

**PROGRAM AND BUDGET PROPOSAL
OPERATING COSTS AND EQUIPMENT**

189c No.

LS-15-1-9A

DATE

January, 1978

Division of Waste Management and Transportation

1598 General

1. BUDGET ACTIVITY NO. JMO30360	3. PROJECT TITLE LASL Radioactive Solid Waste Disposal Studies		
2. SITE			
4. FREQUENCY OF PROGRESS REPORTING <input type="checkbox"/> 1. Monthly <input type="checkbox"/> 3. Semi Annual <input type="checkbox"/> 2. Quarterly <input checked="" type="checkbox"/> 4. Annual	5. PERSON IN CHARGE L. J. Johnson	PRINCIPAL INVESTIGATOR(S) M. L. Wheeler M. A. Rogers	
6. CONTRACTOR Los Alamos Scientific Lab	10. CONTRACT NO. W-7405-ENG-36	15. LEAD BRANCH WO	
7. WORKING LOCATION Los Alamos, NM	12. WASTE APPLICATION DOE <input checked="" type="checkbox"/> Industry <input type="checkbox"/>	18. PROJECT TERM 1. Open <input checked="" type="checkbox"/> 2. Limited <input type="checkbox"/> From _____ (date) To _____ (date) Funding Termination _____ (date) Reference:	
9. TYPE 1. Industry <input type="checkbox"/> 2. DOE Lab <input checked="" type="checkbox"/> 3. Educational <input type="checkbox"/> 4. Government <input type="checkbox"/> 5. Other Non-Profit <input type="checkbox"/>	13. TYPE OF WASTE 1. High-Level <input type="checkbox"/> 2. Solid-Transuranium <input checked="" type="checkbox"/> 3. Fission Prod. <input checked="" type="checkbox"/> 4. Tritium <input checked="" type="checkbox"/> 5. Gaseous or Airborne <input type="checkbox"/> 6. Other <input type="checkbox"/>		
21. MAN YEARS Scientific Other Direct Total Direct	FY 19 PY 78 1.5 3.0 4.5	FY 19 CY 79 (Revised) 2.5 3.0 5.5	FY 19 BY 80 2.5 3.0 5.5
22. COSTS a) Direct Salaries b) Materials & Services c) Subcontracts Total Direct Costs	94 31 30 155	(141) (61) (60) (262)	151 61 100 212
d) Indirect Costs e) Fee Total Costs (In Thousands)	55 210	(76) (338)	76 388
24. EQUIPMENT a) Budget Activity No.			
b) Equipment Obligations (In Thousands)	30	20	110
c) Equipment Costs (In Thousands)			



25. Milestone Chart-LS-15-9A

	FY 1978	FY 1979	FY1980	FY 1981
1. Burial Site Descriptions				
a. Preliminary surface reconnaissance	▲			
b. Detailed burial site descriptions for old sites		▲		
c. Update of source document (LA-6848-MS) on two year cycle		▲		▲
2. Inventory Description				
a. Determine waste placement	▲			
b. Determine waste matrix and isotopic distribution		▲		
3. Pathways Description				
a. Preliminary geological mapping	▲			
b. Detailed geologic mapping of disposal areas		▲		
c. Published geologic map			▲	
d. Establish the water balance			▲	
e. The waste sites				▲
f. Geologic report				▲
g. Description of the Hydrological transport				▲

4. Monitoring Program

a. Description of alternative methods and initiate testing

b. Begin implementing systems

c. Monitor surface changes at the burial sites.

	FY 1978	FY 1979	FY 1980	FY 1981
			ONGOING	
			ONGOING	

26. Publications

1. M. A. Rogers "History and Environmental Setting of LASL Near-Surface Land Disposal Facilities for Radioactive Waste (Areas A, B, C, D, E, F, G, & T): A Source Document," Los Alamos Scientific Laboratory. LA-6848-MS Vol. 1 and II, 1977.

