

BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.
UPTON, L. I., N. Y.

TEL. YAPHANK 4-6262

July 25, 1957

H. C. ... King
N.M.R.I.

REFER:

403799

Dr. Charles L. Dunham
Director, Division of Biology and Medicine
Atomic Energy Commission

Dear Chuck:

At your request, in addition to plans for the regular annual medical survey of the Marshallese for next March which will be submitted in the near future, the following supplementary proposal is submitted. This proposal is based on the assumption that the Navy will again furnish an LST for the annual survey. It is also assumed that the LST will originate from Pearl Harbor. The use of an LST is considered essential for carrying out the entire medical survey and will be explained in more detail in the main proposal.

Since little is known about the relationship in human beings of total body burden of radioactive isotopes to their urinary excretion rates data on these ratios would be of great importance. The Rongelap people generally have higher body burdens of radioisotopes than are found in other peoples of the world. This type of correlative analysis would therefore be more easily accomplished in this group. In addition the influence of the slight environmental contamination which exists on the island could be evaluated in the future from such studies.

In order to achieve these objectives it is proposed that whole body gamma spectra be obtained as well as simultaneous urine collections for radiochemical analysis on all the exposed Rongelap people and the unexposed Rongelap people living with them in conjunction with the next survey. From studies of data from such measurements on body burdens of gamma isotopes and urinary excretion rates of Sr⁹⁰ from fallout, it might be possible to predict the Sr⁹⁰ excretion rate based on body burdens of one or more gamma emitters determined from gamma spectroscopy. These studies would also correlate with similar studies contemplated for the Medical Department at B.N.L. The gamma spectra analyzers could be used at B.N.L. when not in use on the Marshallese.

The following specific requirements are considered necessary:

1. Equipment:

- a) An 8" diameter by 4" thick Sodium Iodide, Thallium activated crystal. A large crystal of this type is needed in order to achieve satisfactory resolution of the photoelectric peaks resulting from gamma rays of various energies.

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Such a crystal has been proved satisfactory in the proposed type of application by Marinelli and Miller at Argonne National Laboratory. It is extremely important that the crystal and the materials used for encasing it be free from radioactive contaminants. A suitable crystal can be fabricated by the Harshaw Company. A stand such as is used with a portable x-ray machine would be used to support the crystal assembly.

b) Two, One hundred channel gamma spectrum analyzers. Conference with Drs. Kuper, Higginbotham and Chase of the B.N.L. Instrumentation Division indicates that this type of instrument would be satisfactory for the type of analysis contemplated. These instruments are currently being fabricated at the Technical Measurements Company, New Haven, Connecticut, for B.N.L. and are considerably less expensive than the two hundred fifty-six channel type analyzer in use at Argonne National Laboratory. In view of the remoteness of the locale of examinations and consequent difficulties of getting repair work done within a reasonable period of time it was also recommended that two of these analyzers be taken along.

c) In order to insure sufficiently low background radiation for such analyses a room with steel walls of at least 4" thickness is deemed advisable. Mr. John S. Medd, Dr. J. S. Robertson and myself of B.N.L. have contacted officials at the Navy Yard, New York, in regard to fabrication of such a room with the following results. We were informed that a barbette from a cruiser is to be removed in the near future for scrapping purposes. This cylindrical barbette could be cut so that four curved sections, 6' high and 6" thick would form the sides of a chamber about seven feet across. Two, two inch thick steel plates could be secured both on the top and bottom of the chamber to afford overall shielding of four to six inches of steel. A door of adequate size of 4 inches steel thickness would be made for access. The size of this room would be adequate for the purposes and the thick steel walls, floor and ceiling would insure a low background. Necessary openings for electrical lines could be made. Subject to Navy approval, this chamber could be fabricated at the Naval Shipyard at New York and shipped to Pearl Harbor via one of the Navy vessels en route there. At Pearl Harbor the room could be assembled and placed on board the tank deck of the LST to be provided. Cranes at Pearl Harbor can easily handle the transfer to the LST.

Two small dehumidifiers would be needed, one in the steel room to make the subjects more comfortable during measurements and one in a small wooden room to be built adjacent to the steel room to protect the analyzer against high humidity.

The power source aboard the LST will be adequate.

Upon completion of the operation the steel room would be stored at Pearl Harbor Navy Yard for future use.

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Use of present shower-room facilities on board the LST would be adequate for setting up the decontamination and change station necessary for preparing personnel for measurement.

Radiochemical urine analyses could be carried out at the Walter Reed Army Institute of Research as in the past.

2. Personnel:

Dr. James S. Robertson, Medical Department, B.N.L. has agreed to participate in the operation and will supervise the measurements.

The Naval Medical Research Institute has tentatively agreed to allow Mr. Maynard Eicher to participate again. His talents will be invaluable in operating the analyzer.

Estimated Costs:

a) Two, 100-channel analyzers at \$9,000 each.....	\$18,000
b) One 8" diameter by 4" thick Sodium Iodide	
Thallium activated crystal.....	4,200
c) Two 5" photomultiplier tubes and one preamplifier..	400
d) X-ray stand.....	500
e) Two dehumidifiers at \$100 each.....	200
f) Cost of fabrication of steel chamber.....	
(Steel plus labor).....	13,000
g) Cost of fabrication of wooden room and examining chair (materials plus labor).....	400
h) Contingency.....	<u>3,300</u>
Total	\$40,000

(Estimates for costs on the two personnel involved will be submitted with the basic proposal.)

It is understood from the planning and estimate division of the New York Naval Shipyard that the fabrication of the steel chamber could be done in about 2 months and work could probably be started around September or October and could be completed in time to arrive at Pearl Harbor probably by January or early February. Such action would necessitate early approval by the Navy (at least verbally until formal approval could be written) for 1) use of an LST in March 1958 for 3-4 weeks and 2) permission for fabrication of the steel chamber at the New York Naval Shipyard, shipment to Pearl Harbor via Naval vessel and installation on board the LST at Pearl.

Sincerely,

Bah

Robert A. Conard, M. D.

RAC:skr

CC: Dr. Lee E. Farr, Dr. Leland J. Haworth, Mr. Emery L. Van Horn,
Mr. John S. Medd, Dr. James F. Robertson

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