UNCLASSIFIED

AD NUMBER

AD473986

NEW LIMITATION CHANGE

TO

Approved for public release, distribution unlimited

FROM

Distribution authorized to U.S. Gov't. agencies and their contractors; Administrative/Operational Use; 1946. Other requests shall be referred to Joint Chiefs of Staff, Washington, DC.

AUTHORITY

Defense Nuclear Agency notice dtd 5 Dec 1979

THIS PAGE IS UNCLASSIFIED

AD-473986

THIS REPORT HAS BEEN DELIMITED
AND CLEARED FOR PUBLIC RELEASE
UNDER DOD DIRECTIVE 5200.20 AND
NO RESTRICTIONS ARE IMPOSED UPON
ITS USE AND DISCLOSURE.

DISTRIBUTION STATEMENT A

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED.

REPRODUCED FROM
BEST AVAILABLE COPY

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

AD No. 473986 ASTIA FILE COPY

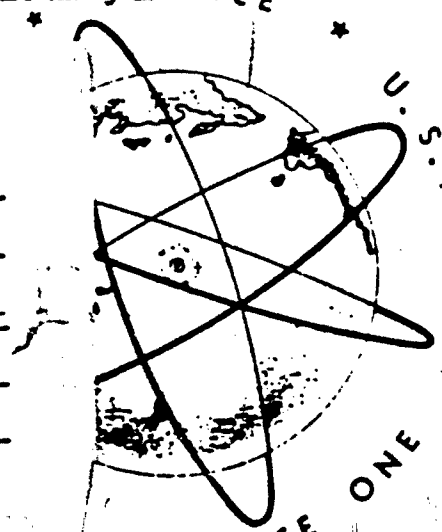
XRD-206
Vol I

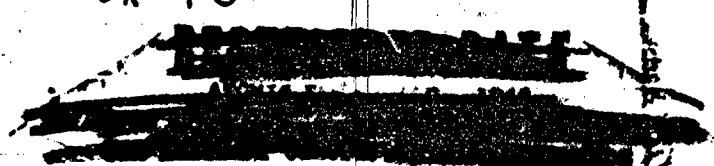
REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)

QUALIFIED REQUESTERS MAY OBTAIN COPIES OF THIS REPORT FROM ASTIA
NOT FOR PUBLIC RELEASE

This document is removed from "Restricted Data" category by authority of U.S.A.E.C. Memorandum (PTIDB:CLM) dated 19 January 1949. Military classification Restricted applies.
Signature and grade
Organization
28 April 1949
Date

NOV 10 1955





CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

UNCLASSIFIED

VOLUME I.

Commander, Joint Task Force One

20050405054

UNCLASSIFIED

UNCLASSIFIED

JOINT TASK FORCE ONE

Navy Department
Washington 25, D. C.

JTF-1/J-35/wm
File: A16-3
Serial: 21

15 November 1946

QUALIFIED REQUESTERS MAY OBTAIN COPIES OF THIS REPORT FROM I
NOT FOR PUBLIC RELEASE

From: Commander Joint Task Force ONE.
To : The Joint Chiefs of Staff.

Subject: Operation CROSSROADS - Operational Report of.

Reference: (a) Commander Joint Task Force ONE Operation Plan No. 1-46.

Enclosure: (A) Operational Report on Atomic Bomb Tests ABLE and BAKER conducted at BIKINI ATOLL, Marshall Islands, on 1 July 1946 and 25 July 1946.

1. Submitted herewith is the operational report of Operation CROSSROADS.

2. This report has been prepared in accordance with Annex (BB) of Reference (a) and covers only the operational aspects of Operation CROSSROADS.

3. The technical features of the tests will be covered by a separate report.

W. H. P. BLANDY

QUALIFIED REQUESTERS MAY OBTAIN COPIES OF THIS REPORT FROM DD
NOT FOR PUBLIC RELEASE

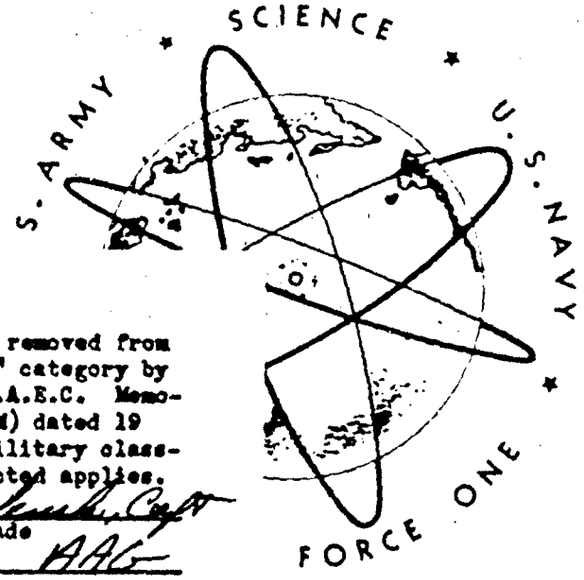
UNCLASSIFIED

QUALIFIED REQUESTERS MAY OBTAIN COPIES OF THIS REPORT FROM DDC.
NOT FOR PUBLIC RELEASE

UNCLASSIFIED

~~RESTRICTED~~

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)



This document is removed from "Restricted Data" category by authority of U.S.A.E.C. Memorandum (PTIDB:CLM) dated 19 January 1949. Military classification Restricted applies.

Signature and grade

Organization

28 April 1949
Date

CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

~~RESTRICTED DATA~~
ATOMIC ENERGY ACT - 1946
SPECIFICALLY RESTRICTED AS TO CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Commander, Joint Task Force One

UNCLASSIFIED

RESTRICTED

~~REPORT ON~~

(6) OPERATION CROSSROADS,

ATOMIC BOMB TESTS ABLE AND BAKER

[redacted])

CONDUCTED AT

BIKINI ATOLL, MARSHALL ISLANDS

ON 1 JULY 1946 AND 25 JULY 1946. VOLUME I.

[redacted]

[redacted]

****

(1) History of Director of Ship Material Dept.,

[redacted]

[redacted]

(11) 1946,

(12) 1v.

(14) XRD-206

RESTRICTED DATA

ATOMIC ENERGY ACT - 1946

SPECIFIC RESTRICTED AREA CLEARANCE NOT REQUIRED

USE MILITARY CLASSIFICATION SAFEGUARDS

SPECIFIC RESTRICTIONS ARE IMPOSED
USE MILITARY CLASSIFICATION

OPERATION CROSSROADS



1946

RESTRICTED

C O M M A N D E R J O I N T T

REPORT ON
ATOMIC BOMB TESTS AB
(OPERATION CROS
CONDUCTED A
BIKINI ATOLL, MARSH
ON 1 JULY 1946 AND

This document is removed from "Restricted Data" category by authority of U.S.A.E.C. Memorandum (PTIDB:CLM) dated 19 January 1949. Military classification Restricted applies.
Signature and grade
Organization
Date

TABLE OF CONT

PART I - INTRODUCTION

		PAGE
Section (A) -	Statement of the Mission	I-(A)-1
(B) -	Synopsis of the Operation	I-(B)-1

PART II - SUMMATION

Section (A) -	Summation by Commander Joint Task Force ONE	II-(A)-1
(B) -	Remarks by Deputy Task Force Commander for AVIATION	II-(B)-1
(C) -	Remarks by Deputy Task Force Commander for TECHNICAL DIRECTION	II-(C)-1
(D) -	Remarks by The CHIEF OF STAFF	II-(D)-1

PART III - COMMENTS

Section (A) -	Comments by Assistant Chief of Staff for PERSONNEL	III-(A)-1
(B)-	Comments by Assistant Chief of Staff for INTELLIGENCE	III-(B)-1
(C) -	Comments by Assistant Chief of Staff for OPERATIONS	III-(C)-1
(D) -	Comments by Assistant Chief of Staff for LOGISTICS	III-(D)-1

PART IV - ORGANIZATION

PART V - NARRATIVE

Section (A) -	Planning	V-(A)-1
(B) -	Preparations; Training of Task Groups	V-(B)-1
(C) -	Conduct of the Tests from the Operational Aspect	V-(C)-1

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION CATEGORIES

RESTRICTED

Subject: Report on Atomic Bomb Tests ABLE and BAKER (Operation CROSSROADS) Conducted at Bikini Atoll, Marshall Islands, on 1 July 1946 and 25 July 1946.

TABLE OF CONTENTS

(D) - Post Test Activities V-(D)-1

PART VI - CHRONOLOGY

Section (A) - Chronology of QUEEN DAY Operation VI-(A)-1
(B) - Chronology of ABLE DAY Operation VI-(B)-1
(C) - Chronology of WILLIAM DAY Operation VI-(C)-1
(D) - Chronology of BAKER DAY Operation VI-(D)-1

PART VII - SPECIAL REPORTS

Section (A) - Logistics VII-(A)-1
(B) - Communications and Electronics VII-(B)-1
(C) - Safety Plan (Including radiological) VII-(C)-1
(D) - Security Plan VII-(D)-1
(E) - Air Operations VII-(E)-1
(F) - Ship Operations VII-(F)-1
(G) - Photographic VII-(G)-1
(H) - Evacuation (BIKINI) VII-(H)-1
(I) - Salvage VII-(I)-1
(J) - Army Ground Equipment VII-(J)-1
(K) - Public Information VII-(K)-1
(L) - Generalized Target Layout Test ABLE VII-(L)-1
(M) - Generalized Target Layout Test BAKER VII-(M)-1
(N) - Oceanographic VII-(N)-1
(O) - Aerological VII-(O)-1
(P) - Air - Sea Rescue VII-(P)-1
(Q) - Observers (non-participating) VII-(Q)-1
(R) - Drone Boat Operation VII-(R)-1
(S) - Combat Information Center VII-(S)-1

PART VIII - PICTORIAL SUPPLEMENT

Best Available Copy

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART I - INTRODUCTION

Section (A) - Statement of Mission of Atomic Bomb Tests

1. The mission of this Task Force, as assigned by the Joint Chiefs of Staff, was to conduct atomic bomb tests;

(a) Primarily, to determine the effects of atomic explosives against naval vessels so disposed as to obtain a graded damage from maximum to minimum, in order to permit appraisal of the strategic implications of the atomic bomb.

(b) Secondarily, to obtain as far as practicable the effects of atomic explosives against ground targets and airplanes, and to acquire scientific data of general value.

RESTRICTED DATA
ATOMIC ENERGY ACT 1946
SPECIFIC CLEARANCE NOT REQUIRED
USE MILITARY INFORMATION SAFEGUARDS

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART I - INTRODUCTION

SECTION (B) - SYNOPSIS OF THE OPERATION

1. Origin and Authorization of the Atomic Bomb Tests.

a. Need for Tests.

The development and use of the atomic bomb in the course of a war emergency precluded a thorough scientific analysis of the new weapon's destructive force. Further information on its effect on shipping in general, and on Naval vessels in particular, was almost wholly lacking. Such a study was required by the defensive interest of the UNITED STATES, and the end of hostilities made it possible to organize and conduct the necessary tests.

b. Recommendation by General ARNOLD.

As early as 18 September 1945, General of the Army H. H. ARNOLD, then Commanding General, Army Air Forces, recommended to the Joint Chiefs of Staff that an atomic bomb be used against Japanese naval vessels.

c. Recommendations by Admiral KING.

On 16 October 1945, Fleet Admiral E. J. KING, Chief of Naval Operations, submitted a memorandum to the Joint Chiefs of Staff in which he discussed the desirability for tests of atomic bombs against ships, the number and nature of tests required, the availability of ships for targets, and selection of a target site. He recommended

that the Joint Chiefs of Staff initiate studies and make early recommendations to the President concerning the conduct of Atomic bomb tests, and that the project be kept in a very high security classification.

d. Recommendation of Admiral BLANDY.

Admiral BLANDY (Then Chief of the Bureau of Ordnance) in a letter dated 1 October 1943, to the Chief of Naval Operations regarding a "Preliminary Draft Plan for Demobilization" suggested that a stock of enemy vessels and surplus American ships should be maintained during peace time as a source of practice targets on which to test the effectiveness of all types of weapons. In this way, the Admiral said, naval architecture and construction could parallel the development of new implements of war.

e. Action Initiated by Joint Chiefs of Staff.

The recommendations by General ARNOLD and Admiral KING were given prompt consideration by the Joint Chiefs of Staff. The latter, in the middle of November, issued a directive to the Joint Staff Planners with instructions to consider, among other things, what tests should be made and what agency should be entrusted with the responsibility for the operation.

f. Report of Joint Staff Planners.

On 22 December, the Joint Staff Planners reported their conclusions, which may be summarized as follows:

(1) Three tests should be carried out; First priority to be an air detonation, second priority to be a surface or moderate underwater detonation and third priority the bomb to be detonated at a great depth below the surface of the water, of the order of several thousand feet
(2) The objective of the tests should be to ascertain the strategic and tactical significance of the atomic bomb as affecting the future com-

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED

position and employment of armed forces, and to determine what changes would be required in naval design and construction.

(3) The operation should be conducted by a Joint Task Force operating directly under the Joint Chiefs of Staff, with a commander appointed by them and assisted by a staff of Navy, Army, and Army Air Force personnel, and by civilian scientists.

(4) Advantage should be taken of the opportunity to study consequences of an atomic explosion on ground and air targets, and to obtain such other scientific data as might be practicable.

(5) The target group should consist of naval and merchant ships providing good representation of modern construction, and the ships should be so arranged as to obtain a gradation in the effects of the burst.

(6) Evaluation of results should be done by an evaluation board appointed by the Joint Chiefs of Staff from Army, Navy, Manhattan District personnel and civilian scientists.

g. Approval of Report of Joint Staff Planners.

A public announcement of the proposed tests was made on 10 December 1945, with the President's approval. On 10 January 1946, the President approved the report of the Joint Staff Planners, as submitted by the Joint Chiefs of Staff.

2. Formation of Task Force and Preliminary Planning.

a. Appointment of the Commander, Joint Task Force ONE.

On 11 January 1946, the Joint Chiefs of Staff appointed Vice Admiral W. H. P. BLANDY, U.S.N., as Commander, Joint Task Force ONE. Important points in the directive to him were:
(1) A statement of general requirements of the tests.

(2) Directions to submit a general plan, and to form a suitable staff composed of Army and Navy personnel and civilian scientists, giving appropriate consideration to the desires of the services.

(3) Authorization to deal directly with War and Navy Departments and the Manhattan District.

(4) Direction to collaborate with an evaluation board to be established by the Joint Chiefs of Staff.

b. Appointment of Evaluation Board by Joint Chiefs of Staff.

In conformity with the approved recommendations of the Joint Staff Planners, the Joint Chiefs of Staff appointed an Evaluation Board which had two functions: first, to be available to the Commander, Joint Task Force ONE, for advice during preparations for the tests; and second, to evaluate for the Joint Chiefs of Staff the results of the tests. The Board consisted of three civilians, two Navy Officers, and two Army Officers. Dr. Karl T. COMPTON, President of the Massachusetts Institute of Technology, acted as chairman.

c. Appointment of Evaluation Commission by President.

The President likewise appointed an Evaluation Commission which, though not expected to participate in the arrangements for the tests, was charged with the responsibility of cooperating with the Secretary of War and the Secretary of the Navy in undertaking a study of the tests.

The Commission was also instructed to submit to the President a record of its observations, findings, conclusions and recommendations. Like the Evaluation Board of the Joint Chiefs of Staff, the Commission was expected to be present at the tests

RESTRICTED DATA
ACT - 1946
SPECIFIC
USE

and prepare its reports on the site of operations. The Commission's Chairman was Senator Carl HATCH, of New Mexico.

d. Admiral BLANDY's General Plan.

Prior to the President's authorization for the tests, Admiral BLANDY had submitted a proposed plan to the Joint Chiefs of Staff in which he presented a general concept of the operation, and recommended that the joint task force be designated as Joint Task Force ONE and that the operation be given the code name "CROSSROADS". On 21 January, 1946, in compliance with his directive as Task Force Commander, Admiral BLANDY submitted a general plan, which was approved on 23 January. This plan:

(1) Proposed to conduct tests at Bikini Atoll, Marshall Islands, with transfer of natives to Rongerik Atoll.

(2) Listed target vessels and their arrangement for tests.

(3) Proposed dates and conditions of tests.

(4) Covered participation of Army Forces and Civilian scientists.

(5) Outlined security of information, safety of personnel, salvage, instrumentation and public relations.

e. Observers and Public Relations.

The intense and wide spread public interest in the tests produced great pressure for release of information. Opposing this was the necessity for safeguarding information vital to the national defense.

A series of directives were issued by the Joint Chiefs of Staff covering observers and classified information. Throughout all phases of the operation, public relations was a major problem.

f. Formation of Staff.

The following key personnel were obtained for the staff:

Major General W. E. KEPNER, U.S.A., as Deputy Task Force Commander for Aviation.

Rear Admiral W. S. PARSONS, U.S.N., as Deputy Task Force Commander for Technical Direction, with two principal assistants:

Dr. R. A. SAWYER, as Technical Director, and

Rear Admiral T. A. SOLBERG, U.S.N., as Director of Ship Material.

Major General A. C. McAULIFFE, U.S.A., as Army Ground Forces Advisor.

Commodore J. A. SNACKENBERG, U.S.N., as Chief of Staff.

All branches of the military services and other appropriate agencies provided professionally qualified military and scientific personnel to complete the staff requirements. Close liaison with bureaus and agencies most vitally interested was provided by direct representation on the staff.

g. Supporting Commands and Agencies.

The detailed preparation and execution of this tremendous operation necessitated the formation of subordinate commands and agencies and the enlistment of active support from other established commands and agencies.

RESTRICTED DATA
AEC ACT - 1946
CLEARANCE NOT REQUIRED

(1) Subordinate Commands.

Rear Admiral F. G. FAHRION, U.S.N., was designated Commander Naval Task Groups, JTF-1, with headquarters at Pearl Harbor, and as such was under CinCPAC, in command of all Joint Task Force ONE ships and activities in the Pacific area up until the time of the arrival there of the Task Force Commander at the start of the active phase of the operation.

Rear Admiral F. J. LOWRY, U.S.N., was designated Commander Rear Echelon and became the task force representative in Washington, D.C., during the absence of Commander Joint Task Force ONE.

(2) Subordinate Agencies.

Logistics and target readiness were expedited by the establishment of subordinate agencies. Logistic Representatives were installed at key transportation points to assist material and personnel movements. Representatives of the Director of Ship Material were sent to Navy Yards to assist in the preparation and instrumentation of target vessels.

3. Preparation and Detailed Planning.

a. Preparation of Bikini Atoll.

On 11 March 1946, the natives of Bikini were moved to Rongerik, under the direction of the Commander in Chief, Pacific Fleet. A survey unit arrived on 10 March, and commenced hydrographic and land surveys, installed navigational aids, located and blasted out numerous coral heads, and commenced biological and oceanographic studies. A naval construction battalion arrived on 20 March, and began the construction of instrument towers, boat landings, shelters and recreation facilities.

b. Target Preparation.

Preceding the official organization of the Task Force, preparation of the target ships was initiated in West Coast Yards and at Pearl Harbor, under the direction of the Chief of Naval Operations, and in accordance with detailed directives of the Bureau of Ships and the Bureau of Ordnance. Exceptions were the PRINZ EUGEN and NEW YORK which were prepared in East Coast Yards, and the NAGATO and SAKAWA which received initial preparation by ships force in Japan. The Task Force provided liaison with this work through representatives in the field and later assumed responsibility for final preparation at Bikini. Installation of the Army and Navy equipment to be subjected to tests proceeded throughout the preparations of the target vessels. Preparation for the testing of biological specimens proceeded in collaboration with the Bureau of Medicine and Surgery and the Department of Agriculture.

c. Technical Preparation.

A major problem was the design, procurement and installation of numerous scientific instruments required to measure the effects of the tests. These included instruments for observing shock waves, water pressures, air blasts, wave actions, deformation of structures and radioactivity. In addition quantities of standard instruments were required. Drone boats and aircraft had to be provided in order to obtain important measurements in radioactive zones. Laboratories were installed on ships and ashore to provide for instrument repair and test analysis. Atomic bomb preparations were carried out by the Manhattan District with the assistance of services provided by the Task Force. Preparations were made for the most extensive photographic coverage ever attempted, including underwater, surface, and aerial. Electronics preparations, in addition to caring for normal functions included provisions for remote controls.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

television, and extensive public relations communications. The latter required the installation of special radio-photo, radio-teletype and broadcast equipment. An extensive weather net was established to meet the need for accurate weather forecasts.

d. Logistic Preparation.

Funds for the operation were made available by the War and Navy Departments, the Manhattan District and other government agencies from their current maintenance appropriations. Logistic directives were issued by the Task Force covering the procurement of supplies, technical equipment, and facilities through normal supply channels and agencies. Stock levels were set up and re-supply procedures established. Among the major items of this program were the procurement of necessary air, sea and land transportation facilities; the arrangements for shore construction and equipment at the advance bases; and arrangements for logistic support through Commander Service Force Pacific and Army Supply channels.

e. Personnel.

Approximately 42,000 persons were required for the operation. The majority of these were Naval personnel and the Chief of Naval Operations granted the Task Force an allowance of 1600 Officers and 22,000 men for staff, target vessels, and other vessels held in commission especially for the tests. The crews of ships temporarily assigned from the active Fleet were not included in this allowance. To assist the filling of the above allowance, the Chief of Naval Operations gave the Task Force priority above the operating fleet and above all other special projects. The Bureau of Naval Personnel offered inducements to persons due for separation to remain on active duty for the operation.

Army personnel requirements were numerically less than the Navy's, and were met with the utmost co-operation by the War Department without setting up formal priorities.

Civilian scientists and technicians were in general employed by the Manhattan District and various Bureaus and Offices of the Navy Department, and to some extent by other government agencies.

f. Training.

In addition to special training for the operation, much basic military training was required since the majority of personnel were recent recruits. Prior to reporting for the operation, the training of many units commenced as follows:

Army Air Units in New Mexico and Southern California.
Navy Air Units in the San Diego Area.
Drone Boat Units at San Pedro and San Diego.
Salvage and Submarine Units at Pearl.
Target ships at conversion yards and on cruises in the vicinity thereof.

g. Preparation of Task Force Organization.

After full consideration of all task requirements, action was taken to obtain operational control of necessary ships, aircraft and other units. Certain units were required immediately for special equipping, training, transportation, shore construction, surveys, and other early tasks; while other units were not needed until the commencement of the tests. Operational control was in each case scheduled for the period that the unit was actually required. After the detailed composition of the task force became definite, the units thereof were organized into the following task groups:

1.1 Technical Group
1.2 Target Vessel Group
1.3 Transport Group
1.4 Army Ground Group

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
UNAUTHORIZED DISCLOSURE SUBJECT TO ADMINISTRATIVE AND CRIMINAL SANCTIONS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED - ATOMIC RESTRICTED DATA - CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

1.5 Army Air Group
1.6 Navy Air Group
1.7 Surface Patrol Group
1.8 Service Group

Appropriate task units were organized within the task groups in accordance with type of function.

b. Preparation of Operation Plan and Supporting Annexes.

On 28 January 1946, Commander Joint Task Force ONE issued an informatory letter summarizing the information and outlining the intentions regarding the atomic bomb tests. This letter, supplemented by additional directives issued in conferences, was the basis for the preparation of the Operation Plan. Due to the complexity of the operation and the large number of planning agencies, coordination of the Plan's many annexes was most difficult and was secured only through frequent conferences for mutual adjustment. Advance copies of tentative plans were sent to task group commanders for their guidance in preparation and training. The Operation Plan was completed and distribution commenced via special air courier on 26 April, 1946.

4. Early Overseas Movements to Forward Area.

The Construction Unit and ground crews of the Army Air Group were moved to the forward area in March by ships of the Transport Unit. Five ships of the Transport Unit remained at Bikini to support the Construction Unit. The Army Air Group set up bases at Kwajalein and Eniwetok. The Survey Unit moved to Bikini during March. Five ships of the Salvage Unit arrived at Bikini during March and April and commenced planting moorings. The NAGATO and SAKAWA proceeded from Japan to Bikini during March and April.

5. Tests Postponed Six Weeks by Order of President.

The Task Force as a whole was in readiness to move forward when the President on 23 March 1946, postponed the date of the first test from 15 May to

1 July. The reason for this postponement had to do with the availability of congressional and other observers, and had its origin outside of the Task Force, which was entirely prepared to meet the 15 May date. The general movement of the Task Force to the target area was therefore delayed; the additional time thus made available was used for further training, for checking and augmenting the instrumentation of the target ships, and for a somewhat longer period at Bikini in advance of the first detonation.

6. Movement of Task Force to Forward Areas.

a. General Movement.

The Task Force moved forward between 1 May and 2 June, with westward shipping heavily concentrated in the latter two weeks of the period.

b. Commander, Joint Task Force ONE, Assumes Operational Command.

From 11 January through 14 May, Commander Joint Task Force ONE coordinated and supervised all activities of Operation CROSSROADS from his headquarters in Washington. During this period, operational control of the ships assigned to the task force was exercised by Commander Naval Task Groups, JTF-1, (Rear Admiral Fahrion) under the Commander in Chief, Pacific Fleet. On 15 May, operational control passed to Commander Joint Task Force ONE, and he hoisted his flag in the U.S.S. MT. McKINLEY (AGC-7), then at Pearl Harbor.

7. Completion of Preparations Overseas.

a. Final Preparations of Units.

During June, preparations for the tests were completed; target ships were moored in position, instrumentation was completed and checked, both on the island stations and in the target ships, and numerous rehearsals were held. The rehearsals

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AS TO CLEARANCE NOT PROVIDED
USS MISSOURI

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
RESTRICTED USE MILITARY CLASSIFICATION SAFEGUARDS

- -

were particularly important; training in the United States could not give practice in coordinating the complicated movements of the operation, and thorough coordination was essential to the success of the operation. Each phase was rehearsed separately, and then on 24 June a full scale dress rehearsal was held. It included every detail of the ABLE Day Operation, from the evacuation of the lagoon and the drop of a simulated atomic bomb, to the return of the observer fleet and the careful testing of the target ships for radioactivity.

b. The Problem of Meteorology.

The postponement of the first test from 15 May to 1 July, placed the dates for each test well within the period of unfavorable weather prevailing in the Marshalls during the summer months. Therefore it was most necessary to the success of the first test to forecast, with accuracy, weather conditions at least 24 hours in advance. It was not enough that the day merely be suitable for high altitude bombing, since the necessary presence of many observing and instrument carrying ships required a wind condition which would permit them to carry out their functions without danger of radiological contamination. Weather conferences were held daily at 0830, with the Task Force Commander and key staff members being present, and at each conference a practice decision, affirmative or negative, was given as to the suitability of the following day. The accuracy of the forecast and the wisdom of the decision were checked with actual conditions 24 hours later. In this way, leading members of the Joint Task Force staff gained thorough familiarity with the problems of meteorology in its relationship to Operation CROSSROADS.

3. Test ABLE.

a. Operations 30 June and 1 July.

By the end of June the Task Force was ready to execute Test ABLE at the first opportunity.

At the morning weather conference on 30 June, the Aerology Section predicted favorable weather conditions for the following day. The Commander, Joint Task Force ONE, set 1 July as ABLE Day with HOW Hour (the intended hour of detonation) as 0830. The evacuation of all non-target ships was started immediately and was completed (except for last-minute ships) by nightfall. The few remaining ships and personnel completed the evacuation by sunrise the following morning. The ships took stations in designated areas from 10 to 30 miles distant from the target center. Shortly before 0600 HOW Hour was postponed until 0900, as at 0530 cloud conditions at Bikini looked doubtful and the bombing plane was held on the ground an extra 16 minutes, when verification of prospective good cloud conditions for HOW Hour was obtained.

At approximately 0830 one drone aircraft went out of control and crashed into the sea and its two control aircraft were returned to base. With this exception there were only minor variations from the preconceived pattern of intricate movements of ships and planes.

There was relatively little radiological contamination of the lagoon except on the targets themselves, and by nightfall of ABLE Day it was possible to return the great majority of the ships of the task force to the lagoon.

9. Preparations for Test BAKER.

Detailed preparations for Test BAKER were begun immediately after the completion of Test ABLE. Damaged vessels were repaired; target ships were moored in the new array; and instruments and cameras were reset. Lessons learned in Test ABLE made it necessary to make certain changes (relatively minor, however) in the plan for BAKER Day, and other changes were made as a result of the rehearsals held between the two tests. A full dress rehearsal of Test BAKER was held 19 July, and though a complete execution of the rehearsal was prevented by bad weather, it was felt that the Units of the Task Force were

RESTRICTED DATA
(AEC) ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED

adequately trained, and sufficiently familiar with their roles to enable Test BAKER to be carried out on 25 July, a target date which had been set soon after ABLE Day.

10. Test BAKER.

a. Operations 24 and 25 July.

On the strength of a favorable weather prediction by the Aerology Section at the morning weather conference on 24 July, the Commander Joint Task Force ONE designated 25 July as BAKER Day, and HOW Hour as 0835. The evacuation of the lagoon followed the same pattern as had been used on ABLE Day, and was completed without major incident. The plan was carried out precisely as scheduled and the bomb was successfully detonated exactly as planned.

b. Contamination of waters of lagoon.

The detonation of the BAKER Day bomb below the surface of the water caused a heavy radiological contamination of that portion of the lagoon in which the operating ships had heretofore anchored; consequently the majority of the operating ships were kept at sea for the time being, and those ships which were brought into the lagoon were anchored near the entrance. As time went on, more and more ships were brought into this "lower" anchorage, and after about five days, ships were able to resume their regular berths.

11. Disposition of Targets and Dissolution of the Task Force.

After Test BAKER, units were released from the Task Force as soon as their services could be spared. By 10 August, activities had been reduced to detailed examination and salvage of target ships, and survey and construction in preparation for Test CHARLIE. On that date his presence being required in Washington in connection with evaluation of results and with discussions as to further tests,

the Task Force Commander departed from Bikini in the MT McKINLEY for Pearl Harbor. After conferring with CinCPAC there, he hauled down his flag on 18 August and departed by air for Washington. At this time, command of JTF-1 activities in the Pacific was passed to Rear Admiral FAHRION, with title of Commander Naval Task Groups JTF-1 and Commander Advance Echelon, JTF-1; in this capacity, Rear Admiral FAHRION reported to CinCPAC for additional duty.

Because of the radiological contamination of most target ships, and of the waters of Bikini lagoon, it was decided late in August to decommission all targets that could not be sufficiently decontaminated to be manned, and to place them in care taker status at Kwajalein. The movement to Kwajalein was completed early in September.

Meanwhile, in late August, it was determined as result of extensive study and laboratory tests (which had been in progress since BAKER Day), that all operating (non-target) ships which had spent any appreciable time in Bikini lagoon since Test BAKER might have picked up a potentially dangerous amount of radioactivity as result of concentration in evaporators, salt water lines, etc. of radioactive products from the waters of the lagoon. All ships had been monitored before leaving Bikini, but the monitoring facilities had not been adequate to detect all the possible sources of hazard. Accordingly, arrangements were made to assemble such ships at certain designated points (principally San Francisco and Pearl Harbor) for further monitoring, decontamination and clearance. This required a considerable effort over a period of months and greatly delayed the return of these ships to their normal assignments.

On 7 September the President announced that Test CHARLIE was indefinitely postponed.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY DECLASSIFICATION

RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

During October plans were formulated with the Chief of Naval Operations for the return of designated target ships of particular interest from Kwajalein to Bremerton and Hunters Point for detailed structural and radiological examination.

In October the preliminary examination and securing of target ships at Kwajalein was completed. On 23 October these vessels and their caretaking unit were detached from Joint Task Force ONE and turned over to the Atoll Commander Kwajalein, under the Commander in Chief, Pacific Fleet. In the meantime other ships of the task force had been detached, as their duties were completed, so that by the end of October, no ships remained.

The Task Force was dissolved on 1 November, 1946, in accordance with directives of the Joint Chiefs of Staff, and a JOINT CROSSROADS COMMITTEE was established to complete the preparation of technical reports.

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART II - SUMMATION

SECTION (A) - SUMMATION BY COMMANDER JOINT TASK FORCE ONE

1. The two atomic bomb tests known as Test Able (air burst) and Test Baker (shallow underwater burst) were successfully carried out by Joint Task Force ONE, under my command, on 1 and 25 July 1946, in exact accordance with the directives of the Joint Chiefs of Staff. The third (deep underwater) test was cancelled by the President on 7 September 1946. The conduct of the two tests followed precisely the plan which had previously been submitted to the Joint Chiefs of Staff and approved by them; this plan proved to be entirely adequate from a technical standpoint, as well as operationally practicable. This report covers only the organizational and operational aspects of the tests; the technical phases are still under analysis and will be discussed fully in the Technical Report, which will follow this (operational) report by about one month.

2. The authority granted to me in the carrying out of these tests proved to be entirely adequate, and the cooperation received from the War and Navy Departments, and from non-military agencies, left nothing to be desired. The magnitude of the operation, coming as it did at a time when the pinch of demobilization was being felt throughout the services, was such that the operation was possible only at the price of severe sacrifices elsewhere in the military and naval establishments and in the Manhattan District. The greatest impact, of course, was felt by the Pacific Fleet, and I should be remiss if I did not mention the unfailing support rendered by the Commander in Chief Pacific Fleet and all his subordinates, notably the Commander Service Force and the Atoll Commander, Kwajalein.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION [illegible] PERMANENCE NOT REQUIRED
[illegible]

RESTRICTED DATA
AT MIDNIGHT - 1946
RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION GUIDANCE

3. The safety of personnel received primary consideration throughout the entire operation. The most strenuous and meticulous efforts were directed toward protection, not only from the blast, heat, and optical effects immediately accompanying the detonation, but also from the ensuing and continuing radioactivity. This latter proved to be by far the greatest hazard. A severe shortage of radiological safety monitors existed after Test Baker, which greatly slowed the salvage and inspection of targets, but this was not allowed to jeopardize the safety of personnel. A dysentery epidemic threatened the health of the Task Force at the very start of the operation, but was brought quickly under control through quarantine and medication. There were no deaths attributable directly to the operation, and only two deatns incident thereto. (One drowning and one aircraft crash). There have been no casualties from overexposure to radiation, and as far as can be determined at this time, no man was so exposed as to give rise to apprehension that he might become a casualty at a later date. In fact, there is no evidence that any person suffered any ill effects whatever from either of the two atomic bomb explosions at Bikini.

4. Public relations was a major problem throughout the entire operation. The intense interest of the public in the tests created a tremendous demand for news coverage. The inclusion of numerous foreign observers presented a difficult security situation. A vociferous minority actively opposed the tests, and deluged the Task Force Commander with letters of criticism and alarm. Such letters were answered in the most courteous and reassuring manner. The Task Force Commander and senior members of the staff made numerous radio talks and public speeches, and held frequent news conferences, in an effort to satisfy the demand for information and allay inordinate fears. The news coverage finally evolved is believed to be the most complete ever obtained and included press, radio-voice, radio photo, and motion picture. Every effort was expended in cultivating cordial relations with United Nations observers and in making non-classified information readily

available to them. In spite of the extraordinarily complete news coverage and the presence of foreigners, it is considered that security of classified information was fully maintained in accordance with directives of the Joint Chiefs of Staff.

5. The inexperience of the new recruits, constituting the majority of our military personnel, added considerably to the basic difficulties of this complex operation. By expending considerable effort on elementary training, and vigilantly detecting and correcting the frequent errors arising from inexperience, the military forces carried out their missions with gratifying success. Inexperience of personnel became critical only as it affected the maintenance and operation of the numerous small craft of the Task Force; which, unlike the larger vessels, had no adequate leavening of experienced personnel. Of additional concern was the inexperience of civilian scientific personnel in military administrative and operational procedures and techniques, but the high average intelligence of such men enabled them to learn quickly and to adapt themselves readily.

6. Radioactive contamination resulting from Test Baker was even more severe than anticipated, and created difficult post-test problems with respect to disposition of targets. It soon became apparent that it would not be practicable to decontaminate the bulk of the surviving targets sufficiently to permit their early return to the U.S. Accordingly, they were towed to Kwajalein and decommissioned there. A caretaker unit was established, and arrangements made to tow the more interesting specimens to mainland yards, as their condition and the availability of towing facilities permit, for docking and detailed examination.

7. Another radiological problem which arose was with regard to the operating (non-target) ships. No such ship was exposed to sufficient radiation as to endanger personnel,

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
[illegible] PROHIBITED

but it was found that radioactive matter tended to accumulate in piping and machinery (notably evaporators) and in the marine growth on the hulls. Thus a ship which had been in water of only very low radioactivity might, over a period of time, build up dangerous concentrations. In most cases danger to personnel would exist only if the affected part where opened up or if the hull were dried and then scraped; nevertheless, the hazard was present and must needs be eliminated unless unacceptable restrictions were to be placed on operation and maintenance. Each ship was monitored before leaving Bikini, and instructions issued which would safeguard the personnel pending decontamination. Then, in cooperation with CNO, BuShips, BuMed and CinCPac, a program was instituted whereby all such ships would be ordered to certain designated ports, principally San Francisco and Pearl Harbor for decontamination and clearance. This program is now well under way and progressing satisfactorily, with the supervision of decontamination and clearance having been taken over, jointly, by BuShips and BuMed.

8. The above radiological problems were made more acute by an increasing shortage of monitors and radiological instruments. The great majority of monitors were civilians from the staffs of educational institutions, and their contracts generally expired by early September. Constant use produced high attrition of instruments and over-taxed instrumental repair and calibration facilities, which in view of the special nature of the instruments, were not over-abundant. The problem was met in various makeshift ways which gave results which sufficed for the moment. Looking to the future, though, it was obvious that a well-trained corps of monitors is essential to any military organization which hopes to cope with atomic warfare; accordingly a Radiological Safety School was set up in Washington by the Task Force, and arrangements made with the War and Navy Departments for a continuation of the program. The first class from the school has already finished its course and is now obtaining practical experience on the ex-targets at Kwajalein; these officers will

thereupon be available to constitute the working nucleus of a radiological safety organization.

9. I should like to express my appreciation of the assistance and cooperation afforded me by the Joint Chiefs of Staff's Evaluation Board and by the President's Evaluation Commission. Their excellent advice and constructive criticism were of great value to me, and I particularly appreciate the friendly and cooperative spirit of the individual members which made our relations so pleasant.

10. The intense public interest in the tests was reflected in the enthusiasm of the Task Force personnel. Many of them volunteered for the tests. Others extended their enlistments or deferred their separation from the service in order to witness the tests. All were highly interested and enthusiastic. All labored indefatigably in the performance of arduous and highly important tasks, many of them without public recognition of any sort, or even a chance to witness the tests. (Many of the hardest-working members of the Task Force were not present at Bikini on the days of the tests, or were on watch at machinery and instruments below decks). I must commend them all, individually and as a whole, for their unselfish contributions to a big job well done.

11. In a Task Force embodying large representation from every branch of the military services and many civilians, an appreciable amount of inter service jealousy and discord might have been expected. Throughout the CROSSROADS Operation, friction was notably absent. The teamwork between all elements of the Task Force was outstanding. This spirit of friendly cooperation characterized individuals as well as organized units, and I desire particularly to express my appreciation to representatives of all the armed services, and to the many civilian scientists who were with us.

RECOMMENDATIONS

12. Tests Able and Baker have shown us about [illegible] of

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC AUTHORIZATION REQUIRED
U.S. [illegible]

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED AUTHORIZED FOR CLEARANCE NOT REQUIRED
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
CJTF - ONE MILITARY CLASSIFICATION SAFEGUARDS

---

the effect of the atomic bomb against naval (or merchant) vessels. Inescapably, however, many important questions on this vital subject are going to have their answers in the blank 10% which is represented by the postponed Test Charlie. Our technical information cannot be considered complete until we have conducted a properly-instrumented deep water test. Much of the initial planning, and even of the construction of moorings and other facilities has already been done in conjunction with CROSSROADS. A much smaller force would be required than was needed for CROSSROADS. (Detailed requirements have already been submitted in my serial 4224 of 24 July). It is recognized that now that it has been "indefinitely postponed", many considerations connected with postwar cut-backs will militate against its ever being held. Nevertheless, a 100% rather than a 90% knowledge of this vital subject is essential to the safety of the country, and I therefore recommend that Test Charlie be conducted as soon as conditions can be made to permit.

13. Discussion of the destructive effect of the atomic bomb is properly left for inclusion in the Technical Report. However, it is a clear non-technical fact that the bomb's destructive capacity dwarfs anything ever before produced, and in fact is of an entirely different order of magnitude. Further, the radioactive contamination produced by a detonation under conditions similar to Test Baker appears to constitute a blow which is even more paralyzing than the actual blast and heat effects. It is absolutely vital to the safety of the United States that no country obtain an ascendancy over us in the production or use of this bomb. Accordingly, unless and until atomic weapon development is prohibited by international agreement, I recommend that development of the military applications of this weapon be pushed with all possible vigor and that underwater uses receive special consideration. Defensive measures should be stressed, too, and as a first step in this direction the training of a corps of radiological monitors (para. 8 above) should be pressed, and adequate safety and decontamination organizations established in all military and naval commands, especially those responsible for important

port facilities and shore installations. Aside from their military uses, monitors will be required in considerable numbers, in the future, as commercial uses of atomic energy are developed.

14. With regard to changes in ship design indicated as necessary for atomic warfare by these tests, naturally all which can be effected without marked reduction in other fighting qualities should be prosecuted without delay. Decision on others can be withheld until the United Nations either accomplish a satisfactory international control system for atomic energy, or reach a complete impasse. Even with a satisfactory peacetime control, I trust that the lessons of Bikini - in design, radiological safety, tactics and strategy, for all the armed forces - will not be forgotten, for in war, peacetime controls do not function, and peacetime promises are often forgotten. Our only course is then to assume, as we did with poison chemicals in World War II, that the enemy if technically capable, may develop and use atomic weapons at some stage of a long war, and prepare ourselves as quickly as possible both to defend and to retaliate against them.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS [illegible] PROHIBITED
USE WITH [illegible]

RESTRICTED DATA
RESTRICTED
SPECIFIC RESTRICTIONS

C C M M A N D E R J O I N T T A S K F O R C E O N E

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 26 JULY 1946

PART II

SECTION (B) - REMARKS BY DEPUTY TASK FORCE COMMANDER FOR AVIATION

LESSONS LEARNED

1. Army and Navy weather reconnaissance aircraft were indispensable to the successful accomplishment of the aerological mission. The organization, set up to obtain the weather information that was so vitally important for the conduct of the tests, was able to provide accurate forecasts and factual weather information largely because of the data obtained by weather reconnaissance aircraft. The mobility of these aircraft permitted the collection of weather reports equivalent to the dense network of surface weather stations, and, in addition, they provided more detailed reports of cloud conditions than possible from surface stations. Care must be taken not to overlook the value of weather reconnaissance aircraft when meteorological information is of vital importance, or to underestimate the number of aircraft that are necessary.

2. The value of photography of all types was emphasized by this operation. There is no doubt that still photographs and moving pictures afford one of the most economical, rapid, and accurate methods of recording data and events. On numerous occasions photographs were instrumental in detecting the inadequacies and inaccuracies of human observations. Moreover, photographic information may be studied leisurely for as long as necessary when analysis and evaluation are in process.

3. The soundness of having organizational air lift, such as Task Unit 1.5.4, was proved. Its usefulness in assisting in carrying peak loads, its ability to rapidly move personnel and cargo to and from points located off the established ATC and NATS lines, and its utility in performing miscellaneous tasks, demonstrated the advantages of having a unit of this type included in the Task Force organization. Estimated or planned air lift requirements may be given to establish air transportation agencies such as ATC and NATS, but in addition, organic air transport units should be provided in future Task Forces to take care of unforeseen emergencies and the almost inevitable humps which occur in air traffic.

4. In the initial planning the need for 24 hour voice radio communications between the Deputy Task Force Commander for Aviation and his subordinate Air Commanders was not foreseen. As the operation progressed it became more and more apparent that such service was required. To provide it, utilization was made of press circuits to KWAJALEIN, and the XJ-4 voice radio circuit which had been set up primarily for the Deputy Task Force Commander for Technical Direction. After ABLE Day the last circuit was turned over to the Deputy Task Force Commander for Aviation. These expedients were not entirely satisfactory. It is vital that the Deputy Task Force Commander for Aviation have 24 hour voice radio communications or radio teletype conference facilities, with security safeguards, to his air units. This operation demonstrated the necessity for rapid and adequate communications to meet the need for urgent last minute conferences without which the efficiency of air operations might well have been jeopardized.

5. In the logistic support furnished at KWAJALEIN such items as water and electricity were at times inadequate. It was also necessary to divert personnel of air units

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS
RESTRICTED

- -

from training and operations to stevedore and police work. While in these instances the deficiencies caused only minor inconvenience, an aggravation of these conditions could have jeopardized the air operations. It is important that a clear understanding of responsibilities for logistical support be had by all echelons of command. Facilities and services available should be surveyed early and any deficiencies brought to the attention of the Commander responsible. It is desirable in a specialized operation of this type, which is of short duration and limited scope as compared with full scale wartime operations, that air units be made as self sufficient as practicable, thus obviating much coordination with and reliance upon logistical agencies that are not adequately manned or equipped to support an operation of this kind.

