LANL 1996
ER ID # 53791

Material Disposal Area L

Los Alamos
NATIONAL LABORATORY

Fact Sheet for Operable Unit 1148 Resource Conservation and Recovery Act Facility Investigation Work Plan

LANL FIELD UNIT 5

The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) work plan is a document that addresses the site characterization activities for all potential release sites (PRSs) at Los Alamos National Laboratory (the Laboratory). The work plan for OU 1148 was submitted to the Environmental Protection Agency (EPA) in May 1992. The primary purpose of this work plan is to describe site characterization activities and verification sampling that address potential contaminant releases from OU 1148. The work plan for OU 1148 is available for public review at the environmental restoration reading room located at 2101 Trinity in Los Alamos and at the information repositories in Los Alamos, Española, and Santa Fe.

Background

OU 1148 includes land in two technical areas (TAs) on property owned by the Department of Energy (DOE): 51 and 54 (Figure 1). The OU contains 51 PRSs, 17 of which are recommended for no further action. Research on techniques for isolating buried waste in dry climates is conducted at TA-51, where the septic system is the only PRS. TA-54 contains four waste-handling and disposal areas (Areas G, H, J, and L) enclosed by security fences and three other facilities located in the western part of the technical area (Figure 1). The active disposal areas in TA-54 are managed by the Laboratory's Waste Management Group (EM-7). To enable the efficient characterization of the PRSs in OU 1148, the work plan groups the 45 PRSs in TA-54 by geographic location.

- Area G is a 65-acre landfill used for hazardous and radioactive wastes since 1957. The 26 PRSs in Area G include disposal pits and shafts for low-level solid radioactive waste and mixed waste, as well as septic systems, sumps, an underground tank, a waste compactor, and a truck-washing pit. A vapor plume of tritium and volatile organic contaminants is present in the unsaturated rocks immediately below Area G. The plume is monitored by a set of wells. Environmental surveillance in the canyon adjacent to Area G has detected concentrations of uranium and plutonium that slightly exceed background values.
- Area H is a 0.3-acre facility, whose 9 shafts were used for disposal of waste, including tritium, between 1960 and 1986. Tritium is the only contaminant known to have been released from the facility.

Acronyms

DOE
Department of Energy

EPA
US Environmental Protection Agency

OU
Operable unit

PRS
Potential release site

RCRA
Resource Conservation and Recovery Act

RFI
RCRA facility investigation

TA
Technical area

This fact sheet provides information specific to OU 1148. General information on the environmental setting of the Laboratory, past cleanup efforts, and ER Program requirements is provided in a separate fact sheet.

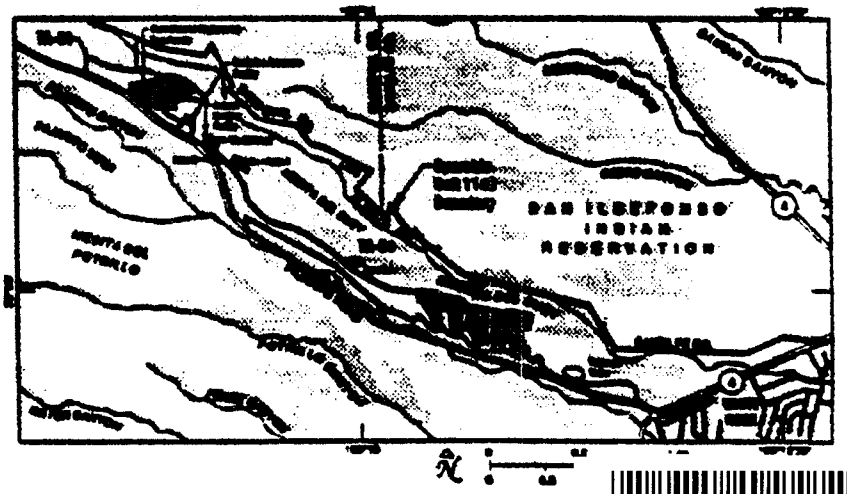

Figure 1. Location of Operable Unit 1148.

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Los Alamos
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Community Involvement & Outreach Office
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E-mail Address: cio@lanl.gov

Date: May 20, 1996
Refer to: CIO:96-174

Mr. Fred Pearson
University of Northern Illinois
Rec. Admin. Dept.
347 Gladstone
Aurora, IL 60506

Re: Tour of Environmental Restoration Sites

Dear Fred:

Late last month, we discussed the possibility of a tour at Los Alamos National Laboratory as part of your "Environmental Problems of the West" course. Enclosed, for your and your students' perusal, are information packets for a tour at Los Alamos National Laboratory's environmental restoration sites. I think you will find them helpful in preparing for the tour. We discussed a possible date of June 25. Please let me know as soon as possible whether that is still a viable date so we can finalize the program.

I propose the following itinerary:

1. Material Disposal Areas G and L;

2. Land Cover studies at Technical Area 51;

3. Decontamination and Decommissioning of Phase Separator Pit at Technical Area 35;

4. Technical Area 33 - Firing Sites;

5. If time permits, Los Alamos Canyon - Omega West Reactor.

This schedule is negotiable depending on the time you have available.

Please let me know if this program looks like it fits your needs. If you have any further questions, please do not hesitate to give me call at (505) 667-1217.

Sincerely,

Marja H. Shaner

Marja H. Shaner
Program Principal
Environmental Management Programs

MAY 2 2 1996

Cy w/o enc.: T. Baca, EM, MS J591
J. Jansen, EM/ER, MS M992
CIO-1, MS A117
CIC-10, MS A150
RPF, MS M707

- Area J is a 2.7-acre facility that includes three pits and two shafts actively used for disposal of nonhazardous waste. There are no known environmental releases from the area.

- Area L is a 2.5-acre permitted facility for waste storage and treatment. Hazardous waste was disposed at Area L between the late 1950s and 1985. The 13 PRSs in Area L include inactive chemical waste disposal pits, shafts, and impoundments for chemical waste and various treatment and storage facilities for chemical, mixed, and hazardous wastes and polychlorinated biphenyls. A vapor plume of volatile organic contaminants is present in the unsaturated rocks below Area L. The plume is monitored by a network of wells that surrounds the area.

