium nitrate	Unknown	NV Leak inside building was reportedly cleaned up.	None Known
TA-21-146	Process Airflow Filter Building	No Date	Radionuclides	Unknown	NV Status is unknown.	None Known
TA-21-21	Vault	No Date	Unknown	Unknown	NV Apparently still used. Contamination status unknown.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 21 (Continued)							
TA-21-61	Laboratory	Pre-1965	PCBs, uranium-235	Unknown	NV	Building once used to store oils containing PCBs. Also used to process U-235. Exhaust system and drains may be contaminated. No documentation on cleanup.	None Known
TA-21-66	Slab	1969	Radionuclides	Unknown	NV	Slab was reportedly contaminated. Current status is unknown.	None Known
TA-21-30	Salt Preparation Building	No Date	Sodium chloride, lithium chloride, potassium chloride, zinc chloride, anhydrous hydrogen chloride, chlorine gas, calcium salts, cadmium, lead oxide, and mercury	Unknown	NV	No information on specific spills inside the building was reported. Current status is unknown.	None Known
TA-21-14	Instrument Building	No Date	Asbestos	Unknown	NV	Originally, this building was a power plant. Currently used by Pan Am. Asbestos reportedly removed when Pan Am occupied building	None Known
TA-21-152	DP East Laboratory	1947-1969	Polonium, actinium, uranium-235, niobium, and beryllium	Unknown	NV	Specific information on spills inside buildings is limited. Bldg. 152 is still standing.	None Known
TA-21-155	Furnace Building	1986	Tritium, highly reactive metal tritides	Unknown	NV	Building once was used for storage, currently referred to as a furnace building and handles tritium.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 22						
TA-22-1	Loading Building (Prefabricated steel building)	1945-to Mid-1950s	PETN, RDX, tetryl, PBX solvents	Unknown	V Special assemblies still intact, was also used for a Laboratory and photoprocessing	None Known
TA-22-2	Magazine	1945-1987	High explosives	Unknown	NV Active. Now part of TA-40.	None Known
TA-22-3	Magazine	1945-1987	High explosives	Unknown	NV Active. Now part of TA-40.	None Known
TA-22-5	Warehouse	1950-1987	High explosives	Unknown	NV Active, contamination status unknown.	None Known
TA-22-34	Laboratory	Early 1950s-1987	High explosives, photoprocessing chemicals and solvents	Unknown	V Active, contamination status unknown.	None Known
TA-22-91	Detonator Support Building	1984-1987	Sodium carbonate, sodium hydroxide, organics, hydrochloric acid and ferric chloride	Unknown	NV Active, contamination status unknown.	None Known
TA-22-93	Detonator Explosives Building	1984-1987	High explosives	Unknown	NV Active. Manufactures explosives for detonators.	None Known
TECHNICAL AREA 23						
No #	Assembly operations	1945	Uranium, lead, high explosives	Unknown	V Specific building(s) were not identified. Most buildings are still standing.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 33						
TA-33-86	Contaminated Laboratory Building	1947 - 1987	Tritium releases occurred inside building and exited via ventilation system	Ranged from 658 - 7,170 curies	NV Building is still active.	1974: Interior swipes show elevated tritium
TA-33-40	Contaminated Saw Building	1951	Uranium released during operation of a slit saw	Unknown	V During tuballoy cutting operations in 1951, air samples from the breathing zone contained uranium 7.5 times the maximum permissible levels. Operations have ceased but the building is still standing.	See Status
No #	Contaminated structure	1954	Polonium	Unknown	NV Leaking assembly in Area 6 (location not further specified). Assembly was bagged and removed, and the area oiled. Other cleanup measures not reported.	1954: 2,000,000 cpm at time of incident
TA-33-19	Contaminated Laboratory and Office Building	1954	Mercury	Unknown	NV Building still exists. Mercury reportedly cleaned up but its final disposition is unknown.	None Known
No #	Contaminated building	1956	Trichloroethylene	Unknown	NV Spill occurred in "Main Shop Building" from a large degreasing tank. Location and cleanup measures not further specified.	None Known
TA-33-110	Incinerator	No Date	Unknown	Unknown	V Incinerator is inactive but still in place.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 35						
TA-35-2	Contaminated Laboratory	Late 1940s-1987	Materials used in the building include alpha sources, radioactive lanthanum, strontium-90, neptunium-237, germanium hydride, beryllium salts, plutonium oxalate aerosols, tritium, lithium tritide, uranium-235, gold, sodium, sodium potassium	Unknown	NV Inside of building was not visited. Some cleanup work was performed in past. Amount of residual contamination is unknown.	Limited
TA-35-7	Contaminated Air Filter Building	Pre-1981	Fission products, strontium-90, cesium-137, low-level TRU material	Unknown	NV Building was cleaned up by 1981. Residual contaminants may exist in the walls. Portions are currently in use.	Assumed during cleanup
TECHNICAL AREA 39						
TA-39-4	Trim Building	? - 1987	High explosives	Unknown	NV Trim Building is still active - potential for contamination is uncertain.	None Known
TECHNICAL AREA 41						
No #	TA-41 Operational buildings	No Date	Lithium hydride, uranium, plutonium, americium, beryllium and beryllium oxide, tritium, arsenic, mercury, lithium hydride, various organics	Unknown	V TA was visited during Survey but not specific buildings. TA is largely covered by buildings and pavement. No visual signs of spills. Potential for contamination inside buildings is uncertain.	None Known

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TABLE D-6 LIST OF CONTAMINATED STRUCTURES STILL STANDING WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Previous Sampling
			Type	Quantity	Current Status or Condition	
TECHNICAL AREA 46						
TA-46-1	Ducts and drains in Laboratory Building	1980	Uranium	Unknown	NV Interior of building was not visited. Building is still in use.	None Known
TA-46-16	Cells 1 and 2 in the Test Building	1986	Uranium	Unknown	NV Interior of building was not visited. Building is still in use.	None Known

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TABLE D-7 LIST OF CONTAMINATED STRUCTURES THAT HAVE BEEN REMOVED WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Previous Sampling
			Type	Quantity	Current Status or Condition	
TECHNICAL AREA 2						
TA-2-3	"Chem Shack"	Pre-1971	Uranyl nitrate, perchloric acid	Unknown	V Building was removed in 1971 and area now occupied by Building 63. No visual signs of contamination. Uncertain whether soils were contaminated and/or removed.	None Known
TECHNICAL AREA 3						
TA-3-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Buildings, Hutment, Production shop, magazine and Burn Pit	1943-1949	High explosives, including PETN and Azide	Unknown	NV Buildings were located on the north end of the present Administration Building parking lot. They were removed in 1949. No information available on the potential for residual soil contamination.	None Known
TECHNICAL AREA 4						
TA-6	Process and Trim Building	Mid-1940s	HE	Unknown	V Inactive firing pit and support structures removed for reconstruction and final D&D during LASCP	Soils during & post RA (LASCP)
TA-4-7	Darkroom and Laboratory	Mid-1940s	Radioactive photoprocessing chemicals	Unknown	V Inactive firing pit and support structures removed for reconstruction and final D&D during LASCP	Soils during & post RA (LASCP)
TA-4-5	Storage Building	Mid-1940s	Unknown	Unknown	V Inactive firing pit and support structures removed for reconstruction and final D&D during LASCP	Soils during & post RA (LASCP)

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TABLE D-7 LIST OF CONTAMINATED STRUCTURES THAT HAVE BEEN REMOVED WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Two

Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 5						
TA-5-1	Laboratory Building	1945- Unknown	High explosives	Unknown	V Inactive; D&D'd.	1959, Mesa soils, under LASCP
TA-5-6	Laboratory Building	1945-Unknown	High explosives	Unknown	V Inactive; D&D'd.	
TECHNICAL AREA 6						
TA-6-10	Laboratory Building drain	1944-1950s	High explosives: PETN; beryllium, mercury, silver, and cadmium	Unknown	V Inactive detonator manufacturing and testing; D&D'd; burned 1960.	None Known
TA-6-13	Small explosives lab	1945- Mid-1950s?	High explosives: PETN; beryllium, mercury, silver, and cadmium	Unknown	V Inactive detonator manufacturing and testing; D&D'd; burned 1960.	None Known
TA-6-14	Pressing Hutment	1945- Mid-1950s ?	High explosives: PETN; beryllium, mercury, silver, and cadmium	Unknown	V Inactive detonator manufacturing and testing; D&D'd; burned 1960.	None Known
TA-6-15	Boiler House	1945- Mid-1950s ?	High explosives: PETN; beryllium, mercury, silver, and cadmium	Unknown	V Inactive detonator manufacturing and testing; D&D'd; burned 1960.	None Known
TA-6-38	Generator Building	1945- Mid-1950s ?	High explosives: PETN; beryllium, mercury, silver, and cadmium	Unknown	V Inactive detonator manufacturing and testing; D&D'd; burned 1960.	None Known
TA-6-49	Ramp and Building	1945- Mid-1950s ?	High explosives: PETN; beryllium, mercury, silver, and cadmium	Unknown	V Inactive detonator manufacturing and testing; D&D'd; burned 1960.	None Known

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TABLE D-7 LIST OF CONTAMINATED STRUCTURES THAT HAVE BEEN REMOVED WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Three

Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Previous Sampling
			Type	Quantity	Current Status or Condition	
TECHNICAL AREA 6 (Continued)						
TA-6-38	Generator Building	1945- Mid-1950s	Unknown	Unknown	V Inactive; removed 1980.	None Known
TA-6-2	Generator Building	1945- Mid-1950s	Unknown	Unknown	V Inactive; intact.	None Known
TA-6-11	Laboratory	1945- Mid-1950s	High explosives: PETN; beryllium, mercury, cadmium	Unknown	NV Inactive; D&D'd 1972.	None Known
TA-6-13	Small explosives laboratory	1945- Mid-1950s	Unknown	Unknown	NV Inactive; destroyed by burning on January 16, 1960.	None Known
TA-6-14	Storage Building	1945- Mid-1950s	Unknown	Unknown	NV Inactive; abandoned.	None Known
TECHNICAL AREA 9AE						
TA-9AE-1, 2, 3, 6, 11, 18, 7, 8, 9, 10, 12, 13, 14, 16, 19	Buildings	1959	High exlosives and radioactive contamination	Unknown	V Buildings were burned in 1960. In 1965 the residues were removed. Efforts included removal of sumps and drains. Area currently looks like an open field.	None Known
TECHNICAL AREA 10						
TA-10-35	RaLa Separation Building	Mid-1940s to 1963	Lanthanum-140, barium-140, cesium-140, and strontium-90	Unknown	V Inactive RaLa used for X-ray source at firing sites. This building commenced operations in 1950	None Known
TA-10-1	Radiochemistry Building	Mid-1940s to 1963	Lanthanum-140, barium-140, cesium-140, strontium-90; nitric, hydrochloric, hydrofluoric, and sulfuric acid; cadmium; platinum; benzene; carbon tetrachloride; organic and inorganic impurities	Unknown	V Combustible sections burned in sparse area, the uncontaminated wall buried "in Bayo Canyon"	None Known

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TABLE D-7 LIST OF CONTAMINATED STRUCTURES THAT HAVE BEEN REMOVED WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Four

Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV**	Current Status or Condition	Previous Sampling
TECHNICAL AREA 10 (Continued)							
TA-10-4	Storage Building	Mid-1940s- 1963	Suspected strontium-90 and HE contamination	Unknown	V	Moved to a clearing and burned in 1960.	Ashes 1-12 mR/hr
TA-10-6	Storage Building	Mid-1940s- 1963	Suspected strontium-90 and HE contamination	Unknown	V	Burned in place in 1960.	Ashes 1-12 mR/hr
TA-10-31	Cell Building	Mid-1940s- 1963	Suspected strontium-90 and HE contamination	Unknown	V	Burned in place in 1960.	None Known
TA-10-3	Storage Building	Mid-1940s- 1963	Suspected slight radioactive contamination	Unknown	V	Moved to a clearing and burned in 1960.	None Known
TA-10-5	Storage Building	Mid-1940s- 1963	Suspected slight radioactive contamination	Unknown	V	Moved to a clearing and burned in 1960.	None Known
TA-10-19	Storage Building	Mid-1940s- 1963	Suspected slight radioactive contamination in inaccessible places	Unknown	V	Placed in streambed and burned in 1960.	None Known
TA-10-32	Welding Shop	Mid-1940s- 1963	Suspected slight radioactive contamination in inaccessible places	Unknown	V	Placed in streambed and burned in 1960.	None Known

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TABLE D-7 LIST OF CONTAMINATED STRUCTURES THAT HAVE BEEN REMOVED WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
Page Five

Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 10 (Continued)							
TA-10-10	Magazine	Mid-1940s - 1963	HE-contaminated	Unknown	V	Burned in place in 1963.	None Known
TA-10-11	Magazine	Mid-1940s - 1963	HE-contaminated	Unknown	V	Burned in place in 1963.	None Known
TA-10-2	Storage Building	Mid-1940s - 1963	Contained a large source shield	Unknown	V	Burned in place in 1963; shielding taken to contaminated dump.	None Known
TA-10-8	Inspection Building	Mid-1940s - 1963	Suspected slight radioactive contamination	Unknown	V	Burned in place in 1963.	None Known
TA-10-14	Battery Building	Mid-1940s - 1963	Suspected slight radioactive contamination	Unknown	V	Burned in place in 1963.	None Known
TA-10-12	Laboratory Building	Mid-1940s - 1963	Suspected slight radioactive contamination	Unknown	V	Burned in place in 1963.	None Known
TA-10-34	Static Test Building	Mid-1940s - 1963	Suspected slight radioactive contamination	Unknown	V	Burned in place in 1963.	None Known
TA-10-21	Personnel Building	Mid-1940s - 1963	Suspected slight radioactive contamination	Unknown	V	Debris taken to contaminated landfill.	None Known
TA-10-20	Warehouse	Mid-1940s - 1963	Suspected slight radioactive contamination	Unknown	V	Inactive; concrete slab still in place.	None Known