6. The ABLE Day bombing produced a gross error which was four times the expected probable bombing error. A careful analysis of the possible causes for this error resulted in finding that the crew performed its functions correctly and that there was no malfunction in the operation of the bombing equipment. Further study is being made on this subject.

7. The analysis of the bombing error also emphasized the need for more adequate data as to the position of the bombing plane during the bombing run by the use of ground radar, data recording motion picture cameras, and a better distribution of accurately surveyed ground check points.

8. Despite all efforts to the contrary on the part of the Task Force Commander and his officers in charge of public relations, news releases and publicity in the majority of

cases tended to create, in the mind of the public, the impression that the tests were primarily a naval activity rather than a joint effort in which all services were participating and in which they were equally entitled to praise or censure. That this impression was easily, though unintentionally, made is not difficult to understand. One of the first purposes of the tests was to determine the effect of atomic bombs against naval vessels. The initial press releases describing famous naval vessels to be used as targets probably created the first impressions, accenting in the public mind the part of the tests naval in character. The locale of the tests, news items based upon the activities aboard ships of the Task Force, tended to heighten this aspect. No doubt the fact that the Task Force Commander and the ranking public relations officer were Naval Officers, the housing of the Commander and staff in the Navy Building, the predominance there of Navy Officers at early conferences and on duty in Task Force offices, furthered the effect upon correspondents and observers that this was primarily a Navy effort. At sea, Navy facilities for releasing press items were convenient, and headlines actually carried such comments as "Navy Atom Bomb Tests". A combination of these and other circumstances apparently tended to influence reporting and to a certain degree prevented the public from receiving a precise conception of the exact nature of the operation and the efforts being made by all the services. In addition, there were occasional unauthorized releases which further detracted from the efforts of the Task Force Commander to present the joint efforts of the operation. Obviously the influences described above made difficult the task of securing perfectly balanced, objective reporting of Operation CROSSROADS. In future operations of this kind great care should be exercised in preparing the initial releases less impressions are made that will be difficult to erase later on. Publicity in joint operations should be a matter of active and continued study to reach solutions which will satisfy all agencies participating. It is believed desirable

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC CLEARANCE FOR REQUIRED

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED DISCLOSURE SUBJECT TO CRIMINAL SANCTIONS
USE MILITARY CLASSIFICATION CATEGORIES

---

that publicity and public relations be controlled through a committee composed of representatives of the interested services. By this method the interests of all concerned would be fostered and protected and differences reconciled. Deadlocked issues could be settled by the Task Force Commander.

9. An operation of this type cannot be surpassed as a medium for training commanders and staffs in joint operations. The experience gained in planning, operations, and logistics is greatly increased by the fact that the problem is "live" and of great interest as compared with normal peacetime maneuvers which may tend to be lifeless and dull because they lack an objective that generates appeal, enthusiasm, and interest.

COMMENTS

1. Since the task of using atomic bombs in the defense of the UNITED STATES must fall upon our Armed Forces, it is of the utmost importance that they have a complete understanding of the tactics and techniques used in their employment and be thoroughly trained in their use. The organization, training, equipment and deployment of units to use the atomic bombs should be carefully reviewed and perfected. Obviously there can be no lengthy period for reorganization and training after the outbreak of hostilities. The ability to use this weapon must keep pace with its development in the scientific laboratory. An future war may certainly include the use of atomic bombs by both adversaries in which case victory may will go to the nation which most quickly and completely exploits the capabilities of this new weapon.

2. Since guidance and direction are necessary to units in the field, there should be established a section, on

- -

the staff of each of the major services, which will concern itself with the problems involved in the military use of atomic weapons. These should be the focal points at which our present knowledge should be gathered, the lessons learned in Operation CROSSROADS digested, and further advances initiated to exploit the use of atomic weapons for both offensive and defensive purposes.

3. The need for the establishment of a Radiological School seems most apparent. The radioactivity associated with the use of the atomic bomb is a new and dangerous aspect not heretofore encountered in military weapons. It concerns the civilian population as well as the military. A Radiological School would provide an initial source for the dissemination of information relative to safety precautions in the handling of atomic weapons and the decontamination of exposed equipment. It could train radiological monitors and inspection teams. Suitable methods of passive defense and of counteracting the effects of radioactivity might be studied and developed for the safety of troop concentrations, industrial centers, and the civil population of heavily populated areas.

4. It is apparent that histories and reports of joint operations such as CROSSROADS will have great value and importance as references in the future. To insure balance and true perspective, it is desirable that each of the participating services contribute qualified personnel to collaborate in the preparation of reports and histories.

5. The variety and magnitude of the tasks performed by the Air Operations Section (J-32), and the importance of these tasks in the operations of Joint Task Force ONE, can hardly be over-emphasized. Under direction of the Deputy Commander for Aviation this section accomplished all air planning, evolved the Air Operations Plan, assisted in supervising its execution, and devised methods to meet the day to day

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED
USE WITHOUT
CLEARANCE NOT REQUIRED
AVIATION

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED MILITARY CLASSIFICATION CATEGORIES

problems encountered in training and in the employment of aircraft in the Atomic Bomb Tests. It was responsible for supervision of air-sea rescue activities within 150 miles of BIKINI. The air transport operations of Joint Task Force ONE in itself was comparable to the operation of a large commercial airline. In view of its importance in Joint Task Force operations, in future operations of this type, the Air Operations Section should be separated and on an equal plane with other major sections. There is no reason why the close coordination cannot be effected that existed between Personnel Section (J-1), Intelligence Section (J-2), Operations Section (J-3), Logistics Section (J-4). As in standard staff procedure the section having the paramount interest in an event or activity would be charged with the responsibility for coordination with other sections of the staff. The wide variance in technique and tactical employment of air operations, as contrasted with surface vessel operations, makes a division in the Operations Section desirable. It is not necessary to carry this principle into the Personnel, Intelligence, and Logistic Sections where the breach is not so marked. The Aerology Section should be a part of the Air Operations Section (J-32) rather than Operations (J-3) under the plan proposed above.

6. The Deputy Task Force Commander for Aviation was not always promptly furnished with copies of important communications pertinent to his office. Navy procedure was followed throughout by the Office of the Flag Secretary in effecting distribution of correspondence. It is suggested that in Joint Task Forces a combined Flag Secretary and Adjutant General be employed and that the administrative procedures of all services be considered and a satisfactory compromise procedure be adopted.

7. At times there was confusion in the minds of originators of messages as to how a message could be delivered to its destination without getting lost or delayed en route. This confusion was due primarily to the lack of administrative call signs for Army Commands and agencies. Many messages required extensive routing instructions within their bodies directed at signal centers to prevent mis-routing and delays. These instructions had to be written by staff officers unfamiliar with the communications system. The assignment of administrative call signs to all Army agencies and thorough dissemination throughout the Army and Navy agencies would have eliminated this confusion not only for the writers but also for the Personnel who handled the messages.

8. Due to intensive boating between BIKINI and the Target Array which, for Test CHARLIE, will be outside the lagoon on the southwest side, the Helicopter Unit should be expanded to provide passenger shuttle.

9. The use of PBM-5A's rather than PBM-5A's for the KWAJALEIN-BIKINI shuttle is desirable in order to eliminate boating of passengers, mail and freight between EBEYE and KWAJALEIN.

10. It is questionable whether information relative to the altitude from which the atomic bomb can be dropped should be restricted for reasons of security. It is self evident that the safety of the bombing aircraft is the primary factor governing the altitude from which the bomb is dropped.

RECOMMENDATIONS

It is recommended that:

1. Studies now being conducted on the ballistic

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED INFORMATION CONTAINED
USE MILITARY CLASSIFICATION GUIDANCE

characteristics of the present atomic bomb be continued.

2. The procedures developed during this operation for the use of ballistic wind data to attain accurate bombing be incorporated in standard visual bombing methods.

3. The organization, training, and equipment of air units designated to use atomic bombs be perfected.

4. A staff section in each of the major services be established to aggressively follow up the lessons learned and continue to give direction and impetus to the development of the tactics and techniques of atomic warfare.

5. A Radiological School be established to disseminate information and instruct personnel in safety precautions and passive defense measures necessary to counteract the dangerous effects of radioactivity.

6. Thought be given to the feasibility of developing a bomb case suitable for the housing of either high explosive or atomic charges.

7. The development and use of weather reconnaissance aircraft be furthered.

8. In future joint operations similar to Operation CROSSROADS air units be made as self sufficient logistically as practicable.

9. Joint Army-Navy Communications Procedure be utilized throughout all service at all times so that joint operations will not be delayed due to the necessity for

additional training for personnel from the services involved.

10. The use of Helicopters in Test CHARLIE be expanded to provide passenger shuttle between the Target Array and the BIKINI anchorage.

11. PBM-5A's be used for the KWAJALEIN-BIKINI shuttle in Test CHARLIE.

12. Publicity be controlled through a committee composed of representatives of the interested services, and initial press releases be carefully prepared to insure a balanced and complete presentation of information to the public.

W. E. KEPNER
Major General, U.S.A.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMIT REQUIRED

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946, AND 25 JULY 1946

PART II - SUMMATION

SECTION (C) - REMARKS BY THE DEPUTY TASK FORCE COMMANDER FOR TECHNICAL DIRECTION

GENERAL

1. The Deputy Task Force Commander for Technical Direction had, under the immediate direction of the Task Force Commander, overall supervision of all technical features of the tests, and was assisted in his duties by the technical staff. The Technical Staff was divided into two main groups:

(a) The Technical Director and his staff which were charged with all scientific instrumentation, measurements, and observations including the preparation of the bombs and the firing of the bomb used during the second test.

(b) The Director of Ship Material and his staff who were charged with the preparation and inspection of target ships and test material exposed on target ships and on shore.

2. In addition, the Deputy Task Force Commander had in his immediate staff assistants for aviation and special projects, the Scientific Advisor, the Technical Historian and the Historians' staff, the Safety Advisor, and the Radiological Safety Advisor. These advisors also acted as direct advisors to the Task Force Commander. The Radiological Safety Advisor was also charged with overall responsibility for radiological safety measures by the Task Force and had access to the facilities of the Manhattan Engineer District in

the discharge of his duties. The Deputy Task Force Commander reported to the Commanding General, Manhattan Engineer District for technical supervision of those features of the test which pertained to Manhattan Engineer District activities.

3. The Technical Staff was composed of officers and enlisted men of the various services and a large number of civilians engaged in scientific and technical work. The organization of the Technical Staff was necessarily unorthodox since it had to combine features of organization applicable to non-military scientific organizations with features normally found in military and naval operational and technical groups. This organization functioned very successfully and the division of the staff into two main groups under the Director of Ship Material and the Technical Director proved to be highly desirable and successful from both an administrative and operational viewpoint.

4. Operation CROSSROADS in its technical and scientific features represented perhaps the largest assembly of scientific and technical talent ever to take place in a field operation. Almost all branches of scientific and engineering endeavor were represented and many of the leading educational, scientific and technical institutions of the country gave freely of the services of their most eminent personnel in order to make Operation CROSSROADS a success. During the entire operation it was necessary for scientists and military personnel to work with the greatest cooperation, for many of the conditions were entirely foreign to their normal way of life. A large amount of originality and mental flexibility was required to be displayed by all in order to cope with the ever present difficulties of location, weather, and

RESTRICTED DATA

other features peculiar to field operations of such a large scope. The fact that the scientific instrumentation and ship preparation and inspections programs were carried out with complete success is a credit to the many men who devoted their energy and time to Operation CROSSROADS.

LESSONS LEARNED

5. Preparation.

The most hopeful lesson of this technical operation was the demonstrated ability of military personnel of all branches of the services and scientific civilian personnel with many different types of backgrounds to carry out successfully and with the greatest harmony a large technical operation in the field.

6. The technical features of the tests and their results are covered fully in the Technical Report and therefore will not be touched upon in this section. However, mention should be made for the sake of emphasis of the one lesson from test BAKER which has served to punctuate the deadliness and awesomeness of the Atomic Bomb: the radiological danger. The extent of the radiological hazards after Test BAKER were vividly impressed on the consciousness of all of the members of the Task Force and it is hoped that the impact of this tremendous problem will be fully realized throughout the Services, the scientific world, and the nation at large.

7. It was demonstrated that in such a complex and unusual operation as CROSSROADS it is mandatory that the technical (scientific) and military (operational) staffs interlock at the high echelons.

This requirement had been anticipated and had led to the decision to have the duties of C.T.G. 1.1 (Technical Groups) and the Deputy Task Force Commander for Technical Direction performed by the same individual, that individual to base primarily in the Task Force Flagship. The organization and function of the technical staff was basically sound and required no modifications during the operation. The technical staff utilized the services of the operating staff through the Assistant Chiefs of Staff for logistical, administrative, and operational support as required. Some difficulties, not of an unsurmountable character however, were encountered in the technical staff due to the forced division of the staff into groups quartered in various ships. The physical separation of these groups and the communications and transportation difficulties which were bound to appear created some difficulty in insuring smooth and coordinated functioning at times; however, these difficulties were not of any serious or permanent nature.

8. Communications.

The technical staff had, by pre-arrangement, the exclusive use of two communication nets for use between the various ships in which the technical staff was quartered. These were: (a) a scrambled radio teletype net and (b) a radio telephone net.

The radio teletype net was only partially successful at times due primarily to technical difficulties associated with frequency selection, lack of frequency stability of transmitters and shortage of trained personnel. However, it was indispensible in allowing the transmission of long technical dispatches and reports of a classified

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION [illegible] FOR REQUIRED

RESTRICTED DATA

nature. For future operations of this nature a similar radio teletype net, but equipped with more stable transmitters and using carefully selected frequencies would result in considerable advantage to the technical staff.

The radio telephone net was extremely useful in expediting the business of the technical staff. Through the use of this net which, incidentally, was also loaned to other sections of the Task Force, such as the Air Staff and the Logistic Staff, a considerable amount of boating and formal communications could be dispensed with and a great saving of time was achieved. Its weakness was that it had no security other than that given by the quasi-visual range of the frequency used. Had the proper degree of security been available in this circuit through some scrambling device, its usefulness would have been correspondingly increased.

As a whole it can be said that without these two technical nets the many operations and activities of the technical staff would have been severely handicapped. They are considered a "must" for any similar operation in the future.

W. S. PARSONS
Rear Admiral, U.S. Navy

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART II - SUMMATION

SECTION (D) - REMARKS BY THE CHIEF OF STAFF

1. The atomic bomb tests were unique in the military annals of the United States, combining as they did all the features of a full scale military operation and the exacting conditioning attendant upon a laboratory experiment of imposing proportions. In consequence, it was essential that the organization of the Task Force provide adequately for scientific as well as military planning and execution by the inclusion of civilian specialists with highly important and practically autonomous functions within their spheres of activity. The selection of a military specialist as Deputy Task Force Commander for Technical Direction was effective in incorporating successfully the plans of the scientists within the military framework and conversely, in adopting military procedures to the requirements of science. In this respect, the military and scientific personnel, by energetic cooperation, gave to the organization a flexibility it would not otherwise have possessed and facilitated its administration correspondingly. The Task Force was thus enabled to, and did, alter operational plans to improve conditioning for science to the end that better data might be obtained. As the test dates approached and purely military operational details were perfected, the scientific aspects received additional consideration. That the tests proceeded on schedule and without untoward incident is a tribute to the single-mindedness of purpose that pervaded the entire Joint Task Force.

2. Joint Task Force ONE as an organization was well adapted to its mission. It was not found necessary to make any fundamental changes and very few minor ones. The state of the Armed Forces as regards demobilization and the scarcity of experienced personnel left something to

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC AUTHORITY REQUIRED

be desired in the execution of routine procedures, but there was no lack of zeal and earnest intent on the part of all personnel. Morale was excellent.

3. The operation received public scrutiny from its inception to its completion through the eyes of the press, civilian scientists, and military observers. There was no censorship of the press, the members of which were free to record their impressions. The Intelligence Division of the staff effectively limited the extent of visual observations by careful supervision of the movements of the press and non-participating observers. It required the exercise of nice judgment on the part of the Public Relations Officers to coordinate the many and varied requests made by the invited guests of the United States. They were ably assisted by the Commanding Officers of the ships in which non-participating observers were embarked.

4. Joint operational planning was detailed and meticulous. While the Task Force headquarters was in Washington, daily staff conferences were employed to develop the fundamental plans. By the end of the planning period, conferences were reduced to a weekly basis. Upon arrival of the Task Force Commander in Pearl Harbor, the opportunity was taken to present the operation as visualized by the staff to the Task Group and Unit Commanders, all Commanding Officers of ships, and to senior officers of the Army and Navy stationed on Oahu. In the target area, the Task Force Commander presided at weekly progress conferences attended by Task Group and Unit Commanders and Commanding Officers of major ships. These were of great assistance in solving local problems on the spot and of much educational value to Task Force personnel. Matters requiring staff action were considered at weekly conferences, and at many special-purpose meetings. Both tests were preceded by full scale rehearsals to check plans and procedures and were followed by critiques.

5. Regular local radio broadcasts in the target area were utilized by the Task Force Commander to disseminate information of general interest on particular phases of

the operation. These created and maintained a lively interest in the tests, especially among the enlisted personnel. They also had the salutary effect of dispelling nebulous exaggerated ideas as to the probable effects of the atomic bomb on the target area, ships, and men.

6. In execution, both tests proceeded exactly as planned and on schedule. The complex air phase was accomplished with remarkably accurate timing.

7. The basic logistic requirements were essentially those necessary for an amphibious operation, upon which were superimposed the requirements of science. A large amount of air lift was used for high priority shipments. The excellent foresight and judgment demonstrated by the logistic planners was one of the outstanding features of the operation and contributed greatly to its success.

8. Health of the Task Force personnel was a major consideration in the target area. An incipient epidemic of dysentery was eradicated by prompt and energetic measures. There were but four accidental deaths and none from natural causes. Swimming beaches were tested daily for B-coli contamination and occasionally had to be closed prior to the second test. After Test Baker, radio-active contamination of the beaches precluded all swimming.

9. The construction and operation of officers' and enlisted men's clubs, together with attendant recreational facilities, provided adequate diversion for all personnel. Non-participating observers and members of the press also used these facilities.

RECOMMENDATIONS

(a) Future tests with military atomic weapons should be conducted without provision for the attendance of observers for whom special and extraordinary security arrangements must be made.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS ON DISSEMINATION APPLY
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

- -

(b) Large scale tests of atomic weapons should be conducted as joint operations when practicable.

(c) There should be incorporated in the operating armed forces military personnel especially trained in the detection, evaluation, and elimination of radiological hazards.

J. A. SHACKENBERG,
Commodore, U. S. Navy.

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART III - COMMENTS

SECTION (A) - COMMENTS BY THE ASSISTANT CHIEF OF STAFF FOR PERSONNEL

GENERAL

1. The organization of the Personnel Division consisted of the following:

J-1	Assistant Chief of Staff for Personnel
J-10	Executive Officer
J-11	Personnel
J-11A	Naval Officers and Civilian Orders - Records - Reports
J-11B	Naval Enlisted Orders - Records - Reports
J-11C	Correspondence - Filing and Mailing
J-11D	Division Officer - Staff Personnel Flag Allowance
J-11E	Army Personnel Section
J-11E-1	Orders Unit Army
J-11E-2	Army Records Unit
J-11E-3	Army Finance Unit
J-12	Legal
J-13	Personnel Movement
J-14	Recreation, Quartering and Messing

2. Since Operation CROSSROADS was an entirely new project without previous experience upon which to draw, the personnel requirements could not be planned a great deal in advance, and was continually having to be revised because of new requirements of the technical and scientific groups. These requirements were further complicated because many of the vessels of the support force which were to have been furnished by the active fleet were actually furnished to JTF-1 from the inactive or reserve fleets with their entire crews being charged directly to the CROSSROADS allowance.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
UNAUTHORIZED DISCLOSURE SUBJECT TO ADMINISTRATIVE AND CRIMINAL SANCTIONS

RESTRICTED DATA
ATOMIC ENERGY ACT
RESTRICTED

---

3. In order to obtain the required personnel the Chief of Naval Operations granted to JTF-1 priority for personnel over the operating fleet and all other special projects. The Bureau of Naval Personnel assisted by authorizing rated personnel who were eligible for separation to volunteer for duty with CROSSROADS up to 1 January 1947 with a guarantee of one month's leave commencing 1 December 1946. This authority was later modified to permit volunteering to 15 November with leave to commence 15 October. Electronics Technician School graduates from the schools at Treasure Island, etc., were permitted to volunteer for duty with CROSSROADS. Reserve officers were permitted to remain on active duty for CROSSROADS under the AlNav which permitted their retention on active duty until the completion of a special project.

4. The Navy Personnel allowance for JTF-1 was first set at thirteen hundred officers and eighteen thousand enlisted men. This allowance was increased to sixteen hundred officers and twenty-two thousand enlisted men. The Army and Army Air Force were never given a definite personnel allowance, the demand for Army personnel being much smaller, making it less of a problem for the Army to meet the JTF-1 requirements, which they did promptly in all cases.

5. All personnel, both officers and enlisted men, who were attached to the staff for duty or temporary duty plus the crews of all Navy vessels not assigned to the Post-War active fleets were directly charged against the Navy Allowance for CROSSROADS. Officers who were ordered to the staff on temporary additional duty orders from the various bureaus and offices of the Navy Department were not charged against the personnel allowance.

6. Civilian scientists and technicians were employed by the Manhattan District of the War Department or by the various bureaus and offices of the Navy Department.

7. At the peak, during June and July, the number of military personnel attached to JTF-1 for Test A and B were as follows:

	Officers	Enlisted
Navy charged to CROSSROADS or on TAD orders	1820	20607
Navy charged to Active Fleet	833	12602
Army charged to CROSSROADS	869	2436
Rear Echelon, JTF-1 (Army & Navy)	92	178

8. The personnel allowance for the target vessels was established on the assumption that these crews would be required to steam their vessels to Bikini, anchor them and leave them. As the operation developed, these target vessel crews were not only required to steam their vessels to Bikini, but were required to keep them up for from four to five months, plus assisting to a large extent in the preparation and inspection of their vessels for the tests. As it developed, the assigned crews were inadequate for their arduous task. In the case of many of the supporting vessels, especially in the case of salvage vessels, the peacetime complement of personnel was entirely inadequate and required considerable augmenting by CROSSROADS personnel to permit these vessels to perform their assigned missions.

9. By the time the Task Force assembled at Bikini prior to Test A, the complements were filled about 100 per cent by numbers and about 75 per cent by rates. This lack of experienced rated personnel placed a serious handicap on the Task Force and was overcome only by hard work and enthusiastic devotion to duty by all hands.

10. All during the summer the Task Force was faced with the replacing of personnel who had to be returned to the U. S. for separation, etc. The replacements were obtained by reassigning officers and men from sunken target vessels to various operating units. In this manner both the Bureau of Naval Personnel and Commander Service Force Pacific were of great assistance in that they both agreed that no personnel would be withdrawn from the Task Force until they were made available by CJTF-1.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948
[illegible] NOT REQUIRED

RESTRICTED DATA

11. JTF-1 was required to furnish approximately one hundred radiomen and electronics technicians to the Joint Communication Centers at Guam and Kwajalein in order for these centers to carry the additional communication load placed upon them by CROSSROADS traffic.

12. The problem of having approximately forty thousand personnel in Bikini for several months posed a serious morale problem. To aid in maintaining the morale in as high a state as possible the Bikini Officer's Mess and the Bikini Enlisted Men's Recreation Area was established under the direction of the Recreation, Quartering and Messing Officer, and under the direct control of the officer in charge of the Bikini Officer's Mess and Bikini Enlisted Men's Recreation Area. These facilities provided liquor, beer, and soft drinks for the officers, and beer and soft drinks for the men on a non-ration basis, plus excellent swimming, basketball, volleyball, horseshoe pitching, trap shooting, baseball, etc. The area was established to handle about six thousand men daily. The number of persons ashore at times reached as high as nine thousand.

RECOMMENDATIONS FOR FUTURE TESTS

1. For future tests of a similar nature the top echelon of the staff should be ordered sufficiently in advance (approximately four months) to study the requirements for personnel. Based on these requirements a definite organization should then be established indicating the billets for each officer and man of the staff.

2. At the same time a definite study should be made of the requirements for vessels, bases, and services to support the staff in carrying out the assigned mission. Having determined these requirements an immediate study should be made to determine what additional personnel will be required to properly man the necessary vessels, bases, etc.

3. Based on these requirements for personnel a definite allowance should then be obtained from the Chief of Naval Operations, and a schedule for each officer and man established indicating when, where, and for how long required.

4. The personnel division of the staff must then establish a request system with a definite follow up tickler system for making requests for personnel.

5. Having established the allowance and obtained approval for this allowance from the Chief of Naval Operations, the Chief of Naval Personnel should then be consulted to determine who will furnish the personnel for the staff and the supporting vessels, etc; and to determine exactly which personnel are to be charged against the established personnel allowance and which are to be furnished by the operating units of the fleet, etc., and not directly charged to the special allowance.

6. In such an operation covering so large a geographic area and concerning so many diversified elements, in order to efficiently expedite the handling of personnel it is necessary to establish representatives of the task force commander in various key localities and to authorize these representatives plus certain task group and task unit commanders to endorse orders "By Direction". However in order to keep a record of the personnel of the task force and to keep control of the personnel a written set of instructions covering the proper procedure to be followed must be issued to each representative or commander who is authorized to endorse task force personnel orders. In particular, it is very important that these commands submit to the task force commander immediately copies of all endorsements which they sign.

7. If the above steps are taken well in advance of the commencing of the actual operation the personnel requirements can then be filled in an orderly and efficient manner by permitting the Bureau of Personnel to study the individual special requirements and to locate and order the best suited officer for each billet.

8. In any undertaking such as CROSSROADS, in spite of the most careful planning and study, as the undertaking developes new requirements will be brought to light. Some will be urgent and important, others convenient, and still others merely gilding of the lily. The need for such additional personnel is not a matter for the personnel

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS
USE WITHOUT PERMISSION NOT REQUIRED

division of the staff to decide upon; if the requirement is established, it is for the personnel division to furnish the personnel at the time and place requested. In order to meet such contingencies in establishing the personnel allowance a twenty-five per cent factor of safety should be added over and above the planned requirements for personnel.

R. BRODIE,
Captain, U.S. Navy.

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART III

SECTION (B) - COMMENTS BY THE ASSISTANT CHIEF OF STAFF FOR INTELLIGENCE

GENERAL

1. The unique feature of the organization of this staff division was the vesting therein of staff responsibility for security and all aspects of public information, including the handling of observers. This step was taken because: (A) No positive intelligence mission existed; and (B) Immediate recognition was made of the need for a continuous balancing on a high staff level of the demands of security and public information.

2. The problems presented to the individual branches of the Intelligence Division, while often most difficult, were all orthodox in character and did not require unusual solutions.

LESSONS LEARNED

1. The organization of the Intelligence Division was basically sound and required no modification in operation.

2. Press and observer representation was so large as to be unwieldy. This was unavoidable in view of the interest in the tests. One effect of the size of these delegations was to introduce a very complex transportation problem and a resultant morale problem.

RESTRICTED DATA
ATOMIC ENERGY ACT 1946
SPECIFIC RESTRICTIONS CONTAINED IN THIS DOCUMENT REQUIRED
USE MILITARY AND GOVERNMENT AGENCIES SHALL CONFORM

3. While the system of permanent identification cards worked well, the system of temporary passes authorizing boarding of target ships was over-elaborate.

4. The need was demonstrated for the prompt and authoritative determination in the forward area of criteria for the release of still and motion picture photography and the positive transmission of such information to the releasing agencies.

5. Public radio broadcasting facilities were not tested and "run in" sufficiently in advance of the first test.

RECOMMENDATIONS FOR ANY FUTURE TEST

1. The intelligence organization developed for tests Able and Baker should be substantially adhered to.

2. Official observers and press should be limited to an over-all total of one hundred or less.

3. All official observers and practically all press representatives should be transported to and from the forward area by air.

4. The temporary pass system should be simplified.

5. Timely provision should be made in the forward area for the development of specific criteria for the release of still and Motion Picture Photography.

6. Public radio broadcasting facilities should be established and "run in" at least a week before any test.

T. J. BETTS
Colonel, U. S. Army
Assistant Chief of Staff
for Intelligence

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART III

SECTION (C) - COMMENTS BY THE ASSISTANT CHIEF OF STAFF FOR OPERATIONS

GENERAL

The Operations Division of the Staff was responsible for Ship and Air Operations, Communications, and Aerology. Its principal activities may be outlined as follows:

1. Organization of the division into five sections as follows:
   (a) Ship Operations, Ship Movements, Port Director, Salvage, Radiological Safety Operations.
   (b) Air Operations, Air Transport, Tactical, Training Photography, CIC, and Fighter Direction.
   (c) Communications and Electronics
   (d) Aerology
   (e) Historical and Analytical
2. Procurement of Staff Personnel and their indoctrination and training.
3. Determination of ship and aircraft requirements for conduct and support of the operations.
4. Acquiring operational control of ships and aircraft from CNO and Warcos.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMIT REQUIRED

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED UNAUTHORIZED DISCLOSURE SUBJECT TO CRIMINAL SANCTIONS
USE MILITARY CLASSIFICATION CATEGORIES

5. Obtaining and directing hydrographic survey of Bikini Atoll, preparation of navigational and anchorage charts, minesweeping, blasting out coral heads in anchorage area, erection of navigational beacons, and planting of navigational and mooring buoys.

6. Arranging with CinCPac for movement of natives from Bikini and other nearby atolls.

7. Organization of Task Force.

8. Preparation of operation plan and annexes pertaining to operations, and coordination with annexes prepared by other divisions.

9. Directing movements of units transporting shore based personnel, construction personnel and material to the forward area.

10. Directing movement of technical and target group ships to yards for special outfitting and instrumentation.

11. Organizing communication facilities for handling CROSSROADS operational and public relations traffic.

12. Organizing aerological facilities for the Bikini area.

13. Directing the movement of the Task Force to Bikini.

14. Directing the training and exercise of air units, radiological safety units, and the communication and electronics organizations.

15. Organization and training of flagship operational personnel.

16. Preparation of weather forecasts.

17. Directing ship and aircraft operations in accordance with the operation plan during rehearsals and tests.

18. Directing special ship and aircraft movements incident to radiological safety requirements, salvage, air sea rescue, and oceanographic surveys.

19. Directing ship movements incident to evacuation of natives and returning them to their homes at conclusion of tests.

20. Maintaining operational and damage records during tests, and preparation of despatch reports to JCS.

21. Directing the release and return of ships and aircraft upon the completion of their operations.

22. Preparation of operational report.

LESSONS LEARNED

1. The organization of the Operations Division was basically sound and required no modification in operation.

2. Unforseen changes in the technical requirements for the tests, and modification in procedures based on experience in exercises and rehearsals, made it necessary to introduce numerous minor changes in the operation plan. However, the original plan was basically sound and no serious confusion resulted from these changes to the operation plan; and the plan was sufficiently flexible to permit some last minute

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED DATA DISSEMINATION PROHIBITED
SEE MILITARY CLASSIFICATION CATEGORY

changes to be introduced by despatch. Many procedures and instructions were repeated several times in the various annexes so that a change introduced in one annex was usually found to effect numerous other annexes, which greatly complicated the process of making changes and reduced the flexibility of the operation plan. The latter demonstrated the importance of avoiding duplication and excluding unnecessary details when preparing plans for a large operation.

3. The nature of the operation was such that the heaviest loads were thrown upon boat pool, salvage, communication and electronics and radiological safety facilities. A serious shortage developed in the boat pool as result of inexperienced operating personnel and inadequate maintenance facilities, which hampered technical preparations. Salvage work progressed very well as result of the indefatigable effort of all hands in that unit. There were numerous failures and some improper functioning of radio electronic equipment traceable in large part to interference in the crowded radio channels, and also due in some measure to the extreme shortage of trained personnel. Radiological Safety Units functioned very well at the time of tests despite their extremely short training period, but during the salvage period following the second test, the salvage of target vessels and clearance of other vessels for return to the fleet was delayed considerably by a shortage of radiological safety monitors and instruments.

RECOMMENDATIONS FOR ANY FUTURE TEST

1. The operational organization developed for tests Able and Baker should be substantially adhered to.

2. In preparing the operation plan, greater effort should be directed towards eliminating duplication and unnecessary detail.

3. Boat pool maintenance and operation should be greatly improved.

4. Communication and electronics equipment require better maintenance and operation. This can be obtained only by an increase of trained personnel and more frequent full scale tests of radio and electronic equipment.

5. The radiological safety organization should receive a longer operational training period, and must be available for full strength operation for a longer period after the tests. To accomplish this a large, active, and well equipped radiological safety organization must be developed within the Navy.

C. H. LYMAN,
Captain, U.S. Navy.

RESTRICTED DATA

RESTRICTED
ATOMIC ... CLEARANCE ...
SPECIAL RESTRICTED ... CLASSIFICATION SAFEGUARDS
RESTRICTED
USE MILITARY CLASSIFICATION SAFEGUARDS

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946, AND 25 JULY 1946

PART III - COMMENTS

SECTION (D) - COMMENTS BY THE ASSISTANT CHIEF OF STAFF FOR LOGISTICS

1. Staff Officers. Difficulty was experienced in securing officers for duty in the Logistics Divsion who were experienced in Staff procedures and in Joint Amphibious Operations. The importance of assigning well qualified and experienced officers to duty of this nature can not be stressed too strongly.

2. Liaison. Close liaison between all elements of a Task Force must be effected at an early date to insure efficient logistic planning. Many difficulties and some duplication was experienced which could have been avoided if earlier liaison had been established with supply agencies in the Pacific. The delay in obtaining officers for the Logistics Division, and the short time available for planning made it impossible to effect this early liaison.

3. Supply Policy. The adopted policy of utilizing existing Army and Navy agencies to furnish Logistic support proved sound. The rapid demobilization program of both the Army and Navy reduced the efficiency of support agencies but in general adequate support was rendered.

4. Land Based Support. Plans provided that all support in the target area would be afloat. This was considered necessary as the damage to be expected on Bikini Island as a result of the bomb

burst was unknown when planning was initiated. As a result, the operation of the Construction Unit, Boat Pool and the handling of Intransit Cargo were made more difficult. Wherever circumstances permit it is considered desirable that activities of this nature be based ashore.

5. Navy Supply. Requirements were adequately provided. Service Division Eleven (TG 1.8), provided by ComServPac, functioned in an excellent manner and provided adequate support in the forward area.

6. Army Supply. Requirements were adequately provided. Difficulty was experienced in obtaining spares for B-29 aircraft of TG 1.5 thru PACUSA channels. Arrangements for direct supply from the United States were made as an emergency measure. This worked satisfactorily.

7. Transportation. Arrangements for water, rail and air movements proved satisfactory and requirements were adequately met except for surface shuttle from Kwajalein to Bikini and return.

a. Transhipment of freight at Kwajalein was often delayed and in several instances packages were lost. The lack of adequate trained stevedore and freight handling personnel at Kwajalein was largely responsible.

b. The LCI's provided for the surface shuttle to Bikini proved very inadequate for handling freight. LSM's would have proved much more efficient.

8. Maintenance and Boat Pool. Service Division Eleven (TG 1.8), provided by ComServPac, furnished ship maintenance and boat pool support. The type

RESTRICTED DATA
AUG ACT - 1946
721479 O—46

RESTRICTED DATA
SPECIFIC RECIPIENTS
USE, MILITARY
CLEARANCE NOT REQUIRED
CLASSIFICATION SAFEGUARDS

and quantity of material supplied were quite adequate, but insufficient experienced personnel were provided.

a. Excellent maintenance facilities were furnished, but lack of trained motor machinist, electrician and machinist rates rendered the accomplishment of any but essential repairs impossible. In spite of the personnel shortages, the maintenance organization functioned very satisfactorily and did an outstanding job in keeping all ships running. However, to insure efficient operations adequate experienced maintenance personnel must be provided.

b. The Boat Pool was handicapped by lack of adequately trained operating and repair personnel and by the poor material condition of the craft assigned. The poor quality of operators and the lack of repair personnel made it impossible for the Boat Pool to keep more than half the assigned boats in operation. It is essential that adequate and experienced repair and operating personnel be provided if a Boat Pool is to operate efficiently.

c. Great administrative difficulty was encountered as a result of billeting Boat Pool personnel among the three ships assigned to the unit. For proper operation, the entire operational personnel should be housed and dispatched at one central location, preferably on the beach, but otherwise on an APL set up for this specific purpose. In spite of the difficulties encountered, the operational schedule was not jeopardized by lack of boat transportation and the most essential needs were met by full cooperation from the entire

Task Force.

9. Medical. The health of the command was exceptionally good. A dysentery epidemic was averted by prompt and vigorous action by the Force Medical Officer.

10. Construction. Required construction was accomplished under difficulties and proved to be entirely adequate.

11. Test Charlie. In the event Test Charlie is conducted it is recommended that the same basic principles for logistic support be followed except that minimum facilities be established ashore for the Construction Unit, Boat Pool and for handling Intransit Cargo.

DAVID H. BLAKELOCK
Colonel, Cavalry

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC [illegible] CLEARANCE NOT REQUIRED

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
REGRADED MILITARY CLASSIFICATION SAFEGUARDS

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART IV

ORGANIZATION OF JOINT TASK FORCE ONE

1. The organization of Joint Task Force ONE followed the basic principles employed during the war in the development of Amphibious Task Forces and incorporated such modifications as were found requisite to the needs not only of a military operation but to those of a scientific experiment of huge proportions.

2. This organization consisted of an operating Joint Task Force headed by a Joint Staff comprising Army, Navy and Civilian scientific personnel. Through the staff, liaison was maintained with the War and Navy Departments, the Manhattan Engineer District and United States Government agencies interested in the operation. Liaison with the Manhattan Engineer District was maintained through the Commanding General, who exercised general technical direction over all matters relating to the atomic bomb, acting either directly through the Task Force Commander or the Deputy Task Force Commander for Technical Direction.

3. All arms and branches of the Army were well represented in the organization by staff membership and Task Group compositions, with Task Group 1.4 comprising all elements of the Army Ground Forces while Task Group 1.5 contained Army Air Forces personnel. Also many officers of both services were assigned to the Staff on additional duty from the War and Navy Departments thus affording excellent liaison with their permanent establishments.

4. The main divisions of the Staff organization of the Task Force are shown in Figure 1, while Figures 2 to 8 inclusive show them in detail.

5. A Rear Echelon Staff, complementing the main staff, was established in WASHINGTON to assist the Task Force in the field and to effect coordination with the War and Navy Departments and other government agencies. This organization appears in Figure 9.

6. The Joint Task Force was subdivided into Task Groups and Task Units in such a manner as to meet its specialized functional requirements which are delineated in Figure 10. The detailed organization of the Joint Task Force is listed in paragraph 8.

7. Commander Joint Task Force ONE maintained liaison with two boards of special interest, the Joint Chiefs of Staff's EVALUATION BOARD and the President's EVALUATION COMMISSION. The Evaluation Board was appointed by the Joint Chiefs of Staff and had two broad functions, (a) to be available to the Task Force Commander for advice during the preparation for the tests and (b) to evaluate for the Joint Chiefs of Staff the results of the tests as reported by Commander Joint Task Force ONE. The Evaluation Commission appointed by the President, while not expected to participate in the arrangements for the tests, had two functions to perform: (a) to cooperate with the Secretaries of War and Navy in the conduct of the tests as might be required by them and, (b) to undertake a study of the tests and to submit to the President the Commission's observations, findings, conclusions and recommendations.

8. The organization of Joint Task Force ONE, during Operation CROSSROADS follows:

JOINT TASK FORCE ONE - Vice Admiral W.H.P. BLANDY, U.S.N.
(Major General W.E. KEPNER, U.S.A.
Deputy Task Force Commander for Aviation)
(Rear Admiral W.S. PARSONS, U.S.N.
Deputy Task Force Commander for Technical Direction).
(Major General A.C. McAULIFFE, U.S.A.
Ground Forces Advisor)

RESTRICTED DATA
ACT - 1946
SPECIFIC PERMISSION REQUIRED

RESTRICTED

CJTF - ONE
Operational Report - CROSSROADS - PART IV - Organization of Joint Task Force ONE

- -

(a) Force Flagship - Mount McKinley (AGC-7) - Captain W.N. CAMET, U.S.N.

(b) Technical Group (TG 1.1) - Rear Admiral W.S. PARSONS, U.S.N.

Laboratory Unit (TU 1.1.1) - Captain E.H. ECKELMEYER, Jr., U.S.N.

Albemarle (AV-5) (F) - Captain E.H. ECKELMEYER, Jr., U.S.N.

LCT - 1359 - W. WANNSTEDT, CM2c, U.S.N.
LSM - 60 - Commander H.A. OWENS, U.S.N.

Instrumentation Unit (TU 1.1.2) - Captain A.C. THORINGTON U.S.N.

Kenneth Whiting (AV-14) - Captain A.R. TRUSLOW, Jr., U.S.N.
Cumberland Sound (AV-17) - Captain H.R. HORNEY, U.S.N.
Wharton (AP-7) - Captain V.F. GORDINIER, U.S.N.
Avery Island (AG-76) - Commander D.E. PUGH, U.S.N.
Burleson (APA-67) - Captain C.L. CARPENTER, U.S.N.
Haven (APH-112) (F) - Captain A.C. THORINGTON, U.S.N.

Drone Boat Unit (TU 1.1.3) - Commander R.R. BRADLEY, U.S.N.

Begor (APD-127) (F) - Lieut. Comdr. R.K. MARGETTS, U.S.N.

(c) Target Vessel Group (TG 1.2) - Rear Admiral F.G. FAHRION, U.S.N.

Fall River (CA-131) (F) - Captain D.S. CRAWFORD, U.S.N.

Battleship and Cruiser Unit (TU 1.2.1) - Captain W. DEWEESE, U.S.N.

BatDiv - 7 Captain W. DEWEESE, U.S.N.

Arkansas (BB-33) (F) Captain W. DEWEESE, U.S.N.
New York (BB-34) - Captain L. H. BIBBY, U.S.N.
Nagato (Ex-Jap BB) - Captain W.J. WHIPPLE, U.S.N.

BatDiv - 9 Captain C.H. BUSHNELL, U.S.N.
Pennsylvania (BB-38) - Captain C.H. BUSHNELL, U.S.N.
Nevada (BB-36) - Captain C.C. ADELL, U.S.N.

CruDiv - 23 Captain J. CONNOR, U.S.N.
Salt Lake City (CA-25) (F) - Captain J. CONNOR, U.S.N.
Pensacola (CA-24) - Captain D.J. RAMSEY, U.S.N.
Sakawa (Ex-Jap CL) - Captain H.L. STONE, U.S.N.
Prinz Eugen (Ex-German CA) - Captain A.H. GRAUBART, U.S.N.

Aircraft Carrier Unit (TU 1.2.2) - Captain N.M. KINDELL, U.S.N.

CarDiv - 31
Independence (CVL-22) (F) Captain N.M. KINELL, U.S.N.
Saratoga (CV-3) - Captain O.S. MacMAHAN, U.S.N.

Destroyer Unit (TU 1.2.3) Commander L.W. SEDGWICK, U.S.N.R.

DesDiv-1 Commander D.S. BILL, Jr., U.S.N.
Hughes (DD-410) (F) - Commander D.S. BILL, Jr., U.S.N.
Lamson (DD-367) - Lieut. Comdr. H.H. ELLISON, U.S.N.
Ralph Talbot (DD-390) - Lieut. Comdr. B.W. SPORE, U.S.N.
Rhind (DD-404) - Lieut. Comdr. D.M. SHARER, U.S.N.
Anderson (DD-411) - Lieut. Comdr. J.J. McMULLEN, U.S.N.R.

DesDiv-2 Commander L.W. SEDGWICK, U.S.N.R.
Wainwright (DD-419) (F) - Commander L.W. SEDGWICK, U.S.N.R.
Stack (DD-406) - Comdr. E.A. SHUMAN, U.S.N.R.
Wilson (DD-408) - Lieut. Comdr. R.H. PAULI, U.S.N.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA

CJTF - ONE
Operational Report - CROSSROADS - PART IV - Organization of Joint Task Force ONE

DesDiv-3 Commander M. HARVEY, U.S.N.
Mugford (DD-389) - (F) - Commander M. HARVEY, U.S.N.
Flusser (DD-368) - Lieut. Comdr. W.R. LAIRD, U.S.N.
Conyngham (DD-371) - Lieut. Comdr. F.W. BAMPTON, U.S.N.
Mustin (DD-413) - Lieut. Comdr. J.C. MATHEWS, U.S.N.

