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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI

1201 ELM STREET

DALLAS, TEXAS 75270

March 10, 1987

MEMORANDUM

SUBJECT: Findings at Los Alamos National Laboratory (NM0890010515), Department of Energy Comprehensive Environmental and Response Program Survey Coordination Meetings, February 11-12, 1987

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Los Alamos National Laboratory (LANL) is located in Los Alamos, New Mexico. This site is operated by the University of California as a government contractor to the Department of Energy (DOE). Operations at LANL began during World War II and have continued to this date. The purpose of this facility is to provide the U.S. with advanced technologies in the fields of National Defense, nuclear physics, and medicine. As a result of the research conducted at LANL, hazardous waste, including low-level radioactive, and transuranic wastes have been generated. Hazardous waste management practices have been varied throughout the existence of the facility.

LANL is located among a series of mesas which finger out above the Rio Grande river flood plain. The upper 800-1250 feet of these mesas are composed of moderately welded volcanic ash flows, or tuffs, laid approximately 1.1 million years ago. Regional volcanic activity has subsided, with the last eruptive episode occurring 50,000 years ago. As a result of cooling, vertical fractures have developed in the volcanic tuff.

The moderately welded tuff has been found to have porosities ranging from 5-30%. Permeability is low, except where fractures are common. The character of the volcanic tuff is such that little connate water reaches ground water. The potentiometric surface of ground water underlying LANL has been found to exist 800-1250 feet below the surface. Therefore, saturation, if any, occurs in the vadose zone.

Precipitation in Los Alamos ranges from 12-15 inches per year. Evaporation rates exceed yearly precipitation rates by 3:1. LANL believes that no surface-to-groundwater migration is likely.

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## I. WASTE MANAGEMENT

LANL's waste management practices can be broken down into the following four stages:

STAGE I (1942-1959) Indiscriminant disposal of hazardous, low-level radioactive and transuranic waste.

Most site locations were logged, but the contents were not manifested. The majority of these disposal sites are located within the present boundaries of Los Alamos township. Waste management practices were characterized by excavation adjacent to test facility, razing of the facility, and in-place burial.

STAGE II (1960-1971) Increased concern about disposal practices at LANL.

All the hazardous waste disposal sites were logged. Low-level radioactive mixed waste and transuranic waste were segregated. Disposal sites were located in isolated areas. Some indiscriminant dumping along canyon walls continued.

STAGE III (1972-1983) Formation of an environmental surveillance group.

Hydrology and subsurface geology studies were conducted. Better engineering techniques were applied to the construction of new disposal sites. Studies of waste reduction by incineration were conducted. Hazardous waste management plans were developed in-house, with no input from the New Mexico Environmental Improvement Division (NMEID) or the United States Environmental Protection Agency (EPA). Some haphazard and uncontrolled dumping continued at individual test facilities.

STAGE IV (1984 to present) LANL becomes more receptive to the Resource Conservation and Recovery Act (RCRA) regulations as NMEID and EPA focus on LANL.

NMEID discovers violations at two active sites (areas G and L) and imposes a \$100,000 fine (as yet unresolved). NMEID issues a compliance order to LANL to determine if a ground-water monitoring waiver is warranted. DOE becomes increasingly concerned with the environmental impact of past and present hazardous waste management practices at DOE sites throughout the U.S. NMEID is informed that area P has been active since 1980; EPA is informed that area H has also been active since 1980. DOE adopts the Comprehensive Environmental and Response Program.

During the past 45 years LANL has disposed of its waste in over 300 sites. Of these, only a handful have been well documented. Many of the 300 sites contain high explosive residues and could pose a serious hazard to individuals conducting site assessments. LANL is reluctant to conduct surveys at these sites, and would prefer to leave them untouched. Many of these sites are located along canyon walls.

## II. SOLID WASTE

Waste streams at LANL are constantly changing since research projects change over time. Solid wastes include low-level radioactive and transuranic wastes. Much of these waste are stored in unlabelled drums. NMEID is requiring LANL to conduct tests on unlabelled drums. All low-level radioactive solid wastes are being disposed of in half-acre pits, then covered with material used to excavate the pits.

## III. LIQUID WASTE

Technical Area #50 (TA-50) treats low-level radioactive wastes. These wastes are transmitted from other technical areas via 4.5 miles of pipelines. The annulus space surrounding the pipes is monitored for leaks. Low-level radioactive wastes are mixed with an acidic solution (>2.0 pH) to aid in transporting. Low-level radioactive waste are defined by DOE as those exhibiting less than 100 nannocuries per gram of radioactivity.

LANL and DOE have been conducting studies with a PCB/transuranic waste incinerator to determine if an effective waste reduction process is attainable. Throughput of the incinerator has been determined to be 200 gallons per week.

