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Chairman Schlesinger
Commissioner Ramey
Commissioner Larson
Commissioner Doub
Commissioner Ray

THRU: General Manager

ENIWETOK RADIOLOGICAL SURVEY

This memorandum provides information regarding current activities on Eniwetok Atoll. These activities concern the surveys essential to the cleanup, rehabilitation, and resettlement of the atoll in connection with the announced return of Eniwetok to the Trust Territory of the Pacific Islands (TTPI).

In April 1947 the United Nations formally designated the former Japanese Pacific Mandates (Eniwetok included) as Trust Territories to be administered by the United States. Upon written notification to the U.N., Eniwetok was designated a nuclear testing site in December 1947, with the first test series there, SANDSTONE, being conducted in the spring of 1948. Prior to SANDSTONE, the Eniwetok people, about 136 in number, were moved by the United States to Ujelang Atoll where they still reside, although their number has now increased to about 432. Additional test series were conducted in the atoll during the years 1951 (GREENHOUSE), 1952 (IVY), 1954 (CASTLE), 1956 (REDWING), and 1958 (HARDTACK - PHASE I). The last of 43 tests was in July 1958. All tests have been listed publicly.

Geographic location of the atoll is shown in Figure 1. Its remoteness suggests inherent costly operations to accomplish the necessary surveys and subsequent cleanup. Figure 2 identifies the islands of the atoll and general location of the nuclear tests conducted.

On April 18, 1972, High Commissioner Johnston and Ambassador Williams jointly announced the intention of the United States to return Eniwetok Atoll to the TTPI subject to retention of some minor residual rights. Subsequently, the Department of Interior (DOI), Department of Defense (DOD), and AEC determined that a comprehensive and coordinated program to survey and clean up Eniwetok Atoll must be undertaken to make Eniwetok habitable. The program was divided into three phases: (1) Pre-cleanup Radiological and Engineering Survey, (2) Cleanup, and (3) Rehabilitation

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and Resettlement. As with Bikini Atoll, responsibility for cleanup and rehabilitation rests with the DOD and DOI respectively. AEC is responsible for conducting a radiological survey, assessing the results, and establishing criteria and constraints for cleanup and rehabitation, involving other agencies, as appropriate.

Organization of the Eniwetok Radiological Survey, now under way, is shown in Figure 3. The Washington Interagency Group is charged with coordination of actions to effect overall Eniwetok Atoll objectives. The Manager, Nevada Operations Office, has been directed to plan, organize, and conduct the AEC radiological field survey to develop sufficient data on the total radiological environment of Eniwetok Atoll. Technical standards and requirements for the survey and cleanup operations will be provided by responsible divisions within AEC Headquarters. Specifically:

(a) The Division of Biomedical and Environmental Research (DBER) has the responsibility for reviewing and guiding the preparation of a report on the radiological status of the atoll. This report will be prepared by the Data Evaluation Group at Lawrence Livermore Laboratory.

(b) The Division of Operational Safety (DOS) shares responsibility with DBER and the Division of Military Application (DMA) for planning the survey. DOS will provide the coordination of these plans and their extension during the survey with the Assistant General Manager for Environment and Safety (AGMES). DOS will also provide information on the survey to EPA staff at the Washington level upon request. DOS will review and evaluate all data and assessments relevant to the feasibility of various cleanup methods and methods for disposal of hazardous materials. Cleanup criteria, requirements, guidelines, and environmental and health protection standards to be employed during cleanup operations will then be developed by DOS in consultation with appropriate AEC staff sections and other agencies.

(c) The AGMMA has the overall authority and responsibility within the AEC for coordinating matters related to the rehabilitation of the Eniwetok Atoll.

The radiological survey, and the interpretive effort associated with it, is a large program superimposed on a number of technically qualified organizations. Survey activities and analytical efforts by responsible organizations are reflected in Figures 4 and 5.