The RFI work plan for OU 1148 includes characterization plans for septic systems at three facilities located in the western part of TA-54:

- A newly constructed facility to perform final verification testing and certification of plutonium-containing waste. The waste from this facility will be transported to the Waste Isolation Pilot Plant site in southern New Mexico for ultimate disposal, when and if that plant begins to operate.

- Two facilities that housed animals used in medical and radiological research from the 1960s to the 1980s. The radiation sources were removed when the research terminated. One of the facilities is now used as a laboratory for analyzing environmental samples and the other for research on the effects of oxides of nitrogen on animals.

Cleanup Activities

The closure provisions of RCRA apply to many of the PRSs in Areas G and L. The RFI work plan for OU 1148 proposes to modify existing closure plans for these PRSs. To date, one of the PRSs in Area G (which contains six small waste oil storage tanks) has been cleaned up.

Areas H and L are no longer used for waste disposal. The impoundments, trenches, and shafts at these areas have been sealed. Trenches and shafts in the active disposal areas (Areas G and J) are sealed after they are filled, and studies are being conducted at Area G to determine the most effective capping materials.

The RFI work plan for OU 1148 includes a voluntary corrective action plan for Area L to accelerate remediation of the vapor plume, to impede continued lateral and vertical migration of the plume, and to address any concerns that the plume could contaminate deep groundwater.

Contaminants and Pathways of Concern

The principal exposure pathways of concern in OU 1148 are air, surface water run-off, surface sediments, and subsurface migration of volatile contaminants. The four septic systems located in TA-54 and TA-51 are not believed to have received hazardous or radioactive waste. However, the absence or presence of contaminants in each septic system will be investigated. The principal exposure pathway for any contaminants in the septic systems is ingestion of soil.

The list of analytes for OU 1148 includes volatile organic compounds, semivolatile organic compounds, metals, pesticides, polychlorinated biphenyls, cyanide, and tritium. The presence of radioactive contaminants will be investigated by measuring gross alpha and gross beta and by gamma spectroscopy. In addition, radionuclides of concern at Area G have been selected for analyses based on waste disposal records.

Potential receptors of contaminants released from PRSs in OU 1148 are site workers and individuals who access public land adjacent to the operable unit. Field surveys conducted at OU 1148 did not identify any impacts on endangered species.

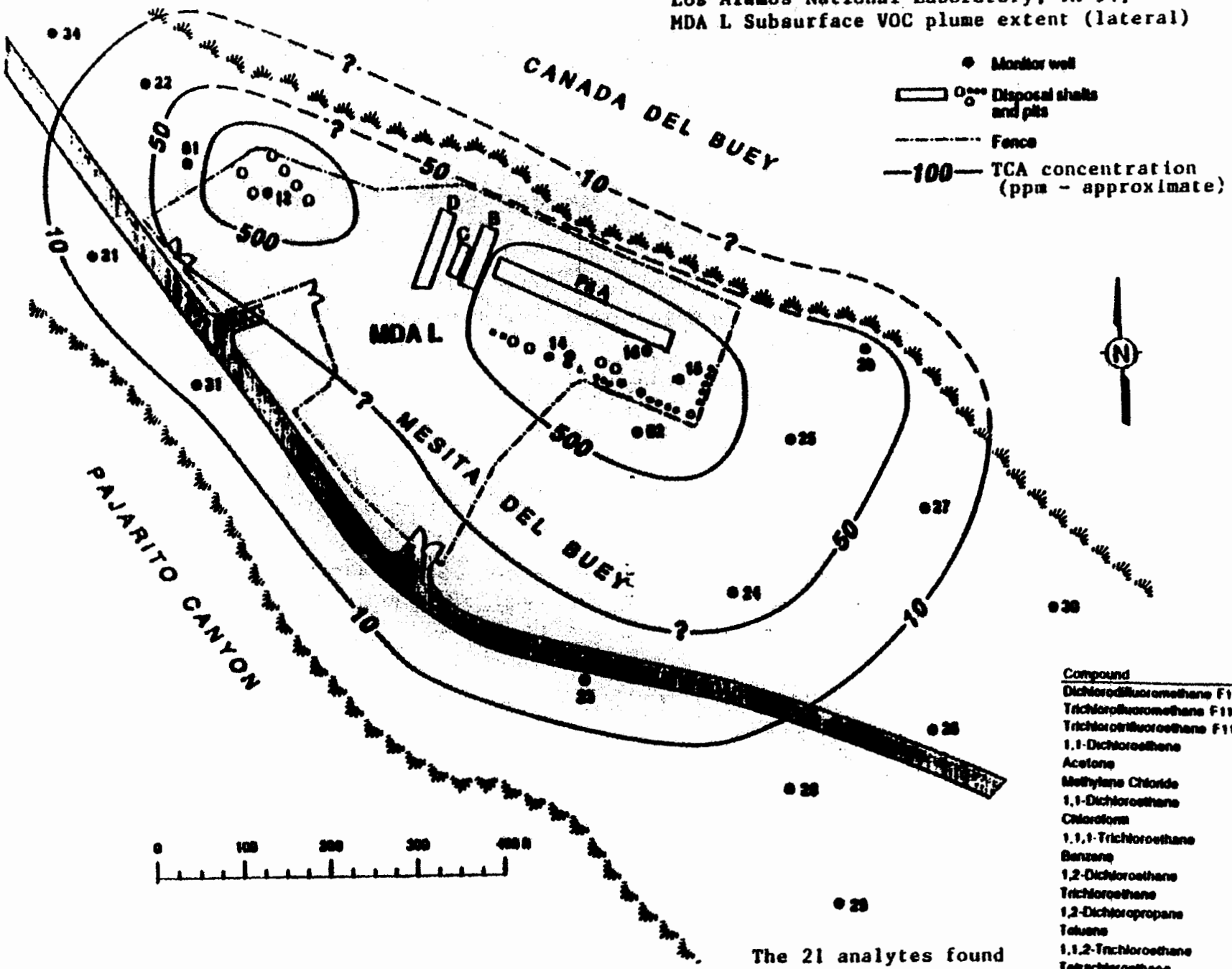
Site-Specific Approach to Characterization

Because the four waste-handling and disposal areas will remain closed to public access, investigations will focus on the release of contaminants beyond their security fences. Site characterization of the four septic systems, which are on land owned by DOE, assumes that the public will have access to the land in the future. An onsite mobile laboratory and offsite laboratories will be used to provide analytical data.