DesDiv-4 Commander M.H. BUAAS, U.S.N.
Mayrant (DD-402) (F) - Commander M.H. BUAAS, U.S.N.
Trippe (DD-403) - Lieut. Comdr. W.J. KEATING, U.S.N.

Submarine Unit (TU 1.2.4) (SubRon-11)
Commander R.A. WAUGH, U.S.N.

SubDiv-111 Lieut. Comdr. F.J. COULTER, U.S.N.
Skipjack (SS-184) (DF) - Lieut. Comdr. F.J. COULTER, U.S.N.
Searaven (SS-196) - Lieut. Comdr. R.C. SMALLWOOD, Jr., U.S.N.
Tuna (SS-203) - Lieut. Comdr. G. JACOBSEN, U.S.N.
Skate (SS-305) - Lieut. Comdr. E.P. HUEY, U.S.N.

SubDiv-112 Lieut. Comdr. H.G. REAVES, U.S.N.
Dentuda (SS-335) (SF) - Commander R.A. WAUGH, U.S.N.
Parche (SS-384) (DF) - Lieut. Comdr. H.G. REAVES, U.S.N.
Apogon (SS-308) - Lieut. Comdr. J.W. JOHNSON, U.S.N.
Pilotfish (SS-386) - Lieut. Comdr. R.B. LANING, U.S.N.

Landing Craft Unit (TU 1.2.5) Lieut. V.C. VINT, U.S.N.

LST Group - 9	Lieut. V.C. VINT, U.S.N.
LST - 52	Lt(jg) C.E. BOGGS, U.S.N.
LST - 125	Ensign R.E. STOCKWELL, U.S.N.
LST - 133	Lieut. V.C. VINT, U.S.N.
LST - 220	Lt(jg) J.O. MARZLUFF, U.S.N.
LST - 545	Lt(jg) S.L. VOILER, U.S.N.R.
LST - 661	Lieut. W.F. MARLOW, U.S.N.
LCI Group - 7	Lt(jg) P.W. SCHOTT, U.S.N.R.
LCI - 329	Ens. R.C. HAYES, U.S.N.R.
LCI - 327	Ens. R.P. LEMKE, U.S.N.R.

LCI Group - 7 (Cont'd)

LCI - 332	Ens. W.F. ZARTMAN, U.S.N.R.
LCI - 549	Lt(jg) W.F. FERGUSEN, U.S.N.
LCI - 615	Ens. H.L. COWLIN, U.S.N.R.
LCI - 620	Ens. J.H. HANES, U.S.N.R.

LCT Group - 15 — Lt(jg) J.D. SIMMONS, U.S.N.R.

- LCT - 1130 (F)
- LCT - 816
- LCT - 818
- LCT - 874
- LCT - 1078
- LCT - 1112
- LCT - 1113
- LCT - 1114
- LCT - 1115
- LCT - 1116
- LCT - 1132
- LCT - 1156

LCT Group - 21 — Lt(jg) M.W. BELEW, U.S.N.R.

- LCT - 1237 (F)
- LCT - 412
- LCT - 414
- LCT - 705
- LCT - 812
- LCT - 1013
- LCT - 1175
- LCT - 1187
- LCT - 1268
- LCT - 1341
- LCT - 1377
- LCT - 1415

Miscellaneous Group

- ARDC - 13
- YOG - 83
- YO - 160

RESTRICTED DATA
ACT - 1948

Merchant Type Unit (TU 1.2.6) Captain W.H. STANDLEY, U.S.N.

TransDiv - 91 Captain D.F. WILLIAMSON, U.S.N.
- Gilliam (APA-57) - Captain D.F. WILLIAMSON, U.S.N.
- Banner (APA-60) - Commander W.L. KITEH, U.S.N.
- Brule (APA-66) - Lieut. Comdr. A.B. TAYLOR, U.S.N.R.
- Carlisle (APA-69) - Commander E.T. GOYETTE, U.S.N.
- Carteret (APA-70) - Lieut. Comdr. J.L. HUNTER, U.S.N.
- Fallon (APA-81) - Commander W.W. SACKETT, U.S.N.R.

TransDiv - 92 Captain P.C. CROSLEY, U.S.N.
- Crittenden (APA-77) (F) - Captain P.C. CROSLEY, U.S.N.
- Barrow (APA-61) - Commander J.E. KENDELL, U.S.N.R.
- Butte (APA-68) - Captain A.R. MONTGOMERY, U.S.N.
- Cortland (APA-75) - Commander J.L. HAINES, U.S.N.R.
- Dawson (APA-79) - Captain D.D. HUMPHREYS, U.S.N.R.

TransDiv - 93 Captain W.H. STANDLEY, Jr., U.S.N.
- Niagara (APA-87) - Captain W.H. STANDLEY, Jr., U.S.N.
- Bladen (APA-63) - Captain L.S. HEWHINNEY, U.S.N.
- Bracken (APA-64) - Commander C.S. LEE, U.S.N.R.
- Briscoe (APA-65) - Captain W.S. RODIMON, U.S.N.
- Catron (APA-71) - Captain E.B. ELLIS, U.S.N.R.
- Fillmore (APA-83) - Captain L.E. DIVOLL, U.S.N.
- Geneva (APA-86) - Captain P.J. NEIMO, U.S.N.

TransDiv - 94 Captain H.W. HOWE, U.S.N.
- Appling (APA-58) (F) Captain H.W. HOWE, U.S.N.
- Gasconade (APA-85) - Captain A.S. CARTER, U.S.N.
- Artemis (AKA-21) - Commander M.E. SELBY, U.S.N.

Salvage Unit (TU 1.2.7) Captain B.E. MANSEAU, U.S.N.
- Palmyra (ARST-3) - Lieut. Comdr. R.H. DRAZELL, U.S.N.R.
- Preserver (ARS-8) - Lieutenant C.B. HINER, U.S.N.
- Current (ARS-22) - Lieutenant H.F. GINDLING, U.S.N.
- Deliver (ARS-23) - Lieutenant F.F. SHARP, U.S.N.
- Clamp (ARS-33) - Lieut. Comdr. S.D. FREY, U.S.N.

- -

Salvage Unit (TU 1.2.7) (Cont'd)

Conserver (ARS-39) - Lieut. Comdr. C.H. ROOKLIDGE, U.S.N.R.
Reclaimer (ARS-42) - Lieutenant J.S. LEES, U.S.N.
Chickasaw (ATF-83) - Lieut. Comdr. F.H. MATTHEWS, U.S.N.
Achomawi (ATF-148) - Lieutenant C.H. McCULLAR U.S.N.
Widgeon (ASR-1) - Lieutenant A.F. HAMEY, U.S.N.
Coucal (ASR-8) - Lieutenant J.E. REID, U.S.N.
Gypsy (ARSD-1) - Lieut. Comdr. C.S. HORNER, U.S.N.
Mender (ARSD-2) - Lieut. Comdr. A.V. SWARTHOUT, U.S.N.
Etlah (AN-79) - Lieutenant L.E. MARSH, U.S.N.
Suncock (AN-80) - Lieutenant L.G. HICKLE, U.S.N.
Oneota (AN-85) - Lt(jg) J.B. BIRTCH, U.S.N.
Shakamaxon (AN-88) - Lt(jg) M.F. ROOT, U.S.N.
ATA-180 - Lieutenant E.R. WEAVER, U.S.N.
ATA-185 - Lieutenant R.B. LEONNIG, U.S.N.
ATA-192 - Lt(jg) A. MORRIS, U.S.N.
ATR - 40 - Lieutenant A.J. ROBERTS, U.S.N.
ATR - 87 - Lieutenant R.E. WARD, U.S.N.
LCT - 581
LCT - 746
LCT - 1184
LCT - 1420

(d) Transport Group (TG 1.3) Captain W.P. DAVIS, U.S.N.

Transport Unit (TU 1.3.1)

TransDiv-31 Captain W.P. DAVIS, U.S.N.
George Clymer (APA-27) (F) - Captain M.M. BRADLEY, U.S.N.
Rockbridge (APA-228) - Captain W.H. TRUESDELL, U.S.N.
Rockingham (APA-229) - Captain G.P. ENRIGHT, U.S.N.
Rockwall (APA-230) - Captain C.H. WALKER, U.S.N.
Saint Croix (APA-231) - Captain C.E. CARROLL, U.S.N.
Bayfield (APA-33) - Captain J.C. LANDSTREET, U.S.N.
Henrico (APA-45) - Captain J.B. WILLIAMS, U.S.N.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION REQUIRED

TransDiv-31 (Cont'd)
Bottineau (APA-235) - Captain H.B. EDGAR, U.S.N.
Bexar (APA-237) - Captain C.C. RAY, U.S.N.
Rolette (AKA-99) - Captain M. DURSKI, U.S.N.
Ottawa (AXA-101) - Commander A.K. EHLE, U.S.N.
LST - 817 - Lt(jg) J.A. SCOTT, U.S.N.R.
LST - 881 - Lt(jg) J.M. SCOTT, U.S.N.

Press Unit (TU 1.3.2) Captain J.B. RENN, U.S.N.
Appalachian (AGC-1) - Captain J.B. RENN, U.S.N.

Observers Unit (TU 1.3.3) - Captain W.B. AMMON, U.S.N.
Panamint (AGC-13) (F) - Captain W.B. AMMON, U.S.N.
Blue Ridge (AGC-2) - Captain C.R. CRIDDLE, U.S.N.

(e) Army Ground Group (TG 1.4) Colonel J.D. FREDERICK, U.S.A.

Engineer Unit (TU 1.4.1) - Lieut. Colonel S.B. SMITH, C.E. U.S.A.

Signal Unit (TU 1.4.2) - Capt. C.H. WOLLENBERG, SigC. U.S.A.

Ordnance Unit (TU 1.4.3) - Lt.Col. S.F. MUSSELMAN, Ord., U.S.A.

Chemical Unit (TU 1.4.4) - Capt. H.C. ADAMS, CWS, U.S.A.

Quartermaster Unit (TU 1.4.5) - Colonel L.P. JORDAN, QMC, U.S.A.

Air Unit (TU 1.4.6) - Major E.K. WALTERS, AC, U.S.A.

(f) Army Air Group (TG 1.5) - Brig.General Roger M. RAMEY, U.S.A.

Headquarters Air Unit (TU 1.5.10)

Tactical Operations Unit (TU 1.5.1) Colonel W.H. BLANCHARD, Jr., U.S.A.

Tactical Operations Unit (TU 1.5.1) Cont'd)
Command Aircraft 1 B-29 1.5.11
Bomb Carrying Aircraft 1 B-29 1.5.12
Pressure Drop Aircraft 2 B-29 1.5.13
Army Weather Reco Aircraft 3 B-29 1.5.14
Radiological Reco Aircraft 11 B-29 1.5.15

Army Air Photographic Unit (TU 1.5.2) Colonel P.T. CULLEN, U.S.A.
VIR Photographic Aircraft 1.5.21 8 F-13
C-54 Photographic Aircraft 1.5.22 2 C-54

Instrumentation and Test Requirements Unit (TU 1.5.3)-

Air Transport Unit (TU 1.5.4) Lt.Col. P. JENNINGS, U.S.A.

10 C-54
Air Passenger and Freight Aircraft 1.5.41
EN:WETOK Emergency Air Evacuation Unit 1.5.42
Thermal Radiation Aircraft (Test BAKER only) 1.5.43

Air Services Unit (TU 1.5.5) Colonel C.J. HEFLIN, U.S.A.

Army Drone Unit (TU 1.5.6)
Army Drone Air Unit (4 B-17 Control Planes 1.5.61
4 B-17 Drones)
Army Field Recovery Unit 1.5.62

Army Air Meteorological Unit (TU 1.5.7)

Army Air Orientation Unit (TU 1.5.8)
Radio Broadcast Aircraft 1 B-29 1.5.81
Press Photography Aircraft 1 B-29 1.5.82
Observation Aircraft 1 B-29 1.5.83

(g) Navy Air Group (TG 1.6) Rear Admiral C.A.F. SPRAGUE, U.S.N.

Drone Carrier Unit (TU 1.6.1) Captain W.D. COGSWELL, U.S.N.

Shangri La (CV-38) (1.6.11) (F) Captain W.D. COGSWELL, U.S.N.

RESTRICTED DATA
AEC IV - (B) - 12 1948
SPECIFIC ... AUTHORITY REQUIRED

RESTRICTED DATA

ComDesRon - 5 (1.6.12) - Captain R.L. CAMPBELL, U.S.N.

DesDiv - 51
Turner (DD-834) (F) - Commander E.B. RITTENHOUSE, U.S.N.
C.P. Cecil (DD-835) - Commander W. OUTERSON, U.S.N.
Furse (DD-882) - Commander C.J. HEATH, U.S.N.
N.K. Perry (DD-883) - Commander N.E. SMITH, U.S.N.

Navy Field Recovery Sub-Unit (1.6.13)

Carrier Drone Air Unit (1.6.14)
4 F6F Dronen
16 F6F Drone Control Planes

Photographic Carrier Unit (TU 1.6.2) - Captain T.U. SISSON, U.S.N.
Saidor (CVE-117) (1.6.21) - Captain T.U. SISSON, U.S.N.
F6F Photo Aircraft (4 F6F-5P)
TBM Photo Aircraft (4 TBM-3P)
Helicopter Sub-Unit (2 HOS-1)

Seaplane Unit (TU 1.6.3)
Naval Air Base (EBEYE)
Patrol Seaplane Squadron VPB 32 9 PBM-5
Air Sea Rescue Squadron VH-4 6 PBM-5

Seaplane Tender BIKINI (TU 1.6.4) - Commander J.D. SHEA, U.S.N.
Orca (AVP-49) - Commander J.D. SHEA, U.S.N.

(h) Surface Patrol (TG 1.7) - Captain E.N. PARKER, U.S.N.
DesRon - 7

DesDiv - 71 - Captain E.N. PARKER, U.S.N.
Barton (DD-722) (F) - Commander H.P. McINTIRE, U.S.N.
Walke (DD-723) - Commander T.F. McGILLIS, U.S.N.
Laffey (DD-724) - Commander O.D. WATERS, Jr., U.S.N.
O'Brien (DD-725) - Commander H.E. DAY, U.S.N.
Lowry (DD-770) - Commander E.S. MILLER, U.S.N.

- -

DesDiv - 72 Captain F. P. LUONGO, U.S.N.
A.M. Sumner (DD-692) (F) - Commander J.W. HOWARD, U.S.N.
Hoale (DD-693) - Commander R.P. WALKER, U.S.N.
Ingraham (DD-694) - Commander F.A. BROCK, U.S.N.
R.K. Huntington (DD-781) - Commander M. THOMPSON, U.S.N.

(1) Service Group (TG 1.8) Captain G.H. LYTTLE, U.S.N.
Dixie (AD-14) (F) Captain J.C. GOODNOUGH, U.S.N.
Coasters Harbor (AG-74) - Commander A.C. HARSHMAN, U.S.N.R.
Aucilla (AO-56) - Commander W.B. SAMPSON, U.S.N.
Chickaskia (AO-54) - Captain W.M. SEARLES, U.S.N.
Severn (AO-(W)-61) - Captain M.H. McCOY, U.S.N.
Enoree (AO-69) - Commander W.C. CROSS, U.S.N.
Tombigbee (AOG(W)-11) - Lieutenant J.R. DAVIDSON, U.S.N.
Pollux (AKS-4) - Commander D.A. CRANDELL, U.S.N.
Hesperia (AKS-13) - Commander H.B. MacLEOD, U.S.N.R.
Ajax (AR-6) - Captain J.R. CLARK, U.S.N.
Phaon (ARB-3) - Lieutenant W.F. HORSTKAMP, U.S.N.
Telamon (ARB-8) - Lieutenant F.E. SCHWENNEKER, U.S.N.
Cebu (ARG-6) - Commander D.B. CANDLER, U.S.N.
Creon (ARL-11) - Lieut. Comdr. H.T. SMITH, U.S.N.R.
Sphinx (ARL-24) - Lt(jg) H.G. SALISBURY, U.S.N.
Fulton (AS-11) - Captain A.R. ST. ANGELO, U.S.N.
Sioux (ATF-75) - Lieutenant W.H. MOORE, U.S.N.
Chowanoc (ATF-100) - Lieut. Comdr. F.C. ZIESENHENNE, U.S.N.R.
Munsee (ATF-107) - Lieutenant J. BUDAY, U.S.N.
Wenatchee (ATF-118) - Lieutenant T.P. PIERCE, U.S.N.R.
Wildcat (AW-2) - Commander R.N. NEWTON, U.S.N.R.
Quartz (IX-150) - Lt(jg) R.K. RITZERT, U.S.N.R.
Limestone (IX-158) - Ens. J.H. RICHTER, U.S.N.R.
ARD-29 - Lieutenant J.B. WARNER, U.S.N.
ATA-124 - Lt(jg) F.H. LaPIERRE, U.S.N.
ATA-187 - Lieutenant E.B. TERRIO, U.S.N.
LST-388 (Recreation Ship) - Lt(jg) P.H. SULLIVAN, U.S.N.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1

(1) Service Group (TG 1.8) (Cont'd)

LST-361 (Post Office) - Lieutenant J.T. GORDON, U.S.N.
YC-1009 (Mooring Gear)
YF-733 (Lumber, etc.)
YF-754 (Medical Supplies)
YF-990 (Movie Exchange)
YF-991 (Electronics)
YF-992 (Electronics)
YF-734 (GSK)
YF-735 (Empty)
YF-385 (Provisions)
YF-752 (Provisions)
YF-753 (Provisions)
YC-199
YO-132
YOG-63
YCG-70
YW-92

TU 1.8.2 Blank

Despatch Boat and Boat Pool Unit (TU 1.8.3) - Commander J.G. BLANCHE, Jr., U.S.N.

San Marcos (LSD-25) (F) - Commander J.G. BLANCHE, Jr. U.S.N.
Gunston Hall (LSD-5) - Lieut. Comdr. W.H. BARCKMANN, U.S.N.R.
Presque Isle (APB-44) - Lieutenant B.F. CAVER, U.S.N.R.
PGM-23 - Lt(jg) E.A. CLARK, U.S.N.R.
PGM-24 - Lt(jg) J.W. FERRIL, U.S.N.R.
PGM-26 - Lt(jg) J.T. MOSS, U.S.N.R.
PGM-29 - Lt(jg) N.C. THOMAS, U.S.N.R.
PGM-31 - Lt(jg) J.L. DE BLOCK, U.S.N.R.
PGM-32 - Lt(jg) G.A. OBERLE, U.S.N.R.
LCI-977 - Lt(jg) H.P. COHN, U.S.N.R.
LCI-1062 - Ens. H.W. PHIPPS, U.S.N.R.
LCI-1067 - Ens. E.R. NUTTER, U.S.N.R.
LCI-1091 - Lieutenant L.F. KOCH, U.S.N.R.
LCT-1361 - Lt(jg) P.M. MITCHELL, U.S.N.R.
LCT-1461 - Ens. J.T. JANS, U.S.N.R.

Medical Unit (TU 1.8.4) Captain D.M. MACKEY, U.S.N.
Benevolence (AH-13) - Captain E.P. CREEHAN, U.S.N.
Bountiful (AH-9) (F) Captain D.M. MACKEY, U.S.N.

Survey Unit (TU 1.8.5) Captain C.B. SCHIANO, U.S.N.
Bowditch (AGS-4) (F) - Captain C.B. SCHIANO, U.S.N.
John Blish (AGS-10) - Lieutenant F.A. WOODKE, U.S.N.
James M. Gilliss (AGS-13) - Lieutenant E. E. SIMMS, U.S.N.
YP-636 - Lt(jg) T.H. RISCH, Jr., U.S.N.R.
YMS-354 - Ens. W.H. McALPIN, U.S.N.R.
YMS-358 - Ens. S.M. GARBER, U.S.N.R.
YMS-413 - Ens. V.P. FIMOS, U.S.N.

Construction Unit (TU 1.8.6) - Commander K.C. LOVELL, CEC, U.S.N.
53rd Construction Battalion

Rongerik Evacuation Unit (TU 1.8.7) - Captain G.E. ELY, U.S.N.R.
LST-871 - Ens. M.B. FLETCHER, U.S.N.R.
LST-989 - Lieutenant G.H. GROMER U.S.N.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

JOINT TASK FORCE ONE STAFF ORGANIZATION

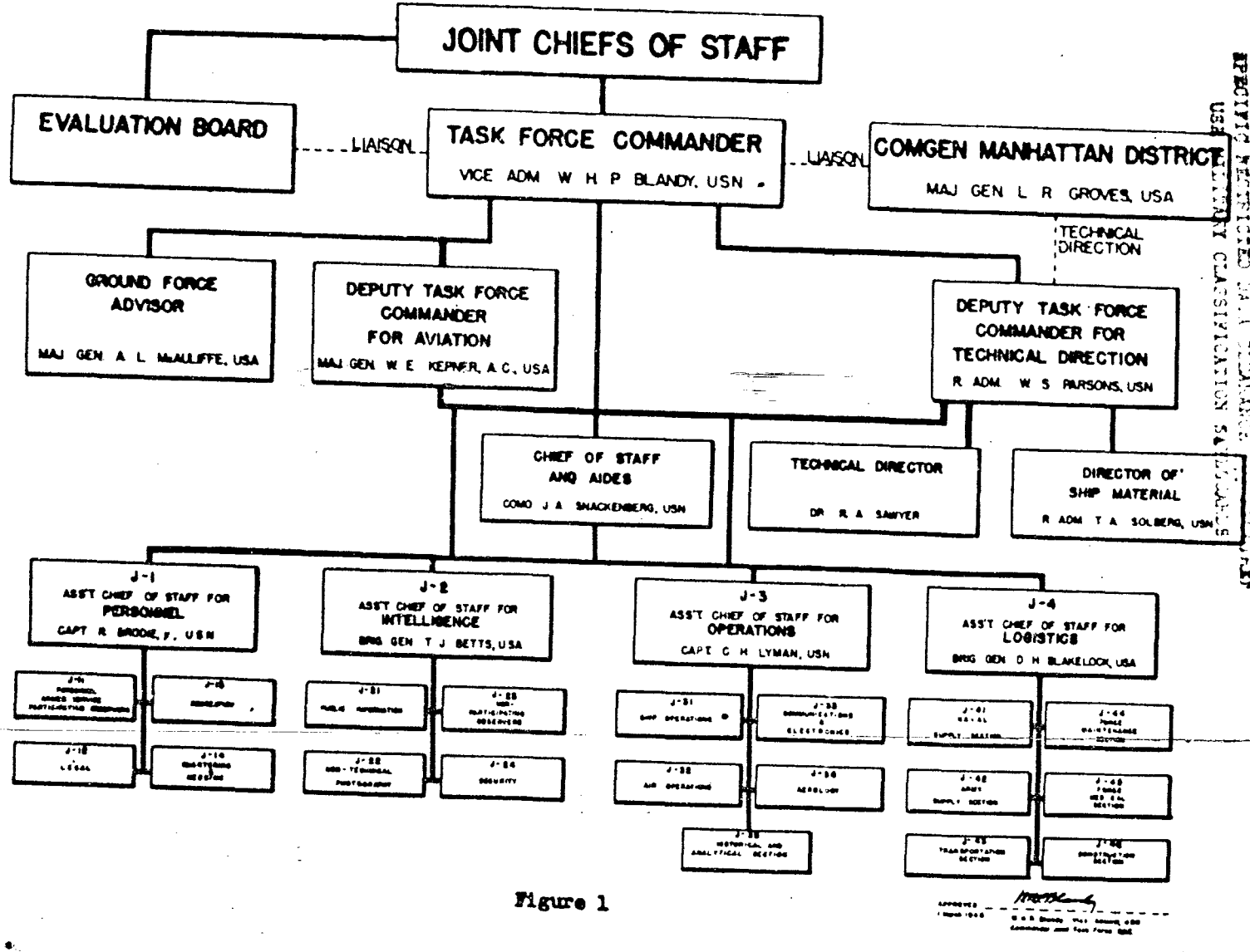
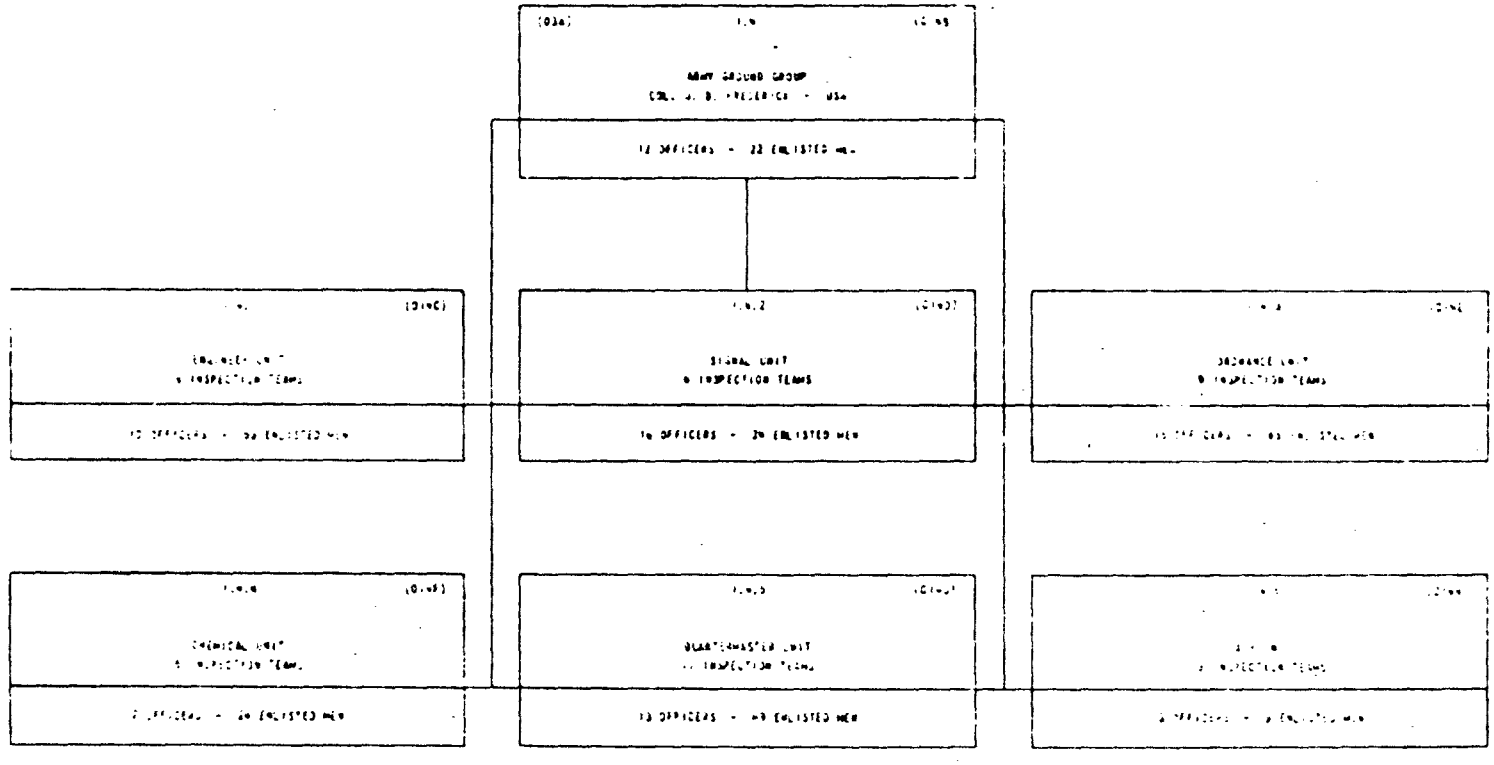


Figure 1

JOINT TASK FORCE ONE

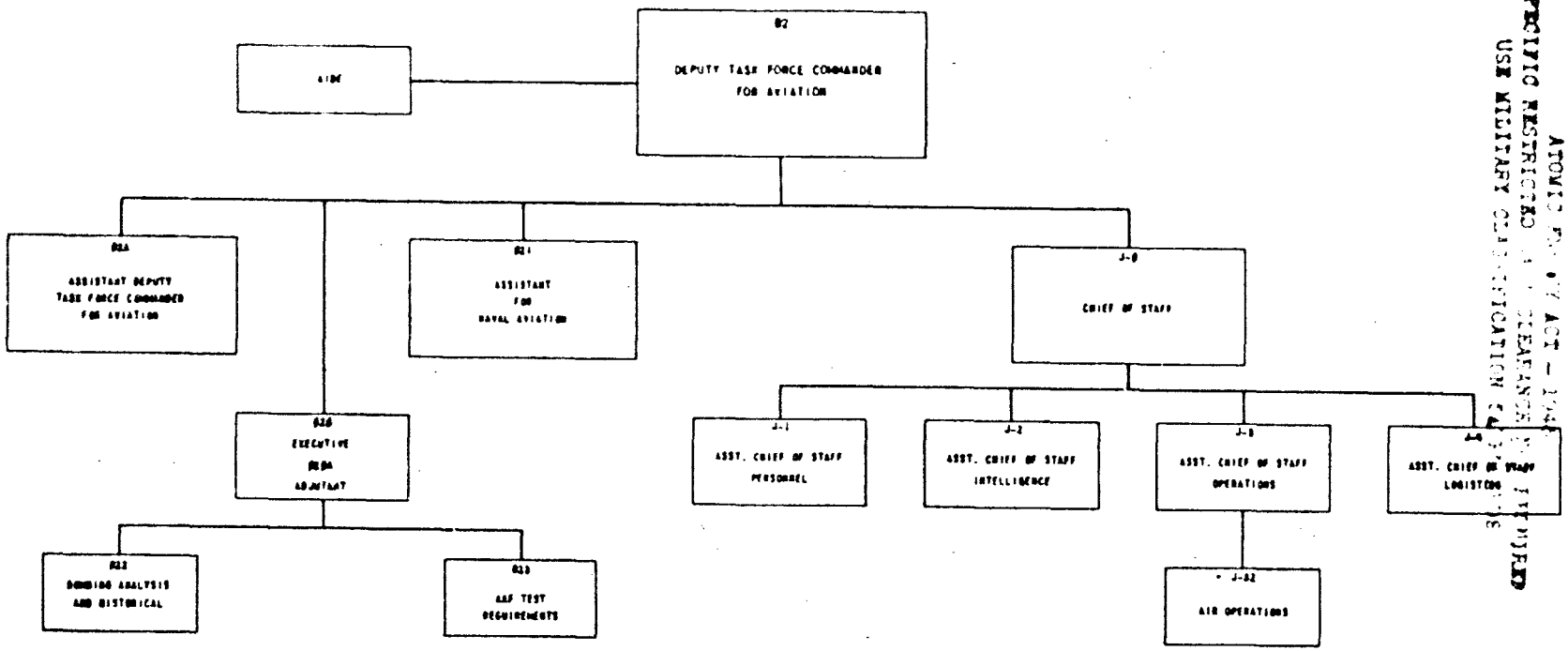
ARMY GROUND GROUP ORGANIZATION



RESTRICTED DATA

JOINT TASK FORCE ONE

STAFF ORGANIZATION DEPUTY TASK FORCE COMMANDER FOR AVIATION



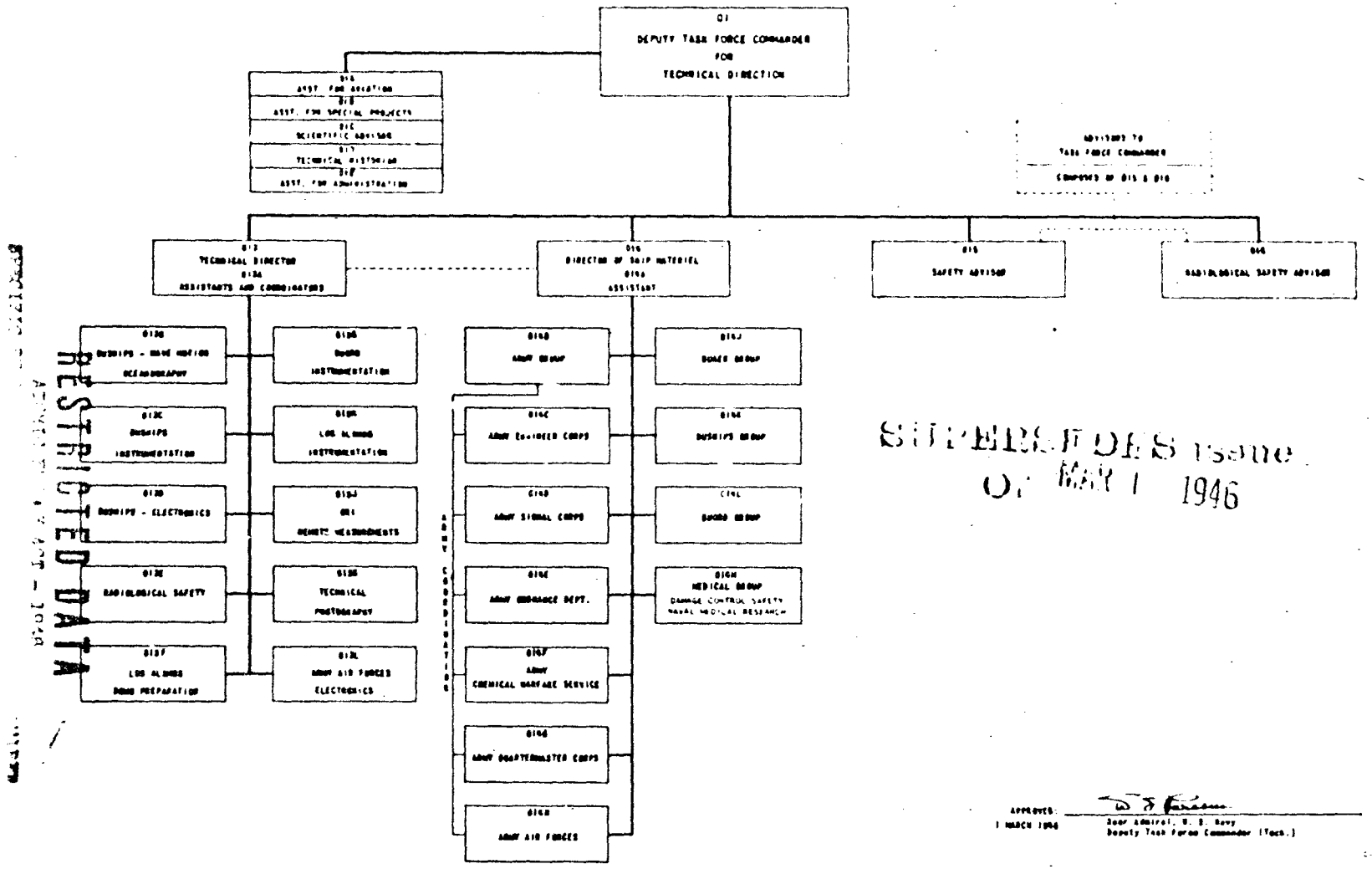
RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC RESTRICTED
USE MILITARY

APPROVED: _____
1 MARCH 1946 Major General, U. S. Army,
Deputy Task Force Commander (Aviation)

Figure 3

COMMANDER JOINT TASK FORCE ONE

STAFF ORGANIZATION - DEPUTY TASK FORCE COMMANDER FOR TECHNICAL DIRECTION



SUPERSEDES Issue Of MAY 1 1946

APPROVED: 1 MARCH 1946

Rear Admiral, U. S. Navy
Deputy Task Force Commander (Tech.)

RESTRICTED DATA

Figure 4

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS APPLY
USE MILITARY CLASSIFICATION

