407533

RADIOLOGICAL SURVEY PLAN

FOR

THE MARSHALL ISLANDS

TAB 1

RADIOLOGICAL SURVEY PLAN FOR THE NORTHERN MARSHALL ISLANDS

PURPOSE

THE PURPOSE OF THE NORTHERN MARSHALL ISLANDS SURVEY PROGRAM IS TO PROVIDE A DOCUMENTATION OF THE REMAINING RADIOACTIVITY FROM NUCLEAR TESTING AND TO PROVIDE SUPPORTING DATA FOR AN ASSESSMENT OF THE RADIATION DOSE TO PEOPLE BEFORE THE TERMINATION OF THE [illegible] TRUST AGREEMENT.

OBJECTIVES

THE OBJECTIVES OF THE PROGRAM ARE

1. TO OBTAIN AERIAL RADIOLOGICAL MAPS OF THE NORTHERN MARSHALL ATOLLS, AND ISLANDS,

   A study has identified 11 atolls and 2 islands as those most likely to have received fallout from one or more nuclear tests conducted at Bikini and Enewetak during the U.S. Pacific testing program.

2. TO SAMPLE AND ANALYZE THE RADIONUCLIDES IN SOIL, WATER, PLANT LIFE AND FOOD, AND IN MARINE AND TERRESTRIAL LIFE, AND,

3. TO PREPARE A FINAL REPORT WITH THE FINDINGS OF THE SURVEY AND AN ASSESSMENT OF THE RADIATION DOSE TO THE PEOPLE WHO MAY BE LIVING ON THE NORTHERN ATOLLS AND ISLANDS.

TAB 2

PART II

The U.S. nuclear weapons testing program conducted from 1946 to 1958 in the Pacific left long-term radiological contamination and health problems. Bikini and Enewetak Atolls, where the testing was conducted, were the most severely affected. But fallout from these tests has touched many islands in the Northern Marshalls. Of special concern was the heavy fallout from the March 1954 test which caused radiological injury to many of the people of Rongelap and Utirik and resulted in at least one death for radiation related disease.

The Department of the Interior (DOI), Department of Defense (DOD), and the Atomic Energy Commission (AEC), Energy Research and Development Administration (ERDA), and now the Department of Energy (DOE), cooperated in the steps taken to date to perform radiological surveys and assessments (1967-1968) and to begin cleanup of the contamination of Bikini (1969 to present) and in the radiological survey and assessment of Enewetak Atoll (1972-74). This first survey utilized the most up-to-date and modern techniques, including the use of helicopters utilizing sensitive radiation monitoring equipment to survey the islands. The DOD began the Enewetak cleanup in 1977, with the first rehabilitation program initiated during cleanup to take advantage of the logistical and communications capabilities attendant to military operations. The DOE has performed followup radiological surveys at Bikini and Enewetak Atolls, and also conducts medical observation of the exposed populations of Rongelap and Utirik Atolls at frequent intervals.

The Department of the Interior (DOI), Office of Trust Territory of the Pacific Islands (TTPI), is responsible for the rehabilitation of the former test sites, Bikini and Enewetak. Part of the Bikini program included planting of coconut trees and building homes and other community buildings on Bikini Islands. The houses were built along the lagoon shore where the radiation levels were the lowest. This was done at the request from TTPI for

assistance in locating the second group of graves on Bikini Island, the ERDA recommended that an aerial survey of the type flown at Enewetak be conducted for the entire Bikini Atoll. The survey would provide detailed data including contours of the total external gamma radiation, isotopic content and plutonium in the soil surface. Neither the ERDA nor the DOI had the integrated logistical support [illegible] needed for an aerial survey and DOD was requested to supply [illegible]. The DOI would request reimbursement for its support and there was insufficient time to obtain the necessary funding. ERDA conducted a limited ground survey of external radiation levels on Bikini and Eneu Islands in May 1977. The results of this survey showed that the radiation [illegible] was too high for further housing settlements and that future resettlements on nearby Eneu Island would minimize radiation exposures. Currently, the Bikini resettlement project is under review. A lawsuit, THE PEOPLE OF BIKINI, ET AL VS. SEAMANS, ET AL, CIVIL NO. 75-0078 [illegible], in Hawaii, alleges that the U.S. Government has not assessed properly the radiological conditions at Bikini and among other things, requests the court to order [illegible] aerial survey for Bikini comparable to that conducted at Enewetak. During its consultations with the Department of Justice, the [illegible] legal team concluded that the surveys and evaluation of radiological conditions at Bikini Atoll were not as comprehensive as more recent work at Enewetak Atoll, and sought an aerial radiological survey of Bikini and the other northern Marshall Islands.

The merits of the aerial survey have been thoroughly discussed at staff levels between ERDA, DOI, and DOD both before and after the initiation of the lawsuit. Briefings on the survey were provided to the Administrator of ERDA, the Assistant Secretary of [illegible] Health and Environment, the Department of the Interior, Office of [illegible] Territories, staff members of OTA, and the Deputy Director of the OMB.

After obtaining cost estimates for logistics support from the DOD and the technical program from ERDA, the Office of Management and Budget (OMB) determined that the survey should be conducted, and funds for reimbursement of DOD's logistics support were included in a DOI FY 78 supplement. DOE was requested to fund the technical program costs.

Although the U.N. Trust Territory Agreement with the U.S. is expected to end soon, it is clear that the U.S. will continue to have a vital national interest in the northern Marshalls. Resettlement of Bikini Island has suffered a setback due to radiation exposures significantly exceeding acceptable standards, and the conditional nature under which Enewetak is being resettled, and the need to continue following the health of the Rongelapese, will require radiological monitoring of these people and their environment for the foreseeable future. The aerial survey will be a major part of a radiological data base which will provide information needed for evaluating any future claims for damage or injury. It will contribute to the future monitoring program planned for Bikini, Enewetak, and Rongelap Atolls.

In addition to Enewetak, Bikini and Rongelap Atolls, there are eleven other atolls or single islands that received intermediate range fallout from one or more of the Pacific nuclear tests. [illegible] of these atolls are presently inhabited while [illegible] are used for food collection. During nuclear test operations there was a limited radiation program that did not provide anywhere near the coverage that can be obtained with the current aerial survey technology and instrumentation. In addition, there is little or no data on possible plutonium contamination outside of Bikini and Enewetak Atolls.

The proposed aerial survey uses the same equipment and procedures which were successfully employed at Enewetak Atoll in 1972-1973. As documented

in the lawsuit, the people of Bikini [illegible] have been short-changed because the U.S. [illegible] a highly [illegible] exhaustive radiological survey of Enewetak. The Bikini portion of the aerial survey, coupled with the previous [illegible] ground [illegible], will go a long way toward making the Bikini [illegible] a base comparable to that of Enewetak.

If the aerial survey of the north [illegible] including Bikini, is not conducted, the U.S. Government would [illegible] be precluded from settling the Bikini lawsuit [illegible] while there is the expectation of a successful [illegible] there is considerable potential for adverse publicity deriving therefrom. The U.S. could also be charged with not taking all practical steps to ensure that there were no individual sources of radiological contamination [illegible] released from U.S. custody.

