LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO 87545

OFFICE MEMORANDUM

TO :Distribution

DATE: November 7, 1978

FROM :Margaret Anne Rogers, H-12 MAR

SUBJECT :UPDATE OF LA-6848-MS, VOLS I & II, "HISTORY AND ENVIRONMENTAL SETTING OF LASL NEAR SURFACE LAND DISPOSAL FACILITIES FOR RADIOACTIVE WASTE (AREAS A,B,C,D,E,F,G, AND T)"

SYMBOL :H12-78-374

MAIL STOP: 490

1741 TA 06

The update covers the period July 1976 - July 1978. I am interested in memos and other documentation of work in the disposal areas during this period. Also, I would like lists of photographs and slides (with captions) taken in the disposal areas. Please get me your input by November 14, because the update will be written during November.

MAR:tj

Distribution: - Willie Abeele
Merle Wheeler
Bill Purtymun
Jack Nyhan

11-28-78

The update is being held up pending your response. Would you please let me know when I can expect to hear from you.

2895

A preliminary survey of Area C for radioactivity showed several hot spots that had been overlooked in a former survey.

Plans are now being drawn for a study of radioactive elements present at depths underlying the spots for which a complete surface study of radioactive elements has been achieved by Linda Trocki.

As far as the in-depth soil analysis is concerned, samples will be taken with a 3" x 24" splitspoon and analysed down to 20" with 4" increments, disregarding the upper 4" or surface samples.

Five spots showing high gross α activity were selected. This will consequently amount to 20 samples analysed for gross α.

Four spots were selected because of high gross β activity. This means 16 samples to be analysed for gross β.

Two spots with high activity due to the presence of ^{137}Cs were selected, meaning 8 analyses for that particular element.

Three spots were selected for their high activity due to the presence of ^{238}Pu, which calls for 12 analyses. The same three spots show high concentration of ^{239}Pu, which consequently calls for 12 more analyses.

For all the above described analyses, seven different sites have been chosen. Since tritium was not measured at any of the hot spots determined by means of the phoswich and in order to save labor, I propose to determine the tritium distribution from the 28 core samples taken from these sites. We consequently end up with a total of 108 analyses to be performed which would enable us to determine whether the presence of a specific radionuclide at the surface is due to a spill or from an upwelling caused by hydrology, flora or fauna. This could be deducted from the study of the soil contamination profile.

[signature]

P.S. Sorry for the delay

LASL NEAR-SURFACE LAND DISPOSAL FACILITIES

FOR RADIOACTIVE WASTES

INTRODUCTION

Recently intensified Atomic Energy Commission (AEC) emphasis on determining the environmental impact of solid waste disposal practices resulted in a United States Geological Survey (USGS) contract to perform historical evaluations of site monitoring practices for all major AEC solid waste disposal sites. The LASL site monitoring evaluation began in September 1973, and included Materials Disposal Areas A,B,C,D,E,F,G, and T; the major LASL disposal areas as spelled-out in the Radioactive Waste Management Site Plan and those designated for evaluation at the LASL site by the AEC. (See Figure _). Principal investigators were T. E. Kelly of the USGS Water Resources Division, Albuquerque Office, and M. A. Rogers of LASL/H-8, Environmental Studies Group. Data for this evaluation were collected during the Fall of 1973.

This report parallels the one done for the AEC, but includes much more detail than the USGS report. The purpose of this document is to provide an historical, in-depth LASL reference source for information on the site monitoring and waste disposal practices of the Los Alamos Scientific Laboratory, from their inception in 1944. It is as comprehensive as time and information sources allowed, but should not be considered a final effort as it will be periodically updated to include additional information, clarification, and revision such as may become available.

It should be noted that in compiling the information presented in this report, value judgments on the accuracy of particular sources have been avoided and all source references have been included. Hence, it is left to the reader to determine the validity of those sources most relevant to his interests.

THE PHYSICAL ENVIRONMENT

The Los Alamos Scientific Laboratory and its resident communities of the original townsite, Barranca Mesa, White Rock, and Pajarito Acres, are located on the Pajarito Plateau, flanking the eastern side of the volcanic Jemez Mountains in north-central New Mexico. The plateau is 16-24 km (10-15 mi) wide and more than 48 km (30 mi) long. It is bounded on the west by the Sierra de los Valles, on the east by the Rio Grande, on the northeast by the Puye Escarpment, and on the southeast by Canada de Cochiti (see Figure _). Approximately 10% of this area is encompassed by the 110-km (27 000-acre) Laboratory site.

The plateau slopes eastward from an elevation of 7800 feet abutting the Sierra de los Valles to an elevation of 6200 adjacent to the Rio Grande. It is cut 61-122 m (200-400 ft) deep by numerous sowtheast trending intermittent streams. The dissected eastern margin of the plateau rises 300-1000 feet above the Rio Grande. Los Alamos is located 38.6 km (23 mi) northwest of Santa Fe and 92.8 km (58 mi) north-northeast of Albuquerque by air.