JOINT TASK FORCE ONE
STAFF ORGANIZATION - PERSONNEL DIVISION

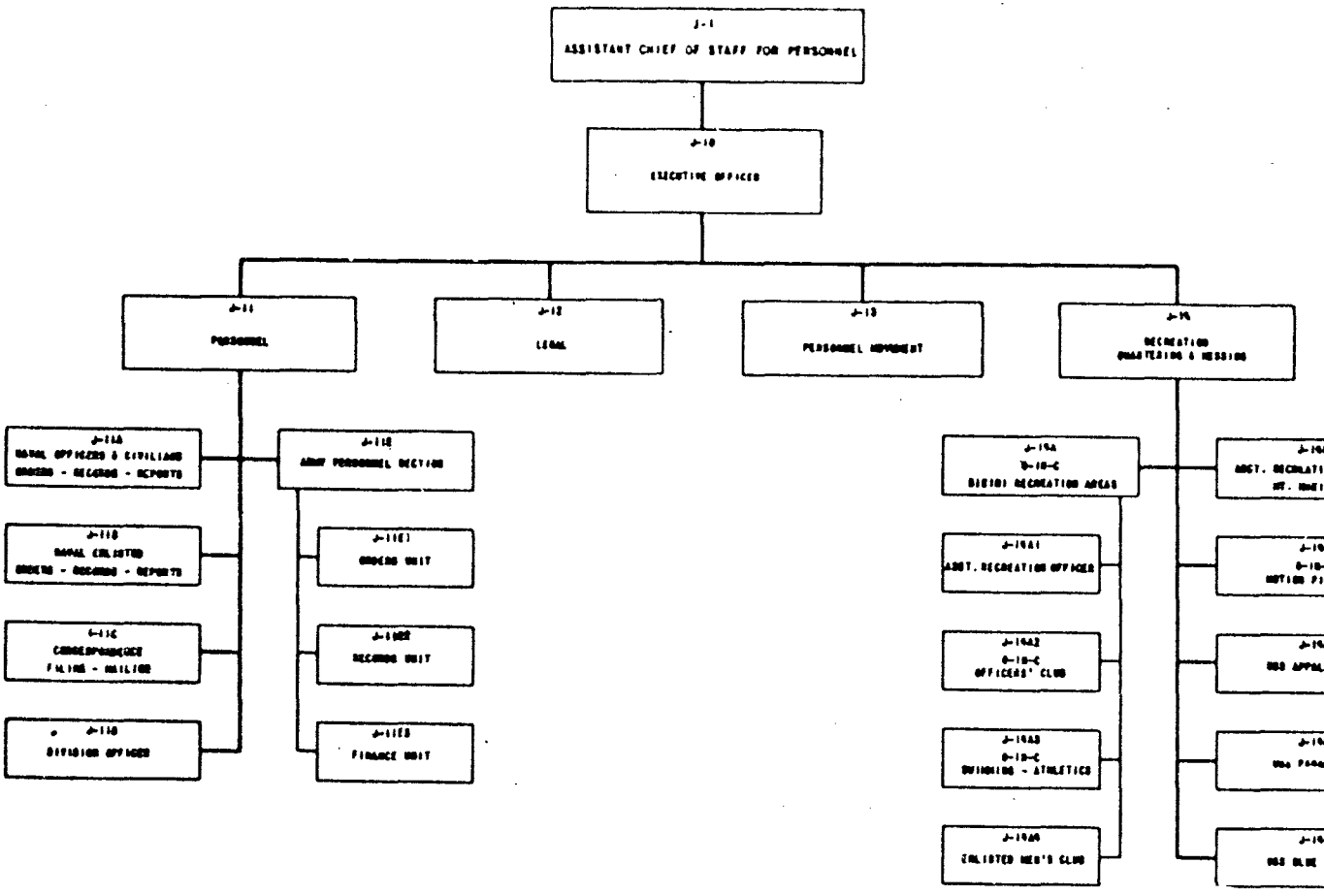


Figure 5

APPROVED: R. Brodie Jr
20 MARCH 1946 Captain, U.S. NAVY
Asst. Chief of Staff

RESTRICTED DATA

JOINT TASK FORCE ONE
STAFF ORGANIZATION INTELLIGENCE DIVISION

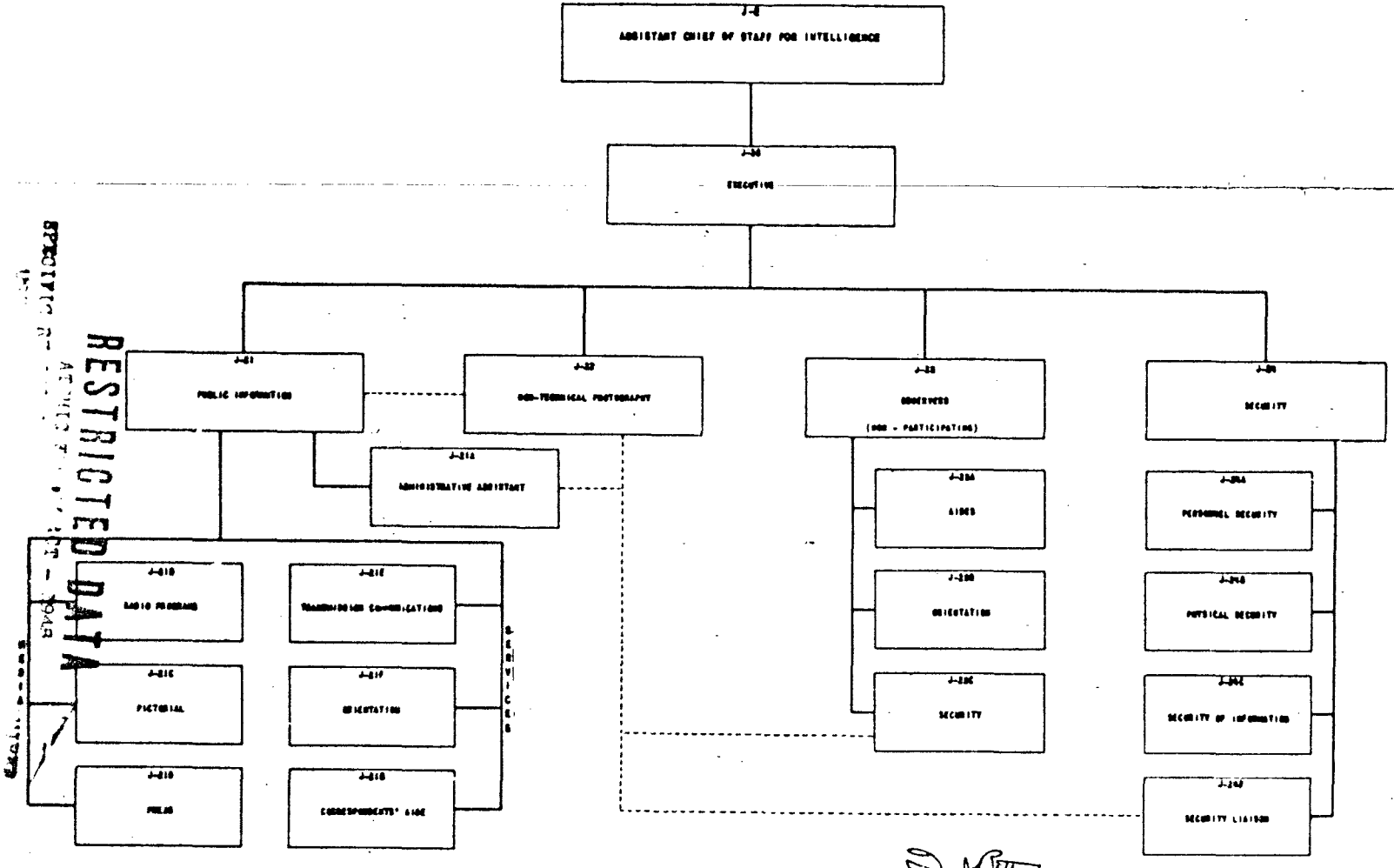


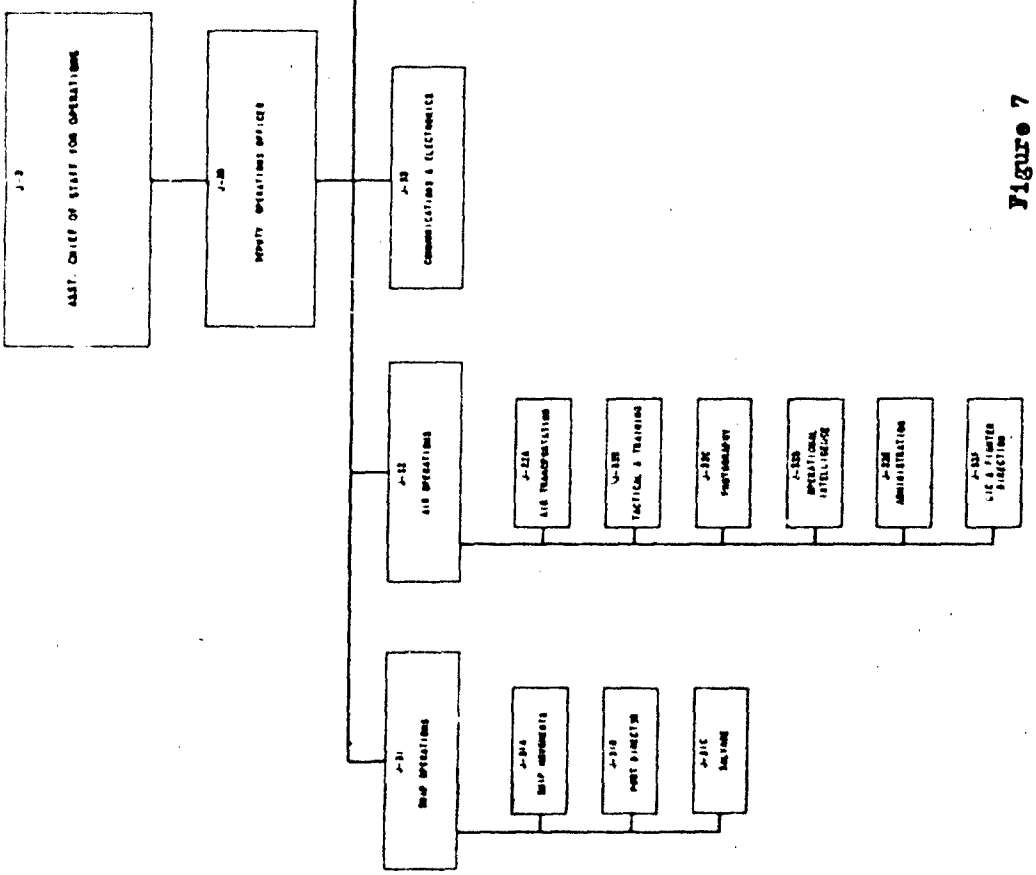
Figure 6

APPROVED: 1 MARCH 1946

Brig. Gen., U. S. Army
Assistant Chief of Staff

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC RESTRICTED DATA CLEARANCE REQUIRED
USE MILITARY CLASSIFICATION

JOINT TASK FORCE ONE
STAFF ORGANIZATION OPERATIONS DIVISION



APPROVED: 1 MARCH 1946
Charles H. Lyman
Captain, U.S. Navy
Asst. Chief of Staff

Figure 7

RESTRICTED DATA

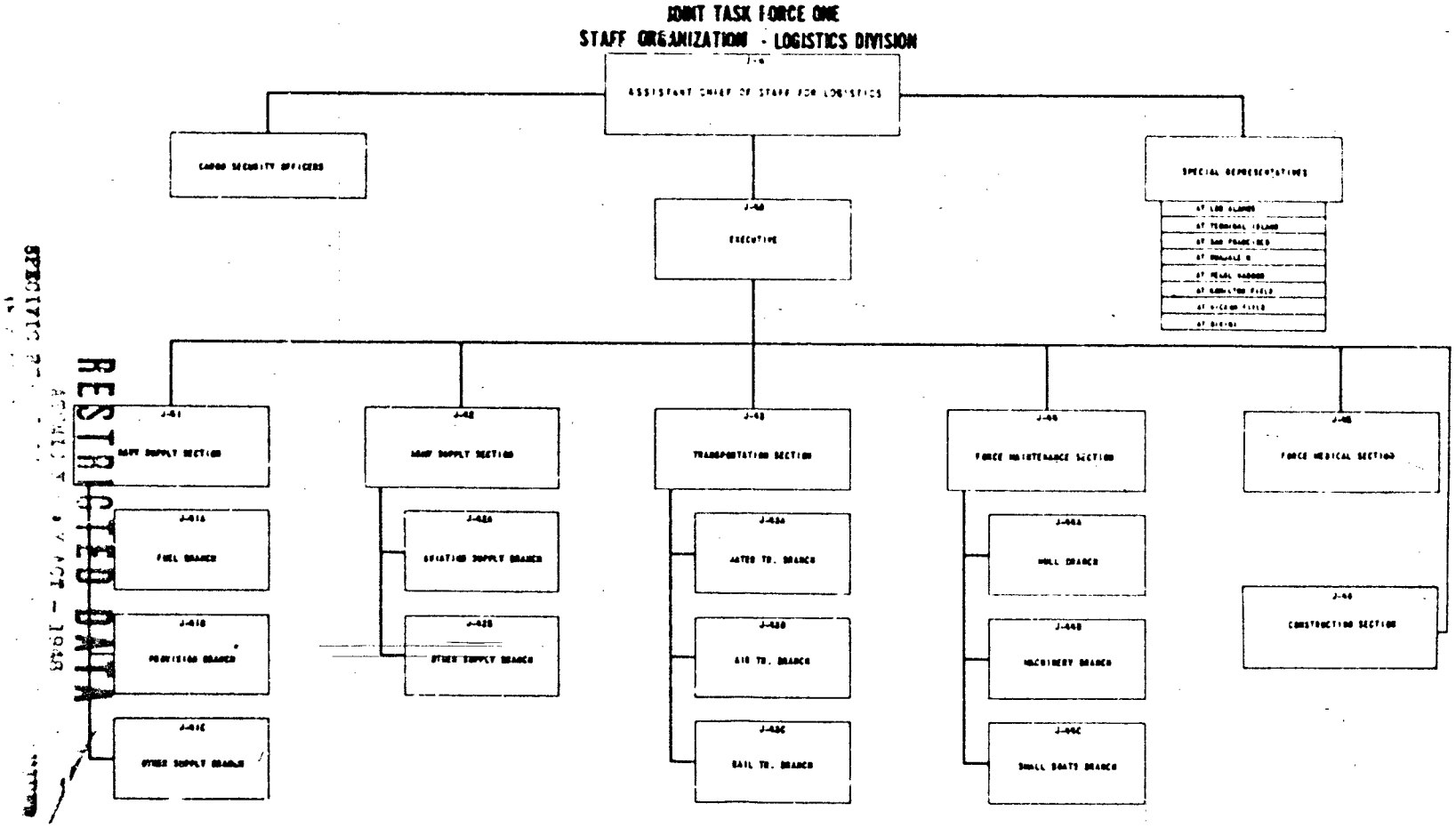


Figure 8

APPROVED: 1 MARCH 1946

Brig. Gen., U. S. Army
Assistant Chief of Staff

JOINT TASK FORCE ONE, REAR ECHELON, STAFF ORGANIZATION

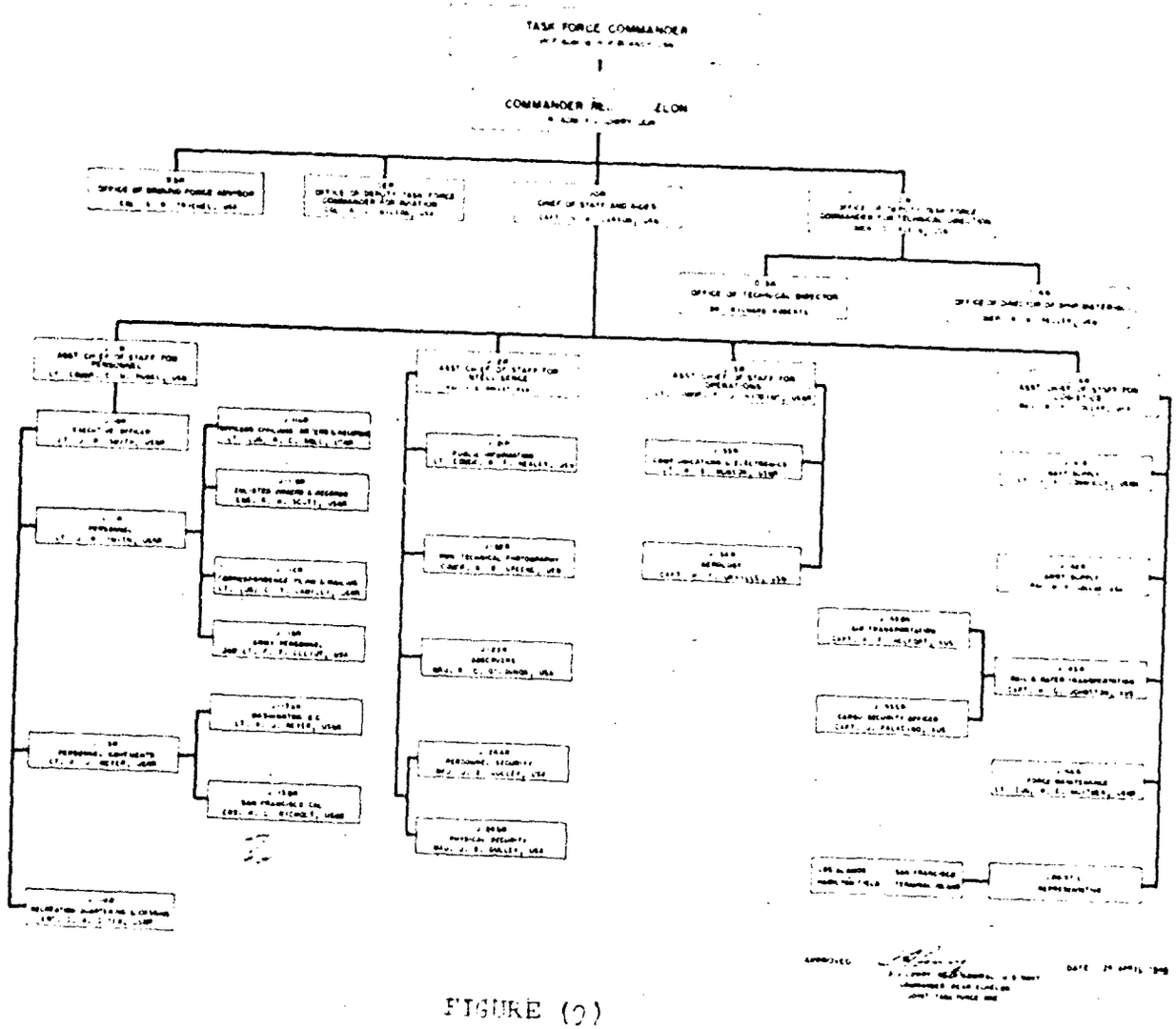


FIGURE (2)

RESTRICTED DATA
ATOMIC ENERGY ACT 1954
SPECIFIC RESTRICTED AREA CLEARANCE REQUIRED
USE MILITARY CLASSIFICATION GUIDANCE

JOINT TASK FORCE ONE

FORCE ORGANIZATION

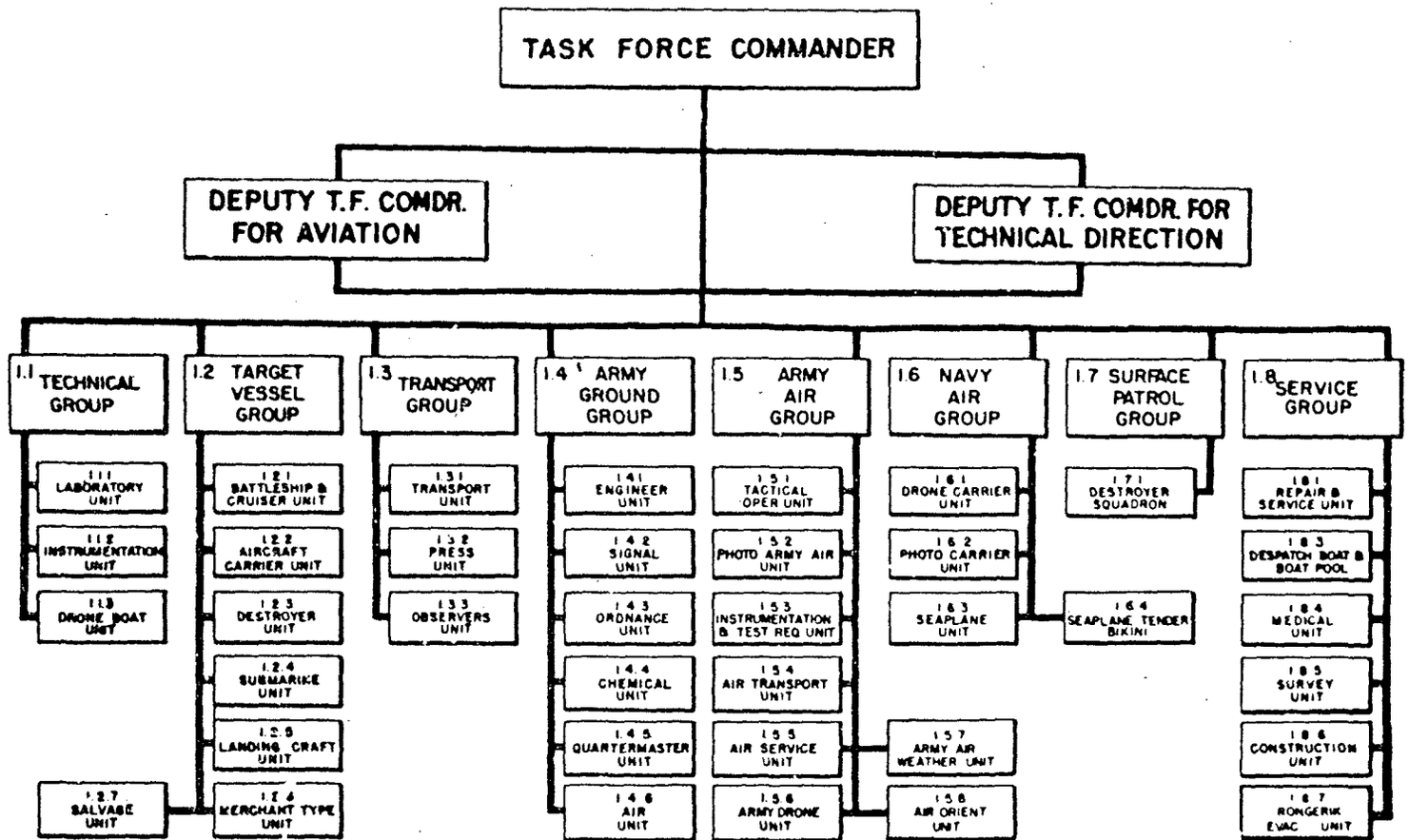


Figure 10

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED RESTRICTED DATA CLEARANCE REQUIRED
USE MILITARY CLASSIFICATION CATEGORIES

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART V - NARRATIVE OF THE OPERATION

SECTION (A) - PRELIMINARY PLANNING

1. President TRUMAN on 10 December 1945 made a public announcement to the effect that the UNITED STATES would explore further the capabilities of atomic energy, and that this exploration would be in the form of scientific atomic bomb tests or experiments. He designated the Joint Chiefs of Staff as the agency under whose jurisdiction the tests would be conducted.

2. In order to accomplish the atomic bomb tests, the Joint Chiefs of Staff proposed to the President that an operating agency be set up composed of Army and Navy personnel and leading civilian scientists, other Government Departments assisting the War and Navy Departments as necessary. On 10 January 1946, the President approved this proposal.

3. The Joint Chiefs of Staff appointed Vice Admiral W.H.P. BLANDY, United States Navy, as Commander Joint Task Force ONE, the agency designated to execute the tests. The operation was given the unclassified code name "CROSSROADS".

4. Steps were immediately taken to procure an adequate staff and to formulate plans for the tests. It was agreed advisable for a senior Army Air Forces officer to be Deputy Task Force Commander for Aviation and a senior Army Ground Forces officer to be a staff adviser. The following key personnel were obtained:

Major General W. E. KEPNER, U.S.A., as
Deputy Task Force Commander for Aviation.

Rear Admiral W. S. PARSONS, U.S.N., as
Deputy Task Force Commander for Technical Direction

Major General A. C. Mc AULIFFE, U.S.A., as
Army Ground Forces Advisor.

Dr. R. A. SAWYER as Technical Director.

Rear Admiral T. A. SOLBERG, U.S.N., as Director of Ship Material.

Commodore J. A. SNACKENBERG, U.S.N., as Chief of Staff, with four Assistant Chiefs of Staff:

Captain R. BRODIE jr., U.S.N., Personnel
Brig. Gen. T. J. BETTS, U.S.A., Intelligence
Captain C. H. LYMAN, U.S.N., Operations
Brig. Gen. D. H. BLAKELOCK, U.S.A., Logistics

5. In addition to the War and Navy Departments, liaison was maintained with the Joint Chiefs of Staff's EVALUATION BOARD, the President's EVALUATION COMMISSION and the MANHATTAN DISTRICT.

6. The Assistant Chief of Staff for Operations was responsible for the preparation of the operation plan and coordination of the various annexes prepared by other sections of the staff. Advice and technical assistance in planning was obtained from the appropriate Bureaus and Sections of the War and Navy Departments, the Manhattan District, and the Joint Chiefs of Staff Evaluation Board. The plans as finally developed were submitted to the Joint Chiefs of Staff for approval.

7. The plan as developed gave the organization of the Task Force, mission, dates, designations, location of tests and was supported by detailed annexes. At weekly conferences the staff was kept up to date on the progress of the plan, general policies to be followed were delineated and the responsibilities of the various sub-divisions defined.

8. Among the outstanding problems confronting the Commander, Joint Task Force ONE, after the appointment of his staff, was the selection of a site for the tests. Several places were considered, and Bikini Atoll, in the Northern Marshalls Group, was chosen as most nearly meeting the requirements. The choice was made despite two disadvantages attached to the locality: first, the Atoll was at a great distance from the mainland of the United States; and second,

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

the climate was injurious to some of the more important and delicate instruments, such as electronic equipment and cameras. These disadvantages were offset by many advantages. Bikini was remote from large communities and its isolation eliminated the danger of atomic explosions to municipal centers. The population of the island was sufficiently small to be removed without difficulty. The lagoon offered adequate anchorage for both the target and observer fleets. Adjacent to the target area within the lagoon were several small islands affording excellent foundations upon which to erect camera towers and instrument shelters. Moreover the general area of the Marshall Islands was considered free of the danger of violent storms. The locality was also found to be well suited for high altitude visual bombing during a large part of the year, and the wind direction was reasonably constant, at least below 20,000 feet. These two features were particularly important in determining the location of the experiment. Finally, Bikini was near the air bases already established at Kwajalein and Eniwetok, and therefore it was easily accessible for air operations.

9. Due to the tremendous size of the Task Force and the necessity for the organization to work with clock like precision, a Rear Echelon was established in Washington under Rear Admiral F. J. LOWRY, U.S.N., with Capt. H. R. CARSON, Jr., U.S.N., as Chief of Staff. After the departure of the Task Force Commander to the forward area this Rear Echelon staff provided a system of representation and liaison in Washington. It comprised officers who served in the various divisions during the early days of the Task Force, organized exactly as the Forward Echelon. It provided personnel for the entire Task Force, supervised security measures including screening of photographic material, maintained liaison with press and radio, and followed up on the logistic support of the Task Force.

10. Before firm plans for instrumentation and target layouts could be made it was necessary to select the Target Ships. Data was desired on graded damage against all types of Naval Vessels including Merchant types and landing craft.

The list as finally selected included 3 captured Enemy Men-of-War and totalled ninety three (93) vessels of the following types:

BATTLESHIPS (5)

BB-33 ARKANSAS, BB-34 NEW YORK, BB-36 NEVADA BB-38 PENNSYLVANIA, Ex-Japanese BB NAGATO.

CRUISERS (4)

CA-24 PENSACOLA, CA-25 SALT LAKE CITY, Ex-Japanese CL SAKAWA, Ex-German CA PRINZ EUGEN.

AIRCRAFT CARRIERS (2)

CV-3 SARATOGA, CVL-22 INDEPENDENCE.

DESTROYERS (14)

DD-367 LAMSON, DD-371 CONYNGHAM, DD-368 FLUSSER, DD-389 MUGFORD, DD-390 RALPH TALBOT, DD-402 MAYRANT, DD-403 TRIPPE, DD-404 RHIND, DD-406 STACK, DD-408 WILSON, DD-410 HUGHES, DD-411 ANDERSON, DD-413 MUSTIN, DD-419 WAINWRIGHT.

SUBMARINES (8)

SS-184 SKIPJACK, SS-196 SEARAVEN, SS-203 TUNA, SS-305 SKATE, SS-308 APOGON, SS-335 DENTUDA, SS-384 PARCHE, SS-386 PILOTFISH.

MERCHANT TYPES (20 APA's)(1 AKA)

APA-57 GILLIAM, APA-58 APPLING, APA-60 BANNER, APA-61 BARROW, APA-63 BLADEN, APA-64 BRACKEN, APA-65 BRISCOE, APA-66 BRULE, APA-68 BUTTE, APA-69 CARLISLE, APA-70 CARTERET, APA-71 CATRON, APA-75 CORTLAND, APA-77 CRITTENDEN, APA-79 DAWSON, APA-81 FALLON, APA-83 FILLMORE, APA-85 GASCONADE, APA-86 GENEVA, APA-87 NIAGARA, and AKA-21 ARTEMIS.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED SPECIFIC RESTRICTED INFORMATION CONTAINED
USE MILITARY CLASSIFICATION FOR PUBLIC RELEASE

LANDING CRAFT TYPES (6 LST's)(6 LCI's)(24 LCT's)

LST's 52, 125, 133, 220, 545, and 661.

LCI's 327, 329, 332, 549, 615, and 620.

LCT's 412, 414, 705, 812, 816, 818, 878, 1013, 1078, 1112, 1113, 1114, 1115, 1116, 1130, 1132 1156, 1175, 1187, 1237, 1268, 1341, 1377, and 1415.

MISCELLANEOUS TYPES (3)

ARDC-13
YOG-83
YO-160

11. The plan contemplated two tests considered most suitable for accomplishing the mission with the target vessels assigned:

(a) Test ABLE, an air drop from an Army B-29 aircraft operating from KWAJALEIN.

(b) Test BAKER, a static detonation at or below the surface of the water. Subsequent decision was reached to make Test BAKER a shallow subsurface detonation.

(c) Test CHARLIE, a third test, with the bomb detonated at a great depth, was necessary for the completion of the program desired by the Joint Chiefs of Staff. The preparation for it, however, required the construction of a bathysphere to withstand the tremendous pressures involved, and this consideration precluded the carrying out of this phase of the tests before the spring of 1947.

12. The operation plan originally contemplated that if favorable conditions were met Test ABLE would be held on 15 May, designated as ABLE DAY, and Test BAKER would be held on

1 July, designated as BAKER DAY. However, on 23 March the President postponed the tests for six weeks. The consequent revision of the Plan established 1 July as the date for Test "A", if favorable conditions were met, and that Test "B" would follow ABLE DAY as closely as salvage and repair work from Test "A" and preparation for Test "B" would permit, with at least three weeks intervening between the tests.

13. The postponement necessitated immediate research into weather conditions for the months of July and August as weather deteriorates markedly in the vicinity of BIKINI ATOLL from summer to late fall. Personnel problems were reviewed. Service extensions or replacements were obtained for Military personnel being demobilized and for civilians returning to fall terms at colleges and universities.

14. The plans incorporated provision for the correlation of Publicity and Security. The secrecy concerning many phases of the operation required for National Security complicated this correlation. The wide spread public interest displayed necessitated the provision for a large contingent of domestic and foreign observers, reporters and commentators.

15. To assist the Target and Task Unit Commanders in their preliminary preparations, advance copies of the Annexes were furnished them when tentatively approved. The close liaison and cooperation maintained between the planning and operating staffs proved a valuable asset in obtaining a high degree of efficiency both in the preparation and execution of the task. As finally approved the plan was issued as Commander, Joint Task Force ONE, OPERATION PLAN No. 1-46, and proved to require only minor revisions in execution.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
(A)-6

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED SPECIFIC RESTRICTED DATA CLEARANCE REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

COMMANDER JOINT TASK FORCE ONE

REPORT ON ATOMIC BOMB TESTS ABLE AND BAKER (OPERATION CROSSROADS) CONDUCTED AT BIKINI ATOLL, MARSHALL ISLANDS ON 1 JULY 1946 AND 25 JULY 1946

PART V - NARRATIVE OF THE OPERATION

Section (B) - Advance Preparation; Training of Task Groups

1. The period of preparation for Operation CROSSROADS began with Vice Admiral BLANDY's assumption of command of Joint Task Force ONE, 11 January 1946, and continued through 29 June. There were many problems to be solved. A system of logistics had to be perfected, and sea and air transportation established. A Joint plan of operations had to be devised for Army and Navy Units, and for their respective air contingents. Groups and Units had to be trained in the technicality of their assignments. Target vessels had to be prepared and specially equipped for their roles. The Task Force had to be moved into forward position, and the target fleet had to be moored in proper array.

2. The task of assembling the target and observer fleets was one of great difficulty. In early January many vessels selected as targets for CROSSROADS were either at disposal ports or were enroute thereto. Also many of the transport class target ships were still being used to return American troops to the United States under Operation MAGIC CARPET. Fleet Units that were to assist in CROSSROADS were busily engaged in reorganization, training, and upkeep incident to the end of the war. All categories were involved in the personnel problem of demobilization and readjustment.

3. In mid January all the destroyers which were to be assigned as targets were either at Pearl Harbor or destined thereto, and many had been decommissioned in anticipation of future use for conventional explosive tests. On 19 January the prospective targets were designated and those requiring such action were ordered re-commissioned; this process was completed by 31 January. They were formed into four temporary divisions for better administration with the senior officer

in each division acting as Division Commander. This organization assisted in coordinating the efforts of the ship preparation.

4. In addition to instrumentation preparation, most of the ships required varied repairs to enable them to make the trip from Pearl Harbor to Bikini. With the arrival of the Bureau of Ship's representatives at Pearl Harbor, the ship preparation program was expedited. Ships were granted Navy Yard availabilities in rotation and CROSSROADS priorities were changed from the lowest to the highest. Ships remaining at the buoys profitably employed themselves in personnel training and reorganization, making underway cruises as necessary to implement the program. All Destroyers reported to Commander Joint Task Force ONE for duty on 15 May.

5. In accordance with a directive issued by the Chief of Naval Operations in January, eight submarines were designated as target vessels for CROSSROADS. At the time of the assignment four of these vessels, the SKATE (SS-305), PARCHE (SS-384), APOGON (SS-308) and the PILOTFISH (SS-386) were in Pearl Harbor, the SEARAVEN (SS-196) and the DENTUDA (SS-335) were in San Francisco and the SKIPJACK (SS-184) and the TUNA (SS-203) were in New London. They were all in the process of post war disposition either to disposal or to inactive fleet status. The SEARAVEN and the DENTUDA arrived in Pearl Harbor 14 February while the SKIPJACK and the TUNA arrived 2 March. On 6 March the CROSSROADS Submarines were formed into a temporary squadron. The commanding officer of the U.S.S. DENTUDA, by virtue of being senior commanding officer, assumed command in accordance with a directive issued by the Commander-in-Chief, U.S. Pacific Fleet.

6. On 4 March the CROSSROADS Submarine Unit of the Bureau of Ships, headed by Commander C. L. GAASTERLAND, USN, arrived in Pearl Harbor. A close liaison was established between the CROSSROADS Submarine Unit and the Commanding Officers of the submarines. The submarine staff officer of Commander, Task Group 1.2, Captain G. A. SHARP, USN, arrived at the same

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS
USE MILITARY CLEARANCE FOR PROCURE
IGATION

time and furnished valuable assistance in instructing and advising on matters of submerging the submarines by means of weights and in coordinating the work of the submarines with Task Group 1.2. Systematic preparations for making the submarines ready for tests "A" and "B" progressed in a very favorable manner from the first week in March. All the submarines were given five to seven days availability at the Naval Shipyard for the installation of special fittings and equipment required for the tests. Compartment air tests were made on each submarine by the repair force of the U.S.S. AJAX. Other work items preparatory to CROSSROADS were accomplished by the repair department of the Submarine Base, Pearl Harbor. In general the submarines complied with the surface ship directives regarding preparations for the tests, and in addition made special preparations peculiar to the submarine type alone. All submarines reported to Commander Joint Task Force ONE for duty 15 May.

7. In January, five battleships, including one ex-Japanese, four cruisers including one ex-German and one ex-Japanese, and two aircraft carriers were designated as heavy ship targets. All U.S. ships less the NEW YORK and the INDEPENDENCE were in West Coast yards. The NEW YORK was in Philadelphia but was moved to San Francisco arriving there 31 March. The INDEPENDENCE was in the Pacific engaged in "Magic Carpet" operations but was sent to San Pedro. The PRINZ EUGEN arrived at San Pedro on 22 March from Bremerhaven via Boston and Philadelphia. The NAGATO and SAKAWA were in Yokosuka, Japan. Stripping of the ships and preparation for their missions was in general carried out at the yards before the movement to Pearl Harbor which occured between the 29th of April and 9th of May. The NAGATO and SAKAWA were given preliminary preparation by ships force at Yokosuka and were not sent to Pearl Harbor. On arrival in Pearl Harbor minor additional work items were accomplished and all units were ready for CROSSROADS by the reporting date 15 May. The Japanese battleship NAGATO and the cruiser SAKAWA were given final preparation at Bikini after their arrival from Japan, by the Service Group, Task Group 1.8, in accordance with instructions received from the Director of Ship Material.

8. In early 1946 the APA's of the Merchant Type Unit were in widely scattered locations carrying out Magic Carpet assignments. Upon completion of lifts then in progress, these ships were ordered to various Naval Shipyards on the West Coast and at Pearl Harbor for stripping. Final assembly of the ships at Pearl Harbor was completed in March. At Pearl Harbor the ships received their instrumentation installations, exposed cargoes, and necessary structural work for the CROSSROADS tests. Reorganization, preparation of special bills, and landing of excess material were accomplished during this period. Intensive programs were undertaken to train inexperienced crews, and to achieve at least the minimum degree of efficiency necessary for the safe operation of the ships. Most of the ships were given short training cruises in the Hawaiian Area.

9. Surface units supporting the tests were for the most part suitable without modifications except those required to perform special functions. Vessels requiring modifications were satisfactorily refitted to meet the special requirements and all reported to Commander Joint Task Force ONE in time to comply with the Operation Plan.

10. In order to prepare Bikini Atoll for target operations a considerable amount of work had to be accomplished in the lagoon and on the principal Islands. It was necessary first to clear the lagoon of Japanese mines. A hydrographic survey was instituted to complete the meager data recorded on the available Japanese charts. After the survey, it was necessary to blast out a number of coral heads to permit safe navigation of ships of considerable draft and to permit proper location of the ships in the proposed target arrays. Navigational and mooring buoys had to be planted in the lagoon and navigational beacons placed on shore. On the islands, photographic towers, recording stations, recreational facilities and landing facilities had to be erected. This work was started in early March and accomplished by a special Naval Construction Battalion, and by the Survey Unit and elements of the Service Group, assisted by minesweeping units of the Pacific Fleet. The target area preparation work continued

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

on schedule and was completed just prior to the arrival of the main groups about the first of June. In the interests of time, costs and efficient utilization of personnel, construction of different types of structures was held to a minimum. It was found satisfactory for all major structural requirements to use only two types of structures, (a) the 75 foot steel airfield control tower and (b) the 20 by 20 foot steel arch magazine, both being standard Navy Advance Base Structures and both were available from surplus wartime stocks.

11. The approval by Joint Chiefs of Staff of the original plan for Operation CROSSROADS immediately placed in effect the training program designated for all units participating in this scientific experiment. Since the units assigned to CROSSROADS were engaged in carrying out duties directly related to problems of the immediate post war period or were in the process of demobilization, deactivation, and overhaul it was necessary to provide a very considerable degree of basic training in addition to the specialized training for the specific requirements of the test.

12. Regardless of the operational status of the units when ordered for duty with Operation CROSSROADS, the first problem encountered was that of adequate and trained personnel. Three methods were used to bring the personnel quotas of all units to completion. First, a concerted effort was made to encourage trained personnel who were due for discharge to extend their duty period to September 1946. Second, regular personnel from deactivated units of the Army and Navy were transferred for temporary duty to the various operational units of CROSSROADS. As a last resort, the additional men required were obtained from basic training stations.

13. Each unit of the task force had its individual problem to overcome, but basically all units were required to initiate rigorous training schedules for officers and men in the phases of ship handling, engineering procedure, fire

fighting, boat handling, and supply procurement and expenditure. The problem as presented would seem to differ very little from conditions at the outbreak of World War II. However the program was expedited to a great extent through the already established training manuals and methods, and availability of material. The operational training was further facilitated by the high standards of morale and interest manifested by all participants, although it was slightly dampened by the six week period of postponement. But this period was used to complete training of individual ships and units and to some extent to give inter-group training.

14. An individual breakdown by units will clarify to some extent the problems of training for OPERATION CROSSROADS:

A. TASK GROUP 1.1

Instrumentation of all targets and target areas was one of the functions of this group. Ships assigned to the group were set up as floating laboratories with every facility available to service scientific instruments and properly record all data. Both of these requirements necessitated the training of military personnel to supplement the civilian technicians in properly mounting, reading, and collecting scientific instruments. Of special interest was the BURLESON (APA-67). This ship was fitted out as a floating hostelry and animal laboratory to move all experimental animals to the target area, place them on the targets at the appropriate time, and after the atomic bursts, to collect them and make studies to determine as closely as possible the effect on animals, and thus on human beings, of radioactivity. To obtain immediate results the personnel of the BURLESON were augmented for the first ten days after each experiment by medical personnel from other ships who were specialists in surgery and internal medicine.

A major training program was undertaken by the Drone Boat Unit (TU 1.1.3) to perfect the operation of obtaining radioactive samples of water in the lagoon by remotely controlled small landing craft (LCVP). This program especially emphasized operation and repair of electronic equipment, and radiological safety.

RESTRICTED DATA
(B) ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MI...

B. TASK GROUP 1.2 - TARGET VESSEL GROUP

All ships designated as targets were placed under special training standards involving personnel evacuation and reboarding techniques. The difference in ship characteristics necessitated a program for each type. In many instances it was necessary to indoctrinate the new crews and familiarize them with their own vessels. This work was undertaken simultaneously with damage control training and with preparing the ships as targets. Each ship had to be equipped throughout with special identifying markers for frames, water lines, and compartments, and special instrumentation had to be provided.

A special ship-operational training program was further necessitated by the inclusion of three enemy vessels as targets, the German cruiser PRINZ EUGEN, the Japanese battleship NAGATO, and the Japanese cruiser SAKAWA. In the first instance the transition was more easily accomplished than in the latter two cases, as the PRINZ EUGEN was already in an American Navy Yard. The cruiser's installations were completed in short time and all necessary blueprints and operating manuals were supplied, though the German system of engineering installation differed in many ways from the American system. Especially was this true in such phases as steam crossconnections. After an underway cruise from the Philadelphia Navy Yard to the San Diego Naval Repair Base, in which American complements worked alongside German crews, it was possible for the PRINZ EUGEN to proceed to the target area completely manned by United States Naval Personnel. The Japanese warships were battle damaged, all blueprints and manuals had been destroyed, and engineering installations were in poor condition from lack of maintenance. However it was possible to obtain the services of many English-speaking members of their crews to assist the American complements to become familiar with the operational controls of the vessels. The U.S. crews were then able to steam the ships from Japan to the target area. Much credit is due to the American complements of these two vessels for their zeal and skill in learning the operational features of these vessels under the

handicaps previously mentioned.

Ships requiring the least training of crews were the targets assigned from Merchant Vessel Type and Landing Craft Type. The former had been released from Magic Carpet duty and assigned directly to Operation CROSSROADS. The landing craft were assembled at Bikini, generally direct from the forward area and without preliminary training; however, the nature of their tasks was such that relatively little training was required, and this was given after arrival at Bikini.

The Submarine Unit and Salvage Unit, after their arrival at Pearl Harbor, were correlated in some phases of their training and undertook jointly the task of submarine submergence. One submarine was used as an example and several tugs were assigned as working aides. Then tests were conducted in various means of submerging and refloating while representative groups from other submarines and salvage vessels were present as observers and participants. Of all units that required extra basic training, the Submarines were fortunate in requiring the least, as most of their complements were almost intact from war operational duties. However they were required to do an extensive overhauling and reinstalling of their equipment as only two of them were operational at the time of their assignment as targets. As to the Salvage Unit, its early work in the target area involved towing, planting of buoys and moorings, and placing ships in the complicated pattern of the target array; this constituted excellent training for the basic type of salvage. In addition, this unit obtained valuable experience through the practice submergence of submarines, and also conducted intensive training in firefighting.

All ships in the target Task Group carried out the required tests and inspections as outlined by the Director of Ship Material in "Instructions to Target Vessels for Tests and Observations by Ships Force." In this process the personnel obtained valuable knowledge and experience in damage control and engineering, as well as in their individual technical specialties.

RESTRICTED DATA
AEC - 1946
SPECIFIC PERMISSION
USE MISUSE

C. TASK GROUP 1.3 - TRANSPORT GROUP

In this group were the assigned active transports and ships designated to carry the official observers and press correspondents. The APPALACHIAN (AGC-1), for press correspondents, was ordered to a Naval Ship Yard for complete overhaul of her communications equipment, and installation of further facilities to meet the requirements of the expected large demand for news output. This phase provided an excellent opportunity for the instruction of personnel in materiel installation, upkeep, and repair which was especially of importance due to the number of new men assigned in the communication branch. The transports concentrated their program in small boat handling, as their major function was the evacuation of all target ship personnel. Later they furnished facilities for the reboarding teams. Small boat handling was expected to be (and in fact became) one of the major problems of the operation, as a tremendous amount of boating was required, and the facilities of the boat pool, as well as the boating capabilities of all ships present, were taxed to the utmost.

D. TASK GROUP 1.4 - ARMY GROUND FORCES

The objective of this group was chiefly one of testing and studying Army Materiel exposed to atomic explosions. To this end it was necessary to train men in materiel survey and classification. Special allowances were set up of Army materiel, and Army personnel placed it aboard target vessels, and removed and studied it after the atomic bursts.

E. TASK GROUP 1.5 - ARMY AIR FORCES

This task group was composed of units that had the following assignments: weather reconnaissance, transportation, bombing, photography, radio and press, air-sea rescue, observation, and servicing.

The variation in the assignments required individual training of units, with the bombing unit in the highest classification. A designated island was used as the experimental target and, after the selection of the five

bomber crews to be trained, exercises were held continually with the dropping of simulated atomic bombs to perfect the teams and to study all ballistic characteristics necessary for the ABLE Day experiment. A competitive system was set up for the crews of the bombers and grades assigned on basis of flight, engineering, communications, navigation, bombing, and morale performance. The final results were studied by the division heads and the crew designated for the actual bombing run.

All land-based drone planes and mother planes were based at ENIWETOK and carried out a continuous program of rehearsals. The remainder of the Task Group operated from its base at KWAJALEIN and exercised in the many phases of their various prospective assignments.

F. TASK GROUP 1.6 - NAVY AIR GROUP

This group had three definite functions: drone planes and drone boat control, aerial photography, and seaplane transportation. Training requirements in all phases were very high and necessitated extra individual rehearsals. The U.S.S. SHANGRI LA (CV-38) was drone carrier and operated from ROI Island in the MARSHALLS where a land base was installed for landing and experimentation of the drone planes. Training was carried through from arrival up to the actual tests to perfect drone plane operations and complete further experiments on drone boat control. The U.S.S. SAIDOR (CVE-117) operated from BIKINI Lagoon with the drone boat control unit and photographic unit on board. The drone boat control unit (of TBM aircraft) trained in directing drone boats through the lagoon, and correlated all phases of training with Task Unit 1.1.3. The photographic unit was trained through actual operation as it was desired to have a complete pictorial record of Operation CROSSROADS from the initial stages of target placement. Thus photographic aircraft (TBM's, F6F's, and two helicopters) were manned by experienced pilots and photo-men for the completion of their mission. The ORCA (AVP-49) was stationed at BIKINI as terminal and service unit for transport seaplanes. This unit maintained the seaplane runways, and furnished the overhaul servicing required for all planes on turn-around service.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948

CJTF * ONE
Operational Report - CROSSROADS - PART V - Narrative of the Operation
Section (B) - Advance Preparations; Training of Task Groups

- -

G. TASK GROUP 1.7 - DESTROYER SURFACE PATROL

Destroyer Squadron 7 completed an operational training program similar in many respects to those undertaken in a shakedown cruise. The majority of the crews were new personnel and the ships organizations of necessity required continuous training; this was given, and in addition the ships were prepared for their special assignments. Primary among the latter was the tracking of radiologically contaminated water outside the lagoon. This necessitated the installation of water-sampling equipment, and facilities for obtaining such samples either from the surface or at a considerable depth. Secondarily, the ships were equipped and trained to take extensive bathythermograph data and to conduct oceanographic surveys in general. In addition, they were prepared for harbor entrance control duties, air-sea rescue missions, and general screening duties.

H. TASK GROUP 1.8 - SERVICE GROUP

The training of Service Group personnel was entirely along the lines normally followed for such personnel in the usual course of training a Service Division, and had no particular scientific phases, being concerned almost entirely with the usual matters of maintenance and repairs, construction, supplies, and equipment, boat service and recreation. There were two units within this group, however, which were exceptions, and were directly connected with the scientific aspects of the operation. One was the Survey Unit, which was charged, in addition to its hydrographic survey duties, with the conduct of oceanographic surveys and wave measurements in a large area embracing Bikini, Rongelap, Kwajalein, and Eniwetok, and with biological and piscatorial studies both at Bikini and at neighboring atolls. The other exception was the group of PCM's, which was given the highly important duty of spearheading the radiological patrol of the lagoon. Unfortunately the personnel of the above units was generally inexperienced, but all were quick to learn, and no particular difficulties were experienced in their instruction and indoctrination.

16. Following the individual and group training mentioned above, and after arrival at Bikini, rehearsals were held of each phase of the Able and Baker Day operations. Then, about six days before each of the actual detonations, a complete dress rehearsal was held; this included evacuation of non-target ships and personnel from the lagoon, and the operation of ships, planes and radio and electronic circuits exactly as was contemplated for the coming test. The days of the rehearsals for Able and Baker Days were designated Queen and William Days, respectively. These rehearsals embraced, too, the radiological patrol of the lagoon, islands and surrounding waters, and the re-entry of the observing ships, including salvage operations. After each of these dress rehearsals a critique was held, performance analyzed, and such changes as were considered appropriate were made in the plan. Actually, very few changes were found necessary.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
GUIDANCE NOT REQUIRED

RESTRICTED DATA
RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART V - NARRATIVE OF THE OPERATION

SECTION (C) - CONDUCT OF THE TESTS FROM THE OPERATIONAL ASPECT

1. Operation CROSSROADS culminated with Test ABLE and Test BAKER, two atomic bomb tests of laboratory precision held on a huge scale. The number of personnel and quantities of material involved reached a size never before attempted in the world of scientific experiments. Nearly all of the varied technical resources of the United States were drawn upon in some degree to make the success of these tests possible. Every science and art that could be of use in obtaining desired data and information, was utilized to the utmost. New measuring devices were especially manufactured for the tests, and old devices with new applications were used.

2. Months were spent in planning, preparation and rehearsal before holding the tests. Every effort, regardless of magnitude, was expended in perfecting the plan for this very complex operation, and in molding personnel and material into a coordinated machine to attain a complete success. During the months of planning and preparation, the Joint Staff composed of Army, Navy, and civilian scientific personnel, worked closely together in entire harmony.

3. Throughout the preparatory stages the operation ran smoothly. The ship preparation, training of units individually and collectively was on schedule and according to plan. QUEEN Day operations, the official rehearsal for Test ABLE, completed the preparations for the first test except for minor adjustments and last minute preparations. By 30 June the stage was set for the first test, the air burst.

4. Good weather, with favorable wind direction, was a dominating factor in the selection of a day for the test. Good visibility with not over four tenths cloud cover was required for bombing accuracy and, since it was considered possible that the atomic cloud might reach a height of 60,000 feet, it was necessary that resultant winds up to that height should be from easterly quadrants, in order to avoid the possibility of radiological contamination of the operating and observing ships, which were of necessity disposed in the area to the eastward of Bikini. This posed considerable of a problem, since at this time of year the winds at around 30,000 feet were more often from the west than from the east. (This was in contrast to the winds below 20,000 feet, and also those above 40,000 feet, which were generally from easterly quadrants). Further, it was extremely difficult to predict these upper winds as much as 24 hours in advance; and because of the number of ships involved, and the complexity of the final instrumentation, it was necessary to start the evacuation process 24 hours in advance of the intended hour of detonation. The optimum hour for the detonation was between 0815 and 1000; it could not be earlier because the final evacuation of the lagoon and the takeoff of certain planes should for safety be done in daylight, and on the other hand if the detonation were delayed beyond 1000 it would jeopardize the completion of certain essential phases of the radiological petrol before dark.

5. The target date for the first test was 1 July, and consequently the morning weather conference on 30 June was an important one. Fortunately, the prospect for the following day was favorable, and at 0900 a general signal to the Task Force was made, to the effect that, "ABLE Day is One July. Sector Axis Zero Five Five. How Hour Zero Eight Thirty."

6. The following twenty-four hours was a period of intense activity. In accordance with carefully prepared and detailed plans, the evacuation of target vessel personnel to their assigned transports was started immediately and

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC [illegible] INCLUDED

completed by 1500, except for last minute personnel. All non-crossroads air operations were suspended within five hundred miles of the target area. Notification of the test was given to interested parties. The evacuation of the lagoon was started at once. By early afternoon all personnel had been evacuated from all islands except Bikini, Amen, and Enyu, and the natives on RONGERIK were embarked on shipboard as a safety precaution in case radioactive matter might be carried in that direction. By 1800 the evacuation of the lagoon had been completed, except for last minute ships, and at 1923 the Technical Director reported his preparations completed.