As an example of the complex radiological situation which exists on Eniwetok, one island, Runit, is shown in Figure 6 with a plot of gamma exposure rates on that island. Contamination from eight tests on Runit is measurable today. An early preliminary survey has confirmed the presence of a plutonium-bearing, sand layer outcropping on the ocean side of the island, and the existence of solid plutonium-bearing chunks, grains, and other particulates on the island surface and near surface. Earth and debris moving activities during and after test operations have resulted in a complex radiological situation in which adjacent areas may be quite different as to levels and vertical distribution of radioactivity in soil Data available to date indicate that radiological contamination is less severe on other islands but is sufficient to pose a considerable problem.

At a September 7, 1972, Interagency Meeting, the following agreements with respect to funding were reached

(a) The AEC will fund the radiological aspects of the precleanup survey, the conduct of any other radiological survey activity that might be required to understand conditions in the environment as they relate to exposures of people and developments of standards, and the conduct of periodic follow-up radiological surveys that take place after cleanup. If later field and/or laboratory work is done by the AEC in support of cleanup, AEC should be reimbursed by DOI

(b) DOD would be responsible for funding the engineering portions of the precleanup survey and those monitoring and survey activities that are required to support cleanup operations and to insure safety of personnel involved in cleanup activities. DOD also would fund the later cleanup of both radiological and non-radiological activities. DOI would be responsible for funding rehabilitation costs once cleanup is completed

Present best estimate of the cost of the AEC precleanup radiological survey is $1.3M. Costs of subsequent studies and radiological monitoring activities are estimated to be approximately $1M per year for FY 1974 and beyond. DOD costs for cleanup and related activities are estimated at between $20-40M and may go higher. The actual final costs are highly dependent on the amount of soil and debris needed to be removed and subsequent disposal methods employed. To date the DOD has committed approximately $500K in the precleanup engineering survey.

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The initial field survey was contemplated for the period October 12-December 6, 1972. The first week of this schedule was started, but not completed, when Typhoon Olga caused a suspension of activities. Subsequently, it was necessary to revise and reschedule the survey to account for weather factors and logistic limitations. An aerial radiological and photographic survey of the atoll was accomplished November 8-25 during the period of minimal logistic support. Survey activities were resumed during the week of November 27 on a revised schedule and will now extend to mid-February 1973. The AEC radiological survey now appears to be progressing smoothly and collected samples are being returned to the CONUS for analysis. Data to date, based mainly on the results of the aerial survey, appear to be generally consistent with earlier knowledge and expectations.

[signed]
F. [illegible] Gilbert for
Frank A. Camm
Major General, USA
Assistant General Manager
for Military Application

Enclosures:
Figures 1, 2, 3,
4, 5, and 6

Distribution:
so&sc: Chairman w/enclosures
sc: Comr Ramey w/enclosures
sc: Comr Larson w/enclosures
sc: Comr Doub w/enclosures
sc: Comr Ray w/enclosures
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and Resettlement. As with the rehabilitation of Bikini Atoll, responsibility for cleanup and rehabilitation rests with the DOD and DOI respectively. AEC is responsible for gaining a sufficient understanding of the radiological environment at Eniwetok Atoll to provide a reliable basis for judgements with respect to the future use of the islands. Typical judgements requiring this information would deal with conditions affecting safe reinhabitation levels to which radiological contamination should be reduced during cleanup; and any constraints which may be indicated on the use of land or water areas.

