402909

ADFO Proposed Program Budget FY 80

Special Operations:the Pacific Program

JFC —

Schedules

A. Photo Mission

July 19-21 EG&G arrives Kwaj.

24-27 Setting up photo lab

25-26 EC-121 Flies Kwaj

28 Fly First Mission

B USNS Wheeling

Aug 7 Complete mission, Hermosa

8-9 Processing

11 Arrive San Diego for Helo loading

14 Helo Training

17-25 Arrive Hawaii, Load test gear, Training, etc.

26 LV for Hawaii

Sept 10 - Oct 9 First Series

Guam refuel & maintenance

Oct 19 - Nov 14 Second Series

Guam Refuel & maintenance

Nov 28 - Dec 24 Third Series

USNS Wheeling l/s for Hawaii - then

Hueneme, California.

J.

ADFO SUMMARY - FY 1979 DIRECTOR'S RESERVE

01	Branch	K($)
Occupational Safety & Health		
OH record & Retrieval system	OM	280
Public Health & Environment		
NEPA ~~Assistance~~ Assurance	EP	140
Anal. of Env. data	EP	250
Subtotal		670
02		
OSH		
Guidelines - ALAP	OSH	40
Anal. of stds. for solar	OSH	100
PH&E		
D/D criteria	OSH	79
Handbook on Effluent Monitoring	EP	48
Subtotal		267
03		
OSH		
Toxic Material Advisory Committee	OSH	200
HP support and assistance	OSH	300
IH support and assistance	OSH	200
Guidelines - Personnel dose calibration	OSH	125
neutron dosimeter enhancement	OSH	175
PH&E		
Natural phenomena surveys	PFS	120
Subtotal		1120
04		
Marshall Islands Rad Safe program	SP	189
Pacific radioecology program	SP	150
Social & psychological impact re Marshall Is.	SP	200
Subtotal		539
Total Request		2596

01

ES&H Assurance & Measurement

1. Uniform Employee Health Status and Occupational Hazards Records System $280,000

This will provide for the development of a "HEALTH TRACK" system. DOE is currently significantly behind the industry-wide state-of-the-art in employee surveillance systems. In industry and in Government it is no longer sufficient or acceptable to concentrate solely on making the workplace safe within the known parameters of the state-of-the-art of ES&H disciplines. Rather what is required is positive assurance that there are no occupationally related adverse health effects in the work force. Such assurance can only be provided by a close, timely, and systematized measurement and surveillance of the integrity of the working environment and of the health status of the workers.

2. NEPA Assurance $140,000

To the extent possible, the "Executive Summary" will address NEPA assurance. Additionally, a computerized information system would be beneficial in keeping track of the projected environmental impacts versus the actual impact. This would be a "magnanimous" undertaking, but if the work is to be conducted in OES, then we should start budgeting for it.

3. Analysis of Environmental Data at Energy Facilities $250,000

EG&G has been invited to submit a proposed management plan to OES which would provide for complete overall management of effluent onsite discharge and environmental monitoring data systems currently handled by EG&G Idaho and the AMS and Graphic Overview Information Systems managed by EG&G Nevada. The requested funds are needed to support development and implementation of such an overall management system for analysis of environmental data and information.

02

ES&H Standards and Criteria

1. Guidelines - ALAP $40,000

This program is in its last year. The BNW requested amount in the schedule 189 is 80K. The OES recommendation was a cut to 40K. The loss of 40K would necessitate cutting the number of drafts to one iteration which would severely lower the quality and acceptability of the final document. The reduction of funds would also impact on the time and number of reviews prior to finalization.

2. D/D Criteria - Contamination Limits for Property $79,000

To develop analytical methods, pathway models and procedures necessary for the analysis and disposition of property known or suspected of contamination.

Proposed program is consistent with the OES program element ES&H Standards and Criteria as contained in the MRCD. The establishment of criteria is consistent with OES responsibility in the D/D program. Additional funds requested to accelerate project to meet program needs.

3. Handbook on Effluent Monitoring $48,000

DOE contractors charged with conducting effluent and environmental monitoring and reporting require criteria documents. To date, criteria for environmental radiological surveillance have been provided. What is now needed is an Effluent Monitoring Handbook. The proposed BMI effort will provide essential guidance in the area of effluent monitoring.

4. Analysis of Standards needs of Energy Technologies - Solar $100,000

This project is a sequel to the Geothermal Standards project. Standards serve as the base for a safety program concerned with the protection of the worker and the public - i.e., the objective as stated.

Basic to ES&H activities associated with the energy technologies is the need to identify, develop, and implement safety standards. Without standards the prognosis for an effective safety program is poor.

03

ES&H Support and Assistance

1. Toxic Material Advisory Committee $200,000

To provide timely authoritative support and assistance relative to toxicity, work practices, and handling of chemicals to field offices, tech. programs and contractors. Examples of support and assistance are in problem areas associated with technetium, MOCA, new solar heat transfer fluids, etc.

Proposed program is consistent with the OES program element ES&H support and assistance as contained in the MRCD. It will bring to bear necessary technical expertise to address special problems to assure a safe work environment.

DOE currently lacks the capability to provide timely authoritative support to toxic problems.

2. Natural phenomena surveys $120,000

This project involves the performance of geophysical surveys and review of prior geophysical surveys at major DOE sites and the preparation of tornado and seismic risk models based on this information. Additional costs of 120K requested in FY 1979 are required to fund the surveys now scheduled for FY 1979 by LLL. This present schedule will also necessitate $170K in FY 1980 funding to complete the surveys at all major DOE sites which house critical facilities requiring consideration of tornado and seismic design parameters. The development of these risk models as soon as possible is important to DOE because of the present lack of a coordinated Headquarters program to establish this information.

3. Health Physics Support and Assistance $300,000

This project is intended to provide technical assistance to OES and FO in special key priority areas where time and technical skills are an important element, e.g., recordkeeping systems, adequacy of dose assessment, impact of factor 10 reduction to the dose equivalent.

Several key issues and special technical problems have arisen requiring immediate evaluation and recommendations. At the present time, the "system" does not permit the immediate selection of expertise to focus on these problems. The proposed project will permit this capability.

4. Industrial hygiene support and assistance $200,000

This project is intended to provide the staff assistance to conduct surveys of DOE or contractor facilities, to conduct investigations, to develop program plans, to prepare written documentation, and to conduct workshops as may be necessary to fulfill DOE's industrial hygiene program requirements.

Limited DOE-IH staffing makes it necessary to establish the proposed program.

5. Guidelines - Personnel Dose Calibrations $125,000

To evaluate the reliability of reported exposure data through a study of dosimetry systems, design practices, and calibration. Develop appropriate guidelines to improve the quality and reliability of reported exposure information.

Proposed program is consistent with the OES program element ES&H Standards and Criteria as contained in the MRCD. The criteria will be a means of assuring worker protection through reliable estimates of exposure. The proposed program is responsive to needs dictated by concerns for exposure to low level radiation.

The stress on records is meaningless unless we upgrade the quality and reliability of the data going into the records. The project is directly related to the epidemiology study.

6. Neutron Dosimeter Enhancement $175,000

This project is intended to study current and new methods for improving neutron dose assessment. The project will not be oriented toward the development of a "new" dosimeter rather will involve dosimeter performance measurements and an assessment of potentially new areas of dosimetry. This program is crucial in view of J. Anderson "claim" and the implication of the new information on neutron quality factors (Rossi).

Series difficulties are encountered in determining and accurately recording exposures to neutrons. The proposed project is intended to address this problem.

04
Special Operations

1. Marshall Islands Radiation Safety Program $189,000

To provide long term radiological followup on terrestrial environment and people in the Marshalls. Sharing of logistics with a BER funded medical followup program, also at BNL, is unsatisfactory. Funding at a level that will support separate field trips is needed.

Proposed program is consistent with OES objective of performing radiological surveillance and followup tasks.

High priority - DOE currently lacks the capability of fielding radiological followup surveys in the Marshalls apart from BER supported medical field trips.

2. Pacific Radioecology Program (Add on) $150,000

The purpose of this is to retain the services of the University of Washington to support the Pacific activities. There is a large backlog of environmental samples and special expertise in the marine food pathway analysis that must be retained and revitalized.

$200,000

3. Social and Psychological Impact Considerations of DOE Radiological Protection Activities in the Marshall Islands

DOE scientific findings, and resultant recommendation to DOI and DOD in their cleanup and rehabilitation of nuclear testing Atolls, are forcing disruptive life-style changes among the Marshallese. This pilot study during FY 79 will initiate a 3-year program designed to determine effective methods of cross-cultural communications that will promote understanding of DOE radiological protection activities in the Marshalls. FY 79 efforts will place two persons experts in social and psychological evaluation in the Pacific for 6 months to study and gather information on Marshallese comprehension of past activities, their misunderstandings and apprehensions, and will support followup field trips and consultation with other DOE contractor staff who work in the Marshalls. This will be followed in FY 80 and 81 by development and testing of a communication process.

Our best scientific work to promote radiological health and safety in the Marshalls is being blunted by a lack of effective communications of results. Currently our efforts to apply radiation protection standards are not understood and the people's supicion is that they are part of an experiment using human subjects. DOE's credibility is sagging. OES is operating on ES&H data collection and analysis system for the Marshalls. We need an effective system for reporting results.

High priority - DOE lacks the know-how to effectively communicate with Marshallese people on ES&H matters.

PROPOSED BUDGET OF THE ADFO

FY 80

Funding requests for Program Elements are categorized as follows:

I. ES&H Assurance & Measurement

II. ES&H Standards & Criteria

III. ES&H Support & Assistance

IV. Special Operations

Projects under each of the above categories are prioritized in accordance with the following OES list of objectives (in order of priority):

OES Objectives for FY 1980

High Priority

1. Establish/maintain viable ES&H data analysis and reporting systems (PMS, environmental).
2. Establish/maintain specialized ES&H technical resources, including starting ES&H program for technologies.
3. Continue to provide radiological support for the Enewetak cleanup.
4. Continue the data analysis and reporting required by the 13-Atoll survey.
5. Establish/promulgate ES&H guidelines and criteria for DOE operations (including D&D).
6. Maintain the Aerial Measuring System.
7. Conduct occupational health surveillance (incl. medical records followup, medical exams followup, exposure records followup).
8. Establish/maintain EDP & NEPA followup activities.
9. Maintain the Atmospheric Release Advisory Capability.
10. Monitor DOE ES&H resources.

Intermediate Priority

1. Maintain/enhance a risk analysis and assessment capability.
2. Establish an institutional standards effort.
3. Establish an institutional Q&RA effort.
4. Establish a contingency fund for ES&H problems (field & HQ).
5. Establish Think Tank (enhance methodology, assessment, and analysis capability).

Lower Priority

1. Establish safety system laboratory redundant to SSDC.
2. Establish an ES&H measuring system at a pilot plant to evaluate operating practices.
3. Study DOE ES&H liabilities, roles, and responsibilities for commercialized activities.

I. ES&H ASSURANCE AND MEASUREMENTS

PRIORITY	RPIS	TITLE	FY 79	FY 80 MIN.	FY 80 CURRENT	FY 80 ENHANCED
H-2	600021	Assessment of Criticality Safety	60K			34K
H-2	600022	Natural Phenomena Hazards to DOE Critical Facilities	190K			170K
H-2	600148	Technical Safety Assessments	250K			370K
H-7		Occupational Health and Safety Recordkeeping and Retrieval System for DOE Activities				250K

TOTAL BY PRIORITY

H-2's	570K
H-7	250K

GRAND TOTAL (ALL PRIORITIES) 824K

II. ES&H STANDARDS AND CRITERIA

PRIORITY	RPIS	TITLE	FY 79	MIN.	FY 80 CURRENT	FY 80 ENHANCED
H-2		Analysis of Standards Needs of Energy Technologies of Fossil, Solar				200K
H-5	600026	Standards for Reactors	290K			285K
H-5	600088	D/D Criteria Procedures and Pathway				93K
H-5	600040	Criteria for Decontamination of Material Induced with Activity				115K
H-5	600128	Resource Book - Criticality Study				280K
H-5	600134	Technical Guidelines for Radiation Dosimetry Calibration				125K

TOTAL BY PRIORITY

H-2	200K
H-5's	898K

GRAND TOTAL (ALL ES&H STANDARDS & CRITERIA PRIORITIES)

1098K

PRIORITY	RPIS	TITLE	FY 79	FY 80 MIN.	FY 80 CURRENT	FY 80 ENHANCED
H-1	600212	DOE site annual environmental summary	22K			8K
H-1	600205	EIS/ODIS	30K			30K
H-1	600205	Environmental Monitoring Data Data System (EMDS)	100K			45K
H-1		Analysis of Environmental Data from Energy Facilities				1000K
H-1		QAP for Environmental Penetrating Radiation Measurements				200K
H-1		Non Radiological Environmental QAP Program				200K
H-1		QAP Occupational Measurements				70K
H-1		Annual Pesticide Report				35K
H-2	600097	Emergency Technology	380K			405K
H-2	600027	Fusion Safety Symposium	35K			60K
H-2	600217	Factory Mutual Fire Inspection				175K
H-2	600218	Schermer Fire Inspections				125K
H-2		In Staff Assistance, Ad Hoc				150K
H-2		Assistance to Field Offices re evaluation of contractor programs				120K
H-2	600082	Fusion Fire Protection	260K			320K
H-2		Assistance to Field Offices re Solution of Specific Problems				300K
H-2		Ad Hoc evaluation of Rad Safety problems				150K

PRIORITY	RPIS	TITLE	FY 79	FY 80 MIN.	FY 80 CURRENT	FY 80 ENHANCED
H-2		Aircraft Safety Support and Rail Safety				100K
H-5	600019	Ventilation Systems Analysis	175K			193K
H-5	600014	Respirator Testing and Respirator Advice & Service to Contractors				172K
H-5	600029	Handbook on Effluent Monitoring	48K			27K
H-5	600168	Development of Explosives Manual				See explanation
H-5	600015	Development of Air Sampling Strategies				172K
H-5		Development of Carcinogen Control				110K
H-5		Neutron Dosimeter Development				200K
H-5		Standard Computer Model for Assessing Dose				50K
H-6	600001	AMS (Aerial Measuring System)	2100K			2400K
H-7		Inspection of Contractor Facilities				120K
H-8		Computerized NEPA Assurance Information System				280K
H-9	600031	Atmospheric Release Advisory Capability (ARAC)	510K			980K
I-1		Implementing Investigation Recommendations				100K

III. SUPPORT & ASSISTANCE

TOTAL BY PRIORITY	
H-1's	1588K
H-2's	1905K
H-5's	924K
H-6	2400K
H-7	120K
H-8	280K
H-9	980K
I-1	100K
GRAND TOTAL (ALL SUPPORT & ASSISTANCE PRIORITIES)	8297K

"EXPLANATION"

III. SUPPORT & ASSISTANCE

RPIS 600168 "Development of Explosives Manual"

This project was under Don Ross--when Dennis Skinner moved to his new assignment he asked to take this project with him. This should probably remain under ADFO purview. This one needs to be resolved.

IV. SPECIAL PROJECTS

" THE PACIFIC PROGRAMS"

PRIORITY	RPIS	TITLE	FY 79	FY 80 MIN.	FY 80 CURRENT	FY 80 ENHANCED
H-3	600169	Marshall Islands Radiological Safety Support Enewetak Radiological Support Project				1,330K
H-4	600216	13 - Atoll Survey	158K			148K
H-4		Additional 13 - Atoll Work				300K
*H-11	600 003 004 146 165	Marshall Islands Radiological Followup Program				631K

*It is requested that a separate high priority be established for this aspect of the Marshall Islands Programs. This is a perpetual followon study and should be ongoing after other programs are terminated.

CAPITAL EQUIPMENT

FY 80

I. ES&H Assurance & Measurements

MIN.	CURRENT	ENHANCED
		35K

II. ES&H Standards & Criteria

MIN.	CURRENT	ENHANCED
		55K

III. ES&H Support & Assistance

MIN.	CURRENT	ENHANCED
		2,039K

IV. Special Operations

MIN.	CURRENT	ENHANCED
		100K

IV. SPECIAL PROJECTS

A. Aerial Monitoring System, AMS - Operations and Technical Support

Emergency response capability - East and West Coast base
Major site surveys
Software development and hardware modifications
Operational capability for sensing in gamma, optical, infrared and electromatic portions of spectrum

MIN	CURRENT	ENHANCED
1,200,000	1,200,000	

B. Marshall Islands Radiological Safety Support

a. Enewetak Radiological Support Project

Establish guidelines for radiological cleanup
Provide advice to DNA
Conduct radiological surveys, data processing and analysis
Provide on-island radiochemistry lab support
Provide on-island instrument maintenance and calibration
Classify soil radioactivity levels
Certify radiological condition of atoll at completion of cleanup

MIN	CURRENT	ENHANCED
1,330,000	1,330,000	

b. 13 Atoll Survey

Analysis of radionuclide content of soils, plants, animals, sediments, and ground water
Analysis of survey data
Dose calculations for 13 Atolls
Report preparation

MIN	CURRENT	ENHANCED
450,000	450,000	

c. Marshall Islands Radiological Followup Program

Following radiological surveys of the environment and people at Bikini, Enewetak, Rongelap, Ailinginal, and Rongerik Atolls
Fishtagging project at Enewetak Atoll
Continuing dose assessments for Marshall Islands peoples

MIN	CURRENT	ENHANCED
681,000	681,000	

Log: 80-002

1.