TAB 3

SCOPE OF WORKS

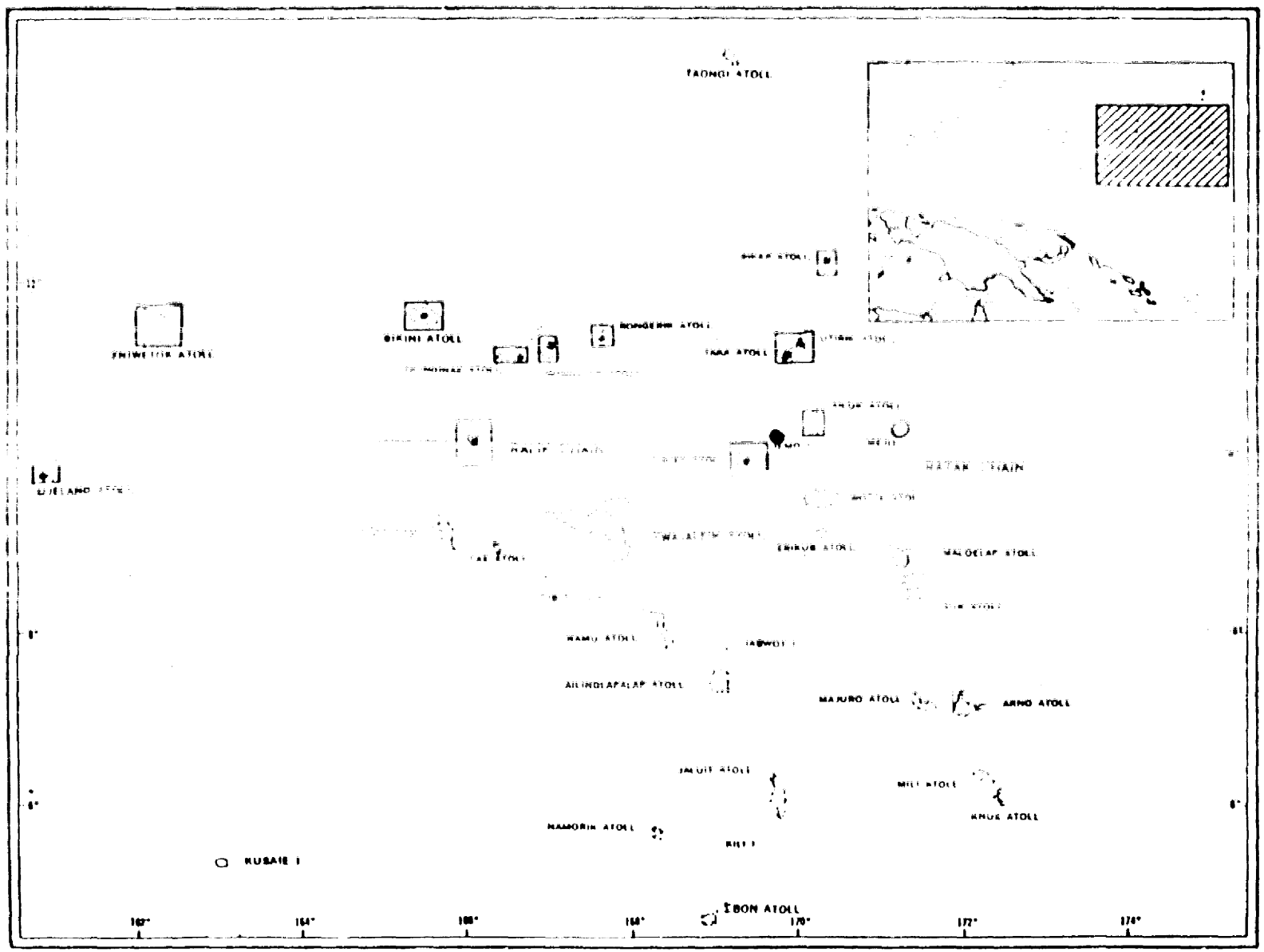
RADIOLOGICAL SURVEY PLAN FOR THE NORTHERN MARSHALL ISLANDS

SCOPE OF SURVEY PROGRAM

The Radiological Survey program of the Northern Marshall Islands will cover the following atolls and islands in the time frame of July 1978 through December 1978.

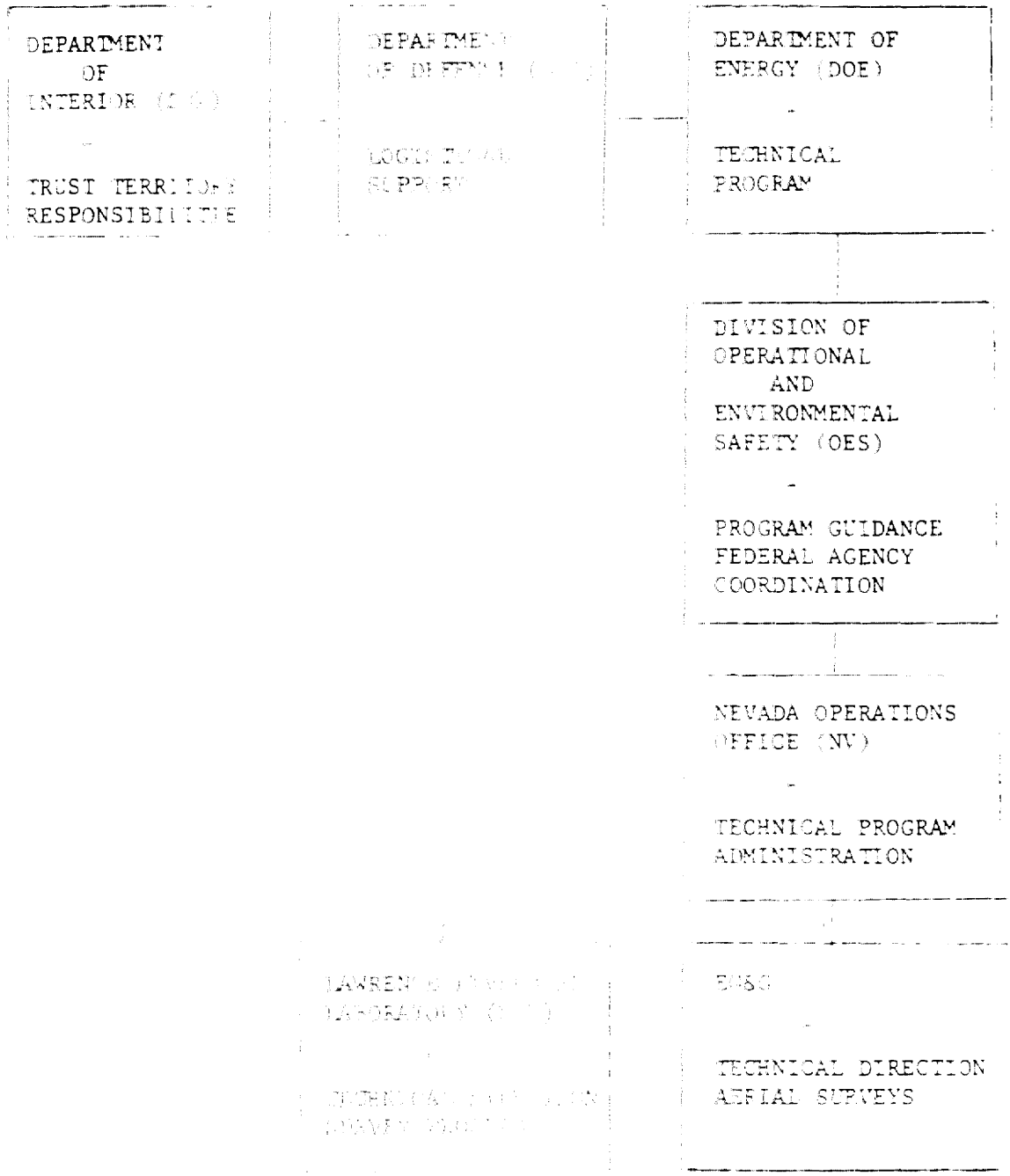
Atolls	Approximate Number of Islands to be Surveyed	Total Area ($mi.^2$)
1. Ailinginae	[illegible]	.93
2. Ailuk	[illegible]	1.72
3. Bikar	[illegible]	.19
4. Bikini	[illegible]	3.00
5. Likiep	[illegible]	3.02
6. Rongelap	[illegible]	.52
7. Rongerik	[illegible]	.81
8. Taka	[illegible]	.18
9. Ujelang	[illegible]	.60
10. Utirik	[illegible]	1.27
11. Wotho	[illegible]	1.38
12. Jemo Island*	1	Unknown
13. Mejit Island*	1	Unknown

*The term "Island" is used to designate an isolated island that is not part of an atoll and does not belong to Japan.



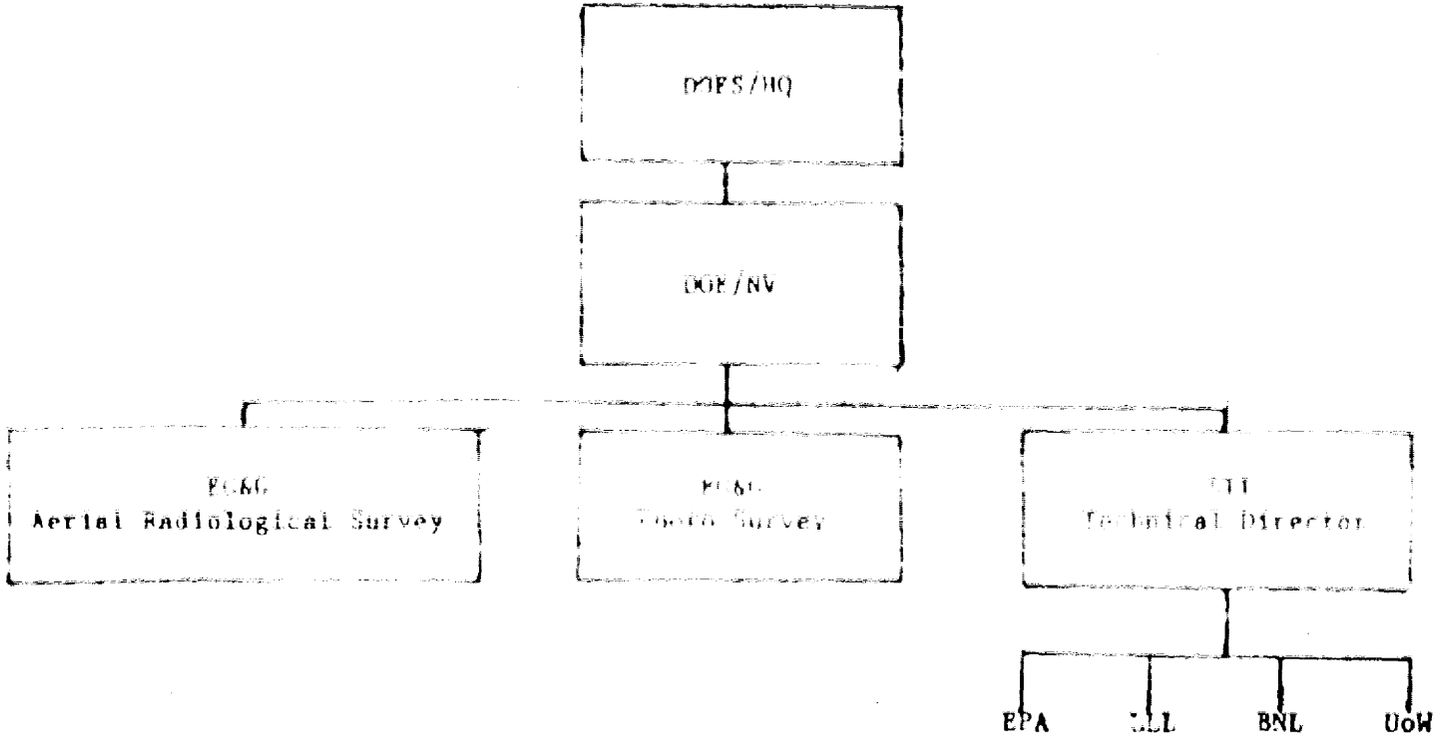
MARSHALL ISLANDS

The Northern Marshall Islands Radiological Survey Program organizational relationships are shown on the chart below.