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TABLE D-7 LIST OF CONTAMINATED STRUCTURES THAT HAVE BEEN REMOVED WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 11						
TA-11-7, 8, 9	Storage magazines	1959	Contaminated with high explosives	Unknown	NV Removed in 1960.	None Known
TA-11-10	Shelter	1959	Contaminated with high explosives	Unknown	NV Removed in 1960.	None Known
TECHNICAL AREA 12						
TA-12-1	Trim Building	Mid-1950s	HE contamination	Unknown	V Burned 1960; noncombustible remains left in place.	None Known
TA-12-5	Generator Building	Mid-1950s	Old 55-gallon drum nearby	Unknown	V Burned 1960.	None Known
TA-12-6	Junction shelter	Mid-1950s	None reported	Unknown	V Burned 1960.	None Known
TECHNICAL AREA 13						
No #	P-Site Building	1947	High alpha activity - possibly polonium. Potential for beryllium to have been present.	Unknown	NV Location not specified. Most buildings were removed by 1950.	None Known
No #	"Hot" Building	1948	Unknown - probably radionuclides	Unknown	NV Location not further identified All buildings except TA-13-2, 3, and 4 (alias TA-16-476, 477, 478), which were the laboratory and two bunkers, have been removed.	None Known

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TABLE D-7 LIST OF CONTAMINATED STRUCTURES THAT HAVE BEEN REMOVED WITH INFORMATION ON CONTAMINANTS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 14							
TA-14-3	Control Room	1944-1952	Unknown	Unknown	V	Inactive.	None Known
TA-14-4	Explosive Preparation Building	1944-1952	HE: pentolite, torpex, tamped tetryl, Comp B, TNT, Baronol	Unknown	V	Inactive.	None Known
TA-14-7	Electric Shop	1944-1952	Unknown	Unknown	V	Inactive.	None Known
TA-14-10	Storage Building	1947-1952	Unknown	Unknown	V	Inactive.	None Known
TECHNICAL AREA 18							
TA-18-15	Magazine	No Date	Uranium and beryllium oxide	Unknown	V	General vicinity where magazine was reportedly located was visited during Survey. The structure was once used for storage but was removed sometime after 1971. The area is an open, relatively flat field. No visual signs of contamination.	None Known

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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 19						
TA-19-1	Laboratory Building	1944-1962	Radioactivity, trimethylborate toluene	300 Ci of cobalt-60 source	V Inactive; transferred to Zia in 1962; assigned to LAAO in same year.	1962 for rad only; one shelf contaminated
TA-19-2	Battery Building	1944-1956	Radioactivity, trimethylborate toluene	Unknown	V Inactive transferred to Zia in 1962; assigned to LAAO in same year.	1962 for rad only; one shelf contaminated
No #	Shelter Building	1944-1962	Unknown	Unknown	V Location unknown.	1962 for rad only; one shelf contaminated
TECHNICAL AREA 20						
TA-20-11	Hot Storage	No Date	Radioactivity	Unknown	V D&D'd prior to 1985; foundation blocks in place.	No radioactivity observed during Survey

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Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 21							
No #	Storage facility	1973	Plutonium	> 10 n/Ci Pu	NV	Retrievable storage facility used during removal of Building TA-21-12. Assumed to no longer exist.	None Known
TA-21-12	Filter Building	1945-1973	Plutonium-239	Unknown	NV	Building removed in 1973. Some debris and large metal items went to MDA-A. Aproximately 30 cm of soil removed from beneath building and backfilled. Subsurface soil contamination may still remain.	None Known
TA-21-22	Warehouse	1957-1966	Unknown	Unknown	NV	Used to store contaminated equipment. Removed in 1967. No information on removal.	None Known
TA-21-6	Machine shop and cafeteria	1957-1966	Unknown	Unknown	NV	Contamination reported in corridor in 1957, and possibly in floor drains. Removed in 1966. No information on removal.	None Known
TA-21-35, 93, 145, 147, 185, 192, 255, and 271	Waste Treatment Facility	1952-1967	Contaminated with alpha-emitting radionuclides	Unknown	NV	Facility was removed and disposed of on Mesita del Buey. No information on removal or possibility of residual soil contamination.	None Known
TA-21-151	DP East Laboratory	1947-1966	Polonium, actinium, uranium-235, niobium, and beryllium	Unknown	NV	Specific information on spills inside building is limited. Removed in 1966. No information on its removal.	None Known

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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 21 (Continued)						
TA-21-153	Filter Building	1957-1978	Uranium-235, actinium-227 and its daughters	Unknown	NV Building shut down in 1970 and decommissioned and removed in 1978.	1969: 10,000 cpm alpha found
TA-21-20	Laundry	1945-1963	Plutonium	Unknown	NV Removed in 1965. Potential for residual soil contamination unknown.	None Known
TECHNICAL AREA 22						
TA-22-4	(Prefab Steel Building)	1945-1984	High explosives	Unknown	NV Inactive; landfill special assemblies removed in 1984	None Known
TA-22-26	Old Ranch Building used for storage	Pre-1940s	Unknown	Unknown	V Inactive; removed prior to 1984.	None Known
No #	Log cabin	Pre-1940s	Unknown	Unknown	V Approximate location observed.	1959: no contamination
TECHNICAL AREA 23						
TA-23-1	Laboratory	1945-1952	HE	Unknown	NV Inactive; all of this TA is within the confines of present TA-9.	None Known
TA-23-2	Office Building	1945-1952	Unknown	Unknown	NV Inactive; all of this TA is within the confines of present TA-9.	None Known

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Structure Number	Description	Date*	Contaminant Characteristics: Type	Contaminant Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 23 (Continued)						
TA-23-4	Laboratory	1945-1952	HE	Unknown	NV Inactive; all of this TA is within the confines of present TA-9.	None Known
TECHNICAL AREA 24						
TA-16-495	Contaminated shelf in building	1957	High explosives, uranium	Unknown	V Removed in 1960, area looks like an open field.	None Known
TA-16-497	Old magazine	1957	High explosives, strontium-90	Unknown	V Removed in 1960, area looks like an open field.	None Known
TA-16-499	Building	1957	Alpha, HE contamination	Unknown	V Removed in 1960, area looks like an open field.	None Known
TA-16-500	Building	1957	High explosive, uranium	Unknown	V Removed in 1960, area looks like an open field.	None Known
TA-16-490	Old T-Site Lab	1959	High explosive	Unknown	V Removed in 1960, area looks like an open field.	None Known
TA-16-491	T-Site Hutment	1959	High explosive	Unknown	V Removed in 1960, area looks like an open field.	None Known
TA-16-492, 493, 494	Hutments	1959	High explosive	Unknown	V Removed in 1960, area looks like an open field.	None Known

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			Type	Quantity	Current Status or Condition	
TECHNICAL AREA 25						
V-(TA-16-528)	Pit (electrical)	Pre-1945	High explosive and beryllium	Unknown	NV Removed in 1945. No documentation on removal or possible residual contamination.	None Known
V-3	Building	Pre-1945	Beryllium	Unknown	NV Removed in 1945. No documentation on removal or possible residual contamination.	None Known
TECHNICAL AREA 27						
TA-27-2	Control Building	1944-1947	Radioactivity, beryllium, thorium, uranium	Unknown	V Inactive; D&D'd.	
TECHNICAL AREA 31						
TA-31-1	Receiving dock	1945-1954	Unknown	Unknown	V Inactive; removed and area replaced with Eastern Area housing.	None Known
TA-31-2 through 5	Warehouses	1945-1954	Unknown	Unknown	V Inactive; removed and area replaced with Eastern Area housing.	None Known

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Page Thirteen

Structure Number	Description	Date*	Contaminant Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 31 (Continued)							
TA-31-7	Warehouse	1945-1954	Unknown	Unknown	V	Inactive; removed and area replaced with Eastern Area housing.	None Known
TA-31-8	Transformer storage	1945-1954	PCBs possible	Unknown	NV	Inactive; removed and area replaced with Eastern Area housing.	None Known
TECHNICAL AREA 32							
TA-32-1	Laboratory Building	1945-1954	Radioactivity	Unknown	V	Inactive; no records on D&D; was for biologic effects.	None Known
TA-32-2	Laboratory Building	1945-1954	Radioactivity	Unknown	V	Inactive; no records on D&D.	None Known
TA-32-3	Office Building	1945-1954	Radioactivity	Unknown	V	Inactive; no records on D&D.	None Known
TA-32-5	Laboratory Building	1945-1954	Radioactivity	Unknown	V	Inactive; no records on D&D.	None Known

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TABLE D-8 LIST OF MISCELLANEOUS INACTIVE WASTE OR RELEASE SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL

Structure Number	Description	Date*	Waste Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 4							
TA-4-1, 2 and 8	Magazines	Mid-1940	Natural and depleted uranium, aluminum or steel, beryllium; HE	Unknown	V	Inactive; cleared from area. Soils were sampled following the removal of the buildings.	See Status
TECHNICAL AREA 5							
TA-5-2	Magazine	1945-1953	High explosives	Unknown	V	A routine survey of abandoned structures determined that the structure was free of radioactivity but contaminated with HE. The structure was removed and disposed of at Airport Landfill.	1959, 1985 (LASCP)
TA-5-3	Magazine	1945-1953	High explosives	Unknown	V	Inactive with no visible signs of contamination. A routine survey of abandoned structures determined that the structure was free of radioactivity but contaminated with HE.	1959, 1985 (LASCP)
No #	Animal irradiation experiment	1955	Cobalt-60	30 Ci	V	Inactive. Location unknown.	None Known
No #	P-Division experiment	1979	Kerosene, heavy metals	Unknown	V	D& D'd under LASCP.	None Known

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TABLE D-8 LIST OF MISCELLANEOUS INACTIVE WASTE OR RELEASE SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Two

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 6						
No #	Large mound	Mid-1940s to Mid-1950s	Unknown	Unknown	V Inactive, use is unknown. Mound is still intact located 500-700 ft SE of "concrete saucer."	None Known
TA-6-16, 17, 21 through 30	Magazines (12)	Mid-1940s to Mid-1950s	PETN, beryllium, mercury, silver, and cadmium	Unknown	V Inactive; detonator manufacturing and testing; D&D'd; burned 1960.	None Known
TA-6-4	Magazine	Mid-1940s to Mid-1950s	PETN, beryllium, mercury, cadmium	Unknown	V Inactive; D& D'd 1972.	None Known
TECHNICAL AREA 7						
No #	Pulse-explosive-driven-generator	No Date	Unknown	Unknown	V Inactive with no evidence of contamination observed.	None Known
No #	Berm with inclined pipes	1944-1945	Unknown	Unknown	V Inactive. Berm and pipes remain in place.	None Known
TECHNICAL AREA 8						
No #	Machinist's equipment	1950	Radionuclide	Unknown	NV Location unknown.	None Known
Identified during Survey	Metal box-like structure	1987	Organic solvents suspected	Unknown	V Structure located west of Bldg. TA-8-2. Strong odor was noted during the Survey. No other information available.	None Known
TA-8-66	Steam manhole	?-1987	Asbestos	Unknown	V Pipes lined with asbestos under a partially collapsed wooden cover.	None Known

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TABLE D-8 LIST OF MISCELLANEOUS INACTIVE WASTE OR RELEASE SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Three

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 11						
MDA-S	Experimental 10-foot square plot	Mid-1970s - ? Release	Barium nitrate, boric acid high explosives	Unknown	V Active.	None Known
TECHNICAL AREA 12						
TA-12-8	Radiation test structure	1959	RaLa source used HE and strontium-90	1,000 Ci RaLa	V One test structure still in place.	None Known
No #	Acetylene gas gun	1968	Acetylene bottles	Two	V Used in motor locator experiments.	None Known
No #	Vertical aluminum pipe	No Date	Unknown	Unknown	V 6" liquid in aluminum 18"-dia. vertical pipe open to 2- ft depth.	None Known
TECHNICAL AREA 14						
TA-14-9	Magazine	1944-1952	Unknown	Unknown	V Inactive.	None Known
TA-14-11	Magazine	1944-1952	High explosives	Unknown	V Inactive.	None Known
TA-14-1	Magazine	1944-1960	HE: pentalite, torpex, tamped tetryl, Comp B, TNT, Baronol	Unknown	V Burned in 1959.	1959: free of rad.
TA-14-13	Magazine	1944-1960	High explosives	Unknown	V Burned in 1959.	1959. free of rad.

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TABLE D-8 LIST OF MISCELLANEOUS INACTIVE WASTE OR RELEASE SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
Page Four

Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 14 (Continued)						
TA-14-22	Magazine	1950 - Present	HE: pentolite, Baronol, TNT, tamped tetryl, Comp B, torpex	Unknown	NV Active; 55-gal storage of HE scrap.	None Known
TA-14-30	Magazine	1950 - Present	HE: pentolite, Baronol, TNT, tamped tetryl, Comp B, torpex	Unknown	V Inactive.	None Known
No#	Trash-burning area	1950s	Depleted uranium, beryllium, lead	Unknown	V Inactive; grassy berm E of TA-14.	None Known
TECHNICAL AREA 15						
TA-15, 264, 265, 270, 271, 272, 273	Series of holes on the north side of Three Mile Canyon	1968-1972	TNT, beryllium, tritium, lead	4,000 lb < 200 grams 200 Ci unknown	V Inactive. 150-ft-deep holes. Two holes used, one for calibration, the other for a test with 500 lb of plastic bonded HE. Holes covered with wood and/or metal plates.	None Known
TECHNICAL AREA 22						
TA-22-6	Boiler	1950-1984	Unknown	Unknown	NV Inactive; removed 1984.	None Known
TA-22-7 to 24 and 35 to 41	Magazine(s)	Mid-1950-Present	High explosives	Unknown	V Active; replanting grass on earth cover.	None Known

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TABLE D-8 LIST OF MISCELLANEOUS INACTIVE WASTE OR RELEASE SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics		V/NV**	Current Status or Condition	Previous Sampling
			Type	Quantity			
TECHNICAL AREA 23							
TA-23-2	Magazine	1945-1957	HE	Unknown	NV	Inactive; all of this TA is within the confines of present TA-9.	None Known
TECHNICAL AREA 28							
TA-28-1, 2, 3, 4, 5	Magazines	1947 - Recent	HE propellant	10,000 lb limit	V	Active.	None Known
No #	Old metal can disposal	1964	Floor sweepings	75 lb each	NV	These were removed from the cliff side and disposed of.	1964
TECHNICAL AREA 29							
TA-29-1, 2	Magazine	1951-1957	HE	Unknown	V	Inactive; burned in 1957.	None Known
No #	Incinerator	1930s	Refuse burning	Unknown	V	Used by Civilian Conservation Corps; no contamination suspected.	None Known