Organization of the Eniwetok Radiological Survey, now underway, is shown in Figure 3. The Washington Interagency Group is charged with coordination of actions to effect overall Eniwetok Atoll objectives. The Manager, Nevada Operations Office, has been directed to plan, organize, and conduct the AEC radiological field survey to develop sufficient data on the total radiological environment of Eniwetok Atoll. Technical standards and requirements for the survey and cleanup operations will be provided by responsible divisions within AEC Headquarters. Specifically:

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(b) DOD would be responsible for funding the engineering portions of the pre-cleanup survey and those monitoring and survey activities that are required to support cleanup operations and to insure safety of personnel involved in cleanup activities DOD also would fund the later cleanup of both radiological and non-radiological activities. DOI would be responsible for funding rehabilitation costs once cleanup is completed

Present best estimate of the cost of the AEC pre-cleanup radiological survey is $1.3M Costs of subsequent studies and radiological monitoring activities are estimated to be approximately $1M per year for FY 1974 and beyond. DOD costs for cleanup and related activities are estimated at between $20-40M and may go higher. The actual final costs are highly dependent on amount of soil and debris needed to be removed and subsequent disposal methods employed. To date the DOD has committed approximately $500K in the pre-cleanup engineering survey.

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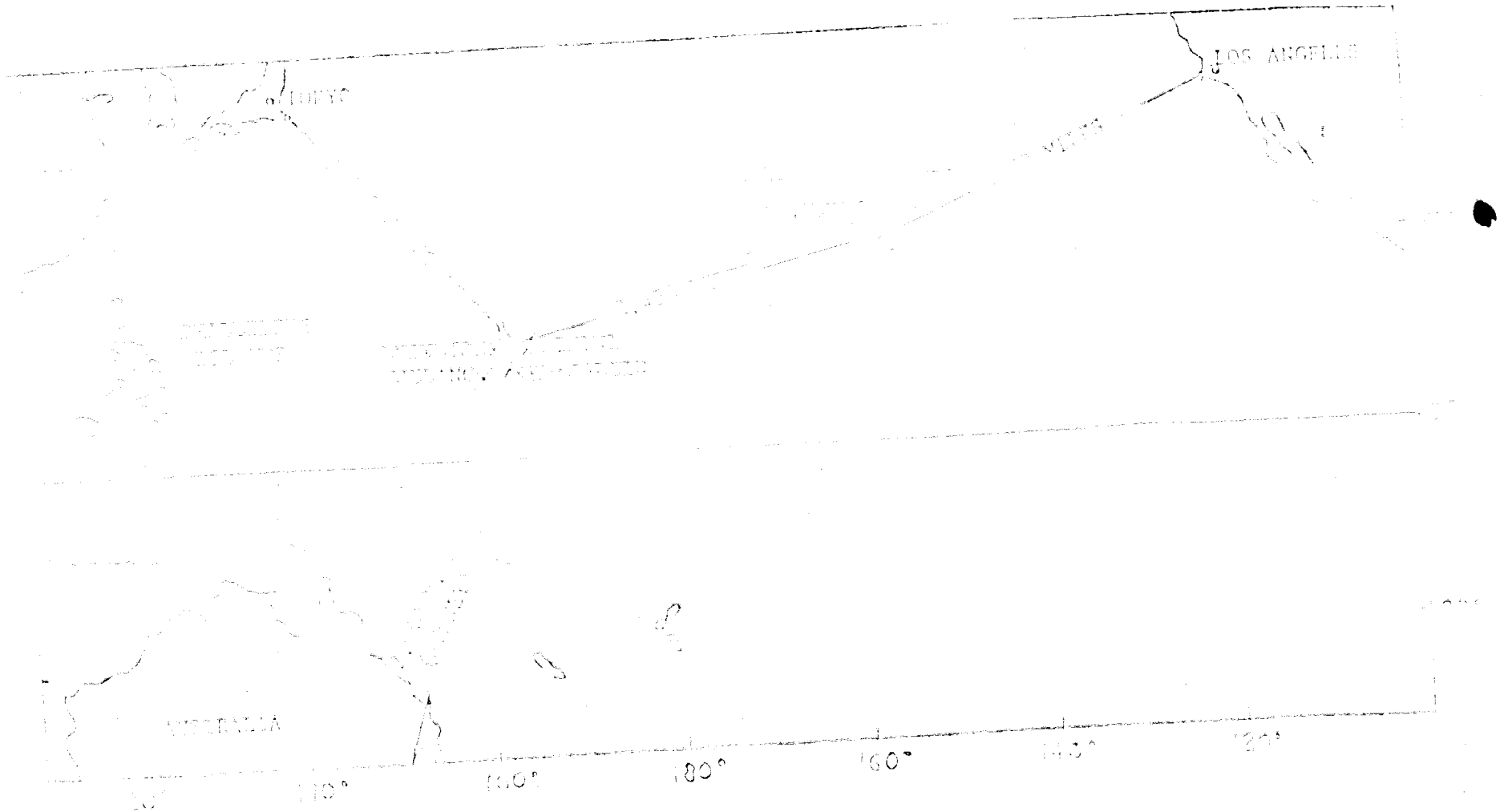

