

U.S. DEPARTMENT OF ENERGY
FIELD TASK PROPOSAL/AGREEMENT

1. WORK PACKAGE NUMBER	2. TASK NO.	3. REV. NO. 0	4. PROJECT NO.	5. DATE PREPARED (mm dd yy) 03/31/80	6. CONTRACTOR NUMBER HP 0410 (600003)
7. TASK TITLE Marshall Islands Radiological Safety Program			8. WORK PACKAGE TITLE		
9. BUDGET AND REPORTING CODE HA-02-01-02	10. TASK TERM Begin: (mm dd yy) Continuing	End: (mm dd yy) Open	11. CONTRACTOR NAME Associated Universities, Inc.	12. CODE (See instructions) BNL	
13. CONTRACTOR TASK MANAGER (Name: Last, First, MI) (FTS No.)			14. PRINCIPAL INVESTIGATORS (Name: Last, First, MI)		

C.B. Meinhold
666-4209

Greenhouse, N.A.
666-4250 or 4207

15. WORK LOCATION (See instructions): Name of facility, City, State, Zip Code	16. Is this task included in the Institutional Plan? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	17. Does this task include any management services efforts? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
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18. TASK DESCRIPTION (Approach, relation to work package, in 200 words or less)

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.

- a. Personnel monitoring and environmental sampling to provide data for BNL dose assessments and determination of radiological trends.
- b. Individual and population dosimetry based on actual measurements. The resulting data will be used to modify dose commitment predictive models so that they may more accurately reflect future trends.
- c. Continuation of diet and living pattern assessments to update relevant parameters in long range predictive dose efforts.

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

- a. In vivo counting and urine bioassay of Rongelap and Utirik residents to determine dose commitments from environmentally-derived radionuclides at these atolls, and to better understand excretion kinetics among the Marshallese.
- b. Followup personnel monitoring at Enewetak to evaluate any change in radionuclide body burden associated with 1 year of residence on Enewetak Atoll.
- c. A final determination of radionuclide body burdens among the former residents of Bikini Atoll.
- d. Continuation of analyses of transuranic nuclide excretion rates among Northern Marshall Islands residents, and of transuranics and fission and activation products among Marshallese control groups who reside outside of the fallout area.

19. CONTRACTOR TASK MANAGER

Charles B. Meinhold

(Signature)

N.A. Greenhouse

03/31/80

(Date)

20. DETAIL ATTACHMENTS. (See instructions)

- | | | | |
|--|---|--|---|
| <input checked="" type="checkbox"/> a. Facility Requirements | <input checked="" type="checkbox"/> d. Background | <input checked="" type="checkbox"/> g. Future accomplishments | <input type="checkbox"/> j. Explanation of milestones |
| <input checked="" type="checkbox"/> b. Publications | <input checked="" type="checkbox"/> e. Approach | <input checked="" type="checkbox"/> h. Relationships to other projects | <input type="checkbox"/> k. ZBB Detail |
| <input checked="" type="checkbox"/> c. Purpose | <input checked="" type="checkbox"/> f. Technical progress | <input checked="" type="checkbox"/> i. Environmental assessment | <input type="checkbox"/> l. Other (Specify) |

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TASK REQUIREMENTS FOR OPERATING/EQUIPMENT
COSTS AND OBLIGATIONS

CONTRACTOR NAME

Associated Universities, Inc.

WORK PACKAGE NUMBER

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0 | | 03/31/80

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HP 0410 (600003)

21. STAFFING (in staff years)	FY 1980	FY 1981 - BY-1		AUTHORIZED	BY-FY 19 82
	BY-2	PRESIDENT'S	REVISED		
a. SCIENTIFIC	2.9	3.9	3.9		3.9
b. OTHER DIRECT	<u>3.1</u>	<u>3.1</u>	<u>3.1</u>		<u>3.2</u>
c. TOTAL DIRECT	6.0	7.0	7.0		7.1
22. OBLIGATIONS AND COSTS (in Thousands)					
a. TOTAL COSTS	300	415	465		514
b. TOTAL OBLIGATIONS	300	415	485		530
23. EQUIPMENT (in Thousands)					
a. EQUIPMENT COSTS	32	24	24		38
b. EQUIPMENT OBLIGATIONS	50	5	5		60
24. OTHER COSTS (specify)					
a.					
b.					
c.					
d.					
25. OPTIONAL FIVE-YEAR PLAN (in Thousands) Constant BY dollars					
		BY + 1	BY + 2	BY + 3	BY + 4
a. TOTAL OPERATING COSTS					
b. TOTAL OPERATING OBLIGATIONS					
c. TOTAL EQUIPMENT COSTS					
d. TOTAL EQUIPMENT OBLIGATIONS					
26. MILESTONE SCHEDULE					
		PROPOSED SCHEDULE		AUTHORIZED SCHEDULE	

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TITLE	BUDGET AND REPORTING CODE	DATE PREPARED
Marshall Islands Radiological Safety Program	HA-02-01-02	03/31/80
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		0

20a. Facility Requirements.

It is anticipated that work for this proposal will use existing Laboratory facilities and site utility services.

20b. Publications.

Greenhouse, N.A., Miltenberger, R.P., Lessard, E.T. External Exposure Measurements at Bikini Atoll, BNL 51003, January 1979.

