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IN REPLY
REFER TO: H8-77-100

March 9, 1977

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Gentlemen:

Attached is the February, 1977 report on three programs being pursued at LASL dealing primarily with shallow land burial of radioactively contaminated solid waste materials. A section is included reporting on special program-related activities on which we have invested some effort this reporting period.

Sincerely,


LaMar J. Johnson
Group Leader
H-8 Environmental Studies

LJ:kr
Attachment: Report a/s
Distribution List



0813 TA-21

MONTHLY PROGRESS REPORT

FEBRUARY 1977

- LS-14-1-7A
- EVALUATION OF TRU-CONTAMINATED WASTE BURIAL SITES

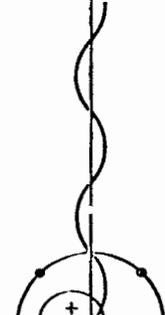
- LS-15-1-7A
- LASL RADIOACTIVE SOLID WASTE DISPOSAL SITE STUDIES

- LS-20-1-7A
- RADIOACTIVE WASTE BURIAL TECHNOLOGY

- RELATED ACTIVITIES

LOS ALAMOS SCIENTIFIC LABORATORY

ENVIRONMENTAL STUDIES GROUP H-8



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LOS ALAMOS, NEW MEXICO 87544

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WORK PERFORMED FOR
DIVISION OF WASTE MANAGEMENT,
PRODUCTION, AND REPROCESSING
U.S. ENERGY RESEARCH
AND DEVELOPMENT ADMINISTRATION

UNITED STATES
ENERGY RESEARCH AND
DEVELOPMENT ADMINISTRATION
CONTRACT W-7405-ENG. 36

EVALUATION OF TRU-CONTAMINATED WASTE BURIAL SITES, LS-14-1-7A

Error identification and correction for the user's manual for the biological transport portions of the LASL system for burial site evaluation continued throughout February. Current efforts emphasize simplifying the input and output option selection toward making the program easier for the user to run.

Computer code documentation and program documentation were begun for the forest simulation and herbivore/ruminant simulation portions of the biologic transport model. The former consists of labeling operations within the computer code to aid the user in following the flow of the logic. Program documentation is a separate endeavor, wherein each equation or relationship in the program is explained and referenced. The documentation work on these two portions of the biologic transport model will continue into March.

A topical report, "Preliminary Evaluation of the Potential for Plutonium Release from Burial Grounds at the Los Alamos Scientific Laboratory" (LA-6694-MS) was published during the month. The report summarizes the evaluation work performed over the last few years. Six copies of this publication are included with this report.

Preliminary data has been obtained on the effects burrowing animals may have on burial ground. The material excavated from burrows could be a direct radionuclide pathway to the environment if taken from sufficient depths. Modern burial sites are typically covered with 1 to 2 meters of clean earth, and several species are known to dig to such depths. Some typical depths of a number of burrowing species are as follows.

<u>Species</u>	<u>Maximum Typical Burrow and Tunnel Depth</u>
Harvester Ant	~ 3 m
Mole	~ 1.2 m
Prairie Dog	~ 2 m
Pocket Gopher	~ 0.6 m
Pocket Mouse	~ 1.5 m
Deer Mouse	~ 0.6 m

This information will be expanded, with estimates of volumes excavated and burrow density per unit area, for use in the final evaluation of LASL burial grounds.

LASL RADIOACTIVE SOLID WASTE STUDIES, LS-15-1-7A

Area G Studies

All samples from the 866 ft of core obtained in the horizontal drilling project under Pit 3 have been submitted for gross-alpha and -beta screening. The purpose of this program is to detect moisture and radionuclide migration beneath the pit.

At the end of this month, all three levels on the 40-ft tall meteorological tower had been wired for two windspeed channels and one temperature and one humidity channel on each level.

The neutron moisture probe is continuing to monitor 13 drill holes for monthly changes in moisture content. This will yield information on water migration at the disposal area.

Studies at Other Areas

A project is currently under way to define surface contamination at Area C and to determine whether Area F had been used for radioactive waste disposal. Two hundred and eight surface soil samples and 187 vegetation samples were collected from the two areas in August and September, 1976. Soil sample preparation begun in January is complete. This preparation involved moisture distillation for ^3H analyses and drying at 100°C for 24 hours for ^{137}Cs , gross-alpha and gross-beta analyses. The vegetation samples were classified into five different categories (i.e. grasses, forbes, etc). Moisture in the vegetation samples is being distilled for ^3H samples. The remaining plant sample will be measured for ^{137}Cs , gross-alpha and gross-beta content.

