[redacted]

2222

OAK RIDGE NATIONAL LABORATORY
CENTRAL FILES NUMBER
48-12-208

B-137

Date December 3, 1948

Subject Waste Concentration and Disposal Program

By

To

File C.7.

Those Eligible To Read The Attached

Copy# 8A

~~C. N. Rucker~~

INV. 64

Before reading this document, sign and date below:

Name	Date	Name	Date
LBE	1/12		

11/13/95

Note: THIS DOCUMENT WAS REQUESTED TO DECLASSIFY ONLY PP. 5-7 UYM

INV. 68

TRANSMITTAL DATED

[redacted]

ChemRisk Document No. 2222

Oak Ridge Operations	Present Program	Areas of Research and Development	Future Program	Areas of Research [illegible]
O.R.N.L. Installation of a plant scale evaporator will provide 2 years additional waste storage capacity at ORNL. Has AEC wide applicability	(1) To design, construct and operate a pilot plant evaporator for concentrating highly active chemical waste solutions. Pilot plant model installed 11-20-48. Lab scale evaporation studies on scaling phase and boiling characteristics of solutions, etc. are being carried out.	Evaporation	Continuation design of plant scale unit is 92% complete.	
	(2) Spray Dryer - Design and development.	Evaporation	Survey of commercial equipment conducted - result indicate need for a specially designed unit. Active work to begin Jan. 1949.	-----
	(3) Studies are being conducted to determine various chemical methods that may be feasible for concentrating waste solutions as listed in the next column. These techniques may have local and AEC-wide application. These studies are being conducted on a lab. basis.	(1) Absorption on resins (2) Carrier precipitation (3) Precipitation of inorganic salts.	If laboratory tests are promising semi-works scale units will be established.	Same
			Metal Recovery - to develop a method for recovery of metal in local tank farm. Can start first quarter 1949.	Precipitation Fluorination Solvent extra[illegible]
	(4) Isolation of Fission Zirconium & columbium. Chemical methods are being developed for the isolation of these F.P. from Redox I-AW Raffinate.	Ion Exchange Adsorption Others	Continuation of program should preliminary phases prove feasible.	Solvent extra[illegible]
	(5) Investigation of Rare Earths. Emphasis is being placed on determining identity & characteristics of rare earths produced in fission.	Ion Exchange	Continuation of present program	Solvent extra[illegible]
	(6) Instrument Development. Development of instruments to assist in the analytical interpretation of the effectiveness of waste disposal.	Electronic instruments for routine measurement of gross gamma activity in liquid or solid samples and alphaemitters in solution.	Continuation of present program	
	(7) Chemistry and Radio Chemistry of F.P. To augment present knowledge of the distribution, properties and identity of the products of fission This information considered necessary for intelligent approach to the waste disposal problem.		Continuation of program. Indefinite continuation is imperative for successful development separation process.	

Special Facilities	Present Personnel	Future Personnel	1949 Budget	1950 Budget
Pilot Plant evaporator system	5 chemical engineers	---	$35,000	None
If results indicate feasibility of this method a plant scale spray dryer will be installed	2 chemical engineers after 1-1-49.	---	$20,000	$75,000 for Design work, fabrication and installation.
Laboratory. Semi-works equipment	2 chemists 3 chemical engineers	---	$35,000	$70,000
Equipment and personnel could be made available.	None	---	$35,000	$85,000
Chemistry laboratory "Hot" laboratory (if required).	1 Sr. chemist 2 Jr. chemists		$12,000	$12,000
2 chemistry laboratories. 1/2 "Hot" laboratory building.	2 Sr. chemists 2 Jr. chemists		$18,000	$18,000
2 instrument shops	1 Sr. chemist 2 Jr. chemists 3 technicians		$28,000	$28,000
5 chemistry laboratories 1 "Hot" laboratory 2 Shielded counting rooms. Unique instrumentation	4 Sr. chemists 10 Jr. chemists 2 Technicians		$77,000	$77,000
			260,000	1,370,000

[redacted]