PROPOSAL REVIEW WORKSHEET

(To be used only as a tool in the review process; not to be construed as a final determination of OES action)

Originator: Nevada

Title: AMS - Operations and Technical Support

Type: 189 Proposal No:

Funding Requested:	FY 1977	FY 1978	FY 1979	FY 1980
Operating:		$1,800	$2,390	$3,100
Equipment:		$1,457	$1,200	$1,200

Lead AD: ADFO

Control No: 600001

B&R No: GK-01-01-08-3

AD Recommendation (Summarize documentation of initial review):

A. Recommended - Indicate Funding Level, Branch, and OES Project Officer:

B. Not recommended - reason:

Reviewed by: _____ _____

Project Officer Assistant Director

Reviewer Checklist (Not all proposals will require consideration of all of the following, but the reviewer should consider the applicability of each item below):

1. Responsiveness to the Annual Call.
2. Applicability to OES programs.
3. Continuity of OES programs.
4. Peer review.
5. Suitability of proposer.

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

SCHEDULE 189

NEVADA OPERATIONS OFFICE

Environmental R&D PROGRAM

1. Contractor: EG&G, Inc.		Contract No: EY-76-C-08-1183	Task No:
2. Project Title: AMS - Operations and Technical Support		RPIS No:	189 No:
3. Budget Activity No: GK-01-01-08-3		4. Date Prepared: 24 February 1978	
5. Method of Reporting: Monthly and Quarterly		6. Working Location: Las Vegas/Santa Barbara	
7. Person in Charge: H. A. Lamonds Principal Investigator: J. F. Doyle		8. Project Term: Continuing From: To:	

9. Man-Years:	FY 1978	FY 1979	FY 1980	5 YEARS
a) Scientific				
b) Technical/Other				
TOTAL	26.3	32.3	38.8	

10. Funding: Summary	FY 1978	FY 1979	FY 1980	5 YEARS	TOTAL
a) Operational	1,800.0K	2,390.0K	3,100.0K		
b) Capital Equip.	1,457.0K	1,200.0K	1,200.0K		
TOTAL	3,257.0K	3,590.0K	4,300.0K		

[redacted] DETAILED JUSTIFICATION FOR PROPOSED CAPITAL EQUIPMENT PURCHASES AS ATTACHMENT

SCHEDULE 189

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

NEVADA OPERATIONS OFFICE

Environmental R&D
PROGRAM

10.1 Fundings: Detail	FY 1978	FY 1979	FY 1980
DIRECT			
Salaries	597.1K	791.5K	1025.9K
Fringes	116.4K	166.2K	219.5K
– Subtotal	713.5K	957.7K	1245.4K
Travel / Subsistence	82.0K	110.0K	143.0K
Other Direct	298.6K	398.4K	518.0K
TOTAL	1094.1K	1466.1K	1906.4K
INDIRECT	705.9K	923.9K	1193.6K
TOTAL OPERATING COSTS	1800.0K	2390.0K	3100.0K

11. Scope: (To be written by principal investigator - approximately 400 words)

Attached

11. Scope

The EG&G AMS program provides an integrated airborne remote sensing capability to serve the interest of the Department of Energy (DOE). The capability which EG&G maintains provides useful types of airborne remote sensing and associated ground correlation capabilities. Types of remote sensing provided include the following: 1) large area radiological mapping; 2) high altitude aerial photography; 3) multispectral aerial scanning; and 4) airborne gas and particulates sampling.

Services provided by the capability include: 1) data acquisition by remote sensing over all sites of interest to the DOE where remote sensing is the most appropriate method of acquiring data; and 2) emergency response capability (24-hour-per-day accident response).

One function of the program is to provide data necessary to insure that all DOE programs and operations are conducted in a manner that will protect the public, insure occupational safety and health and preserve the environment in accordance with nationally accepted norms. Remote sensing data provides information on the following environmental parameters: 1) ecological systems; 2) water quality; 3) subsidence/seismicity; 4) air quality; 5) socio-economic; and 6) integrated environmental measurements.

Another important function of the AMS program is to provide a 24-hour-per-day accident response capability. In support of this function, the following situations are maintained:

1. Materials, equipment, and personnel are stationed at both an East Coast and West Coast facility.

2. Personnel and equipment are staged and organized in such a way as to allow the initiation of a response to an accident situation within two hours.

3. Capability is constantly maintained for the rapid assessment of radiation release, major facility damage, or significant spills.

Present AMS activities provide remote sensing surveys of projects for geothermal, fossil fuel, conservation, and nuclear energy development. The program provides for the generation of data to be used in environmental, safety, and health studies. In addition, the system hardware is usable in a response for Congressional inquiries or situations requiring litigation information. The system provides the [illegible] required [illegible] in [illegible] environmental assessments.

11. Scope (cont)

AMS integrated environmental measurement activities include the acquisition of multisensor data in support of Environmental Impact evaluations, the generation of material to allow management overview by means of a graphic overview system and a data base collection for DOE facilities. Current activities in the development portion of the program include a project to evaluate and optimize the exciter/sensor system for detecting the fluorescence of materials on the surface from an airborne platform. Investigations are being carried out relative to the application of multispectral scanner data for non-nuclear energy development site evaluation.

12. Publications

August 1977	Limiting Values for Radionuclide Concentration in the Soil from Remote Spectrometer Measurements
October 1977	Aerial Radiological Survey of the Gnome Site
October 1977	Aerial Radiological Survey of the Lawrence Livermore Laboratory
October 1977	Aerial Radiological Survey of the Genoa (LaCrosse) Boiling Water Reactor Site
December 1977	Laboratory Evaluation of Air N_2 Laser Fluorosensor

Scheduled

March 1978	Aerial Radiological Survey of Mound Facility
March 1978	Aerial Radiological Survey of the Robert Emmett Ginna Area
April 1978	Aerial Radiological Survey of the Dresden Area
April 1978	Aerial Radiological Survey of Argonne Site A
April 1978	Aerial Radiological Survey of National Lead
April 1978	Aerial Radiological Survey of the Paducah (PGDP) Area
May 1978	Aerial Radiological Survey of the Crystal River Area
May 1978	Aerial Radiological Survey of Ames Laboratory
May 1978	Aerial Radiological Survey of Battelle
May 1978	Aerial Radiological Survey of Fermi Lab (Batavia)
June 1978	Aerial Radiological Survey of NTS-Tonopah Test Range
June 1978	Aerial Radiological Survey of Portsmouth
June 1978	Aerial Radiological Survey of Humboldt Bay Area
Ju[illegible]197[illegible]	[illegible]rial [illegible]adio[illegible]ica[illegible]rve[illegible]f M[illegible]ton[illegible]rea
Ju[illegible]197[illegible]	[illegible]rial [illegible]adio[illegible]ica[illegible]rve[illegible]f St[illegible]uci[illegible]rea

12. Publications (cont)

Scheduled (cont)

July 1978	Aerial Radiological Survey of Puget Sound
July 1978	Aerial Radiological Survey of Edwin I. Hatch Area.
July 1978	Aerial Radiological Survey of Joseph M. Farley Area
July 1978	Aerial Radiological Survey of Sequoyah Area
July 1978	Aerial Radiological Survey of St. Louis (Four Sites)
August 1978	Aerial Radiological Survey of Argonne National Laboratory
August 1978	Aerial Radiological Survey of Salton Sea
August 1978	Aerial Radiological Survey of Diablo Canyon Area
August 1978	Aerial Radiological Survey of Maxey Flats Area
August 1978	Aerial Radiological Survey of NFS Erwin Area
August 1978	Aerial Radiological Survey of San Onofre Area
August 1978	Aerial Radiological Survey of Trojan Area
August 1978	Aerial Radiological Survey of Barnwell (Chemical Nuclear)
August 1978	Aerial Radiological Survey of Los Alamos Scientific Laboratory
Unknown	Laboratory Evaluation of KrF Laser Fluorosensor
Unknown	Sample Characterization & System Considerations for a PAH Excitor Sensor

13. Relationships to Other Projects

The AMS Program shares a common technology base with the following:

DOE/NV NEST Program
DOE/NV SANDS Program
NOAA Snow Survey Program
NRC Program

14. FY78 Accomplishments

Emergency response capability was maintained. Major site surveys were carried out within the resources of the program. Expanded photographic production and process control equipment was activated I[illegible]l d[illegible]rati[illegible]f th[illegible]na[illegible]roc[illegible]ing [illegible]nte[illegible]as [illegible]ieve[illegible]pro[illegible]ding [illegible]imited analysis capability for i[illegible]ge d[illegible].

15. FY79 Objectives

Emergency response capability will be maintained at an Eastern and a Western base. Major site surveys using a variety of sensor systems will be carried out within the resources of the program. A side scan radar, exciter/sensor system, or other advanced sensor system will be acquired and made operational. Expanded capability to process and distribute photographic images will be provided. The second half of the equipment to implement the trinity concept of image processing will be acquired. A scanning microdensitometer and accessories will be placed in operation. A minimum complete capability to acquire and process remotely sensed data will exist.

16. FY80 Objectives

Emergency response capability will be maintained at an Eastern and a Western base. Major site surveys, utilizing a variety of sensor systems, will be carried out within the resources of the program. An airborne magnetometer or other advanced remote sensing system will be made operational. Software development and hardware modification for the image processing center will be completed. An operational integrated capability will be established to acquire, process, and distribute remotely sensed data from the gamma ray, optical and near infrared, thermal infrared, and microwave parts of the electromagnetic spectrum.

The overall capability will be sufficiently developed to allow an in depth integrated study of approximately ten major sites per year. In addition, limited coverage of up to ten smaller sites would be provided

As part of the technical support portion of the program, studies will continue relative to the amount and type of remote sensing appropriate to carry out the DOE/AMS mission. Part of the activity will include requirements for new classes of remote sensing equipment and appropriate ground correlation measurements and analysis.

These studies will determine the type and amount of data reduction capability, ground truth measurements, laboratory analytical and calibration backup necessary to process and disseminate remotely sensed data acquired by the operational airborne measurement systems in response to specific program needs and objectives. Software will be developed or modified, tested, and applied as necessary. In addition, evaluation and design assistance will be provided for any necessary expansion of hardware associated with the image processing facility or the sensor system arrays.

17. Proposed Obligations

See pages attached

18. Project Milestones

CAPITAL EQUIPMENT REQUIREMENTS FOR FY79 AND FY80

	FY79 Total	FY80 Total	FY80 Additions	FY80 Replacements
AMS	$1,200K	$1,200K	$1,155K	$ 45K
Laboratory/Analytical Equipment	$ 50K	$ 50K	$ 30K	$ 20K

Laboratory test equipment, soil sampling analysis equipment, and other equipment which support the laboratory portion of the Aerial Measurements Program.

Communications Support Equipment	$ 40K	$ 25K	$ 25K	-0-

Communications support equipment for the Aerial Measurements Program.

Photo/Optical Equipment	$ 175K	$ 150K	$ 150K	-0-
Operations and Aircraft Support Equipment	$ 295K	$ 250K	$ 225K	$ 25K

Equipment to support the field portion of the Aerial Measurement Program. Funding also incl the acquisition of aircraft support equipment and fixtures to support DOE owned aircraft utilized on th Aerial Measurements Program. Major acquisition during FY79 will be a scanner gyro stable platfor During FY80, a thermovision will be acquired.

CAPITAL EQUIPMENT REQUIREMENTS FOR FY79 AND FY80

	FY79 Total	FY80 Total	FY80 Additions	FY80 Replacements
Data Laboratory Equipment	$ 280K	$ 425K	$ 425K	-0-

Provides for equipping a data laboratory which will contain a ground based array of equipment to accept output from any and all of the non-nuclear remote sensing systems and allow processing, analysis, display, and output of data. Major acquisitions in FY79 are an analysis station, data storage memory, an a densitometer/video hard copier. Major acquisition during FY80 will be a scanning densitometer. Also in FY80 a high density tape to disc system will be purchased.

Airborne Remote Sensing Equipment	$ 360K	-0-	-0-	-0-

For the acquisition of all sensor systems used aboard aircraft; includes both nuclear and non-nucl systems. Major acquisitions during FY79 will be Dual IR detectors and an airborne exciter/sensor syste

Field Processing Equipment	-0-	$ 300K	$ 300K	-0-

To provide for one or more arrays of vehicle-mounted or air-transportable arrays of data processing equipment capable of accepting any and all outputs of the airborne nuclear and non-nuclear remot sensing systems. The equipment will allow limited amounts of processing, analysis, display, and output of data under field conditions. Major acquisition during FY80 will be a computer van system.

AMS OPS EXPENDITURES THROUGH 3/26/75

OPERATIONS

NUCLEAR SURVEYS	157.0 K
NON-NUCLEAR SURVEYS	90.3 K
REPORTS	94.1 K
GRAPHIC OVERVIEW	39.3 K
DATA REDUCTION	110.0 K
AIRCRAFT M+S	35.0 K
ADMINISTRATIVE MANAGEMENT	14.0 K
TOTAL AMS Ops COST	539.7 K

TECHNICAL SUPPORT

NUCLEAR DETECTOR DEVELOPMENT	59.6 K
IMAGE PROCESSING CENTER	13.6 K
EXCITER/SENSOR FOLLOW-ON	61.4 K
EXPERT - REMOTE SENSING CAPABILITY	←
DETERMINE NEXT SENSOR SYSTEM	8.4 K
MODIFY AIR SAMPLING CAPABILITY	5.6 K
ESTABLISH SENSOR LAB (NON R+D)	13.6 K
ESTABLISH SENSOR LAB (R+D)	18.6 K
Photographic Image Processing Development	←
TOTAL AMS TECH SUPPORT	180.8 K

Department of Energy
Nevada Operations Office
P.O. Box 14100
Las Vegas, NV 89114

L. J. Beaufait
Emergency Program Officer
Emergency Preparedness Branch, DOES/HQ

PROJECTED AMS PROGRAM EXPENDITURES FOR BALANCE OF FY-78

The following information is a projection for the remainder of fiscal year 1978 of expenditures of the AMS program funds. The figures are based on totals in the program as of March 26, 1978.

I.	AMS OPERATIONS		
	A. Surveys		
	1. Nuclear	$240K	
	2. Non-nuclear	130K	
	B. Reports	98K	
	C. Graphic Overview	70K	
	D. Data reduction (Nuclear and non-nuclear)	140K	
	E. Aircraft M&S (Maintenance and Service)	20K	
	F. Management and Administration	17K	
	SUB-TOTAL		$715K
II.	AMS TECHNICAL SUPPORT		
	A. Nuclear Detector Development	$ 15K	
	B. Image Process Center	80K	
	C. Excitor Sensor Follow-on	105K	

II. AMS TECHNICAL SUPPORT (Cont'd)

D.	Report - Remote Sensing Capability	$ 20K
E.	Define next sensor system	35K
F.	Modify Air Sampling Capability	35K
G.	Establish Sensor Laboratory (Operations)	40K
H.	Establish Sensor Laboratory (R&D)	20K
I.	Development Photo Imaging Processing	15K
	SUB-TOTAL	$365K
	TOTAL	$1080K

G. C. Allen
Nuclear Systems Officer
Nuclear Operations Branch
Nuclear Systems Division

NSD:GCA-329

Log: 80-001

PROPOSAL REVIEW WORKSHEET

(To be used only as a tool in the review process; not to be construed as a final determination of OES action)

Originator: Nevada

Title: Enewetak Radiological Support Project

Type: 189 Proposal No:

Funding Requested:	FY 1977	FY 1978	FY 1979	FY 1980
Operating:		$1,044	$1240	$1,330
Equipment:		~~$1,044~~ 0	~~$1,240~~ 0	~~$1,330~~ 0

Lead AD: ADFO

Control No: 600169

B&R No: GK-01-01-08-4

AD Recommendation (Summarize documentation of initial review):

A. Recommended - Indicate Funding Level, Branch, and OES Project Officer:

B. Not recommended - reason:

Reviewed by: _____ _____

Project Officer Assistant Director

Reviewer Checklist (Not all proposals will require consideration of all of the following, but the reviewer should consider the applicability of each item below):

1. Responsiveness to the Annual Call.
2. Applicability to OES programs.
3. Continuity of OES programs.
4. Peer review.
5. Suitability of proposer.