NORTHERN MARSHALL ISLANDS SURVEY

ORGANIZATION



ORGANIZATION

DOE/NV

The management of all survey operations will be the responsibility of the NV Program Manager or his designated representative. The technical directors for the Terrestrial and Marine Programs, the Aerial Radiological Survey, and the Aerial Photo Survey will advise and support the NV Program Manager, and have full authority and responsibility for the technical plan.

The survey party is expected to include representatives of:

1. Division of Operational & Environmental Safety (O&ES), DOE/HQ
2. DOE/NV
3. EG&G, Las Vegas, Nevada
4. LLL
5. EPA
6. BNL
7. U of W

RADIOLOGICAL SURVEY PLAN FOR THE [illegible] ISLANDS

The Division of [illegible] and Environmental Safety (OES) is responsible for coordination with the Department of [illegible] and all Washington level Federal agencies and officials and for providing the technical program guidance to the Nevada Operations Office.

The Nevada Operations Office is responsible for administering the technical program and to assure the successful accomplishment of the objectives of the program plan.

The technical direction of the sampling program will be carried out by the Lawrence Livermore Laboratory (LLL) staff with personnel from the following organizations: Environmental Protection Agency (EPA), University of Washington, and Brookhaven National Laboratory. The technical efforts of the participating organizations will be carried out as a cooperative effort utilizing the skills and resources of the individual members under the direction of LLL. Members of these organizations will collect the necessary samples and perform the in-situ measurements. Samples will be collected from atoll soil, water, plant life and food, adjacent marine waters, and marine and terrestrial life. All samples will be analyzed for ^{137}Cs, ^{90}Sr and the trans-uranics by wet chemical methods. The analysis of the samples will be undertaken by [illegible] and _____

The evaluation of the analytical data will be performed by the members of the participating organizations with the technical coordination of the Lawrence Livermore Laboratory. The [illegible] radiological surveys of certain atolls will be performed under the technical direction of the Lawrence Livermore Laboratory.

The aerial radiological surveys of the atolls will be performed by EG&G. The estimated time required for completion of the aerial operations is 21 days. This period of time includes the time to move operations between atolls as well as to perform the survey on each atoll but does not include the travel time to and from the Republic of Marshall Islands.

Due to the length of the survey program, the technical personnel will be rotated through three series for maximum efficiency and dedication of effort. Medical personnel will be available at the atoll working areas to provide appropriate [illegible] care of the DOE and contractor staff.

TERRESTRIAL PROGRAM

MINIMUM EFFORT

The Terrestrial Program involves going onto the islands without a backhoe and sampling the available terrestrial food products, surface soil, and existing water cisterns and shallow wells. Transportation of personnel to the islands will be by helicopter when the whaler cannot be used. On larger islands a jeep will be necessary to relocate gear, water barrels, and personnel. Transporting the jeep from ship to island and from island to island will have to be accomplished using the helicopter.

On the average, 9 surface soil samples and 10 vegetation samples will be collected at each atoll, resulting in analysis for ^{137}Cs, ^{90}Sr, and the transuranics of approximately 1,000 samples.

The assumption that there will be three well sites or cisterns on the inhabited atolls will require the analysis of an additional 21 samples to determine the radionuclide concentrations in water.

A total of seven personnel will be required to support this program.

Terrestrial Program

PROGRAM COST

Preparation and Equipment 28K

3 freezers
15 gallon barrels for water
drying oven
food lockers
freeze dryer
land and water sampling gear

Analytical Cost

Surface soil and vegetation samples	440.0K
*Water samples	8.5K
Total	476.5K

*Each additional water sample will add [illegible] to the total.

MARINE PROGRAM

A Marine Program will include the collection of a sufficient quantity of reef fish and marine invertebrates. Attempts to collect pelagic species will be made only when the whaler can safely enter the lagoons. As a minimum, at least two (2) representative reef species commonly consumed will be collected from five (5) atoll locations at each atoll. Five to ten larger pelagic species will be taken from only two (2) atolls. Water samples will also be collected in conjunction with the fish. Concentration factors will be computed from the generated data and compared to those already available from Enewetak, Bikini, and Kwajalein. Only water will be collected at the remaining atolls. With the new set concentration factors, the average fish concentrations at the remaining atolls can be assessed. This procedure will yield about 180-240 separate fish samples and approximately 100 water samples requiring analysis for ^{137}Cs, ^{90}Sr, and plutonium.

Transportation to the island from the [illegible] will be by helicopter when the whaler cannot be used. Three personnel for each leg will be required to support the program.

Preparation and Equipment	3.5K
2 freezers	
Fishing Gear	
Insulated shipping containers	
Analytical Cost	150.0K
180-240 fish samples	
100 water samples	

TERRESTRIAL/MARINE PROGRAM

COST ESTIMATE

A summary of the estimated costs for the program is shown below.

Marine Program	153.5K
Terrestrial and Water Processing	476.5K
Dislocation Pay and Air Travel at a rate of 100K/10 people for three months	150.0K
Shipping Cost	35.0K
Assessment	100.0K
Total	975.0K

AERIAL PHOTO AND RADIOLOGICAL SURVEY PROGRAM

A. PHOTO MISSION

Photographic coverage of all islands of interest in the Northern Marshalls is required for three purposes: (1) detailed color flight maps of each island at specific scales for use by the radiation survey team, (2) specific data analysis to provide a variety of information about the islands, and (3) overlays for the radiation data.

Coverage will be obtained using precision photographic equipment operated for the DOE by EG&G. This equipment is calibrated and adjusted for optimum performance to obtain imagery suitable for analysis purposes as well as the production of photographic prints.

The photo mission will be flown using a EC-47 provided by the Pacific Missile Test Center based out of Kwajalein. Some film processing will be accomplished while at Kwajalein utilizing the photo lab operated by KENTRON. The film processing of imagery obtained for scientific purposes will be processed under controlled conditions by EG&G in Las Vegas, Nevada.

Seven EG&G personnel are required to support the mission which is expected to take 21 days. The team will also [illegible] time contingencies.

B. RADIOLOGICAL SURVEY

The Aerial Radiation Surveys will be carried out by means of two helicopters SH-3G's which will fly multiple missions from the USS WHEELING station near the atoll or in the lagoons when possible. EG&G will supply the scientific flight crews and technical support personnel to operate and maintain the radiation measuring and position measuring equipment.

The aerial radiation survey employs large arrays of NaI(Tl) sintillation detectors mounted on a helicopter platform. Gamma radiation data is accumulated continuously in a 400-channel multichannel analyzer and recorded on magnetic tape once each second. Position information obtained from a microwave ranging system and a radar altimeter are also recorded on magnetic tape each second. The aircraft is flown at an altitude of 100' or line spacing of 200'.

During the data reduction phase, radiation and position data are correlated on a second-by-second basis and processed in the form of radiation contours overlayed on aerial photographs. The radiation data are processed to provide total gamma ray exposure rate and selected isotope (e.g. ^{241}Am, ^{137}Cs, and ^{60}Co) concentration contours.

A total of nine (9) personnel will be required to support the above program for each series.

AERIAL PHOTO AND RADIOLOGICAL SURVEY PROGRAM
LOGISTIC SUPPORT

The Northern Marshall Island Survey will be conducted in two separate phases--the photographic survey and the Aerial Radiological Survey. The Navy Project Manager for coordination and execution of DOD responsibilities for rendering logistical support to this survey is commander, Pacific Missile Test Center, Pt. Mugu, California.

The photographic survey of eleven (11) atolls and two (2) islands will be accomplished utilizing a Department of Navy EC-121 aircraft. The platform has been specifically configured to receive DOE-provided high resolution and infra-red capable cameras, plus additional peripheral support equipment.

The aircraft will be based out of Kwajalein and will be required to fly 10-12 hours a day for approximately 22 days. This includes contingencies for weather and aircraft down time.

Utilizing data gathered from the foregoing photographic survey, an Aerial Radiological Survey will be conducted of the same atolls and islands by means of two SH-3H helicopters equipped with DOE-provided radiation detection and recording instrumentation. The helicopters will normally operate from the USNS WHEELING, a base support ship which will, in addition, provide a wide range of logistic support for the terrestrial and Marine programs.

LOGISTIC SUPPOR

The current pla establishes the nee for 77 days on station and 57 days in transit, including transit port for logistics replenishment and reprovisioning or more reasonable combination thereof. It is estimated that 536 total flight hours will be required for the SH-3G helicopter, which will include flight hours for pre-deployment training, transporting personnel and equipment ashore, and for other administrative purposes as required.