Schedule

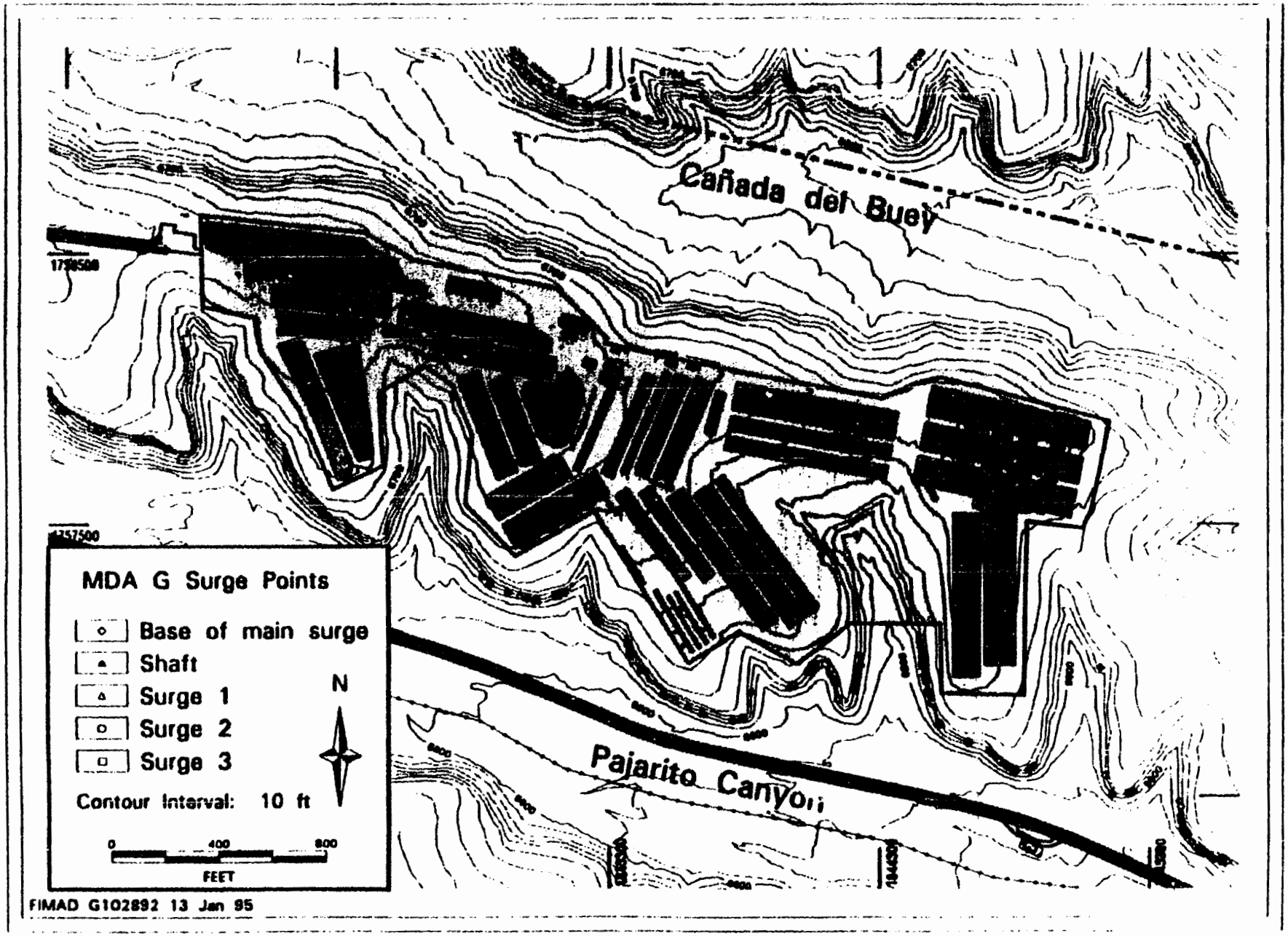
The RFI began in the summer of 1992 and is expected to continue until January 1998. If extensive studies beyond the initial studies are necessary, the field work may not be completed until December 1999. The first field investigation to be performed at OU 1148 is the characterization of the vapor plume in the subsurface at Area L.

Los Alamos National Laboratory, TA-54,
MDA L Subsurface VOC plume extent (lateral)



Compound	TBGOMS ppmv maximum
Dichlorodifluoromethane F12	3
Trichlorofluoromethane F11	12
Trichlorotrifluoroethane F113	87
1,1-Dichloroethene	35
Acetone	21
Methylene Chloride	45
1,1-Dichloroethane	13
Chloroform	28
1,1,1-Trichloroethane	523
Benzene	8
1,2-Dichloroethane	27
Trichloroethene	139
1,2-Dichloropropane	43
Toluene	24
1,1,2-Trichloroethane	1
Tetrachloroethene	17
Chlorodibromomethane	2
Chlorobenzene	3
Ethylbenzene	1
M+P-Xylene	6

The 21 analytes found in vapor wells in MDAs L and G, 1st Qtr, 1996



Map of MDA G, TA-54, Los Alamos National Laboratory. MDA G is LANL's low-level solid radioactive waste disposal area. Rectangles=pits (hatchered=active); triangles= shafts. "Surge Points" = basal surge of Unit 2, Bandelier Tuff

Technical Area 51 - Waste Management Engineering Test Facility

Environmental Engineered Cover Demonstration

Background

Surface covers or caps are one of the proposed remedies for contaminated sites at Los Alamos. The Waste Management Engineering Test Facility provides the area to demonstrate the effectiveness of surface covers and to test other technologies that may be applicable to sites at Los Alamos and throughout the Department of Energy Complex. The Waste Management Engineering Test Facility is located in the pinion-juniper woodland ecosystem which encompasses approximately half of the Los Alamos National Laboratory. Different experiments related to surface cover design and behavior, soil erosion, and subsurface flow and transport of contaminants have been performed at the Waste Management Engineering Test Facility over the years.

