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Form 189 U. S. ATOMIC ENERGY COMMISSION
Project Proposal for Research and Development Activities

Idaho Operations Office *Preliminary*

1. Project Title - Environmental Research and Development	2. Budget Activity 04 06 40 01	3. Date Prepared January 20, 1965
4. Contractor U. S. Weather Bureau	5. Contract No. NA	6. Contractor's No. NA
7. Person in Charge Norman F. Islitzer	8. Working Location NRTS	9. Project Term From: 1949 To: Indef.
10. Reactor Concept	11. Materials	

12. Operating Costs	(In Thousands of Dollars)				
	FY 1965 Mid-Year Request	FY 1966		FY 1967	
	(1)	BOB Estimate (2)	ID Recommend. (3)	Based on BOB Est. (Column 2) (4)	Based on ID Recommend. (Column 3) (5)
A. Contract Expense					
1. Direct Labor					
2. Mat'ls. & Supplies	\$ 40	\$ 45	\$ 45	\$ 45	\$ 45
3. Support Services					
4. Fuel Fabrication					
5. Misc. R&D Subconts.					
6. Irradiations (.6)					
7. Test Reac. Other (.7)					
8. Reactor Fabrication					
9. Indirect Expense					
10. NRTS Expense*					
11. Expendable Equip.					
12. Computer Services					
Subtotal	40	50	50	50	50
B. Non-Contract Expense					
1. Special Reac. Mat'ls.					
2. Computer Time					
3. Misc. Mat'ls. & Serv.					
Subtotal					
Total Operating Costs	\$ 40	\$ 50	\$ 50	\$ 50	\$ 50

REPOSITORY INEL
COLLECTION CERT
#22305, FRC # ~~780~~ 430 780073
BOX No. File: USWB-1963-64
Fam-189 1-20-65
FOLDER Environmental Research & Dev.

*Includes ID NRTS

13. Direct Manpower (Man Years)	No. of Man-Years				
	FY 1965 Mid-Year Request	FY 1966		FY 1967	
	(1)	BOB Estimate (2)	ID Recommend. (3)	Based on BOB Est. (Column 2) (4)	Based on ID Recommend. (Column 3) (5)
A. Scientific & Engineering	6.0	6.0	6.0	6.0	6.0
B. Other Technical	7.0	7.0	7.0	7.0	7.0
C. Other (Including Admin.)	1.0	1.0	1.0	1.0	1.0
Total	14.0	14.0	14.0	14.0	14.0

Aver. Salary per MY

14. Cost of Related Construction Project & Capital Equipment Obligations
A. Construction
Line Item
GPP
B. Capital Equipment

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15. Purpose and Need

This project provides the meteorological data and analyses for reactor siting and advance planning purposes in accordance with Health and Safety standards. Meteorological observations, diffusion weather forecasts, and meteorological control of reactor operations are needed to conduct reactor operations with adequate health and safety controls. Meteorological studies, including the correlation of measurements of radioactive isotopes and artificial tracers in the atmosphere to meteorological computations, are needed to fulfill this objective. Trajectory and diffusion measurements are also supplied by radar tracing airborne targets.

16. Relationship to Other Projects

The meteorological program is coordinated with the Health Physics Branch programs of the Health and Safety Division that pertain to radioactive waste disposal into the atmosphere.

17. Accomplishments in FY 1965

The meteorological analyses of the three SPERT I and the first SNAPTRAN destructive tests have been completed. Source strengths, puff-type dispersion parameters and deposition velocities were computed from radiological measurements. This information has been presented for inclusion in ID reports and special write-ups. The second test in the CERT was conducted with a release of iodine 131 over an irrigated pasture during meteorological conditions similar to the first test except for higher wind speeds. Meteorological analyses have been completed. Higher deposition velocities on the grass during the second test was apparently due to the increased density of the grass in the irrigated pasture. The carbon-covered deposition plates also showed an increase of deposition for the second test indicating that wind speed may be a factor. Carbon plates showed the least scatter of all deposition collectors used and appear to be useful for comparisons between tests with different meteorological conditions. Another iodine 131 release was conducted for study of the deposition of this element on carbon plates and the analysis of this test is being carried out.