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TABLE D-8 LIST OF MISCELLANEOUS INACTIVE WASTE OR RELEASE SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 32						
TA-32-9	Incinerator	1945-1952	Radioisotopes	Unknown	V Inactive; no records on D&D.	None Known
TECHNICAL AREA 33						
TA-33-4 & 6, alias MDA-D	Two underground test chambers	1948 and 1952	High explosive, polonium, uranium, beryllium	1952 test: 600 mCi of Po-210	V Two 6 ft x 8 ft x 46 ft-deep concrete-lined shafts that have been backfilled. No fence.	None Known
MDA-E, TA-33-59	6 pits and 1 destroyed underground chamber. Pit 3 is included under landfills (Table D-4). The remaining portion of MDA-E was used in underground testing.	1949-1960s	Pit 1: Polonium/beryllium fired targets (240 Ci); Pit 2: Polonium-210 (60 Ci); Pit 3: Can of beryllium dust immersed in kerosene; Pit 4: Unspecified radionuclides; Pits 5 and 6: Unknown - may not have been used Underground Chamber: HE, polonium Total: Several hundred kilograms of uranium	See Type	V Pits and chamber have been covered and are fenced but there is a potential that one pit remains outside fence. Two partially filled underground test chambers are located outside fence and are not considered part of MDA-E because they were reportedly never used.	Monitored for rad under IWMP; elevated tritium found in soil moisture.
TECHNICAL AREA 36						
No #	Burned area near Buildings 9 and 10	?-1986	Unknown	Unknown	NV Site not found by CEARP personnel.	None Known
No #	Containment Vessel S of IJ Firing Site	? - 1987	Potentially contaminated with plutonium	Unknown	V Abandoned in place - possibly contaminated.	None Known

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TABLE D-8 LIST OF MISCELLANEOUS INACTIVE WASTE OR RELEASE SITES WITH WASTE CHARACTERISTICS AND CURRENT CONDITION, LANL
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Structure Number	Description	Date*	Waste Characteristics: Type	Waste Characteristics: Quantity	V/NV** Current Status or Condition	Previous Sampling
TECHNICAL AREA 40						
No #	Burning cage	1961 - mid-1980s	Oils, solvents, paper and wood contaminated with HE	3' diameter 4' high	V Inactive, wire-cage-type incinerator in 100 ft-diameter leveled area.	1985: As, Ba, Cd, Cr, Pb, Hg, Se and Ag all below detection limits
TECHNICAL AREA 45						
No #	Building debris	No Date	Construction/building debris	Unknown	NV Inactive, not observed during Survey - may be practice of Los Alamos County Roads Dept.	None Known
TECHNICAL AREA OOL						
TA-OOL-17	ULR-139 Incinerator	No Date	Burned classified documents and possibly radioactively contaminated wastes	Unknown	V Inactive. Radiation measurements of 40 to 100 cpm recorded during Survey.	None Known

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** V, DOE Survey team representative(s) visited site; NV, DOE Survey team representative(s) did not visit site.

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PREFACE
TO
THE DEPARTMENT OF ENERGY
LOS ALAMOS NATIONAL LABORATORY
ENVIRONMENTAL SURVEY PRELIMINARY REPORT

This report contains the preliminary findings based on the first phase of an Environmental Survey at the Department of Energy (DOE) Los Alamos National Laboratory (LANL), located in Los Alamos, New Mexico. The Survey is being conducted by DOE's Office of Environment, Safety and Health.

The LANL Survey is a portion of the larger, comprehensive DOE Environmental Survey encompassing all major operating facilities of DOE. The DOE Environmental Survey is one of a series of initiatives announced on September 18, 1985, by Secretary John S. Herrington, to strengthen the environmental, safety and health programs and activities within DOE. The purpose of the Environmental Survey is to identify, via a "no-fault" baseline Survey of all the Department's major operating facilities, environmental problems and areas of environmental risk. The identified problem areas will be prioritized on a Department-wide basis in order of importance in 1989.

The findings in this report are subject to modification based on the results from the Sampling and Analysis phase of the Survey. The findings are also subject to modification based on comments from the Albuquerque Operations Office concerning the technical accuracy of the findings. The modified preliminary findings and any other appropriate changes will be incorporated into an Interim Report. The Interim Report will serve as the site-specific source for environmental information generated by the Survey, and ultimately as the primary source of information for the DOE-wide prioritization of environmental problems in the final Survey report.

January 1988
Washington, D.C.

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2.0 GENERAL SITE INFORMATION

Section 2.1 briefly describes the site, including the location, of the Los Alamos National Laboratory (LANL), the land use of the surrounding area, and the demographics and climate of the region. Section 2.2 presents an overview of major operations and programs performed on the site. Section 2.3 discusses Federal and state regulatory concerns.

2.1 Site Setting

This section provides a discussion of both the physical and socioeconomic setting of the LANL. The physical setting includes location and the general aspects of geology, hydrology, climatology, and vegetation cover. Land use (both adjacent and on-site), demographics, and public access are also discussed.

Location

The LANL is located on an approximately 28,000-acre site in Los Alamos County in north-central New Mexico. Los Alamos County is a small incorporated county located on the Pajarito Plateau between the Jemez Mountains to the west and the Rio Grande Valley to the east. Los Alamos County is 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe (see Figure 2-1). Within the county are the LANL and two adjacent communities, Los Alamos and White Rock. The LANL also occupies a small portion of Santa Fe County. Figure 2-2 presents the land ownership surrounding the LANL. The LANL is bordered on the south and west by the Bandelier National Monument, to the west and north by the Santa Fe National Forest, and on the north by private and county land. Some small tracts of General Service Administration land and Santa Fe National Forest land are also on the north side of LANL. To the east, the LANL is bordered by the San Ildefonso Pueblo and the communities of Pajarito Acres and White Rock.

Geology

The Pajarito Plateau forms a topographically high area along the western margin of the Rio Grande depression. The Pajarito Plateau is 10 to 15 miles wide and 25 to 30

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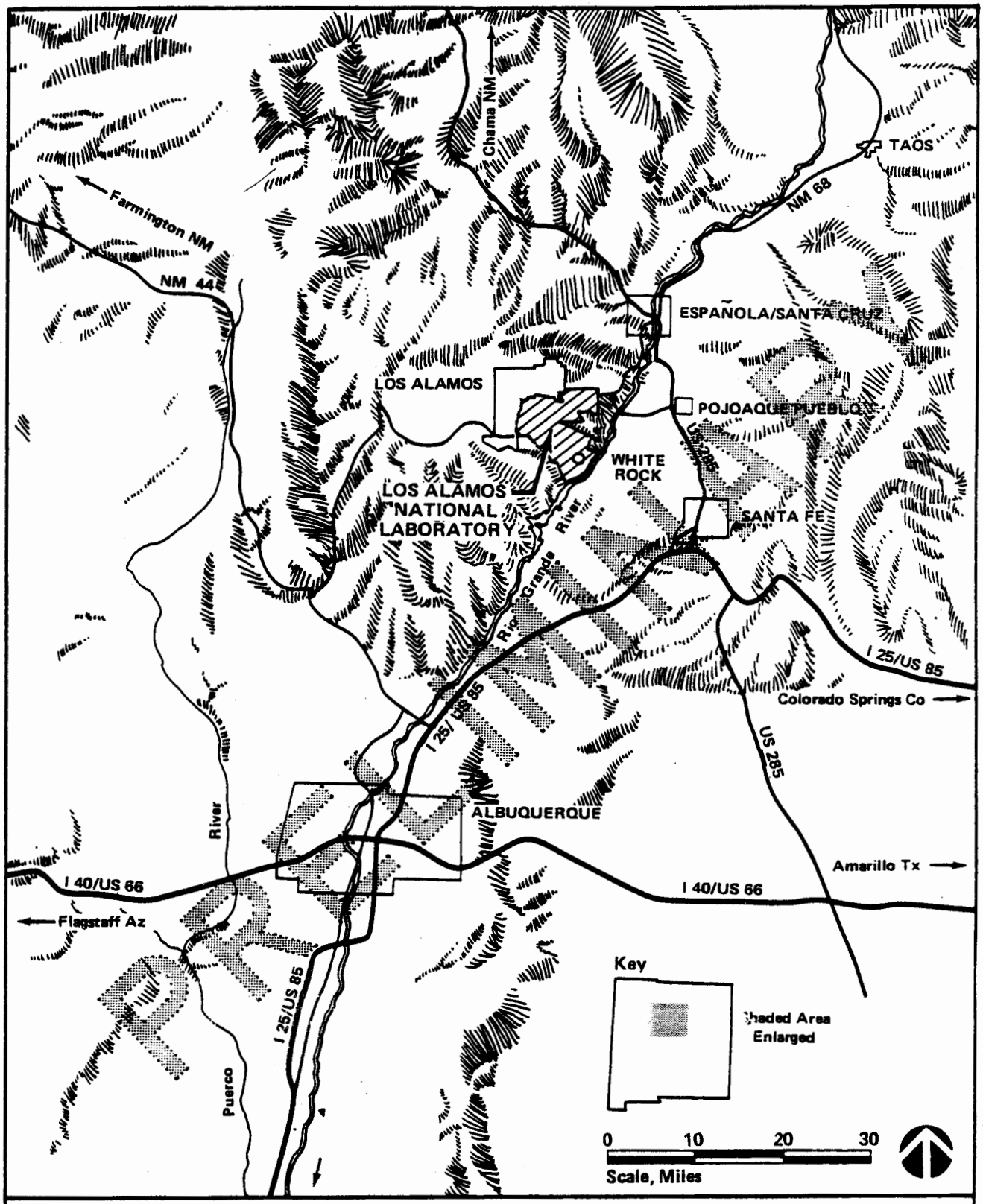
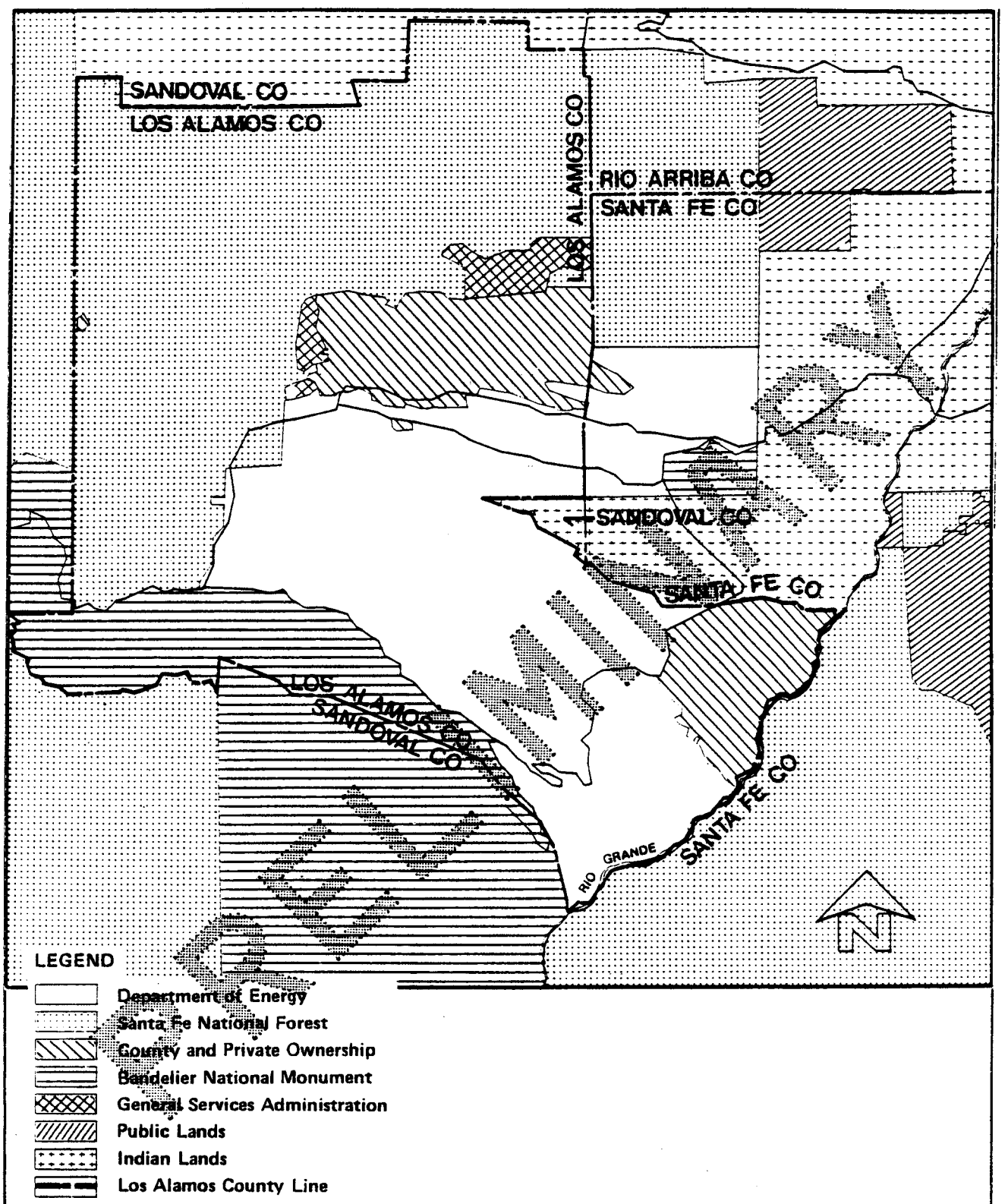