SCHEDULE 189

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

NEVADA OPERATIONS OFFICE

Multi-Resource : Environmental R & D
PROGRAM

1. Contractor: EG&G Eberline H&N-PTD DRI Sandia LLL LASL EPA	Contract No: Various	Task No:	
2. Project Title: Enewetak Radiological Support Project	RPIS No: 002941	189 No:	
3. Budget Activity No: GK-01-01-~~52-3~~ 08-4	4. Date Prepared: March, 1978		
5. Method of Reporting: Progress reports	6. Working Location: Enewetak Atoll, Marshall Islands		
7. Person in Charge: Roger Ray Principal Investigator: Roger Ray/Bruce Church	8. Project Term: From: July, 1977 To: September, 1980		

9. Man-Years:	FY 1978	FY 1979	FY 1980
a) Scientific			
b) Technical / Other			
TOTAL	16.5	16.25	17.0

10. Funding: Summary	FY 1978	FY 1979	FY 1980
a) Operational	$ 1,044	$ 1,240	$ 1,330
b) Capital Equip.	0	0	0
TOTAL	$ 1,044 *	$ 1,240	$ 1,330

NOTE: INCLUDE JUSTIFICATION & DETAIL ON PROPOSED CAPITAL EQUIPMENT PURCHASE AS AN ATTACHMENT

DATE:

* Does not include $ 277K DNA funds

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SCHEDULE PAGE

SCHEDULE 189

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

NEVADA OPERATIONS OFFICE

Multi-Resource : Environmental R & D
PROGRAM

10.1 Funding: Detail	FY 1978	FY 1979	FY 1980
DIRECT			
Salaries			
Fringes			
– Subtotal			
Travel / Subsistence			
Other Direct			
TOTAL			
INDIRECT			
TOTAL OPERATING COSTS	$ 1,044 *	$ 1,240	$ 1,330

11. Scope: (To be written by principal investigator - approximately 400 words)

Project Organization and Management Concept

The Enewetak Radiological Support Project organization is composed of elements of the staff of the Nevada Operations Office, various NV contractors, the Environmental Protection Agency, and the National Weapons Laboratories. The project is directed and managed for NV by the Nv Project Manager. Actual on-site operations are managed by the Project Manager,or in his absence, one of the Deputy Project Managers. Assisting the Project Manager and Deputies will be an on-island technical advisor(provided on a rotational basis from either NV, EPA, Sandia, LLL, or LASL).

* DOE funds only- does not include $277K DNA funds (balance of DNA $ 1.5M support to DOE effort)

DATE:

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SCHEDULE 189

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

NEVADA OPERATIONS OFFICE

Environmental Research & Develop.
PROGRAM

Responsibilities

As a part of the overall effort to clean up and rehabilitate the islands of the Enewetak Atoll, the DOE has been tasked to provide radiological support to the DOD/DNA operation. DOE responsibilities include:

1. Establish guidelines for radiological cleanup
2. Provide advice to the DNA in radiological safety and other radiation related matters
3. Conduct radiological surveys, data processing and analysis
4. Provide on-island radiochemistry lab support
5. Provide on-island instrument maintenance and calibration
6. Classify soil radioactivity levels
7. Certify (document) the radiological condition of the atoll upon completion of the clean-up phase of the project

Project Organization

HQ has delegated responsibilities 2 through 7 to NV. To manage this project, this office set up a project organization consisting of NV, the EPA, DOE national weapons laboratories, and NV contractors. Project responsibilities are detailed below by participant.

1. NV - will provide overall technical direction and management to the support operation, as well as radiological advice and consultation to the DNA.
2. EPA & Laboratories - Sandia, LLL, LASL, the EPA and NV will, on a rotating basis, have a representative on-island to function as the technical advisor to the NV Project Manager or his designee on health physics and related matters.

DATE:

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ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

NEVADA OPERATIONS OFFICE

Environmental Research & Develop. PROGRAM

3. EG&G - is responsible for the fabrication, operation, and maintenance of the in-situ field mobile radiation detection vans and their data measurement and recording system. EG&G will also assist with data reduction and analysis. Additionally, they will provide technical advice and assistance to the Project Manager.

4. Eberline - will maintain and supervise the operation of field laboratories for radiochemical analysis and instrument calibration. EIC will train and direct soil samplers. They will also provide technical advice and assistance to the Project Manager.

5. DRI (Desert Research Institute) - will perform statistical functions including data mapping and interpretation. In addition, they also will provide technical advice and assistance to the Project Manager.

6. H&N/PTD - will supply logistical and operational support.

Clean-up Overview

The cleanup will consist of collecting non-radioactive debris and explosive ordnance, radioactively contaminated debris, and plutonium contaminated soil. Estimates by DNA for the volume of soil that must be dealt with range from 70-200,000 cubic yards.

Non-contaminated debris will be dumped in the lagoon. Contaminated debris and soil will be placed in and adjacent to one (or both) craters at the north end of Runit Island. A concrete cap will be constructed over the relocated debris.

General guidance for removal of contaminated soil was provided by an AEC Task Group in June 1974. The detailed clean-up concept is set forth in the DNA Environmental Impact Statement of April 1975. The Clean-up Plan, including a description of ERSP participation is set forth in DNA OPLAN 600-77. The NV project management organization and concept of operations is outlined in NV memo of February 23, 1977. (copy enclosed)

DOE support operations got underway in FY 1977 and are expected to continue into FY 1980. The DOD/DOE phase of the project (the cleanup and certification) is expected to come to an end in FY 1980, when demobilization will occur.

SCHEDULE 189

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

NEVADA OPERATIONS
OFFICE

Multi-Resource : Environmental R & D
PROGRAM

12. Dates & Titles of Publications

13. Relationship to Other Projects

14. Progress in FY 19 78 See attached

15. Expected Results in FY 1979 See attached

16. Expected Results in FY 1980 See attached

17. Proposed Obligations for Related Construction Projects N/a

18. Project Milestone Chart

	FY 19	FY 19	FY 19
Indicate Activities & Task Duration, ie. A. Field Research	6 Months		

DATE:

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Attachment

SCHEDULE 189

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

NEVADA OPERATIONS OFFICE

Multi-Resource ; Environmental R & D PROGRAM

14. Progress in FY 1978

The Project became partially operational late in FY 1977, and early in FY 1978 became fully operational. During FY 1978 an initial survey was completed over all potentially contaminated islands in the northern half of the Atoll (21 islands). This effort defined those areas containing plutonium concentrations which exceeded clean-up criteria.

15. Expected Results in FY 1979

Resurvey of those areas where contaminated soil was removed. If surface concentrations still exceed criteria, additional soil must be removed. This process will be repeated until radiological criteria for surface contamination are satisfied. After all soil removal is complete, radiological conditions will be documented (certified).

16. Expected Results in FY 1980

The final stages of island certification will be completed. Demobilization will then occur and personnel and equipment will be returned to the continental U. S.

DATE:

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Log: 80-037

PROPOSAL REVIEW WORKSHEET

(To be used only as a tool in the review process; not to be construed as a final determination of OES action)

Originator: Nevada – U of Nevada

Title: DOES II - 13 Atoll Survey

Type: 189

Proposal No:

Funding Requested:	FY 1978	FY 1979	FY 1980
Operating:	$22,000	$144,000	$148,000
Equipment:	$42,000	$ 14,000	

Lead AD: ADFO

Control No: 600216

B&R No: GK-01-01-08-4

AD Recommendation (Summarize documentation of initial review):

A. Recommended - Indicate Funding Level, Branch, and OES Project Officer:

B. Not recommended - reason:

Reviewed by: _____ _____
Project Officer Assistant Director

Reviewer Checklist (Not all proposals will require consideration of all of the following, but the reviewer should consider the applicability of each item below):

1. Responsiveness to the Annual Call.
2. Applicability to OES programs.
3. Continuity of OES programs.
4. Peer review.
5. Suitability of proposer.

NEVADA OPERATIONS OFFICE

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

SCHEDULE 189

DOES II
Pacific Radioecological
PROGRAM

1. Contractor: University of Washington Laboratory of Radiation Ecology		Contract No: EY-76-S-08-0269	Task No:
2. Project Title: DOES II 13 Atoll Survey		RPIS No:	189 No:
3. Budget Activity No: GK-01-01-08-4		4. Date Prepared: 28 February 1978	
5. Method of Reporting: Annual and Special Reports		6. Working Location: Seattle, Washington Marshall Islands	
7. Person in Charge: Principal Investigator: Allyn H. Seymour (Acting) " "		8. Project Term: From: April 1978 To: September 1980	

9. Man-Years:	FY 1978	FY 1979	FY 1980
a) Scientific	0.33	2.5	2.5
b) Technical/Other	0.17	1.5	1.5
TOTAL	0.5	4.0	4.0

10. Funding: Summary	FY 1978	FY 1979	FY 1980
a) Operational	$ 22,000	$ 144,000	$ 148,000
b) Capital Equip.	42,000	14,000	-
TOTAL	$ 64,000	$ 158,000	$ 148,000

NOTE: INCLUDE JUSTIFICATION & DETAIL ON PROPOSED CAPITAL EQUIPMENT PURCHASE AS AN ATTACHMENT

DATE:

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DOES II Item 10 Attachment

The need for capital equipment and the items to be purchased are described in the following paragraphs.

Our three Ge(Li) detection and measurement systems are our most used systems and are in constant operation 24 hours per day, every day. However, the detectors are coupled with old multi-channel analyzers and interfaced with a PDP-5. The PDP-5 is an old model computer that was acquired from government surplus several years ago and it has served us well but many parts have reached or exceeded their life expectancy and replacements (transitors, drum, etc.) are not now available. Except for one, the multi-channel analyzers are of the same vintage as the PDP-5 and suffer from the same ailments. If an old multi-channel analyzer breaks down and is not reparable, then one system is out of action; if the PDP-5 breaks down and is not reparable, then it will be necessary to resort to manual reduction of the measurement data which, obviously, will severely limit the number of samples that can be analyzed. To maintain the integrity of our gamma spectrum measurement and data processing systems, the time has arrived for replacement of the old multi-channel analyzers and the PDP-5.

The first step in the replacement process is to acquire a new data and analysis system that can accommodate the three Ge(Li) diode units. A single input system, but one that can accommodate the three additional units is available for $31,500. The integral parts of the system are an analog to digital converter (ADC), a direct memory access unit (DMA), a cathode ray display tube, a disc storage unit, a data processor, and a terminal. With this addition one Ge(Li) diode detector unit would be on line with the new system and two would remain on the old system; however, this addition also provides the potential for the addition of three other units.

The second step is the addition of the other two Ge(Li) diode detection units to the single input data and analysis system of Option A. This action would transfer all three of the Ge(Li) units now on hand from the old multi-channel analyzers and PDP-5 to the new system. The cost of the addition of the first unit is $6,500 (ADC, DMA, software, 12K memory) and of the second unit, $4,000 (ADC and DMA, only); the combined cost is $10,500.

The third step is the addition at some later time, of a fourth and final unit which could accommodate detectors of one of various types--Ge(Li) diode, alpha diode, x-ray or sodium iodide.

NEVADA OPERATIONS OFFICE

ADDITIONAL EXPL[illegible]ON FOR OPERATING COSTS
RESEARCH AND DEVELOPMEN[illegible]D PROCESS DEVELOPMENT ACTIVITIES

SCHEDULE 189

DOES II
PROGRAM Pacific Radioecological

10.1 Funding: Detail	FY 1978	FY 1979	FY 1980
DIRECT			
Salaries	$ 6,000	$ 64,000	$ 68,000
Fringes	1,000	11,000	12,000
– Subtotal	$ 7,000	$ 75,000	$ 80,000
Travel Subsistence	9,000	11,000	4,000
Other Direct	3,000	26,000	30,000
TOTAL	$ 19,000	$ 111,000	$ 114,000
INDIRECT	3,000	32,000	34,000
TOTAL OPERATING COSTS	$ 22,000	$ 144,000	$ 148,000

11. Scope: (To be written by principal investigator - approximately 400 words) The 13 Atoll Survey is designed to provide a comprehensive radiological survey of atolls in the vicinity of the former Pacific Test Site for which only partial or no radiological information is now available. An intensive aerial monitoring program will be supplemented by the collection and the analyses of terrestrial and marine samples. From this information the relationship between background radiation and the kinds and quantities of radionuclides in the terrestrial and marine environments will be established. The objectives of the project described here is the collection and radiological analyses of samples from the marine environment.

In preparation of this 189, it was assumed that the 13 Atoll Survey will commence late in the summer of 1978 and one-half of the field program will be completed by 30 September. For our laboratory, this will require the effort of two people for two months in preparation for and execution of the first half of the field program. In FY 79, the field program will be completed and radiological analyses of the samples will begin. In FY 80, the sample analyses will be completed and the final report prepared.

The schedule for the collection and analyses of samples follows. About 100 samples will be collected from each of 13 atolls. The samples will include various species of fish (goatfish, surgeon fish, mullet, parrot fis tuna, etc.) and of invertebrates (claws, spiny lobsters, crabs, snails, etc.) plus algae and sediments. For the fish and invertebrates, one to three tissues will be sampled. The number of samples prepared for analyses will be about 100 per atoll of which about 65 will be fish, 25 invertebrates, 5 algae, and 5 sediments. All samples will be analyzed by gamma spectrometry, about 30 per cent for plutonium and 2 per cent for iron-55. For the 13 atolls, the total number of analyses in the two-year program will be about 1300, 390, and 26, respectively.

DATE:

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NEVADA OPERATIONS OFFICE

ADDITIONAL EXPL[illegible]ION FOR OPERATING COSTS
RESEARCH AND DEVELOP[illegible]ND PROCESS DEVELOPMENT ACTIVITIES

[illegible]EDUL[illegible]
DOES II
PROGRAM Pacific Radioecologica

12. Dates & Titles of Publications Program not yet funded.

13. Relationship to Other Projects If the Enewetak fish tagging and monitoring program is funded, there will be limited interaction with that project.

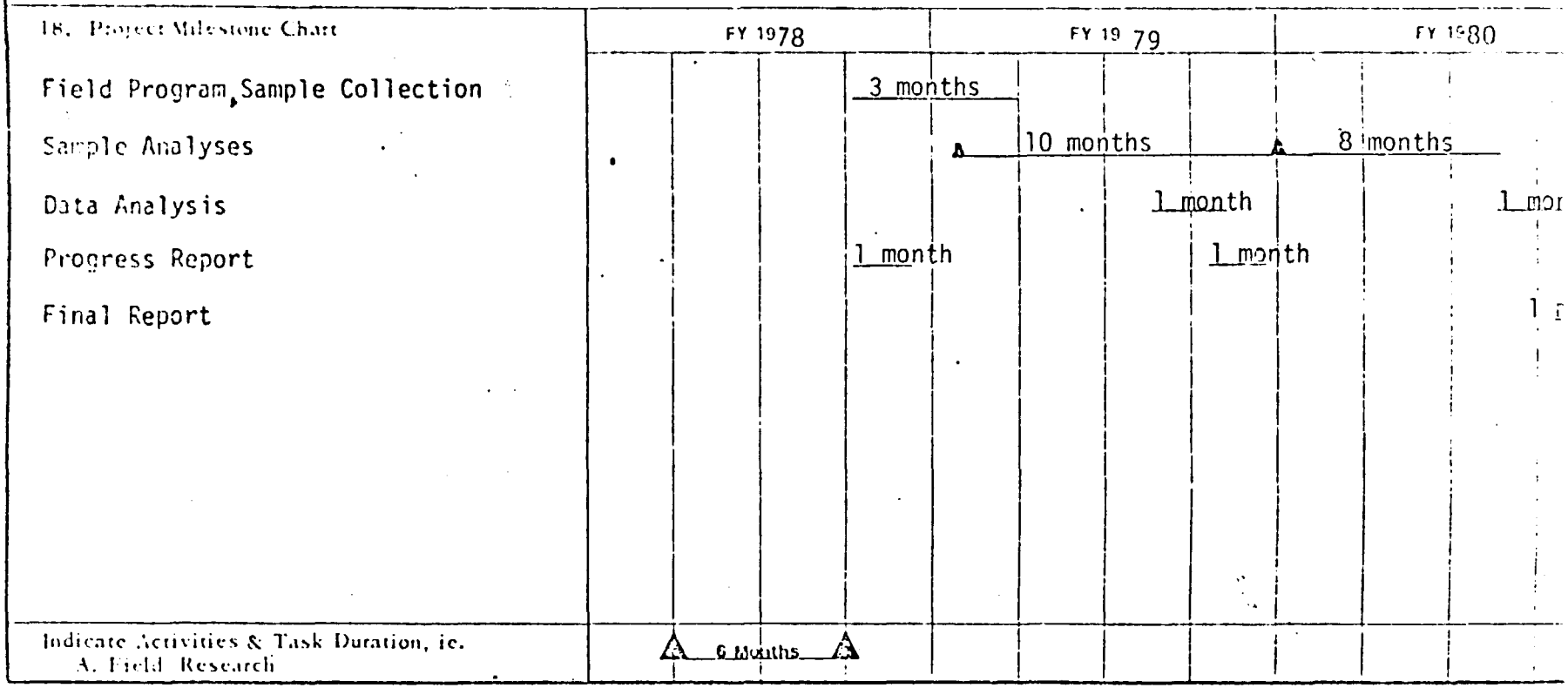
14. Progress in FY 19 78 Prepare for and begin field program including collection of samples.