Current Activities

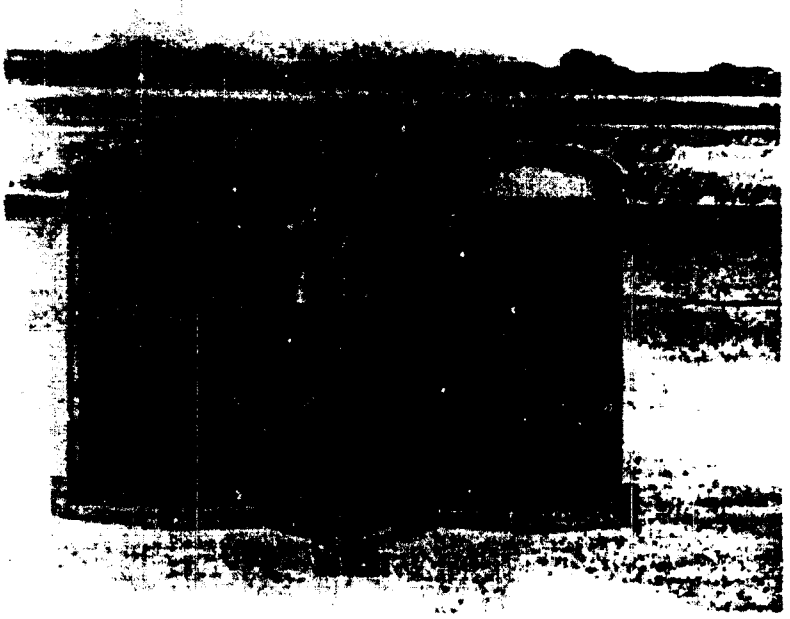
The visitor will see the Environmental Engineered Surface Cover Demonstration. This demonstration has been operating since 1992. It is designed to provide regulators and remediation engineers with data on the performance of different surface cover designs and to develop soil water measurement systems for cover performance monitoring. The handout materials attached describe experimental design in more detail.

TARGET TECHNOLOGIES

a portfolio of research -- ready for development

Waste Management Engineering Test Facility

At this 20-acre site, researchers can perform pilot-scale testing of geotechnics and develop models for waste management sites or environmental restoration sites. Scientists can use two clusters of caissons (each caisson is 10 ft in diameter and 20 ft deep) with central control and sampling levels at every 2 ft to conduct experiments that will validate models; they can also test the performance of blockage of contaminant transport. Two clusters of caissons have clusters of six units with a center instrument and access unit. The units have been designed so that actual weather conditions can be allowed to prevail during testing, or accelerated testing can force the system. This site has underneath it a collection system that can collect any effluents produced from a failed design.



Caissons available for model validation studies

Los Alamos is seeking an industrial partner to complete the development and commercialization of this promising and viable technology.

For technical information contact:
Wayne R. Hansen, Phone: 505-667-3331.

Applications

- Validates models used to estimate treatment system behavior and success
- Tests treatment system for efficiency and problems under safe conditions
- Tests monitoring systems
- Accelerates tests of treatment systems or monitoring systems

Configuration

- Caissons 20-ft deep and 10 ft in diameter, with instrument access every 2 ft
- Lysimeter field with 1-ft diameter, 3-ft to 6-ft deep
- Mock waste trenches for tests under field conditions

Advantages

- Industry can use instruments to test real-world problems
- Access to Environmental Sciences Group experience in monitoring and measuring the performance of waste management and treatment systems

Development Phase

- Rainfall simulator available
- 6 caissons available
- Lysimeter field available

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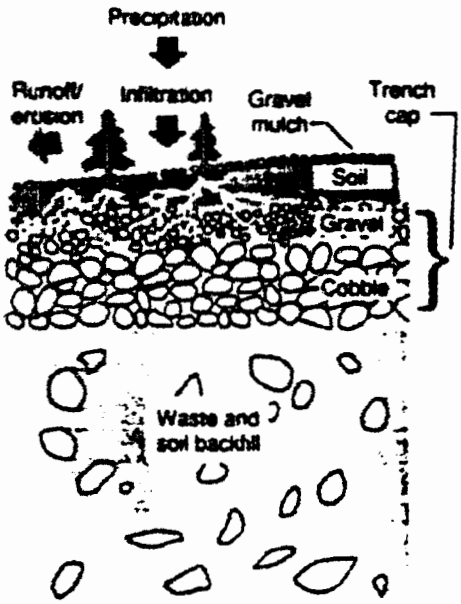
Hydrologic and Ecosystem Studies of Landfill Covers

Preparing the landfill cover testbeds that will measure the effect of differing cover materials and surface slopes are (from left) Fairley Barnes, Tracy Schofield, J. Lee Martinez, and Jack Nyhan.



Studying how surface vegetation and subsurface cover material affect the water cycle will help determine how best to reduce cover erosion and keep moisture from reaching the landfill contents.

For thousands of years people have disposed of waste by burial and open dumping. Today, everything from household garbage to old furniture to toxic and low-level radioactive waste (such as is used in medical diagnostic equipment) comes to a final rest in a landfill. But some landfills have caused problems—harmful waste has contaminated water and soil nearby. Federal regulations now establish performance criteria for proposed and closed landfills and for landfills currently in use so that possibly harmful contents will not escape the landfill boundaries. These criteria require that waste remain safely in place for more than one hundred years. The United States has 3,700 landfills that are contaminated with hazardous and radioactive substances and approximately 5,000 sites that contain uranium mill tailings. In our innovative research on landfills, we at Los Alamos are exploring solutions that could bring these landfills into compliance at reasonable cost; our findings will also lead to improved designs for new landfills.