Source: LANL, 1982a

REGIONAL LOCATION OF THE LOS ALAMOS NATIONAL LABORATORY

FIGURE 2-1



Source: LANL, 1982a

NEARBY LAND OWNERSHIP AT THE LANL

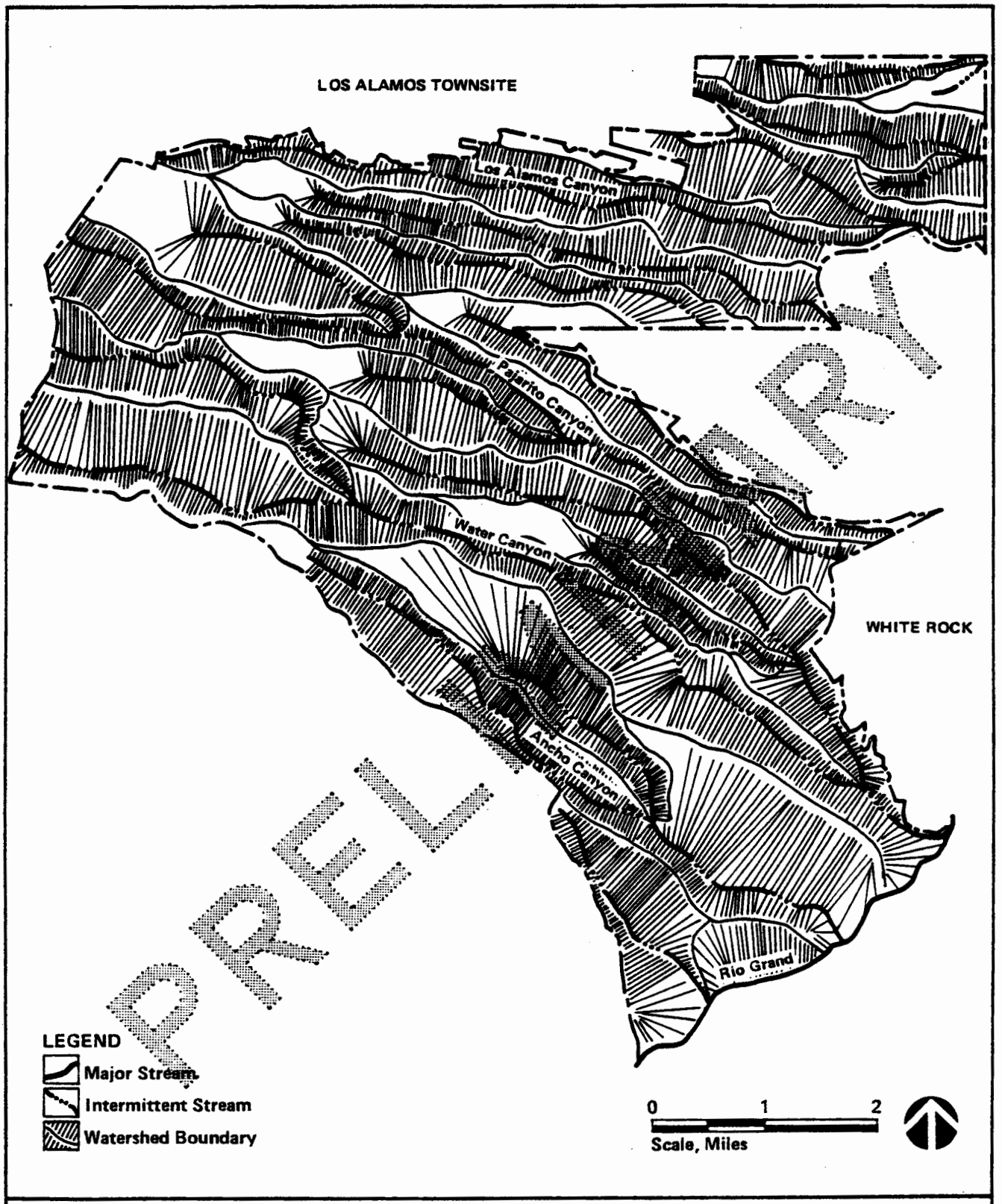
FIGURE 2-2

miles long. It slopes eastward from an altitude of 7,800 feet to 6,200 feet, ending above the Rio Grande at the Puye Escarpment and the rim of White Rock Canyon. The Rio Grande depression began to form about 21 million years ago as a result of faulting. Sediments were eroded from the highland mesas to the east and west. These sediments formed the basin-fill sedimentary rock of the Tesuque Formation of the Santa Fe Group. Volcanic activity that occurred during the formation of the Santa Fe Group deposited many basalt flows and plugs through the sediments. These basalt eruptions in the area laid down a series of basalts that flowed northwest into the White Rock area.

The volcanic rocks of the Jemez Mountains began to form during the Pliocene epoch with a series of eruptions along the western margin of the depression southwest of Los Alamos. The volcanic rocks built a high mountain mass northward from the original vents. The volcanoes covered an area of over 1,000 square miles and attained a thickness of at least 4,500 feet. The volcanic activity climaxed about 1.1 to 1.4 million years ago with two explosions that deposited 100 cubic miles of rhyolite tuff and pumice around the flanks of the volcanic mass. This ejection of tuff and pumice preceded the collapse of the center of the highlands. The collapse formed a large caldera (a large basin-shaped depression).

Surface Hydrology

Sixteen drainage areas, with a total of 52,500 acres, pass through or start with the LANL site. Streamflow in these canyons is intermittent. Figure 2-3 shows the surface hydrology on the site. Springs on the flanks of the Jemez Mountains supply base flow into the upper reaches of some canyons. The amount of water is insufficient to maintain surface flows across the LANL site before depletion. Runoff from heavy thunderstorms or heavy snowmelt reaches the Rio Grande several times a year. Effluents from sanitary sewage, industrial waste treatment plants, and cooling tower blowdown provide enough flow to some canyons to maintain surface water for about 1 mile. The intermittent flow in the streams has deposited alluvium that ranges from less than 3 feet to as much as 100 feet thick. The alluvium is quite permeable, in contrast to the underlying volcanic tuff and sediments. Intermittent runoff in canyons infiltrates the alluvium until its downward movement is impeded by the less permeable tuff and volcanic sediment. This results in a shallow alluvial



Source: LANL, 1982a

SURFACE HYDROLOGY AT LANL FIGURE 2-3

groundwater body that moves downgradient in the alluvium. As water in the alluvium moves downgradient, it is depleted by evapotranspiration and movement into the underlying volcanic sediment.

The main aquifer in the LANL area is located within the Tesuque Formation beneath the entire plateau and Rio Grande Valley. The lowest part of the Puye Conglomerate and the Tesuque Formation are within the main aquifer beneath the central and western portions of the plateau. The depths to water below the mesa tops range from 1,200 feet along the western margin of the plateau to about 600 feet along the eastern part. The thickness of potable water in the aquifer is estimated to be at least 3,900 feet. The hydraulic gradient of the aquifer averages about 60 ft/min within the Puye Conglomerate and increases to about 100 ft/min along the eastern edge of the Pajarito Plateau. The average movement rate within the aquifer is 1 ft/day toward the Rio Grande.

Climate

Los Alamos has a semiarid, temperate mountain climate. Average annual precipitation is nearly 18 inches. Forty percent of the annual precipitation occurs during July and August in the form of thunderstorms. The rest of the precipitation is from winter storms. Winter precipitation falls primarily as snow, with accumulations of about 51 inches. Winter temperatures typically range from 15° to 25°F during the night and from 30° to 50°F during the day. Summers are sunny with moderate, warm days and cool nights. Maximum temperatures are usually below 90°F. Brief afternoon and evening thunderstorms are common. The high altitude, light winds, clear skies, and dry atmosphere allow night temperatures to drop below 60°F.

Surface winds in Los Alamos often vary dramatically with time of day and with location because of the complex terrain. With light, large-scale winds and clear skies, a distinct daily wind cycle often exists. A light southeasterly to southerly upslope wind occurs during the day. During the night, a light westerly to northwesterly drainage wind occurs. However, several miles to the east toward the edge of the Pajarito Plateau, near the Rio Grande Valley, a different daily wind cycle

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is common. A moderate southwesterly wind occurs up-valley during the day. Either a light northwesterly to northerly drainage wind or a moderate southwesterly wind occurs at night. On the whole, the predominant winds are southerly to westerly over Los Alamos County.

Vegetation Cover

The ecosystem on the LANL site is diverse because of the 5,000-foot gradient between the Jemez Mountains and the Rio Grande. Variations in precipitation and temperature and the difference in solar radiation reaching the north-facing and south-facing canyon walls result in a great diversity of plants. Figure 2-4 presents a map of the vegetation cover on the LANL. Six major vegetative complexes or community types occur in Los Alamos County. These are juniper-grassland, pinyon-juniper, ponderosa pine, mixed conifer, spruce-fir and subalpine grassland. The juniper-grassland, pinyon-juniper, and ponderosa pine are the three predominant community types on the site. Each occupies about one-third of the site. Areas of sparse or no vegetation occur only in scattered locations.

Adjacent Land Use

The isolation of Los Alamos was ideal for an atomic weapons laboratory during World War II. The surrounding area, including all of Los Alamos County and large portions of Sandoval, Rio Arriba, and Santa Fe Counties, remains largely undeveloped. The U.S. Forest Service (USFS) held large tracts of land in the Jemez Mountains to the north, west, and south. Indian lands border the LANL to the east and northeast. Table 2-1 presents a summary of the land use in the area surrounding the LANL site. Grazing lands and commercial timber are the two predominant land uses, accounting for 95.6 percent of the total land use.

Laboratory Land Use

Established in 1943, the LANL had as its initial mission the development of the world's first nuclear fission weapon. This project lasted until the duration of World War II. From the start, the University of California operated the LANL under contract. However, in its early years, Los Alamos was under Army control. The

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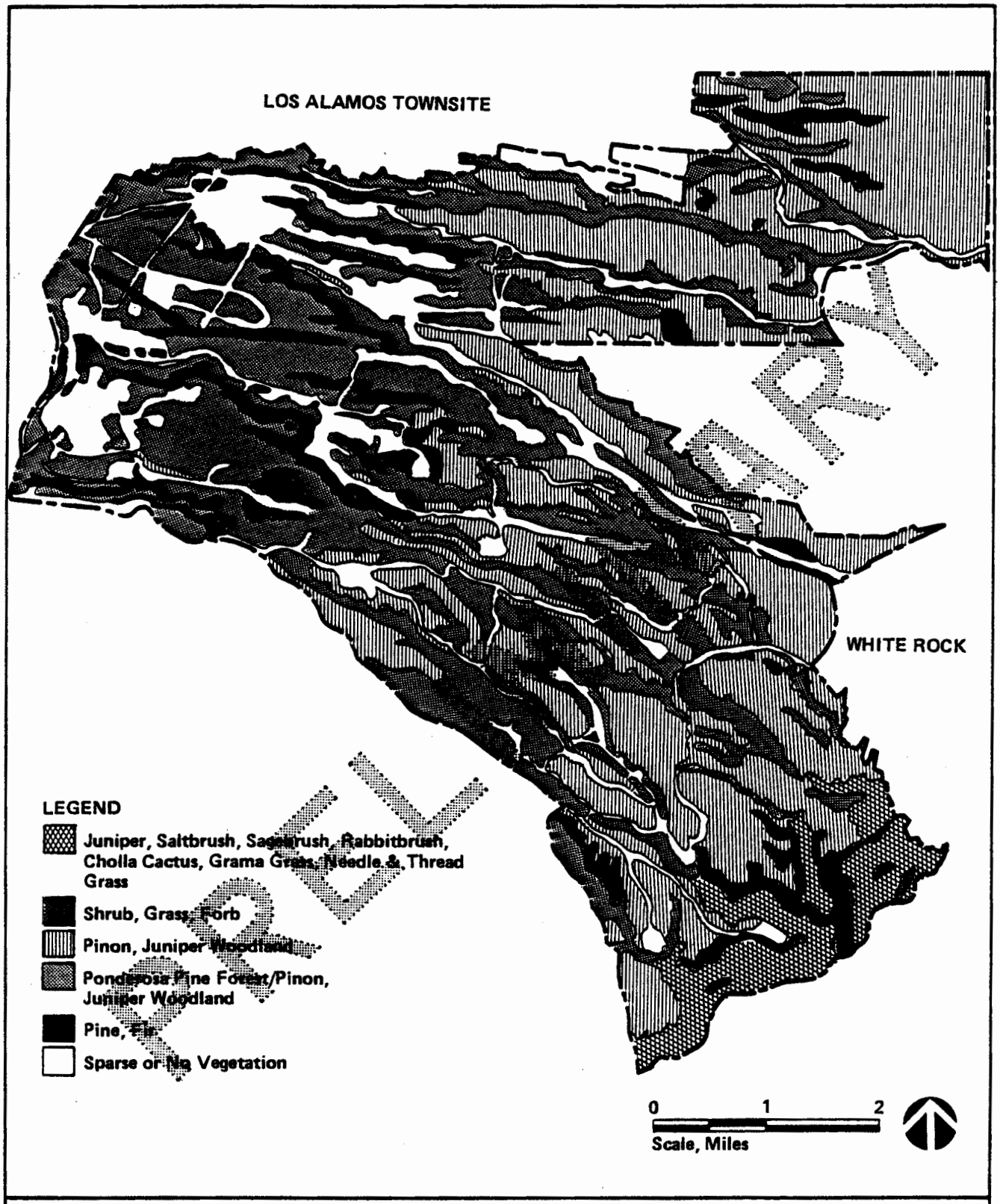

Source: LANL, 1982a

VEGETATION COVER AT THE LANL FIGURE 2-4

TABLE 2-1

LAND USE SURROUNDING THE LANL IN 1975

County	Land (km^2)						
	Grazing Land	Commercial Timber	Built-up[a]	Agriculture	Recreation	Miscellaneous	Total
Los Alamos	111	0	32	0	26	111	280
Rio Arriba	10,486	4,215	175	207	86	67	15,236
Santa Fe	4,230	406	149	150	5	4	4,944
Sandoval	8,025	1,285	143	76	93	5	9,627
Total	22,852	5,906	499	433	210	187	30,087
Percent of Total	76.0	19.6	1.7	1.4	0.7	0.6	

Source: DOE, 1979

a Built-up includes urban areas, lands subdivided for residential and industrial uses, and roads.
b Miscellaneous includes defense lands, and lakes and reservoirs with surface area of 0.16 km^2 or more.

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Army located Project Y, the code name for Los Alamos, at the Los Alamos Ranch School for Boys. This school comprised some 50 log buildings on a 790-acre site. In 1942, the Undersecretary of War directed acquisition of the site. The acquisition ultimately included the Ranch School property, 2,900 acres in homesteads and grazing lands, and 45,666 acres of public domain land supervised by the USFS. During 1947 and 1948, the Atomic Energy Commission (AEC), which controlled the site after the Army, acquired additional lands totaling 19,725 acres. The size of the laboratory has, with one exception, been decreasing since 1958. Beginning in 1958, 7,500 acres of land located in the Los Alamos and White Rock communities were transferred to private control. In 1959 and 1963, a total of 6,482 acres were transferred to the Park Service for extension of the northern and northwestern boundaries of Bandelier National Monument. In 1963, 3,925 acres (portion of Otowi Section) were placed under administrative control of the AEC by Presidential Proclamation. Land totaling 27,370 acres that formed the western and northern boundaries of Los Alamos County was transferred to the USFS in 1969. In 1973, the AEC excessed to the General Services Administration (GSA) 3,464 acres that adjoined the Western and Northern Community and Barranca Mesa areas. The GSA transferred 2,254 acres to the USFS in 1976. Also in 1976, a tract in the Los Alamos townsite (4 acres) was transferred to the GSA for eventual disposal to another government agency. Table 2-2 documents these land transactions.