15. Expected Results in FY 1979 Complete field program and begin analysis of samples.

16. Expected Results in FY 1980 Complete analysis of samples and final report.

17. Proposed Obligations for Related Construction Projects None

18. Project Milestone Chart



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ADDITIONAL EXP[illegible]ION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

[illegible]ADA OPERATIONS OFFICE

DOES II
Pacific Radioecological
PROGRAM

Some of the information provided on pages 1, 2 and 3 was obtained from forms 189, 189A and 189B that were prepared one year ago for the project, "Pacific Radioecological Program (SSC Section) Baseline and Aeria Survey." However, there are some differences. This 189 schedule is exclusively for the 13 Atoll Survey including field work and the radiological analyses of samples for FY 78, 79 and 80. The FY 78 section includ only the first half of the field program whereas the 189's prepared last year for FY 78, included the analyse of the remainder of samples that had been collected in 1976 as well as the initial part of the 13 Atoll Surve The results of analyses of the 1976 samples is included in the, "DOES I Baseline" project for FY 78.

DATE:

BOOK PAGE:

Log: 80-036

PROPOSAL REVIEW WORKSHEET

(To be used only as a tool in the review process; not to be construed as a final determination of OES action)

Originator: Nevada ~ U of Wash

Title: DOES I BASELINE

Type: 189 **Proposal No:**

Funding Requested:	FY 1978	FY 1979	FY 1980
Operating:	$50,000	$53,000	$56,000
Equipment:	000	000	000

Lead AD: ADFO **Control No:** 600004

B&R No: GK-01-01-08-4

AD Recommendation (Summarize documentation of initial review):

A. Recommended - Indicate Funding Level, Branch, and OES Project Officer:

B. Not recommended - reason:

Reviewed by: _____ _____

Project Officer Assistant Director

Reviewer Checklist (Not all proposals will require consideration of all of the following, but the reviewer should consider the applicability of each item below):

1. Responsiveness to the Annual Call.
2. Applicability to OES programs.
3. Continuity of OES programs.
4. Peer review.
5. Suitability of proposer.

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND ... SS DEVELOPMENT ACTIVITIES

SCHEDULE 189

DOES I
Pacific Radioecological
PROGRAM

1. Contractor: University of Washington
Laboratory of Radiation Ecology
Contract No: EY-76-S-08-0269
Task No:

2. Project Title: DOES I Baseline
RPIS No:
189 No:

3. Budget Activity No: GK-01-01-08-4
4. Date Prepared: 28 February 1978

5. Method of Reporting: Annual and Special Reports
6. Working Location: Laboratory of Radiation Ecology
Seattle, Washington

7. Person in Charge: Allyn H. Seymour
Principal Investigator: (Acting) " "
8. Project Term: Continuous
From: To:

9. Man-Years:	FY 1978	FY 1979	FY 1980
a) Scientific	0.67	0.67	0.67
b) Technical/Other	1.00	1.00	1.00
TOTAL	1.67	1.67	1.67

10. Funding: Summary	FY 1978	FY 1979	FY 1980
a) Operational	$50,000	$53,000	$56,000
b) Capital Equip.	-	-	-
TOTAL	$50,000	$53,000	$56,000

NOTE: INCLUDE JUSTIFICATION & DETAIL ON PROPOSED CAPITAL EQUIPMENT PURCHASE AS AN ATTACHMENT

BOOK PAGE:

NEVADA OPERATIONS OFFICE

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

SCHEDULE 189

DOES I
PROGRAM: Pacific Radioecological

10.1 Funding: Detail	FY 1978	FY 1979	FY 1980
DIRECT			
Salaries	$ 24,000	$ 26,000	$ 27,000
Fringes	3,000	3,000	4,000
– Subtotal	$ 27,000	$ 29,000	$ 31,000
Travel Subsistence	1,000	1,000	1,000
Other Direct	9,000	10,000	10,000
TOTAL	$ 37,000	$ 40,000	$ 42,000
INDIRECT	13,000	13,000	14,000
TOTAL OPERATING COSTS	$ 50,000	$ 53,000	$ 56,000

11. Scope: (To be written by principal investigator - approximately 400 words) The laboratory has collected marine, terrestrial, and soil samples for radiological analyses at the former Pacific Test Site since 1946 and some of these samples have been prepared and stored for later use. A list of samples by date and area of collection and by sample type that are now on hand is given in the five tables that are attached. Reports of the results of analyses of most of the samples have been reported but all of the methods and techniques of analyses that are now available were not available when the samples were originally analyzed. For example, prior to 1954 the only analysis performed was for gross beta and gamma radiation; the analyses for ^{90}Sr began in 1954 and, by gamma spectrometry, in 1956; and, for plutonium, the first analysis was in 1964.

It is now proposed that selected archive samples be analyzed for ^{90}Sr, ^{137}Cs, and Pu for the baseline program for FY's 79 and 80. As a result of this program, the 31-year history of these radionuclides at Bikini and Enewetak, their 24-year history at Rongelap, and their 20-year history at these three areas, as well as other areas, after conclusion of the test program could be established. It is unlikely that similar information can be obtained for any other area of the world. The number of analyses will be approximatey 200 for Pu, 200 for ^{90}Sr, 200 by gamma spectroscopy (^{137}Cs and other radionuclides if present) and 20 (of the more recent fish samples) for ^{55}Fe per year.

In FY 1978, the analyses of all of the samples collected in 1976 and 1977 for DOES that have not been previously analyzed will be completed. The results of analyses will be included in two reports - one, on the 1975 radiological survey in Micronesia and the other on 1976 and 1977 radiological surveys in the Marshall Islands. The latter, essentially, will be an updating of NVO-269-32.

DATE:

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DOA OPERATIONS OFFICE

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT PROCESS DEVELOPMENT ACTIVITIES

DOES I
PROGRAM Pacific Radioecological

12. Dates & Titles of Publications
13. Relationship to Other Projects

1. Annual Report 18 July 1977.
2. Radiological Survey of Plants, Animals and Soils in Micronesia, Nov. 1975 (in preparation).
3. Radiological Survey of Plants, Animals and Soils in the Marshall Islands Progress Report for 1976-1977 (in preparation).

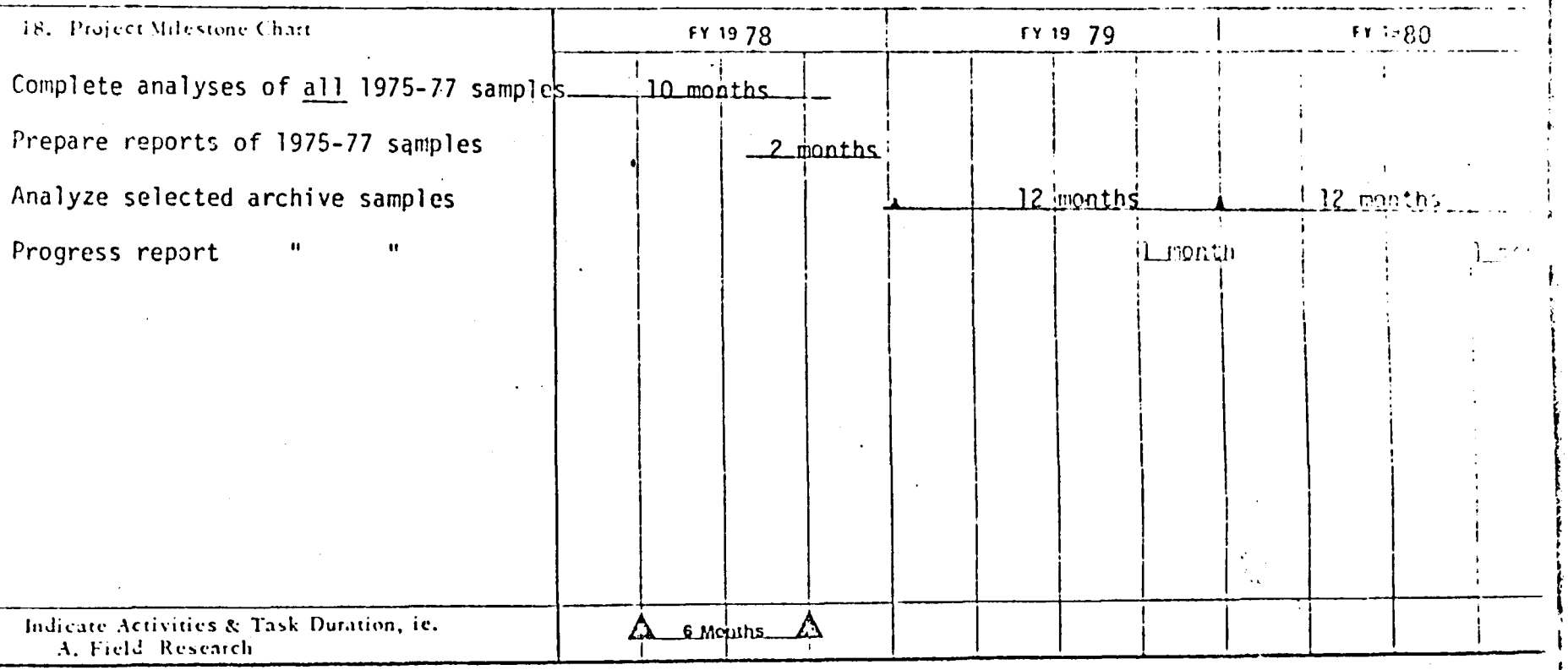
14. Progress in FY 1978 Complete the analyses of all samples for the DOES collected in 1975, 1976 and 1977. Prepare reports of the results of analyses.

15. Expected Results in FY 19 79 Begin analyses of selected archive samples; prepare progress report.

16. Expected Results in FY 19 80 Continue analyses of selected archive samples; prepare progress report.

17. Proposed Obligations for Related Construction Projects None

18. Project Milestone Chart



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NEVADA OPERATIONS OFFICE

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

SCHEDULE 189

DOES I
Pacific Radioecological
PROGRAM

Two sets of 189's were prepared on 29 April 1977, "Pacific Radioecological Program (SSC Section) Baseline and Aerial Survey" and "Pacific Radioecological Program SSC Section Fish Tagging." This year three sets have been prepared for the same programs - "DOES I, Baseline," "DOES II, 13 Atoll Survey," and "DOES III, Enewetak Fish Tagging and Monitoring."

The programs remain essentially the same with one exception. The baseline program for FY 78 is unchanged but for FY 79 and FY 80 the analysis of archive samples is proposed. The addition of the archive samples is complemented by a slight reduction in the number of analyses of samples from the 13 Atoll Survey. The total budget for all programs for FY 79 and FY 80 are approximately the same as given in last year's 189's, and for FY 78 is significantly less because of the delay in initiating DOES programs II and III.

ARCHIVE SAMPLES
Laboratory of Radiation Ecology
University of Washington

TABLE 1: Bikini Atoll

	1948	1949	1954	1955	1956	1957	1958	1964	1967	1969	1970	1972	1974	1975	1976	1977
LAND PLANTS																
Coconut	2		1	3	3	3		11	2			16	2	15	5	
Scaevola	2				1	2	2	14	7							
Papaya	1			6	4	3						4			2	
Pandanus				1		1	1	2	2			5	1	2	8	
Arrowroot			1	2	1	3										
Messerschmidia	1				1	2	2	18	1				1			
Breadfruit														2	9	
Other	7				1	1	4	39	6			1	1		3	
SOIL																
Island Soil			13'	5	3	5	2	72	36	31	166	23	94	62	1	
Beach Sand			1	2												
Lagoon Sediment			1					7		5	1	30			10	8
LAND ANIMALS																
Coconut Crab				3	4			9	19	44		43	3			
Rats								20	14	4	21					
Birds			6	2				142	36	9						
MARINE BIOTA																
Tridacna	4		10		3	1		85		4		8		4		
Other Molluscs	11			1		6		40		7		9				
Tuna				3	3	8			6	74		18			1	12
Mullet								11	3	14		25	4		3	6
Goatfish						1		3	1	8	10	22		1		4
Surgeonfish			1	3			2	32	1	14		7	2	3		
Other Fish				3	6	26	5	147	4	20		52		5	41	
Crustaceans				2	7	16	1	74	14	35	1	12			1	6
Coral/Sponge	30	1		1	4	2		33				14				
Echinoderms						2		64				9				
Plankton	4					8		7								
BENTHIC ALGAE																
Halimeda		2		1	4	2	1	8				13				
Other					3	8		27		1	3	1				

ARCHIVE SAMPLES
Laboratory of Radiation Ecology
University of Washington

TABLE 2: Enewetak Atoll

	1948	1949	1951	1952	1954	1955	1956	1957	1958	1959	1961	1964	1972
LAND PLANTS													
Coconut							3		17			3	
Scaevola					1	2	11	4	12	1	1	15	
Papaya									1				
Pandanus							4	1	1				
Arrowroot													
Messerschmidia							5	5	15	2	1	15	
Breadfruit													
Other	1						12	11	19	4	6	33	
SOIL													
Island Soil			9	11	114	41	20	6	14	43	6	44	19
Beach Sand				1	42	10	7		1				
Lagoon Sediment				3	33	15	8	1	7	2	1	3	16
LAND ANIMALS													
Coconut Crab							18	6		7			
Rats						3	2				9	35	
Birds	1				1				6			38	
MARINE BIOTA													
Tridacna	2				68	3		7	31	2	17	45	27
Other Molluscs	2				13	1	1	2	4	1	4	13	5
Tuna					26	7	6	120	8		5		24
Mullet					1	3						14	40
Goatfish					1	1		2	3			11	35
Surgeonfish					2			5	7		6	34	31
Other Fish					9		1	95	56		68	145	81
Crustaceans						1	24	18	52		9	61	3
Coral/Sponge	20			1	12	3	2	7	1		1	16	1
Echinoderms				13		3	6	1	32		3	76	22
Plankton	2	2			1			13	35		5		
BENTHIC ALGAE													
Halimeda	1				1	2	4	3	7	1	3	11	1
Other					3	1	19	10	16	3	1	27	1

ARCHIVE SAMPLES
Laboratory of Radiation Ecology
University of Washington

TABLE 3: Rongelap, Ailinginae, and Rongerik Atolls

	1954	1955	1956	1957	1958	1959	1961	1963	1964	1967	1971	1972	1974	1976
LAND PLANTS														
Coconut	1	8	6	5	28	45	126	100	34		1		5	10
Scaevola				7	13	59	84	29	2					
Papaya	1	1	1		1	7	3	5						
Pandanus		4	2	2	28	90	52	50	4		6		10	1
Arrowroot	2	1	1	1	5									
Messerschmidia				5		54	67	15	2					
Breadfruit			3	2	2	14	10	11	3		1		1	1
Other		3	4	5	125	260	173	118	5		11			
SOIL														
Island Soil	7	21	11	10	258	340	270	163	17		24		106	82
Beach Sand	2	6	4	1										
Lagoon Sediment		12		2	10								3	
LAND ANIMALS														
Coconut Crab		8		10	90	112	17	75	30	4	8		29	12
Rats								1						
Birds	4	9			2	2		48	12				2	
MARINE BIOTA														
Tridacna		1		10	61	9		34	15				2	10
Other Molluscs	4		1	8	46	7	5	29	27				3	
Tuna		7			1	4		17			6		5	1
Mullet													7	3
Goatfish		1	1	3		45	70	50			8	1	3	4
Surgeonfish					6	6		11					2	
Other Fish		1	2	35	4	21	30	145					10	
Crustaceans			1	4	13		1	106	4					
Coral/Sponge				9	20	3	1		10					
Echinoderms		3		9	14	56		14	17					
Plankton					4	11	1							
BENTHIC ALGAE														
Halimeda		9	1	3	12	1	1	16	4					
Other		2		2	26		3	40	4		1		1	

ARCHIVE SAMPLES
Laboratory of Radiation Ecology
University of Washington

TABLE 4: Other Marshall Islands

	1949	1954	1955	1956	1958	1959	1963	1972	1974	1975	1976
LAND PLANTS											
Coconut			4	2	5	2				6	9
Scaevola					1	1					
Papaya			1	3	2	2				2	6
Pandanus			2	2	3	5	8		2	9	21
Arrowroot		1		2	1						
Messerschmidia				1	1						
Breadfruit		1		5	3					5	15
Other				1	2	5	1		1		4
SOIL											
Island Soil			5	3					17	17	106
Beach Sand			5								
Lagoon Sediment									2		
LAND ANIMALS											
Coconut Crab				2	8	9	4			5	
Rats											
Birds			4								
MARINE BIOTA											
Tridacna					9				3		
Other Molluscs					8	1					
Tuna								13			
Mullet									1	1	
Goatfish							5				
Surgeonfish					2			2			2
Other Fish					6			7	2	3	1
Crustaceans				9	8						
Coral/Sponge											
Echinoderms				3	27						
Plankton	1										
BENTHIC ALGAE											
Halimeda				3	2						
Other			1		1						

ARCHIVE SAMPLES
Laboratory of Radiation Ecology
University of Washington

TABLE 5: Micronesia and Polynesia

Area	Year	Sample Type				
		LAND PLANTS	SOIL	LAND ANIMALS	MARINE BIOTA	BETHIC ALGAE
Hawaii	1951					1
Ponape	1954	5	1			
	1956	13	1			
	1958	9			21	2
	1975	15	11		4	
Kusaie	1956	7	4		6	2
	1958	13			16	2
Tarawa	1956	6	3		5	1
	1958	1			19	
Guam	1956				9	
	1958				5	4
	1959				27	7
	1975	25	13		7	
Yap Is.	1956				4	
Palau	1956				3	
	1958			3	4	
	1959				17	3
	1975	19	15		1	
Kapingamarangi	1958	3			11	
Thailand	1958				2	1
	1959				7	1
Canton	1961		1			
	1962	1	13		34	2
Christmas Is.	1962	7	34		1	2
	1975	20	8		27	1
Pago Pago	1962		1			
Line Islands	1962	10	12		21	
Tongatapu	1962	9	8		11	4
Samoa	1962	10	12		3	
Fiji	1962	5	6		2	1
Johnston Is.	1962	27	67		199	14
	1966	4	7		65	3
	1967	3	6		24	
Roratonga	1962	15	5		3	
Hong Kong	1963				3	
Galapagos	1966		1		2	
Truk	1975	25	16		2	

Log: 80-038

PROPOSAL REVIEW WORKSHEET

(To be used only as a tool in the review process; not to be construed as a final determination of OES action)

Originator: Nevada – U of Wash

Title: DOES III ENEWETAK FISH TAGGING AND MONITORING

Type: 189 Proposal No:

Funding Requested:	FY 1978	FY 1979	FY 1980
Operating:	$35,000	$70,000	$75,000
Equipment:	000	000	000

Lead AD: ADFO Control No: 600165

B&R No: GK-01-01-08-4

AD Recommendation (Summarize documentation of initial review):

A. Recommended - Indicate Funding Level, Branch, and OES Project Officer:

B. Not recommended - reason:

Reviewed by: _____ _____

Project Officer Assistant Director

Reviewer Checklist (Not all proposals will require consideration of all of the following, but the reviewer should consider the applicability of each item below):

1. Responsiveness to the Annual Call.
2. Applicability to OES programs.
3. Continuity of OES programs.
4. Peer review.
5. Suitability of proposer.