Preparations have begun for geophysical work to define possible pit boundaries at Area B. Records searches for information on Areas B, D, and E were made. Sampling will be

conducted in these areas this spring and summer to determine whether any surface radioactive contamination exists.

Geologic Studies

LASL Group G-6, Geosciences, initiated work to define the geological and geochemical differences among the different units of the Bandelier Tuff. Review of existing geologic literature is complete; field studies will start in March.

Field reconnaissance work has started for the production of a stratigraphic map defining the extent and relationships between the different units of the Bandelier Tuff at waste disposal sites. This geologic information is necessary for radionuclide migration studies and to determine the degree of containment afforded by tuff as a waste disposal media.

RADIOACTIVE WASTE BURIAL TECHNOLOGY, LS-20-1-7A

An investigation of unused waste disposal areas at LASL is in progress. These studies will indicate the present distribution of radionuclides in the tuff, and, with additional laboratory experimentation, define some of the processes responsible for the distribution.

A portion of the samples collected last year at one site was analyzed at Argonne National Laboratory, (ANL) using solid state detectors sensitive to the gamma and L-X-ray emissions of transuranic materials. Also, aliquots from these samples were analyzed at LASL. The comparative analyses on one set of samples is presented in Fig. 1. The results are in sufficient agreement to encourage the development of the L-X-ray techniques, as it is less expensive than the wet chemistry techniques. The ANL data indicate that the detection limit is approximately 18 pCi/g (total plutonium) at the 3 σ level. Available equipment at LASL will yield a 15 pCi/gm sensitivity, which can be reduced to about 5 pCi/gm with additional work and new instrumentation. This technique will be used for analyses of ²⁴¹Am and plutonium content of samples collected during the coming months.

RELATED ACTIVITIES

The information requested by Battelle Pacific Northwest Laboratories (BPNL) for the ERDA Generic Waste Management Statement was prepared and delivered by February 15. Some time was also spent reviewing the Nuclear Regulatory Commission's responses to comments on NUREG 0116.