2. B. M. Crowe, G. M. Linn, G. Heiken, and M. L. Bevier, "Stratigraphy of the Bandelier Tuff in the Pajarito Plateau: Applications to Waste Management Studies," Los Alamos Scientific Laboratory report. In press.

3. W. D. Purtymun, M. L. Wheeler, and M. A. Rogers, "Geological Description of Cores from Holes P-3 MH-1 Through P-3 MH-5, Area G, Technical Area 54," Los Alamos Scientific Laboratory report, in press.

27. Scope

This program is structured to evaluate the present status of monitoring schemes for LASL radioactive waste disposal sites, describe the possible migration pathways, develop any required new monitoring systems, and implement these systems. The generalized objective is to provide a system of surveillance over any possible environmental releases from LASL burial sites, and to collect sufficient long-term data to evaluate the significance of such releases.

28. Relationship to Other Projects

Other programs funded by DOE at the LASL include:

1. TRU Waste Burial Evaluation, LS-14-1-8A
2. Radioactive Waste Burial Technology, LS-20-1-8A
3. ERDA TRU Waste Research, Development, and Demonstration Program, LS-12-1-8A

4. Contaminated Solid Waste Disposal and Storage, LS-11-1-8A.

LASL Radioactive Solid Waste Disposal Studies, LS-15-1-8A, interacts with all of the above. Evaluation of past and present monitoring practices depends upon background data from the TRU Waste Disposal and Storage work and upon data from studies which examine potential changes in the waste matrix due to chemical and physical reactions of stored radionuclides and changes in waste matrix due to treatment and volume reduction processes. Interaction with the TRU burial evaluation studies provides that program with information on the condition and use history of selected disposal areas, and provides this program with information on possible migration pathways. Similarly, the waste burial technology programs draws upon information related to past burial practices, and provides information on possible migration mechanisms operative at LASL disposal sites.

29. Technical Accomplishments in FY 1978

Preliminary reconnaissance of radionuclide distributions in plants, soils and animals at major LASL disposal areas were continued, and more detailed investigations begun in selected areas. Detailed geologic mapping of these major disposal areas will be finished, together with measurements of the significant hydrologic transport parameters at these sites. Studies will be underway to quantify the radionuclide movement along potential pathways.

Data collection from the moisture monitoring net continued. Experiments are being conducted, using the meteorological tower at Area G, to define the net flux of moisture into the burial site. Further work was conducted on defining the regional groundwater migration pathway, using groundwater dating techniques. Several possible systems for monitoring the radionuclide migration were selected, and testing initiated.

The stratigraphy of the Pajarito Plateau and the waste burial sites will be described in the form of geological maps. Preliminary geochemical data has been developed for the Bandelier Tuff.

30. Expected Results in FY 1979

An environmental report will be prepared, describing the major geologic and hydrologic features at Area G. This will include the stratigraphy and structure, petrographic and geochemical data, and description of the principal potential migration pathways. The results of investigations, or radionuclide distributions in plants, animals and surface soils will be used to design a subsurface sampling program at the major LASL disposal areas. Together, the surface and subsurface investigations present a complete picture of the distribution of radionuclides in the vicinity of the waste disposal pits or shafts. When this information is coupled with the migration pathways analysis, the likely rates and direction of any further movement can be established. The measurement of moisture distributions in earth material over and adjacent to waste disposals will be evaluated, and modifications made, as necessary, in the location and frequency of those measurements. The overall goal of the program is to predict, with reasonable accuracy, the quantities of precipitated moisture moving through the waste material.

Measurements at Area G will continue to be taken and recorded of windspeed, temperature, humidity, precipitation, surface temperature, and heat transfer in the soil. Routine surveillance of wind-direction and velocity will assist in tracking any accidental atmospheric release during burial site operations. Intensive research studies will be performed to model atmospheric dispersion processes, soil moisture flux, and evaporation of precipitation. These studies add to the understanding of possible processes of radionuclide migration.