Project

NEVADA OPERATIONS OFFICE

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT / PROCESS DEVELOPMENT ACTIVITIES

SCHEDULE NO.

DOES III
Pacific Radioecologics
PROGRAM

1. Contractor:	University of Washington Laboratory of Radiation Ecology	Contract No:	EY-76-S-08-029
		Task No:	
2. Project Title:	DOES III Enewetak Fish Tagging and Monitoring	RPIS No:	
		189 No:	
3. Budget Activity No:	GK-01-01-08-4	4. Date Prepared:	28 February 1978
5. Method of Reporting:	Annual and special reports.	6. Working Location:	Seattle, Washington Enewetak Atolls
7. Person in Charge: Principal Investigator:	Allyn H. Seymour , Acting; " " "	8. Project Term:	2½ years From: April 1978 To: September 1980

9. Man-Years:	FY 19 78	FY 19 79	FY 19 80
a) Scientific	0.50	1.5	1.5
b) Technical / Other	0.50	0.5	0.5
TOTAL	1.00	2.0	2.0

10. Funding: Summary	FY 19	FY 19	FY 19
a) Operational	$ 35,000	$ 70,000	$ 75,000
b) Capital Equip.	0	0	0
TOTAL	$ 35,000	$ 70,000	$ 75,000

NOTE: INCLUDE JUSTIFICATION & DETAIL ON PROPOSED CAPITAL EQUIPMENT PURCHASE AS AN ATTACHMENT

DATE:

BOOK PAGE:

SCHEDULE PAGE:

NEVADA OPERATIONS OFFICE

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT PROCESS DEVELOPMENT ACTIVITIES

SCHEDULE 191

DOES III
Pacific Radioecological
PROGRAM

10.1 Funding: Detail	FY 1978	FY 1979	FY 1980
DIRECT			
Salaries	$ 13,000	$ 26,000	$ 30,000
Fringes	2,000	4,000	5,000
– Subtotal	$ 15,000	$ 30,000	$ 35,000
Travel Subsistence	6,000	12,000	10,000
Other Direct	7,000	15,000	15,000
TOTAL	$ 28,000	$ 57,000	$ 60,000
INDIRECT	7,000	13,000	15,000
TOTAL OPERATING COSTS	$ 35,000	$ 70,000	$ 75,000

11. Scope: (To be written by principal investigator - approximately 100 words) The principal objectives are to determine if fishes migrate from plutonium contaminated to non-contaminated areas in the lagoon where they may be caught by Atoll residents for food or other purposes; and, to determine the plutonium and gamma emitting radionuclide concentrations in fishes and a few other selected marine organisms during the Enewetak clean-up period. The concentration of plutonium in foods, including fish, has recently taken on new significance since some data now indicat that the transfer coefficient for plutonium from digestive tract to tissue for mammals may be 2 to 3 orders of magnitudes greater than previously reported.

Since the Enewetak clean-up program is underway, the fish tagging and monitoring program should begin as soon as funds are available. Migrations and movements of lagoon and reef fishes are poorly known. One seven-day study of fish movements in and out of La Crosse and Cactus Craters on Runit Island has been made by Nolan (1976). He tagged 141 fish and found six families of fishes to be transient crater residents but did not have the opportunity to determine longer migrations. Studies of sub-tropical Atlantic reef fishes indicated that their migrations range from several meters to the full breadth of coastal areas.

A successful fish migration study requires an extensive program of recovery as well as tagging. Every third month about 3 weeks will be spent at Enewetak to tag as many fish as possible at selected sites. Part of the field time will also be spent in special efforts to recover tags including contact with the Enewetakese fishermen, sports fishermen, and researchers from the Mid Pacific Laboratory (MPL). A reward system for the return of tags captured by others will be considered. Because of the great variation in size, shape, and habits of tropical reef fishes, various types of tags - streamer, button, strap - and of gear - throw nets, traps,

BOOK PAGE: _____

Scope (Cont.)

beach seines, gill nets - will be required to catch a sufficient number of fish to positively identify migration patterns. The field party will include two laboratory people and two Enewetakese who will be used to identify the edible fishes, to suggest means of capture, to participate in fish catching activities, and to establish liaison with the Enewetakese fisherman for the recovery of tags.

At the time that the fish are captured for tagging, a sample will be obtained for radionuclide analyses in the home laboratory. About one-fourth of the total effort will be devoted to sample analyses and, with this effort about 100 selected samples per year can be analyzed for both gamma emitting radionuclides and plutonium. Samples collected in the vicinity of Runit will be of special interest.

Use of the facilities at the Mid Pacific Laboratory and of small craft for in-lagoon transportation will be required. Dr. Reese, Director of MPL, has indicated an interest in a fish tagging program but with objectives other than those outlined above. We would welcome the opportunity to work with him.

ADA OPERATIONS OFFICE

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

DOES III
Pacific Radioecological
PROGRAM

12. Dates & Titles of Publications: Program not yet funded.

13. Relationship to Other Projects: If the 13 Atoll Survey project is funded, there will be limited interaction with that project.

14. Progress in FY 1978 (April-September): Complete first two phases of the tagging and recovery project. Began radiological analyses of samples.

15. Expected Results in FY 1979: Complete fish tagging project. Continue fish recovery and radiological analyses project.

16. Expected Results in FY 1980: Complete all projects; prepare final report of fish migrations and of plutonium and gamma spectrum analyses projects.

17. Proposed Obligations for Related Construction Projects: None.

18. Project Milestone Chart

	FY 1978				FY 1979								FY 1980			
Field Program, Phases I thru VIII			1*	1	1	1	1	1	1	1						
Plutonium and Gamma Analyses				2			12				5					
Data Analysis				1					1					1		
Progress Report				1					1							1

*Months

Indicate Activities & Task Duration, ie.
A. Field Research — 6 Months

DATE:

BOOK PAGE:

SCHEDULE PAGE:

Attachment

NEVADA OPERATIONS OFFICE

ADDITIONAL EXPLANATION FOR OPERATING COSTS
RESEARCH AND DEVELOPMENT AND PROCESS DEVELOPMENT ACTIVITIES

DOES III

PROGRAM: Pacific Radioecological

A major portion of the information provided on pages 1, 2, and 3 was obtained from forms 189, 189A, and 189B that were prepared last year (29 April 1977) for the project, "Pacific Radioecological Program, SSC Section, Fish Tagging." To date, the program has not been funded. Before preparation of this form, the subject was discussed with Mr. Mc Craw.

DATE:

BOOK PAGE:

Log: 80-015

PROPOSAL REVIEW WORKSHEET

(To be used only as a tool in the review process; not to be construed as a final determination of OES action)

Originator: BNL

Title: Surveillance of Facilities and Sites--Marshall Islands Radiological Safety Program

Type: 189

Proposal No:

Funding Requested:	FY 1977	FY 1978	FY 1979	FY 1980
Operating:		~~$198,000~~ $150,000	~~$369~~,000 $400,000	~~$427~~,000 $420,000
Equipment:		$ 11,000	$ 20,000	$ 50,000

Lead AD: ADFO

Control No: 600003

B&R No: GK-01-01-08-4

AD Recommendation (Summarize documentation of initial review):

A. Recommended - Indicate Funding Level, Branch, and OES Project Officer:

B. Not recommended - reason:

Reviewed by: _____ Project Officer _____ Assistant Director

Reviewer Checklist (Not all proposals will require consideration of all of the following, but the reviewer should consider the applicability of each item below):

1. Responsiveness to the Annual Call.
2. Applicability to OES programs.
3. Continuity of OES programs.
4. Peer review.
5. Suitability of proposer.

DEPARTMENT OF ENERGY

ENERGY - OPERATING EXPENSES AND CAPITAL ACQUISITION

SCHEDULE 189
ADDITIONAL EXPLANATION FOR OPERATING OBLIGATIONS

Brookhaven National Laboratory — GK-Multi-Resource
Laboratory — Mission Resource

1. Contractor: Associated Universities, Inc.
Contract No.: EY-76-C-02-0016
Task No.:

2. Project Title:
Surveillance of Facilities and Sites
Marshall Islands Radiological Safety Program
189 No.:

3. Budget Activity No.:
GK-01-01-~~52-3 (a)~~ 08-4
(600003)

4. Date Prepared:
March 1978

5. Method of Reporting:
Annual Report to Division of Safety Standards and Compliance (SSC)
Monthly Visits to SSC
Scientific Journals and Meetings

6. Working Location:
Brookhaven National Laboratory

7. Person in Charge:
C. B. Meinhold

Principal Investigator:
N. A. Greenhouse (664-4250)

8. Project Term:
Continuing
From: To:

9. Person-Years:

	FY 1978	Pres.Bud. FY 1979	Rev.Req. FY 1979	FY 1980
Direct Person-Years				
Scientific & Professional	2.0	3.0	3.0	3.0
Others	2.5	2.0	4.0	4.0
Guests & Research Collaborators	---	---	---	---
Total	4.5	5.0	7.0	7.0

10. Costs (In Thousands of Dollars):

	FY 1978	Pres.Bud. FY 1979	Rev.Req. FY 1979	FY 1980
Research Costs	150	211	400	420
Total Research Obligations	198	218	369	427
Equipment Obligations	11	20	20	50

11. Reactor Concept:

12. Materials:

GK-115

Project Title: Surveillance of Facilities and Sites
Marshall Islands Radiological Safety Program GK-01-01-52-3-(a)

13. Publications:

Greenhouse, N. A. and Miltenberger, R. P. Radiological analyses of Marshall Islands environmental samples from 1974 through 1976. BNL Report (in press).

Greenhouse, N. A. and Miltenberger, R. P. External radiation survey and dose predictions for Rongelap, Utirik, Rongerik, Ailuk, and Wotje Atolls. BNL Report (in press).

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14. Scope:

(a) 200 Word Summary: A comprehensive radiological safety program will be maintained for the inhabitants of atolls in the northern Marshall Islands contaminated as a result of the U.S. Pacific Testing programs. The following items and services will be provided:

1. Environmental and personnel monitoring to provide data for BNL dose assessments and determination of radiological trends.

2. Individual and population dosimetry based on actual measurements. These data will be used to modify dose commitment predictive models so that they accurately reflect future trends.

3. Suggestions based on field experience to mitigate doses via the more critical pathways.

4. A flexible resource of radiological expertise to independently review radiation protection programs associated with rehabilitation efforts in the northern Marshalls, and for related health physics interests of OES in the Pacific Basin.

Program activities for the coming fiscal year will emphasize the following:

1. In vivo counting of Bikini and Enewetak residents. These efforts will define baseline body burdens of gamma-emitting nuclides for new residents at both atolls, and will periodically assess changes in body burdens over time which might result from various exposure pathways.

2. Urine bioassay to define radionuclide excretion patterns from individuals, and to estimate ^{90}Sr and transuranic nuclide burdens.

(See Continuation Sheet)

Surveillance of Facilities and Sites

Project Title: Marshall Islands Radiological Safety Program GK-01-01-52-3-(a

14. Scope: (continued)

3. Definition of the annual contributions to dose via the inhalation pathway at Bikini, Rongelap, and Utirik. Special emphasis will be placed on continuous air sampling for wind-mediated resuspension of radionuclides in local soils; and on special measurements to define aerosol contributions resulting from human activity.

4. Development of radiological dose predictive models which involve both human and environmental monitoring data.

(b) Supplement to 200 Word Summary: The FY 1979 budget request contains a significant increase over the FY 1978 allocation. This increase reflects a realistic assessment of operating costs imposed by the in vivo counting, bioassay, and air monitoring activities begun in FY 1978. Additionally, field trip activities and analytical laboratory services have substantially exceeded original estimates for the basic radiological safety program, and these costs are expected to continue. Finally, there are a number of peripheral programs of mutual interest to BNL and OES which will be cost-effective if included with the basic efforts, manpower and budget permitting. These include in order of importance:

1. Definition of local diet patterns at all atolls of interest, and continuous monitoring of diets for seasonal changes and long-term trends which might impact on realistic dose predictions.

2. Incorporation of public information and education programs into the total BNL effort to minimize the adverse psychological and sociological impacts of local radiological conditions and of our efforts to understand them.

3. Retrospective assessment of the radiological picture in the northern Marshalls prior to the establishment of the BNL program in FY 1975.

4. Continued collaboration with UW/LRE on OES radiological programs.

15. Relationship to Other Projects:

This program will be logistically coupled wherever possible to the BNL Medical Program in the Marshall Islands. Technical collaboration will continue on matters of mutual interest. The radiological safety program will also bear directly on a retrospective reassessment of thyroid and whole body doses to the BRAVO fallout victims at Rongelap and Utirik, a new program for which funding is expected in FY 1978. The program will also interact cooperatively with related efforts at the University of Washington (LRE) and at Lawrence Livermore Laboratory.

GK-117

(See Continuation Sheet)

Surveillance of Facilities and Sites

Project Title: Marshall Islands Radiological Safety Program GK-01-01-52-3-(a

16. Technical Progress in FY 1978:

Several reports are in press or in progress for publication in FY 1978. These reports will summarize all BNL radiological program activities to date and identify the technical issues to be addressed in FY 1979 and 1980. Two field trips were made in October 1977 to initiate the BNL air monitoring programs at Bikini, Rongelap, and Utirik; and to establish the in vivo counting program. Sufficient field monitoring data will become available to assess average radionuclide body burdens for residents of Bikini, Rongelap, and Utirik, and to make a preliminary analysis of the inhalation pathway at these atolls.

Personnel and analytical laboratory resources are being mobilized to provide technical program support for the "13 Atoll Survey" which is expected during FY 1978.

At least two additional field trips are planned for FY 1978 to continue environmental surveillance programs at Utirik, Rongelap, and Bikini, and the study of trends in ^{137}Cs body burdens at Bikini. Field trip scheduling continues to be hampered, however, by uncertainties over logistics support.

17. Expected Results in FY 1979:

At least three field trips will be made to Bikini, Rongelap, and Utirik Atolls to conduct routine environmental surveillance and personnel monitoring activities. In addition, two or more field trips will be made to Enewetak to continue baseline in vivo counting and bioassay activities begun in FY 1978, and to initiate a new environmental surveillance program consistent with the return of control of the atoll to the Marshallese.

Average baseline radionuclide body burdens will be established for typical residents of uncontaminated atolls. Additional contributions to body burdens from environmental pathways on contaminated atolls will be determined for individuals and populations at Bikini, Rongelap, and Utirik. Definition of the inhalation pathway at the aforementioned atolls will be completed, and a working predictive model will be developed which incorporates environmental and pathway analyses with actual human uptake experience.

18. Expected Results in FY 1980:

Continuation of programs described in FY 1979.

(See Continuation Sheet)

Project Title: Surveillance of Facilities and Sites
Marshall Islands Radiological Safety Program GK-01-01-52-3-(a)

19. Description and Explanation of Major Materials, Equipment and Subcontract Items:

Capital Equipment - FY 1980:

Two phantoms ($10,000) are required to provide adequate calibrations for the Marshall Islands In Vivo Counting program. A computer-based pulse height analyzer ($40,000) is needed to maintain the division counting laboratory at state-of-the-art, and to provide independent analytical facilities for ultra-low-level sample counting.

20. Proposed Obligations for Related Construction Projects:

None.