FIGURE 1

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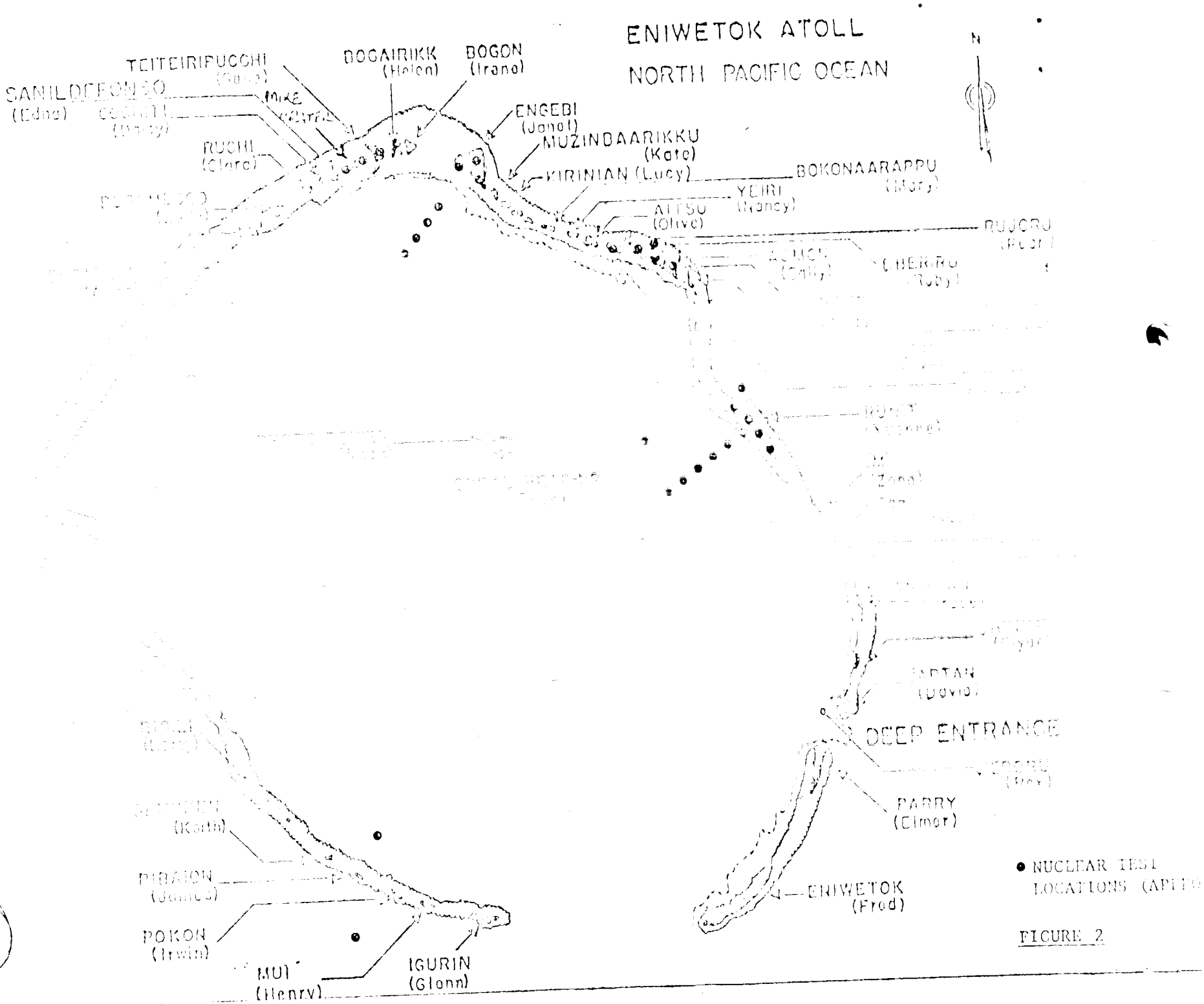
ENIWETOK ATOLL
NORTH PACIFIC OCEAN
N
TEITEIRIPUCCHI
BOGAIRIKK
(Helen)
BOGON
(Irene)
SANILDEFONSO
(Edna)
MIKE
ENGEBI
(Janet)
MUZINBAARIKKU
(Kate)
RUCHI
(Clara)
KIRINIAN (Lucy)
BOKONAARAPPU
YEIRI
(Nancy)
ATTSU
(Olive)
RUJORU
EBERIRU
(Ruby)
DEEP ENTRANCE
PARRY
(Elmer)
ENIWETOK
(Fred)
(Karth)
PIBAION
POKON
(Irwin)
MUI
(Henry)
IGURIN
(Glenn)
NUCLEAR TEST
LOCATIONS (APPRO