7. An evening weather conference was held, at which suitable conditions were still predicted for the following day. By daybreak, however, numerous heavy cumulus clouds had gathered over Bikini. The bombing plane, due to take off at 0530, was held on the ground at Kwajalein until the Task Force Commander was assured by weather reconnaissance east of Bikini that a clear area was moving west, and that the cumulus tops were evaporating as the sun rose higher. This delay required postponing How Hour until 0900.

8. Evacuation of last minute personnel from the target ships and Bikini, Amen and Enyu Islands was completed by 0512. By 0603 last minute ships had cleared the lagoon and evacuation was complete.

9. The air operations began with the take off of the command plane at 0423, and by 0800 all air and surface craft were on station. The bomb carrying plane made one practice run and started its live bombing run at 0850. At 0859 "bombs away" was reported and detonation occured within thirty-three seconds of the time set.

10. During the test, ship and air facilities were used to a maximum for observation. Members of the President's Evaluation Commission, the Joint Chiefs of Staff's Evaluation Board and selected news and radio representatives witnessed the test from the air. The remainder of the press and other non-participating observers were taken care of on ships stationed as near the test as was deemed consistent with safety. The Secretary of the Navy observed the test from the Task Force Flagship.

11. Immediately after detonation the Task Force re-entry began with the sending in to the lagoon entrance of the six PGM's of the radiological reconnaissance wave. These craft were on hand promptly and commenced their re-entry within slightly less than two hours after the bomb had detonated. In the meanwhile, drone aircraft and boats were engaged within the radioactive area in collecting air and water samples for analysis. Observers in Naval Observation aircraft reported radioactivity over the lagoon and target damage. Four hours after the drop a preliminary estimate of the damage was sent to the Joint Chiefs of Staff.

12. Initial Boarding Teams and Salvage Unit commenced re-entry four hours after the bomb detonated and proceeded with boarding and salvage operations as rapidly as radiological and other safety considerations permitted. There was considerable radioactivity in the water and aboard targets near the center of the array, and there were a number of fires, some involving gasoline and ammunition. Communications and coordination of effort between the radiological safety organization, salvage unit and initial boarding teams were excellent and this phase of the operation was executed safely and expeditiously.

13. As had been anticipated, the problem of re-entry and berthing of ships during the late afternoon of ABLE Day was considerably complicated by the presence of radiologically contaminated water in the anchorage areas and the approaches thereto. However, at 1430 the lagoon was declared safe for entrance and the Task Group Commanders brought their ships in promptly upon the reciept of orders. All ships were safely anchored in temporary berths in the lagoon before darkness. By 2030 initial boarding teams had boarded and cleared 18 target ships. The natives at Rongerik were disembarked during the afternoon as no further radioactive danger was anticipated in that area.

14. In only two respects did the ABLE Day operations vary from the prescribed plan: (1) The bomb was wide of its mark by between 1500 and 2000 feet; no reason is apparent for this large error, and analysis is continuing.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

CJTF - ONE
Operational Report - CROSSROADS - PART V - Narrative of the Operation
Section (C) - Conduct of The Tests from the Operational Aspect

Fortunately, the target array had been laid out to allow for a contingency of this nature, and the desired graded damage was obtained notwithstanding. (2) At 0851 a Navy F6F drone went out of control and crashed into the sea.

15. The situation at the end of ABLE Day may be summarized as follows. Considerable radioactivity still persisting aboard target ships and in the water, being particularly heavy near the center of the target array. All re-entry ships were at temporary anchorages in the lagoon except stragglers from Task Group 1.6 and destroyers of the upwind and downwind patrol. A total of eighteen ships had been reboarded by initial boarding teams but no ships teams placed aboard any vessel of the target group.

16. On ABLE plus one day re-embarkation of target personnel commenced and proceeded with gratifying speed and smoothness. Inspections by initial boarding teams and reboarding by ships teams continued throughout the day on those ships which were radiologically safe and habitable. By nightfall forty-seven such ships had been reboarded by all or part of the ships teams and the work of restoring them to normal conditions proceeded rapidly.

17. During ABLE plus one the submarine SKATE was beached lightly in shallow water off ENYU Island and anchored bow and stern. The badly damaged INDEPENDENCE was moved to spare moorings to the westward of target array, with all fires out and the ship in no apparent danger of sinking. The YO-160 was moved from the center of the target array to spare moorings outside the target area. The SAKAWA sank as a result of progressive flooding just after being taken in tow for beaching. The islands of BIKINI and ENYU were inspected and declared radiologically safe.

18. On the third, fourth and fifth of July, the reembarkation of personnel on radiologically safe and habitable target ships continued as rapidly as conditions

permitted. By nightfall of the third of July twenty-two ships had reported normal conditions fully restored, and the ARDC-13 was beached on ENYU Island to prevent sinking. By the fifth of July the remaining ships had been rehabilitated to the extent necessary for BAKER Day preparations.

10. Operational results of Test ABLE indicated that the bomb detonated with approximately the expected power at a point 1500 to 2000 feet westerly of the desired location and at approximately the planned altitude. Five ships were sunk. Two transports and a destroyer sank immediately and another destroyer capsized and sank later. The ex-Japanese cruiser SAKAWA was heavily damaged and sank at 1037 the following day. Ships sunk in addition to the SAKAWA were the GILLIAM (APA-57), CARLISLE (APA-69), ANDERSON (DD-411), and the LAMSON (DD-367). Of the five sunken vessels, four were either sunk outright or received lethal and irreparable damage on detonation of the bomb. The SAKAWA could probably have been saved, had not radiological contamination of the ship and surrounding water precluded safe access to her by salvage personnel. The INDEPENDENCE was the most heavily damaged of surviving vessels. She was on fire aft when the salvage vessels re-entered the lagoon, and due to the danger of explosion of her magazines and exposed torpedo warheads, she could not be approached without unacceptable risk to salvage vessels and personnel. It is of note that the PENSACOLA, in spite of severe damage to her topside and moderate damage to her boilers, was able to get underway under her own power on 11 July to take her place in the target array for Test BAKER. The SKATE sustained the most spectacular damage of any surviving target vessel, and even to expert observers, appeared to be in imminent danger of sinking. When the ship was boarded and inspected after beaching, this estimate was found to be entirely erroneous, as the ship's machinery and all spaces within the pressure hull were found to be in excellent condition, and the ship was gotten underway under her own power on the same day. Other ships in the target array were damaged in varying degrees dependent upon their proximity to point of detonation. Roughly, it may be summed up by saying that ships

RESTRICTED DATA (C)
ATOMIC ENERGY ACT - 1948
DISCLOSURE OF [illegible] TO [illegible] DEFENCE NOT REQUIRED

within 500 yards of the explosion were sunk or mortally damaged, those 500 to 1,500 yards suffered varying degrees of heavy damage, and beyond 1,500 yards, minor damage. There were instances of fires being started as far away as two miles.

20. As soon as the extent of the damage to target vessels from Test ABLE had been determined, the Task Force Commander tentatively selected 25 July for Test BAKER. The period from the 5th to the 24th of July was utilized in general preparations. Ships were repaired, located in their final target position, instrumentation was completed, training was continued and a final rehearsal was held on 19 July. After Test ABLE the press ship APPALACHIAN returned to Pearl Harbor via Kwajalein to permit certain press representatives to leave and to reembark others for Test BAKER. Non-participating observers were taken on a cruise to some of the Central Pacific Islands in the PANAMINT and the BLUE RIDGE. The itinerary of this cruise included visits to the Islands of MAJURO, PONAPE, TRUK and GUAM.

21. By the 24th of July preparations were complete. Weather was not so important a factor since radioactivity was not expected to be carried to such a height and although good visibility was desired for photographic purposes it was not as essential as in Test ABLE when bombing was a factor. At the morning weather conference on 24 July, the predictions for the following day were favorable and the Task Force Commander at 0850 made the general signal designating 25 July as BAKER Day, and 0835 as How Hour.

22. The twenty-four hours preceding the actual detonation in general followed the same pattern as in Test ABLE and was marked by intense activity. Evacuation of target ship personnel to transports was completed by 1630, except for last minute personnel, and by 1700 evacuation of the lagoon except for "last minute" ships was complete. Three remaining target submarines were submerged although the SEA RAVEN partially surfaced later and was not finally resubmerged until 2300. At 0435 on BAKER Day evacuation

of last minute personnel from target ships was reported complete; however at 0530 3 men were detected on the GASCONADE and picked up. At 0610 final bomb adjustments had been completed under the direct supervision of the Deputy Task Force Commander for Technical Direction and ten minutes later the last ship had cleared the lagoon. By eight o'clock all air and surface craft were on station. Due to the difference in the type of test it was possible to station press and observer ships approximately ten miles closer to the target than for Test ABLE. Members of the Joint Chiefs of Staff and the President's Evaluation Commission were present to witness the test.

23. At 0835 the Bomb was detonated on schedule. Immediately following the detonation the BEGOR (Drone Boat Control Ship) was directed to proceed and operate close off shore east of ROKAR, the six radiological PGM's proceeded to the entrance of the lagoon and at 0916 were directed to enter and commence operations. Early reports from the PGM's and from reconnaissance aircraft indicated intense radioactivity both in the waters of the lagoon and in the surrounding atmosphere and it became apparent that complete reentry would be considerably delayed. However it was found possible later in the day to anchor some ships within the entrance of the lagoon.

24. The Joint Chiefs of Staff were advised of target damage as it became available. In addition to the bomb carrying barge, the ARKANSAS and YO-160 sank immediately, LCT-1114 was capsized, the SARATOGA was heavily damaged and sank at 1616 the same day due to progressive flooding. The NAGATO was damaged, and although her condition did not appear critical she sank from progressive flooding during the night of 29 July while still radiologically dangerous. Of the submarines, the PILOTFISH and APOGON were found on the bottom so severely damaged they could not be raised, the SKIPJACK and SEARAVEN although on the bottom were later surfaced, the DENTUDA was not sunk but damaged sufficiently to require raising and beaching.

V - (C) - 8 RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC [illegible] CLEARANCE NOT REQUIRED

RESTRICTED DATA
AT [illegible] ACT - 1954
SPECIFIC RESTRICTIONS [illegible] APPLY
RESTRICTED MILITARY [illegible]

Other ships requiring beaching due to damage were the transport FALLON and the destroyer HUGHES. The battleships PENNSYLVANIA and NEW YORK, heavy cruisers PENSACOLA and SALT LAKE CITY were sufficiently damaged to require counterflooding measures. In many cases it was impossible to determine the extent of damage because of dangerous radiological contamination.

RESTRICTED

C O M M A N D E R J O I N T T A S K F O R C E O N E

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART V - NARRATIVE OF THE OPERATION

SECTION (D) - POST TEST ACTIVITIES

1. After Test Baker, dangerous radioactivity persisted aboard most target ships and over large areas of the lagoon, effectively blocking or retarding the work of re-entry, salvage and reboarding. Some target ships sank before they could be reached by salvage teams. Others were in immediate danger of sinking. Early access to ships and islands had to be provided in order to rescue perishable records and test animals. Complete safety had to be guaranteed for the personnel engaged in this pressing work. This was accomplished by a continuous and highly accurate radiological reconnaissance conducted on a vast scale. It involved the recording and plotting of tens of thousands of readings daily as well as providing monitors for all parties entering hazardous areas. It required a constant revision and dissemination of safety instructions and delineation of dangerous areas. Representative operating ships of the task force were monitored daily, after they entered the lagoon, to guard them against dangerous concentrations of radioactivity. Ships in the northern part of the anchorage accumulated considerable radioactivity in their evaporators, and on 2 August were shifted to uncontaminated berths near the lagoon entrance where they remained until 7 August.

2. Most targets were hosed down vigorously with salt water or received experimental washes with various materials, in an effort to reduce radioactivity and expedite reboarding. These efforts, while in many cases very helpful, produced only a partial reduction in radioactivity, and reboarding continued to be a slow and hazardous process, with boarding periods kept strictly within allowable exposure limits prescribed by the radiological safety section. Priority in reboarding was given to beaching operations, recovery of test animals, recovery of instruments and records, surfacing

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION CLEARANCE NOT REQUIRED

of submerged submarines, and operations to limit flooding of ships with severe underwater damage. Four target APA's on the southern fringe and one target APA on the western edge of the array received no appreciable radioactive contamination and were promptly reboarded and manned by their regular crews. Decontamination efforts were eventually sufficiently effective to permit the reboarding and manning of the destroyer CONYNGHAM on 4 August, and the reboarding and temporary manning of five target submarines in August and September. But all other major target vessels were so heavily contaminated that reboarding and detailed inspection could be undertaken only for a very short period each day, and manning them would have exposed their crews to unacceptable radioactive hazard. On 26 July the destroyer HUGHES and on 27 July the APA FALLON, were beached at Enyu Island to keep them from sinking. Of the six submarines submerged for test Baker; TUNA and DENTUDA were surfaced on 27 July and the latter was beached at Enyu on 28 July; SEARAVEN was surfaced on 29 July; the severely damaged SKIPJACK was finally surfaced on 2 September; and all attempts to surface the PILOTFISH and APOGON were unsuccessful. The PENNSYLVANIA, NEW YORK, PENSACOLA, and SALT LAKE CITY, had considerable flooding and operations were commenced early in August to pump them out and limit flooding. The capsized LCT-1114 was sunk by demolition charge on 30 July. ARDC-13 sank on 6 August as result of progressive flooding, which could not be checked because of extreme radioactivity. LCI-620, which was in damaged and generally poor material condition and of no further technical interest, was towed to sea and sunk by destroyer gun fire on 10 August. LST-125 in similar condition, was sunk by gun fire of the FALL RIVER on 14 August. Recovery of test animals was completed on 30 July. The general recovery of instruments and records was completed by 7 August.

3. As soon as the radiological situation permitted, the survey unit and construction unit commenced preparations for Test Charlie at the western end of the lagoon. The survey unit commenced hydrographic surveys, installed navigational aids, and conducted land surveys for Test Charlie instrumentation. The Construction Unit prepared moorings

for Test Charlie targets, commenced construction for instrumentation towers, blasted out coral heads and prepared landings at the western islands.

4. After Test Baker, units were sailed from the forward area as soon as their services could be spared, and were released from the Task Force either immediately thereafter or on completion of unloading. The Drone Carrier Unit, Press and Observers Unit, ALBEMARLE, FURSE, BOUNTIFUL, and CUMBERLAND SOUND had sailed by 1 August. Additional departures by 10 August, included: Photographic Carrier Unit, Surface Patrol Group, Drone Boat Unit, BURLESON with all test animals, four PGM's; BAYFIELD, APPLING and two LST's with Army Equipment and personnel from Kwajalein and Eniwetok; OTTAWA and ST. CROIX with SeaBee equipment; the BOTTINEAU and the Army Air Group. Remaining after 10 August were: Target Group, Service Group, Seaplane Unit, part of Transport Unit, HAVEN and WHARTON.

5. There was only one item of note with regard to the movements of ships after release from the Task Force. YP 636, after return to the Service Force Pacific Fleet, and while en route to San Francisco, ran aground at Miramontes Point, California, at 0415 on 13 September. No lives were lost, but the ship quickly broke up. Of her cargo, which comprised the entire collection of fish specimens painstakingly collected by the Oceanograph Survey Section, only 2% were salvageable.

6. There was an early demand for the presence of Vice Admiral Blandy in Washington in connection with evaluation of tests already conducted, discussions as to future tests, and decisions as to disposition of target vessels and radiological safety clearance of vessels released from the Task Force. By 10 August, activities had been reduced to detailed examination and salvage of target ships, and survey and construction in preparation for Test Charlie, and on that date the Task Force Commander departed from Bikini in the MOUNT McKINLEY for Pearl Harbor. After conferring with CinCPac there, he hauled down his flag on 18 August and departed by air for Washington. At this time, Command of Joint Task Force ONE

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
[illegible] VOCATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT
RESTRICTED PUBLIC RESTRICTION
USE MILITARY

activities in the Pacific was passed to Rear Admiral Fahrion, with title of Commander Naval Task Groups JTF-1, and Commander Advance Echelon JTF-1; in this capacity, Rear Admiral Fahrion reported to CinCPac for additional duty. Administration of the Task Force remained in the MOUNT McKINLEY until 26 August, when it was shifted to the headquarters in the Navy Department.

7. Early in August it became apparent that the tendency of radioactive material to concentrate and accumulate in the evaporators and marine growth on hulls of ships operating in Bikini Lagoon made it mandatory to shift the base of the Task Force to Kwajalein. At the same time, radiological surveys of target vessels indicated that many of these could not be boarded for sufficiently long periods to either prepare the ship for movement to Pearl Harbor or to assess fully in all cases the damage sustained, and it was recommended that the more heavily contaminated vessels be decommissioned at Kwajalein. CNO approved and CinCPac concurred with this plan, and ComNavTaskGrps was ordered on 16 August to shift base to Kwajalein and to proceed with the decommissioning of certain specified ships. This movement to Kwajalein was commenced late in August and completed early in September.

8. During the operations in Bikini Lagoon after Test Baker all ships were carefully monitored and were never allowed to operate in water of high radioactivity. However, evaporators and the marine growth on the hulls of ships were found to build up concentrations of radioactive material that exceeded tolerance limits. Prior to departure all ships were given a special monitoring and a conditional clearance was granted subject to the following of individually assigned procedures for safety. While the observance of a few simple safety precautions was in all cases sufficient to continue safe operation of these ships, it was recognized that these ships could not be released for unrestricted operation, repair or disposition until they were decontaminated and proved to be definitely clear of radioactivity. On 19 August a letter was addressed to ships which had been present at Bikini from 25 July to 10 August which directed the monitoring of such ships prior to dry docking or repair of contaminated machinery. By

28 August it became apparent that additional safeguards would be required, and recommendations were made to CNO and CinCPac that all exposed ships be assembled and put through a clearance procedure. This was approved by CNO, and CinCPac directed the assembly of exposed ships for necessary decontamination and monitoring. On 9 September a letter was addressed to the commanding officers of all exposed ships giving details of the clearance procedure, and a monitoring organization was set up by the Task Force under the direction of district medical officers. Rear Admiral Solberg of the Task Force staff was ordered to the West Coast for a conference with Commander Western Sea Frontier and to witness decontamination experiments at Hunters Point from 17 to 20 September. As result of this conference, experienced officers from the Task Force staff were ordered to temporary duty under Commander Western Sea Frontier to follow up and coordinate the decontamination, monitoring and clearance of exposed ships. On the basis of the experiments at Hunters Point, the Bureau of Ships and Bureau of Medicine and Surgery issued a joint speed letter on 24 September in which they assumed responsibility for giving final radiological clearance to vessels and prescribed detailed decontamination and clearance procedures for ships destined for the active fleet. Additional directives from these two Bureaus covered further decontamination details and the decontamination and clearance procedures for ships destined for inactivation or disposal.

9. On 7 September 1946, the President announced that Test Charlie was indefinitely postponed. A directive was received from the Joint Chiefs of Staff relative to dissolving the Task Force. On 9 September the Task Force Commander directed that no further preparations be made for Test Charlie and that Operation CROSSROADS be terminated as soon as practicable consistent with obtaining vital information in regard to mechanical and radiological damage and retaining in usable condition ships which constitute valuable samples of such type of damage.

10. All survey and construction activities at Bikini were rapidly brought to a close, and the atoll was completely evacuated on 26 September 1946. For safety and security reasons, recommendation was made to CNO that Bikini lagoon

RESTRICTED DATA
V - (D) ACT - 1946
CLEARANCE NOT REQUIRED

RESTRICTED DATA

be declared a defensive sea area, and pending CNO action CinCPac was requested to make periodic air reconnaissance in order to exclude foreign or private shipping. CNO did not concur to the above recommendation, but ordered that surveillance of this area be continued to restrict entry of foreign, merchant or private shipping which has not been duly authorized. This restriction was promulgated through Notice to Mariners declaring the area bounded by latitudes 11-28 N and 11-43 N and longitudes 165-10 E and 165-35 E dangerous to shipping and personnel, and restricting entry except to those duly authorized by proper authority.

11. The CONYNGHAM, TUNA, DENTUDA, PARCHE, SEARAVEN, and SKATE proceeded from Kwajalein to Pearl Harbor under their own power arriving there on 6 September. The SKIPJACK was towed to Pearl Harbor arriving on 22 September. In accordance with arrangements with CNO they were moved in October to the San Francisco area for decommissioning and retention for radiological study, arriving there by 22 October except for SKIPJACK which did not depart from Pearl Harbor until the latter part of the month.

12. During October plans were formulated with the Chief of Naval Operations for the return of additional target ships of particular interest from Kwajalein to Bremerton and Hunters Point for detailed structural and radiological examination. This plan included the towing to San Francisco of the GASCONADE, INDEPENDENCE, FALLON, CRITTENDEN, BRULE and MAYRANT; and the towing to Puget Sound of the HUGHES, PENSACOLA, SALT LAKE CITY, NEW YORK, RHIND and NEVADA. It was proposed to move ships from Kwajalein at the rate of one per month and deliver them alternately to each area in the order given above, starting San Francisco area first.

13. In October the preliminary examination and securing of target ships at Kwajalein was completed. On 1 October, the Chief of Naval Operations directed that on dissolving Joint Task Force ONE, these ships and their caretaking unit be turned over to the Commander-in-Chief, Pacific Fleet.

CJTF - ONE
Operational Report - CROSSROADS - PART V - Narrative of the Operation
Section (D) - Post Test Activities

Disposal of unstable ammunition was completed on 23 October, and on that date these vessels and their caretaking unit were turned over to the Atoll Commander Kwajalein under the Commander-in-Chief, Pacific Fleet. The caretaking unit at that time consisted of the salvage tugs CONSERVER and CURRENT, three LCI's, APL-27, YF-753, a shore based radiological safety unit, an ammunition disposal unit, and several small landing craft.

14. Prospective work for the caretaking unit, in addition to routine caretaking, includes the removal of ammunition as practicable from target ships scheduled for return to the West Coast, and participation in the training of graduates of the radiological safety school who are being sent to Kwajalein to gain practical experience.

15. In accordance with directives of the Joint Chiefs of Staff, steps were carried out rapidly to complete the work of the Task Force and to turn over operational control of all units to appropriate commands. As of 24 October no ships or units remained under the operational control of the Task Force, and only staff activities were left. The Task Force was formally dissolved on 1 November 1946. A JOINT CROSS-ROADS COMMITTEE with Rear Admiral W.S. PARSONS, U.S.N., as chairman was established at that time to complete the preparation of reports and summarization of technical data.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIED IN (D) 7 CLEARANCE NOT REQUIRED

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VI - CHRONOLOGY

SECTION (A) - CHRONOLOGY OF QUEEN DAY OPERATION

(All times are Zone minus Eleven (Love))

22 June, 1946 - QUEEN DAY minus ONE

0930 - CJTF-1 executed all Task Force signal: "Queen Day is twenty three June. Sector Axis zero nine zero. How hour ten hundred love." Evacuation of Target Vessel personnel to assigned transports was started immediately and completed by 1500, except for last minute personnel.

0945 - Simulated message from CJTF-1 to War and Navy Departments, the Manhattan District and others interested, notifying them of the date and intended hour of detonation.

1028 - CJTF-1 sent the following message to CROSSROADS Air Groups: "Queen Day now scheduled twenty three June. How Hour ten hundred love. Expect confirmation prior midnight. CTG 1.5 propose bombing axis by dispatch prior zero six hundred love. Probable radex two four five clockwise to three five zero true. Adjustments may be made while airborne."

1200 - Evacuation of lagoon started with the departure of the Upwind and Downwind destroyer patrols.

1206 - CJTF-1 sent message stating that radio silence would be effective zero eight thirty love Queen Day.

1321 - CJTF-1 sent dispatch to CTG 1.5 authorizing bombardier to use as aiming point any visible vessel within 1,000 foot radius of Nevada on fourth or succeeding runs, if Nevada obscured.

1420 - 5 Chief Torpedomen intended for initial boarding teams stranded on LST-388 with motor launch from Dixie broken down. Dixie recovered men and boat.

1500 - Evacuation of all except last minute personnel completed. Evacuees on Transports of TG 1.3.

1600 - PGM-24 cleared the lagoon entrance with evacuated personnel from Erik and Prayer Islands.

1715 - Shangri La with Turner and Cecil departed Roi for Operating area, to remain in area until completion of dress rehearsal.

1800 - Evacuation of lagoon completed except for last minute ships. CTG 1.5 advised CJTF-1 proposed bombing axis Queen Day zero four five degrees true.

2224 - CJTF-1 sent out following all task force message: "Queen Day cancelled for twenty three June. Task Group 1.1 plus Fulton, Coasters Harbor, San Marcos, Coucal, and PGM-24 return to port at dawn, others remain at present stations. Present prospects are for improved weather twenty four June."

2309 - CJTF-1 sent message to CTG 1.7: "Desire to take maximum advantage Queen Day postponement by taking oceanographic sections. Ships so equipped take Hydrographic stations others use deep bathythermograph. Desire Barton remain point Willys. Suggest others run North South line returning to assigned areas by 0500 Love Queen Day.

23 June, 1946 - QUEEN DAY minus ONE

0910 - At conclusion weather briefing conference CJTF-1 executed signal establishing Queen Day as 24 June with How Hour at 0830 and surface sector axis 090 degrees true.

1058 - CJTF-1 sent message to Task Force stating that radio silence would be effective at How Hour minus one hour and thirty minutes on Queen and Able days.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC CLEARANCE NOT REQUIRED

RESTRICTED DATA
AT NE
SPECIFIC RE
RESTRICTED SE MILITA

1134 - CJTF-1 sent following message to Air Groups: "For Queen Day twenty four June. How Hour zero eight thirty Love. X-Ray Hour zero six forty nine Love. First predicted radex zero nine zero clockwise to two seven zero true. Until Mike plus fifteen Navy drone recovery planes may remain in radiological danger area outside twenty nautical miles or if cloud is visible eight nautical miles from vertical projection nearest portion. No plane should be under the edge of overhanging Atomic Cloud."

1255 - Mayrant (DD-402) reported engineering casualty. Leaky superheater tubes. Only one boiler remaining in operation. Considered unsafe to operate. With tender assistance upon return to port believe boilers can be repaired in four days unless complete inspection reveals additional repairs necessary.

1600 - San Marcos, PGM-24, Coasters Harbor, Wharton, Fulton, Coucal, Haven, Burleson and Avery Island cleared the lagoon entrance.

2326 - CJTF-1 sent message to Air Group: "Queen Day twenty four June confirmed. Second predicted radex zero eight five to two eight five. Further predictions before final briefings if available."

24 June, 1946 - QUEEN DAY

0132 - CJTF-1 sent message to Air Groups. Third predicted radex 080 degrees to 280 degrees.

0423 - Command aircraft airborne. Air Operations proceeding in accordance with Air Operation order number one dash forty six.

0500 - Exact bearing of initial point and orbit point Baker given as two two five degrees true. Sector axis changed to zero seven five degrees true.

0528 - Bombing aircraft takeoff authorized.

0537 - Bomb carrying aircraft airborne.

0622 - Radiological axis is zero seven five degrees true.

0634 - CJTF-1 sent dispatch; for Queen Day remind all hands information concerning point of bomb detonation is classified secret. CJTF-1 will warn airborne personnel direct.

0635 - Mt. McKINLEY stood over toward PGM-23 on Northeastern corner of Enyu Island. Asked her by visual message: "What are you doing there?" No reply came from PGM-23. Mt. McKINLEY dispatched picket boat and DD-693 Moale to stand over toward her.

0642 - PGM-23 moved seaward under her own power. Mt. McKINLEY cancelled message to picket boat and Moale.

0711 - One shock wave analysis C-54 landed at Kwajalein due to an oil leak.

0725 - Mt. McKINLEY sent following message to DD-722 Barton: "Are you at point Willys?"

0729 - Reply from Barton: "We are 3,000 yards West of Point Willys taking soundings."

0731 - Bomb carrying aircraft over target reports weather not very good but possible.

0750 - Bomb carrying aircraft was informed that the area was clear.

0759 - Bomb carrying airplane first practice run completed. Thirty minutes before first possible bomb release.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
USE MILITARY [illegible] SAFEGUARDS

721479 O—46—9

RESTRICTED DATA

0805 - Received word that all army aircraft were on station.

0820 - Bomb carrying airplane starting final bombing run; ten minutes before first possible bomb release.

0822 - All Navy planes present except 30,000 foot drone F6F.

0831 - Negative report from bomb carrying airplane. Target obscured by clouds.

0844 - Bomb carrying airplane established time for bomb to be dropped as 0915.

0853 - B-17 30,000 foot drone and drone control planes returned and landed at Eniwetok.

0900 - Bomb carrying airplane starts live bomb run.

0914 - Bombs away!

0915 - Practice bomb exploded slightly aft and to the starboard quarter of the Target ship Nevada.

0916 - CJTF-1 sent out all Task Force Message stating that Mike Hour was 0914 Love.

0929 - Downwind destroyers commence radiological patrol.

0931 - CJTF-1 message to Henrico, Artemis and Appling: "Wave seven approach entrance to lagoon and hoist out radiological LCPL's, remaining behind wave one."

1001 - Radiological axis changed to zero nine zero degrees true. Cloud path boundaries two four five to two nine five true.

1033 - Fall River directed to take station as Harbor entrance control vessel.

1145 - PCM's start entering the lagoon for radiological patrol.

1225 - Moale departed for Kwajalein.

1305 - Permission given to board LCT-1175, LST-220, LCI's 549, 329, 527 and APA-87 Niagara.

1307 - Air Radiological danger areas from Mike plus four hours. All altitudes 120 degrees to 180 degrees. Twenty five miles to one hundred and thirty miles.

1315 - Barton starts her first crossing on downwind radiological patrol.

1344 - Wave eight proceed to re-entry area Easy.

1424 - Wave nine proceed re-entry area next behind wave eight.

1436 - Situation report Mike plus five hours. Moale enroute Kwajalein with water samples. Waves one to five inclusive have entered the lagoon. Radiological situation in anchorage area clearing rapidly after one constructive "hot" area near Bikini Island disappeared. Barton making final downwind crossing.

1601 - Sumner, Mayrant and Trippe directed to return to port.

1749 - Re-entry completed except for tugs with tows and radiological patrol destroyers.

2300 - Radiological destroyers completed crossings of patrol sectors.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY SECTION

4.

25. June 1946 - QUEEN DAY plus ONE

0734 - Re-entry of all ships into the lagoon completed.

1230 - All reboarding of target vessels completed.

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946, AND 25 JULY 1946

PART VI - CHRONOLOGY

SECTION (B) - Chronology of ABLE DAY Operation

(All times are Zone minus Eleven (Love))

30 June 1946 - ABLE DAY minus ONE

0900 - CJTF-1 Executed All Task Force signal: "ABLE DAY IS ONE JULY X SECTOR AXIS ZERO FIVE FIVE X HOW HOUR ZERO EIGHT THIRTY X" Evacuation of target vessel personnel to assigned transports was started immediately and completed by 1500, except for last minute personnel.

0918 - CJTF-1 directed CTU 1.8.7 to embark natives at RONGERIK and await further orders.

0923 - CJTF-1 sent CROSSROADS Air Notice Number NAN ONE giving ABLE DAY schedule and requesting interested addressees to comply with ALPAC 153 suspending air operations within 500 NM BIKINI twelve hours prior to detonation.

0924 - CJTF-1 notified War and Navy Departments, the Manhattan District and others interested, date and intended hour of detonation.

0959 - Directed all ships have maximum boiler power available commencing at HOW Hour.

VI (B) 1

RESTRICTED DATA

ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED
ATOMIC ENERGY ACT -
RESTRICTED DATA
USE MILITARY CLASSIFICATION ONLY

1142 - TECHDIR reported LCT 412 partially unloaded at BIKINI. Unable to complete unloading in sufficient time to place LCT at ENYU, due to broken equipment. Crew evacuated to HENRICO. Directed LCT left beached at BIKINI.

1245 - Evacuation of lagoon started with departure of upwind and downwind patrols.

1410 - PGM-24 reported personnel evacuated from ERIK and PRAYER Islands.

1450 - CTU 1.8.7 reported all natives RONGERIK embarked in LST 989 at 1430 Love.

1514 - CJTF-1 directed ship Radar silence effective until MIKE Hour plus thirty minutes.

1603 - CTG 1.7 directed WALKE DD-723 proceed BIKINI lagoon entrance, await orders and be prepared to take SUMNER in tow.

1621 - CTG 1.7 reported SUMNER DD-692 had salted three boilers, cause undetermined. Able to steam on one boiler and one engine. Anticipate two boilers and two engines by midnight.

1800 - Evacuation of lagoon complete, except for last minute ships.

1923 - TECHDIR reported preparations complete and all personnel accounted for.

2200 - CTG 1.7 reported SUMNER DD-692 salting stopped, proceeding on two engines, one boiler, services of second boiler questionable.

2242 - CJTF-1 to CTG 1.5, CTG 1.6 ABLE DAY confirmed and first predicted Radex.

2243 - CJTF-1 directed COMDESDIV 72 to substitute MOALE for SUMNER at Orbit Point SUGAR.

1 July 1946 - ABLE DAY

0111 - CJTF-1 sent out second predicted Radex. One two five clockwise two nine zero true. Red sixteen, Blue twenty-two.

0423 - Command aircraft airborne. Air Operations proceeding in accordance with Air Operation Order Number One dash Forty-six.

0445 - CTG 1.3 reported embarkation of all last minute personnel completed.

0512 - PGM 23 reported all personnel clear on YURO, NARU and AMEN Islands.

0513 - CJTF-1 in MOUNT MCKINLEY and other last minute ships underway, standing out of lagoon, proceeding to ABLE DAY stations.

0535 - In response to inquiry by Admiral BLANDY, Colonel HOLZMAN replied that he could not state positively what weather conditions would prevail between 0830 and 0°00. However, he did believe that weather conditions would be suitable for a drop. General KEPNER recommended that the bombing plane be ordered to take off and that HOW HOUR be set for 0°00. Admiral PARSONS remarked that some of the planes already had taken off. Captain CUMBERLEDGE stated that the weather plane reported weather conditions favorable to bombing.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
DOD MILITARY SECURITY SAFEGUARDS

0540 - Admiral BLANDY ordered that the bombing plane take off and stated that HOW HOUR would be based on actual take-off time. He commented that HOW HOUR could be designated as 3 hours subsequent to actual take-off time which was the basis on which the earlier decision of HOW HOUR at 0830 had been reached. General KEPNER acknowledged Admiral BLANDY's decision, adding that he would designate HOW HOUR as 0900.

0540 - CJTF-1 authorized bombing aircraft take off.

0542 - Admiral PARSONS informed Admiral BLANDY that the plane received the take-off order in about 30 seconds.

0547 - HOW HOUR changed to 0900 LOVE.

0548 - CJTF-1 notified War and Navy Departments, the Manhattan District and others interested that ABLE DAY was confirmed but HOW HOUR would be 0900.

0555 - Bomb carrying aircraft reported airborn.

0557 - General KEPNER reported to Admiral BLANDY that word had been received "bombing plane was airborne at 0555." Admiral BLANDY questioned General KEPNER as to the chances of landing the bomb-carrying plane should it become necessary. General KEPNER replied that even fully laden, the plane could be landed; that much would depend on the pilot under the circumstances but that he had absolute confidence.

0603 - Evacuation of lagoon completed.

- -

0610 - CTG 1.7 reported SUMNER DD-692 available for twenty-six knots. Conditions considered normal.

0628 - Admiral BLANDY, Admiral PARSONS, and Captain QUACKENBUSH discussed a message from KENNETH WHITING concerning the possibility of a CPhoM having been left behind. Captain QUACKENBUSH stated that the WHITING's message had been predicated on outdated information, that he was confident the man in question was on another vessel.

0630 - Admiral PARSONS commented that re-entry should be possible by mid-afternoon if the bombing took place at 0900.

0630 - Captain CUMBERLEDGE made a report on wind conditions based on information as of 0500. He stated that one more wind report would be made at 0730.

0640 - Admiral BLANDY directed Lt. HUMPHREY to make a recheck of the radiological plot on the basis of 0600 wind information.

0649 - Major STONE reported that no change in radiological plans necessary on the basis of 0500 FALL RIVER wind information. Admiral BLANDY noted that a change, if made, must be started before 0730. He directed Major STONE to keep a close watch on the subject since it might even be necessary to make a change in sector axis after the bomb was actually dropped.

0736 - Captain LYMAN reported to Admiral BLANDY that the radiological danger limits had been increased; that the boundaries were now 135° to 325° T. and

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED
USN MILITARY ... CLEARANCE NOT REQUIRED
... CATION ...

RESTRICTED DATA
RESTRICTED
USE MILITARY CLASSIFICATION REQUIRED

---

that the axis was now 050° true. Admiral BLANDY commented that there was no necessity for ordering a change in the sector axis and he directed that the AVERY ISLAND be restricted in her movements in the southeast quadrant to a safe limit.

0747 - In answer to Admiral BLANDY's inquiry, MOUNT McKINLEY gave her position as being 8¼ miles from point AUTC.

0747 - Admiral PARSONS informed Admiral BLANDY that the AVERY ISLAND had been given appropriate instructions concerning her movements.

0750 - CJTF-1 directed AVERY ISLAND to shift from designated operating area because of changed upper winds and to operate in Area FEDERAL until Mike Hour plus fifteen minutes, then proceed to Area FORD.

0752 - Surface wind 12 knots from 111° true.

0755 - General KEPNER reported to Admiral BLANDY that Navy drones had taken off about 40 minutes before and would be on station about 0845.

0800 - General KEPNER reported all planes airborne.

0800 - Bomb carrying plane over target array.

0820 - Bomb carrying plane started first practice run.

0831 - Bomb carrying plane completed first practice run.

0840 - General KEPNER reported Rades all C.K.

0845 - It was learned that no word had been received from the CUMBERLAND SOUND concerning receipt of the tone signal.

0845 - Admiral BLANDY asked Admiral PARSONS if he would be willing to drop the bomb only on oral contact, to which Admiral PARSONS replied in the negative, remarking that the entire instrumentation program depended on the tone signals.

0849 - Captain WINN reported to Admiral BLANDY and Admiral PARSONS that CUMBERLAND SOUND had reported ready for bombing run, whereupon Admiral BLANDY gave the command to start the live bombing run.

0850 - Bomb carrying plane started live bombing run.

0851 - Navy drone plane F6F "Red Dog" out of control and crashed at sea.

0859 - "Bomb's Away".

0900 - Bomb detonates. MIKE HOUR.
Following movements initiated at MIKE HOUR:

(1) Wave 1 (6 PGM's of Radiological Safety Patrol) proceeded to Area CATERPILLAR.
(2) Wave 7A (HENRICO, ARTEMIS, APPLING) proceeded to Area CATERPILLAR.

0900 - CJTF-1 notified Task Force MIKE HOUR was 0900 LOVE.

0906 - CJTF-1 notified War and Navy Departments, the Manhattan District, and others interested that Atom Bomb detonated 0900 LOVE 1 July 1946.

0908 - Fires in target area becoming quite noticeable. Drone B-17 seen passing thru the atomic cloud.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
[illegible]

0002 - U.T. McKINLEY now 11.7 nautical miles from NEVADA.

0028 - Admiral BLANDY commented to Admiral PARSONS that an order must be put out to all ships prohibiting eating fish taken in these waters until further notice.

0030 - CJTF-1 directed BEGOR (APD-127) to proceed to and operate close offshore eastward of BIKINI to conduct drone boat operations.

0040 - General KEPNER stated that the plane carrying news and radio representatives had requested permission to remain in area an additional thirty minutes. Admiral BLANDY gave his approval providing radiological safety requirements were observed. Concerning General KEPNER's statement that the plane should be kept at a distance of thirty miles for security reasons, Admiral BLANDY remarked that the distance was too great to permit observers to see anything worthwhile.

0047 - Radiological clearance given BARTON to go to lagoon entrance and for PGM's to go in behind the BARTON: ARTEMIS, HENRICO and APPLING also to go in and launch boats.

0048 - CJTF-1 directed Waves 3 and 4 plus FALL RIVER to proceed to area STANLEY.

0049 - CJTF-1 directed Wave 7A to enter lagoon and hoist out radiological LCPL's.

1002 - CJTF-1 directed CTU 1.8.7 to disembark natives from LST 980 at RONGERIK as evacuation not required.

1003 - CJTF-1 prohibited fishing in BIKINI and surrounding waters until radiological reconnaissance was completed and clearance given.

1008 - Received first communication from PBM "CHARLIE". Msg No. 3 reported LAWSON capsized.

- -

1018 - PBM "CHARLIE" Msg No. 1 relayed by DSM reported apparent center of damage near the GILLIAM.

1018 - PBM "CHARLIE" reports fires on the NEVADA, PENSACOLA, YO-160, SAKAWA, SARATOGA and BRISCOE.

1036 - CJTF-1 gave BEGOR (APD-127) permission to enter the lagoon.

1042 - PBM "CHARLIE" reported that the GILLIAM and CARLISLE had sunk.

(Note: Numerous transmissions from PBM "CHARLIE" reporting fires and damage on various ships not recorded here in detail.)

1050 - Wave 1 entered the lagoon.

1050 - CTG 1.6 reported three navy drones successfully completed their mission and landed at ROI. One was intercepted fifty-three minutes after the blast, fourth drone out of control and lost before the blast.

1057 - CJTF-1 directed FALL RIVER to take station as harbor entrance control vessel.

1111 - CJTF-1 ordered TG 1.5 to execute Air Operation Order No. 3-46.

1114 - CJTF-1 ordered Waves 3 and 4 to re-enter Area ABLE.

1115 - O'BRIEN DD-725 reported number two boiler disabled due to at least one ruptured tube.

RESTRICTED DATA
ACT - 1946
CLEARANCE NOT REQUIRED

RESTRICTED DATA
AT MIC... A.T.-1
RESTRICTED PERTAINING ... INCLUDED
USE MILITARY CLASSIFICATION ... LEVELS

1125 - Wave 7A completed launching radiological LCPL's of Wave 2 at lagoon entrance.

1128 - Situation summary MIKE plus TWO Hours. Operations proceeding on schedule. FALL RIVER taking station at lagoon entrance. Waves ONE and TWO have entered the lagoon. Drone boats in operation. CARLISLE and GILLIAM sunk. LAMSON capsized. A few other ships more or less damaged. Radiological conditions about as expected.

1132 - CJTF-1 directed Wave 5 to proceed to re-enter Area BAKER.

1134 - CJTF-1 directed Wave 8 to proceed to Area CATERPILLAR and FORD.

1152 - CJTF-1 declared entrance clear for Waves 3, 4, and 5.

1202 - FALL RIVER anchored in berth 386 and assumed duties as harbor entrance control vessel.

1204 - CJTF-1 directed Wave 9 to proceed to Area CHALMERS at discretion.

1228 - MCALE directed to bring three monitors from KWAJALEIN to BIKINI.

1234 - CJTF-1 directed Wave 6 to proceed to Areas FEDERAL and CADILLAC.

1300 - Waves 3 and 4 commenced entry.

1300 - MCALE reported water samples on board proceeding to KWAJALEIN at high speed.

- -

1302 - DSM ordered first initial boarding teams to NIAGARA and GENEVA.

1306 - CJTF-1 sent following message to Joint Chiefs of Staff info CNO, COMGEN(AIR), WARCOS, CG MANHATTAN DISTRICT and CINCPAC Quote 010206Z TEST ABLE COMPLETED IN ACCORDANCE WITH PLAN AND WITHOUT MISHAPS EXCEPT ONE NAVY DRONE WHICH WENT OUT OF CONTROL BEFORE BOMB DROP AND FELL CLEAR OF ALL SHIPS X PRELIMINARY ESTIMATE OF DAMAGE X TRANSPORTS GILLIAM AND CARLISLE SUNK X DESTROYER LAMSON CAPSIZED X JAP CRUISER SAKAWA, LIGHT CARRIER INDEPENDENCE, CRUISER PENSACOLA, AND SUBMARINE SKATE CONSIDERABLE DAMAGE X JAP BATTLESHIP NAGATO, BATTLESHIP NEVADA, TRANSPORT CRITTENDEN, YO-160 AND LCM-1 SLIGHT DAMAGE X OTHER SHIPS NO VISIBLE DAMAGE REPORTED FROM AIR: ARMY PONTOON BRIDGE NOT VISIBLE PRESUMED SUNK X NO VISIBLE DAMAGE BIKINI X CONFIRMING AND AMPLIFYING REPORT WILL FOLLOW X EXPECT TO ENTER LAGOON THIS AFTERNOONX Unquote.

1312 - Admiral BLANDY directed that orders be given OBSERVER and PRESS ships that no boats were to enter the target area until further orders.

1340 - Small fire aboard NIAGARA, extinguished at 1355.

1350 - Colonel WARREN made a detailed report on radiological conditions.

1356 - CJTF-1 directed Wave 8 to proceed to Areas CADILLAC and FEDERAL.