For a landfill to remain intact for hundreds of years, water must not reach the contents and carry them outside the landfill, and the landfill's cover must not erode and expose the waste contents to air and water. Achieving these goals requires understanding what happens to the water in the local environment. In the natural water cycle, water from rain or snow runs off, seeps into the ground, or is evaporated from the surface. The moisture that soaks into the ground can drain away in the subsurface, be absorbed by the roots of plants covering the landfill, or seep into the landfill contents. We want to discover the balance of soil cover and plant life that will allow water to be diverted horizontally and transpired (absorbed from the soil through the roots and lost to the air through pores in leaves) by the cover vegetation, thus permitting only a minimal amount of moisture to sink into the landfill.

To better understand the water cycle, we have defined certain elements that we can measure. We measure the amount of moisture in the soil at any time, total precipitation, surface runoff, evaporation from the soil surface, transpiration from plant leaves, horizontal subsurface flow away from the landfill, and vertical seepage into the landfill contents. Soil moisture is important because it represents the amount of water in the landfill cover's soil layers available for cover plants to absorb through their root systems for growth. In addition, the rate at which water moves through the landfill cover increases by 21 orders of magnitude (10^{21}) as the soil water content increases and the soil becomes saturated.

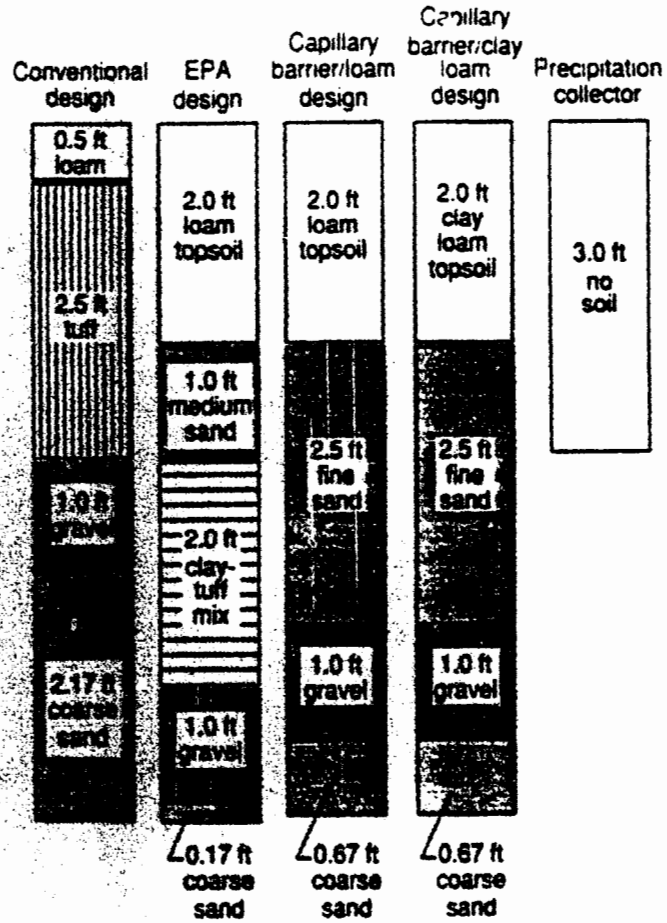
Discovering appropriate plant cover is one part of our study. We want to understand what types of vegetation grow well and consistently remove soil moisture in specific locations and how much vegetation can be supported by the amount of moisture that is available. One pound of plant matter (dry weight) can remove from 40 to 4,000 pounds of water a year from the soil through transpiration.

History has shown that, without human intervention, native vegetation eventually covers the surface of an undisturbed landfill. After studying the hydrology at Laboratory disposal sites varying in climate and ecology, we selected areas of native vegetation at three closed waste disposal landfills to serve as test plots. The plots range from high-altitude, high-precipitation ponderosa pine forest to low-altitude, low-precipitation

piñon-juniper woodland. At these plots we measure precipitation, soil moisture, and transpiration. Because these plots represent the extremes of range for disposal sites on Laboratory property, the findings can be applied to any landfill here. When we better understand how plant cover affects soil moisture and the water cycle, we can use appropriate kinds and densities of native vegetation as part of a barrier system to prevent moisture from seeping into the contents of waste sites.

In another study we have constructed specially designed test plots to measure how a landfill is affected by three factors: content of the cover materials, degree of surface slope, and slope length. In a conventional landfill, the waste is covered by a 2.5-foot layer of tuff or other available material and then topped off with 6 inches of topsoil. The Environmental Protection Agency (EPA) has proposed a cover consisting of a hydraulic barrier covered by medium-fine sand and then topsoil. The clay layer in the EPA design prevents water from passing into the landfill contents. The sand layer allows subsurface water to flow laterally. In our test plots we compare the conventional cover, the proposed EPA cover, and two other cover designs containing capillary barriers for the control of moisture. The latter designs have no impermeable barrier to protect the landfill contents. Instead, they use the capillary properties of fine sand to promote the passage of water through the sand and, on a slope, away from the landfill.

At this test site, we constructed the four test plots side by side in a 34-foot-long bed at a 5-percent slope. To test the effect of slope, we repeated the four test plots in three additional 34-foot-long beds at 10-percent, 15-percent, and 25-percent slopes. Our experiment to test the effect of surface slope is one of only two such experiments being conducted in the world. The other, in Germany, is being conducted on an indoor experimental plot. Built into the Los Alamos beds are 2 miles of plumbing—all of the precipitation that falls on the test beds is measured.



Cross sections of landfill cover material on the test plots. Each combination of materials will contain or transport water differently; our test will show how well water flows away, remains in the cover material, or seeps into the landfill contents.

Instruments buried in the soil measure the soil moisture, and pipes collect runoff from the various depths of cover material. We are recording how much water runs off the surface, how much enters the subsurface sand, and how much penetrates the sand and moves into the landfill contents (represented by a layer of gravel). We are also measuring the amount of soil in the runoff water to determine the surface and subsurface erosion rates.

We will gather data at these plots for eight years. During that time, native vegetation will begin to grow and the role of plant life can be further studied.