Log: 80-016

PROPOSAL REVIEW WORKSHEET

(To be used only as a tool in the review process; not to be construed as a final determination of OES action)

Originator: BNL

Title: DOSE REASSESSMENT FOR POPULATIONS ON RONGELAP AND UTIRIK FOLLOWING EXPOSURE TO FALLOUT

Type: 189 **Proposal No:**

Funding Requested:	FY 1977	FY 1978	FY 1979	FY 1980
Operating:			$25,000	
Equipment:			000	

Lead AD: ADFO

Control No: 600160

B&R No: GK-01-01-08-4

AD Recommendation (Summarize documentation of initial review):

A. Recommended - Indicate Funding Level, Branch, and OES Project Officer:

B. Not recommended - reason:

Reviewed by: _____ Project Officer _____ Assistant Director

Reviewer Checklist (Not all proposals will require consideration of all of the following, but the reviewer should consider the applicability of each item below):

1. Responsiveness to the Annual Call.
2. Applicability to OES programs.
3. Continuity of OES programs.
4. Peer review.
5. Suitability of proposer.

DEPARTMENT OF ENERGY

ENERGY - OPERATING EXPENSES AND CAPITAL ACQUISITION

SCHEDULE 189
ADDITIONAL EXPLANATION FOR OPERATING OBLIGATIONS

Brookhaven National Laboratory — GK-Multi-Resource
Laboratory — Mission Resource

1. Contractor: Associated Universities, Inc.
Contract No.: EY-76-C-02-0016
Task No.:

2. Project Title:
Surveillance of Facilities and Sites
Dose Reassessment for Populations on Rongelap and Utirik
Following Exposure to Fallout
189 No.:

3. Budget Activity No.:
GK-01-01-~~52-3-(b)~~ 08-4
(600160)

4. Date Prepared:
March 1978

5. Method of Reporting:
Annual Report to Division of
Biomedical & Environmental Research
Scientific Meetings and Journals

6. Working Location:
Brookhaven National Laboratory

7. Person in Charge:
C. B. Meinhold

Principal Investigator:
J. R. Naidu (664-4210)
N. A. Greenhouse (664-4250)

8. Project Term:
From: To:
Project to be initiated and terminated in FY 1979

9. Person-Years:

	FY 1978	Pres.Bud. FY 1979	Rev.Req. FY 1979	FY 1980
Direct Person-Years				
Scientific & Professional	---	---	0.5	---
Others	---	---	---	---
Guests & Research Collaborators	---	---	---	---
Total	---	---	0.5	---

10. Costs (In Thousands of Dollars):

	FY 1978	Pres.Bud. FY 1979	Rev.Req. FY 1979	FY 1980
Research Costs	0	0	25	0
Total Research Obligations	0	0	25	0
Equipment Obligations	0	0	0	0

11. Reactor Concept:

12. Materials:

GK-120

Project Title: Surveillance of Facilities and Sites
Dose Reassessment for Populations on Rongelap and Utirik
Following Exposure to Fallout GK-01-01-52-3-(b)

13. Publications:

None

14 Scope:

(a) 200 Word Summary: Incidences of thyroid nodules, benign and malignant, in the exposed populations of Utirik and Rongelap have indicated critical differences in correspondence between nodule incidence and thyroid dose for the two populations. The estimated external dose received from the time fallout began to the time of evacuation shows that the Rongelap population received an external dose (175 rads) which was about thirteen times that for the Utirik population (14 rads), and the thyroid dose was about ten times larger, whereas the incidence of thyroid nodules in the two populations were not signficantly different.

A preliminary study has indicated that the critical area of investigation that could shed light is the period during fallout and evacuation for both the islands. In addition, the fact that the Utirik population returned within 120 days following evacuation, whereas the Rongelap population returned only after three years, requires that we look closely at the Utirik population in terms of a longer exposure period, both internal and external. Further studies would, therefore, have to concentrate on the re-examination of all available data in reports issued by various agencies during that period, consultations with scientific personnel involved at that time, identifying the areas of uncertainty, and using appropriate computer programs to analyze the data. The end result will enable us to look for correlations between the incidence of thyroid nodules and the reassessed dose estimates.

15. Relationship to Other Projects:

(a) This study will help establish dose estimates from the time of the incident to the present, and will complement the aerial survey, for external radiation measurements, over these islands, which is scheduled soon. Together they should present a reliable picture of doses received by the populations and also enable dose estimates to be projected into the future.

(b) This study will be in close conjunction with the BNL Radiological Safety Program in the Marshall Islands and with related programs of the BNL Medical Department. Continued collaboration with the University of Washington, Laboratory of Radiation Ecology, in the area of environmental radioactivity will be maintained.

16. Technical Progress in FY 1978:

Preliminary literature search and consultations with Dr. C. A. Sondhaus, University of California, have been completed. This has resulted in defining areas of uncertainty in information and establishing the procedural steps that should be carried out towards elucidating this problem. Progress is being made

(See Continuation Sheet)

Project Title: Surveillance of Facilities and Sites
Dose Reassessment for Populations on Rongelap and Utirik
Following Exposure to Fallout

GK-01-01-52-3-(b)

16. Technical Progress in FY 1978: (continued)

in the analysis of historical samples (dated March 1, 1954 from Rongelap and Utirik Islands). However, delay in funding for FY 1978 has caused the project to be set aside until such time that the funding is appropriated. Consequently, it is expected that studies will have to be continued into FY 1979.

17. Expected Results in FY 1979:

The literature search, consultations and the analysis of data will be completed, and will lead to comprehensive discussions and final dose assessments for both the islands. These results will be used to test the hypothesis that radiation effects can be translated into meaningful dose estimates. The prognosis of the FY 1978 study should also permit validation of the models used in arriving at the dose estimates in terms of present day exposures.

18. Expected Results in FY 1980:

Program completed.

19. Description and Explanation of Major Materials, Equipment and Subcontract Items:

None.

20. Proposed Obligations for Related Construction Projects:

None.

Log: 80-032

PROPOSAL REVIEW WORKSHEET

(To be used only as a tool in the review process; not to be construed as a final determination of OES action)

Originator: LLL

Title: CONTINUING MARSHALL ISLAND RADIOLOGICAL DOSE ASSESSMENT

Type: 189 Proposal No:

Funding Requested:	FY 1977	FY 1978	FY 1979	FY 1980
Operating:		$50,000	$55,000	$80,000
Equipment:			000	000

Lead AD: ADFO Control No: 600146

B&R No: GK-01-01-08-4

AD Recommendation (Summarize documentation of initial review):

A. Recommended - Indicate Funding Level, Branch, and OES Project Officer:

B. Not recommended - reason:

Reviewed by: _____ _____

Project Officer Assistant Director

Reviewer Checklist (Not all proposals will require consideration of all of the following, but the reviewer should consider the applicability of each item below):

1. Responsiveness to the Annual Call.
2. Applicability to OES programs.
3. Continuity of OES programs.
4. Peer review.
5. Suitability of proposer.

SCHEDULE 189

Lawrence Livermore Laboratory
University of California
Livermore, California

[X] Environment
[ ] Life Science Research Biomedical Applications

1. CONTRACTOR: University of California, Contract #W-7405-eng-48

2. PROJECT TITLE: Continuing Marshall Island Radiological Dose Assessment

2c. RPIS No. 600146

2b. ABSTRACTED TITLE: Marshall Island Dose Assessment

2d. 189 No. LLL/ASEV-80-22

3. BUDGET ACTIVITY NO.:	4. DATE PREPARED:	5. METHOD OF REPORTING:	6. WORKING LOCATION:
GK-01-01-05-4	March 1978	Annual	Livermore, California

7a. PERSON IN CHARGE: M. L. Mendelsohn /E.M. Morimoto

7b. PRINCIPAL INVESTIGATOR: W. Robison

8. PROJECT TERM: Continuing

9. MAN YEARS:

		FY 79				
	FY 78	Pres. Budget	Reprog.	New	TOTAL	FY 80
(a) Scientific	0.7	0.7	0	0	0.7	0.7
(b) Other Technical	0.1	0.1	0	0	0.1	0.1
Total	0.8	0.8	0	0	0.8	0.8

10. FUNDING (Thousand $):

		FY 79				
	FY 78	Pres. Budget	Reprog.	New	TOTAL	FY 80
Operating Costs:						
(a) Manpower	22	24	0	0	24	27
(b) Materials, Services, etc.	11	12	0	0	12	33
(c) Indirect Expenses	17	19	0	0	19	20
Total Operating Costs	50	55	0	0	55	80
Capital Equipment not Related to Construction	0	0	0	0	0	0

11. REACTOR CONCEPT: Not Applicable

12. MATERIALS: Not Applicable

13. PUBLICATIONS:

1. W.L. Robison, W.A. Phillips, and C.S. Colsher, Dose Assessment of Bikini Atoll, Lawrence Livermore Laboratory, Rept. UCRL-51879, Pt. 5 (1977).

2. W.L. Robison, V.E. Noshkin, and W.A. Phillips, Assessment of Potential Doses to Populations from the Transuranic Radionuclides at Enewetak Atoll, Lawrence Livermore Laboratory, Rept. UCRL-52408 (1978).

3. V.E. Noshkin and W.L. Robison, Consideration of the Impacts of Soil Disposal on Northern Runit (Yvonne) Island and the Marine Environment, Report to DOE Headquarters, 8 p. (1977).

14. SCOPE:

This project will evaluate the radiological problems associated with the resettlement of Bikini Atoll in the Marshall Islands including:

- alternate living patterns involving Bikini Island,
- alternate islands, e.g., Eneu Island and Nam Island in the northern section of Bikini Atoll, for primary residence,
- radiological implications of copra produced at Bikini Atoll on the world market,
- economic impacts to the Bikini people and the Marshall Islands if such crops are restrained from the world market,
- long-term use of Bikini as more time-dependent data become available.

We will maintain the data files and information both from Bikini and Enewetak so that we can respond rapidly to DOE needs for Marshall Island assessments.

15. RELATIONSHIP TO OTHER PROGRAMS:

This assessment program is closely related to the follow-up research programs at the Bikini and Enewetak Atolls (189 Nos. LLL/ASEV-80-5 and -22), to the continuing assessment of Enewetak Atoll, and to past surveys at both atolls. Results from this program will be integrated closely with any future atoll surveys.

16. TECHNICAL PROGRESS IN FY 1978:

The initial dose assessment of Bikini and Eneu Islands at Bikini Atoll (see publication No. 1) was completed. The predicted doses for living patterns involving Bikini Island are more than double the

Federal Guidelines. The predicted dose for Eneu Island living patterns is marginally in line with Federal Guidelines. The terrestrial food-chains pose the greatest potential contribution to the population dose.

A Marshall Island data bank was initiated. This data bank will include data generated in our field programs and data published by others.

We also have supplied DOE with two reports on Enewetak Atoll (see publication Nos. 2 and 3). The assessment of the potential doses due to the transuranics at Enewetak atoll indicate that predicted lung and bone dose rates at Enewetak Atoll may exceed the new EPA guidance.

17. EXPECTED RESULTS FOR FY 1979:

Our goals for FY 1979 are fivefold. We will:

- Continue to update assessments of potential doses for alternate living patterns at Bikini Atoll as new data become available from the test plots established on Eneu Island.
- Reevaluate all of the living patterns and potential long-term use of the atolls as more time-dependent data become available.
- Develop the assessment of the radiological significance of copra produced on Bikini and entered into the world market.
- Expand the Marshall Island data bank so we can respond rapidly to needed assessments of Bikini Atoll.
- Assess proposed changes in living patterns as suggested by DOE, Department of Interior (DOI), the Trust Territory, the Bikini and Enewetak people, and ourselves. Many of the needed assessments will be identified as the resettlement proceeds and questions arise.

18. EXPECTED RESULTS IN FY 1980:

Additional assessments considered necessary by DOE, DOI, the Trust Territory, the Bikini people, and ourselves will be conducted. These will include evaluations of alternate living patterns, annual dose and body burden estimates, alternate diets, and remedial actions directed toward reducing either uptake or radionuclide inventories at Bikini. Evaluation at Bikini Atoll of islands other than Bikini and Eneu also may be necessary. Delineation of the possible long-term use of the atoll will be of particular importance.

19. MAJOR MATERIALS, EQUIPMENT, AND SUBCONTRACT ITEMS:

None.

20. PROPOSED OBLICATIONS FOR RELATED CONSTRUCTION PROJECTS:

None.

PRELIMINARY

UNSOLICITED PROPOSAL

Submitted to

United States Department of Energy

by

Battelle Memorial Institute
Pacific Northwest Division
Human Affairs Research Centers
4000 N.E. 41st Street
Seattle, Washington 98105

For

Social and Psychological Causes and Consequences
of the Communication Process
in the Marshall Islands

Joseph E. Trimble, Project Manager
(206) 525-3130, Extension 402

Milford P. Kindley, Business Contracting Officer
(206) 525-3130, Extension 273

PROPOSED RESEARCH PROGRAM

SOCIAL AND PSYCHOLOGICAL CAUSES AND CONSEQUENCES OF THE COMMUNICATION PROCESS IN THE MARSHALL ISLANDS (P10338)

to

UNITED STATES DEPARTMENT OF ENERGY
DIVISION OF BIOMEDICAL AND ENVIRONMENTAL RESEARCH
WASHINGTON, D.C.

from

BATTELLE MEMORIAL INSTITUTE
HUMAN AFFAIRS RESEARCH CENTERS
SEATTLE, WASHINGTON

January 14, 1978

SUMMARY

In 1946, the people of Bikini Atoll in the northern Marshall Islands were relocated when their atoll was selected as the United States' post-war nuclear test site. The following year communities at Enewetak Atoll were moved as nuclear tests were continued and expanded. Both atoll communities are currently in the process of resettling portions of their original homeland. Before the atolls can be totally resettled, the Department of Energy (DOE) has the responsibility for compiling data on the levels of radiological contamination to determine relative safety factors

Over the past 20 years a series of radiological-related problems have been encountered by certain atoll residents. Some have suffered health effects due to radiation exposure; others have

increased body burdens of cesium caused by eating certain foods. The experiences of these people have aroused concern, anxiety and fear among many Marshallese. Consequently, the general topic of radiation and its health effects are very confusing to the Marshallese. Despite past efforts to inform the people about radiation risks and necessary safety precautions, many misunderstandings still prevail.

Radiological-related decisions and policies affecting Marshall Islanders can best be made and developed if data on the physical and biological dimensions of atoll cleanup and resettlement are supplemented with social and psychological knowledge. Specifically, this study will focus on the communication process between governmental agencies and Marshallese communities concerning radiological topics. The results will assist DOE to effectively inform resettling Marshallese of monitoring activities and safety and health standards associated with radiation levels. The improved communication process can minimize disruption of communities, increase community understanding of health and safety standards, and improve intercultural relations.

Six sequentially related research tasks are proposed in this study, which will require 151 man months of effort. These tasks involve use of sociocultural and psychological research techniques, including analysis of existing archival documents, interviews with federal agencies and Marshallese representatives, and direct observation of activities occurring on certain atolls. The total research effort will coincide with the eventual resettlement of Enewetak Atoll in late 1980.

The Battelle staff members who will conduct the proposed research are highly qualified in studies of different cultural groups. Some have direct experience in developing communication schemes with underdeveloped countries. One staff member, an anthropologist, is extremely knowledgeable about sociocultural characteristics of Bikinians and Enewetakese. Moreover, the project staff are sensitive to the issues and concerns posed by intracultural and intercultural experiences, which is a requisite for conducting the type of research proposed in this project.

INTRODUCTION

BACKGROUND

In 1946, the people of Bikini Atoll in the northern Marshall Islands were relocated when their atoll was selected as the United States' first post-war nuclear test site. The following year the small communities at Enewetak Atoll were moved to Ujilang Atoll as nuclear tests were continued and expanded. Prior to relocation, northern Marshallese groups were a relatively isolated people having limited contact with outsiders. Since 1946, traditional living patterns have been altered due, in part, to multiple relocations, accelerated contact with outsiders, and growing dependency on the federal government for resources.

The Enewetakese and perhaps some Bikinians anticipate returning to their native homes, especially since the federal government authorized resettlement. On August 12, 1968, President Lyndon B. Johnson announced that the Bikinians would be able to return to Bikini Island but not before homes were built and relative safety standards established. Since 1972 a small group of Bikinians has

returned to Bikini Island. On September 26, 1976, Enewetak Atoll was released and officially returned to the people. Most Enewetokese are scheduled to return some time during late 1980 or early 1981, but only after radioactive soil and debris have been removed and islands are certified as "safe" for habitation.

Resettlement and rehabitation issues and concerns are the ultimate responsibility of the Department of the Interior (DOI) through the Office of Territorial Affairs. However, decisions concerning the relative environmental safety of Marshall Island atolls rest with DOE. Health and safety decisions will be based on the results of careful monitoring and sampling of soil, marine and aquatic life, and terrestrial flora and fauna. DOE has compiled a great deal of information on the level of radiological contamination of Enewetak Atoll, a necessary prerequisite to cleaning up the Atoll. A less extensive assessment of Bikini Atoll was conducted before the small group was permitted to resettle Bikini Island.