Building sites, test areas, waste disposal locations, roads, and utility rights-of-way occupy the developed land at the LANL. The LANL divides the site into 33 Technical Areas (TAs). Figure 2-5 depicts the locations of the active Technical Areas within the LANL. However, these Technical Areas and other developed land uses account for only a small fraction (5.2 percent or 1,439 out of 27,800 acres) of the total land use (see Table 2-3). Most of the land provides isolation for security and safety or for future structures. TA-57 is 28 miles west of Los Alamos on the southern edge of the Valles Caldera.

Demographics

Los Alamos County in 1986 had an estimated population of approximately 18,250 (based on the 1980 census, and adjusted for 1986) (LANL, 1987a). The Los Alamos

TABLE 2-2

SUMMARY OF LAND TRANSACTIONS AT THE LANL THROUGH 1976

Year	Acreage Involved	Cumulative Site Acreage	Comment
1942	+ 790 + 2,900 + 45,666	49,356	Original acquisition by Department of War
1947-1948	+ 19,725	69,081	Additional land acquired by AEC
1958-1965	-7,500	61,581	Community Disposal Act sold land and houses to private individuals
1959	-3,600	57,981	Land transferred to Park Service; extended northern boundary of Bandelier National Monument
1963	-2,882	55,099	Land transferred to Park Service; extended northwestern boundary of Bandelier National Monument
1963	+ 3,925	59,024	Otowi Section placed under AEC control
1969	-27,370	31,654	Land forming western and northern boundaries of Los Alamos County transferred to Forest Service
1973	-3,464	28,190	Land adjoining Western and Northern Community and Barranca Mesa, excessed to GSA. In 1976, GSA transferred 2,254 acres to Forest Service
1976	-4	28,186	Land transferred to GSA

Source: DOE, 1979

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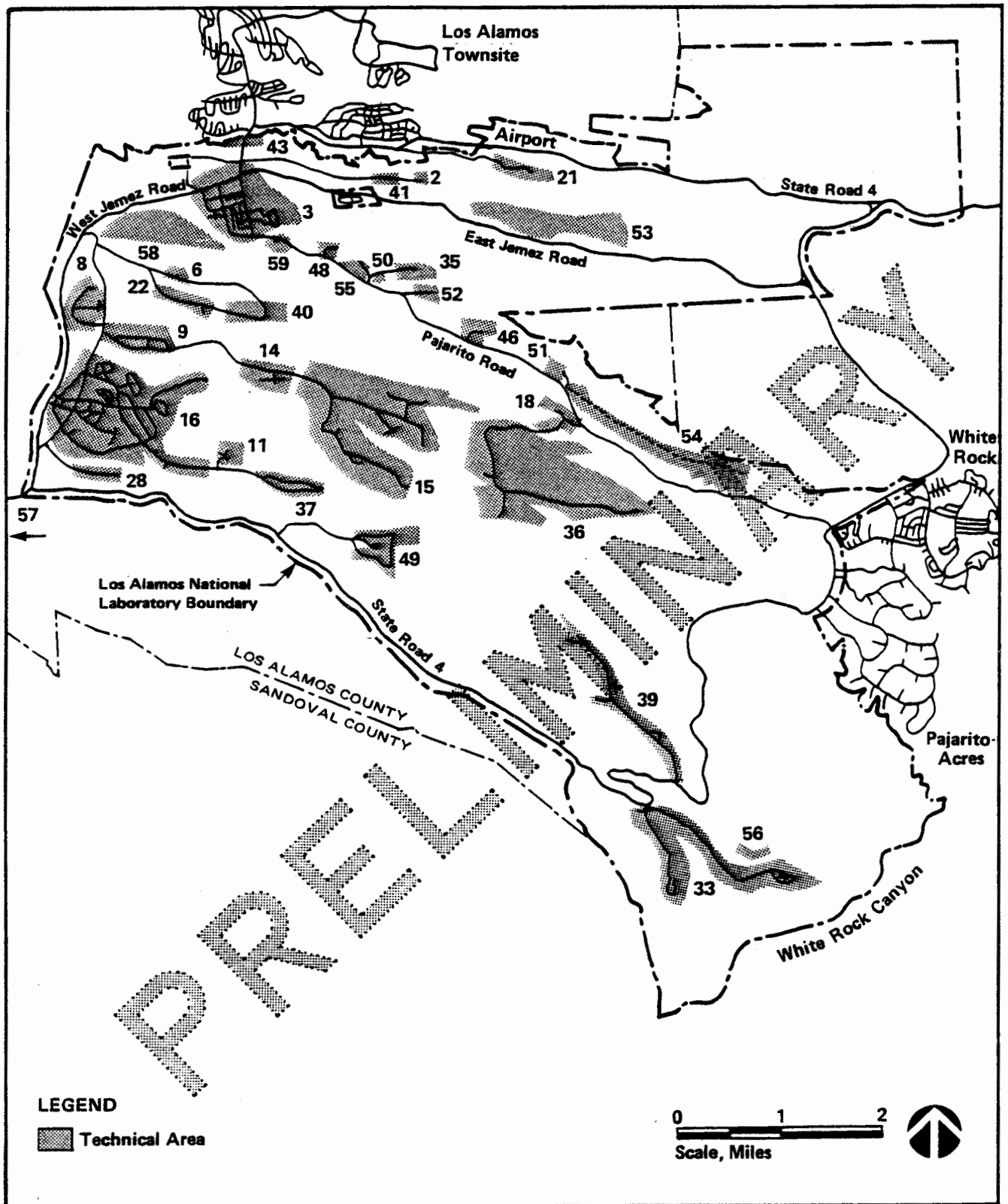

Source: LANL, 1982a

ACTIVE TECHNICAL AREAS AT LANL FIGURE 2-5

TABLE 2-3

DEVELOPED ACREAGE BY TECHNICAL AREA (1981 Data)

Technical Area	Developed Area (Acres)
0	462.2
2	1.5
3	213.3
6	99.0
8	11.3
9	10.8
11	5.8
14	7.3
15	26.5
16	93.4
18	6.3
19	35.1
21	NA[a]
22	24.2
28	4.7
33	12.2
35	30.2
36	15.2
37	63.2
39	12.1
40	7.5
41	4.4
43	5.1
46	21.1
48	13.4
49	22.6
50	10.7
51	.9
52	15.5
53	148.3
54	67.0
55	100.0
58	2.4
59	12.6
Total	1,565.8 [b]

Source: LANL, 1982a
a. Data omitted from reference material
b. Total does not included estimate for TA-21

townsite, the original area of development, has a population of 11,400 (LANL, 1987a). The White Rock area, including White Rock, La Senda, and Pajarito Acres, has about 6,790 residents. About one-third of those employed at the LANL commute from other counties. Population estimates for 1986 indicate that about 180,000 people live within a 50-mile radius of the LANL (LANL, 1987a). Table 2-4 shows the distribution of this population around the LANL. The majority of the population is between the northeast and southeast and at distances of between 20 and 40 miles from the LANL.

Public Access

The LANL allows limited public access to certain areas of the site. An area north of Ancho Canyon between the Rio Grande and State Road 4 is open to hikers, rafters, and hunters. No woodcutting or vehicles are allowed in this area. Portions of Mortandad and Pueblo Canyons are also open to the public. An archaeological site (Otowi Tract), northwest of State Road 4 at the White Rock Y, is open to the public, but cultural resource protection regulations restrict public use. Two roads (Pajarito and East Jemez) that cross the LANL site are open to the public, but DOE has the authority to close the roads if necessary.

2.2 Overview of Major Site Operations

Since its start in 1943, the LANL's primary mission has been nuclear weapons research and development. Current programs include weapons development, magnetic and inertial fusion, nuclear fission, nuclear safeguards and security, and laser separation. There is also basic research in the areas of physics, chemistry, and engineering that supports such programs. Other programs include applied photochemistry, astrophysics, earth sciences, energy resources, nuclear fuel safeguards, laser technology, computer sciences, solar energy, geothermal energy, biomedical and environmental research, and nuclear waste management research.

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TABLE 2-4
1986 POPULATION ESTIMATES
WITHIN 80 KILOMETERS OF THE LANL [a,b]

Direction	1-2	2-4	4-8	8-15	15-20	20-30	30-40	40-60	60-80
N	--	--	--	--	--	--	1100	--	356
NNE	--	--	--	548	--	525	1677	1742	214
NE	1	--	--	--	307	14549	978	1108	3758
ENE	--	--	--	1681	1515	2353	2538	1151	2236
E	--	--	72	22	482	992	603	--	1440
ESE	--	--	--	--	--	253	20058	1046	1448
SE	--	--	6780	--	--	--	46370	2117	7
SSE	--	--	--	--	--	--	369	3767	82
S	--	--	--	50	--	210	406	4589	--
SSW	--	--	--	20	--	540	133	5446	22136
SW	--	--	--	--	--	--	208	2748	--
WSW	--	--	--	--	--	208	207	1682	137
W	--	--	--	--	--	--	--	108	87
WNW	--	1440	6556	--	--	---	--	--	2037
NW	--	525	1727	--	--	--	--	1393	--
NNW	--	580	581	--	--	--	--	62	60

Source: LANL, 1987a

a This distribution represents the resident, non-workforce population with respect to the Los Alamos Meson Physics Facility's stack at TA-53.

b Total estimated 1986 population within 80 kilometers of Los Alamos is 178,118.

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The operations of the laboratory are conducted in the 32 active TAs. Table 2-5 presents the primary functions of the major active TAs.

TA-3 is the main administrative and technical center of the LANL. TA-3 has a dense configuration of buildings, including some of the oldest structures at the Laboratory. The Chemical and Materials Research (CMR) Building and the Sigma Building account for a significant portion of the radioactive waste generated at the LANL.

TA-16 is the center for research into high explosives (HE) at the LANL. The site contains areas for synthesis, formulation, and testing of HE.

TA-21 engages in chemistry and high-temperature research. In addition, tritium research facilities are located in there. HE research activities are conducted at firing sites within TA-39, which is located in the southern portion of the LANL site. TA-48 is the Radiochemistry Laboratory, at which highly radioactive samples from research and development (R&D) activities at the LANL and other DOE facilities are studied. TA-50, the main liquid radioactive waste management center at the LANL, includes TA-50-1, the Liquid Radioactive Waste Treatment Plant, the Controlled Air Incinerator, and the Size Reduction Facility. TA-53 contains the Los Alamos Meson-Physics Facility (LAMPF), with its large research accelerator. The LAMPF engages in nuclear physics research and is a world-renowned center for these studies. TA-54 is the main solid waste management center for the LANL. It contains an active radioactive waste burial area (Area G), a hazardous waste treatment and storage area (Area L), as well as landfills for asbestos and classified wastes. Plutonium processing occurs in TA-55, which is one of the largest generators of radioactive waste at the LANL.

2.3 State/Federal Concerns

Representatives of the Survey team met with the U.S. Environmental Protection Agency (EPA), Region VI, and the State of New Mexico environmental agencies on February 11, 1987, as part of the pre-Survey information exchange. At this meeting,

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TABLE 2-5

DESCRIPTION OF PROGRAMS IN TECHNICAL AREAS AT THE LANL

Technical Number	Area Name	Program Description
TA-2	Omega Site	Omega West Reactor, an 8-megawatt nuclear research reactor, is located here. It serves as a research tool in providing a source of neutrons for fundamental studies in nuclear physics and associated fields.
TA-3	South Mesa Site	In this main technical area, the Administration Building contains the Director's Office and administrative offices and laboratories for several divisions. Other buildings house the Central Computing Facility, administrative offices, the Materials Department, the science museum, chemistry and materials science laboratories, physics laboratories, technical shops, cryogenics laboratories, a Van de Graaf accelerator, and a cafeteria.
TA-6	Two Mile Mesa Site	This is one of three sites (TA-22 and TA-40 are the other two) used in development of special detonators for initiation of high-explosive systems. Fundamental and applied research in support of this activity includes investigation of phenomena associated with initiation of high explosives, and research in rapid shock-induced reaction with shock tubes.
TA-8	GT Site of Anchor Site West	This is a nondestructive testing site operated as a service facility for the entire Laboratory. It maintains capability in all modern nondestructive testing techniques for ensuring quality of material, ranging from test weapon components to checking of high-pressure dies and molds. Principal tools include radiographic techniques (X-ray machines to 1 million volts, a 24-MeV betatron), radioactive isotopes, ultrasonic testing, penetrant testing, and electromagnetic methods.
TA-9	Anchor Site East	At this site, fabrication feasibility and physical properties of explosives are explored. New organic compounds are investigated for possible use as explosives, and storage and stability properties are studied.
TA-11	K-Site	Facilities are located here for testing explosives components and systems under a variety of extreme physical environments. The facilities area is arranged so that testing may be controlled and observed remotely, and so that devices containing explosives or radioactive materials, as well as those containing nonhazardous materials, may be tested.

TABLE 2-5

DESCRIPTION OF PROGRAMS IN TECHNICAL AREAS AT THE LANL (Continued)

Technical Number	Area Name	Program Description
TA-14	Q-Site	This firing site is used for conducting various tests on relatively small explosive charges and for fragment impact tests.
TA-15	R-Site	This is the home of PHERMEX- a multiple-cavity electron accelerator capable of producing a very large flux of X-rays for certain weapons development problems and tests. This site is also used for the investigation of weapon function and weapon system behavior in nonnuclear tests, principally by electronic recording means.
TA-16	S-Site	Investigations at this site include development, engineering design, pilot manufacture, environmental testing, and stockpile production liaison for nuclear weapon warhead systems. Development and testing of high explosives, plastics, and adhesives and process development for manufacture of items using these and other materials are accomplished in the extensive facilities here.
TA-18	Pajarito Laboratory Site	The fundamental behavior of nuclear chain reactions with simple, low-power reactors called "critical assemblies" is studied here. Experiments are operated by remote control and observed by closed-circuit television. The machines are housed in buildings known as kivas and are used primarily to provide a controlled means of assembling a critical amount of fissionable materials. This is done to study the effects of various shapes, sizes, and configurations. These machines are also used as a source of fission neutrons in large quantities for experimental purposes.
TA-21	DP-Site	This site has two primary research areas, DP West and DP East. DP West is concerned with chemistry research. DP East is the high-temperature chemistry and tritium site.
TA-22	TD-Site	See TA-6.
TA-28	Magazine Area "A"	This site is an Explosives storage area.
TA-33	PH-Site	A major high-pressure tritium-handling facility is located here. Laboratory and office space for Geoscience Division related to the Hot Dry Rock Geothermal Project is also here.