Greenhouse, N.A. Dosimetry Methods and Results for the Former Residents of Bikini Atoll, BNL 26797, November 1979.

Miltenberger, R.P., Greenhouse, N.A., Lessard, E.T. Whole Body Counting Results for Inhabitants of the Northern Marshall Islands: 1974-1978, Health Physics, in press.

Miltenberger, R.P., Lessard, E.T., Greenhouse, N.A. Dietary Radioactivity Intake from Bioassay Data: A Model Applied to ¹³⁷Cs Intake by Bikini Island Residents, Health Physics, in press.

20c. Purpose.

The primary purpose of this program is to measure and evaluate the internal and external doses to people living on those islands in the Marshalls group which were impacted by tropospheric fallout from United States atmospheric nuclear tests in the Pacific. Its objectives are:

- a. Direct or indirect measurement of radionuclide body burdens and resultant doses and dose commitments.
- b. Measurement of external radiation environments and their contributions to the total doses to individuals and island populations.
- c. Evaluation of dietary habits and living patterns insofar as they relate to the elucidation of exposure pathways and the determination of doses.

20d. Background.

This program was initiated in 1974 at the request of the AEC (DOS) in anticipation of potential radiation exposures to the returning Bikini population.

20e. Approach.

Internal and external doses will be measured and evaluated using accepted and up-to-date health physics practices.

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20e. Approach cont.

Dietary and living pattern information will be derived from direct observations of island residents, and from standardized interviews with island residents during programmatic field trips.

Management Controls

Fiscal control will be exercised in the form of monthly comparisons, over the task term, of actual costs incurred against corresponding line items of the budget. Technical results shall be monitored through a periodic review, by the Contractor Task Manager, of accomplishments by measuring actual performance as compared to expected progress. All work shall be conducted in conformance with generally accepted standards for R&D and other investigative or analytic procedures, as observed by universities and large independent research facilities including Brookhaven National Laboratory (BNL).

20f. Technical Progress.

Technical Progress in BY-3 (FY 1979).

External and internal dose equivalents received during residency on Bikini Island and internal dose equivalents to be received post residency were evaluated for former Bikini residents. Bioassay results from samples collected in January and May 1979 and prior bioassay results were used to construct individual ^{90}Sr - ^{90}Y body burden histories. Whole body counting results during 1979 and results obtained in prior years were used to establish ^{137}Cs - $^{137\text{m}}\text{Ba}$ individual body burden histories. Daily activity ingestion rates were calculated from the body burden data. Uptake regimes which best fit the activity ingestion rate data were; constant continuous uptake for ^{90}Sr and stepwise increasing uptake for ^{137}Cs . Dosimetric models which described the uptake scenario were derived and individual dosimetric results for persons residing on Bikini Island sometime during the years 1969 and 1978 were determined. In addition, doses due to residual radioactivity in persons after departure from Bikini were calculated. Individual body burdens, urine activity concentrations and dose equivalents have been recorded or stored in a computer data base. Publications and reports describing dosimetric methods and results, whole body counting results and biological removal rate constants for Bikinians have been written.

Routine personnel monitoring was provided for Rongelap and Utirik residents. A statistical analysis was performed to determine the minimum sample size needed to establish the mean ^{137}Cs body burden at the 90% confidence level. Male and female adult, adolescent and child categories were counted at each atoll and many persons who participated in prior whole body counting visits were recounted. In addition, urine bioassay samples were collected from adult and adolescent population groups. Body burden histories and dosimetric results have been completed for half the resident populations for years following rehabilitation of the atolls.

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20f. Technical Progress cont.

Data collection on types and amounts of food consumed by the Marshallese was done by actually living with them. Simultaneous observations on their living patterns were also made. These studies were part of the Northern Marshallese Islands Radiological Survey (13-Atoll Survey).

Expected Progress in BY-2 (FY 1980).

Baseline radionuclide body burdens will be evaluated for the returning Enewetak population. Evaluation of the post residence decline of body burdens among former Bikini residents will continue. The data base on dietary habits and living patterns will be updated for all relevant atolls and/or islands.

Expected Progress in BY-1 (FY 1981).

Personnel monitoring and related demographic assessment activities will continue at Rongelap, Utirik, Enewetak and other areas of interest to DOE. Monitoring of former Bikini residents will be phased out unless circumstances dictate otherwise.

Expected Progress in BY (FY 1982).

Personnel monitoring and related demographic assessment activities will continue in all areas of interest in the Marshall Islands.

20g. Future Accomplishments.

A running account will be maintained of individual and population dosimetric information for the residents of islands affected by the Pacific Testing Programs. These data will provide an empirical basis for improving the accuracy and value of long-range predictive dose assessments from man-made radionuclides in the environment.

20h. Relationship to Other Projects.

This program operates and interacts directly with the Brookhaven Medical Program in the Marshall Islands, and provides contemporary data to be factored into the Retrospective Dose Reassessments for Rongelap and Utirik (and other islands affected by weapons test fallout). It also provides empirical bases for upgrading long range predictive dose modelling activities such as those of the Lawrence Livermore Laboratory. Coordination of this program with related programs within DOE and its contractors will be accomplished through timely exchange of program findings and related information.

20i. Environmental Assessment.

Work done under this task proposal has either no environmental impact or has impacts similar to those described in and covered by BNL's Environmental Impact Statement (ERDA 1540).

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