FIGURE 2

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ORGANIZATION OF THE ENIWETOK SURVEY PROGRA

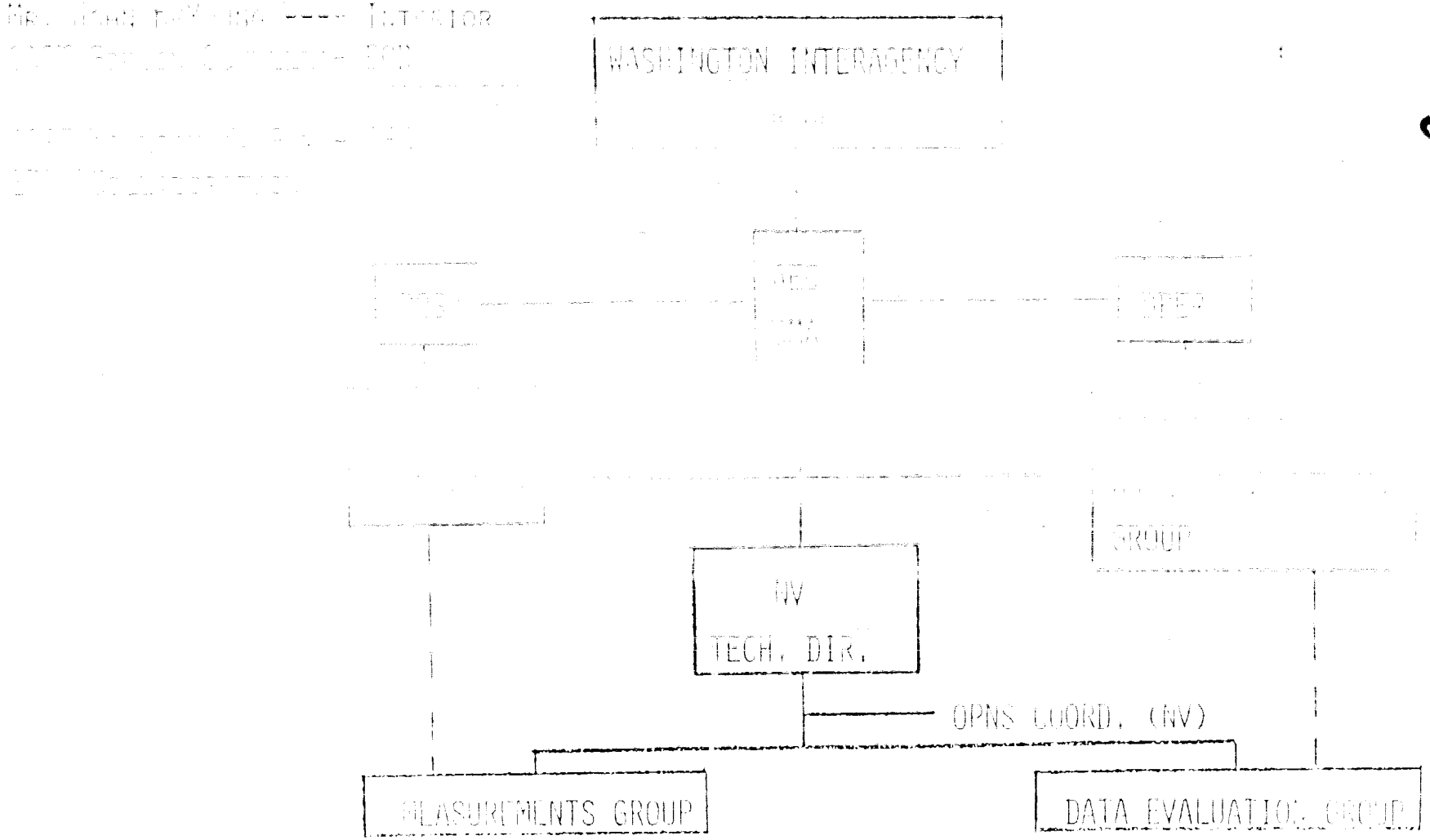

FIGURE 3

SURVEY [illegible]

EXTERNAL DOSE AND SOIL SURVEY ([illegible] SAMPLES)

- EXTERNAL GAMMA DOSE AND [illegible]
- SOIL SAMPLING [illegible] CORES, [illegible] AND SURFACE
- AERIAL MEASUREMENTS ([illegible] AND PHOTO)

AIR, BIOTA, AND POTABLE WATER [illegible] 1000

- AIR PARTICULATES
- COLLECTION OF FOOD PLANTS [illegible]
- RAD CHEM ANALYSIS OF MATERIALS

AQUATIC SURVEY ([illegible] SAMPLES)

- BIOCHEMICAL BEHAVIOR [illegible] ELEMENTS
- SHALLOW WATER [illegible] DREDGING
  IN SITU [illegible]
- MARINE SAMPLING [illegible] LAGOON
- COLLECTION OF [illegible] AND
  INVERTEBRATES

FIGURE 4

58

50 [illegible]

LABORATORY ANALYTICAL CAPABILITY

LABORATORY	KIND OF ANALYTICAL WORK
[illegible]	SAMPLE PREPARATION – SOIL AND BIOTA SAMPLE ANALYTICAL TREATMENT FOR WATER GAMMA ANALYSIS, ALL TYPES OF SAMPLES, MARINE SURVEY
MCL	GAMMA ANALYSIS SOIL DISSOLUTION AND ANALYSIS FOR PU AND ^{90}SR [illegible]
[illegible]	MARINE SURVEY ^{55}FE ANALYSIS ^{90}SR ANALYSIS
CONTRACT ANALYSES	GAMMA ANALYSIS SOIL DISSOLUTION AND ANALYSIS FOR PU AND ^{90}SR
NERC (EPA) LAS VEGAS	ANALYSIS FOR PU
LASL	PU HEALTH STUDIES