TABLE 2-5

DESCRIPTION OF PROGRAMS IN TECHNICAL AREAS AT THE LANL (Continued)

Technical Number	Area Name	Program Description
TA-35	Ten Site	Nuclear safeguard research and development, which is conducted here, is concerned with techniques for nondestructive detection, identification, and analysis of fissionable isotopes. Research in reactor safety and laser fusion is also done here.
TA-36	Kappa Site	Various explosive phenomena, such as detonation velocity, are investigated here.
TA-37	Magazine Area "C"	Explosives storage area.
TA-39	Ancho Canyon Site	Nonnuclear weapon behavior is studied here, primarily by photographic techniques. Investigations are also made into various aspects of explosives, interaction of explosives, and explosions with other material.
TA-40	DF-Site	See TA-6
TA-41	W-Site	Personnel in this site are engaged primarily in engineering design and development of nuclear components, including fabrications and evaluation of test materials for weapons.
TA-43	Health Research Laboratory	The Biomedical Research Group does research here in cellular radiobiology, biophysics, mammalian radiobiology, and mammalian metabolism. A large medical library, special counters used to measure radioactivity in humans and animals, and animal quarters for dogs, mice, and monkeys are located in this building.
TA-46	WA-Site	Applied photochemistry, which includes development of technology for laser isotope separation and laser enhancement of chemical processes, is investigated. Solar energy research, particularly in the area of passive solar heating for residences, is conducted.
TA-48	Radio-chemistry Site	Laboratory scientists and technicians at this site study nuclear properties of radioactive materials by using analytical and physical chemistry. Measurements of radioactive substances are made, and "hot cells" are used for remote handling of radioactive materials.

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TABLE 2-5

DESCRIPTION OF PROGRAMS IN TECHNICAL AREAS AT THE LANL (Continued)

Technical Number	Area Name	Program Description
TA-50	Waste Management Site	Personnel at this site have responsibility for treating and disposing of most industrial liquid waste received from Laboratory technical areas, for development of improved methods of solid waste treatment, and for containment of radioactivity removed by treatment. Radioactive liquid waste is piped to this site for treatment from many technical areas.
TA-51	Animal Exposure Facility	Here, animals are exposed to nonradioactive toxic materials to determine biological effects of high and low exposures.
TA-52	Reactor Development Site	A wide variety of activities related to nuclear reactor performance and safety are done here.
TA-53	Meson-Physics Facility	At the Los Alamos Meson-Physics Facility (LAMPF), a linear particle accelerator is used to conduct research in the areas of basic physics, cancer treatment, materials studies, and isotope production.
TA-54	Waste Disposal Site	This is a disposal area for solid radioactive waste and a storage area for hazardous waste.
TA-55	Plutonium Processing Facilities	Processing of plutonium and research in plutonium metallurgy are done here.
TA-57	Fenton Hill Site	This is the location of the Laboratory's Hot Dry Rock Geothermal Project. Here scientists are studying the possibility of producing energy by circulating water through hot, dry rock located hundreds of feet below the earth's surface. The water is heated and then brought to the surface to drive electric generators.
TA-58	Twomile Mesa	This is an undeveloped technical area.
TA-59	Occupational Health Site	Occupational health and environmental science activities are conducted here.

Source: LANL, 1987a

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the Survey team representatives asked the Federal and state representatives to identify and discuss their environmental concerns about the LANL so that these could be reviewed during the DOE Survey. These concerns are summarized below.

EPA's primary interest was with LANL solid waste disposal practices in Areas L, G, P, and H, and the holding ponds near the LAMPF. All of these areas are discussed in the Waste Management section of this report.

The major issues raised by the state are summarized below:

Air - There were no pressing noncompliance issue mentioned, although the state has only a limited understanding of stack emissions, which may become a concern should the state issue hazardous air emissions regulations. In addition, state representatives are following the progress on the LANL incinerator.

Surface Water - The state representatives expressed a concern over repeated NPDES violations. In addition, they felt that there was not an exhaustive analysis of the outfalls, particularly for organics. They suggested that the Survey team look at discharge parameters beyond those included in the NPDES.

A second concern was the possibility that hazardous materials may have been disposed of at the LANL through sanitary sewers and storm drains. In addition they mentioned that septic tanks, some without bottoms, could constitute underground injection.

Finally, they expressed a concern over the potential for hazardous materials to enter surface-water courses in the area.

Groundwater - Although the state agree that the depth to groundwater is extreme in this location, they differ with the LANL on the migration potential. They also suggested that the Survey look at the seeps.

Hazardous Waste - The state felt that the LANL must be at maximum capacity for storing hazardous waste. They see little waste going off-site and are interested in finding out what is being done with it.

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Relative to disposal, they expressed a concern that innovative means of disposal may have been used at the LANL that do not agree with the regulations. They also felt that boring into the tuff and placing drums into the boreholes may constitute underground injection under the Safe Drinking Water Act (SDWA). They were also concerned that these boreholes may contain hazardous wastes in addition to the low-level radioactive waste for which they were designed. They pointed out that large quantities of lead are not accounted for at the LANL. They are interested in where this lead may have been disposed of. In addition, they had heard rumors of poor disposal practices in the arroyos. In general, they would like to see waste reduction at the site.

The state also questioned if the LANL was mixing hazardous materials into its radioactive waste treatment facility at TA-50 and, if so, they are concerned about what might be coming out of that facility's outfall.

The state mentioned that materials never come out of the explosives research areas. They were interested in finding out the fate of those materials including scrap, the ash from burning, runoff, disposal of buildings contaminated with high explosives, and the oil that was used in those buildings that may have been contaminated with polychlorinated biphenyls (PCBs). They asked the Survey team to look into whether flashing material contaminated with high explosives is the best method of handling such waste materials.

Solid Waste - The state was interested in finding out where asbestos was being disposed of. They suggested that the Survey team check the radioactive waste landfills. They mentioned that the state may be issuing asbestos rules in the future.

PCBs - The state asked if any shipments were going out and if so how much.

Quality Assurance - The state suggested that the Survey team look at the analysis of organic solvent wastes.

Inactive Sites - The state suggested that the Survey team look into employee interviews conducted during the CEARP.

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General - The state expressed an interest in being involved in any emergency preparedness efforts at the LANL.

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APPENDIX A

SURVEY PARTICIPANTS

PRELIMINARY

LANL SURVEY PARTICIPANTS
MARCH 30-APRIL 17, 1987

DOE

Team Leader	R. Aiken
Assistant Team Leader	K. Farber/J. Boda
Operations Office Representative	G. Lasker

TECHNICAL SPECIALISTS

Waste Management/Contractor Coord.	P. Alexandro, NUS
Surface Water	A. McClure, NUS
Air	R. Andes, NUS
Radiation	W. Joyce, NUS
Inactive Waste Sites	J. Clay, NUS K. Sichelstiel, NUS
Hydrogeology	W. Murray, NUS
Quality Assurance/TSCA	P. Byrne, NUS
Chemical Materials Storage	J. English, ICF

PRELIMINARY

APPENDIX B

ENVIRONMENTAL SURVEY PLAN

LOS ALAMOS NATIONAL LABORATORY

PRELIMINARY

ENVIRONMENTAL SURVEY PLAN

LOS ALAMOS NATIONAL LABORATORY

MARCH 30 - APRIL 17, 1987

LOS ALAMOS, NEW MEXICO

PRELIMINARY

COMMENTS ON DOE ENVIRONMENTAL SURVEY PRELIMINARY REPORT
Los Alamos National Laboratory
Health, Safety and Environment Division

GENERAL OBSERVATIONS:

1. The findings are frequently presented without the context of past and ongoing monitoring results. Thus, the significance of potential environmental problems is difficult to decipher. In turn this flaws any future ranking of the significance of findings.

2. The introduction presents a series of criteria for categorizing findings according to relative severity of the problems that are identified in each finding. However, within the findings themselves, there is no attempt to relate the discussion to these criteria. Because of this, the findings sometimes appear arbitrary.

3. The findings also fail to relate potential problems to potential receptor populations. This again makes it difficult to judge the significance of the finding.

4. There were numerous comments correcting factual errors in the hazardous and radioactive waste sections, and the section on potentially contaminated lands. In addition, not all potential errors have been detected. In view of the large number of corrections, it is impractical to present the comments here. Perhaps a more expeditious way to handle the large number of comments is to have a meeting with the DOE Headquarters individuals who drafted the report to discuss the comments.

SPECIFIC COMMENTS:

p. ES-2. The fourth major finding appears to be out of place here. It apparently is derived from finding 3.3.4.3(1), which is a category three. Sampling and modeling of the streams and river show that impacts to the river are minimal even though above-background plutonium is transported down the Los Alamos Canyon streambed (see LA-10992-ENV and predecessors, LA-10356-MS). The doses quoted on p. 4-109 support this conclusion. In addition this list of "major" findings includes Category III findings while leaving out some Category II findings (e.g., 3.3.4.2(1) and 4.1.5.2(2)).

p. ES-2 and ES-3. The summary of findings and conclusions gives an erroneous impression of problems being previously unidentified and having significant risk levels. For example, the fourth bullet addresses plutonium contamination being transported to the Rio Grande. This condition has been known and monitored since the 1940s, and has been evaluated at various times to determine that no standards or dose guidances have been exceeded or even approached. Basic data has been reported in the annual series of environmental monitoring reports since the early 1970s documenting both the presence of contamination in Los Alamos Canyon and the absence of significant impact on the Rio Grande. Various pathway studies have been performed and published in public documents (e.g., the Site

EIS, DOE/EIS-0018, 1979; the FUSRAP report DOE/EV-0005/30 and LANL-8890-ENV, 1981; and the special sediment and foodstuff sampling documented in several annual surveillance reports). All dose evaluations have been small fractions of applicable standards. Yet the Overall Conclusion (p. ES-3) suggests that little is known about either the existence or significance of the condition by saying only that environmental problems are not "... an immediate threat to human life" and will require further study. The condition is part of Finding 1 in Category III under surface water (p. 3-103 and 3-104). While the Category III definition is very broad, there is one statement that would seem to apply: "In general, however, conditions that meet regulatory or other requirements ... should not present a potential hazard and will not be identified as an environmental problem" (p. 1-4). Accordingly, it does not seem appropriate to include the sediments as a problem at all, much less as one of the five conditions highlighted in the Executive Summary as "major."

p. ES-2, last line. Offsite transport of radionuclides in Los Alamos Canyon and into the Rio Grande has occurred since the first wastes (1943) were released into the canyon. The transport of the radionuclides in Los Alamos Canyon into the Rio Grande at Otowi is documented in a number of reports.

p. 1-2 to 1-4. The discussion of Categories II and III findings is very confusing. For example, one criterion for category three is "existence of ... materials ... that pose or may pose a hazard to human health or environment." The definition of posing hazard is presented as "... generally those which are violations of regulations or requirements (e.g., improper storage of hazardous chemicals in unsafe tanks)." It is unclear how this latter definition distinguishes this category from Category II. In fact, improper storage of hazardous chemicals is the general findings 4.2.2.2, categorized as II. Without better distinction of the Categories and without discussion of why findings were categorized as I or II, the significance of the findings cannot be effectively evaluated by policy makers. Nor can the findings be meaningfully prioritized.

p. 1-5, second paragraph. The S & A team will begin sampling in May 1988, rather than March 1988.

p. 2-1, end of Location paragraph. LANL is also bordered by Forest Service land along the Rio Grande south of White Rock.

p. 2-4, second paragraph, line 7. Rhyolite tuff and pumice were not ejected or deposited by the volcanic explosion.

p. 2-4, third paragraph, line 5. It should be noted that flow to the Rio Grande several times per year occurs only in some canyons (Los Alamos) and not in others (Mortandad).

p. 2-6, second paragraph. Gradient units should be feet/mile.

p. 2-7, third paragraph, line 2. "All" of Los Alamos County is not undeveloped. It supports two residential communities (ca. 17,000 population) and one large research and development facility.

p. 2-7, last paragraph. Delete "duration" and replace with "end."

p. 2-9, Table 2-1. The estimate of [livestock?] grazing land within Los Alamos County is very exaggerated for 1988.

p. 2-14, third paragraph. A major LANL research activity which should be added is elementary particle research.

p. 2-21, under Groundwater. The "seeps" referenced here need to be identified. They are not mentioned further in this report.

p. 2-21, under Air Issues. Which incinerator is being referred to - solid waste fired, CAI, or TA-16 HE incineration?