The requirement for berthing on the USS WHEELING while on the survey is as follows:

Military Sealift Command	62
PACMISTESTCEN	23
EC-1	24
OCE Minimum	27
Further Technical Support	13
Total	129

RADIOLOGICAL SURVEY PLAN FOR THE
NORTHERN MARSHALL ISLANDS

SCHEDULE

A.	24 AUG-6 SEPT	Load and install gear at Port Hueneme.
B.	7 SEPT	USNS WHEELING departs for Pearl. Two technicians from EG&G will be aboard.
C.	12 SEPT	Arrive Pearl; logistics equipment repair if necessary.
D.	14 SEPT	Depart Pearl, enroute Kwajalein; two EG&G technicians aboard.
E.	20 SEPT	Arrive Kwajalein—logistics; embark DOE survey party, equipment check.
F.	22 SEPT	Start Series I.
G.	16 OCT	Arrive Kwajalein; disembark DOE survey crew. Survey crew prepares for return to U.S. WHEELING departs for Guam logistics run.
H.	31 OCT	Arrive Kwajalein; embark DOE survey crew. Depart Kwajalein for Series II.
I.	26 NOV	Arrive Kwajalein; disembark DOE survey crew. Survey crew prepares for return to U.S. WHEELING departs for Guam logistics run.
J.	10 DEC	Arrive Kwajalein; embark DOE survey crew. Depart Kwajalein for Series III.
K.	5 JAN	Arrive Eneweta; disembark DOE survey crew. Survey crew prepares for return to U.S. WHEELING departs for Kwajalein.
L.	18 JAN	WHEELING arrives Port Hueneme. Equipment off-load.

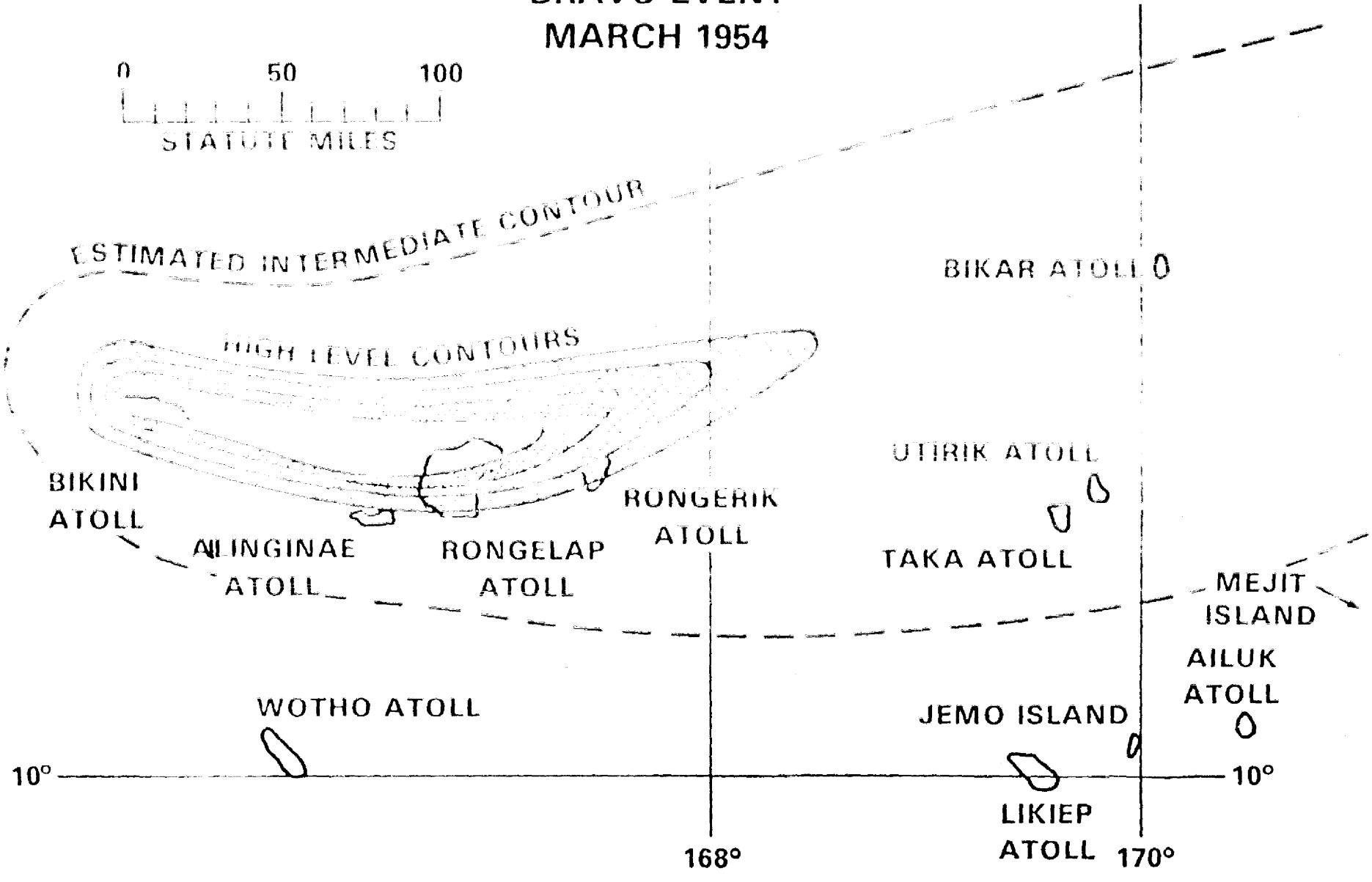
FALLOUT FROM PACIFIC TESTS

ATOLLS IN FALLOUT AREA	EVENTS	LOCATION	DATE
AILINGINAE	SANDSTONE-ZEBRA	ENEWETAK	5/48
	CASTLE-BRAVO	BIKINI	2/54
	CASTLE-UNION	BIKINI	4/54
	CASTLE-YANKEE	BIKINI	5/54
	HARDTACK-NAVAJO	BIKINI	6/58
AILUK	CASTLE-BRAVO	BIKINI	2/54
BIKAR	CASTLE-BRAVO	BIKINI	2/54
	CASTLE-YANKEE	BIKINI	5/54
BIKINI	ALL BIKINI EVENTS	-	-
LIKIEP	CASTLE-BRAVO	BIKINI	2/54
RONGELAP	SANDSTONE-ZEBRA	ENEWETAK	5/48
	CASTLE-BRAVO	BIKINI	2/54
	CASTLE-UNION	BIKINI	4/54
	CASTLE-YANKEE	BIKINI	5/54
RONGERIK	SANDSTONE-ZEBRA	ENEWETAK	5/48
	CASTLE-BRAVO	BIKINI	2/54
	CASTLE-UNION	BIKINI	4/54
	CASTLE-YANKEE	BIKINI	5/54
TAKA	CASTLE-BRAVO	BIKINI	2/54
UJELANG	IVY-KING	ENEWETAK	11/52
	HARDTACK-ORANGE	ENEWETAK	5/58
UTIRIK	CASTLE-BRAVO	BIKINI	2/54
WOTHO	CASTLE-BRAVO	BIKINI	2/54
	HARDTACK-NAVAJO	BIKINI	6/58
JEMO ISLAND*	CASTLE-BRAVO	BIKINI	2/54
MEJIT ISLAND*	CASTLE-BRAVO	BIKINI	2/54

*The term "island" is used to identify each individual island that is not part of an atoll and does not have a lagoon.

FALLOUT PATTERN

BRAVO EVENT
MARCH 1954



HYDROGRAPHICAL SURVEY PLAN FOR THE
NORTHERN MARSHALL ISLANDS

SPRING 1984

All equipment loaded at Port Hueneme or Pearl Harbor. Equipment check performed while ship enroute to Kwajalein from Honolulu. Remaining technical support will board U.S. WHEELING at Kwajalein either at port or utilizing the SH-3 Helos that are aboard the ship. Helo travel is preferred by MMTC.

1ST SERIES

1 day travel to Rongelap (20 hrs. travel)

7 days survey Rongelap

1 day pack and depart for Bikini (20 hrs. travel)

12 days survey Bikini

1 day pack and depart for Utirik (16 hrs. travel)

4 days survey Wotho

1 day pack and depart for Kwajalein (16 hrs. travel)

27 DAYS

Crew change and off load supplies at Kwajalein.