FIGURE 5

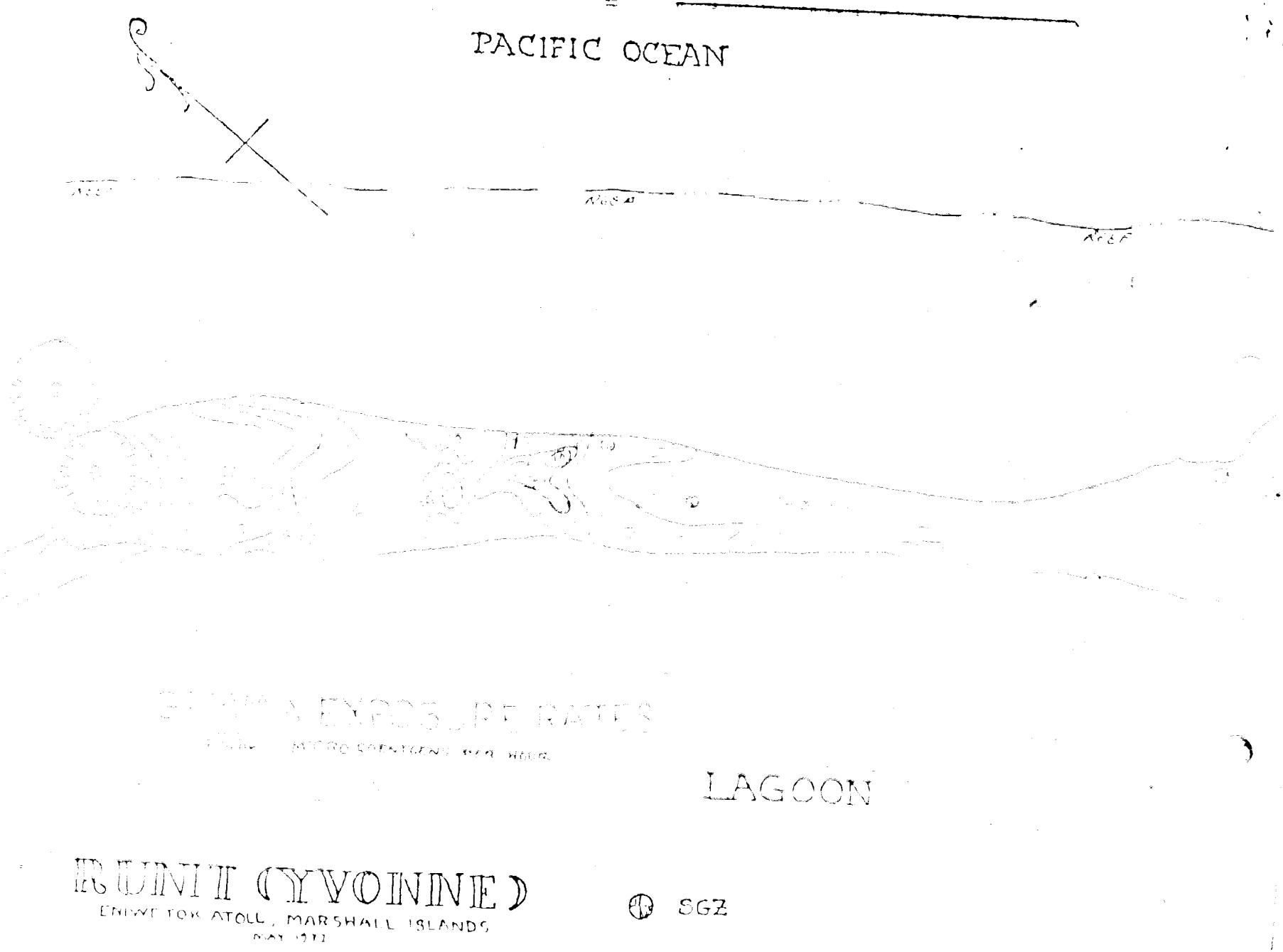
PACIFIC OCEAN
LAGOON
RUNIT (YVONNE)
ENIWETOK ATOLL, MARSHALL ISLANDS
SGZ

FIGURE 6