Late in 1978 an extensive survey of the following 12 atolls and one island in the Marshall Islands will be initiated by DOE: Rongerik, Bikini, Ujelang, Wotto, Ailinginai, Rongelap, Ailuk, Likiep, Taka, Utirik, Bikar, Mejit and Jemo Island. These atolls and island lie in the northern section of the Marshalls and are considered as the range of the area in the South Pacific where radiation fallout most likely occurred during the nuclear tests. Tests will be conducted to bring the radiological information up to what is currently known about Enewetak Atoll.

The need for an extensive survey of the above atolls was prompted by a series of radiological-related problems encountered

by residents at Rongelap, Utirik and Bikini and the general belief that more technical data were required to assess atoll safety.

Rongelap and Utirik initially were not thought to be affected by the radiation fallout generated by the different nuclear tests. However, prevailing weather conditions during a thermonuclear detonation at Bikini Atoll on March 1, 1954 produced radiation fallout on Rongelap and Utirik; consequently numerous residents suffered radiation exposure despite evacuation efforts. The Rongelap people were displaced from their community for three years, the people of Utirik for three months.

While no deaths occurred, acute thyroid radiation effects we detected initially among the Rongelapese, later among the Utirikese. Hence, the Rongelap and Utirik people had to contend with the physical and psychosocial hardships imposed by short-term relocation and biological side effects of radiation exposure.

Bikinians who returned to Bikini Island are beginning to experience some biological side effects of radiological contamination. Before Bikinians were permitted to return, they were informed that the island was relatively safe for habitation. However, they were warned not to consume certain natural foods, especially the flora such as pandanus, breadfruit and coconut. Marine life was considered safe for consumption. Apparently Bikinians disregarded the safety warnings and consumed toxic foods; as a result, increased body burdens of cesium have been detected among residents. Consequently, Bikinians were recently told that further rehabitation of Bikini Island was undesirable and again reminded of the risks associated with consumption of certain flora.

The biological problems experienced by people at Rongelap,

Utirik and Bikini have aroused considerable concern and anxiety among the Marshallese in general. In fact, the general topic of radiation and its health effects are very confusing to most atoll residents. For example, there is no word comparable to "radiation" in the Marshallese language; hence it makes discussions about radiation topics very awkward and misleading. Yet, DOE has the responsibility of communicating with the Marshallese concerning risks and safety standards associated with radiation. Unfortunately, up to the present time, communication with the Marshallese concerning radiological topics has been hampered by:

1. inadequate translations from English to Marshallese;
2. misunderstandings about the biological side effects generated by radiation exposure;
3. a lack of knowledge on the ability to predict how Marshallese will respond to communications; and
4. a lack of knowledge on how to prevent further communications difficulties such as those that occurred at Bikini.

In addition to the communication difficulties listed above, the extensive 13-atoll survey is likely to arouse additional suspicion and confusion among atoll residents. Presence of additional teams of technicians conducting the aerial and ground surveys is likely to arouse curiosity and concern, especially since most of the atolls included in the survey have not received such attention in the past. Many of the atoll residents believe that islands are safe and have not been affected by radiation. Hence, it is possible that new fears will be created and add to already increasing levels of apprehension about radiation exposure

and its side effects among the Marshallese. To allay potential fears and apprehension, the Department of Energy may have to advise atoll residents of the nature and intent of the survey work, a task that will require careful planning to avoid previously encountered difficulties.

The need for developing an effective communication process is essential for use on Enewetak Atoll. Circumstances surrounding the resettlement of Enewetak will present many potential complications for the returnees.

In late 1980, when the Enewetak people are scheduled to return to their native islands, they will not be able to resettle the total atoll. It is estimated that islands on the atoll's southern rim, the original home of the riEnewetak, will be relatively safe. Islands on the northern rim, originally the home of the riEnjibi, will be unsafe for resettlement. This status may be in effect for a number of decades. In addition, Runit Island, on the atoll's eastern rim, will be entirely uninhabitable because it will be the depository for contaminated soil and debris. Despite the resettlement restrictions, about 300-400 Enewetak people plan to resettle on the atoll's rim. The ability of the environment to provide enough natural resources for the returnees is questionable. In addition, traditional land tenure systems will need to be readjusted to accommodate both the riEnewetak and riEnjibi populations.

STATEMENT OF THE PROBLEM

Circumstances surrounding the topic of radiological contamination and its biological and physical side effects in the Marshall

Islands have created certain social and psychological problems for atoll communities. Previous radiological-related communications with atoll residents have been hampered, leading to confusion, misunderstandings and suspicion. Moreover, risks introduced by the presence of radiation in the soil and certain natural foods has forced disruptive life-style changes among specific atoll groups. Future resettlement of Bikini and Enewetak Atolls will present readjustment difficulties owing to restrictions imposed by radiation dosages.

PROPOSED RESEARCH

OBJECTIVES

The overall objective of the proposed research is to collect, analyze and interpret information which will permit more effective communication between DOE and Marshall Islanders about radiological topics and resettlement of the Marshall Islands. This information would assist the Department of Energy to effectively inform resettling Marshallese communities of the current monitoring activities and safety and health standards associated with radiation levels.

Six specific practical objectives will contribute to the overall research objective. They are:

1. To identify, review and analyze previous communications and contacts involving radiological topics between Marshallese and their representativies and federal agency representatives.

2. To identify and analyze current Marshallese perceptions and interpretations of radiological topics, atoll safety standards, atoll clean-up operations and resettlement.
3. To identify and analyze sociocultural factors that influence and regulate behavior among Marshallese in situations involving risks.
4. To investigate procedures for effective communication of information to Marshallese communities.
5. To develop a communication process to effectively inform Marshallese communities of activities and factors associated with radiation topics and resettlement.
6. To advise and assist in the implementation of the communication process and monitoring the behavioral responses of resettling Marshallese.

RESEARCH PHASES

The six specific objectives are grouped according to three temporal research phases:

1. Identification and perception of radiological topics;
2. Investigation and development of a communication process; and
3. Provide advice and assistance in implementing and monitoring the effects of the communication process.

The research tasks are discussed under their respective phases in the next section.

TECHNICAL APPROACH

Information will be collected from a number of federal agency representatives in the continental United States, Hawaii, the northern Mariana Islands and the Marshall Islands. Data will also be obtained from a sample of Marshall Islanders residing in a number of atoll and island communities. Additional information will be obtained from federal and territorial documents that pertain to radiological activities and resettlement of the Marshall Islands.

Since 1946, federal agency representatives have had a number of interactions with the Marshallese concerning relocation, presence of dangerous levels of radionuclides in the environment and resettlement of atolls. Similarly, many Marshallese have experienced a variety of difficulties caused in part by multiple relocations and misunderstanding. To understand the impact of these interactions and experiences on the Marshallese, one must intensively study their background, current status and intergroup relations. This knowledge can best be obtained by using an analytic case study method (Blau and Meyer, 1971).

The analytic case study method involves the examination of existing records and documents, interviewing involved participants, and taking part in the phenomenon under study. The scope of such study typically covers individuals, situations, groups and communities (Selltiz, Wrightsman and Cook, 1976). In this study, emphasis will be placed on the

examination of existing archival documents, interviews with key federal agency representatives and representatives of certain Marshall Island communities, and direct observation of activities occurring on certain atolls. Key informants, Marshallese knowledgeable about folk culture of atoll residents and resettlement activities, will be identified and serve as a major source of information about the activities occurring on the Marshalls.

Because of the critical importance of language differences for this research, frequent consultation will be made with several bilingual persons in the Marshalls. These persons will include educated Marshallese, Peace Corpsmen still on the islands and representatives of the Office of Territorial Affairs. In addition, field workers selected for the project will also be bilingual and thoroughly familiar with Marshallese culture and customs.

RESEARCH TASKS

Each of the six specific objectives corresponds to a research task. Tasks 1, 2 and 3 will be accomplished in the first 18 months of the contract period. Tasks 4 and 5 will be accomplished in an additional 18 months; and Task 6 will be accomplished in the final 12 months.

Tasks will be described under their respective research phases listed earlier in the proposal. While tasks will be described separately it must be emphasized that taken together, they constitute an integrated program of research.

PHASE 1. Identification and Perception of Radiological Topics

Collectively, information provided by the following tasks will provide insights into the nature and effects of previous efforts to communicate radiological and resettlement information to the Marshallese. Document content, frequency and nature of contacts and subjective perceptions will provide necessary background information to better assess and comprehend the situation currently existing in the Marshalls.

Identification of current Marshallese perceptions of radiological topics and knowledge of Marshallese decision-making processes will form the data base necessary to understand and predict behavioral outcomes of future interactions with federal representatives, the subject of research to be accomplished in Phases 2 and 3.

Task 1. Identify, review and analyze previous communications

Since 1946, a series of government documents have been compiled concerning: (a) environmental safety of the Marshall Islands; (b) conditions necessary for resettlement; and (c) communication between Marshallese, their representatives and federal representatives of the Department of Energy and Office of Territorial Affairs. Documents will be identified, reviewed and analyzed in terms of: (1) message content, (2) channel through which the information was communicated to the Marshallese, and (3) written response (if any) of Marshallese and their representatives.

Analysis of the documents will serve to integrate existing information. Moreover, results will allow investigators to substantiate and form judgments about the effect previous communications and contacts have had on Marshallese' communities.

To assist in integrating background information a chronology of events will be prepared beginning with the first environmental assessments conducted by DOE. Administrative records, trip reports, research reports and discussions with key federal representatives will serve as the resource for this effort. The chronology will include the number and nature of contacts with Marshallese made by federal representatives including representatives of DOE, e.g., Brookhaven, Lawrence Livermore, etc.; contract organizations; e.g., Holmes and Narver; and trust territory representatives in Majuro, Saipan and Washington, D.C.

While analysis of archival data can provide useful information, there are limitations. Subjective impressions and personal experiences are often omitted. To fill in gaps and assist in clarifying circumstances surrounding the preparation of key documents formal interviews will be conducted with a select sample of approximately 30 respondents consisting of federal representatives (e.g., DOE, DOI), and representatives of the Marshallese people (e.g., district representatives, attorneys). Criteria for the selection of respondents will be primarily determined by the extent of individual knowledge and experience with the Marshallese resettlement

program as reflected in job responsibilities. The interview schedule will be aimed at tapping basic similarities and differences in the understanding of the effects of radiological contamination on resettlement of the atolls. Investigators anticipate addressing the following subject areas:

1. radiological safety of the atoll;
2. effectiveness of cleanup efforts;
3. adjustment and adaptation of returning Marshallese;
4. monitoring of people and environment;
5. perceptions of Marshallese' understanding of radiological safety and resettlement; and
6. solutions to potential problems.

Additional topics which arise in connection with the archival survey and those brought to the attention of the investigators during the early phase of the task may be included in the interview.

Task 2. Identify and analyze Marshallese perceptions and interpretations of radiological topics and resettlement

Information provided by this task will assist in clarifying how Marshallese interpret, comprehend, and respond to communications initiated by federal representatives. Results will be useful in clarifying perceptions and understandings of federal representatives concerning Marshallese interpretations of radiological topics and resettlement issues.

Information specific to understanding radiation and its effects, safety of atolls and specific islands and

adaptation to resettlement will be obtained from selected Marshallese informants at Ujilang Atoll, Bikini Atoll, Kili Island, Japtan Island, Rongelap Atoll and Utirik Atoll. Sample sizes will vary between 10-20 adult male and female informants per atoll or island. Selection will largely be determined by existing population and availability of informants. Interview procedures will be less formal and less structured than those anticipated for use with respondents in Task 1 above. Content of the interviews, however, will focus on the general topics identified in Task 1 and, in addition, include: (a) knowledge about radiation, (b) nature of communications and contacts with federal representatives;and (c) perceived responsibilities of federal government agencies.

Interviews will be conducted with the assistance of interpreters. Prior to the interviews, items will be subjected to a back-translation technique (Brislin et al., 1973) to control for potential sources of invalidity due to translation.

Task 3. Identification of sociocultural factors that influence and regulate behavior among Marshallese

Task 3, although a separate task, will be accomplished at approximately the same time data are collected for Task 2. Therefore, in the course of collecting interview information, investigators will adapt social-psychological procedures for tapping certain Marshallese personality variables and

characteristic decision-making processes. Kiste (1974) and Trimble (1977) emphasize that the sociocultural characteristics of the Marshallese have largely contributed to misunderstandings about radiation and resettlement. The Marshallese have a different social orientation and perspective than Americans. While some of the cultural characteristics are known (cf. Kiste 1974; Tobin, 1973), certain social-psychological characteristics remain undefined and need to be assessed. Results can aid in understanding how the Marshallese interpret and respond to communications from federal agencies. Therefore, measures will be developed to assess:

1. subjective perception of risks as experienced in daily activities and during natural disasters, e.g., typhoons;
2. group problem-solving procedures;
3. processes by which decisions are formed; and
4. factors that are perceived to control and influence behavior.

Techniques exist for assessing the above psychological variables among western societies; however their appropriateness for use with Marshallese is yet to be determined. For example, risk perception studies typically require subjects to assign a subjective probability to participation in some event (skiing, mountain climbing, auto racing, etc.). The Marshallese counting system does not contain percentages or probabilities; hence an approach to measurement needs to be sensitive to this problem.

Identification of group problem-solving procedures, formation of decisions, and factors that are perceived to control and influence group behavior as they relate to risk perceptions can be accomplished through semi-structured interviews with key Marshallese informants and direct observations of community activities. For example, investigators will attempt to determine if Marshallese tend to be fatalistic about the effects of natural disasters or similar phenomena as was determined about people living in the southern United States (Sims and Baumann, 1972). If Marshallese are not fatalistic, this would tell investigators that atoll residents tend to believe they have some control over what happens to them in their daily lives. This information would be useful in characterizing a communication process. In the course of this part of the task, additional discussion topics and observations will focus on situations or events that involve risks and could cause injury to health and property, e.g., childbirth, fishing in shark-infested waters. Emphasis would be placed on identifying key criteria and cognitive procedures used to derive appropriate decisions.

Knowledge of psychological decision-making processes will enable investigators to understand how the Marshallese evaluated the information elicited in the survey concerning radiological topics and resettlement concerns.

PHASE 2. Investigation and Development of a Communication Process

Data obtained from Tasks 1, 2 and 3 in Phase 1 will provide background for Tasks 4 and 5, scheduled to be accomplished during this phase.

Collectively, Tasks 4 and 5 involve the identification of the informal communication process typically used by Marshallese and using this information with theoretical assumptions to develop a communication process. The prime purpose of the process is to facilitate the communication of radiological and resettlement topics between federal representatives of DOE and resettling Marshallese.

Task 4. Investigate procedures for effective communication among Marshallese communities

Knowledge gained from this task will assist in identifying the general framework of the flow of communication in the Marshall Islands and specifically on atolls where radiological topics are a focus of concern. In addition, credibility of sources and personal characteristics will be identified. Characteristics of the communication flow and the sources will assist in developing a communication process; the second task in this research phase.

Communication among Marshallese tends to be informal and transmitted by word of mouth. Formal communications are limited to a single newspaper, The Micronesian Independent, and a limited range radio station at Majuro. Both formal media sources are restricted and underutilized in the remote atolls such as Bikini, Enewetak and Rongelap. Hence, Marshallese must rely on word of mouth for the bulk of local and international news.

Salient characteristics of the communication process will be identified by investigators through direct observation of the process and interviews with key informants. Following the format and structure of the Shannon-Weaver communication model (Shannon and Weaver, 1949) investigators will determine:

1. the source, including who or what they tend to be;
2. messages, including their content, composition and structure;
3. channel(s) through which messages flow;
4. receivers, including those likely to be informed first, second, etc.; and
5. effects, including the general nature of responses to communications.

Two informal communication networks exist in the Marshall Islands. An overall network exists among the islands and atolls. Local networks exist in regions and on the small islands in the atolls. Initial research efforts will concentrate on determining the operation and structure of the flow of communications throughout the Marshall Islands. Once the major network process is identified and categorized, research efforts will concentrate on the information flow in and out of Bikini, Kili, Ujilang, Enewetak, Rongelap and Utirik. In both instances, elements in the Shannon-Weaver model will direct the collection of information.

Perceived credibility of communication sources is likely

to be a key variable in understanding the effects of communications on the Marshallese. Investigators will identify criteria used by Marshallese in attributing credibility to a media form, e.g., print, electronic, in-person. Certain persons, such as traders, federal representatives and representatives to the Micronesian Congress may have varying levels of credibility. Credibility can also vary with the subject under consideration. Characteristics and methods of operation of the credible sources will be obtained from direct observation and interviews.

Task 5. Develop and field test a communication process

Data collected from previous tasks will complement questions addressed under this task. Basically, a communication process will be developed and tested in appropriate situations. Results of the field test will be useful in determining the effectiveness of the prepared communication process.

Design of the communication process will involve three steps: (1) determination of communication objectives; (2) analysis of the audience; and (3) design of the program.

Basically, communication objectives are the desired effects of communication efforts, that is, the desired behavior sought from the receiver or audience. Objectives will be prepared in collaboration with key representatives of DOE and will focus on radiological topics and their relationship with certain Marshallese communities. Determination of the objectives also will be affected by knowledge obtained in Phase 1 and Task 1 of

Phase 2. Objectives must be practical and consistent with the Marshallese perspective and current radiological health and safety standards.