1402 - Salvage Unit fighting fires aboard the SARATOGA, BLADEN, BRACKEN, PENNSYLVANIA, LCI-332, LST-661 and CORTLAND. Large fire aboard the INDEPENDENCE, but unable to approach because of radiological contaminated water.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIAL CLEARANCE NOT REQUIRED

CJTF - ONE
Operational Report - CROSSROADS - PART VI - Chronology
Section (B) - Chronology of the ABLE DAY Operation

- -

1409 - CTU 1.8.7 reported all natives disembarked RONGERIK at 1300 LOVE.

1419 - CJTF-1 authorized re-entry of all Waves.

1425 - Wave 5 commenced entry.

1427 - CJTF-1 directed Wave 8 to follow Wave 6 into re-entry area.

1430 - Lagoon declared safe for the entrance of all ships.

1439 - Secretary of the Navy sent the following message to the Task Force: "CONGRATULATIONS ON A WELL PLANNED AND WELL EXECUTED OPERATION SIGNED JAMES FORRESTAL".

1500 - CJTF-1 in MOUNT McKINLEY entered lagoon.

1526 - CJTF-1 sent a WELL DONE message to the Task Force.

1537 - DSM directed all ships to stay at least 1100 yards away from LST-661 as she was on fire and had Army ammunition aboard.

1551 - CJTF-1 directed CTG 1.2 to transfer the SAKAWA to one of the berths for badly damaged ships. SAKAWA was not accessible at this time, due to radiological contamination.

1552 - DSM directed BURLESON to remove animals from topsides GENEVA, NIAGARA, LST-133, LCI-327, and LCI-329, and not to go below on those ships unless cleared by ships' safety teams aboard.

1605 - DSM advises in view of lateness of the hour he did not intend to place any ships' teams aboard target vessels tonight.

1610 - Following ships declared free of radiological contamination: NIAGARA, GENEVA, CONYNGHAM, LCI-327, LCI-329, LCI-549, and LST-133.

1618 - CROSSROADS Air Notice Number NAN TWO sent in accordance with ALPAC 153 advised that area within 500 NM BIKINI now radiologically safe for flight operations.

1619 - CTG 1.6 reported that all planes engaged in ABLE DAY Operations had safely landed except Red Drone splashed before HOW Hour. OpPlan followed in detail and considered all missions remarkably successful.

1632 - CJTF-1 notified Atoll Commander KWAJALEIN Test ABLE completed and area clear for general use until further notice.

1644 - Wave 6 (Transports) commenced entry into lagoon.

1730 - DSM declared PENNSYLVANIA, BLADEN, FILLMORE, and PILOTFISH radiologically clear for boarding.

1735 - Salvage vessels anchoring for the night as assignments completed.

1757 - Wave 8 commenced entry.

1757 - Large fires and heavy explosions observed on INDEPENDENCE.

1836 - Wave 9 commenced entry.

1945 - DSM directed all salvage vessels not anchored proceed immediately to anchorage.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC CLEARANCE REQUIRED

2026 - Situation summary MIKE plus TEN hours. Operation proceeding on schedule though reboarding has been delayed by radioactivity in the anchorage area. All waves have re-entered except small portion of Service Group. Initial boarding teams have boarded and cleared eighteen target ships. Fires still active on INDEPENDENCE, BUTTE, and LST-601, all of which are dangerous to approach due to possibility of explosions. Down wind destroyers have completed four crossings of surface survey sector. Radioactivity persists in anchorage area with neither reduction nor enlargement of contaminated area. Consequently, most ships are anchored in temporary berths. Landing not permitted on AMEN Island due to radioactivity in approaches. Ban on trans-Pacific flights through KWAJALEIN has been lifted. Alert for evacuation of ENIWETOK and RONGERIK has been cancelled and personnel evacuated from ENIWETOK by transport have been given clearance to return. All sea areas outside lagoon declared radiologically clear.

2142 - The use of evaporators prohibited in lagoon until further notice.

2146 - CJTF-1 directed CTG 1.5 to resume air shuttle to ENIWETOK effective 2 July.

2146 - MCALE DD-693 reported transfer of water samples completed.

2225 - CTG 1.2 advised relative temporary disposition targets center array for tomorrow. Beach SAKAWA off ENYU both for purpose of enabling detailed inspection and prevent sinking. Move YO-160 to spare mooring near berth 220. Beach SKATE off ENYU with view to later removal and docking. Move INDEPENDENCE to spare mooring in westward berth of mooring area.

- -

0356 - CJTF-1 advised JCS, CNO, MARCOS, CINCPAC, and COMGEN MANHATTAN DISTRICT of following recapitulation of approximate target damage in Test "A". Ships sunk: Transports CARLISLE and GILLIAM, Destroyer LAWSON, perhaps also destroyer ANDERSON not located by night fall. Ships badly damaged: battleships ARKANSAS, NAGATO, heavy cruiser PENSACOLA, light cruiser SAKAWA, submarine SKATE, light carrier INDEPENDENCE, LST 661. Ships moderately damaged: battleship NEVADA, heavy cruiser SALT LAKE CITY, transport CORTLAND. Ships slightly damaged: battleships PENNSYLVANIA, NEW YORK, carrier SARATOGA, ten destroyers, seven submarines, four transports. Expect radiological condition will permit thorough inspection tomorrow. Damage on ships remaining afloat is apparently confined to topside in nearly all cases.

2400 - Situation at the end of the day. Total of 18 ships reboarded by initial boarding teams. No ships' teams placed aboard any vessels. Fires on INDEPENDENCE still burning briskly. Smaller fires on BUTTE and LST 661. Considerable radioactivity persists aboard ships and in water, particularly near center of target array. All vessels at temporary anchorages in lagoon except for stragglers from Task Group 1.8 and destroyers of down wind radiological patrol. Ships sunk are GILLIAM (APA-57), CARLISLE (APA-69), ANDERSON (DD-411) and LAWSON (DD-367).

2 July 1946 - ABLE DAY plus ONE

0506 - CNO sent message to Task Force "WELL DONE TO ALL X C \. NIMITZ".

0715 - Initial boarding teams resumed reboarding and inspection of target ships.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PENALTIES ... CLEARANCE NOT REQUIRED
USE ...

0614 - CJTF-1 directed CTU 1.6.3 to resume air shuttle to BIKINI.

0734 - CJTF-1 advised JTF-1 that radiological safety damage control safety reconnaissance would proceed on ABLE plus ONE according to plan and that strict compliance with Annex EASY would be observed.

0940 - DSM requested teams A and B be sent to CATRON, SARAVEN, SHACKLE, and TUNA, these vessels, in addition to ships declared yesterday, are radiologically clear for boarding.

1000 - Reboarding by ships' teams initiated with dispatch of Team A to NEW YORK.

1037 - SARATOGA sank just after being taken in tow for beaching. Sinking resulted from progressive flooding. Ship was not accessible for salvage, due to radiological contamination.

1102 - SKATE under tow to beaching area off ENYU Island. During the forenoon the INDEPENDENCE was removed to spare moorings to the westward of the target array. All fires out and ship in no apparent danger of sinking. YO-160 was moved from her position in the center of the target array to the vicinity of Berth 220.

1332 - CJTF-1 lifted restriction on distilling plant operation.

1514 - BIKINI and ENYU declared radiologically safe.

1641 - SKATE was beached lightly in shallow water off ENYU Island and anchored bow and stern. Vessel still not radiologically safe for reboarding.

0400 - Situation at the end of the day. Inspection by initial boarding teams and reboarding by ships' teams continued throughout the day on those ships which were radiologically safe and habitable. By nightfall 47 such ships had been reboarded by all or part of ships' teams and the work of restoring them to normal conditions was proceeding rapidly. All twelve target LCT's were opened up, inspected, and found to be in good condition. These craft were not re-manned. Exceptions to the foregoing were as follows:

(1) SHIMAKAZE still radiologically "sour" in numerous spots.

(2) SALT LAKE CITY uninhabitable due principally to boiler damage with consequent lack of power for operating generators, pumps, auxiliary machinery, etc. Ship was boarded and inspected by Commanding Officer and ships' Team Able, who returned to evacuating transport before nightfall.

(3) HUGHES uninhabitable due to boiler damage. Boarded and inspected by Commanding Officer and Teams Able and Baker.

(4) YO-160 still radiologically "sour".

(5) ARDC-13 still radiologically "sour".

(6) ARKANSAS still radiologically "sour" and uninhabitable due to boiler damage.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION CATEGORIES

RESTRICTED DATA
ATOMIC ENERGY ACT 1946
SPECIFIC RESTRICTED DATA CONTAINED HEREIN
REQUIRES MILITARY CLASSIFICATION SAFEGUARDS

(7) NEVADA uninhabitable due to boiler damage.

(8) NAGATO uninhabitable due to lack of power - same condition as that existing before test, when ship had to be supported by APL alongside.

(9) INDEPENDENCE uninhabitable as consequence of severe damage from primary effects of blast and subsequent serious fires aboard.

(10) SKATE still radiologically "sour". Beached off ENYU Island.

3 July 1946 - ABLE DAY plus TWO

0715 - Resumed re-embarkation of remaining ships' personnel on radiologically safe and habitable target ships.

1500 - Completed re-embarkation of ships' personnel of all vessels listed as exceptions yesterday. By nightfall 22 ships had reported normal conditions fully restored. ARDC-13 beached off ENYU Island to prevent sinking.

4 - 5 July 1946 - ABLE DAY plus THREE and FOUR

Continued with rehabilitation of all re-boarded target vessels. All such vessels reported back to normal by 5 July. Damaged vessels being repaired to extent required for Test BAKER, with crews living and subsisting on assigned evacuation transports.

At 0800 on 5 July, the SKATE was reboarded by inspection personnel, Commanding Officer, and crew. Despite extensive damage to superstructure, above-water fairing and upper part of periscope shears, the ship's machinery and all spaces within pressure hull were found to be in excellent condition. During the afternoon the ship got underway under her own power and proceeded to anchorage near the FULTON.

On 5 July the work of clearing out the center of the target array and laying buoys for Test BAKER was commenced, expect to complete by 15 July.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION CATEGORIES

RESTRICTED DATA
AT MIS ... ACT ...
SPECIFIC PERMISSION ... REQUIRED
RESTRICTED USE MILITARY CLASSIFICATION ... APPLIES

C O M M A N D E R J O I N T T A S K F O R C E O N E

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VI - CHRONOLOGY

SECTION (C) - CHRONOLOGY OF WILLIAM DAY OPERATION

(All times are Zone minus Eleven (Love))

18 July 1946 - WILLIAM DAY minus ONE

0847 - CJTF-1 sent dispatch to JTF-1: "WILLIAM DAY IS NINETEEN JULY. SECTOR AXIS ZERO NINE ZERO. HOW HOUR ZERO EIGHT THREE FIVE."

0858 - CJTF-1 sent message to all ships: "TOMORROW IS WILLIAM DAY. SECTOR AXIS IS 090. HOW HOUR WILL BE 0835. EXECUTE PREPARATIONS (INCLUDING EVACUATION) IN ACCORDANCE WITH ANNEX H MY OPPLAN 1-46."

0921 - CJTF-1 sent dispatch to CROSSROADS Air Groups: "WILLIAM DAY IS NINETEEN JULY. HOW HOUR ZERO EIGHT THREE FIVE LOVE. EXECUTE AIR OPS ORDER NO. 2-46 EXCEPT TU 1.5.6 USE ENIWETOK PROPOSED DRONE PLAN."

1052 - SUMNER relieved harbor entrance control vessel.

1226 - All Seabees embarked in evacuation ships except for one electricians mate left on BIKINI to operate generators for marine and army detachments and those quartered in LST-881 who are employed preparing Test CHARLIE moorings.

1421 - CJTF-1 sent dispatch to CTG 1.5: "SEND ONE CHARLIE 54 TO ROI TO RETURN LOS ALAMOS SCIENTIST HILL AND GOLDSTEIN PLUS FILTER SAMPLES TO KWAJALEIN ON WILLIAM DAY. SEND ONE CHARLIE 54 TO ENIWETOK TO RETURN LOS ALAMOS SCIENTISTS ENGELMIER, METCALF, AND COWAN PLUS FILTER SAMPLES TO KWAJALEIN ON WILLIAM DAY."

CJTF - ONE
Operational Report - CROSSROADS - PART VI - Chronology
Section (C) - Chronology
of WILLIAM DAY Operation

1443 - CJTF-1 sent dispatch to CROSSROADS Air Groups: "CHANGE EIGHT TO MY OPPLAN TO BE ISSUED 21 JULY WILL CONTAIN FOLLOWING CHANGES WHICH ARE EFFECTIVE FOR WILLIAM DAY: CHANGE ALTITUDE MASTER DRONE CONTROL PLANE MIKE TO 18,000 FEET. CHANGE ALTITUDE FLIGHTS BAKER TO 30,000 FEET."

1506 - Destroyers of TG 1.7 ordered to carry out rehearsal as for Baker Day.

1513 - Message from CTU 1.1.3 to Radiological Safety Section: "FOR WILLIAM DAY DRONE BOATS 1 AND THREE WILL TRANSMIT SIMULATED RADIATION 14180 KCS AND 4365 KCS RESPECTIVELY. THESE TWO NEW FREQUENCIES ON TRIAL TO OBTAIN LESS INTERFERENCE."

1515 - Last member of wave measurement group returned aboard FULTON, having completed last minute instrumentation check.

1515 - CTG 1.5 sent dispatch to CJTF-1: "WEATHER NEGATIVE OVER TARGET AT 0850. CLOUD COVERAGE H TENTS AND VARYING TO AFFIRMATIVE."

1523 - CJTF-1 sent message to CTG 1.8: "WHAT IS GILLISS DOING IN LAGOON? BRAMBLE WAS AUTHORIZED TO REMAIN OVER WILLIAM DAY TO CONDUCT SURVEY WESTERN ISLANDS. DO NOT RECALL GRANTING GILLISS AUTHORIZATION TO REMAIN IN LAGOON."

1555 - JAMES GILLISS directed to proceed to Wotho.

1635 - All ships TG 1.3 less GEORGE CLYMER (APA-27), ROCKBRIDGE (APA-228) and LST-881 clear of Atoll.

1640 - CJTF-1 sent dispatch to CTG 1.6: "UPON COMPLETION WILLIAM DAY ACTIVITY REQUEST CTG 1.6 RELEASE STATEMENT REGARDING REHEARSAL RESULTS AND NAVY AIR GROUP PARTICIPATION."

RESTRICTED DATA
VI-(C)-2 OCT - 1948
SPECIFIC RESTRICTED
USE MILITARY
CLEARANCE NOT REQUIRED
DECLASSIFICATION SAFEGUARDS

RESTRICTED
AT WEST ... EXCEPTED FROM AUTOMATIC DOWNGRADING AND DECLASSIFICATION
USE MILITARY CLASSIFICATION SHOWN ABOVE

- -

1707 - All TG 1.8 Vessels clear of lagoon excepting those authorized to remain and following: CHICKASKIA (AO-54) who has anchor foul on Army truck, ATF-100 assisting and ATA-187 to pick up disabled LCM in entrance.

1750 - CHICKASKIA anchor clear. ATA-187, ATF-100 and CHICKASKIA clear of Lagoon. All ships of Task Force except target ships and last minute ships clear of lagoon.

1806 - CTG 1.6 in SHANGRI LA with TURNER and CECIL departed ROI for operating area at 1700. Expected to return to ROI at 1600 on the nineteenth.

1834 - CJTF-1 sent dispatch to air groups: "ON WILLIAM DAY AIR UNITS REHEARSE ALL MISSIONS SCHEDULED FOR COMPLETION BEFORE 1300 LOVE BAKER DAY. ALSO EXECUTE CHARLIE 2 MISSION. CTG 1.5 DISPATCH F-13 COMBINES NIGHT OWL SONOR MISSION IF DESIRED. CANCEL ALL REMAINING MISSIONS. TU 1.6.3 RESUME BIKINI EBEYE SEAPLANE SHUTTLE PLAN AT 0900 LOVE WILLIAM PLUS ONE DAY."

2006 - Message from Technical Director: "READINESS REPORT NUMBER TWELVE. ABLE. CONFIRM 013 GROUPS WILL BE READY TO CARRY OUT WILLIAM DAY OPERATIONS ON 19 JULY."

2148 - Message from CTG 1.2 to PGM-23: "MARINES AND SEABEES WILL NOT BE EVACUATED WILLIAM DAY."

2150 - JAMES GILLISS returning to anchorage at ARJI ISLAND.

2209 - CJTF-1 sent dispatch to Air Groups: "WILLIAM DAY NINETEEN CONFIRMED. HOW HOUR 0835 LOVE. FIRST PREDICTED RADEX 210 DEGREES CLOCKWISE TO 280 DEGREES TRUE. RED 10, BLUE 13."

- -

2347 - Entire last minute party ordered to remain aboard PENNSYLVANIA on WILLIAM DAY, operate equipment as directed by DSM and take necessary precautions for safety of personnel at HOW Hour.

19 July, 1946 - WILLIAM DAY

0233 - CJTF-1 sent dispatch to CTG 1.5: "ALL RADIO CIRCUITS OF TU 1.5.8 (ORIENTATION) WILL BE OPERATED TO TEST INTERFERENCE, BY MILITARY PERSONNEL POSSESSING RED IDENTIFICATION CARDS OR BY MEMBERS OF CREWS FLYING AIRPLANES. ALL AIRPLANES OF TU 1.5.8 OR SUBSTITUTE TYPES WILL BE FLOWN TO CHECK AND PRACTICE MISSION AND MANEUVERS IN AIR PATTERN. AT NO TIME WILL AIRCRAFT OF TU 1.5.8 APPROACH CLOSER THAN 15 MILES TO THE CENTER OF TARGET ARRAY 19 JULY."

0417 - Completed evacuation of all target ships "Last Minute" Personnel by GEORGE CLYMER and ROCKBRIDGE.

0450 - Embarkation last minute personnel completed with exception of the PENNSYLVANIA, PARCHE and four men on the RHIND who will not be evacuated on WILLIAM DAY.

0512 - PGM-23 underway, evacuation of AMEN completed.

0530 - Command aircraft airborne.

0541 - Message from CJTF-1 to Transport Group: "TRANSPORT GROUP OPERATE IN THAT PART OF AREA MARMON THAT LIES MORE THAN FOURTEEN MILES FROM POINT AUTO. KEEP WELL CLEAR OF CUMBERLAND SOUND."

0546 - CJTF-1 sent message to Air Group: "SECOND PREDICTED RADEX 240 DEGREES CLOCKWISE TO 300 DEGREES. RED 10, BLUE 13."

0551 - CJTF-1 sets up surface sector as two four zero to three zero zero true.

RESTRICTED DATA
VI - (C) - 4 - 1948
SPECIFIC RESTRICTIONS ... ASSISTANCE NOT REQUIRED
... MILITARY ... OPERATION SAFEGUARDS

CJTF - ONE
Operational Report - CROSSROADS - PART VI - Chronology
Section (C) - Chronology
of WILLIAM DAY Operation

0635 - Command Aircraft on station, vicinity of BIKINI, altitude 16,500 feet. Requests check of rate and direction of cloud movement.

0636 - Command Aircraft advised of rain to south and west of BIKINI. Clear spot to north and east. Command Aircraft reports flying on contact at 16,500, but that cumulus come up to that altitude. Sky bad to west of BIKINI. Request check with weather station at KWAJALEIN.

0643 - All last minute ships clear of the lagoon.

0650 - Command Aircraft requests CTG 1.6 check weather for possible return of Navy Drones to ROI.

0702 - Command Aircraft recommends to CTG 1.6 that Drone Missions be cancelled due to weather.

0709 - CTG 1.6 advises that all drone control aircraft will be launched, but no drones.

0711 - CTG 1.6 requests permission to fly drone controls only and no drones.

0715 - General KEPNER confirms decision CTG 1.6 to launch Navy Drone Control Aircraft, but no drones.

0726 - SHANGRI LA reports all prime control aircraft airborne.

0740 - Command Aircraft reports weather deteriorating rapidly. 23 miles to east of BIKINI 10/10 at 20,000 feet and above. Recommends cancellation of air participation in rehearsal.

0751 - CJTF-1 postpones HOW Hour to 0905.

0754 - Command Aircraft informs CIC of decision to send all aircraft except F-13's and B-29's back to home stations.

- -

0805 - CJTF-1 to CTG 1.7: "FLUSSER APPEARS TO BE LOST. AM SENDING HER TO AREA MACK. HAVE YOU GIVEN HER OTHER INSTRUCTIONS?"

0806 - CIC reports to Air Plot that Captain CUMBERLEDGE (Weather) has taken over Sugar Peter Radar, CIC unable to track aircraft letting down in "SOUP", and unable to maintain pattern.

0814 - Flash and minor explosion occurred in the target ship area near the NEVADA.

0819 - Command aircraft reports all aircraft have left area except Powerhouse 1 and 2, Eggleston 1 and command plane.

0821 - Position of SHANGRI LA reported as 133 Degrees True 45 nautical miles from Point Auto.

0821 - CJTF-1 to COMDESDIV 72: "WHEN MT. McKINLEY CAME OUT OF HARBOR FLUSSER WAS WEST OF SOUTH OF THE LAGOON ENTRANCE AND HENCE FAR FROM AREA MACK. MY BT TO YOU ASKING FOR INFORMATION ON HER LOCATION APPARENTLY WAS MISINTERPRETED AND YOU SENT HER TO POINT NAN WHERE SHE WAS FOR AIR REHEARSAL 14 JULY BUT WHERE SHE HAS NO BUSINESS TODAY. HAVE SENT HER BACK TO MACK."

0835 - Command Aircraft reports weather over BIKINI open, area to north now closing in badly. Weather at original HOW Hour would have been impossible.

0858 - CJTF-1 sent dispatch to CTG 1.5 and CTG 1.6: "WEATHER DETERIORATING OVER TARGET AREA. ALL AIRCRAFT MISSIONS CANCELLED EXCEPT LEADER FOX 13, FLIGHT ABLE, COMMAND AIRCRAFT & PBM DUMBO ONE. AIRCRAFT HAVE BEEN DIRECTED TO RETURN TO BASE. WEATHER PERMITTING EXCEPT TO CONDUCT AIR OPERATIONS FOR DRONE BOAT CONTROL. SAIDOR AUTHORIZED TO OPERATE IN AREA PAIGE WEST BOUNDRY EXTENDED TO LINE NORMAL TO SECTOR AXIS."

RESTRICTED DATA
ACT - 1946
SPECIFIC AUTHORIZATION REQUIRED

RESTRICTED DATA
RESTRICTED ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION FOR DISSEMINATION NOT REQUIRED
CJTF ONE MILITARY CLASSIFICATION SAFEGUARDS

- -

0906 - All Task Force Message: "MIKE HOUR WAS ZERO NINE ZERO FIVE LOVE".

0908 - BARTON to commence Radiological patrol including area just inside entrance.

0909 - TG 1.1.3 ordered to operate close off shore to eastward BIKINI to conduct drone boat operations. SAIDOR reported in "SOUP" maneuvering to make landing of planes possible. Not yet committed on launching of drone boat conning aircraft.

0912 - SAIDOR recommends to Admiral SPRAGUE that drone control aircraft not be launched for at least 45 minutes. Release at that time dependent on conditions then.

0913 - CHICKASAW ordered to close ARDC-13 and examine it without boarding it, looking especially for possibility of personnel aboard.

0914 - PGM's ordered to enter the lagoon after the BARTON.

0915 - TU 1.2.8 ordered to enter the lagoon remaining south and west of buoy Number Six to hoist out Radiological LCPL's. To remain behind PGM's at all times and to return to area FEDERAL after launching the LCPL's.

0916 - CJTF-1 received dispatch from CTG 1.6: "FLASH AIR REPORT. WEATHER CONDITIONS WERE SATISFACTORY FOR ROUTINE CARRIER OPERATIONS BUT CONSIDERED UNSUITABLE FOR DRONE OPERATIONS. ALL PRIMARY CONTROL AND SECONDARY CONTROL PLANES ARRIVED ON STATION. PILOTS REPORT BIKINI WAS INTERMITTENTLY UNSUITABLE AND POSSIBILITY OF SUCCESSFUL MISSIONS DISTINCTLY QUESTIONABLE. ALL TU 1.6.1 PLANES HAVE LANDED."

- -

0928 - KENNETH WHITING ordered to proceed to and enter the lagoon following Task Unit 1.2.8 to anchor berth Oboe. She is to remain behind lagoon radiological patrol at all times.

0937 - CJTF-1 received dispatch from CTG 1.6: "AIRCRAFT THIS UNIT UNABLE TO REACH ORBIT POINT FOR WILLIAM DAY REHEARSAL DUE TO CLOUDS. TOOK STATIONS APPROXIMATELY THREE PLANES 3 MILES NORTH IN CLEAR, AS DIRECTED BY COMMAND PLANE AND HELD THERE UNTIL RELEASED BY SAME AUTHORITY. ALL EQUIPMENT ABOARD UNIT OPERATED SATISFACTORILY. DRONE CONTROL EXCELLENT. EXTRAORDINARY CONDITIONS OR INCIDENTS NEGATIVE."

0939 - A.M. SUMNER ordered to commence Radiological Patrol and receive water samples.

0941 - FALL RIVER ordered to take station as harbor entrance control vessel.

0948 - SAIDOR reports all planes landed. Request weather report on area PACKARD.

0950 - SAIDOR authorized to conduct air operations in outer edges of area PACKARD at discretion.

0955 - SAIDOR recommends 1 hour delay in launching of drone boat control aircraft.

1018 - HENRICO, ARTEMIS and APPLING ordered to expedite re-entry. Message from CHICKASAW to CJTF-1: "NO PERSONNEL IN SIGHT ON ARDC-13. WE INSPECTED AFTER EXPLOSION AT 0915 LOVE AND NO PERSONNEL WERE SEEN THEN. AM STANDING BY."

1028 - Salvage unit ordered to proceed to Area STANLEY.

1024 - Downwind Destroyers ordered to commence radiological patrol.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION GUIDELINES

1033 - Radio silence lifted.

1045 - Drone boats in water.

1106 - SAIDOR launches drone boat control conning aircraft.

1113 - SERVICE GROUP ordered to area GRAHAM.

1115 - Transport Group ordered to proceed to area FORD.

1117 - GEORGE CLYMER developed turbine trouble, sheared out of column and hoisted breakdown flag.

1119 - Salvage unit ordered to enter lagoon entrance remaining behind lagoon radiological patrol at all times.

1123 - GEORGE CLYMER hauled down breakdown flag and proceeded to take regular station as guide TU 1.3.1

1130 - BIKINI and ENYU landing parties left KENNETH WHITING.

1159 - Remainder of Technical Group ordered to enter the lagoon after salvage unit and to anchor in regular berths.

1206 - Transport Group ordered to proceed to lagoon entrance and enter and anchor in regular berths.

1208 - Task Unit 1.2.8 ordered to proceed to lagoon entrance remaining behind Transport Group, enter and anchor in regular berths.

1211 - Service Group ordered to proceed to lagoon entrance remaining behind Transport Group which includes HENRICO, APPLING and ARTEMIS. To enter and anchor in regular berths.

1230 - CJTF-1 received dispatch from CTG 1.5: "SUBJECT FLASH AIR REPORTS FOR WILLIAM DAY MISSION. ALL AIRCRAFT ARRIVED ON STATIONS AS SCHEDULED. AT 0805 BOTH PRIEST AND COMMAND AIRCRAFT BEGAN NOTIFYING INDIVIDUAL AIRCRAFT TO RETURN TO BASE DUE TO WEATHER. COMMAND AIRCRAFT AND EGGLESTON 1 REMAINED UNTIL LATEST HOW HOUR. TARGET OBSCURED BY 10/TENTHS CLOUDS FROM 25 TO 17 THOUSAND FEET, LOWER BROKEN CLOUDS 5 TO 7 TENTHS. PHOTOGRAPHY OBSCURED EXCEPT FOR SOME PHOTOS TAKEN OF TARGET BY EGGLESTON 1. EQUIPMENT AND AUTOMATIC SIGNAL OPERATED SATISFACTORILY. DRONES SUBMITTING SEPARATE REPORT."

1256 - Photographic Unit ordered to enter the lagoon at discretion and anchor in regular berths. This unit is not to enter the lagoon until photographic planes have been recovered.

1317 - ORCA ordered to enter the lagoon at discretion and anchor in regular berth.

1332 - A.M. SUMNER has water samples aboard and is starting simulated run to KWAJALEIN.

1340 - BENEVOLENCE proceeding at best speed to lagoon entrance to pick up emergency Appendicitis case from ROCKINGHAM.

1401 - FLUSSER ordered to return to port and anchor in berth two seven zero Able for Radiological safety drills.

1420 - FLUSSER has completed two hour patrol and is returning to upwind patrol station.

1441 - A.M. SUMNER relieves FALL RIVER as harbor entrance control vessel.

1500 - Last Plane landed.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948
SPECIFIC RESTRICTION: CLEARANCE NOT REQUIRED
USE MILITARY INFORMATION SAFEGUARDS

721479 O—46—11

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CONTAINED
USE MILITARY CLASSIFICATION GUIDELINES

1601 - CJTF-1 sent the following message to Radiological Safety Section: "RELEASE O'BRIEN AND LAFFEY FROM DOWNWIND PATROL AFTER EACH HAVE MADE ONE CROSSING. REMAINDER DOWNWIND PATROL TAKE POSITION FOR OPERATIONS COLGATE AND LUX IN ACCORDANCE RADSAF MEMORANDUM OF 29 JUNE SUBJECT PROSPECTIVE OPERATIONS FOR DESTROYERS AFTER ABLE DAY. FLUSSER NOW IN STATION EASY. STATION DOG OF OPERATION COLGATE WILL NOT BE MANNED.

1702 - Reembarkation all target vessels completed.

1725 - O'BRIEN released from rehearsal to proceed with oceanographic survey.

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946, AND 25 JULY 1946

PART VI - CHRONOLOGY

SECTION (D) - Chronology of BAKER DAY Operation

(All times are Zone minus Eleven (Love))

24 July 1946 - BAKER DAY minus ONE

0850 - CJTF-1 to JTF-1: "BAKER DAY IS TWO FIVE JULY X SECTOR AXIS ZERO NINE ZERO X HOW HOUR ZERO EIGHT THREE FIVE X"

0850 - Evacuation of target ship personnel to transports was commenced immediately and completed by 1630, except for last minute personnel.

0904 - CJTF-1 sent dispatch to interested Commands in Pacific Ocean Area: "CROSSROADS AIR NOTICE NAN THREE X ATOMIC BOMB TEST BAKER NOW SCHEDULED FOR TWENTY FIVE JULY EAST LONGITUDE DATE X SCHEDULED DETONATION TIME 0835 LOVE X REQUEST YOU DIRECT AIRCRAFT UNDER YOUR CONTROL COMPLY ALPAC 153 AS MODIFIED BY ALPAC 201 SUSPENDING OPERATIONS 400 NM BIKINI TWELVE HOURS PRIOR DETONATION X"

0907 - CJTF-1 sent dispatch to CROSSROADS Air Groups: "TWENTY FIVE JULY IS BAKER DAY X EXECUTE AIR OP ORDER NUMBER 2-46 X HOW HOUR IS 0835 LOVE X"

0909 - CJTF-1 sent dispatch to interested Commands in Pacific Ocean Area: "CROSSROADS AIR NOTICE NUMBER YOKE THREE X ATOMIC BOMB TEST BAKER SCHEDULED FOR 25 JULY EAST LONGITUDE DATE X SCHEDULED DETONATION TIME 0835 LOVE X REQUEST YOU DIRECT AIRCRAFT UNDER YOUR CONTROL COMPLY WARCOS NOL 35331 CTG

ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA - CLEARANCE NOT REQUIRED
USE MADE OF (D) - DECLASSIFICATION GUIDANCE

- -

0909 - 222159Z APRIL 46 SUSPENDING OPERATION WITHIN 400 NAUTICAL MILES BIKINI TWELVE HOURS PRIOR DETONATION X"

0930 - CJTF-1 notified War and Navy Departments, the Manhattan District and others interested date and intended hour of detonation.

0933 - Evacuation of lagoon commenced with departure of SAIDOR and her plane guard destroyers FURSE and N.K. PERRY.

0933 - During the day the submerging of the last three of the six submarines to be submerged, was carried out under the direction of Captain G.A. SHARP of the staff of CTG 1.2.

1018 - CJTF-1 sent dispatch to CTU 1.6.4 KENNETH WHITING (AV-14): "CONTINUE EFFORTS EFFECT EMERGENCY REPAIRS TO ENGINE MARINER SEAPLANE SUFFICIENT PERMIT LIGHT LOAD FLIGHT TO EBEYE X IF UNABLE COMPLETE TIME DEPART BIKINI NOT LATER THAN SUNSET MINUS TWO HOURS ADVISE CJTF-1 AND HAVE PLANE ALONGSIDE KENNETH WHITING (AV-14) WHICH IS HEREBY DIRECTED PREPARE TO HOIST IN THIS PLANE X CTU 1.6.4 AND KENNETH WHITING KEEP CJTF-1, CTG 1.6 AND CTU 1.6.3 ADVISED OF PROGRESS ORCA AUTHORIZED DELAY SORTIE UP TO SUNSET ACCOMPLISH ABOVE X"

1229- CJTF-1 sent dispatch to CTG 1.5: "THIS AMPLIFIES MY 190656Z JULY NOT TO ALL X REQUIREMENTS MAY EXIST ON BAKER PLUS ONE TO FLY 65 PRESS CORRESPONDENTS SIMULTANEOUSLY OVER TARGET AREA IN CHARLIE 54 AIRCRAFT X MISSION WILL BE CANCELLED IF NOT REQUIRED X OTHER SCHEDULED AIRCRAFT WILL BE IN AREA X LIMITING ALTITUDE AND DISTANCE FROM TARGET WILL BE GOVERNED BY RADIOLOGICAL FACTORS WHICH WILL BE FURNISHED WITH AUTHORIZATION FOR FLIGHT X NEW SUBJECT X TWO CHARLIE 54 APPROVED TO ACCOMPANY DRONES TO MUROC IF MISSION AUTHORIZED X"

- -

1254 - Salvage Unit sortied from lagoon.

1351 - Aerial inspection reported Boro Boku Oruk Maxy Aran evacuated.

1354 - Service Group sortied from lagoon.

1426 - CJTF-1 received dispatch from CTU 1.6.4: " PBM 28X102 HAS BEEN SUCCESSFULLY REPAIRED X PLANE NOW AIRBORNE ENROUTE KWAJALEIN X LIFT OF PLANE BY KENNETH WHITING NOT NECESSARY X "

1430 - Task Unit 1.2.8 (HENRICO, APPLING, AND ARTEMIS) sortied from lagoon. All of Task Group 1.2 now clear of lagoon, except FALL RIVER, CONSERVER, COUCAL, WIDGEON, ETLAH and target vessels.

1441 - CJTF-1 sent dispatch to CTU 1.6.3: "INSERT FOLLOWING ANNEX FOR PAGE F TWO SEVENTY FOUR AFTER QUOTE AND AWAIT FURTHER ORDERS UNQUOTE WHEN IT NO LONGER BECOMES NECESSARY TO FOLLOW RADIOLOGICAL PATTERN PRESCRIBED PBM CHARLIE ONE AND TWO WILL CONDUCT RECONNAISSANCE OVER TARGET AREA AS REQUESTED BY DSM SHIP OBSERVER IN PLANE IN ORDER TO MAKE NECESSARY SHIP OBSERVATIONS AND OBTAIN PHOTOGRAPHS X DURING THIS PERIOD PLANES WILL NOT FLY BELOW ANY HEIGHT PRESCRIBED BY THE FORCE FIGHTER DIRECTOR AND WILL OBSERVE ANY OTHER PRECAUTIONS PRESCRIBED BY HIM X UNQUOTE X ON PAGE F TWO SEVENTY FIVE AN END OF FIRST PARA AS QUOTE AT ALL TIMES WHEN FLYING PATTERNS PRESCRIBED BY RADSAFE PBM'S CHARLIE ONE AND TWO ALSO WILL CONFORM AS FAR AS PRACTICABLE WITH THE WISHES OF DSM SHIP OBSERVER IN THE PLANE IN ORDER TO OBTAIN SHIP PHOTOGRAPHS AND SHIP OBSERVATIONS UNQUOTE X DELETE REQUIREMENT THAT SHIPS OBSERVERS NOTIFY CJTF-1 BY VOICE PRIOR TAKING HOURLY PHOTOS X"

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
[illegible] LOCATION SAFEGUARDS

1500 - Technical Group (except for last minute ships) sortied from lagoon.

1507 - Transport Group (less GEORGE CLYMER AND ROCKBRIDGE) sortied from lagoon.

1555 - PGM 23 reports evacuation of Yuro and Namu completed.

1655 - All Task Group 1.8 vessels clear of lagoon.

1700 - Radar mast of PILOTFISH sighted above water. No corrective action contemplated due to lack of time. Evacuation of lagoon, except for last minute ships, now completed.

1712 - TG 1.1 reports fully ready.

1735.- Destroyer assigned to Point SUGAR ordered to circle clockwise at How Hour minus twenty minutes at twenty five knots. Duty will be completed at Mike plus ten.

1846 - Bow and periscope shears of SARAVAN sighted above surface.

1956 - Message from Technical Director to Deputy Technical Director: "READINESS REPORT NUMBER 16 X PREPARATION COMPLETE FOR TEST BAKER X RECORDS AND INSTRUMENTS FROM TEST ABLE RECOVERED EXCEPT FEW ON SUNKEN VESSELS X THESE ARE NOT CRITICAL FOR REPORTS AND DO NOT REPEAT NOT WARRANT DELAY IN TEST BAKER X"

2204 - CJTF-1 sent dispatch to CROSSROADS Air Group: "BAKER DAY TWENTY FIVE JULY CONFIRMED X HOW HOUR ZERO EIGHT THREE FIVE LOVE X FIRST PREDICTED RADEX TWO SIX ZERO CLOCKWISE TO THREE SIX ZERO TRUE X RED TEN BLUE FOURTEEN X FURTHER PREDICTIONS BEFORE

2204 - FINAL BRIEFING IF AVAILABLE X"

2300 - ETLAH, after considerable difficulty and loss of one suspension anchor, successfully completed resubmersion of SEARAVEN.

25 July 1946 - BAKER DAY

0435 - CTG 1.3 reported embarkation of all last minute personnel from target ships completed.

0445 - Stump CFC reports unable to start diesel generator on board MUSTIN (DD-413) prior evacuation. Therefore fire control gear not in operation.

0459 - CONSERVER underway.

0506 - Command Aircraft takes off from KWAJALEIN.

0509 - CUMBERLAND SOUND underway.
0510 - KENNETH WHITING underway.

0512 - Evacuation of AMEN Island completed.

0514 - ALBEMARLE underway.

0518 - ROCKBRIDGE underway.

0519 - GEORGE CLYMER underway.

0522 - FALL RIVER underway.

0524 - CJTF-1 in MOUNT MCKINLEY underway.

0530 - Observed bunting flying from GASCONADE. CONSERVER was ordered alongside to remove last minute personnel.

0533 - PCE-23 underway.

0543 - COUCAL and ETLAH underway.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
INFORMATION SAFEGUARDS

RESTRICTED DATA
AT
RESTRICTED
USE MILITARY

- -

0543 - CJTF-1 to TG 1.7, plus FLUSSER and ORCA: "SURFACE SURVEY SECTOR TWO SIX ZERO TO THREE FOUR ZERO TRUE X"

0545 - CJTF-1 changed Sector Axis to 120° True.

0547 - CJTF-1 to War and Navy Departments, Manhattan Districts, Rear Echelon and others interested: "THIS CONFIRMS THAT BOMB DETONATION EXPECTED TO TAKE PLACE TWO FIVE JULY EAST LONGITUDE DATE AT ZERO EIGHT THREE FIVE LOVE X"

0547 - Command Aircraft on station, vicinity of BIKINI.

0550 - All ships TG 1.3 clear of Atoll.

0610 - ALLEN M. SUMNER underway.

0620 - Evacuation of lagoon completed.

0620 - TG 1.2 less target vessels clear of lagoon.

0633 - Command Aircraft informed CIC that he had completed cloud run. Estimated weather for HOW HOUR looked good.

0656 - Command Aircraft informed CTG 1.6 that conditions looked favorable for drone operations.

0725 - CIC informed all aircraft of second predicated Radex: 220° clockwise to 360°, Red 9, Blue 11.

0750 - Surface Survey Sector changed to new limits of two two zero to three six zero true.

0755 - Command Aircraft advised CIC that all AAF aircraft are on stations.

- -

0835 - Bomb Detonated. MIKE HOUR.
Following movements initiated at MIKE HOUR:
(1) BEGOR proceeding to Area CHALMERS.
(2) Task Unit 1.2.8 (HENRICO, ARTEMIS and APPLING) proceeding to Area CHALMERS.
(3) Six radiological PGM's proceeding to Area CATERPILLAR.
(4) SAN MARCOS (LSD-25) proceeding to Area GRAHAM to join Technical Group.

0845 - War and Navy Department, Rear Echelon, Manhattan District and others interested notified by dispatch that bomb detonated at 0835 Love 25 July. CJTF-1 notified task force that MIKE HOUR was zero eight three five Love.

0851 - VIP Observer plane requested permission to remain on station additional 30 minutes.

0856 - Surface Survey Sector changed to new limits of two six zero to three six zero.

0858 - CJTF-1 ordered BARTON and O'BRIEN to commence radiological patrol, including area just inside lagoon entrance.

0900 - Command Aircraft advised CIC that CTG 1.6 reported all Navy drones picked up and returning to base.

0907 - PBM "CHARLIE" reports only ships not in sight are ARKANSAS, LCT 1114, LCT 816, and LCT 818.

0912 - CJTF-1 directed BEGOR to proceed and operate close offshore south of ROKAR, conducting drone boat operations.

0914 - PBM "CHARLIE" reports SARATOGA listed slightly to starboard.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION ONLY

0916 - CJTF-1 directed Radiological PGM's to enter lagoon.

0918 - Command Aircraft reports AAF Drone FOX damaged in blast. Bomb bay doors jammed, but plane under control.

0918 - CJTF-1 directed Task Unit 1.2.8 to enter lagoon, remaining east of buoy 3 and south of 11° 32' North, and hoist out radiological LCPL's. Thereafter retire to Area FEDERAL.

0921 - CJTF-1 directed KENNETH WHITING to enter lagoon and anchor in berth "OBOE".

0924 - PBM "CHARLIE" reports SARATOGA stack collapsed to port and lying on flight deck.

0935 - FALL RIVER proceeding to Area CATERPILLAR.

0938 - PBM "CHARLIE" reports SARATOGA down heavily by stern.

0942 - CJTF-1 received dispatch from CTG 1.6: "FLASH AIR REPORT NAVY DRONES X BLUE HOT X WHITE AND RED DO NOT SHOW ANY INDICATIONS OF BEING HOT AND THEIR PICTURES SHOULD BE O.K. X CLOUD BURST LOOKED LIKE FOAMITE AND RAINBOW OBSERVED IN CLOUDS BLUE DRONE CONTROL PILOTS LT COMDR COOPER AND LT BRIGHT REPORT WHAT LOOKED LIKE ONE MAJOR SHIP DIRECTLY ON NOSE BEFORE PLUNGING TO BOTTOM X SHOCK WAVE GOOD THUMP AT EIGHT MILES X ROUGHLY TWO MINUTES AFTER BLAST WATER WAVE PASSED OVER YORAN ISLAND X"

0947 - CJTF-1 directed FALL RIVER to take station as harbor entrance control vessel.

0951 - Radiological Safety Section advised that landings on BIKINI Island probably not feasible.

0958 - RADIOLOGICAL RECONN PBM ADVISE OF NECESSITY OF CHANGING PLAN X HAS ENCOUNTERED HIGH RADIOACTIVITY AND HAS DIRECTED DOG TO MAKE SWEEP AT 3000 FT.

1000 - CJTF-1 informed all aircraft of new Radex 270° clockwise to 360° Rad 4 to 45 Mi.

1011 - CJTF-1 received dispatch from CTG 1.6: "FLASH AIR REPORT X ALL NAVY DRONES LANDED ROI X"

1016 - CJTF-1 directed Salvage Unit to enter lagoon, remaining behind lagoon patrols and outside blue line.

1018 - Command Aircraft reported low AAF Drone Fox at 6,000 ft. had bomb bay doors pushed in, all inspection plates off, and glass broken.

1018 - Task Unit 1.2.8 commenced launching Radiological LCPL's.

1022 - Teletype to Air Plot from RadSafe: "RADSAFE: "RADEX 270° CLOCKWISE TO 360° DISTANCE FROM TARGET 8 MILES TO 50 MILES APPLIES BETWEEN M PLUS 2 TO M PLUS 3 HOURS X"

1028 - CJTF-1 informed all aircraft that Radex for Mike plus 2 to Mike plus 3 was 270° clockwise to 360° at distance of 8 to 50 miles.

1040 - PBM "CHARLIE" reports YO-160 and LCT-1114 sunk.

1045 - KENNETH WHITING entered lagoon.