Section 3. Throughout this section the references to "Guevara and Dvorak, 1986" should be changed to "Guevara and Dvorka, 1987."

p. 3-5, third paragraph. The definition of DCG is wrong. The DCG is based on effective dose equivalent, not whole body or organ dose. In addition, the definition should state that continuous exposure is assumed. The definition should indicate that the dose is either the 30-year dose commitment, or the dose in the 50th year of continuous exposure.

p. 3-5, third paragraph. Other than Santa Fe, the background levels here are not particularly relevant to Los Alamos and region. Pertinent data are published in the annual surveillance report for the Laboratory.

p. 3-9, Table 3-4. This Table should be retitled if it is to include uranium.

p. 3-10, Figure 3-1. Several of the more important radioactive emission points, such as TA-41, are missing.

p. 3-11. Delete (336) in ^{41}Ar column - Footnoted should read "Does not include about 0.4 percent of the TA-53 gaseous mixed activation products identified ^{41}Ar."

p. 3-13, third paragraph. Uranium emissions discussed under Test Firings should also be included under Section 3.1.2.7, Radioactive Emissions.

p. 3-16. The first statement under "Radioactive Emissions" implies that LAMPF is the major source of tritium emissions. This is not true (see Table 3-5).

p. 3-17, first paragraph, last sentence. The LAMPF stack is 110 feet high.

p. 3-17, third paragraph. The 44 mR dose for 1984 given in this paragraph without explanation is misleading. The actual maximum individual dose for that year was 31 mrem. The 41 mR "dose" is the fence line exposure, measured with TLD's in milliRoentgens. This exposure still needs to be converted to dose in tissue, and corrected for self-shielding by the body and for shielding by buildings. In addition, it is important that the Preliminary Report cite the primary reference for the dose and emission for 1984, the 1984 environmental surveillance report.

p. 3-19. The citation of a factor of eight decrease in LAMPF emissions is accurate for the first two years after the beam stop upgrade. However, taking the 1987 LAMPF operating period into account, the decrease is more like a factor of 5.4.

p. 3-22, second paragraph. It is true that the LAMPF stack flow is measured continuously, but for official purposes, the stack flow is measured with the EPA methods used on the other stacks in the Laboratory.

p. 3-29, Table 3-9. The site #10 should be the "N area" for north community.

p. 3-34. The preliminary ranking of DP facilities' operations ranks the firing sites as the Laboratory's second highest operation. This ranking was purportedly based upon these survey findings and based upon the airborne emissions resuspension of deposition from the firing sites. Yet there is not even a finding for this here in the discussion of the air pathway.

p. 3-37, Figure 3-5. The depiction of many of the canyons and mesas in this figure is mistaken. E.g., Two Mile Mesa and Two Mile Canyon are misplaced, Water Canyon does not empty into Ancho Canyon, and Ancho Canyon is mislabeled on the map. The Figure should be revised and corrected using a topographic map.

p. 3-37, Figure 3-5. Replace "Buey Mesa" with "Mesita del Buey."

p. 3-37. Labels should be made consistent with Figure 3-6.

p. 3-46. Some amounts are given as weight or mass per hour yet column heading says annual.

p. 3-48, second paragraph. Delete "Six" for last sentence.

p. 3-48, third paragraph. "2,000 feet" should be "1,200 feet." Change last two sentences to "The laboratory sinks drained to a buried drain field in Area 11. Area 5 contained the assembly buildings and instrumentation trailers. At the present time, all that remains in Area 5 is the well house at test well DT-5A."

p. 3-48, third paragraph, last line. Delete "pump house" and add sentence "At the present time all that remains in Area 5 is the well house at test well DT-5A."

p. 3-48, last paragraph. Change last two sentences to "As the experiment was detonated, measurements and samples were taken. Afterwards, the shafts were generally filled with sand and sealed with concrete."

p. 3-50, first paragraph. Change amounts in third sentence for depleted uranium to 160 kilograms and for beryllium to 10 kilograms. Change fourth sentence to

read "Large amounts of lead were used." Delete fifth sentence as it is redundant to first sentence.

p. 3-50, second paragraph. Change first sentence to "Cuttings brought to the surface from a side drift extended at the bottom of one of the shafts in late 1960 had plutonium contamination." Change last sentence to read "The surface of Area 2 in TA-49 was covered with as much as six feet of compacted aggregate and a four- to six-inch layer of asphalt."

p. 3-50, second paragraph, line 1. Delete "in the TA-49" and add "2" between "area" and "during."

p. 3-50, third paragraph. Add to end of paragraph "Transport of contaminants from TA-49 would be into Water Canyon to the north or Ancho Canyon to the south. Surveillance of sediments in Water Canyon and Ancho Ancyon downgradient from TA-49 at State Road 4 and at the Rio Grande failed to detect any transport of contaminants, chemical or radiochemicals (ESG 1987)."

p. 3-50, last paragraph. Add to last line "However, monitoring of sediments, which is an indication of transport of contaminants, in Water Canyon and Ancho Canyon at State Road 4 and at the Rio Grande has failed to detect any transport of contaminants from Technical Areas in the drainage areas of these two canyons (ESG-1987)."

p. 3-51, Table. Change entry for Beryllium at TA-49 to 10 kg.

p. 3-59. The discussion of plutonium from TA-49 lacks context. If plutonium does not leave the site, why is it a problem? The findings should be findings that there is an existing or potential problem. If monitoring data indicate that the problem is negligible, what leads to the conclusion the problem is a Category III?

p. 3-60, first paragraph. Change second sentence to read "Cuttings brought to the surface from a side drift extended at the bottom of one of the shafts in late 1960 had plutonium contamination." Change fifth sentence to read "The surface of Area 2 in TA-49 was covered with as much as six feet of compacted aggregate and a four- to six-inch layer of asphalt."

p. 3-62, second paragraph, line 5. "TA-49" should be "TA-39."

p. 3-63, last paragraph, last line. "The concentration of iron and lead at Cochiti ... Otowi Bridge samples." There is no significant difference between the iron and lead concentrations in water at Otowi and Cochiti as shown in the tables.

p. 3-63, last paragraph. The last sentence insinuates that the iron and lead concentrations are indicative of contamination. The levels are in the parts per billion range and fractions of even the drinking water standards.

p. 3-68, top paragraph. Discharge into Pueblo Canyon is from the Los Alamos County sewage treatment plant. No discharges are made into Bayo Canyon.

Suggest adding sentence at end of paragraph indicating that occasional flows from any of these canyons into the Rio Grande are even much smaller than that of the Santa Fe River (noted on p. 3-63) with correspondingly smaller possible influence on water quality in Cochiti Reservoir.

p. 3-68. Flows from Mortandad Canyon have not been observed to enter the Rio Grande even during heavy runoff.

p. 3-68, first paragraph, line 13. Replace "at White Rock" with "below White Rock."

p. 3-68, first paragraph. Add as last line "However, the storm and snowmelt runoff from these canyons reaching the Rio Grande would have minimal or no influence on the quality of water of the Rio Grande. The intermittent flow from the canyons of the plateau is very small compared to the flow of the Rio Grande."

p. 3-69, Figure. Impression of flatness of plateau across LANL is not in agreement with either reality or the text description; several of the deep canyons extend across the LANL.

p. 3-70, Figure. Well labeled "PA-1" should be "PM-1."

p. 3-74, first paragraph, line 7. Change "monthly" to "mainly."

p. 3-79, first paragraph. "After the water is drained from the solids, the solids are removed and taken to TA-54, Area G, for disposal because the sludge may contain low-level radioactivity." The last eight words in the last phrase of this sentence should be omitted, because the sludge does not contain radioactivity. Historically, the sludge could be hauled off by Los Alamos County residents for use in horticultural activities. However, since 1979, the sludge has been disposed at Area G for pragmatic reasons, i.e., on-site disposal at Area G decreases the Laboratory's liability for public health concerns.

p. 3-79, third paragraph. Add indication that the concentrations of the mixed activation products are small fractions of Concentration Guides. Add indication that the contaminated sediments have been documented and evaluated to have no significant impact as part of the environmental monitoring program (e.g., LA-10721-ENV for 1985 p. 89).

p. 3-79, last paragraph, line 4. Change "1986" to "1985."

p. 3-80, item 12. Change "TA-55" to "TA-53."

p. 3-79, second paragraph, line 2. In the phrase "For removal of organics" does "organics" refer to organic chemicals or sewage? Should be clarified that this treatment is for sewage and not organic chemicals.

p. 3-79, fourth paragraph, line 3. Same comment as above for "organics."

p. 3-80, last paragraph, line 2. Change "cemented" to "dry cement added."

p. 3-82, top paragraph. Sludges were not analyzed for pesticides.

p. 3-82. Fish are not sampled from any of the ephemeral streams on the plateau.

p. 3-83. The last paragraph indicates there are 20 NPDES categories in a single permit, one of which is the Fenton Hill outfall. Aside from the confusion of categories and outfalls, the Fenton Hill Geothermal Site discharge is regulated by a separate NPDES permit number NM0028576, and is not included in NPDES permit number NM0028355 which covers the Laboratory's Main Technical Area.

p. 3-87, last paragraph, line 8. Delete "Sandia."

p. 3-87, last paragraph, line 9. Delete "considered within effluent release areas" and insert "areas that have received or now are receiving treated low-level radioactive effluent. Sandia Canyon receives sanitary effluent and cooling water from the power plant."

p. 3-87, last paragraph, line 15. Delete "All canyons in the effluent areas"; replace with "Los Alamos, Mortandad, and Acid-Pueblo Canyons that have received or now are receiving low-level industrial effluent."

p. 3-90, Figure 3-16. Add "AND GROUND" between "SURFACE" and "WATER."

p. 3-92, second paragraph. Add "in the distribution system" at the end of the last sentence.

p. 3-92, last paragraph, line 9. Replace "retention ponds" with "sediment traps."

p. 3-92, last paragraph, line 10. After "canyon" add "which are located onsite 1.25 miles within the Laboratory boundary."

p. 3-92, third paragraph. Spring snowmelt may last several weeks.

p. 3-95, first paragraph, line 1. Should read "... and within the Laboratory boundary in Mortandad Canyon."

p. 3-95, last paragraph, line 6. Delete "Sandia."

p. 3-95, last paragraph, line 7. Insert "industrial" between "within the" and "effluent release."

p. 3-96, Table 3-28. In first column under "Mortandad Canyon at Retention Ponds near MCO-7" replace "Retention Ponds" with "Sediment Traps" and add after MCO-7 "(within the Laboratory boundary)."

p. 3-98, first paragraph, line 1. Insert "with the exception of Sandia Canyon" between "areas" and "showed."

p. 3-104, last paragraph. There is adequate data and interpretation to conclude that the contaminated sediments in Los Alamos Canyon do not meet the criteria

for a Category III problem. See previous discussion of comment, pages ES-2 and ES-3.

p. 3-105, first paragraph, line 3. Replace ".005" with "0.042." Put the concentrations of plutonium in perspective, i.e., the proposed screening level of the USEPA (1977) is about 15 pCi/g, which is the level that the USEPA considers so low that no additional studies are required to further evaluate health impacts.

p. 3-105 and 3-106. The reference to the potential for HE and solvent contamination of soils at NPDES Outfall 054 indicates that overflow of water from the weir box and flume may have contaminated the soil beneath the flume. It should be noted that the deficiencies in the weir box and flume have been corrected by reconstructing the weir box and placing turbulence dampening boards down the center of the steep section of the flume to prevent wastewater from splashing over the sides of the flume. Furthermore, this outfall historically discharged at the same location down the side of the canyon prior to the flume's construction in 1986. Therefore, any water presently dripping or splashing from the flume onto the ground would create minor impact vis-a-vis the entire wastewater volume historically flowing down the canyon.

p. 3-105, second paragraph, end of sentence. Add "however, surveillance of sediments in Water Canyon at State Road 4 and the Rio Grande have failed to detect any contamination related to Technical Areas drained by Water Canyon (TA-49). The volume of storm and snowmelt that could reach the Rio Grande would not affect the quality of water in the river as the intermittent flow (storm and snowmelt runoff) from Water Canyon is very small compared to the flow of the Rio Grande."

p. 3-105, second paragraph, line 15. Revise or delete the sentence that starts with "These appear to be functioned properly ... down the canyon." The sediment traps were designed to take care of a 50-year runoff event and associated sediments. If the runoff should exceed a 50-year event, the transport of contaminants would still be confined within the Laboratory. The transmission losses in the lower part of the canyon in the 1.25 mile reach east of the traps to the boundary is about 15 cfs/1,000 feet based on previous runoff events. This is due to the channel characteristics as it braids out on the canyon bottom and is underlaid by a large volume of highly permeable and unsaturated alluvium.

p.3-106. Although wildlife and workers may be exposed to the tritium in water, soils, or vegetation in the marsh, environmental problems would not ensue without regular exposure. Levels of tritium in the immediate area are known (LA-UR-87-4121) and a pathways analysis could evaluate whether this was a true concern.

p. 3-107, second paragraph. Add at end of last sentence. "The results of the survey of sediments in the tributary canyon will be compared to the routine surveillance results of past years. The transport of contaminants out of the canyon into Los Alamos Canyon and into the Rio Grande would result in little if any effect on the quality of water in the river due to the small volume of runoff in the canyon as compared to the volume of flow in the river."

p. 3-108. The subject of Number 3 has been corrected during 1987 by submitting an NPDES permit application to EPA.

p. 3-108. This discharge from TA-53-19 is into Sandia Canyon, not Mortandad Canyon.

p. 3-109, first paragraph, line 4. Insert "sedimentation and" between "associated" and "volcanism."

p. 3-109, second paragraph, line 6. Starting with "This unit occurs ... for Paleozoic areas." Budding (1978) indicated Carboniferous sediment, early Tertiary, and late Tertiary sediments and volcanics overlying the N basement rocks.

p. 3-109, second paragraph, line 8. Should modify the sentence "Although the total thickness ... bottom of formation." Some 2,256 feet of sediments of the Tesuque Formation were penetrated by supply well LA-1B in lower Los Alamos Canyon. Outcrop thickness above the well is about 300 feet; thus the Tesuque Formation probably exceeds a thickness of 2,600 feet.

p. 3-111, first paragraph, line 2. "Conglomerate" should be "flangome"; see Griggs (1964).

p. 3-112, second paragraph, last line. May want to modify to include "It is estimated that the water in the depression will be fresh to a depth of 6,000 to 7,000 feet before TDS will exceed 1,000 mg/L. Thus, the main aquifer in the area has a saturated thickness of at least 6,000 feet before chemical quality may restrict the use of the aquifer for municipal and industrial supply." (Purtymun 1984)

p. 3-112, third paragraph, line 13. Figure 3-21 does not show contours.

p. 3-114, indented paragraph 2. Cannot determine which locations are of concern from reading referenced section 4.5.2, except possibly for TA-10, TA-39, and TA-20. Please make more explicit reference to particular burial situations.

p. 3-125, second paragraph, line 2. The statement "Although surface-water ... to off-site areas" is not true as numerous studies have been made to determine the quality of water and characterize the extent and hydrologic properties of the alluvial aquifer. The eastern edge of the aquifer ends between MCO-7.5 and MCO-8, at least one mile west of the boundary and on the Laboratory. For a description of aquifer see U. S. Geological Survey reports by Baltz (1963) or Abrahams (1962), or LANL reports by Purtymun (1974, 1977, 1983).

p. 3-130. Given that wells on Laboratory lands have been vandalized with and without protective casings, the only way to secure them would be to close the lands to public access and provide regular security patrols.