2ND SERIES

1 day travel to Ailinginae (16 hrs. travel)

4 days survey Ailinginae

1 day pack and depart for Rongerik (10 hrs. travel)

5 days survey Rongerik

1 day pack and depart for Bikar (15 hrs. travel)

3 days survey Bikar

1 day pack and depart for Utirik (7 hrs. travel)

4 days survey Utirik

2 days survey Taka (includes packing and travel)

1 day travel to Kwajalein

24 DAYS

Crew change at Kwajalein

3RD SERIES

1 day travel to Ailuk

6 days survey Ailuk

1/2 day pack and depart for Mejit

1 day survey Mejit

1 day pack and depart for Jemo

1 day survey Jemo

1/2 day pack and depart for Likiep

7 days survey Likiep

2 days pack and depart for Ujae and (2 days travel)

5 days survey Ujelang

1 day pack and depart for Enewetak (16 hrs. travel)

SURVEY COMPLETE

26 DAYS

27 1ST SERIES

24 2ND SERIES

26 3RD SERIES

77 TOTAL TIME REQUIRED FOR TECHNICAL SURVEY

[redacted]

SERIES 1		DAYS ON ATOLL
1.	Rongelap	7
2.	Bikini	12
3.	Wotho	4
	Return to Kwajalein	

SERIES 2		
4.	Ailinginae	5
5.	Rongerik	5
6.	Bikar	3
7.	Utirik	4
8.	Taka	2
	Return to Kwajalein	

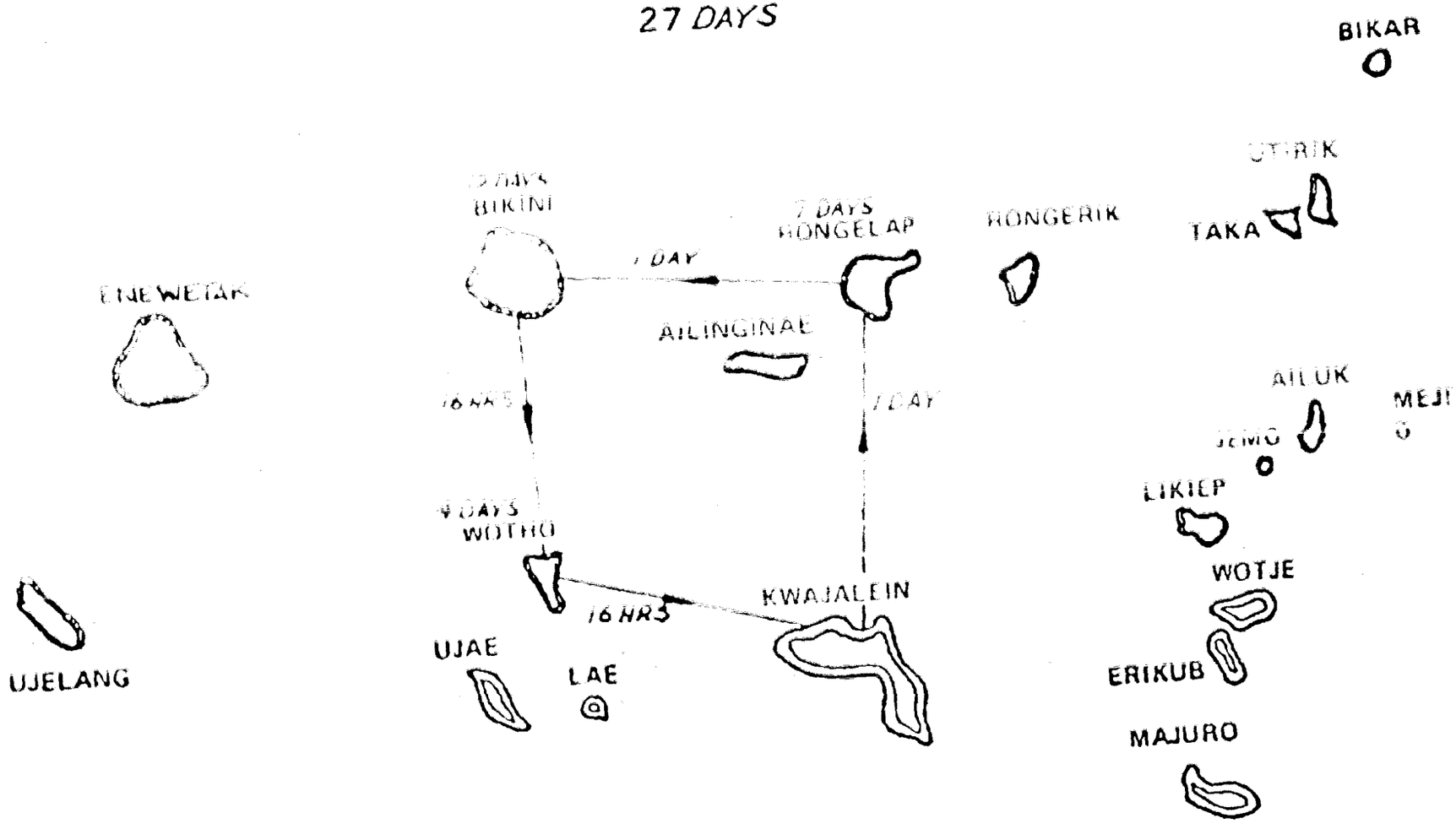
SERIES 3		
9.	Ailuk	6
10.	Mejit	1
11.	Jemo	1
12.	Likiep	7
13.	Ujelang	5
	Complete report at Honolulu	

[redacted]

NORTHERN MARSHALL ISLANDS

1ST SERIES

27 DAYS

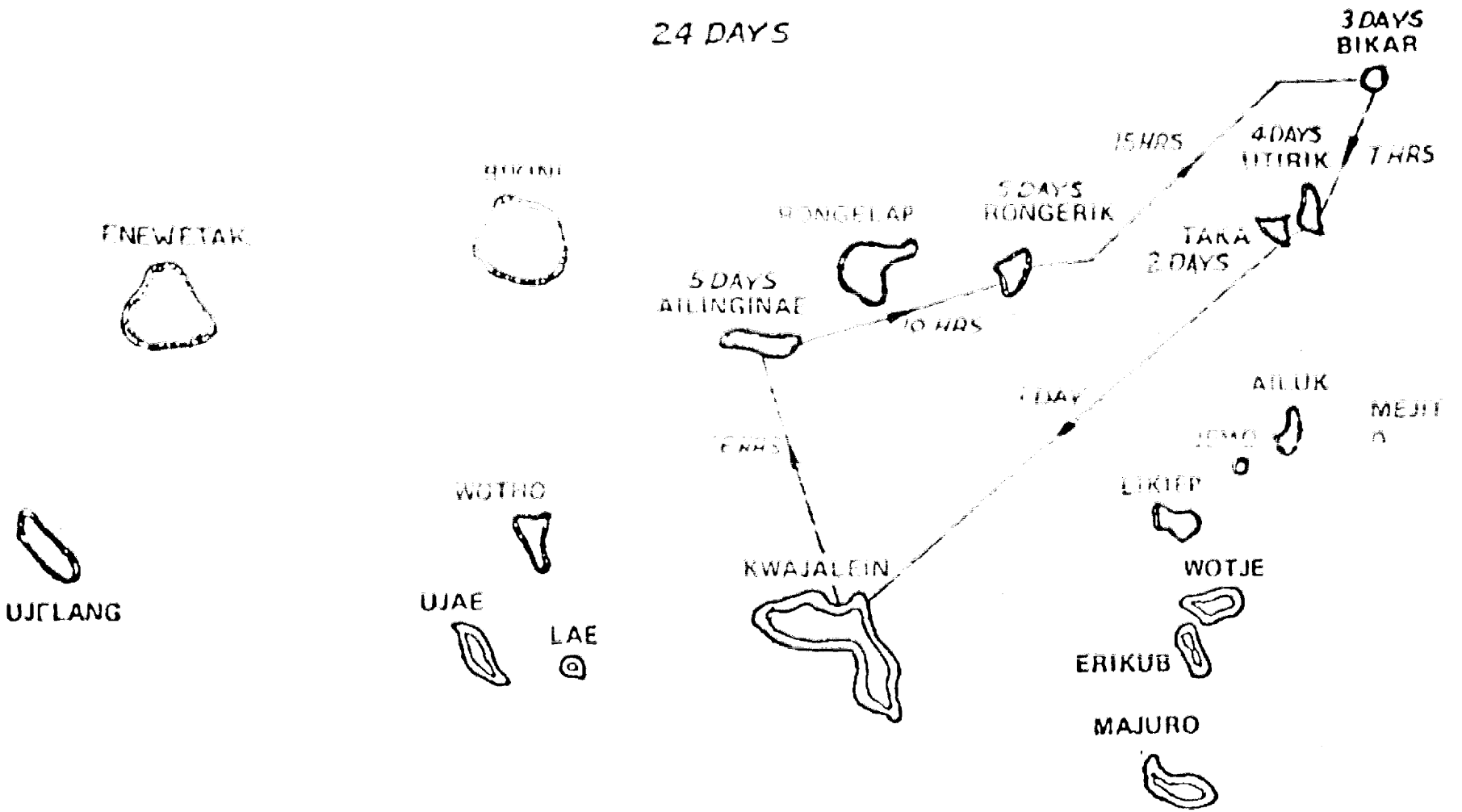


NOTE: DAYS AT EACH ATOLL INCLUDE SET-UP, PACKING, ETC.