The cleanup of existing landfill sites is predicted to cost the United States hundreds of millions of dollars. As an alternative, controlling the water cycle with vegetation and cover materials may prove to be the least expensive, most effective method for making closed landfills safe.

Reprinted from Research Highlights 1991 (LALP-91-75). Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California under contract W-7405-ENG-36 for the U.S. Department of Energy.

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Los Alamos, New Mexico 87545

PROJECT: TA-35 PHASE SEPARATOR PIT DECOMMISSIONING PROJECT

History of Operations

TA-35, also known as Ten Site, is located on a finger mesa between Mortandad and Ten Site canyons. The main laboratory building on this site, TA-35-2, was completed in 1951. Major research programs housed in this building included a hot cell used to prepare kiloCurie sources of radioactive lanthanum (^{140}La), three experimental nuclear reactors (the Los Alamos Power Reactor Experiment I and II (LAPRE-I & II); and the Los Alamos Molten Plutonium Reactor Experiment (LAMPRE), plutonium research laboratories, and a lithium-tritide component development facility.

The original operations conducted in TA-35-2 were the ^{140}La hot-cell operations, located in the basement at the east end of the building. The LAPRE-I & II and LAMPRE reactor experimental programs were operated between 1956 and 1964 in the basement of TA-35-2. These reactors were decommissioned and removed from the building at the conclusion of the experiments. The tritium facility, operated in Rooms A-12, A-12A, and A-12B (also in the basement of TA-35-2) from 1954 until 1974, underwent decontamination and decommissioning (D&D) in 1979.

Current operations in TA-35-2 include research in ceramics, robotics, polymer synthesis, lasers, high-speed impact studies, and strain-rate measurements.

Building TA-35-2 exhausted both off-gas and liquids to the Phase Separator Pit (PSP) (TA-35-3) for segregation and disposal processing. The PSP communicated with the Air Filter Building (AFB) for filtering of off-gas products and with the Process Tank facility (TA-35-10) for processing of liquid effluents. Three underground storage tanks (TA-35-4, -5, -6) adjoining the PSP were used to store liquid waste prior to transfer to TA-35-10. The PSP, underground tanks, and AFB are no longer needed to support programs at TA-35 and therefore, have been scheduled for decommissioning. TA-35-10 was removed during previous D&D activities at TA-35 in 1985.

Project Scope

The project has been broken up into six operational phases and involves removing a system of exhaust ductwork, above/below-grade structures, and liquid waste holding tanks. All structures and systems are in exterior locations, except for Building 2 interior removals (hoods, overhead exhaust ducts, and floor penetrations). The D&D project will not remediate soil. However, should contaminated soil be

identified within the two-foot working envelope around buried structures, it will be removed. If contamination exceeds this working envelope, the remediation of this additional soil will be the responsibility of Field Unit #4.

Phase 1:

This phase removed contaminated hoods, exhaust equipment, and associated overhead pipes from building TA-35-2. In addition, the exhaust duct floor penetrations were sealed. This phase also included all above grade exterior duct along Building 2 leading to Building 7, ducts over the PSP, ducts and associated equipment in Building 7, and two of the Building 7 exhaust stacks.

Phase 2:

This phase will remove the contaminated floor and superstructure at TA-35-7. This includes the associated electrical and mechanical building services. The concrete floor of this facility has a two-part construction. The upper layer consists of a nominal 4-inch concrete cap layer over the original slab. The building structure consists of a steel column supported roof, block-wall exterior, with spread footings for the interior columns. A one hundred foot exhaust stack has also been removed as part of this phase.

Phase 3:

This phase will remove the PSP and the three buried underground hold-up tanks (TA-35-4, -5, -6), including all piping leading to and from the tanks.

Phase 4:

This phase will excavate and remove the external underground ducts along the south side of Building 2. The underground ducts will be cut at the building wall.

Phase 5:

This phase will excavate and remove the underground ducts on the north side of Building 2, and remove Room A-175A. The underground ducts will be cut at the building wall. The removal of Room A-175A is necessary because of its degraded condition and its location over the exhaust ducts to be removed.

Phase 6:

This phase is 95% completed. It included the removal of all accessible Building 2 basement ducts.

Significant Contaminants Found in Project Facilities

- Lead, mercury, chromium, acids, and VOCs (1,1-dichloroethene, carbon tetrachloride, 1,2-dichloroethane, and acetone).
- Elevated levels of alpha, beta, and gamma radioactivity at some sample locations.
- Most below Department of Energy release limits for Removable surface contamination.
- Radionuclides above measurement uncertainty:

Sr-90	Cs-137	Ru-106
Eu-152	Am-241	S-22
Np-237	Co-60	Ce-144

Estimated Waste Generation

This decommissioning project is expected to generate two general classes of waste: Low level radioactive waste (LLW) and mixed waste. Table 1 has been prepared to present the projected waste volumes. Notice that some of the waste is scheduled to be recycled.

Table 1

Waste Type	Waste Volume (cu ft)		Recycled Material
LLW	Protective	Approx. 10-20% of total waste	Cloth Anti-C 400 cu ft
	Metals	12,800	Stainless Steel 54.5 Tons (95% of metals)
	Non-Metals	18,000	
	Liquid	12,000 gallons	
Mixed Waste	Solid	6,700	
	Liquid	Approx. 3000 gallons	

Project Schedule

PLANNING STAGE		Jun., 1993 to Dec., 1993

(Including: site characterization, engineering evaluation and design, environmental compliance, procurement, baselining schedule and cost, plans and readiness review.)

