ATTACHMENT 2

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PREFACE

Northern Marshalls Survey Report

The survey of thirteen islands and atolls in the Northern Marshalls resulted from efforts by Atomic Energy Commission (AEC) staff to determine what information wouldbe needed in the future to support the termination of the United States Trust Territory of the Pacific Islands. The Federal agencies currently having primary responsibilities and interests in the Marshalls are the Department of the Interior (DOI) and the Department of Defense (DOD). DOI has health and environmental responsibilities under the Trust Territory Agreement, and the DOD has programmatic responsibilities related to national security.

AEC, now the Department of Energy (DOE) participated in a series of inter-agency agreement with DOI and DOD that were related to cooperative efforts to rehabilitate Bikini and Enewetak Atolls. Under these agreements, AEC/DOE provided technical information and advice on radiological conditions in the Marshalls. AEC/DOE contractors have carried out the radiological surveys that provide needed data to evaluate radiological conditions which must be known in order to advise DOI and DOD. These data resources are being maintained and enlarged by DOE's contractors, primarily the Lawrence Livermore National Laboratory and the Brookhaven National Laboratory.

In preparation for cleanup of Enewetak, an aerial survey of the islands of this atoll was conducted in September-November, 1972, using sensitive radiation monitoring and position fixing equipment carried in helicopters. Flown along close spaced parallel tracks at low altitudes, the system measured the external gamma radiation field and the contribution to this field by each fallout and

activation product radionuclide in the soil, i.e., those that are gamma emitters. Transuranium element gamma emitters are also detected. Every second, the equipment records the gamma spectra and position fixing signals on magnetic tape. The tapes containing gamma radiation data for each flight were printed out and used as an overlay for maps of each island in the field.

The success of this survey (39 islands surveyed in just sixteen days) right away raised the question of use of this equipment to expand the data base for Bikini Atoll where the numbers and locations of radiation measurements and the amount of spectral data had been limited by dense vegetation and difficult access.

The initial intent by AEC staff was to plan and conduct an aerial survey of Bikini Atoll only using the same equipment and contractor, EG&G, as at Enewetak and with helicopter support provided by the DOD. In determining the logistics support that would be required for the Bikini survey it was determined that Bikini Atoll provided little in the way of facilities that could be used by the survey team and helicopter crews. A ship would be needed that could store, launch, and recover helicopters and provide a base of operations for the survey. The major costs would be to get the ship and helicopters in place. This raised the prospect that several atolls in the Marshalls could be surveyed with only a modest additional cost.

The problem was to plan a survey that would cover enough area and atolls to define the region where higher levels of fallout may have occurred, but not so extensive and costly that funding could not be obtained. This led to the concept of conducting what may be described as a screening survey, e.g., a survey where results could be used to determine whether or not any further survey effort was needed. For such a survey there is also the possibility that if any unexpected results are obtained, some modification of the survey plan can be made during the survey.

AEC staff reviewed the technical files containing information on all nuclear tests conducted at Bikini and Enewetak Atolls, the available radiological monitoring data, and the meterological information for each test. For the tests with the higher fission yields, and using fallout trajectories developed from the winds for the day of the test, atolls that most likely received close-in fallout were identified by inspection. Lacking radiological measurements in the downwind area that could confirm or deny the presence of fallout for a number of tests and atolls, this was considered the best approach for a screening survey plan.

The list of locations that was developed contained 13 islands and atolls (including Bikini and excluding Enewetak). In this were two single islands and eleven atolls with each atoll contained a number of islands. In order to characterize radiological conditions in the atolls, the larger islands and

particularly village islands would be surveyed, and additionally several smaller islands such that each quadrant of the atoll would be measured if there were islands in all quadrants.

Because of the distances between atolls and the large number of islands to be surveyed, the survey was divided into three separate trips with refueling, resupply, and rotation of survey personnel between the trips. Scientists would review preliminary data for each day's aerial survey to determine if additional measurements were needed.

As the survey plan evolved it became clear that it would be a serious mistake to mount an extensive aerial survey in the Northern Marshalls and not collect environmental samples for all areas visited. A requirement to collect soil, water, and marine and terrestrial foods was added to the plan.

The absence of accurate and up-to-date maps of these islands and atolls hindered detailed planning. A requirement for an aerial photographic mission was developed. Photographs of each island to be surveyed were obtained in July-Sept. 1978 using a Navy EC-121 aircraft.

The radiological survey in the Northern Marshalls was conducted during the period September 18 through November 10, 1978. Sixty-six islands were surveyed. The vessel used in the survey was the USNS Wheeling with support from personnel

at the Pacific Missile Test Center, Point Magu, California, and at the Kwajalein Missile Range, Kwajalein Atoll. Helicopter support was provided by personnel of the U.S. Navy HC-1 Helicopter Squadron, San Diego, California. Personnel of EG&G supported the photographic and aerial surveys. Personnel of the Lawrence Livermore National Laboratory conducted the environmental survey. DOD's logistics costs were reimbursed by DOI. DOE funded technical support costs for the survey.

The new information in this report will be interpreted and evaluated elsewhere. However, it may be said that the trends in the radiation data and in the total dose estimates in this report do not indicate any unusual findings. It was expected that fission product radiation and radioactivity levels and accompanying radiation doses would decline with distance from the test atolls, and that these values would approach levels equivalent to world-wide fallout at the perimeter of the region of close-in fallout. This did occur within the area surveyed.