The field testing of migration detection systems, begun in FY 1978, will continue. A program goal is to select an initial system for installation or implementation, beginning in FY 1979. The fruition of this is dependent on research conducted during the latter part of FY 1977 and during FY 1978.

31. Expected Result in FY 1980

The major effort for FY 1980 will be a continuation of efforts during FY 1979. The data from the expanded LASL Burial Facilities Monitoring System will be collected and reviewed, permitting sufficiently more reliable predictions of the movement of radionuclides away from the burial locations. Review of the monitoring data is expected to result in upgrading and modification of the system. As the monitoring system for radionuclides and water movement in the burial sites become final designs, the techniques are expected to be available for use at other DOE contractor or commercial land burial sites.

The definition of the radionuclide migration environment is expected to be completed by the end of FY 1980, although some special problems can be anticipated requiring further definition. It is expected the migration environment will be influenced by the moisture characteristics and conductivity functions of the significant hydrologic units in the Bandelier Tuff. The overall water balance, including precipitation input, runoff transportation, and deep seepage for the waste areas will be an important part of establishing the migration environment.

32. Expected Results Beyond FY 1980

During FY 81, FY 82, and FY 83 will consist of expansion and eventual completion of the monitoring systems for the Solid Waste Disposal

Sites at LASL. Program personnel will be responsible for the collection and interpretation of data from the monitoring net. In order to detect changes in radionuclide distribution at and below surface of the burial sites, this amount of time as a minimum, will be required.

33. Description and Justification of Major Procurement Items.

Funds will be required for conducting test drilling, geophysical, geochemical, and petrographic measurements. Part of this work is expected to be fulfilled by subcontracting. A total cost of dollars 100K is anticipated for these projects.

Increased materials and services costs are anticipated for FY 1980. The monitoring program will be using several expendable pieces of equipment that do not fall under capital items.

34. Description and Justification of Major Equipment Items

Installation and testing of radionuclide monitoring systems is expected to require additional automation of data taking. Additional monitoring systems will be added to other burial sites at LASL. The anticipated equipment includes: 1) microprocessor for data reduction \$20K. 2) electronics for data automation \$10K. 3) drill rig or drilling monitoring holes \$80K.

SCHEDULE 46 - CAPITAL EQUIPMENT NARATIVE

LASL SOLID WASTE DISPOSAL STUDIES

LS-15-1-9A .

The installation and testing of radionuclide monitoring systems in FY 1980 will require some automation to reduce man power requirements. These systems will require additional electronic automation for data reduction and use. In addition a drilling apparatus will be needed for placement of monitoring holes. The present drilling rig is expected to be completely unuseable by that type. The anticipated capital equipment includes: 1) microprocessor for data animation, \$20K 2) associated electronics for updata animation, \$10K 3) drilling apparatus, \$80K.

FMO-80

LS-15-1-9A

Narrative Justification of FY 1980 Operating Estimates

This continuing program is structured to evaluate the present status of monitoring schemes for LASL radioactive waste disposal sites; describe the possible migration pathways, develop any required new monitoring systems, and implement these systems. Work during FY 1978 and FY 1979 will consist of installation and testing of several monitoring systems. During FY 1980 the results of geologic and hydrologic studies will be used to finalize the monitoring systems for lack of the waste burial sites at LASL. The generalized objective is to provide a system of surveillance over any possible environmental releases from LASL burial sites, and to collect sufficient long-term data to evaluate the significance of such releases. The level effort for FY 1979 was estimated to be \$300K. A revised level of effort would be \$338K. The estimated FY 1980 level of effort is estimated to be \$388K.

Narrative Justification of FY 1980 Capital Equipment Requests

The installation and testing of radionuclide monitoring systems in FY 1980 will require some automation to reduce man power requirements. These systems will require additional electronic automation for data reduction and use. In addition a drilling apparatus will be needed for placement of monitoring holes. The present drilling rig is expected to be completely unuseable by that type. The anticipated capital equipment includes: 1) microprocessor for data animation, \$20K 2) associated electronics for updata animation, \$10K 3) drilling apparatus, \$80K.