OPERATIONS STAGE (not performed in sequence)

Phase 1	(above ground ducts removal)	Jan., 1994 to Jul., 1995
Phase 2	(raising Building 7)	Apr., 1996 to Aug., 1996
Phase 3	(PSP and holding tank removal)	Feb., 1996 to Jun., 1996
Phase 4	(south side underground duct removal)	Jan., 1996 to May, 1996
Phase 5	(north side underground duct removal)	Aug., 1995 to May, 1996
Phase 6	(removal of Building 2 basement ducts)	Feb., 1996 to Apr., 1996
Close-out		Jul., 1996 to Sep., 1996

Technical Area 33

Site History

TA-33 was created in 1947 as a test site for weapons experiments using conventional high explosives, uranium, beryllium, and polonium radiation sources. The tests were conducted primarily to verify designs of nuclear weapons' components called initiators. The experiments were performed in underground chambers, on surface firing pads, and at firing sites equipped with large guns that fired projectiles into catcher beams. These activities ceased in 1972. A high-pressure tritium facility was operated at the area from 1955 until late 1990. Current activities are centered primarily at Main Site located near the entrance gate, with laboratory groups occupying portions of the office buildings. Other small buildings and surface areas are also used. The National Radio Astronomy Observatory Very Long Baseline Array radiotelescope antenna was sited at TA-33 in 1985 and is still operational.

Solid Waste Management Unit 33-007(c) Firing Areas

Three buildings remain at Area 6: TA-33-1, TA-33-2, and TA-33-16.

Physical Description

Two firing areas were used at Area 6. The first is south of the principal structure at Area 6, TA-33-16. Immediately to the west of TA-33-16 is a shot pad on which a large-bore gun was mounted. It is a 6 x 10-ft concrete pad surrounded by a concrete apron. South of TA-33-16 catcher boxes were built of timbers in two sections, each about 6 ft on a side. The catcher boxes were filled with soil, wood chips, and vermiculite. The timbers are rotting and disintegrating but still in place.

Area 6 was constructed adjacent to a basaltic cinder cone. The cone was excavated to provide space for a second shot pad. This shot pad lies 100 ft southwest of TA-33-16. Two wooden barricades, constructed of 8 x 8-in. timbers, lie to the north and east of the shot pad. The shot pad and barricades are still in place.

Historical Use and Potential Containment

Area 6 was developed in 1948 for initiator experiments. TA-33-16 (originally TA-33-6) was completed in March 1949. It first housed an air gun, then electronic equipment used to measure neutron production in "gun-type" initiators containing beryllium and polonium-210. Military guns, of 2 to 5 in. bore were also stationed on concrete pads around T-33-16. Projectiles were fired at targets placed in front of barricades. Targets may have contained uranium and beryllium. Compressed air was used to fire the guns. Projectiles often cracked open, contaminating the pads and surrounding area with polonium-210. Firing crews repeatedly painted contaminated parts of the guns and pad with lead paint to reduce surface contamination (Hoard 1990, 02-022). Shots were discontinued at Area 6 by 1955.

In 1956 TA-33-18 was used to make and machine laminating materials containing barium, titanium, lead, and zinc using epoxy resins. The building was supplied with an exhaust blower and stack (Milford 1956, 02-023). In 1957 it was noted that toxic fumes were being blown from the building (Hyatt 1957-02-024). Fans were installed to protect personnel. TA-33-1, Located 50 ft east of TA-33-16, housed experiments to make niobate crystals (Schulte 1958, 02-025). TA-33-2 was a shop. There is no record of hazardous material being used in this building.

In summary, potential contaminants include barium, lead, and projectiles containing uranium, beryllium, polonium-210, other metals, and high explosives.

Present Use

Area 6 has been decommissioned as a firing site. The cinder cone has been further excavated since gun-weapon testing ceased. An aluminum tower, TA-33-192, used for atmospheric physics monitoring by the Atmospheric Sciences Group, SST-7, now occupies the area within the cinder cone. The buildings are empty.

Technical Area 33
Firing Areas

Press Release:

An environmental pilot project to remediate uranium contaminated soils will be conducted at a former weapons research site at Los Alamos National Laboratory (LANL). Scientists from LANL and ICF Kaiser Engineers will join with Thermo Nuclean, a division of Thermo NUtech in Oak Ridge TN, to test innovative methods of sorting and extracting uranium contamination from soil at Technical Area 33.

Thermo Nuclean will operate it's Segmented Gate System (SGS) to sort and separate radioactive soil into contaminated and non-contaminated material streams. The SGS uses precise, fixed geometry detectors that are coupled to a computer operated soil conveyor system. Thermo Nuclean has achieved success in similar projects at other DOE sites, attaining over 90% volume reduction of contaminated soil.

The Laboratory will operate it's Containerized Vat Leach System on the contaminated material stream. This soil will be heaped into containerized vats for leaching with sodium bicarbonate (baking soda) solution. The leaching produces uranium-carbonate complexes which will be extracted from the solution in an ion-exchange process. The uranium-free solution will be recycled; the ion-exchange resin can be regenerated and also recycled. The concentrated uranium extract will be disposed of at an approved LANL facility. Tests of heap leach processes on soil from several LANL sites achieved uranium removal rates as high as 99.5%.

Restoration of the former weapons research site will be in accordance with Department of Energy standards and regulations. Results from this pilot project will be used to assess the effectiveness of these methods for future remediations at LANL and other sites.

Los Alamos Canyon

Omega West Reactor

Brief Description

- There are 13 Solid Waste Management Units at Technical Area (TA) 2 (Potential Release Site (PRS) 2-001 through PRS 2-013) consisting of an underground storage tank, decommissioned reactor waste units, storage pits and tanks, cooling tower drift loss, waste lines, drains, a decommissioned septic system, outfalls, operational releases, and chemical shack waste units.
- TA-2 is located in Los Alamos Canyon south of the main business district in Los Alamos.
- The primary operations at TA-2 involved reactor research with the Omega West Reactor (OWR), an 8-megawatt, water-cooled nuclear reactor fueled by highly enriched uranium. The OWR served as a research tool by providing a source of neutrons for fundamental studies in nuclear physics and associated fields.

Contaminants

- Contaminants at TA-2 include uranium, chromium, acids, fission products, transuranic elements, and organics, including PCBs and solvents.
- Current environmental monitoring has contaminants (primarily tritium, cesium-137, and Sr-90) in alluvial ground water down gradient from TA-2.

Method of Cleanup

- The reactor and buiding are scheduled for Dcontamination and Decommisioning. The other Solid Waste Management Units are presently under investigation and cleanup plans are not yet formulated.