NORTHERN MARSHALL ISLANDS

2ND SERIES

24 DAYS

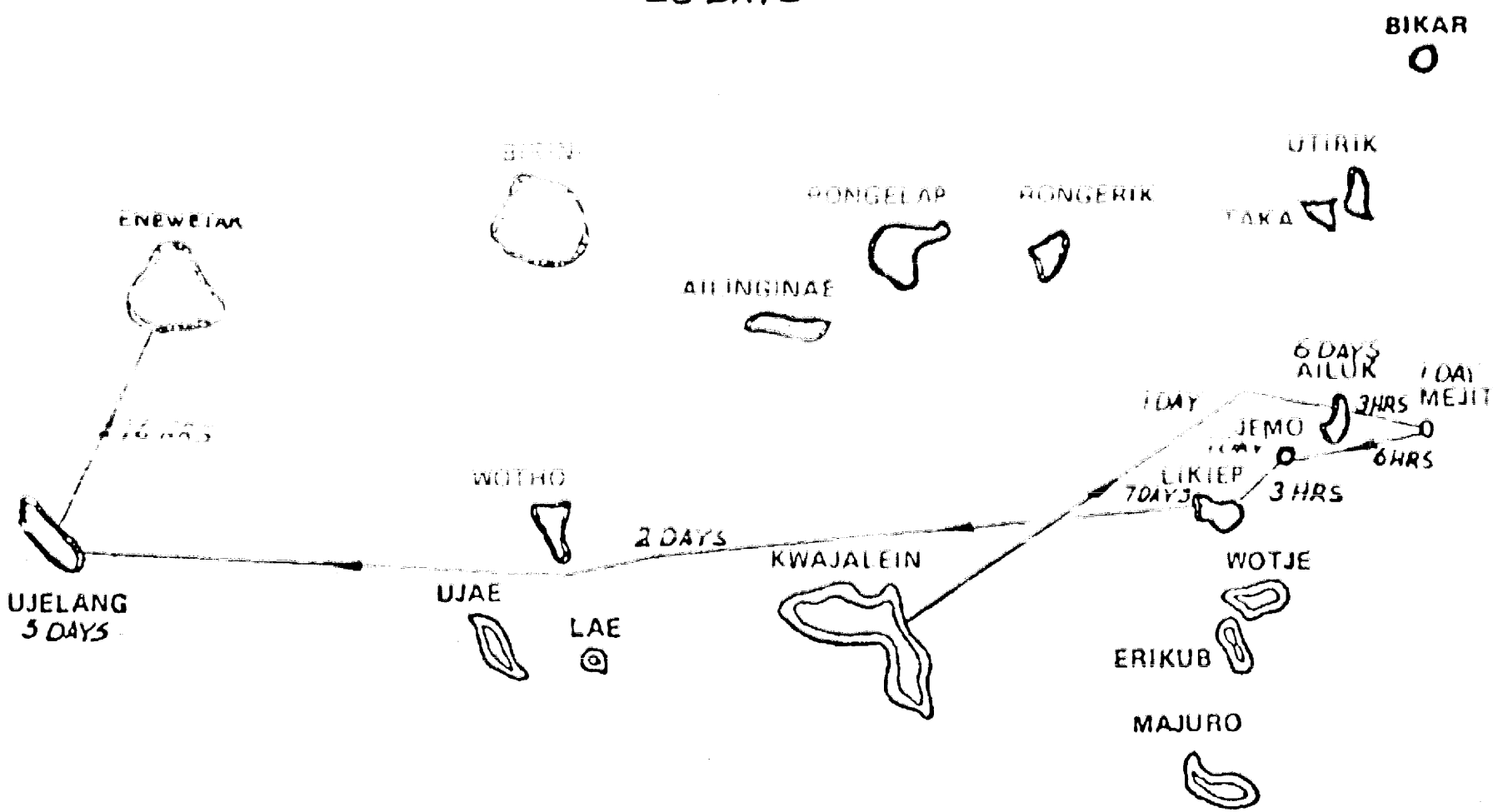


NOTE: DAYS AT EACH ATOLL INCLUDE SET UP, PACKING, ETC

NORTHERN MARSHALL ISLANDS

3RD SERIES

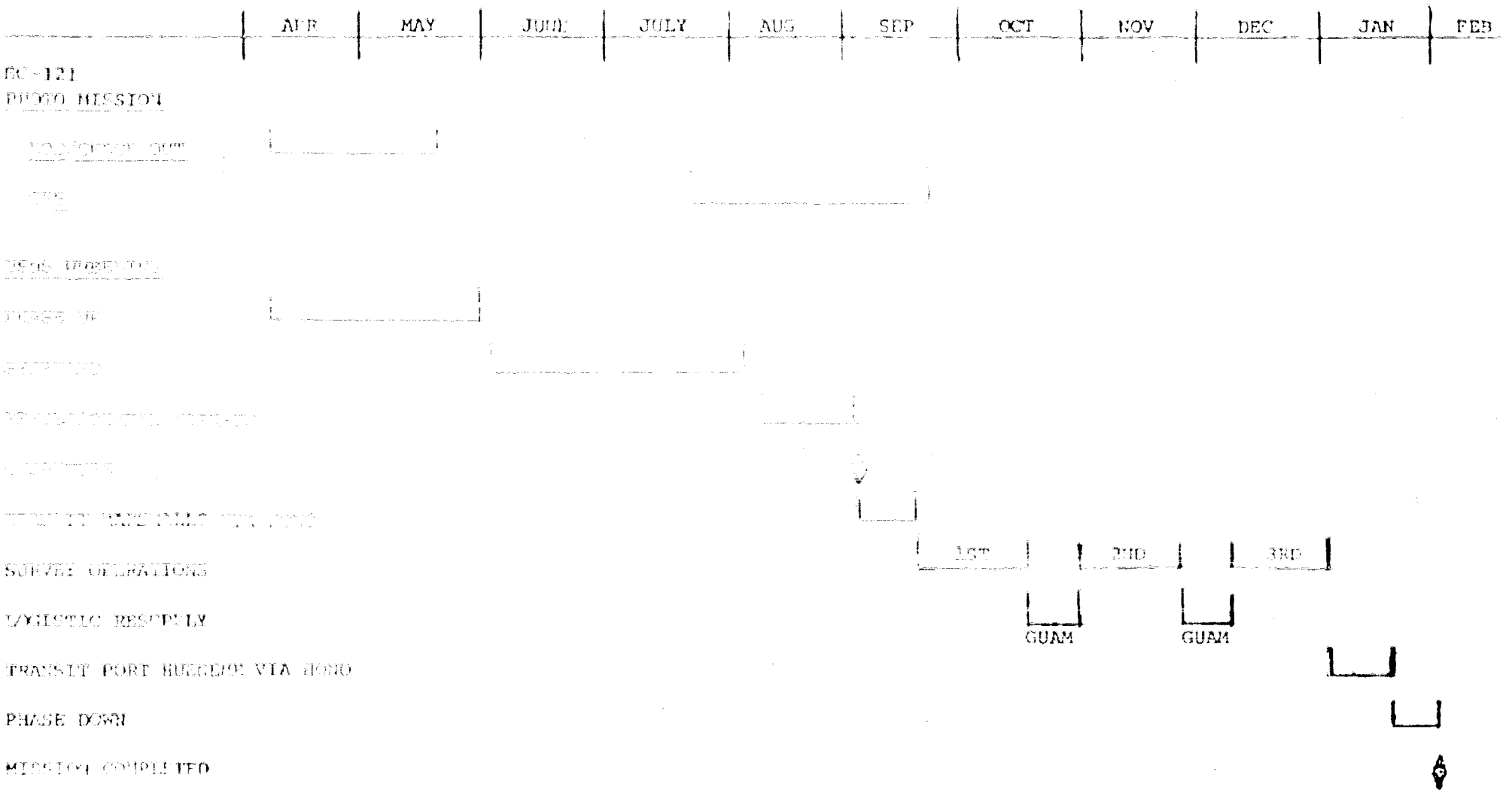
26 DAYS



NOTE: DAYS AT EACH ATOLL INCLUDE SET-UP, PACKING, ETC.

TAB 4

NORTHERN MARSHALL RADIOLOGICAL SURVEY
PLANNED MILESTONES FOR LOGISTIC SUPPORT



USNS WHEELING - Schedule

10 APR-31 MAY	Phase-up
5 JUN-3 AUG	Shipyard
4 AUG-6 SEP	Predeployment [illegible] for overseas move
7 SEP	Depart Port Hueneme
12 SEP	Arrive Hono (Pearl)
14 SEP	Depart for Kwajalein
20 SEP-21 SEP	Arrive Kwajalein, off load Helo equipment, board survey personnel, etc
22 SEP-16 OCT	Series I
16 OCT	Survey personnel off-load at Kwajalein
16 OCT-31 OCT	[illegible] fuel and provisions
31 OCT-26 NOV	Series II
26 NOV-10 DEC	[illegible] fuel and provisions
10 DEC-5 JAN	Series III
5 JAN-11 JAN	To Hono (Pearl)
12 JAN-18 JAN	To Port Hueneme
18 JAN-7 FEB	Phase down

HC-1 Schedule

24-27 JUL	1 Helo plus [illegible] personnel for checkout and training
9 AUG-[illegible] AUG	[illegible] for helo/ship training
23 AUG-[illegible] JAN	[illegible]

EC-121 Schedule

12 APR-19 MAY	EC-121 [illegible]/check out
24 JUL-24 SEP	EC-121 [illegible]

TAB 5

RADIOLOGICAL SURVEY PLAN FOR THE
NORTHERN MARSHALL ISLANDS

AGENCY ANALYSIS

A. Department of Interior (DOI)

1. Grant authority for the conduct of the Northern Marshalls Radiological Survey to the Department of Energy.

2. Assure that the Trust Territory and Marshall Islands Administrations and other appropriate agencies or organizations are aware of the responsibilities and guidelines of the survey.

B. Department of Defense (DOD)

The Department of Defense has authorized the Department of the Navy as the executive agent for the coordination and execution of the responsibilities in providing the required logistical support to the Department of Energy.

C. Department of Energy (DOE)

1. Responsible for the conduct of the technical program to assess the radiological condition of the identified atoll's and environment.