March 1977

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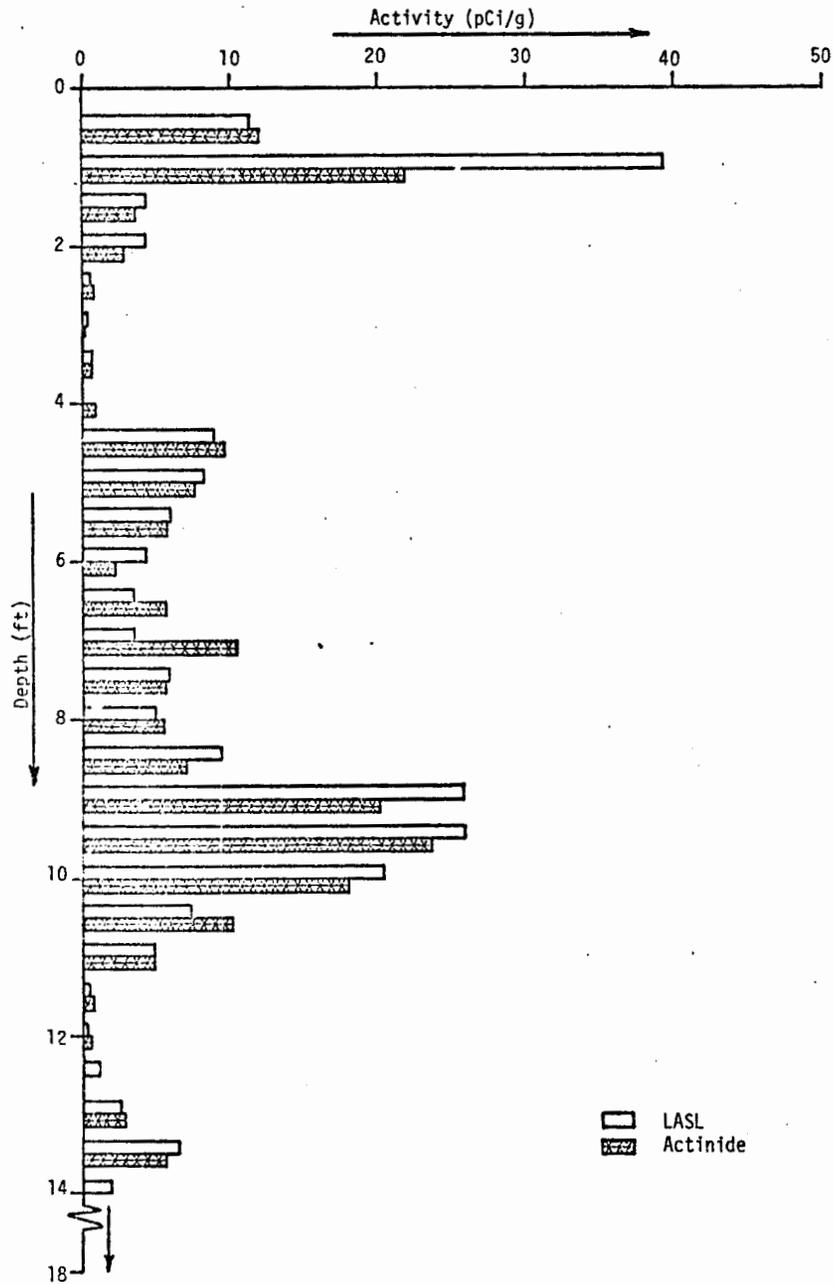
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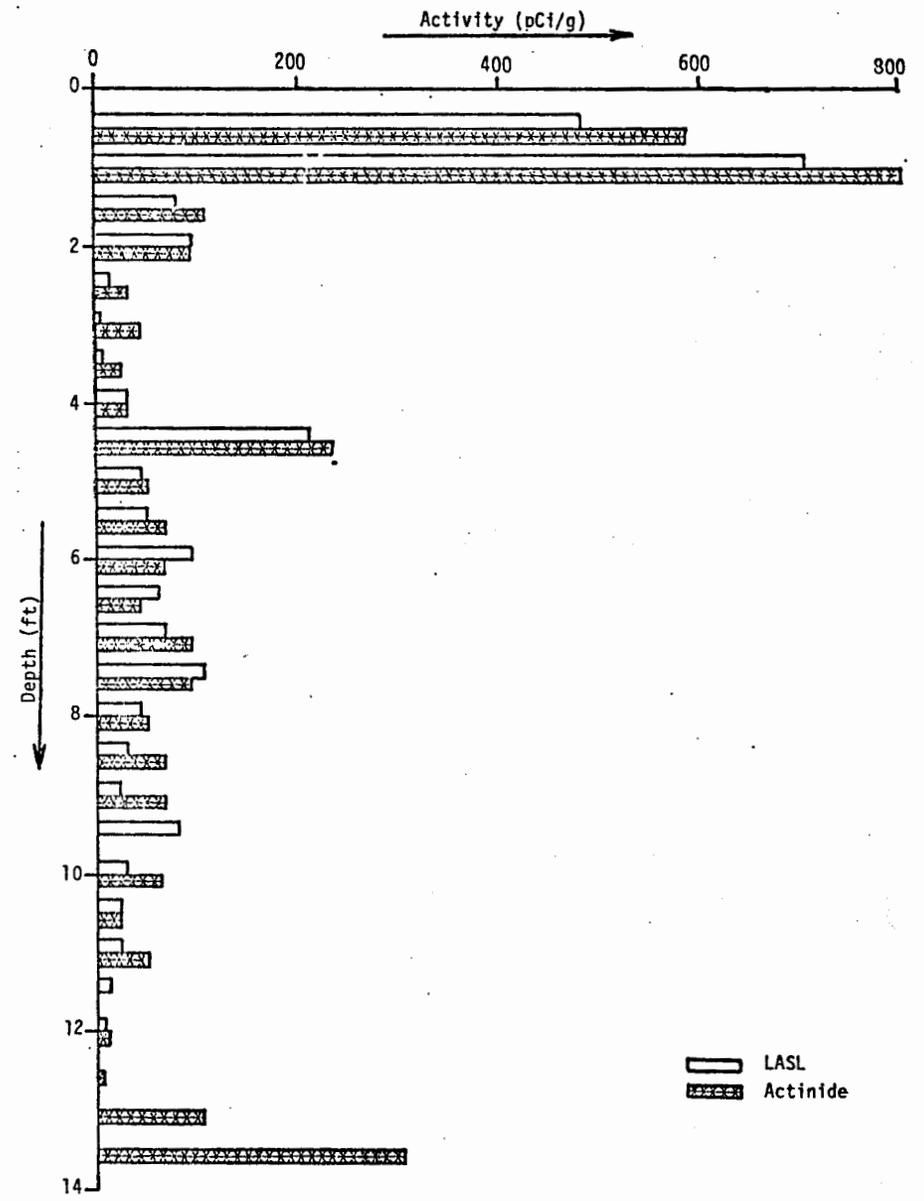
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AMERICIUM DISTRIBUTION AT DISPOSAL SITE



PLUTONIUM DISTRIBUTION AT DISPOSAL SITE

Figure 1