GENERAL BACKGROUND
ON THE ENVIRONMENTAL RESTORATION PROJECT
AT LOS ALAMOS NATIONAL LABORATORY

Environmental Restoration
Los Alamos National Laboratory

June 1995

What does Los Alamos National Laboratory do?

Los Alamos National Laboratory (the Laboratory) is a research and development facility owned by the Department of Energy (DOE) and operated by the University of California for the DOE. It is located approximately 25 miles northwest of Santa Fe. From its earliest beginning in 1943, the Laboratory's primary mission has been nuclear weapons research and development. Although the Laboratory's current mission focuses on national defense, the mission includes many other studies in physics, earth sciences, energy resources, nuclear waste management, and environmental protection and cleanup. The Laboratory plays an important role in expediting the development and commercialization of emerging technologies. The Laboratory is expected to pursue this mission into the foreseeable future.

What is the Environmental Restoration Project?

Many of the processes used in carrying out the Laboratory's mission involved the use of hazardous chemicals and radioactive materials. During World War II and for a while thereafter, some of these materials were disposed on the Laboratory site or were otherwise released into the environment. Beginning in the 1970s, Congress enacted laws to protect the environment. During that time, DOE and the Laboratory began to conduct environmental surveys and to clean up areas where spills and disposal had occurred. Two laws—the Resource Conservation and Recovery Act (RCRA) and the Hazardous and Solid Waste Amendments (HSWA), which modified RCRA—apply to the Laboratory. As a facility that treats, stores, and disposes of hazardous waste, the Laboratory must have a permit to operate under RCRA. Requirements specific to the Laboratory are contained in an attachment to the permit called the HSWA Module.

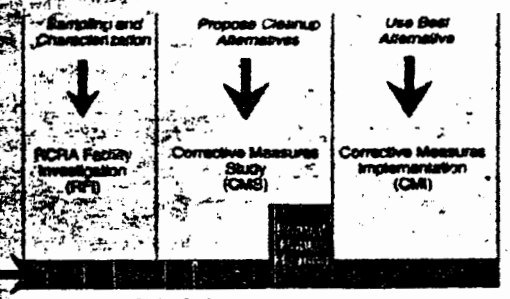
In response to these laws and because we want to make certain that no sites that could contain hazardous chemicals or radioactive materials have been overlooked in past investigations, the Laboratory established the ER Project in 1989. This project is designed (1) to determine whether potential release sites that resulted from past Laboratory operations are still contaminated and, if so, how much, and (2) to evaluate and select the best means of cleaning up any areas that may still contain hazardous chemicals and radioactive materials that exceed levels established with the Environmental Protection Agency. In conducting its investigations and making its recommendations, the ER Project provides formal and informal mechanisms through which all interested parties, [e.g., DOE, Environmental Protection Agency, the New Mexico Environment Department, the Pueblos, and the interested public] can participate.

How does the corrective action process work?

The ER Project follows a Resource, Conservation and Recovery Act-prescribed three-step corrective action process at all potentially contaminated sites. The first step—the RCRA facility investigation (frequently called an RFI)—is designed to identify the presence or absence of contamination (Phase I). Based on the results of Phase I, the ER Project may recommend no further action, though contamination below acceptable risk levels may be present. However, if contamination is present above specified levels, the investigation moves to Phase II. Several different options are available in Phase II, including further investigation and accelerated cleanup. The results of Phase I and II investigations are summarized in facility investigation reports.

If the facility investigation report indicates that further action is required, the project proceeds to the second step—a corrective measures study—to evaluate cleanup alternatives. The study will consider risks to human health and the environment, costs, and other factors such as disposal methods, damage to the ecological system and the amount of generated waste. The third step—corrective measures implementation—carries out the chosen corrective measure, verifies its effectiveness, and proposes control and

Corrective Action Process



Where are we now in this process?

The ER Project has completed almost all of the planning required during the investigation and characterization phase. In response to requirements in the permit, the project prepared its first Installation Work Plan in 1990. This document, which is updated annually, is the projectwide master plan. In addition, since 1990, the ER Project has issued 23 facility investigation work plans, which provide detailed plans for sampling and analyzing data on the nature and extent of potential contamination in the ER Project's five field units. A 24th work plan, which addresses potential contamination in the canyons on and downstream of the Laboratory site, is being prepared in segments. The first one of the canyons' work plans, Los Alamos/Pueblo Canyons, is expected to be completed by 1996. The work plans contain the history and descriptions of each potential release site; the plans for site characterization (the process of taking samples of the surface and subsurface soils, water, and othe materials); and proposals for removing some of these sites without further investigation or cleanup.

If the ER Project decides to propose removing a site from the permit because no further action is needed or if the Project proposes to perform an accelerated cleanup, the Department of Energy and the ER Project petition the Environmental Protection Agency to modify the information in the permit. The modification process involves public notices, meetings, and a comment period. Based on the information obtained in this manner, the Environmental Protection Agency considers whether to approve the modification. Public input weighs heavily in its decision.

How can I be involved in the corrective action process?

The ER Project's draft public participation plan describes in detail the ways in which you may become informed about the project, including signing up for the general project mailing list and participating in roundtable discussions, site tours, and public meetings. The plan also describes our intent to involve the public in activities such as discussions on ER Project issues to community organizations, developing recommendations for cleanup levels and prioritizing sites for cleanup, reviewing and making recommendations on information materials, and making information accessible. In addition, if you are willing to volunteer to help develop ER Project recommendations on a continuing basis, we would like to add your name to a separate list of active participants.

Whom Should I Contact for Further Information

If you need general information on the ER Project, all plans and reports prepared for the corrective action process are maintained at the Laboratory's Community Reading Room, 1350 Central Avenue, Suite 101, Los Alamos, New Mexico.

For a list of information sheets prepared by the ER Project, copies of information sheets themselves, or information on whom to call for answers to specific questions, please call Marja Shaner at 667-1217 or 1-800-508-4400. You can also reach her by e-mail, marja@lanl.gov, or by fax, 665-4411. Our mailing address is: P.O. Box 1663, Mail Stop A117, Los Alamos, NM 87545.