Five releases of iodine 129 were conducted over a sampling grid to 10 miles to determine the usefulness of this isotope for meteorological tracers. Both gaseous and aerosol forms of the tracer were released during two of the and the sampling was extended to about 25 miles by use of the off-site environmental monitoring network. Analysis of the close-in samples, employing ordinary fluoremetric techniques, has been completed for comparison to the contractor's results, using irradiation techniques, when completed. The measurements of the effect of the MTR-ETR buildings upon air turbulence and diffusion have been analyzed and a report has been written. A recording wind station has been installed at the LOFT site for developing

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meteorological statistics for planning purposes in that area. The M-33 radar has been moved to a vantage point 4 miles south of the LOFT and studies involving the tracking of airborne targets, constant-level balloons with transponders attached, have commenced. Trajectory and dispersion information needed for the LOFT, and useful for other reactor problems, are being obtained from these measurements. After an analysis of many years of meteorological records, a sequence of wind and stability conditions was assumed for the LOFT for a five-day period. A five-day practice forecast program is currently underway to determine the reliability with which these weather conditions can be forecast. A rough draft of a new diffusion and engineering climatology, updating old information and incorporating new statistics, has been prepared. Source-receptor relations from the Ru 106 monitoring data from the Waste Calciner are being studied.

18. Proposed Program for FY 1966

Additional CERT tests on an irrigated pasture will be conducted during different meteorological conditions. The effect of wind speeds, stability and other meteorological factors upon deposition and resuspension of iodine 131 will be studied. The LOFT studies, including radar tracking of tetrons and transponders and the 5-day practice forecast program, will be emphasized. An appraisal of the assumed meteorological conditions for the test, as well as design of the meteorological equipment for test support will be made. Some 200 transponder flights will be made for determining types of effluent trajectories expected during various weather conditions. The basic information from the M-33 radar, the range, and azimuth and elevation angles are being converted from analog to digital voltages to automate data collection and computer analysis. If successful, this digital system will be incorporated into the radar. Another SNAPTRAN destructive test planned for FY 1966 will be analyzed in a manner similar to the previous test. More data for diffusion studies is expected than from the first test because the radiological sampling is being increased and no water will be used in the experiment.

Support and participation in a turbulence and vertical energy flux measuring experiment will be given to principal investigators from the Weather Bureau, Washington, D. C. A hypothesis relating energy and momentum flux to turbulence measurements will be examined with these measurements. The feasibility study of multiple tracer techniques, using different non-radioactive elements initially with subsequent irradiation in the MTR and counting by the 256-channel analyzer, will be completed. Some measurements of vertical particle dispersion from release points 0.5 miles upwind of the 200-ft sampling tower will be made. Both uranine dye and post-release irradiated particles will be used. An objective forecast scheme for winds will be developed from a computer analysis of surface and upper-level meteorological observations from stations in this region.

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The LOFT studies, as discussed in the FY 1966 program, will be continued incorporating whatever changes are dictated by preliminary results and re-orientation of LOFT objectives. The radar studies will emphasize dispersion measurements employing three tetroon-transponder releases simultaneously or serially. A three-channel radio receiver will permit tracking of the targets. Techniques for this multiple target tracking will have been developed.

Comparison between radar-transponder measurements and meteorological tracer sampling will be made. Tracer sampling to ten miles is planned concurrent with three transponder releases serially during the tracer emission period. Measurements of turbulence on the 200-ft research tower will be made with sensitive bivanes and possibly a sonic anemometer for comparison to the measured tracer dispersion and radar-derived turbulence statistics.

The role of micrometeorological variables near the surface in the deposition or depletion of an airborne effluent will be studied with special anemometry. Sensitive, matched cup anemometers and a sonic anemometer will measure turbulence quantities near the ground. This equipment will be employed during some of the CERT experiments for comparison to measured disposition.