1046 - CJTF-1 directed Technical Group to proceed to Area FORD.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

1048 - Task Unit 1.2.8 completed launching Radiological LCPL's and retired to Area FEDERAL.

1059 - CIC checked position of Antique 4, and informed him that he was in danger area. Informed him cloud moving in North-West direction. Ordered him to take position West of cloud. Ordered Antique 2 to take position East of cloud.

1105 - Salvage Unit commenced entry.

1106 - Situation Summary MIKE plus TWO Hours: OPERATION PROGRESSING ON SCHEDULE. ARKANSAS, YO-160, AND LCT-1114 SUNK. SARATOGA LISTED TO STARBOARD AND PART OF SUPERSTRUCTURE KNOCKED DOWN. NO FIRES. NO OTHER SERIOUS DAMAGE APPARENT ANY TARGET. DRONE BOATS HAVE SHOWN EVIDENCE OF RADIOACTIVITY NEAR CENTER OF ARRAY AND HIGHLY RADIOACTIVE CLOUD IS STILL IN SIGHT TO NORTHWESTWARD OF ATOLL. ENTRANCE LAGOON CLEAR AT THIS TIME. LAGOON PATROLS ENTERED AND SALVAGE GROUP ENTERING. DOWNWIND PATROL WILL NOT COMMENCE UNTIL AFTER MIKE PLUS FOUR HOURS.

1106 - FALL RIVER anchored in berth 386 and assumed duties as harbor entrance control vessel.

1125 - CJTF-1 informs all aircraft Radex for MIKE plus 3 to MIKE plus 4, 270° clockwise to 360°, distance 14 to 70 miles.

1129 - CTU 1.2.7 reports NIAGARA clear for boarding.

1130 - PBM "CHARLIE" reports SARATOGA in danger of sinking and recommends every effort be made to beach her, if possible.

1136 - CJTF-1 directs BURLESON to enter lagoon and anchor in berth "UNCLE".

- -

1137 - CTU 1.2.7 reports BLADEN clear for boarding.

1142 - CTU 1.2.7 reports CORTLAND clear for boarding.

1144 - CJTF-1 received dispatch from Plane 90 of flight 3: "HERE IS FLASH REPORT ON DRONE OPERATION X ALL FOUR DRONES SAFELY OFF AND ALL REPEAT ALL RETURNED AND ONE SUFFERED MINOR DAMAGE ON LANDING AND ROLLED OFF END OF FIELD, DAMAGED BOTH FLAPS AND TAIL CONE X DRONES FOX AND GEORGE BELIEVED TO BE WITHIN 3 TO 4 SECONDS OF BEING OVER TARGET AT HOW HOUR X DRONE FOX HAD INSPECTION PLATES BLOWN LOOSE, GLASS IN TAIL CONE BLOWN IN BY LOOSE INSPECTION PLATES X DETAILED REPORT WILL FOLLOW X"

1218 - CURRENT reports GENEVA Geiger sweet.

1224 - Radsafe reports NIAGARA Geiger sweet and recommends all teams be returned aboard.

1226 - CTU 1.2.7 reports FILLMORE and LCI-329 clear for boarding.

1239 - CJTF-1 to TG 1.7: "BARTON'S FIRST CROSSING COMPLETELY CHANGED. DIRECT BARTON PROCEED TO AN INITIAL STATION ELEVEN DEGREES FORTY FIVE MINUTES NORTH ONE HUNDRED AND SIXTY FIVE DEGREES THIRTY FIVE MINUTES EAST. FROM THAT POINT PROCEED CAUTIOUSLY DUE WEST TO ONE HUNDRED SIXTY FIVE DEGREES ZERO FIVE MINUTES EAST AND THEN DUE SOUTH TO ELEVEN DEGREES THIRTY MINUTES. MAKE A COMPLETE STATION AT LEAST EVERY FIVE MILES INCLUDING A ONE THOUSAND FOOT BAKER TEST. THIS WILL PROBABLY NOT CHANGE SCHEDULE FOR OTHER DESTROYERS BUT THEY ARE TO STAND FAST UNTIL FURTHER ORDERED.

1240 - No. 1 Instrumentation Team aboard NIAGARA.

1247 - BURLESON entered lagoon.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948
SPECIFIC RESTRICTION - CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC RESTRICTIONS APPLY TO DISCLOSURE OF THIS INFORMATION
RESTRICTED MILITARY CLASSIFICATION CROSSROADS

- -

1255 - TECHNICAL GROUP ordered to enter the lagoon and anchor in assigned special berths at South of lagoon.

1303 - Initial boarding teams aboard LCT-1115.

1304 - Initial boarding team aboard LCI-549.

1307 - Radsafe reports LCT-1115 Geiger sweet and recommends all teams be returned aboard.

1309 - CORTLAND, LCI-549 and FILLMORE reported Geiger sweet.

1315 - Radiological Reconn F-13 reports no indications of radioactivity at 10,000 ft. at 348°, 43 NM from Point ABLE.

1318 - Radiological Reconn F-13 reports very weak reading of radioactivity at 356° 43 NM from Point ABLE.

1322 - CJTF-1 orders Antique 2 to make short sweeps of 2 to 4 miles over cloud, reducing altitude after each sweep by 1000 feet before starting next sweep, if no radioactivity encountered in previous sweep. At completion return and report.

1325 - Teletype to Air Plot from Radsafe: "RADEX 270° CLOCKWISE TO 360°X DISTANCE FROM TARGET 25 MILES TO 100 MILES APPLIES BETWEEN M PLUS 5 TO M PLUS 6 HOURS X"

1325 - Message from Rockbridge to DSM: "SARATOGA 5 DEGREES STARBOARD LIST X DRAFT ABOUT 34 FEET INCREASING SLOWLY X REQUEST PERMISSION RECLAIMER CROSS RED LINE CAREFULLY TO DETERMINE SALVAGE POSSIBILITIES X"

1338 - Initial boarding team aboard FILLMORE.

- -

1343 - Teletype to Air Plot from RadSafe: "AFTER CONFERENCE WITH AEROLOGY RECOMMEND DROPPING ALERT FROM ENIWETOK EVACUATION X"

1347 - No. 3 Initial Boarding Team left GENEVA.

1359 - CTU 1.2.7 reports CARTERET clear for boarding.

1402 - CTU 1.2.7 reports LCT-1013 clear for boarding.

1404 - Technical Group commenced entry.

1411 - CJTF-1 dispatch to CTU 1.5.42: "CANCEL ALERT FROM EVACUATION ENIWETOK X AIRCRAFT TU 1.5.42 RETURN KWAJALEIN SOON AS PRACTICABLE X REPORT ARRIVAL X"

1415 - CJTF-1 received dispatch from Plane 90 of Flight 3: "ADD TO OUR FLASH REPORT X THE DRONE DAMAGED IN LANDING WAS DUE TO BRAKE FAILURE X IN ADDITION TO DAMAGED FLAPS, TAIL CONE AND POSSIBLE REPLACEMENT OF OUTER WING PANEL AND AILERONS X RADIOLOGICAL THE DRONES FOUR AND DRONES FOX AND GEORGE WERE COLD COMPARED TO LOVE X FOX AND GEORGE TOOK RATHER SEVERE BUFFING IN THE BLAST AND WILL REQUIRE CLOSE INSPECTION X WITH EXCEPTION OF DAMAGE TO ONE DRONE IN LANDING, MISSION APPEARS TO BE A SUCCESS AND LOTS OF DATA WILL RESULT THERE FROM X"

1415 - Radiological Reconn reports no radioactivity encountered at 270° 50 miles. Ordered to reduce altitude by 1000 feet stages while continuing sweeps, down to altitude of 1000 feet, if no radioactivity encountered. Return and report results.

1418 - Clearance given to return evacuees to ENIWETOK as danger no longer exists there.

1421 - CJTF-1 directs Task Unit 1.2.8 to enter lagoon and anchor.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

SPECIFIC RESTRICTIONS
USE MILITARY CLASSIFICATION GUIDELINES

RESTRICTED

- -

1426 - No. 1 Instrumentation Team completed BLADEN.

1435 - PGM-24 grounded on reef west of BIKINI Island. Off under own power at 1452. Starboard shaft slightly bent.

1436 - SITUATION SUMMARY 1400 LOVE. SARATOGA SETTLING GRADUALLY BUT STEADILY MAINTAINING CONSTANT SLIGHT LIST TO STARBOARD. HUGHES HAS LIST TO PORT AND IS DOWN ABOUT FOUR FEET. TECHNICAL GROUP HAS ENTERED LAGOON TO ANCHOR NEAR ENTRANCE. RADIOACTIVITY PREVENTED SALVAGE WORK ON SARATOGA OR HUGHES.

1442 - RadSafe to CJTF-1: "DRONE BOAT CONTROL TBM'S CLEAR TO OPERATE OVER ENTIRE TARGET ARRAY AT 2000 FEET FOR 2 HOURS X AT 3000 FEET OR ABOVE FOR 8 HOURS X"

1451 - Initial Boarding teams aboard LCT-1013 and LCT-705.

1455 - CTG 1.6 reports: "ADD MY FLASH AIR REPORTS AND FINAL ALL UNITS REPORT COMPLETE SATISFACTION WITH RESULTS X FROM MY POINT OF VIEW BAKER DAY WAS ANOTHER EXCEPTIONALLY FINE PERFORMANCE BY ALL AIR X LAST PLANE WITH MISSION IN BAKER DAY HAS LANDED FOR RELIEF PLANES DUMBO FOUR AND CHARLIE TWO X"

1505 - Initial boarding team aboard LCI-329.

1515 - Task Unit 1.2.8 entered lagoon.

1516 - Message from DSM to CJTF-1: "SARATOGA HAS SETTLED ABOUT FIVE FEET FORWARD AND AFT IN LESS THAN THREE HOURS X LIST TO STBD HAS INCREASED SLIGHTLY X AFTER STBD CORNER OF FLIGHT DECK ABOUT TEN FEET FROM WATER X FRONT ENTER HAWSE PIPE ABOUT THREE FEET FROM SURFACE OF WATER X USS FALLON HAS LIST TO STBD ABOUT FIVE DEGREES INCREASING VERY SLOWLY X MAYRANT AND ALL DD'S IN THIS LINE AS WELL AS ALL APA'S IN BOTH APA LINES EXCEPT FALLON APPEARS TO BE IN NORMAL CONDITION X"

1525 - DSM reports SARATOGA is settling rapidly and will be gone within one half hour.

1550 - Message from CTG 1.8 to CJTF-1: "SERVICE GROUP NOW IN RONGELAP WITH EXCEPTION OF DIXIE, ENORE, BENEVOLENCE, AND BOUNTIFUL IN AREA PACKARD, SAN MARCOS WITH CTG 1.1 AND LST-861 IN KWAJALEIN. REQUEST IF POSSIBLE TWENTY FOUR HOURS NOTICE BEFORE REENTRY OF RONGELAP SHIPS X"

1555 - SARATOGA definitely started sinking stern first, list increasing and bow coming up. 1559 - stern awash. Air blowing at stern and creeping forward as ship settled. 1609 - deck completely awash and air blowing forward. Ship appeared to right herself as she sank, finally settling in upright position. Final disappearance of superstructure at 1616.

1610 - Radiological Reconn F-13 reports heavy radioactive cloud encountered at 355° 80 NM from MT. MCKINLEY.

1614 - MT. MCKINLEY, APPALACHIAN, BLUE RIDGE, AND PANAMINT ordered to enter the lagoon, anchor in assigned special berths and remain on one hours notice.

1630 - SHANGRI LA with CECIL arrives at ROI. TURNER detached and proceeding to PEARL.

1642 - DSM reports all submarines appear to be in approximate target position. SKATE and PARCHE on surface in normal condition.

1655 - LOWRY (DD-770) entered lagoon.

1700 - CJTF-1 in MOUNT MCKINLEY entered lagoon.

1712 - PANAMINT entered lagoon.

1727 - DSM reports HUGHES on even keel and down by the stern with 5 feet freeboard. Condition of FALLON

721479 O - 46 — 12

RESTRICTED DATA
...T - 1946
...NOT REQUIRED

1727 - unchanged. NAGATO has 2 degrees starboard list. NEW YORK draft unchanged. PENNSYLVANIA settled about one foot.

1728 - APPALACHIAN entered lagoon.

1747 - CJTF-1 directed ALLEN M. SUMNER and MOALE to enter lagoon and take stations for night monitoring.

1749 - LOWRY ordered to take station one seven nine eight FOX for night monitoring.

1751 - CJTF-1 dispatch to interested Pacific Ocean areas: "CROSSROADS AIR NOTICE NUMBER NAN FOUR. IN ACCORDANCE WITH ALPAC 153 AS MODIFIED BY ALPAC 201 AREA WITHIN 400 NAUTICAL MILES BIKINI ATOLL BETWEEN TRUE BEARINGS ZERO THREE ZERO CLOCKWISE TO TWO NINE ZERO DEGREES NOW RADIOLOGICALLY SAFE FOR FLIGHT OPERATIONS UNTIL FURTHER NOTICE."

1756 - CJTF-1 dispatch to CTG 1.5 and CTG 1.6: "I TAKE GREAT PRIDE IN THE EFFICIENT MANNER IN WHICH TODAY'S MISSION WAS EXECUTED X PLEASE CONVEY TO YOUR ORGANIZATION MY CONGRATULATION AND COMMENDATION X KEPNER SENDS X"

1806 - Downwind Destroyers ordered to start radiological patrols.

1840 - ALLEN M. SUMNER, LOWRY, and MOALE entered lagoon.

1842 - ALBEMARLE entered lagoon.

1920 - CJTF-1 orders all vessels anchored in lagoon to remain on one hour's notice unless otherwise directed.

2014 - CJTF-1 sent dispatch to CTG 1.5, CTG 1.6, CTU 1.6.3: "REFER AIR OPS ORDER NUMBER NINE DASH FORTY SIX X ON BAKER PLUS ONE DAY X FLIGHTS JIG AND KING BE

2014 - OVER BIKINI ALTITUDE FIVE THOUSAND AT ZERO SIX HUNDRED LOVE X FURTHER INSTRUCTIONS ON ARRIVAL X BE PREPARED USE VOICE OR CW ON MONITOR CIRCUIT X NIGHT OWL ON STATION ZERO SIX HUNDRED LOVE X DUMBO FOUR RELIEVE ON STATION AT THIRTEEN HUNDRED LOVE X DRONE BOAT CONTROL AND CHARLIE TWO MISSIONS AS DIRECTED X"

2126 - CJTF-1 received dispatch from Com Army Air Group JTF-1: "SUBJECT FLASH REPORT FOR NIGHT OWL AND SONOR MISSION PHOTOGRAPHIC MISSION ACCOMPLISHED AS DIRECTED X SONOR MISSION CANCELLED 1505 BY PRIEST X EXCELLENT PHOTOS OF SARATOGA SINKING X PRIEST CANCELLED NIGHT OWL FLIGHT FOR NIGHT OF 25 JULY, WILL THIS BE RESUMED 0600 HOURS 26 JULY X"

2214 - CJTF-1 sent dispatch to CTG 1.5: "NO FLASH REPORT RECEIVED FROM CTU 1.5.6 X EXPEDITE X EXPLAIN DELAY X"

2311 - Dispatch to Joint Chiefs of Staff: "RECAPITULATION OF APPROXIMATE TARGET DAMAGE IN TEST BAKER FOLLOWS: SHIPS SUNK IMMEDIATELY IN ADDITION TO LSM-60 (THE BOMB CARRYING BARGE) WERE ARKANSAS, YO-160, AND LCT-1114. ONE LCT CAPSIZED - FLOATING VICINITY SKATE - MAY BE LCT-816 WHICH IS MISSING. SARATOGA AT TIME OF BLAST TOOK ABOUT FIVE DEGREE LIST TO STARBOARD, FORWARD HALF OF STACK KNOCKED DOWN AND LYING ACROSS FLIGHT DECK. ELEVATOR DOWN ABOUT TWO FEET ON PORT SIDE BUT EVEN WITH FLIGHT DECK ON STARBOARD. SHIP SETTLED SLOWLY APPARENTLY FROM PROGRESSIVE FLOODING MAINTAINING SAME LIST AND TAKING TRIM BY STERN. RADIOLOGICAL CONDITION PREVENTED ANY SALVAGE OPERATIONS. AT 1545 FLIGHT DECK WAS AWASH AT STERN AFTER WHICH STERN SETTLED TO BOTTOM IN UPRIGHT POSITION WITH MASTHEAD PRACTICALLY AT SURFACE. HUGHES ABOUT 1330 WAS OBSERVED TO HAVE FIVE DEGREE LIST TO PORT AND TO BE TRIMMED SLIGHTLY DOWN BY STERN. THIS CONDITION UNCHANGED

RESTRICTED DATA
AEC ACT - 1946
SPECIFIC REQUIREMENTS ... CLEARANCE NOT REQUIRED
USE, MILITARY ... DISCLOSURE SAFEGUARDS

2311 - UNTIL ABOUT 1800 WHEN APPEARED TO RIGHT ITSELF RETAINING ABOUT FIVE FEET FREEBOARD AFT. AS ON SARATOGA RADIOLOGICAL CONDITIONS PREVENT SALVAGE OPERATIONS. FALLON AS OF 1800 HAS ABOUT FIVE DEGREE LIST TO STARBOARD AND IS UNAPPROACHABLE. OF THE SIX SUBMERGED SUBMARINES NONE HAVE COME TO SURFACE AND JUDGING FROM OBSERVATION OF BUOYS ALL APPEAR TO BE IN ORIGINAL POSITIONS. THERE WERE NO FIRES EITHER ABOARD SHIP OR ON WATER. ON SHIPS OTHER THAN THOSE MENTIONED ABOVE THERE IS NO DAMAGE APPARENT FROM THE NEAREST POSITIONS WHICH OBSERVING OR SALVAGE SHIPS CAN OCCUPY. SOME BEACHED LANDING CRAFT WERE LOOSENED FROM BEACH BY WAVE BUT OBSERVATIONS TO DATE DO NOT INDICATE ANY SERIOUS DAMAGE. HOWEVER TELEVISION OBSERVATION OF ONE BEACHED NON-TARGET LCVP SHOWED IT SWAMPED BY WAVE OF ESTIMATED SEVEN FOOT HEIGHT AT BEACH ALTHOUGH APPARENTLY WITHOUT SERIOUS DAMAGE. MAXIMUM WAVE HEIGHT MUCH GREATER BUT NOT YET DETERMINED. NO WAVE OR UNDERWATER SHOCK OUTSIDE THE LAGOON.

OPERATION WAS CONDUCTED WITHOUT UNTOWARD INCIDENT OR DELAY AND WITH NO CASUALTIES TO PERSONNEL. ALL AIRCRAFT INCLUDING DRONES PERFORMED PERFECTLY AND LANDED SAFELY. DRONE BOATS ALSO PERFORMED TO COMPLETE SATISFACTION. RECOVERY OF PHOTOGRAPHIC FILM AND OTHER DATA FROM BIKINI AND ENYU ISLANDS WAS EFFECTED THIS AFTERNOON BY BOAT INSIDE LAGOON. HOPE TO RECOVER SIMILAR ITEMS FROM AMEN ISLAND BY HELICOPTER TOMORROW. DETAILED EXAMINATION OF TARGET SHIPS MAY BE DELAYED SEVERAL DAYS BY RADIOACTIVITY PERSISTING IN WATER AND ON BOARD. CLEARANCE WAS GIVEN THIS AFTERNOON FOR RESUMPTION TRANS-PACIFIC AIR TRAFFIC THROUGH KWAJALEIN."

2312 - DSM to TECHDIR: "SITUATION REPORT NUMBER TWENTY NINE. KNISKERN SENDS. ABLE ADMIRAL SOLBERG REMAINING IN RECLAIMER. INITIAL BOARDING TEAMS NUMBER ONE REMAINING IN PRESERVER, TEAM NUMBER

2312 - FIVE IN CONSERVER, REMAINING BOARDING TEAMS EXCEPT RADIOLOGICAL MONITORS RETURNED TO WHARTON AND STANDING BY FOR CALL ON FRIDAY. BAKER. SARATOGA, ARKANSAS, YO-160, AND LCT-1114 SUNK. CHARLIE. AS OF 1730 LOVE HUGHES NO LIST BUT DOWN BY STERN WITH ABOUT FIVE FEET FREEBOARD AFT. RADIOLOGICAL CONDITIONS UNSAFE FOR SALVAGE. NAGATO TWO DEGREES LIST TO STARBOARD. FALLON FIVE DEGREES LIST TO STARBOARD. LITTLE OR NO CHANGE IN LIST OF THESE TWO SHIPS DURING AFTERNOON. PENNSYLVANIA APPEARS TO HAVE INCREASED DRAFT AFT ABOUT ONE FOOT. EXAMINATION OF BUOYS INDICATED ALL SUBMARINES IN NORMAL TARGET POSITION WITH POSSIBLE EXCEPTION OF PILOTFISH. ALL OF THIS PART CHARLIE BASED ON REPORTS FROM ADMIRAL SOLBERG. DOG. LCT-1115, LCI-549, CORTLAND, FILLMORE, BLADEN, GENEVA, NIAGARA BOARDED BY INITIAL BOARDING TEAMS AND TOPSIDE FOUND RADIOLOGICALLY CLEAR. LAST THREE SHIPS ALSO BOARDED BY INSTRUMENTATIONS TEAMS FROM KENNETH WHITING. RADIOLOGICAL CONDITIONS PREVENTED FURTHER BOARDING.

26 JULY 1946 - BAKER plus ONE

General Situation

Radiological reconnaissance continuing. Radiologically contaminated water area slowly receding following slight extension to southward during the night. Greater portion of target area still unsafe. HUGHES is down about four feet in the water on an even keel. FALLON has about 4° starboard list and starboard cargo boom hanging over the side. Both these vessels scheduled for cutting out and beaching when radiological conditions permit. NAGATO has about 8° starboard list, but in no apparent danger of sinking. Material condition of other target vessels approximately normal, but

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS
USE MILITARY
CLEARANCE NOT REQUIRED

great majority are still radiologically very "sour", with no early prospect of re-boarding.

0030 - LAFFEY, WALKE, O'BRIEN, INGRAHAM, HUNTINGTON directed to make second crossing with LAFFEY crossing at eighty miles. BARTON to proceed to lagoon entrance.

0421 - WALKE and INGRAHAM ordered to complete crossings and take positions at ERIK and RUJI Passes. All other destroyers to secure downwind patrol and proceed lagoon entrance and report estimated time of arrival at entrance.

0613 - Message from COMREARECH to CJTF-1: "SECNAV INTERESTED. DESIRES ANY INFORMATION RELATIVE CONDITION OF NEW YORK RESULTING BAKER TEST."

0852 - FLUSSER (DD-368) stood in with Vice Admiral HOOVER, Rear Admiral OFSTIE and Generals STILWELL and BRERETON embarked.

0920 - INGRAHAM on station at RUJI Pass.

1145 - SAIDOR (CVE-117) stood in and anchored.

1200 - CTG 1.5 to CJTF-1: "SUBJECT FLASH REPORT ON RADIOLOGICAL RECONN AND NIGHTOWL MISSIONS 26 JULY X AIRCRAFT SEARCHING 300 MILES NORTH WEST OF BIKINI ENCOUNTERED NO POSITIVE ACTIVITY DURING DAY X ONE AIRCRAFT ENCOUNTERED RADIOACTIVITY OVER LAGOON AT 1500 FEET AT 1700 X NO ACTIVITY AT 5000 FEET X HUGHES SINKING AT 1200 AND COMPLETELY SUBMERGED AT 1700 X NIGHTOWL AIRCRAFT ON STATIONS FROM 0700 UNTIL 1800 WHEN RELIEVED BY PRIEST NIGHTOWL TO CONTINUE COMMENCING 0600 27 JULY X"

1242 - WALKE on station at ERIK Pass.

1244 - DSM reports LCT-818 was not sighted. Array in immediate vicinity of LCT-818 obscured preventing a complete search.

1443 - CJTF-1 to interested Commands in Pacific Ocean Area: "CROSSROADS AIR NOTICE NUMBER NAN FIVE X IN ACCORDANCE WITH ALPAC 153 AS MODIFIED BY ALPAC 201 ALL PARTS OF AREA WITHIN 400 NAUTICAL MILES BIKINI NOW RADIOLOGICALLY SAFE FOR FLIGHT OPERATIONS X"

1531 - HUGHES taken in tow by RECLAIMER for beaching.

1608 - CJTF-1 authorized vessels at anchor in lagoon to operate evaporators.

1616 - CJTF-1 dispatch to CTG 1.5, CTU 1.6.2 and CTU 1.6.3: "REQUIREMENTS FOR BAKER PLUS TWO DAY X ONE FOX 13 AS NIGHT OWL ON STATION 0600 to 1800 LOVE X DRONE BOAT CONTROL AIRCRAFT FOR RADIOLOGICAL RECONN USING DRONE BOATS X TU 1.6.2 BE PREPARED TO EXECUTE SANDY TWO MISSIONS IF DIRECTED X CHARLIE ONE ON STATION 0800 LOVE X CHARLIE TWO RELIEVE ON STATION AT 1300 IF ORDERED BY CJTF-1 X DUMBO 1 AND DUMBO 4 AS ON BAKER PLUS ONE X MULTI PLACE AIRCRAFT CARRY MONITORS X FLIGHTS JIG AND KING NOT REQUIRED X AIR OPS ORDERS 8 AND 9REFER X"

1656 - INGRAHAM ordered to proceed to position two miles north of NAMU Island to investigate oil slick. Detailed instruction given by Rad Safe.

1727 - MOALE to CJTF-1: "HAVE INVESTIGATED HEAVY BLACK OIL SLICK NORTH OF BIKINI. CONSIDERABLE DEBRIS CONSISTING OF CRATES, LIFE JACKETS, ABOUT SIX SMALL LIFE RAFTS AND ONE LARGE RAFT. UNABLE TO SEE IDENTIFYING MARKS DUE TO BEING OIL SOAKED. OIL SLICK SHOWS INCREASE IN RADIOACTIVITY."

RESTRICTED DATA
OCT - 1949
NOT REQUIRED

RESTRICTED DATA
SPECIAL ... AMENDED ... SECTION SAFEGUARDS

- -

1752 - HUGHES beached off ENYU Island.

1850 - INGRAHAM reports on station midway between NAMU and YORU.

1845 - PRESERVER attempted to take FALLON in tow for beaching, but unsuccessful due to radiological and other difficulties.

1930 - Message from CTU 1.1.3 to DEPCOMTECHDIR: "DRONE BOAT SUMMARY BAKER PLUS ONE. COMMENCED MORNING OPERATION 0820 WITH TWO DRONES FOLLOWING ROUTES CHESTERFIELD AND LUCKY STRIKE. SAMPLES TAKEN. NO GEIGER. RECOVERED SAMPLES 1100. HIGHEST COUNT WITHIN DRONE 35 MR PER HOUR. AFTERNOON OPERATIONS COMMENCED 1420. TWO DRONES FOLLOWING SAME ROUTES AS MORNING. NO GEIGER. SAMPLES TAKEN. COUNTS WITHIN DRONES 25 AND 80 MR RESPECTIVELY. 24 SAMPLES WITH THEIR RESPECTIVE GRID POSITIONS SENT TO HAVEN. DRONE BOATS BECOMING INCREASINGLY UNRELIABLE. WILL USE ONLY ONE DRONE FOR EACH RUN TOMORROW INSTEAD OF TWO. THREE GEIGER COUNTERS SENT TO HAVEN THIS MORNING FOR TESTING. THESE WERE TO BE USED FOR AFTERNOON RUN BUT HAVEN ADVISED THEY WOULD NOT BE RETURNED TILL TOMORROW. WILL INSTALL FOR MORNING RUN IF AVAILABLE."

2018 - CJTF-1 to Joint Chiefs of Staff: "FOLLOWING SUMMARIZED DEVELOPMENTS SINCE LAST REPORT. SALVAGE UNIT SUCCEEDED IN TOWING HUGHES AND BEACHING HER ON ENYU ISLAND X SHE IS STILL RADIOLOGICALLY UNSAFE TO BOARD BUT IS ON EVEN KEEL THOUGH ABOUT FOUR FEET DOWN IN WATER BOTH FORWARD AND AFT X NEW YORK APPEARS ABOUT FOUR FEET DOWN AT STERN X NAGATO HAS STARBOARD LIST OF ABOUT THREE DEGREES, PILOTFISH, DENTUDA, SKIPJACK AND APOGON BELIEVED FROM OBSERVATION OF BUOYS TO BE ON BOTTOM X AIR BUBBLES AND OIL ARE RISING FROM LOCATION OF APOGON X SEARAVEN AND TUNA VISIBLE IN SUBMERGED POSITION BELIEVED UNDAMAGED X FALLON STILL HAS STARBOARD

2018 - LIST AND CONDITION APPEARS UNCHANGED X THE TARGET ARRAY IN GENERAL CONTINUES TO BE RADIOLOGICALLY HOT AND PREVENTS BOARDING OF SHIPS X HOWEVER THE HEAVY CONTAMINATION IS NOT COMPLETE AND CONTINUOUS AND THE TASK FORCE COMMANDER IN PCM-29 WAS ABLE THIS AFTERNOON TO PROCEED THROUGH AND AROUND THE TARGET ARRAY PASSING ALMOST OVER THE LOCATION OF SARATOGA X FILM AND OTHER IMPORTANT DATA WERE REMOVED FROM AMEN ISLAND THIS AFTERNOON BY HELICOPTER."

2304 - CJTF-1 to CTG 1.6: "REQUEST TWO SEAPLANES ARRIVE BIKINI 1100 AND 1300 LOVE 27 JULY AND TAKE OFF COMPLETION UNLOADING AND RELOADING X LAND VICINITY ORCA AT PILOTS DISCRETION X ORCA LOCATED WEST OF ANCHORAGE NEAR ENYU X MOOR TO STERN OF ORCA DURING STOP OR TAXI SLOWLY X CONTACT PRIEST ENROUTE FOR FURTHER INSTRUCTIONS PRIOR TO LANDING X THIS SCHEDULE CHARLIE AND CONTINUE DAILY UNTIL FURTHER NOTICE X REQUEST JTF-1 LOG REP ARRANGE SPECIAL BOATING FOR PASSENGERS TO AND FROM EBEYE X FREIGHT AND MAIL FOR MT MCKINLEY ONLY WILL BE CARRIED ON 27 JULY AND UNTIL FURTHER NOTICE X"

27 JULY 1946 - BAKER plus TWO

General Situation

Dangerous radioactivity persisting in vicinity of all target ships. Continuing with preparations for beaching FALLON and for such reboarding by initial boarding teams and instrumentation teams as radiological situation will permit.

0405 - CNO to CJTF-1: "CONGRATULATIONS AND WELL DONE ON CONTINUED EXCELLENT PERFORMANCE."

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA

CJTF - CNE
Operational Report - CROSSROADS - PART VI - Chronology
Section (D) - Chronology OF BAKER DAY Operation

0500 - SECNAV to CJTF-1: "YOU ARE CONGRATULATED UPON THE SECOND HIGHLY SUCCESSFUL WELL PLANNED AND EXECUTED ATOMIC BOMB TEST. TO ALL HANDS 'WELL DONE'."

0853 - CJTF-1 all Task Force message: "WARN ALL HANDS THAT DANGEROUS RADIOACTIVITY PERSISTS IN THE VICINITY OF ALL TARGET SHIPS X EXCEPT FOR BOATS CARRYING MONITORS ALL BOATING SHALL BE CONFINED TO THE IMMEDIATE VICINITY OF THE PRESCRIBED ANCHORAGE OF SHIPS AUTHORIZED TO REENTER THE LAGOON."

0855 - LCI-329 clear for boarding.

1006 - CJTF-1 to Rear Echelon: "NO SIGNIFICANT DAMAGE VISIBLE FROM NEARBY OBSERVATION NEW YORK X RADIOLOGICAL CONDITIONS HAVE PREVENTED BOARDING X AS SOON AS SAFETY CONDITIONS PERMIT WILL INSPECT AND SEND FURTHER REPORT."

1022 - Instrumentation team boarded NIAGARA, completing at 1144.

1105 - CTU 1.8.32 to CTG 1.8: "INSPECTION LCT'S 1132, 1268, 1415 MADE 26 JULY X ANCHORED IN APPROX 9,350 YARDS OFF NORTH END RONGELAP ISLAND X CONDITION FOLLOWS. LCT-1132 - CENTER PORT SIDE FLOODED CAUSING BAD LIST. LCT-1268 - DOWN BY STERN AS RESULT COMPLETE FLOODING ENGINE ROOM. LCT-1132 - HULL INTEGRITY INTACT BUT SHIP AND EQUIPMENT IN DEPLORABLE CONDITION. RECOMMEND THESE CRAFT BE BEACHED OR OTHERWISE DISPOSED OF AT RONGELAP. ALL LOADED WITH SMALL BOATS X ADVISE X"

1135 - TUNA surfaced by COUCAL.

1215 - Instrumentation team completed work on FILLMORE.

1244 - CJTF-1 to CTU 1.6.2: "DO NOT SEND SHIPS INTO LAGOON WITHOUT PERMISSION."

- -

1315 - DSM to CJTF-1: "PROPOSE CARRY OUT PLAN TO BEACH FALLON NEAR HUGHES. BELIEVE THIS HAS ADVANTAGES OVER ANCHORING. PRESENTS MANY DIFFICULTIES BECAUSE OF RADIOLOGICAL AND OTHER CONDITIONS."

1343 - CJTF-1 to CTG 1.5: "UR 261000Z X STATEMENT CONCERNING HUGHES IN ERROR X WAS ACTUALLY BEACHED X CORRECT YOUR DATA ACCORDINGLY X KEPNER SENDS X"

1351 - SUMNER ordered to proceed to region of oil slick, take water samples at surface and fifty foot intervals to 200 feet at edge of slick. Cross slick and take samples at center and other edge. Repeat crossing at 2 mile intervals securing in time to anchor in the lagoon by dark.

1407 - SUMNER requested location of oil slick ordered to investigate.

1421 - CJTF-1 to CTG 1.5: "REFUR 261000Z X IF REPORT ON SUBMERGENCE OF HUGHES WAS RELEASED TO PRESS REQUEST YOU ISSUE CORRECTION X"

1432 - FALLON beached off ENYU Island.

1535 - All instruments removed from FILLMORE.

1610 - All instruments removed from BLADEN. DENTUDA surfaced by WIDGEON. Believed partially flooded forward after being on bottom. All instruments removed from GENEVA.

1708 - CJTF-1 to CTG 1.6, CTU 1.6.3, and CTG 1.5: "FOLLOWING AIR OPERATIONS REQUIRED FOR BAKER PLUS 3 DAY X ONE FOX 13 AS NIGHT ONE ON STATION 0800 LOVE X WILL BE RELEASED IF NOT REQUIRED X RELIEF STANDBY AT BASE READY RELIEVE ON STATION AT 1300 LOVE IF ORDERED BY CJTF-1 X NO FURTHER PROSPECT OF NIGHT PHOTO MISSIONS X ONE C-54 AS PLAY BOY ON STATION

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
SPECIFIC RESTRICTED

1708 - 0800 LOVE AT DISCRETION OF CTG 1.5 X TWO TBM'S FOR DRONE BOAT CONTROL OPERATIONS STANDBY READY FOR LAUNCHING TWO HOURS NOTICE COMMENCING 0800 TO 1500 X OPERATIONS OF F6F PHOTO AIRCRAFT OR HELICOPTERS ARE IMPROBABLE X ONE PBM DUMBO AND ONE PBM CHARLIE EXECUTE MISSIONS AS FOR BAKER PLUS TWO X MONITORS REQUIRED ONLY IN PBM'S FOR CHARLIE AND DUMBO X BIKINI EBEYE SEA PLANE SHUTTLE USE PLAN CHARLIE ONE ADDITIONAL SPECIAL PBM FOR M GEN KEPNER AR 1VE BIKINI TIME DEPART FOR EBEYE PROMPTLY AT 0830 LOVE X CTG 1.6.3 ARRANGE TRANSPORTATION KWAJALEIN X"

1800 - DSM to CJTF-1: "HUGHES ON BEACH. SHIP IS VERY HOT. 20 MINUTES MAXIMUM TOLERANCE. NO ONE SHOULD BOARD."

1811 - SITUATION SUMMARY 271600 LOVE. NO FURTHER SHIPS SUNK BEYOND PREVIOUSLY REPORTED ARKANSAS, SARATOGA, YO-160 AND LCT-1114 PLUS THE BOMB CARRYING BARGE LSM-60. HUGHES WAS CUT OUT AND BEACHED FRIDAY AFTERNOON ON ENYU ISLAND BEING IN DANGEROUS CONDITION DOWN IN WATER AT LEAST FOUR FEET FORWARD AND AFT THOUGH ON NEARLY EVEN KEEL. FALLON MAINTAINS ABOUT EIGHT DEGREE LIST TO STARBOARD AND WAS BEACHED ON ENYU 271435 LOVE. OF THE SIX SUBMERGED SUBMARINES ONLY TUNA AND DENTUDA HAVE COME TO SURFACE AND JUDGING FROM OBSERVATION OF BUOYS PILOTFISH DENTUDA SKIPJACK AND APOGON BELIEVED TO HAVE BEEN ON BOTTOM X SEARAVEN AND TUNA WERE VISIBLE IN SUBMERGED POSITION BELIEVED UNDAMAGED. TUNA AND DENTUDA WERE SURFACED TODAY X AIR BUBBLES AND OIL RISING FROM LOCATION OF APOGON. PENNSYLVANIA HAS SLIGHT LIST TO STARBOARD AND IS SLIGHTLY DOWN BY STERN WITH SMALL OIL SLICK STARBOARD SIDE. NAGATO HAS SLIGHT LIST TO STARBOARD. BOTH CARGO HATCHES OPEN ON BRISCOE. NEW YORK DOWN ABOUT FOUR FEET BY STERN. DANGEROUS RADIOACTIVITY PERSISTS THROUGHOUT ENTIRE AREA OF TARGET ARRAY PLUS LAGOON AREAS TO NORTH AND NORTHWEST OF ARRAY. SOME RADIOAC-

- -

1811 - TIVITY JUST NORTH OF ATOLL. SALVAGE AND REBOARDING HAVE BEEN DELAYED BY RADIOLOGICAL CONDITIONS."

1840 - PGM-23 evacuated by order of RadSafe due to exposure to radioactivity.

1951 - CJTF-1 to Joint Chiefs of Staff: "FOLLOWING SUMMARIZES DEVELOPMENTS SINCE MY LAST REPORT. FALLON MAINTAINED ABOUT EIGHT DEGREE LIST THROUGHOUT NIGHT AND MORNING BUT WAS BEACHED ON ENYU ISLAND AT 1436 LOVE AS PRECAUTIONARY MEASURE. TUNA AND DENTUDA WERE BROUGHT TO SURFACE THIS AFTERNOON THROUGH NORMAL METHODS. THEY ARE RADIOLOGICALLY QUITE HOT BUT NO REPORT OF DAMAGE. AIR BUBBLES ARE NOW RISING FROM SKIPJACK AS WELL AS APAGON. NAGATO MAINTAINS LIST WITH MEAN DRAFT INCREASED TWO FEET THREE INCHES SINCE BEFORE TEST. VERY LIGHT SOUTHERLY WINDS PREVAILED FROM TIME OF THE TEST UNTIL TODAY WHEN THEY SHIFTED TO EASTERLY. THEY CARRIED CONSIDERABLE DEBRIS AND RADIOACTIVE WATER ACROSS REEF BETWEEN BIKINI AND AMEN ISLANDS. THIS IS NOW MOVING IN WESTERLY DIRECTION UNDER INFLUENCE OF EASTERLY WINDS AND WILL DISSAPATE RAPIDLY. RADIOACTIVITY IN LAGOON IS SHOWING CONSIDERABLE PERSISTANCE."

1956 - CJTF-1 to all ships present: "DAILY AIR SHUTTLE SERVICE NOW AVAILABLE BETWEEN EBEYE AND BIKINI X DEPART BIKINI 1130 AND 1330 LOVE X"

2115 - CTG 1.5 to CJTF-1: "SUBJECT FLASH REPORT ON NIGHT OWL MISSION 27 JULY X WEATHER SATISFACTORY FOR PHOTOGRAPHY THROUGHOUT DAY X COLOR, BLACK AND WHITE MOVIE X STILL PHOTOS TAKEN X RADIOACTION NOTED AT 400 FEET OVER LAGOON, STRONG OVER NAGATO AND MODERATE OVER FALLON WHILE BEING TOWED TO BEACH X SUB AS SEEN TO SURFACE AT 1433 LOCAL X HUGHES OBSERVED BEACHED X NAGATO APPEARED LOWER IN WATER X AIRCRAFT ON STATION FROM 0600 UNTIL RELIEVED BY

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY INFORMATION SAFEGUARDS

2115 - PRIEST AT 1715 X MISSION TO BE RESUMED 0800, 28 JULY AS REQUESTED X REUR 270321 ERRONEOUS REPORT ON HUGHES WAS NOT RELEASED TO PRESS BY THIS HDQS X"

28 JULY 1946 - BAKER plus THREE

General Situation

Water around majority of target vessels still "hot" precluding re-boarding operations on major scale. Decontamination of target ships promises to be serious problem, and procedures to reduce contamination by hosing and foam are under consideration, using HUGHES and FALLON as test ships. No change in general material condition of target ships. NAGATO'S draft has increased 2' 3" since evacuation. DENTUDA taking some water forward and slightly down by the head. She will be beached today.

0748 - CJTF-1 dispatch to CINCPAC and CINCPOA: "INTEREST CENTERED IN VIEWING TARGET ARRAY FROM AIR COMBINED WITH NECESSITY FOR CONTINUED AIR RESEARCH AND AIR TRANSPORTATION RESULTS IN INTERMITTED CONCENTRATIONS OF AIRCRAFT IN AIR SPACE OVER BIKINI X OPERATIONS SEAPLANES CARRIER AND LAND BASED AIRCRAFT FOR THESE PURPOSES EXPECTED CONTINUE ON GRADUALLY REDUCING BASIS UNTIL ABOUT 5 AUGUST WHEN THEY WILL BE REDUCED TO OCCASIONAL FLIGHTS OVER AREA X FOR SAFETY REASONS AUTHORITY TO IMPOSE POSITIVE AIR TRAFFIC CONTROL OVER BIKINI DURING THIS PERIOD AND TEMPORARY RETENTION OF ASR RESPONSIBILITY ARE DESIRABLE X REQUEST ALPAC 153 BE CONTINUED IN EFFECT THROUGH 5 AUGUST X"

0850 - Message from CTU 1.2.7 to WIDGEON: "BE PREPARED FOR WORK ON RESURFACING SUBMARINE THIS AFTERNOON." Message to COUCAL: "GET UNDERWAY STAND BY FALL RIVER EMBARK CAPT. SHARP AND PROCEED VICINITY WHARTON EMBARK COMDR. CASTERLAND. PROCEED WITH

0850 - CAUTION TO SUBMARINE AREA CLEAR OPERATE UNDER INSTRUCTIONS CAPT. SHARP CONNECTION RESURFACING SUBMARINES."

0913 - CJTF-1 passes to Joint Task Force ONE the following despatches: FROM SECNAV "YOU ARE CONGRATULATED UPON THE SECOND HIGHLY SUCCESSFUL WELL PLANNED AND EXECUTED ATOMIC BOMB TEST. TO ALL HANDS WELL DONE." FROM CNO "CONGRATULATIONS AND WELL DONE ON CONTINUED EXCELLENT PERFORMANCE."

0934 - CJTF-1 to DSM: "REQUEST CLARIFICATION CONDITION NEW YORK. HAVE RECEIVED ONE REPORT STATING DOWN 4 FEET BY STERN AND ANOTHER STATING NO CHANGE IN DRAFT."

1100 - Initial boarding team boarded LST-545.

1141 - CJTF-1 to all ships anchored in certain areas: "PRESENT INDICATION ARE THAT ALL BERTHS EAST OF NORTH-SOUTH LINE THROUGH BERTH 382 WILL HAVE TO BE EVACUATED THIS AFTERNOON SUNDAY. BE PREPARED TO EXECUTE FOLLOWING. BURLESON, AVERY ISLAND, CUMBERLAND SOUND AND SAN MARCOS PROCEED TO AREA MERCURY. NOTE SECTOR AXIS STILL 120. FALL RIVER LIE TO TWO MILES OFF ENTRANCE CONTINUE HECV DUTIES. HOLETTE AND OTTAWA JOIN TG 1.3 UNLESS ORDERED TO PROCEED RONGELAP. REMAINING SHIPS ANCHOR IN BERTHS AS FOLLOWS: MT. MCKINLEY ABLE, HAVEN CHARLIE, WHARTON FOX, FLUSSER GEORGE, BEGOR JIG, KENNETH WHITING 381, APPALACHIAN 382, BLUE RIDGE 357, ORCA 500 YDS WEST OF ABLE, HENRICO WEST OF CHARLIE, APPLING WEST OF FOX, LST-861 WEST OF HENRICO, TU 1.2.7 TO WESTWARD OF OTHER VESSELS BUT SOUTH OF EAST WEST LINE THROUGH BERTH ABLE, TG 1.7 AND PGM'S AS SEPARATELY DIRECTED. ON SIGNAL TO EXECUTE THIS PLAN ALL SHIPS HOIST AFFIRM AT YARDARM AND HAUL DOWN WHEN CLEAR OF ENTRANCE OR ANCHORED NEW BERTH."