The second step will involve the preparation of an exact list of persons, groups and communities within the Marshall Islands that are relevant to the communication objectives. Criteria for selection will be guided by information obtained from previous tasks; however it is possible that such persons will include community leaders, representatives to the Micronesian Congress, and trust territory representatives. Identification of the audience will serve as initial input in the process of media selection, placement and message content.

The final step consists of designing the communication process. Investigators will construct a process containing the basic elements of the Shannon-Weaver communication model--source, message, channel and context. Construction of the communication process will be guided and influenced by data gathered from previous tasks. It is essential that this process be similar to the informal communication network with which the Marshallese are most familiar. Hence, background information and knowledge of the Marshallese culture are crucial for developing an effective process.

With the assistance of DOE representatives' investigators will identify and construct messages pertinent to radiological topics and resettlement. Emphasis will also be placed on including the background data gathered on the perceived characteristics

of source credibility and communication channels. Source and channels are likely to be critical elements in determining the effectiveness of the total communication process.

To assess the effectiveness of the process, investigators will field test it with a small group of Marshallese informants.

Messages, appropriate channels, and modes of communication will be reviewed by the informants. The informants will assess the appropriateness of the communication process for use in various Marshallese communities, identify anticipated outcomes, and recommend changes in cases where ambiguities and inconsistencies exist. It will be important to determine the extent to which the process minimizes misunderstandings and misperceptions. Hence, the field test will assist in: (1) identifying the range of behavior and responses likely to emerge from the process; (2) substantiating the effectiveness of the process; and (3) providing investigators with information that would assist in revising the process, if necessary.

Behavior and responses produced by the field test will be tabulated. Results will be reviewed with DOE representatives to assess relationships between outcomes expected by DOE and those produced by the communication process. Uncovering variations between outcomes expected by DOE and those anticpated by the informants will be vital for determining the effectiveness of the communication process. It will be important to avoid repeating the events that occurred in Bikini Island when Bikinians ate food that DOE representatives had told them was toxic.

Field test results and review of the findings with DOE representatives will provide insights into the effectiveness of the communication process, and its range of potential outcomes. As a consequence, the communication process will be ready for use in appropriate situations.

PHASE 3. Provide Advice and Assistance in Implementing and Monitoring Effects of the Communication Process

Completion of the communication process described in Phase 2 will coincide with the time scheduled for the full return of riEnewetak and riEnjebi to restricted areas at Enewetak Atoll. It is also possible that Bikinians may be relocated to another island in Bikini Atoll at about the same time. The communication process will assist DOE representatives in communicating safety standards and health risks associated with radiological levels to resettling communities. Investigators will assist DOE in implementing the process and developing procedures for monitoring outcomes produced by communications.

Task 6. Assist in implementing the communication process and monitoring outcomes

This task consist of two parts: (1) instructing and advising DOE in the use of the communication process; and (2) assisting in the development of procedures for monitoring adjustments to resettled environments and outcomes produced by the communication process.

Project investigators will instruct appropriate DOE representatives in the use of the communication process. Data collected from previous tasks will be reviewed and related to

the communication process prepared in Phase 2. In addition, assistance will be given in preparing communications, identifying crucial communication elements (e.g., credible sources, etc.) and implementing the process in appropriate settings.

As previously indicated, field test results will assist DOE representatives and project investigators in determining responses to various communications with Marshallese. During the early resettlement of Enewetak Atoll, and possibly another island in Bikini Atoll, behavior of the residents will need to be monitored to fully determine the degree to which communications produce desired outcomes, e.g., refraining from visiting specific atolls or eating toxic foods. Investigators can prepare a monitoring procedure which could be accomplished through direct observation of residents and interviews with key informants. Observations and interviews could focus on: (1) initial response of residents to communications including formal and informal communications initiated by residents and their respective representatives (e.g., Micronesian Congress and/or attorneys) in response to federal representative communications concerning atoll health and safety; and (2) short-term adjustments to atoll life and relationships to expected behavioral outcomes predicted by the communication process including possible deviations or departures from behavior intended by the process.

Continued monitoring of the effectiveness of the communication process is essential in preventing confusion and misunderstanding of radiological topics. Early identification of communication difficulties can occur and alternate strategies can be selected and put into effect. The structure of the process

will provide alternatives in the event that one or another communication strategy fails to achieve desired results.

SUMMARY OF TECHNICAL APPROACH

An analytic case study method including direct observation, respondent interviewing and archival study techniques, will be employed to meet research objectives. Research is planned to occur within a 48-month time span divided into three distinct but interrelated phases. Six research tasks will concentrate on identification of perceptions of federal representatives and residents of atolls in the Marshall Islands concerning radiological topics, identification of the informal communication network existing among native residents in the Marshalls and culminating in the development and field testing of a culturally-appropriate communication process. Behavioral effects generated by the process will be monitored over the course of the resettlement of Enewetak Atoll and possibly other atolls as identified in the proposal.

SIGNIFICANCE

The communication process to be implemented in the final stage of the project is expected to facilitate communications and relationships between federal agency representatives and Marshall Islanders. Moreover, knowledge of intracultural and intercultural demands placed upon the Marshallese will be greatly advanced. The current lack of understanding among the Marshallese as they prepare for resettlement in high risk environments will be carefully examined. The results will assist in identifying adaptation problems and possibly prevent new complications.

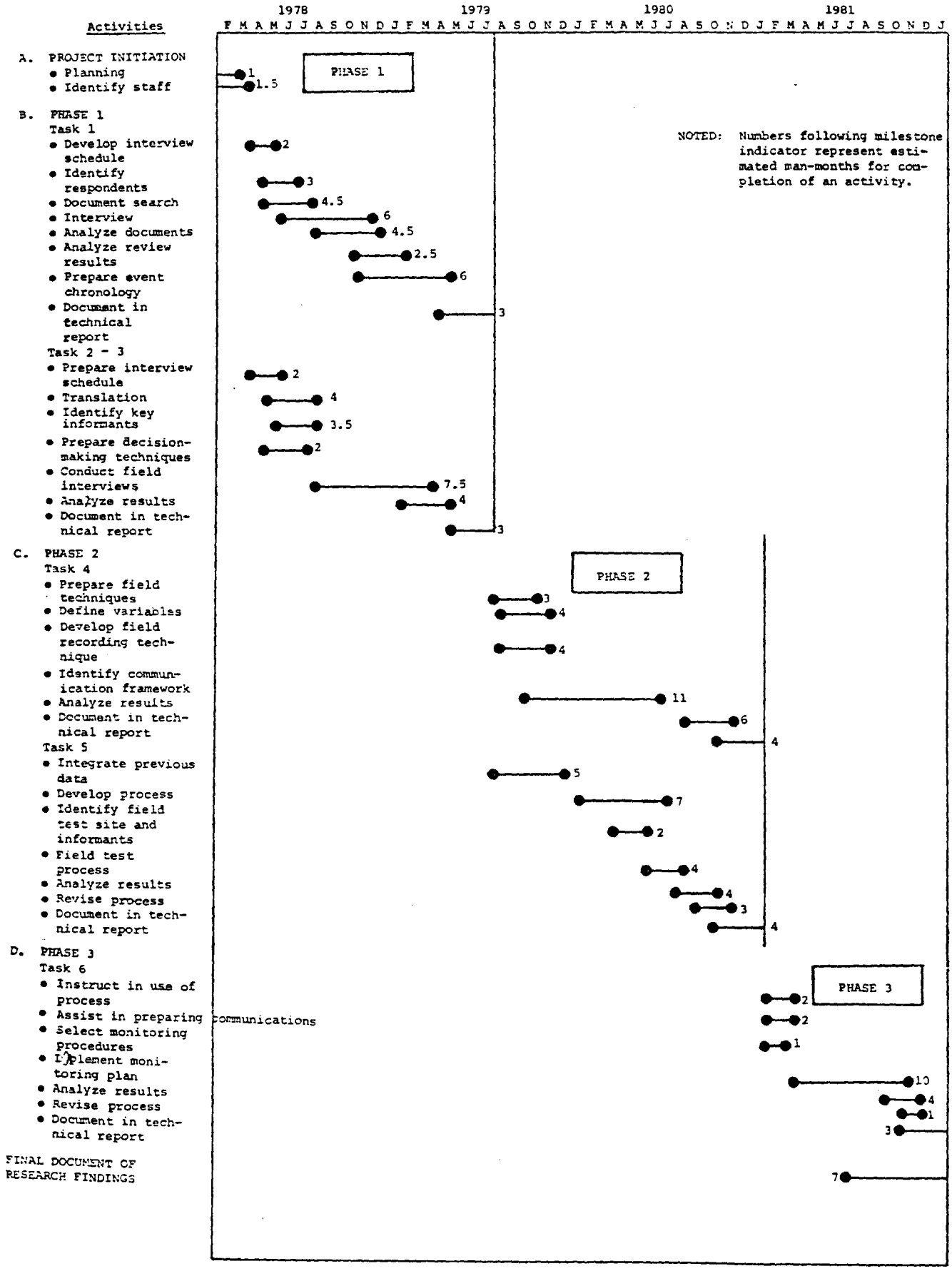
Results produced by the proposed research are potentially useful in other areas. Resettlement of communities in environments containing varying dosages of radioactivity is a relatively new phenomenon. A paucity of data exist on how future residents perceive the risks, problems, and long-term effects. Disposal of radioactive mill tailings and other low-level radiation hazards to make room for population growth will require interaction between DOE and future residents. Safety and health standards will have to be communicated in a convincing manner, one that will prevent misunderstanding and yet provide assurances. This project will contribute to better understanding of future cleanup and resettlement issues and help prepare DOE to deal effectively with residents.

Finally, information gathered in the course of the research project may be useful in identifying possible non-radiation-related adjustment problems associated with resettlement of the atolls. Resettling Marshallese may experience difficulties in establishing former community relationships, building a socioeconomic base and providing sustenance. Should these and other related problems occur, some of the information provided by the proposed research may form the basis for helping identify ways to overcome or resolve the problems.

SCHEDULE OF RESEARCH ACTIVITIES

Figure 1 outlines the research tasks scheduled to occur within the project together with projected times for comple-

FIGURE 1. Schedule of Research Activities



tion. The schedule shows the three principle phases of research and corresponding six tasks. Phases 1 and 2 are planned to occur within 18-month segments or 36 months total and Phase 3 is scheduled to occur within a 12-month period.

Research activities are synchronized with the time schedule allotted for the cleanup of Enewetak Atoll. Enewetak is scheduled for resettlement in late 1980 and by that time most tasks will have been completed.

A series of summary and technical reports are planned. In addition to quarterly reports describing ongoing activities and progress, investigators plan to prepare and submit technical reports following the completion of each research phase and a final technical report containing descriptions of research tasks, findings and interpretations.

HUMAN SUBJECTS STATEMENT

The research plan involves interviewing samples of federal agency representatives, representatives of Marshall Island communities and Marshallese communities. In all cases investigators will seek written informed consent from respondents and key informants. At the time of the interviews, investigators will explain the nature and purposes of the study, answer any questions, request the respondents' voluntary cooperation and obtain signed consent forms.

Investigators are sensitive to what is a persistent problem in sociocultural field research: recalling experiences that have brought grief and hardships upon respondents may provoke a

certain amount of anxiety. Thus, special care and caution will be taken to avoid questions that would generate high levels of anxiety in the typical respondent. This will be accomplished by carefully pretesting research instruments. In all, potential risks to respondents is judged to be very low. It is expected, however, that particularly sensitive respondents will eliminate themselves by refusing to consent to be interviewed.

Finally, it should be mentioned that the Battelle Memorial Institute, through its Pacific Northwest Division, maintains an "Institutional Review Board--Human Subjects Committee." This committee is responsible for protecting the rights and welfare of human subjects and insuring that all research (regardless of sponsor) involving human subjects be conducted in accordance with guidelines established by the United States Department of Health, Education and Welfare.

PLANNED PROJECT PERSONNEL

Joseph E. Trimble, Ph.D. (Social Psychology) is a Research Scientist at the Battelle Human Affairs Research Centers. He will serve as Principal Investigator of the project. His research efforts are concentrated on socio-psychological issues and problems of American Indians including personality development among adolescents, education, and impact of energy development on reservation and Alaska Native village lands. He is one of the few American Indian social scientists in the country working on contemporary issues associated with tribes and native groups.

His background and knowledge of cross-cultural problems makes him aptly qualified to pursue the goals described in this project.

Robert Kiste, Ph.D. (Anthropology) is a Visiting Scientist at the Battelle Human Affairs Research Centers and Professor of Anthropology at the University of Minnesota. He holds a Ph.D. in Anthropology from the University of Oregon. Dr. Kiste will share many of the research responsibilities including the development of the participant observation techniques and maintaining contact with key informants. His field research experience with the Bikini and Enewetak communities is extensive. His relationships with certain Marshallese communities and knowledge of the Marshallese language makes him highly qualified for conducting work in this project.

Additional support will be provided by Marvin E. Olsen and Clarence Chaffee. Marvin E. Olsen is a Senior Research Scientist at the Battelle Human Affairs Research Centers, and an Affiliate Professor of Sociology at the University of Washington. He holds a Ph.D. in sociology from the University of Michigan. His areas of expertise include social organizational processes, community organization, and social change. He has done extensive research and writing on problems of organizational and community processes and structures, as well as the assessment of social impacts of developmental programs.

Clarence Chaffee is a Staff Scientist at the Battelle Seminars and Studies Program and is a specialist in cross-cultural communication. Both will assist in the assessment and development of the communication network and model. Vitae

of the principal project staff are included in the Appendix.

To assist in maintaining contact with Marshallese communities, Battelle will retain the services of two Marshallese interpreters. Both will be skilled and trained in the use of field research techniques and assist in the development of questionnaires, translation and identifying key informants.

FACILITIES

The Battelle Memorial Institute

The Battelle Memorial Institute was formed in 1925 as an Ohio nonprofit public-purpose organization charged generally by its founder, Gordon Battelle, to engage in research, assist in the education of man, and develop, license, and dispose of technology. Battelle's efforts are directed toward using science and technology for the betterment of mankind. The institute was founded as a memorial to the Battelle family, early settlers in Ohio and later prominent in the iron and steel industry. Major laboratory facilities are in Columbus, Ohio; Richland, Washington; Frankfurt, Germany; and Geneva, Switzerland. In addition, the Battelle Seminars and Studies Program the Human Affairs Research Centers are located in Seattle, Washington. The total complement of over 6,000 Battelle staff members has an established record of research accomplishments in more than 75 countries.

The basic concept underlying Battelle's research and development efforts is the solution of specific problems through the formation of teams of scientists, engineers, and supporting

specialists working cooperatively toward common goals. Historically, emphasis has been on the physical, engineering, and life sciences, with research and development efforts focusing on problems of industry and government. Today, however, the solution of significant contemporary social problems requires the increasing involvement of behavioral and social scientists and their integration into interdisciplinary research programs.

Human Affairs Research Centers

The Human Affairs Research Centers (HARC) were established as a result of Battelle's recognition of the need to increase and focus Battelle's capabilities for scientific research and development toward the solution of major societal problems. HARC contributes to the solution of significant regional, national, and international problems by facilitating the formulation, planning, and performance of relevant research programs.

HARC integrates, coordinates, and focuses the physical, engineering, life, social, and behavioral sciences resources of Battelle, to maximize their impact, and provides the in-depth behavioral and social sciences research capabilities required to carry out effective interdisciplinary programs.

Individual study centers focus on specific problems areas, using the physical, engineering, and life sciences capabilities of the Battelle laboratories, where appropriate, and providing the behavioral and social sciences staffs necessary to perform scientific research in the selected societal areas. Study centers have been established in the areas of population, health care, law and justice, social change, and science and government.

Unique combinations of these scientific resources, made possible by the diverse experiences and capabilities of the total Battelle organization, offer the potential for the development and performance of exciting interdisciplinary research programs. In addition, the collective skills and experience of the study centers reinforce and extend the capability of HARC as a whole.

ESTIMATED TIME AND COSTS

Pending your comments on this preliminary proposal, we intend to submit a formal proposal to you. Battelle would propose to conduct research directed toward the objectives outlined in this proposal for a period of forty-eight (48) months, including time for submission of the final report, with an estimated funding of $832,900 which includes a fixed fee of $72,955. An estimated breakdown of costs will be enclosed with the formal proposal. The estimated costs make no provision for extraordinary insurance coverage which might be necessary for this project and, accordingly, such costs might have to be added to the project.

A cost-plus-fixed-fee type of contract would be proposed, calling for Battelle's best efforts within the time and funds provided. All of the terms and conditions including the statement of work would be subject to mutual agreement.

Presently, negotiations are underway between HARC and DOE-Richland for a master contract which would apply to work HARC performed for DOE-Richland, with specific portions of work coming in the form of task orders. Should this Master Contract be finalized, and should a formal version of the present unsolicited proposal be accepted, a task order under the Master Contract could possibly be used as a vehicle for activation of this project.

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