2. Prepare a final report on the radiological condition of the atolls and their environs.

MEMORANDUM OF AGREEMENT

BETWEEN

DEPARTMENT OF THE NAVY
DEPARTMENT OF ENERGY
AND
DEPARTMENT OF THE INTERIOR

Subj: Logistics Support for an Aerial Radiological Survey of the Northern Marshall Islands

Ref: (a) Memorandum of Agreement between Commander, Military Sealift Command and Commander, Pacific Missile Test Center dated 14 Sep/19/7/20 Oct 1977

(b) COMSEALIFTCOM/COMPMTC 201 Operations Order 302-YR

1. BACKGROUND. On June 1977, the Secretary of Defense (DOD) designated the Department of the Navy (DON) as the Executive Agent for the coordination and execution of DOD responsibilities for rendering logistics support to an Aerial Radiological Survey of the Northern Marshall Islands with the understanding that all costs incurred by Navy units would be on a reimbursable basis. The technical direction of the survey will be the responsibility of the Department of Energy (DOE). Funds have been appropriated by the Congress to the Department of the Interior (DOI) for the reimbursement of the logistic support that will be provided.

2. PARTIES TO THE AGREEMENT.

a. Department of the Navy, represented by the Chief of Naval Operations (OP-04).

b. Department of Energy, represented by Nevada Operations Office, Las Vegas, Nevada (NVOO).

c. Department of the Interior, represented by the Office of Territorial Affairs (OTA/DOI).

3. TERMS OF THE AGREEMENT. This Memorandum of Agreement (MOA) will become effective when signed by the last signatory of the parties to this MOA and will remain in effect until the completion of the subject project.

a. For cost purposes, completion of the Radiological Survey is construed to include return of the USNS WHEELING (TAGM-8) to its assigned CONUS West Coast layberth and completion of phase-down to Reduced Operating Status (ROS), or earlier, as may be determined by the DON and concurred to by the other parties to this MOA.

b. DON will receive timely notification of any intended change in the conduct of the Radiological Survey that would significantly affect the terms of this original or duly amended MOA.

c. This MOA may be terminated by the mutual agreement of all three parties to the MOA, or upon 30 days written notice by any single party to the other two parties.

d. This MOA may be modified or amended as agreed to by the several parties to the MOA.

4. CONCEPT OF OPERATIONS. The Aerial Radiological Survey will be conducted in two separate and distinct phases. The

Navy Project Manager for coordination and execution of DOD responsibilities for rendering logistics support to this survey is Commander, Pacific Missile Test Center, Pt. Mugu, California.

a. PHASE I. Initially, a photographic survey of eleven (11) atolls and two (2) islands in the Northern Marshall Islands will be accomplished utilizing a DON EC-121 aircraft. This platform has been specially configured to receive DOE-provided high resolution and infrared capable cameras, plus additional navigational support equipment.

(1) Phase I will be accomplished under the operational direction of the Project Manager (COMPMTC), in accordance with the technical directions and policies of the on-site DOE representative and the terms of this MOU.

(2) COMPMTC will promulgate an appropriate Operations Order for the accomplishment of the Phase I mission.

b. PHASE II. Utilizing data gathered from the foregoing photographic survey, an aerial radiological survey of eleven (11) atolls and two (2) islands will be conducted by means of SH-3G helicopters equipped with DOE-provided radiation detection and recording instrumentation. The helicopters will normally operate from USNS WHITNEY (T-AGOS 1), a base support ship which will, in addition, provide a wide range of logistics support. Flying relatively precise tracks at specified altitudes and air speeds, the data collected will be reduced and result in

the radiological documentation and characterization of the eleven (11) atolls and two (2) islands in the Northern Marshalls for later use as deemed appropriate by DOE and DOI in on-going rehabilitation and resettlement programs.

(3) Operations of USS WHEELING (TAGM-8) will generally be in accordance with reference (a) and this MOA. Should there be a conflict as a result of conducting operations in accordance with these two source documents, the provisions of reference (a) will apply while clarification and resolution is sought by the Project Manager.

(4) The Project Manager will promulgate an appropriate Operations Order implementing this MOA, subject to to approval by cognizant major DOD operational commanders (COMSCPAC and COMNAVAIRPAC).

5. SCOPE OF THE AGREEMENT.

a. This MOA will apply to all DON, DOE and DOI resources assigned by the several parties to prepare for, undertake and complete the aerial radiological survey of the Northern Marshall Islands. For the purpose of more precisely defining the dimensions of the logistic support package the DON anticipates providing to DOE, and to facilitate establishing accurate cost estimates for planning purposes, this MOA will be bounded as outlined below.

b. These aerial survey operations will consist of aerial photographic coverage of areas of interest to be defined by

DOE. This [illegible] to 100 EC-121 flight hours including [illegible] to and from the survey site.

c. Phase II of the survey will be accomplished by deploying the designated base support ship, USNS WHEELING (TAGM-8), with embarked SH-3G helicopter detachment, technical and support personnel to the Northern Mariana Islands. The current plan is to limit USNS WHEELING (TAGM-8) to 77 days on station and 57 days in transit including transits to port for logistics replenishment and repair/maintenance or some reasonable combination thereof. While on station, a twelve-hour working day is agreed to, recognizing the resulting additional overtime costs. The Radiological Survey as planned will be further limited to 556 total flight hours for the [illegible] SH-3G helicopters including those flight hours provided for predeployment training, transporting personnel and equipment ashore and for other administrative purposes as required. Minor adjustments to the foregoing limitations amounting to [illegible] 10% will require formal amendment of the MOA.

d. Appendix B is an overview of the three (3) series (A, B and C) of radiological missions that will constitute Phase II of the survey. It is expanded to be a framework schedule for the complete survey (Phases I and II).

f. SURVEY [illegible] GROUP ORGANIZATION. DOT, DOE and DOI resources dedicated to the accomplishment of the Radiological Survey will be organized into a Survey Task Group as follows:

a. Project Manager. CNMOC was designated Project Manager for the subject survey in CNO msg 0100007Z APR 78 and will continue in this capacity through project completion, coordinating and providing, on behalf of DON, all logistics support required by DOE for the accomplishment of survey objectives.

b. Aerial Photographic Task Element. The Officer in Charge of the P-3C aircraft detachment will report for operational control directly to the Project Manager for the conduct of Phase I of the survey, and will function as the primary point of contact for the DOE Technical Representative having technical direction responsibilities for the conduct of Phase I of the survey.

c. Aerial Radiological Task Element. This Task Element will accomplish Phase II of the survey utilizing USNS WHEELING (TAGM-8), embarked helicopter and associated support personnel and equipment.

(1) Logistics Support Task Commander. Embarked in USNS WHEELING (TAGM-8) will be a Logistics Support Task Commander (LSTC) who will function as the primary point of contact for the DOE representative responsible for technical direction responsibility for the conduct of Phase II of the survey. The LSTC will have overall operational control and management responsibility for DOE provided personnel and equipment. DOE representative will channel survey logistic support requirements through the LSTC who will then coordinate the mutual efforts of the

USNS WHEELING (TAGM-8), the OIC of the helicopter detachment and the DOI survey representatives. The LSTC is further designated as the Ocean Survey Representative (SDR) as defined in reference (a).

(2) MPMC Technical Representative. The Project Manager will designate an experienced MPMC Technical Representative who will act as primary advisor to the LSTC on logistics support matters. In the event that CINCLANTFLT does not assign a Navy Officer to the LSTC billet, the MPMC Technical Representative will assume the functions and responsibilities of the LSTC/SDR.

(3) Master, USNS WHEELING (TAGM-8). The ship's Master will have absolute authority and responsibility for the safety of his ship and embarked personnel as prescribed in reference (a) while responding to the operational requests and recommendations of the embarked LSTC/SDR.

(4) Officer in Charge, Flight Detachment. The embarked helicopter Detachment Officer in Charge will have absolute authority and responsibility for all matters relating to flight operations, particularly safety of flight, while responding to the operational requests and recommendations of the LSTC. Operation of assigned helicopters will be in accordance with appropriate directives to be established by the parent helicopter squadron commander. Administrative control and procedural matters regarding MPMC/OIC and maintenance remain with the parent helicopter squadron commander.

(5) Survey Project Field Director. A DOE employee, embarked in USNS WHEELING, will be designated the DOE Survey Project Field Director (SPFD) and will have responsibility for on-site technical direction of the survey. He will direct the efforts of all DOE and DOE contractor personnel and will make requests for Navy provided logistics support from the LFM. He will be responsible to the designated DOE Survey Project Manager (or PM) for the survey results. To this end, the SPFD will develop detailed survey work plans in coordination through the LFM. He shall be responsible for determining requirements for helo lift, support ashore, duration of stay at each location, and other requirements affecting mission performance, all within an agreed overall resource availability.

d. A diagram of organizational relations is at Appendix III

7. EMPLOYMENT AND OPERATION OF USNS WHEELING (TAGM-8). COMSCPAC, on behalf of CNO, will operate USNS WHEELING (TAGM-8) in accordance with reference (a), current directives, and U.S. Navy Regulations. User/Operator relationships will be as defined in reference (b).