Activity	Present Program	Area of Research and Development	Future Program	Area of Research Development
Oak Ridge Health Physics Division	Project I Planning for this project is underway. Commence two months after approval Objective - Evaluate the effect of radioactive materials on standard sanitary engineering facilities. Information obtained would be generally applicable wherever water and sewage facilities were exposed to radioactive materials.	Recommended that an experimental plant including small size water and sewage treatment units be provided and operated. The effect of radioactive contaminants on following processes may be started: (1) Chemical mixing (2) Flocculation (3) Sedimentation (4) Rapid/slow sand filters (5) Precipitation (6) Ion exchange units (7) Chlorination (8) Diatomaceous earth filters.	Continuation of Project I as listed under present program. Significant data to be obtained within one year after plant is in operation. Operation will continue for several years longer to study specific contaminants.	Same as previous
	Project II Laboratory studies of Potential waste disposal methods. Objective - Various methods are to be investigated to determine their potentialities on waste treatment. Results of this research will determine advisability of large scale unit operations and serve as a guide in operation of expt. plant.	Laboratory experiments are underway for studies in following fields: (1) Adsorption and desorption (2) Flocculation (3) Filtration (4) Natural and synthetic exchange materials (5) Biological procedures (6) Coprecipitation.	Expansion of program listed under present program. Results attained to serve as a guide in the operation of the expt. plant program. Program to extend over a year or two.	Same as previous
	Project III Studies of radioactivity and other conditions in surface waters including hydraulics, water quality, fish, algae and sediments. This program is currently active. Intensive fish and river sampling programs have been made with TVA assistance. Objective- To determine extent of damage to streams and organic life resulting from discharge of mixed fission wastes.	Sampling programs to determine the accumulation and spread of radioactivity in fish, algae, sediment and water in Clinch River.	More intensive surveys are being planned and a continuing long range program is being developed.	Same as previous

[redacted]

d	Special Facilities	Personnel Present Program	Personnel Future Program	Fiscal 1949 Requirements		Fiscal 1950 Requirements	
listed.	(1) Plans call for construction of a specialized water and sewage treatment facility. (2) Completely equipped laboratory available. (3) Water plant equipment salvaged from the old water plant	(1) Other Governmental Agencies (a) USPHS - Sanitary Engineer Conrad Straub Oliver Placak (b) TVA. Sanitary Engineer Lloyd Setter (2) ORNL Roy Marton Venus Knalif Stanley Lyle	ORNL 1 - Chemical Engineer 1 - Chemist 3-4 Plant operators	Project I	$100,000	Project I	$75,000
listed.	One completely equipped laboratory.	Same as Project I	-----		$42,500		$50,000
listed.	Laboratory and necessary equipment available.	Same as Project I	-----		$5,000		$5,000
					367,000		500,000

	Present Operations	Area of research and Development	Future Program	Areas o
K-25 (Oak Ridge) (Cont'd)	(8) Use of barrier material as a filter. Recent studies indicate that barriers may have good possibilities of filtering entrained particles from gas streams and particles from liquid solutions.	(as required)	Continuation of program. Success or failure of barrier as useful gas or liquid filter should be accomplished within six months to a year	
	(9) Investigation of various physical-chemical-electrical methods of decontamination currently investigated as listed in the next column.	Differential volatility Solvent extraction Carrier precipitation Electrolytic separations Ion exchange Evaporation		
Mound Laboratory The research and development program has been directed primarily toward solving the local area problem. However, facilities and manpower exist or could be made available to engage in a commission-wide program of research and development on waste disposal	(1) A full scale water treatment plant is in operation to remove and concentrate alpha contamination.	Coagulation Flocculation Filtration	(1) Continuation of present work. (2) Expansion of this program to other forms of contamination if program is approved by the Commission. (3) Recovery of bismuth metal from process waste liquid for reuse in production. Removal will reduce the amount of final wastes as well as result in considerable economic gain. (4) Investigation of various physical-chemical-electrical methods of concentrating and disposing of radio-active liquid wastes. This program will be undertaken upon approval of AEC	Elec Ion Evap Sani Elec Metal Solv Diff

Research and Development	Special Facilities	Present Personnel	Future Personnel	1949 Budget	1950 Budget
—	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated
	Facilities available	Personnel available	—	Not indicated	Not indicated
	(1) A $40,000 full scale water treatment plant consisting of: (a) Combination flocculator and settler with mechanical sludge removal. (b) Gravity filter and automatic backwork. (c) Vacuum type dry sludge filter. (d) Sludge cake dissolver. (e) Cylindrical stone filter. (f) Brandler kettle for filtrate. Plant will treat 125,000 gals. per day. Pilot plant operations indicate effluent to have less than 5 count per millimeter per minute (2) Complete Health Physics Division. (3) Possibility of having 2 "hot" cells with some modification of present facilities. (4) Chemistry Laboratory (5) Spectrographic equipment.	A wide range of personnel may be available or can be called upon to assist in the problem. 5 - Inorganic chemists 1 - Physical " 1 - Analytical " 1 - Physicist 1 - Electronic engineer 1 - Spectroscopist 1 - Organic chemist 1 - Radiochemist Project Leader - Dr. F. C. Mead, Jr.		No breakdown indicated to accomplish this research and development work in fiscal 1949.	Budgeted $280,000 for study of waste disposal problems. $180,000 for research and development. $100,000 for construction or modification.