## IV. REGULATED UNITS

There have been five active sites at LANL since November, 1980, which contain RCRA waste. Several other sites exist which dealt with hazardous or mixed waste and are the jurisdiction of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). The five RCRA sites include areas G, H, L, P, and possibly T.

### Area G (TA-54)

A low-level radioactive and transuranic waste disposal facility which is located near the edge of a mesa. Area G is approximately 15 to 20 years old and has been in continuous use. Three disposal practices are prevalent at this site, they are:

- 1) Shallow excavation - Approximately 50 feet of surface material is removed from an area covering about one-half acre. The "impoundment" is filled with low-level radioactive mixed waste, then recovered with the excavation material. LANL is planning on covering each impoundment with a semipermeable clay material.
- 2) Stainless steel tubes - Transuranic mixed waste contained in secured vessels are lowered into stainless steel tubes, covered with a plate, then sealed.
- 3) Covered surface impoundment - Transuranic waste, destined for future removal, is stored in specially treated 55 gallon drums. These drums are placed on palletes (6 to a pallette), then stacked on a concrete/asphalt lined surface impoundment. The drums are buried with dirt as the impoundment is filled.

#### Area H

LANL was not specific on the contents of area H, other than the probability that mixed waste was disposed of on site. Data on the contents of the disposal site are largely classified. Area H is not listed in LANL's Part B application.

#### Area L (TA-54)

This disposal site is solely dedicated to non radioactive hazardous waste. The facility has apparently been in operation for a number of years. Both storage and disposal activities have occurred at this site.

Disposal practices at area L are characterized by dumping hazardous waste in several excavated open impoundments. There appeared to be no concern about lining these units. NMEID identified this practice as a violation during a May 23, 1984, evaluation inspection. NMEID and LANL are still negotiating for a resolution of this issue. LANL has apparently ceased operations of these units.

Hazardous waste (i.e. waste which LANL deems hazardous) is stored at a recently constructed unit. This unit is well ventilated, with the floor having a grill and drainage leading to a containment tank. The purpose of the drainage and containment tank is to safeguard against drum leakage.

While the hazardous waste unit contains RCRA-regulated hazardous waste, around the site there are hundreds of 55 gallon drums labelled "Hazardous Waste". A few of the drums were also labelled as "Oxidizing Agent". Area L is identified in LANL's Part B RCRA application.

None of the above impoundment procedures include polyethylene lining material. Area L is identified in LANL's Part B application.

#### Area P (TA-16)

This site was in operation for several years, but LANL apparently discontinued its use in 1984. Area P lies on the face of a canyon wall and has been used to bury equipment laden with high explosives. There are no ground-water monitoring plans proposed for this area. LANL is reluctant to conduct a site assessment because of the potential hazard caused by remnant high explosives. This area has been found to contain waste with elevated EP toxicity levels for Ba.

#### Area T

Little data are available concerning area T. EPA has been made aware of its existence from various correspondence between EPA and and the facility. LANL has disclosed that area T has recieved RCRA regulated mixed wastes.

### V. ENVIRONMENTAL SURVEILLANCE

In fiscal year 1986, the LANL Health, Safety and Environmental Division (HSE) was allotted \$29,802,000. Of these monies, several programs were earmarked for funds, including 1) Environmental Compliance (\$5,451,000), 2) Waste Management (\$5,064,000), and 3) Environmental Surveillance (\$2,587,000). LANL expects its Environmental Compliance budget to exceed \$19 million by fiscal year 1990. Future corrective action monies must be allocated 1 to 3 years in advance and may impede timely regulatory requirements.

The DOE has developed the Comprehensive Environmental Assessment and Response Program (CEARP) to assist the Department in setting aside money for environmental assessment and improvement projects at DOE facilities. CEARP will work with LANL by interviewing past and present personnel, reviewing old data, and photographing old disposal sites and technical areas.

### CONCLUSION

LANL is a complex site which has treated, stored, and disposed of hazardous waste. As the public became enlightened with the impact of pollutants in their environment, LANL has in turn improved their hazardous waste management practices. However, old waste disposal sites continue to pose a health hazard to the environment and populace around Los Alamos. These sites should be addressed under EPA's CERCLA program.

Five sites have been identified at LANL which conduct RCRA activities. LANL has cooperated with NMEID and EPA in identifying its active hazardous waste and mixed waste disposal sites. LANL's waste management practices, however, differ from the RCRA regulations found in the Federal Code of Regulations. LANL should improve its cooperation with NMEID and EPA.

In sum, LANL's hazardous waste management program is so vast that occasional on-site and off-site evaluations cannot adequately assess the complexities of the facility's problems. Without a site-dedicated regulator, LANL's waste management practices, alternate monitoring programs, and corrective actions may be deficient. The problems at LANL are not overwhelming and can be effectively addressed with limited resources, given proper attention.

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