Geology of the Region

LABORATORY ACTIVITIES

Inhabitation of the Los Alamos area began in the 13th century A.D. by the Basketmaker Indians, followed by the Tewa Indian groups in the 1600s. Anglo settlement was transient from the late 1800's until the establishment of the Los Alamos Boys Ranch School in 1918. Because of its mild climate and isolated location, the site was acquired by the Army in 1942 to provide facilities for Project Y of the Manhattan Distric of the Corps of Army Engineers. At this time, the Los Alamos Scientific Laboratory is operated by the University of California under the auspices of the Energy Research and Development Commission (ERDA). Although Los Alamos County and the community came under state jurisdiction in the early 1960's, the Laboratory has always maintained its Federal affiliation under the auspices of the AEC until the inception of ERDA in January 1975.

The principal mission of this Laboratory is to support the National defense posture. This effort is supported by extensive research programs in nuclear physics, hydrodynamics, conventional explosives, chemistry, metallurgy, radiochemistry, and biology. Additionally, considerable effort is directed toward developing nuclear technology, including medium-energy physics, space nuclear propulsion, controlled thermonuclear fusion energy research, laser applications, nuclear safeguards, biomedical research, and space physics. These activities are located in 29 Technical Areas (TA) as shown in Fig. 2.

Consistent with the Laboratory's emphasis on nuclear materials, site facilities include hundreds of potential sources of effluents and wastes, however, processes with the potential for significant releases are confined to only a few locations and are rigorously controlled and monitored.

The principal programs connected with the generation of radioactive wastes are ____

____.

The principal wastes generated by these programs are ______________

______________________________________ (and how produced).

IDENTIFICATION OF WASTES

Nonradioactive Waste

The largest volume of solid waste generated at the LASL is nonradioactive waste. These materials are collected in Dempster Dumpster containers marked "Non-Radioactive Trash Only" and taken to the County sanitary landfill. The landfill is operated by Los Alamos County in accordance with State Health Department and EPA regulations. The currently used landfill site occupies about 55 200 m^2 (13.6 acres) and can be extended to be usable for about 20 years.

Radioactively-Contaminated Wastes

Radioactively-contaminated solid waste includes combustible and noncombustible trash, chemicals, equipment, building debris, and sludge from the radioactive waste treatment plants. Generation of solid waste at the LASL has remained at a relatively constant volume of approximately 600 m^3 (7800 yd^3) per year, in recent years.

The majority of this Laboratory radioactive solid waste is presently disposed of by burial, or is placed in retrievable storage at the radioactive waste disposal area on Mesita del Buey (Area G). Wastes contaminated with transuranic elements at levels greater than 10 nCi/g (100 nCi/g for ^{238}Pu, a LASL practice) are placed in retrievable storage for a 20-year period in accordance with Federal policy. The LASL waste management personnel have designed and constructed facilities for 20-year retrievable storage of this waste and developed specifications for special packaging designed to ensure its durability.

Retrievable transuranic solid waste includes many types of materials. Production of this waste is in the range of about 280-245 m^3 (10 000 - 15 000 ft^3) per year. Most of it comes from the plutonium operations at the Plutonium Processing Facility; some is the Pu-Am waste incorporated into cement paste and put into corrugated metal pipes in retrievable storage areas.

Routine Wastes

Wastes contaminated with radioactive isotopes other than the transuranics, or with transuranics at activity concentrations less than 10 nCi/g, are considered routine wastes. Most of this waste is disposed of by burial into pits and shafts. Combustible waste is always covered with tuff on the day it is delivered. When the capacity of a disposal pit is reached a final minimum covering of at least 1 m (3 ft) of excavated tuff is applied.

LASL SOLID RADIOACTIVE WASTE MANAGEMENT OPERATIONS PROGRAM

The continuing goal of the LASL solid radioactive waste management operations program is to improve operations efficiency and effectiveness. General direction and development assistance for much of this improvement is being derived from interaction with four radioactive solid waste management research programs at LASL. One of these programs has had as its primary task to date the development of criteria used in designing operational facilities for interim 20-year retrievable storage of solid transuranic waste. This program is expected to provide useful information on packag ing and environmental requirements for retrievable storage, and in determining the adequacy of the presently implemented retrievable storage systems.

A closely related program has as its primary objective the development of processes for treating combustible waste by volume reduction and rendering the residue inert. This will be accomplished in the Transuranic Contaminated Solid Waste Treatment Development Facility which is under construction.

A third project, being conducted in conjunction with the United States Geological Survey and mentioned in the Introduction to this text, is an evaluation of the monitoring practices at LASL burial/storage areas. A major objective is to evaluate the of the LASL disposal site as a whole for long-term containment of previously buried waste.

The fourth project is to evaluate possible environmental hazards associated with the past disposal of transuranic solid waste at the LASL. Recommendations for required actions regarding previously disposed waste will be forthcoming from this program.

In future years routine radioactive solid waste disposal and storage operations will continue to be upgraded. At least two new waste disposal pits will be required for routine waste disposal. The retrievable storage concept for transuranic waste at the LASL will undergo extensive study and evaluation to determine its overall adequacy. Major waste disposal/storage site improvements in areas of environmental control and surveillance are being made. An environmental surveillance network in and around both past and presently used solid waste disposal/storage areas is being established to supplement the general surveillance program and accomplish specific research objectives. Waste volume reduction technologies will receive major emphasis.