p. 3-130, first paragraph. Just a note - the first generation of protective-security caps for the observation wells in Los Alamos Canyon was a concrete pad poured with enclosing steel cap and lock. This was breached at observation well

LAO-4.5 by breaking up the concrete block and then throwing pieces of concrete down the well shortly before the survey team visited the canyon. The second generation of protective-security caps consisted of a six-inch diameter casing cemented to about two feet below land surface around the observation well and was equipped with a locking cap. These were installed about a month after the team was at Los Alamos. This protective-security cap was breached within two weeks after installation and the dedicated sampling equipment in the well was taken. The third generation of protective-security caps was installed during the next several months. The steel casing was used in conjunction with an over-sized steel cap with a two-inch flange welded to the top. A steel bar was fitted through holes in the casing and flange. A lock on the bar between the flange and the casing secured the steel cap to the top of the well.

p. 3-130. The potential for cross contamination was eliminated by placing dedicated sampling equipment in each observation well.

p. 4-5, third paragraph, line 1. Change "TA-3-102" to "TA-3-39."

p. 4-5, first paragraph, lines 6-7. The statement "The plating bath wastes are discharged ..." is not true. Should read "The plating bath wastes are discharged to tuff tanks that are taken to HSE-7 for treatment. Two unlined cement tanks, one for acids and one for cyanide, that are located in the basement of the sigma building are used for spill containment."

p. 4-6, second paragraph, line 1-2. Of the container areas listed, TA-9-39 and TA-22-96 are satellite storage areas and TA-40 scrap detonation pit is not a container storage area.

p. 4-6, last paragraph. Drums were stored on pallets, not on soil as implied.

p. 4-7, paragraph 4, line 1-2. "Burn pads" should be "Firing (or detonation) pads", and it should be clarified that only TA-39 detonates reactive chemicals other than explosives.

p. 4-8, paragraph 1, line 3. "Lithium hydroxide" should be "lithium hydride."

p. 4-8, Landfills. It is stated that Shaft 1 received noncontainerized bulk wastes. Shaft 1 did not receive noncontainerized bulk wastes.

p. 4-8, last paragraph. The contents of the pit were not burned periodically to reduce volume. It caught fire by incompatible missing.

p. 4-8, last sentence. Three surface impoundments have been used at Area L and J as described and a third only for a trial treatment of lithium hydride.

p. 4-10, Note 2. Same as above comment on Shaft 1.

p. 4-11, Area H. The shafts at Area H were not capped with concrete as stated. Only dirt was used.

p. 4-14, top paragraph. Waste was stored on pallets on the ground.

p. 4-14, last sentence. Change "TA-22-257" to "TA-21-257."

p. 4-20, second paragraph. TRU Waste is also stored in Pit 9.

p. 4-26, Table 4-7, last item. Change "U" to "A" and under comments change "No containment" to "24-inch curb."

p. 4-28, Table 4-8. Under Capacity (gal) - change "Unknown" to "4,000 gal." and Under Construction Material - change "Unknown" to "Stainless Steel", for TA-50-66-1 and TA-50-66-2, respectively.

p. 4-30, Table 4-9. Under Age (yr)[a] - change "?" to "16*." Add footnote "*installed same time as 68 and 69."

p. 4-31, second paragraph. TA-1 wastes were discharged into Acid Canyon, a tributary to Pueblo Canyon.

p. 4-36, first paragraph. Falsely implies that organic vapors have been detected in relation to the PCB disposal location at Area G, which is not the case.

p. 4-36, first paragraph. Add after last sentence: "Surveillance of sediment in the intermittent stream channel of Canada del Buey to the north and Pajarito Canyon to the south, downgradient from Areas G and L, failed to detect any transport of radionuclides, organic, or inorganic contamination from the areas (ESG 1987)."

p. 4-37, second paragraph, last sentence. " ... at least 20 feet of separation from the bottom of the fill to top of groundwater." Does this mean water in alluvium in Sandia Canyon adjacent to landfill? Top of main aquifer is about 1,300 feet below the landfill.

p. 4-43, second paragraph. The berm was completed in April 1988.

p. 4-47, first paragraph. Should note that the stream flow in Los Alamos Canyon is intermittent, and transport off the Laboratory only occurs during storm or snowmelt runoff.

p. 4-47, second paragraph, line 1. The statement that hazardous wastes are stored throughout the Laboratory in excess of 90 days appears to indicate that this is a common practice and that hazardous waste can be expected to be found everywhere at the Laboratory. This is not the case. Were satellite storage areas considered in the statement? If so, they should be excluded because they do not require RCRA approval.

p. 4-47, paragraph 3, lines 1-2. "Area J" should be "Area H."

p. 4-55, Hydraulic Systems. PCB oil has been sent to ENSCO, not CECOS.

p. 4-67, Table 4-21, row 17, column 5. Capacity for TA-3-36-1 should be "10,000" instead of "6,000."

p. 4-72, paragraph 5, line 2. "6,000" should be "10,000."

p. 4-72, paragraph 5, line 3. The statement "All three tanks were tested for tightness and passed" is incorrect. TA-3-36-1, one of the gasoline tanks, failed the tightness test.

p. 4-74, paragraph 1, line 7. Insert the sentence "The tank was tested for tightness, failed, repaired, and subsequently passed" in lieu of "The tank was tested for tightness and failed due to leaks in the inlet line."

p. 4-99, Table 4-27. Under Structure four down add footnote* - *this tank is surrounded by a 24-inch wall as secondary containment with a drain leading to the raw waste storage tanks. Under Capacity (gal) four down - 1,000.

p. 4-106. A preferable reference for the background radiation data is Report 93 of the National Council on Radiation Protection and Measurements, "Ionizing Radiation Exposure of the Population of the United States."

p. 4-108, first paragraph, last sentence. It should be stated that the 25 mrem/year whole body dose, and 75 mrem/year organ dose, are for the air pathway only.

p. 4-108, second paragraph. The 500 mrem/year dose on which the Concentration Guides were based only applied to radionuclides whose critical organ was whole body, gonads, or bone marrow. The dose limit for the other radionuclides was 1,500 mrem/year to any other organ.

4.109, first paragraph, first sentence. This sentence, "For the purpose of complying ... with DOE Order 5480.1A," is not true. In order to comply with DOE Order 5480.1A, radiation doses were measured with TLD's and not calculated with AIRDOS-EPA. The Laboratory feels that measurements are significantly superior to modeling in determining the dose. To comply with EPA's 40 CFR Part 61 regulation, the Laboratory was required to use AIRDOS-EPA. But at the same time the Laboratory has applied to EPA through DOE to use measurements instead of AIRDOS-EPA for future compliance with 40 CFR Part 61.

p. 4-110, first paragraph, first sentence. Neutrons should be added to the list as causing external radiation exposure.

p. 4-110, first paragraph, third sentence. This sentence should be amended to read "The only offsite TLD measurements showing any effect ...."

p. 4-110, last paragraph, and p. 4-111, last paragraph. For LANL, the maximum individual dose is the whole body dose, approximately 11 mrem for 1986, due to LAMPF effluents, and occurs at the East Gate sampling location. Because this is whole body dose, it is the same as the effective dose equivalent, i.e., 11 mrem. All other doses determined at that location are less than 0.1 mrem effective dose equivalent. Consequently, the maximum effective dose equivalent is 11 mrem for 1986.

It is improper to sum all the effective dose equivalents from all the pathways if it is implausible that the doses could occur to the same individual. In the

Preliminary Report, maximum dose from eating fish at Cochiti Reservoir (approximately 18 miles from East Gate), the maximum dose from inhalation which occurred at Arkansas Avenue in Los Alamos (four miles from East Gate), and the maximum dose from driving by TA-18 (when there was less than one hour in 1986 when this dose could occur), were all summed with the East Gate whole body dose to give 15 mrem. This procedure does not produce a realistic estimate of the dose from Laboratory operations.

Again, the Preliminary Report used the AIRDOS-EPA calculated dose of 10.4 mrem for the LAMPF dose. All the other doses quoted on p. 4-110 were based on measurements. Why not also use the measured LAMPF dose for consistency?

p. 4-111. If the estimated doses are sufficiently low as to be a non-problem, how can the presence of radionuclides on Laboratory lands be considered Category III findings in other sections of this report?

p. 4-127, third paragraph. In the first sentence it should be clearly stated that the liquids were not disposed of in the manner described, but the sludge resulting from the treatment was fixed by mixing it with cement and pumped into the shafts.

p. 4-129, second paragraph, TA-10 Section. The previous detailed studies conducted under the FUSRAP have extensive data on the concentrations and depths of residual Strontium contamination. Thus, there is more than a suggestion of the presence of contaminants. Furthermore, the FUSRAP performed a dose evaluation as part of the determination of a preferred alternative. There is no suggestion in the writeup that an extensive and rational process was used to evaluate the conditions and select an action with appropriate input.

p. 4-147, Table 4-32. Under capacity (gal) 11 and 12 down change Unknown(s) - 50,000 and remove the words stainless.

p. 4-152, second paragraph, lines 5-6. TA-21-107 and 108 are abandoned steel radioactive waste tanks of 50,000 gal capacity.

p. 4-171, second paragraph. The first line should indicate that the lateral movement of liquids was as capillary movement at a low moisture content. The tuff was not saturated nor did the cutting from the holes indicate any transport of contamination.

p. 4-179, fourth paragraph, Suspected Landfill in TA-33. It should be noted that sediment samples from Chaquihui Canyon to the south and Ancho Canyon to the north taken at the Rio Grande indicate no transport of radiochemical contamination from TA-33. Surface water from the main aquifer in Ancho Canyon and Springs 6, 6A, 8A, 9, 9A and DOE Spring in Chaquihui monitor the quality of the main aquifer moving beneath TA-33, and analyses have shown no radiochemical or chemical contamination.

p. 4-187, Burn Pit at TA-10. The extensive sampling during the FUSRAP studies is not mentioned. The main surface sampling grid was centered very near the location of interest depicted in Figure 4-35. There was no evidence of any

significant anomalies in the data for radioactivity (e.g., DOE/EV-0005/15, 1979, FUSRAP survey final report, and the document cited as LANL 1982b).

p. 4-187. Figure 4-36 indicates that northern edges of the depression are ca. 100 feet from the road.

p. 4-202. The discussion of TA-10 appears to completely discount the extensive work performed under the FUSRAP. See comments for p. 4-129 and p. 4-187.

p. 4-219, first paragraph, line 2. Delete "near the head of Mortandad Canyon." and replace "on the mesa near the center of the plateau."

p. 4-219, third paragraph. Area C is closest to the head of Ten-Site Canyon, which is tributary to Mortandad Canyon. There is known contamination in Ten-Site Canyon from a past tank overflow at TA-50 and, further downstream, from old releases from TA-35.

p. 4-219. Area C is at the head of Ten-Site Canyon which is tributary to Mortandad Canyon from the south. Mortandad Canyon heads in TA-3. Radiological evidence from LA-UR-87-139 indicates that Ten-Site Canyon has received run-off from Area C as well as other operations in the area.

p. 4-221, second paragraph. Add "The migration of contaminants from the disposal pits is unlikely as test holes drilled in the canyon alluvium for engineering design and for seismic instrumentation have failed to detect any perched water in the alluvium."

p. 4-222, fourth paragraph. See comments for Page 4-179 with reference to suspected landfill at TA-33.

p. 4-225 and 226, TA-10 Discussion. The discussion of TA-10 appears to completely discount the extensive work performed under the FUSRAP. See comments for p. 4-187.

p. RF-1, last paragraph, last line. 1), LA-10890-MS, Los Alamos National Laboratory, Los Alamos, New Mexico, December.

p. RF-2, twelfth paragraph. Guevara, F. A., and Dvorak, R. F., 1987. "An Overview of Airborne Radioactive Emissions at a National Laboratory." American Society of Heating, Refrigeration and Air Conditioning Engineers Transactions 1987, V. 93, Pt 2, Atlanta, Georgia.

p. RF-3, Entry for LANL 1987b. This report has been published as: Environmental Status of Technical Area 49, Los Alamos, New Mexico, LA-11135-MS.

Table D-2. Add new section under Structure Number - TA-3, across Pajarito Road from TA-59 - 1974.

Table D-2. Under Description - Leak in radioactive liquid waste line between TA-3 and TA-50 waste treatment plant.

Table D-2. Under Type - Liquid Radioactive Waste, plutonium.

Table D-2. Under Quantity - Unknown, Major.

Table D-2. Under Current Status or Condition - Cleanup operations in 1974 and 1984.

Table D-2. Under Previous Sampling - 1984 - less than 75 pCi/g.

Table D-6, p. 1. Under Structure Number: No. #, - Under description delete "Vessel" from "Water Boiler."

Table D-6, p. 1. Under Current Status or Condition - Reactor was defueled in 1974. External structures have been decommissioned but the reactor vessel remains within the biological shield at the TA.

Table D-6, p. 1. Under Previous Sampling remove - None known and add less than 1 mR at surface of biological shield.

Table D-6, p. 1. Under Structure Number TA-2-1 add - 19, 44, 49.

Table D-6, p. 1. Under Description add - Omega West Reactor and related structures.

Table D-6, p. 1. Under Type add - Enriched uranium and fission products.

Table D-6, p. 2. Delete TA-3-43 listing. LANL HSE-1 does not consider TA-3-43 to be contaminated.

Table D-6, p. 3. Under structure No., add - TA-3-154.

Table D-6, p. 3. Under Description add - Liquid Waste Storage Facility.

Table D-6, p. 3. Under Type add - TRU, U, Chemicals.

Table D-6, p. 3. Under Quantity add - Unknown.

Table D-6, p. 3. Under Current Status add - NV Bldg. is in Standby status; could be activated if main liquid waste line were out of service.

Table D-7. Under Structure Number add - TA-2-19 and 32.

Table D-7. Under Description - Outdoor structures associated with TA-2 Water Boiler Reactor Effluent.

Table D-7. Under Type add - Fission products.

Table D-7. Under Quantity add - Unknown Under Current Status Removed in 1986 minor soil contamination. See LA-10890-MS.

Table D-7. Under Structure Number add - TA-3-700.

Table D-7. Under Description add - Liquid Radioactive Waste Collection and Pump Station.

Table D-7. Under Type add - Plutonium, other transurancis, chemicals.

Table D-7. Under Quantity add - Unknown Under Current Status, add Bldg. removed in 1982. See LA-10821-MS.