8. RADIOLOGICAL SAFETY, MONITORING AND DECONTAMINATION. The DOE will assume primary responsibility for all matters pertaining to radiological safety, monitoring and, where required, radiological decontamination.

a. DOE will monitor all radiological hazards and safety

and provide adequate resources to ensure the protection of embarked personnel as prescribed in NAVMED P-5055 (Radiation Health Protection Manual).

b. DOE will assume responsibility for safeguarding all radioactive material stored aboard USNS WHEELING (TAGM-8) or transported by assigned helicopters and will properly dispose of such material upon completion of the survey operation.

c. DOE will assume all responsibilities for determining radiological decontamination requirements and the execution of decontamination measures, where required.

9. SUPPORTING SERVICES. FUEL, SUPPORT, MODIFICATION, ALTERATION AND REPAIRS will be as prescribed herein:

a. The supporting agency for supply support, modification, alteration and repair of USNS WHEELING (TAGM-8) will be as defined in reference (a).

b. Supporting services, supply support, modification, alteration and repair for assigned helicopters shall be as defined by the parent helicopter squadron commander.

c. Modifications, alterations and repairs to USNS WHEELING (TAGM-8) in preparation for deployment and return to ROS will be defined by [illegible].

d. DON will be reimbursed by DOE for all survey-related modifications, alterations, repairs and ship preparation costs associated with preparing, operating and phasing USNS WHEELING (TAGM-8) down to [illegible].

10. FUNDING OF LOGISTICS SUPPORT.

a. General. The net additional costs of logistics support provided by the DON for the accomplishment of the Aerial Radiological Survey of the Northern Marshall Islands will be fully reimbursed from funds appropriated to DOI. Accordingly, such support must be tailored to the availability of those funds to avoid cost overruns. Logistics support addressed herein refers only to those resources provided by the DON, and is inclusive of any other resources that may be provided in support of the survey by any other agency.

b. Application of Funds and Billing. The DON will be solely responsible for the application of DOI funds to the expenses incurred in providing DON logistics support for the project. All subordinate DON elements incurring costs that will be reimbursed by DOI funds will maintain a complete accounting thereof and will forward billings therefor to the Chief of Naval Operations on a monthly basis. Consolidated billings for these costs will be made monthly by the DON to the DOI on a standard form bill and accompanied by a DON notification of the monthly application of resources.

APPENDIX I

OVERVIEW OF RADIOLOGICAL SURVEY SCHEDULES

		DAYS
1.	**SURVEY SERIES A**	
	a. Depart Kwajalein aboard [illegible] Atoll (16 hrs transit)	1
	b. Survey ops Ailinginae Atoll	5
	c. Load-out and embark Rongelap (4 hrs transit)	1
	d. Survey ops Rongelap Atoll	12
	e. Load-out and embark Utirik Atoll (16 hrs transit)	1
	f. Survey ops Rothco Atoll	4
	g. Load-out and embark Kwajalein for DOE [illegible] (Change room assignments)	1
	Sub-Total	25
2.	**SURVEY SERIES B**	
	a. Depart Kwajalein aboard Rongelap Atoll (16 hrs transit)	1
	b. Survey ops Rongelap Atoll	7
	c. Load-out and embark Utirik Atoll (6 hrs transit)	1
	d. Survey ops Rongelap Atoll	5
	e. Load-out and embark Utirik Atoll (16 hrs transit)	1
	f. Survey ops Bokan Atoll	3
	g. Load-out and embark Utirik Atoll (7 hrs transit)	1
	h. Survey ops Utirik Atoll	4

		DAYS
SURVEY SERIES B continued		
i.	Survey Ops Taka Atoll	2
j.	Load-out and enroute Kwajalein for DOE crew change and reprovisioning	1
	Sub-Total	26
3.	**SURVEY SERIES C**	
a.	Depart Kwajalein enroute Ailuk Atoll (12 hrs transit)	1
b.	Survey Ops Ailuk	6
c.	Load-out and enroute Mejit Island (3 hrs transit)	½
d.	Survey Ops Mejit Island	1
e.	Load-out and enroute Jemo Island (6 hrs transit)	1
f.	Survey Ops Jemo Island	1
g.	Load-out and enroute Likiep Atoll (3 hrs transit)	½
h.	Survey Ops Likiep Atoll	7
i.	Load-out and enroute Ujelang Atoll (2 days transit)	2
j.	Survey Ops Ujelang Atoll	5
k.	Load-out and enroute [illegible] ([illegible] hrs transit)	1
	Sub-Total	26
4.	**SURVEY SUMMARY**	
a.	Series A	25
b.	Series B	26
c.	Series C	26
	Total Survey Days	77

APPENDIX D

AERIAL RADIOLOGICAL SURVEY
NORTHERN MARSHALL ISLANDS

FRAMEWORK SCHEDULE FOR COMPLETE SURVEY

1. PHASE I: Equipment Preparation for Survey

   a. 21 [illegible] - 24 Sept 1978

2. PHASE II: Radiological Survey utilizing USNS WHEELING (TAGM-8) and three (3) [illegible] helicopters:

DATE(S)	EVENT
a. [illegible] - 22 May 1978	Phase Up of WHEELING (ROS to FOS
b. 24 May - 06 Jun	Preparations for Overhaul
c. 06 Jun - 04 Aug	Shipyard Overhaul
d. 04 Aug - 06 Sept	Pre-deployment workup; Prepare for Overseas Movement
e. 07 Sept	Deploy from Port Hueneme; enroute Pearl
f. 12 Sept	Arrive Pearl; Logistics
g. 14 Sept	Depart Pearl; enroute Kwajalein
h. 20 Sept	Arrive Kwajalein; Logistics; Disembark 1 SH-3G and 10-man HC-1 Det; Embark DOE Survey Party; Equipment checkout
i. 22 Sept	Depart Kwajalein for Survey Series A; 25 days
j. 18 Oct	Arrive Kwajalein; Disembark DOE Survey Party
k. 19 Oct	Depart Kwajalein enroute Guam
l. 23 Oct	Arrive Guam; refuel and reprovision

APPENDIX II

AERIAL RADIOLOGICAL SURVEY
NORTHERN MARSHALL ISLANDS

FRAMEWORK SCHEDULE FOR COMPLETE SURVEY

DATE(S)	EVENT
m. 2[illegible] Oct	Depart Guam; enroute Kwajalein
n. 3[illegible] Oct	Arrive Kwajalein; Embark DOE Survey Party
o. 3[illegible] Oct	Depart Kwajalein for Survey Series B; 26 days
p. 2[illegible] Nov	Arrive Kwajalein; Disembark DOE Survey Party
q. 2[illegible] Nov	Depart Kwajalein; enroute Guam
r. 0[illegible] Dec	Arrive Guam; refuel and reprovision
s. 0[illegible] Dec	Depart Guam; enroute Kwajalein
t. 1[illegible] Dec	Depart Kwajalein for Survey Series C; 26 days
u. 0[illegible] Jan 1979	Arrive Kwajalein; Disembark DOE Survey Party
v. 0[illegible] Jan	Depart Kwajalein; enroute Pearl
w. 2[illegible] Jan	Arrive Pearl; Logistics
x. 2[illegible] Jan	Depart Pearl; enroute Port Hueneme
y. 3[illegible] Jan	Arrive Port Hueneme; Commence Phaseshown
z. 0[illegible] Feb	WESTLING returned to ROS

TAB 6

TAB 7

SUMMARY OF COSTS

NORTHERN MARSHALL ISLANDS RADIOLOGICAL SURVEY

		TOTAL K $	(FY 78 and FY 79)
1.	AERIAL PHOTO MISSIONS AND RADIOLOGICAL SURVEYS BY EG&G	989.1	989.1
2.	GROUND AND SEA		
	Terrestrial Program*	477.	
	Marine Program*	154.	
	Dislocation pay and air travel	150.	
	Shipping costs	35.	
	Assessment	100.	916
3.	CONTRACTORS		
	Brookhaven National Lab	78	
	Univ. of Washington		
	Environmental Protection Agency		
4.	CONTINGENCY		

*Minimum Option Cost

Terrestrial Range = 477K to 840K
Marine Range = 154K to 707K
Reference: DOE Letter of April 24, 1979

QUESTIONS AND COMMENTS - SUMMARY OF COSTS

NORTHERN MARSHALL ISLANDS ECOLOGICAL SURVEY

1. AERIAL - None

2. GROUND & SEA

Terrestrial

- Ground monitoring surveys are not included.

- Soil profile samples necessary for plant uptake studies are not included in the minimum figure.

- Personnel salaries are not stated as being included.

Marine

- Personnel salaries are not included.

3. CONTRACTORS

- BNL 189 received and costs shown. It is not known whether BNL costs are factored into the LLL estimates shown for terrestrial.

- Is whole body counting of the N. Marshallese desired? No costs are shown.

- 189's not available for both U of Wash., and EPA. It is not known whether their costs are factored into the LLL estimates for "Terrestrial" and "Marine".

4. CONTINGENCY

- Since only the minimum options are listed for the "Terrestrial" and "Marine" programs, the possibility exists for modifications of these costs in the upward direction.

- Have all salary costs been included?

- Have all analytical costs been included?

FY 1980 COSTS

- In view of past experience, funds will be necessary to continue sample analysis into FY 1981. Approximately 300K should be budgeted for this period.

- Have all costs for the final report preparation been included?

APPENDIX

FALLOUT FROM PACIFIC TESTS

FALLOUT FROM BRAVO EVENT 1954