RESTRICTED DATA
OCT - 1946
CLEARANCE NOT REQUIRED

1240 - LCT-618 taken in tow by DELIVER and moved to vicinity of berth 229. Still radiologically "sour".

1246 - Initial boarding teams boarded LST-220 and cleared at 1300.

1323 - Initial boarding team boarded LCI-329.

1332 - CJTF-1 to CTU 1.6.2: "ONE FLIGHT EACH HELICOPTER TO BIKINI TODAY APPROVED X APPROACH FROM EAST X LAND SOUTH AND ONLY X NORTH END STILL RADIOACTIVE X MONITOR MAKE FIRST TRIP AND INSURE THAT PUBINFO TOWERS ARE SAFE TO APPROACH X ADVISE INTENTIONS X"

1338 - CJTF-1 to R.K. HUNTINGTON: "TAKE POSITION ONE MILE NORTH OF ROMUK ISLAND REEF AND EXPLORE EXTENT OF RADIOACTIVITY AND OIL SLICKS WEST 20 MILES THEN NORTH 3 MILES EAST 20 MILES NORTH 3 MILES WEST 20 MILES AND REPORT. LOOK FOR RED OR YELLOW HAVEN FLOATERS. TAKE FREQUENT WATER SAMPLES AT SURFACE AND AT 50 FEET INTERVALS TO DEPTH OF MEASURED RADIOACTIVITY. TAKE 900 FOOT READINGS AT EACH STOP."

1343 - CJTF-1 to BARTON: "TAKE POSITION NORTH OF BIKINI ISLAND EXPLORE EXTENT OF RADIOACTIVITY SURFACE AND DOWN TO FIFTY FEET BELOW RADIOACTIVITY. TAKE FREQUENT WATER SAMPLES AT FIFTY FOOT DEPTH INTERVALS TO DEPTH OF RADIOACTIVITY AND LOOK FOR RED AND YELLOW HAVEN WOODEN FLOATERS. TAKE 900 FOOT BT READINGS AT EACH STOP. COURSE WESTWARD ALONG REEF TO AMEN ISLAND THEN EASTWARD 10 MILES THEN NORTH 2 MILES THEN WESTWARD 10 MILES REPEAT FOR FIVE CROSSINGS AND REPORT."

1351 - Test Animals removed from BRACKEN.

1411 - DENTUDA taken in tow by ATA-192 for beaching.

1415 - TUNA taken in tow by CHICKASAW for mooring in shallow water.

1417 - Initial boarding team boarded LCI-327.

1418 - CJTF-1 to MOALE: "PROCEED ALONG SOUTHERN END OF ATOLL AND MEASURE SURFACE RADIOACTIVITY AND TAKE WATER SAMPLES AT SURFACE, 50, 100, 150, and 200 FEET HALF MILE OFF ERIK, RUJI, CHERRY, ARAN, ORUK AND BORO PASSES. MAKE REPORT AT EACH PASS. REVERSE COURSE AND CONTINUE OPERATIONS AT ABOVE PASSES OR UNTIL 1800. THEN PROCEED ON COURSE 180 FOR FIVE MILES, COURSE 270 FOR TWENTY MILES, COURSE 180 FOR FIVE MILES, COURSE 090 FOR TWENTY MILES. TAKE WATER SAMPLES AT FIFTY FEET DEPTH FROM SURFACE TO 200 FEET AND 900 FEET BT READINGS EVERY FIVE MILES AND AT BEGINNING AND END OF EACH LEG. DO NOT TAKE BT READINGS EXCEPT WHEN STOPPED."

1447 - Half of test animals removed from CATRON. Ship still radiologically "scur".

1458 - Executed signal requiring ships to change to new berths.

1501 - CJTF-1 directed all berths to eastward of North-south line through berth 382 be vacated, because of radioactive water toward lagoon entrance.

1510 - DSM to BUAER: "UNDERSTAND ALL AIRCRAFT ASSIGNED TO OPERATION CROSSROADS AS TARGET AIRCRAFT WERE SURPLUS AND ALREADY STRICKEN OFF NAVY LIST. OF ORIGINAL AIRCRAFT APPROXIMATELY THIRTY REMAIN AFTER COMPLETION TEST BAKER ALL DAMAGED FROM BLAST EFFECT AND IN POOR CONDITION FROM LONG EXPOSURE WEATHER WITHOUT MAINTENANCE. WITH EXCEPTION AIRCRAFT COMPONENTS AND EQUIPMENT RETURNED FOR LABORATORY ANALYSIS PROPOSE JETTISON REMAINING AIRCRAFT WITH NO ATTEMPT SALVAGE USEFUL PARTS. SOME CRITICAL ITEMS NOTABLY CLOCKS, AUTOMATIC PILOTS, AND LIFE RAFT PREVIOUSLY REMOVED. REQUEST BUAER CONCURRENCE THIS PLAN."

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

721479 O—46——18

DATA
PROCURED
SPECIAL

CJTF - ONE
Operational Report - CROSSROADS - PART VI - Chronology
Section (D) - Chronology of BAKER DAY Operation

- -

1529 - DELIVER hosed down LCT-818.

1535 - ATR-87 washed down HUGHES with foam. Substantial reduction in radioactivity noted.

1539 - CURRENT hosed down LCI-327.

1540 - FALL RIVER got underway and proceeded to a point two miles south of entrance buoys there lying to and continuing to act as harbor entrance control vessel. Other ships were moved to anchorage further west.

1544 - CJTF-1 to CTG 1.5, CTG 1.6, and CTU 1.6.2: "HERE ARE REQUIREMENTS FOR BAKER PLUS 4 DAY X ONE FOX 13 NIGHT OWL OR AT DISCRETION CTG 1.5 ONE C-54 PLAY BOY ON STATION 0800 LOVE X RELIEF PLANE READY RELIEVE ON STATION AT 1300 LOVE BUT STAND BY AT BASE UNLESS OTHERWISE DIRECTED BY CJTF-1 TWO TBM'S STAND BY ON TWO HOURS NOTICE FOR DRONE BOAT CONTROL COMMENCING AT 0800 IF ORDERED BY CJTF-1 X F6F PHOTO PLANES IN SAIDOR STAND BY ON TWO HOUR NOTICE PREPARE TO EXECUTE SANDY 1, SANDY 2 MISSIONS IF DIRECTED X ONE PBM CHARLIE 1 AND ONE PBM DUMBO 1 ON STATION AT 0800 LOVE X THESE TWO MISSIONS MAY BE COMBINED AT DISCRETION CTU 1.6.3 X ONE PBM ON STATION RELIEVE AT 1300 LOVE X BIKINI EBEYE SHUTTLE CONTINUE PLAN CHARLIE X RESUME CARRYING REGULAR MAIL X C-54 FLIGHTS FOR PRESS CORRESPONDENTS AS DIRECTED CTG 1.5 X ALL AIRCRAFT MUST MAINTAIN CONSTANT VOICE CONTACT WITH PRIEST WHILE BIKINI AREA X POSITIVE AIR TRAFFIC CONTROL IN EFFECT X"

1556 - DENTUDA beached off ENYU Island.

1641 - TUNA moored to buoy in good water clear of target array.
LCT-1114, previously reported as sunk, was found capsized and adrift northwest of target array.

1755 - BURLESON requests permission to remain in area MERCURY at least one day to attempt further recovery of animals.

1858 - DSM report: "RECLAIMER AND PRESERVER RETURNING TO ANCHORAGE. PRESERVER WITHDREW WHEN ONE DAY TOLERANCE WAS REACHED. WILL RESUME ATTEMPT EARLY MORNING. DSM REP ON PRESERVER BELIEVES FALLON WILL STAY AFLOAT UNTIL MORNING."

1910 - CTG 1.5 to CJTF-1: "SUBJECT FLASH REPORT FOR NIGHT OWL MISSION 28 JULY X AIRCRAFT ON STATION FROM 0800 LOCAL UNIT RELIEVED BY PRIEST AT 1700 X NORMAL PHOTOGRAPHY ACCOMPLISHED AS WEATHER PERMITTED X ATTEMPTS TO SURFACE SUB NOTED X CONSIDERABLE DECREASE IN RADIOLOGICAL ACTIVITY OVER LAGOON X NO OTHER IMPORTANT CHANGES FROM PREVIOUS REPORTS X MISSION TO BE RESUMED 29 JULY X"

1936 - CJTF-1 to COMREARECH: "FURTHER INSPECTION NEW YORK INDICATES ABOUT 1800 TONS INCREASE IN DISPLACEMENT WITH CENTER OF GRAVITY OF ADDITIONAL WATER AT FRAME 103 RESULTING IN TRIM BY STERN OF ABOUT FOUR FEET. SITUATION BELIEVED STABILIZED AND SHIP IN NO DANGER."

1938 - CJTF-1 to Joint Chiefs of Staff: "DEVELOPMENTS SINCE MY LAST REPORT. LCT-1114 PREVIOUSLY REPORTED SUNK HAS BEEN FOUND CAPSIZED ADRIFT NORTHWEST OF TARGET ARRAY. LCT-816 LISTED IN FIRST REPORT AS MISSING IS ALONGSIDE LST-133 APPARENTLY IN GOOD CONDITION. DENTUDA WHICH WAS BROUGHT TO SURFACE YESTERDAY HAD BEEN ON BOTTOM AND HAD HAD SOME LEAKAGE FORWARD. SHE LOST FREEBOARD DURING THE NIGHT AND AS A PRECAUTIONARY MEASURE WAS BEACHED THIS AFTERNOON ON ENYU ISLAND BETWEEN HUGHES AND FALLON. FROM BRACKEN RECOVERED ALL ANIMALS ALIVE EXCEPT FOR TWO RATS AND RECOVERED HALF OF ANIMALS FROM CATRON. INTENSITY OF RADIOACTIVITY NEAR CENTER OF ARRAY HAS DIMINISHED BUT STILL IS SUCH AS TO PREVENT LONG-CONTINUED SALVAGE OR INSPECTION ACTIVITY ON ANY TARGET. ENLARGEMENT OF CONTAMINATED AREA TO SOUTH AND EAST HAS MADE THE AREA IN LEE OF ENYU ILLAND

1938 - UNSUITABLE FOR CONTINUOUS ANCHORAGE AND HAS FORCED TO SEA OR TO LESS DESIRABLE AREA TO WESTWARD THE SHIPS WHICH HAD BEEN BROUGHT IN."

1952 - DSM report: "LCI-329 AND 549 REBOARDED AND FOUND GEIGER SWEET. LST-545 GEIGER SOUR AVERAGE READING 2.0 R. LST-220 GEIGER SOUR AVERAGE 3.0 R. ANIMALS RECOVERED FROM BRACKEN BY MEDICAL TEAM FROM BURLESON ABOARD CONSERVER. ALSO RECOVERED ONE HALF ANIMALS FROM CATRON. CATRON GEIGER SOUR 15.0 R. AVERAGE. LCT-327 BOARDED FOUND GEIGER SOUR AVERAGE 2.5 R. WAS HOSED DOWN VIGOROUSLY AND RECHECK SHOWED AVERAGE READING 1.5 R. LCT-818 MOVED TO BUOY BERTH 229. WAS BOARDED FOUND GEIGER SOUR AVERAGE 4.0 WAS HOSED DOWN VIGOROUSLY AND RECHECKED AVERAGE ABOUT 2.0 R. DENTUDA BEACHED LIGHTLY AT 1557 BETWEEN HUGHES WASHED DOWN TO REMOVE FOAMITE GEIGER CONDITIONS IMPROVED ABOUT THIRTY PERCENT ALL GEIGER READINGS PER 24 HOURS. CHECK ON DRAFTS 1600 TO 1730 INDICATED FOLLOWING CHANGES SINCE BAKER MINUS ONE. ALL READINGS ARE ONLY ACCURATE TO PLUS OR MINUS ABOUT THREE INCHES. BRACKEN PLUS EIGHT INCHES FORWARD PLUS ONE FOOT AFT. CATRON PLUS 18 INCHES AFT. GASCONADE PLUS 11 INCHES FORWARD. NEW YORK MINUS TWO FEET FORWARD PLUS 4 FEET 3 INCHES AFT. SALT LAKE CITY PLUS 4 INCHES FWD PLUS ONE FOOT AFT. LST-133 PLUS 1 FOOT 7 INCHES FWD. NAGATO PLUS THREE FEET 3 INCHES FWD PLUS 3 FEET 6 INCHES AFT. BRULE MINUS 5 INCHES FWD PLUS 18 INCHES AFT. FOLLOWING SHIPS SHOW NO CHANGE: INDEPENDENCE, BARROW, CRITTENDEN, DAWSON, BANNER, BUTTE, CARTERET, CORTLAND, CONYNGHAM, MUGFORD, RHIND, STACK, TRIPPE, MAYRANT, NEVADA, MUSTIN, AND BRISCOE, NO NOTICEABLE CHANGE IN DRAFT OF NEW YORK LAST EIGHT HOURS. NAGATO STILL HAS LIST OF EIGHT DEGREES TO STARBOARD AND HAS INCREASED VERY LITTLE IF ANY DURING LAST TWENTY FOUR HOURS. NAGATO DRAFT HAS INCREASED 3 INCHES FORWARD AND 6 INCHES AFT LAST EIGHT HOURS. RECOMMEND CONSIDERATION BE GIVEN TO DISPOSITION OF NAGATO."

- -

2159 - DSM situation report number thirty: "ADMIRAL SOLBERG STILL IN RECLAIMER. A. THIS REPORT SUMMARIZES ALL IMPORTANT CHANGES IN SHIP CONDITIONS SINCE REPORT NUMBER TWENTY NINE. B. LCT-1114 DEFINitely IDENTIFIED FLOATING BOTTOM UP. NO APPARENT DAMAGE TO BOTTOM AND SIDES. C. HUGHES, FALLON AND DENTUDA HAVE BEEN BEACHED OFF ENYU. DENTUDA HAD BEEN ON BOTTOM WAS SURFACED 27 JULY, BUT INCREASED DRAFT FORWARD DURING NIGHT. TWO MAIN BALLAST TANKS BLOWN DOWN 28 JULY TO RECOVER FREEBOARD BEFORE BEACHING. TUNA WAS SURFACED ON 27 JULY AND APPARENTLY UNDAMAGED. ANCHORED IN SHALLOW CLEAR WATER 28 JULY. SEARAVEN IS PRETEST POSTION AND IS TO BE SURFACED 29 JULY. APOGON IS ON BOTTOM. UNSUCCESSFUL ATTEMPT TO SRFACE INDICATES POSSIBILITY RUPTURED TANK TOPS OR LEAKS IN SALVAGE FITTINGS. SKIPJACK AND PILOTFISH APPARENTLY ON BOTTOM. DIVING OPERATIONS WILL BE REQUIRED TO SURFACE THESE LAST THREE. E. FOLLOWING ARE LATEST ESTIMATES OF CHANGES IN DRAFT SINCE EVACUATION: PENNSYLVANIA FWD MINUS 2 INCHES. AFT PLUS 3 INCHES. NEW YORK FWD MINUS 2 FEET, AFT PLUS 4 FEET 3 INCHES. SALT LAKE CITY FWD PLUS 4 INCHES, AFT PLUS 1 FOOT. NAGATO FWD PLUS 3 FEET 3 INCHES, AFT PLUS 18 INCHES. PENSACOLA FWD NO CHANGE, AFT PLUS 18 INCHES. BRACKEN FWD PLUS 8 INCHES AFT PLUS 1 FOOT. CATRON FWD NO CHANGE AFT PLUS 18 INCHES . GASCONADE FWD PLUS 11 INCHES, AFT NO CHANGE. BRULE FWD MINUS 5 INCHES AFT PLUS 18 INCHES, LST-133 FWB FPLUS 1 FOOT 7 INCHES, AFT NO CHANGE. ALL READINGS ARE ONLY ACCURATE TO PLUS OR MINUS THREE INCHES. F. RADIOLOGICAL CONDITIONS CONTINUE TO PREVENT BOARDING MOST SHIPS FOR ANY APPRECIABLE LENGTH OF TIME. ALTHOUGH WATER CONDITONS SOMEWHAT BETTER PARTICULARLY IN EASTERN PART OF TARGET ARRAY. LCI-329 IS ONLY SHIP RADIOLOGICALLY CLEAR IN ADDITON TO THOSE LISTED MY REPORT NUMBER TWENTY NINE. G. ALL ANIMALS FROM BRACKEN AND ONE HALF FROM CATRON REMOVED BY TEAM FROM BURLESON.."

2327 - Ordrs issued to COUCAL to get underway about 290800 Love and proceed with resurfacing submarine as instructed by Captain SHARP.

ATOMIC ENERGY ACT - 1946
SPECIAL [illegible] NOT REQUIRED

2346 - CJTF-1 to A.M. SUMNER: "AT DAWN PROCEED OUT OF LAGOON TO AREA WITHIN FIVE MILES OF EASTERN REEF. FLUSH OUT WHEREVER POSSIBLE WITH UNCONTAMINATED WATER. YOUR PRESENT SITUATION NOT DANGEROUS IF ALL MEN ARE KEPT WITHIN TOLERANCE OF ONE TENTH ROGER PER DAY. MAKE HOURLY REPORT TO RADSAFE."

2352 - A.M. SUMNER TO CJTF-1: "MONITOR REPORTS READINGS SOME OUTBOARD BUNKS 0.156 PER DAY AND BUILDING UP READINGS AT EVAPORATORS 0.204 PER DAY. EVAPORATORS SECURED ON ORDERS OF MONITORS. HAVE FEED WATER FOR TWO FOUR HOURS. REQUEST PERMISSION TO MOVE TO CLEAR WATER."

29 JULY 1946 - BAKER plus FOUR

General Situation

Dangerous radioactivity still persists around target ships. Attempt will be made to re-embark ships' personnel on BLADEN, CORTLAND, FILLMORE, GENEVA AND NIAGARA, with view to early rehabilitation and departure. Surfacing of submarines to be continued.

0008 - DSM to CTG 1.2.7 and CJTF-1: "INTEND MOVE SKATE TO BUOYS BEING PLANTED IN SHALLOW WATER LEE OF ION ISLAND. ALSO SUBMERGED SUBMARINES SOON AS RAISED. THIS WILL EXPEDITE DECONTAMINATION AND INSPECTION."

0525 - DSM to CJTF-1: "REQUEST CONSIDERARTION BE GIVEN TO PLACING SHIPS CREWS ON BLADEN CORTLAND FILLMORE GENEVA AND NIACARA. TEAMS A AND B CAN BOARD TO OPEN SHIPS AND DETERMINE CONDITION BELOW DECKS AND LIGHT OFF BOILERS IF SATISFACTORY. WHEN FULL CREWS ABOARD SUGGEST MOVING OUT OF AREA TO SAFE AREA FOR INSPECTION BY TECHNICAL AND INSTRUMENTATION GROUPS. BELIEVE INSPECTION REQUIREMENTS WILL BE MINOR SO THAT THESE

0525 - VESSELS CAN SAIL AT AN EARLY DATE. CREWS FOR DENTUDA AND TUNA WILL BE REQUIRED AT AN EARLY DATE. RECOMMEND THEY BE BROUGHT INTO HARBOR SO THEY WILL BE AVAILABLE WHEN CALLED FOR."

0545 - A.M. SUMNER proceeded to sea for radiological decontamination.

0620 - BAYFIELD stood in with crews of NIAGARA and FILLMORE embarked.

0830 - SKATE taken in tow by ACHOMAWI and moored to buoy near berth 287A.

0850 - LaField Group to DSM and RadSafe: "A. WITH AV-17 AT SEA IMPOSSIBLE FOR LA FIELD TO KEEP CLOSELY IN TOUCH WITH REENTRY AND REBOARDING SITUATIONS AS BEFORE HENCE REQUEST EARLY INFO ON POSSIBILITY OF BOARDING FOR EVEN SHORT TIME FOLLOWING SHIPS APA'S 70 AND 77; NAGATO: PENNSYLVANIA. B. REQUEST PERMISSION SEND PARTY MORNING OF THIRTY JULY TO BIKINI AND AMEN ISLANDS TO EVACUATE EQUIPMENT. THESE PARTIES WILL CARRY RADIATION METERS."

0900 - Ship's Teams A and B boarded NIAGARA.

0918 - Ship's Teams A and B boarded FILLMORE.

1037 - SEARAVEN surfaced by COUCAL.

1053 - AVERY ISLAND stood in.

1300 - CUMBERLAND SOUND stood in.

1305 - Ship's Teams A and B boarded CORTLAND and GENEVA.

1318 - FALL RIVER re-entered and anchored in berth 386.

RESTRICTED DATA
OCT - 1948
CLEARANCE NOT REQUIRED

1358 - PGM-31 ordered to proceed to a point five miles south of ENYU Island and conduct decontamination trial runs.

1412 - CJTF-1 to CTG 1.1.3: "NEED FOR DRONE BOAT OPERATIONS NO LONGER EXISTS. PREPARE YOUR UNIT FOR EMBARKATION IN SAINT CROIX."

1426 - CJTF-1 to JUPITER PLUVIUS. INFO: DAVY JONES, JTF-1, CRE. Delvd. JTF-1 29 July by boat. "REQUEST HALF GALE FROM NORTHEAST WITH COPIUS RAINFALL AT BIKINI ATOLL BY 1 AUGUST. URGENTLY NEEDED TO CLEAR LAGOON OF HOT WATER AND WASH TARGET VESSELS. FIRST INFO ADEE ADVISE HIS AGENCIES KEEP CLEAR TO SOUTHWEST UNTIL RADIOACTIVITY DISSIPATED. GREATLY APPRECIATE YOUR FINE COOPERATION ABLE AND BAKER DAYS. UNOFFICIAL."

1440 - Ship's Teams A and B boarded BLADEN.

1521 - CJTF-1 to all ships present: "AREA TO SOUTHWARD OF LINE FROM NORTHERN TIP ENYU TO CENTER BERTH 339 THENCE DUE WEST TO LONGITUDE 165-25 NOW RADIOLOGICALLY SAFE. ONE HOURS NOTICE NO LONGER REQUIRED IN THE ABOVE AREA. SAFE TO OPERATE EVAPORATORS."

1531 - CARTERET APA-70 approved for boarding for limited time only. Monitor guard continuously against exceeding tolerance while board. CRITTENDEN has not been boarded.

1528 - NIAGARA got underway and shifted to berth 381.

1528 - Considerable improvement in radiological condition of water during the day. Reentry of certain units planned for tomorrow.

1528 - Draft of NAGATO slowly but steadily increasing and main deck awash from stern to amidships.

1528 - Attempts to surface SKIPJACK by blowing forward tanks were unsuccessful.

- -

1731 - CJTF-1 to CTG 1.5, CTU 1.6.2, CTU 1.6.3, and CTU 1.6.4: "AIR OPERATIONS FOR BAKER PLUS FIVE X ONE FOX 13 OR C-54 AT DISCRETION OF CTG 1.5 ON STATION OVER BIKINI AT 0800 LOVE X RELIEF PLANE RELIEVE ON STATION AT 1300 LOVE UNLESS OTHERWISE DIRECTED BY CJTF-1 X DRONE BOAT CONTROL AIR OPERATIONS SANDY TAMAR AND HELICOPTER MISSIONS COMPLETED X ONE PBM COMBINED CHARLIE ON DUMBO 1 STAND BY AT BASE ON ONE HOURS' NOTICE X CARRY MONITOR IF ORDERED CARRY K20 CAMERA PHOTMATE IF AVAILABLE X BIKINI EBEYE SHUTTLE USE PLAN CHARLIE X"

1933 - CJTF-1 to Joint Chiefs of Staff: "DEVELOPMENTS SINCE MY LAST REPORT. NAGATO SETTLED 9 INCHES AFT DURING NIGHT WITH LIST SLIGHTLY INCREASED. SHIPS BOARDING TEAMS BOARDED NIAGARA, FILLMORE, BLADEN AND GENEVA. NIAGARA UNDERWAY UNDER OWN POWER AND ANCHORED TO SOUTH OF ARRAY. SEARAVEN WAS BROUGHT TO SURFACE BY NORMAL METHODS THIS MORNING. RECOVERED ALL ANIMALS FROM CATRON AND BRISCOE. SARATOGA MAST JUST BELOW SURFACE AT LOW TIDE CONSTITUTES NAVIGATIONAL HAZARD WILL BE BUOYED. THERE HAS BEEN FURTHER REDUCTION IN INTENSITY OF RADIOACTIVITY THROUGHOUT LAGOON. AREA TO SOUTH OF ARRAY WHICH SHOWED INCREASE OF RADIOACTIVITY YESTERDAY AND FORCED EVACUATION OF ENYU ANCHORAGE HAS NOW CLEARED. SHIPS BOARDING TEAMS ARE EXPECTED TO BOARD CORTLAND, CARTERET, TUNA, DENTUDA, CONYNGHAM TOMORROW."

2101 - CTU 1.2.7 to CJTF-1: "SARATOGA MAST AND ISLAND BUOYED WHITE AND BLACK. REQUEST ALL SHIPS BE NOTIFIED OF ABOVE AND THAT HYDROGRAPHERS SURVEY AND BUOY PROPERLY ENTIRE WRECK."

2121 - DSM to CJTF-1: "NAGATO LIST GRADUALLY INCREASING NOW NINE DEGREES. CHANGES IN DRAFT SLOW BUT INDICATE PROGRESSIVE FLOODING FROM AFT TO FORWARD. CONSIDER SALVAGE OPERATIONS IMPRACTICAL BECAUSE OF RADIOLOGICAL HAZARDS, STRUCTURAL ARRANGEMENTS

RESTRICTED DATA
AEC - 1948
REQUIRED

2121 - OF SHIP, PRESENT CONDITION AND OTHER FACTORS. EFFORTS OF SALVAGE GROUP AND DSM BEING CONCENTRATED ON DECONTAMINATING NEW YORK, PENSACOLA AND LCT-816 AND ANY OTHERS WHICH MAY IN TIME DEVELOP UNSATISFACTORY CONDITIONS BECAUSE OF ABSENCE OF CREW. ALSO ENGAGED IN DECONTAMINATING TEAM OPERATIONS. IF NAGATO IS TO BE USED AS TARGET CONSIDER THIS MUST BE DONE NOT LATER THAN WEDNESDAY TO OBTAIN SIGNIFICANT RESULTS. REQUIRE ONE DAY PREPARATION FOR ANY TOWING OPERATION. REQUEST INSTRUCTIONS."

2125 - DSM report: "REHABILITATION OF TARGET VESSELS STARTED. SHIP TEAMS A, B, AND C BOARDED NIAGARA. SHIP MOVED TO NEW BERTH UNDER OWN POWER. SHIP TEAMS A AND B BOARDED GENEVA, BLADEN, AND FILLMORE. LATTER SHIPS WILL SHIFT BERTH TOMORROW. ANIMALS NOW RECOVERED ALL SHIPS EXCEPT GASCONADE WHICH IS TOO HOT RADIOLOGICALLY TO BOARD. CONDUCTED EXTENSIVE ATTEMPTS TO REDUCE RADIOACTIVITY BY HOSING DOWN VARIOUS TARGETS VESSELS WITH WATER AND WITH FOAMITE DETAILED REPORT WILL BE SUBMITTED SEPARATELY. IN GENERAL A LARGE IMPROVEMENT IS NOTED AFTER FIRST WASHING DOWN WITH ONLY SLIGHT IMPROVEMENT THEREAFTER. TOLERANCE ON NEW YORK INCREASED FROM TWENTY MINUTES TO FORTY MINUTES AFTER LIMITED WASHING DOWN. NO SIGNIFICANT CHANGES IN DRAFT ANY TARGET VESSEL DURING DAY. NAGATO APPEARS TO HAVE TAKEN SOMEWHAT GREATER LIST MAIN DECK AWASH FRAME 120 TO FRAME 150. SKATE MOVED TO BUOY VICINITY BERTH 287A. SEARAVEN SURFACED AT 1037. TUNA MOVED TO BUOY VICINITY BERTH 270A. INITIAL BOARDING TEAMS BOARDED SHIPS TODAY AS FOLLOWS LCT-874, LCT-1013, LCT-1078, LCT-1112, LCT-1113, CARTERET, CONYNGHAM, WAINWRIGHT , 2 PB2Y'S, MUGFORD AND GASCONADE ATTEMPTED BUT TOO HOT TO BOARD."

2240 - DSM report: "FOLLOWING CHANGES SHIPS CONDITIONS NOTED FROM 0900 to 1030 29 JULY PENNSYLVANIA MINUS 3 INCHES FORWARD PLUS THREE INCHES AFT.

- -

2240 - NAGATO PLUS 9 INCHES FORWARD PLUS SIX INCHES AFT. GASCONADE PLUS SIX INCHES AFT. FOLLOWING SHOW NO READABLE CHANGE. NEW YORK, CATRON, SALT LAKE CITY, BRULE, PENSACOLA, HAS ABOUT ONE DEGREE LIST TO STARBOARD. BOARDED QUARTER DECKS NEW YORK ABOUT 1100. TOLERANCE TWENTY MINUTES. AM HOSING DOWN TOPSIDE NEW YORK, LOCATED SUPERSTRUCTURE OF SARATOGA. TOP OF REMAINING MAST WHICH WAS ESTIMATED THIRTY FIVE FEET ABOVE FLIGHT IS ALMOST AT SURFACE AT LOW TIDE. PGM'S AND OTHER VESSELS SHOULD BE CAUTIONED TO AVOID THIS AREA. LOCATION BEARING BEACON EASY 019.5 BEACON DOG 045 BEACON ABLE 144.85. BUOY WILL BE PLANTED."

2248 - CJTF-1 to CTG 1.6: "ORCA WILL MOVE TO ORIGINAL BERTH 30 JULY X REQUEST YOU DIRECT TU 1.6.3 RESUME SCHEDULE BAKER 31 JULY X DEPARTURE TIMES 0900 AND 1430 FROM BIKINI EBEYE X"

2350 - CTG 1.8 to CTU 1.8.5: "DIRECT ALL SELF PROPELLED CRAFT LESS AJAX X LCT'S TUGS AND CTU 1.8.5 VESSELS GET UNDERWAY 30 JULY PROCEED BIKINI INDEPENDENTLY X OBTAIN BERTH ASSIGNMENTS FROM HECV X"

30 JULY 1946 - BAKER plus FIVE

General Situation

Continuing improvement of radiological condition of the waters of the lagoon. Ships reentering are to be sent to regular berths. Reboarding to continue as radiological condition of ships will permit. Most ships, however, are dangerously hot.

NAGATO sank during the night. Exact time not established, due to dark moonless night and absence of other manned ships in near vicinity.

RESTRICTED DATA
Y ACT - 1946
REQUIRED

0212 - CJTF-1 to A.M. SUMNER: "BE PREPARED FOR TORPEDO FIRE AGAINST NAGATO IMMEDIATELY UPON YOUR RETURN FROM KWAJALEIN. ADVISE HOW MANY TORPEDOES NOT OVER FIVE YOU WILL HAVE READY."

0545 - CTG 1.3 entered with GEORGE CLYMER, ROCKINGHAM, ROCKWALL, ROCKBRIDGE, BOTTINEAU, ST. CROIX, and BEXAR.

0628 - DSM to CJTF-1 and CTG 1.2: "NAGATO SANK DURING NIGHT. DID NOT APPEAR TO BE IN CRITICAL CONDITION 291700 LOVE."

0645 - CTG 1.8 entered with DIXIE, FULTON, BENEVOLENCE, ENOREE AND HESPERIA, all ships proceeding to regular berths.

0757 - FALL RIVER having been relieved as harbor entrance control vessel by O'BRIEN, got underway and proceeded to regular anchorage in berth 91.

0800 - BLADEN shifted berths to berth 354.

0800 to 1200 - Ships reentered the lagoon to anchor in regular berths on one hours notice.

0802 - CJTF-1 to A.M. SUMNER: "CANCEL MESSAGE REFERRING TO TORPEDOING OF NAGATO AS NAGATO SANK DURING THE NIGHT."

0850 - NIAGARA shifted back to her regular anchorage in berth 282.

0900- FILLMORE shifted berths to berth 382.

During the day continued experimental treatment of various target vessels by spraying with foamite and washing down with salt water at high pressure. Initial results somewhat favorable but all target vessels not already cleared and boarded still

dangerously radioactive, with little or no improvement noted. Other experimental procedures under consideration.

1036 - BURLESON to CJTF-1: "BETWEEN BERTHS 113 AND 115 READINGS OF SEA WATER THREE CC HAS APPROXIMATELY THIRTY TIMES THE ACTIVITY OF ONE MILIGRAM URANIUM. THREE FEET ABOVE WATER READS ONE TENTH ROGER PER TWENTY FOUR HOURS."

1036 - One hours notice cancelled. Target ships in general are extremely unsafe. Boats without monitors ordered to stay more than fifty yards away from them.

1333 - CTU 1.8.7 to ATCOM KWAJ: "ALL NATIVES RELOCATED ON WOTHO AND RONGELAP."

1600 - HENRICO to CJTF-1: "SIGHTED DEAD PIG FLOATING OFF STARBOARD BEAM OF APA-45 WITHIN TRIANGLE APA-85, APA-71 AND USS PENNSYLVANIA AT 1550L."

1601 - CJTF-1 to All Ships Present: "LIBERTY AND SHORE LEAVE WILL BE GRANTED COMMENCING JULY THIRTY FIRST. CLUB AND BEER GARDEN WILL BE OPEN FOR NORMAL OPERATION. CLUB AND RECREATION AREA EXCLUSIVE OF BEACHES RADIOLOGICALLY SAFE. LOITERING ON BEACHES FORBIDDEN UNTIL FURTHER NOTICE."

1631 - CJTF-1 to CTG 1.5 and 1.6.3: "REQUIRE FOR BAKER PLUS SIX DAY ARE AIR OPERATIONS AS FOLLOWS: ONE F-13 OR C-54 ON STATION OVER BIKINI AT 1000 LOVE UNTIL 1500 LOVE ONE PBM RESUME STATION AS REGULAR ASR AIRCRAFT BIKINI X BIKINI EBEYE SHUTTLE USE PLAN BAKER X LANDINGS AND TAKE OFFS IN REGULAR SEAPLANE OPERATING AREAS WHICH BECAME RADIOLOGICALLY SAFE BAKER PLUS FIVE X MONITORS ARE NO LONGER REQUIRED FOR AIRCRAFT X"

2013 - CJTF-1 to Joint Chiefs of Staff: "DEVELOPMENTS SINCE MY LAST REPORT. NAGATO WHICH HAD NINE DEGREE LIST AT DARK YESTERDAY AND WHICH WAS TOO

RESTRICTED DATA

2013 - RADIOACTIVE TO BOARD SANK DURING THE NIGHT. ATTEMPTS TO SURFACE SKIPJACK BY BLOWING ONLY FORWARD END WERE UNSUCCESSFUL AND EFFORTS TO SURFACE WILL BE CONTINUED WHEN POSSIBLE TO REACH END OF HOSE (NOW 8 FEET UNDER WATER) WHICH LEADS TO AFTER TANKS. COMPLETED RECOVERY OF ALL ANIMALS FROM TARGETS. SHIPS BOARDING TEAMS BOARDED CORTLAND TODAY BUT RADIOLOGICAL SITUATION PREVENTED FURTHER BOARDING. WATERS OF LAGOON CONTINUED TO DECREASE AS TO RADIOACTIVITY AND ENTIRE TASK FORCE ENTERED AND RESUMED REGULAR DUTIES EXCEPT FOR A FEW SHIPS WHICH HAD TO BE ASSIGNED ALTERNATE BERTHS. TARGET SHIPS THEMSELVES HOWEVER CONTINUE IN GENERAL TO BE RADIOLOGICALLY UNSAFE. THIS WILL BE FINAL DAILY REPORT UNLESS FURTHER ITEMS OF PARTICULAR INTEREST ARISE."

2024 - LCT-1114 sunk by demolition charge under direction of CTU 1.2.7.

2100 - CTG 1.5 to CJTF-1: "SUBJECT FLASH REPORT OF 30 JULY X AIRCRAFT ON STATION 0800 UNTIL RELIEVED BY PRIEST AT 1530 X NAGATO EVIDENTLY SUNK DURING NIGHT. PICTURE TAKEN OF OIL SLICK OFF NAMU X LST OBSERVED CAPSIZED IN AREA X ROUTINE PHOTOS TAKEN OF TARGET ARRAY NO RADIOACTIVITY ENCOUNTERED X MISSION TO BE CONTINUED 31 JULY 1946 X"

2209 - DSM report: "ALL SHIPS TEAMS REBOARDED CORTLAND. ANIMALS WERE REMOVED FROM GASCONADE, COMPLETING REMOVAL OF ANIMALS FROM ALL SHIPS. ATTEMPT MADE TO SURFACE SKIPJACK AND PILOTFISH BY BLOWING FORWARD TANKS WAS UNSUCCESSFUL. DRAFT OF NEW YORK, PENNSYLVANIA, PENSACOLA, BRISCOE, BRULE HAS NOT CHANGED APPRECIABLY IN THE LAST TWENTY FOUR HOURS PENSACOLA LIST INCREASED TO THREE AND ONE HALF DEGREES STARBOARD. PLANNING OPERATIONS TO INVESTIGATE AND CORRECT PENSACOLA LIST. DECONTAMINATION OPERATIONS USING SEA WATER AND FOAMITE CONDUCTED ON NEW YORK, PENSACOLA, MUGFORD, CONYNGHAM, HUGHES,

2209 - TUNA, BENTUDA AND SEARAVEN SHOWED IMPROVEMENTS IN SOME CASES. RESULTS IN OTHERS PARTICULARLY SUBMARINES INDICATE PROBLEM IS A MOST SERIOUS ONE. SMALL SCALE EXPERIMENTS HAVE BEEN STARTED ALSO. FURTHER RESULTS TOMORROW. DECONTAMINATION OPERATIONS WILL BE CONTINUED ON AN EXPANDING SCALE. HURRIED BOARDINGS OF NEW YORK AND PENSACOLA WERE MADE AND SOME INSTRUMENTS RETRIEVED. PIECES OF STEEL FOUND ON QUARTER DECK OF PENSACOLA APPEARS TO BE FROM LSM-60. ALL ARE VERY HIGHLY RADIOACTIVE."

31 JULY 1946 - BAKER plus SIX

0545 - Remaining units of Service Group commenced re-entry, all vessels proceeding to regularly assigned berths.

0800 - DSM conducted inspection of beached target craft on BIKINI Island. All found to be "Geiger sweet" except LCT-1187, LCT-1175, ONE LCVP and one LCM which were slightly over tolerance. Many of smaller craft moved for considerable distances and capsized during test, but otherwise no new damage noted.

0925 - RadSafe to CJTF-1: "RECOMMEND GENERAL WARNING THAT ALL PERSONNEL GOING ASHORE NOT TO TOUCH OR COME UP AGAINST OBJECTS WHICH HAVE DRIFTED ASHORE ESPECIALLY THOSE COATED WITH OIL."

1212 - CTU 1.2.7 to CJTF-1: "LCT-1114 SUNK AT 302124 LOVE IN 54 FEET OF WATER WITH BEACON GEORGE BEARING 74 DEGREES AND 4-1/2 FATHOM SHOAL BUOY BEARING 143 DEGREES."

1631 - CJTF-1 to CTG 1.5, CTU 1.6.3 and CTU 1.6.4: "ONLY AIR REQUIREMENTS FOR BAKER PLUS SEVEN DAY ARE THOSE OF BIKINI & EBEYE SHUTTLE WHICH CONTINUES PLAN BAKER X AND ASR X PBM WHICH REMAINS AT BIKINI X

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION REQUIRED

1631 - BOTH CONTINUE UNTIL FURTHER NOTICE X ALL NIGHT OWL AND PLAY BOY MISSIONS HAVE BEEN COMPLETED X"

1825 - CTG 1.5 to CJTF-1: "SUBJECT FLASH REPORT ON NIGHT OWL MISSION OF 31 JULY AIRCRAFT ON STATION FROM 1000 UNTIL RELEASED BY PRIEST AT 1440 X VERTICAL AND OBLIQUE PHOTOS TAKEN OF PENSACOLA DURING MORNING AND AFTERNOON AS REQUESTED X NO UNUSUAL FACTS NOTED X"

1907 - DSM to CJTF-1: "DSM AND RADSAFE INSPECTED CONYNGHAM, WAINWRIGHT AND MUGFORD ABOVE AND BELOW DECKS. RADIOLOGICAL CONDITIONS ARE SUCH THAT PORTIONS OF CREWS CAN BE PUT ABOARD FOR CARRYING OUT DSM DECONTAMINATION PROCEDURE ISSUED THIS DATE TO ALL TARGET VESSELS. WAINWRIGHT AND MUGFORD HAVE ABOUT THREE TO FOUR FEET ACCUMULATED LEAKAGE IN ENGINE ROOM BILGES. WILL BE CORRECTED TOMORROW. ALSO INTEND DEWATERING SALT LAKE CITY EARLY MORNING AND POSSIBLY PENSACOLA LATER IN DAY."

1946 - DSM report: "SITUATION SUMMARY. NEW YORK CONTINUES SETTLE LIGHTLY. CONDITION PENSACOLA APPEARS CHANGED ONLY SLIGHTLY IN LAST 24 HOURS. SALT LAKE CITY SETTLED ABOUT SIX INCHES AFT LAST 48 HOURS AND HAS ASSUMED LIST ABOUT THREE AND ONE HALF DEGREES STARBOARD. GASCONADE SHOWS SLIGHT PORT LIST. WAINWRIGHT AND MUGFORD BOARDED BRIEFLY AND FOUND TO HAVE 3 TO 4 FEET WATER IN ENGINE ROOMS. EXPERIMENTS IN DECONTAMINATION TARGET SHIPS BY SURFACE CLEANSING CONTINUE. RESULTS OBTAINED SHOW SOME PROMISE. CONYNGHAM, WAINWRIGHT, MUGFORD AND TUNA BEING BOARDED BY SPECIAL SHIPS DECONTAMINATION TEAMS TOMORROW FOR LIMITED PERIODS AGREED UPON BY RADSAFE AND DSM."

1950 - All ENIWETOK natives embarked by LST-989.

2013 - DSM to APA-235: "FOR COMMANDING OFFICER USS TUNA. TEAMS A & B REBOARD TUNA THURSDAY FOR PERIOD NOT TO EXCEED 4 HOURS. CARRY OUT DECONTAMINATION PROCEDURES OF DSM MEMO NUMBER 13 ISSUED 31 JULY.

- -

2013 - OPENING UP SHIP ALSO AUTHORIZED BUT MUST BE CLOSED BEFORE LEAVING. OPTAIN MONITOR FROM HAVEN. GIVE CAREFUL ATTENTION TO MONITORING DECKS AND ALL SPACES AND EQUIPMENT. REPORT RESULTS TO DSM."

General Situation as of 2400L, 31 July.

(1) Five APA's, NIAGARA, BLADEN, CORTLAND, FILLMORE, and GENEVA, fully re-manned and in normal operation condition.

(2) All remaining anchored target vessels dangerously radioactive in varying degrees and not reboarded except, in some instances, briefly, for removal of instruments and test animals. Additional damage to these ships resulted from Test BAKER not known.

(3) Vessels of landing craft type beached on BIKINI Island, generally in good condition, except for some LCM's and LCVP's knocked about and capsized. Majority are "Geiger sweet" except for a few which are slightly over tolerance.

(4) Submarines

TUNA surfaced and moored to buoy in shallow water.
DENTUDA surfaced and beached near ENYU Island.
SKATE moored to buoy in shallow water (was on surface during test).
SEARAVEN surfaced and left in place.
PARCHE left in place (was on surface during test).
PILOTFISH resting on bottom.
APOGON resting on bottom.
SKIPJACK resting on bottom.

(5) Waters of lagoon "Geiger sweet" except near bottom. This condition precludes diving for examination of

RESTRICTED DATA
AEC ACT - 1946
CLEARANCE NOT REQUIRED

721479 O—46——14

RESTRICTED DATA
AEC ACT - 1946
SPECIFIC RESTRICTIONS ON DISCLOSURE
RESTRICTED MILITARY SECURITY INFORMATION SAFEGUARDS

sunken ships and is delaying raising of three submarines still remaining on the bottom.

(6) Persistent radioactivity on target ships show little improvement and makes prospects for reboarding very discouraging. Various procedures have been tried and are under consideration. Following schedule for 1 August:

(a) SALT LAKE CITY to be boarded by a ship's party, within the time limit of tolerance, for opening up, pumping out and investigating conditions below decks.

(b) PENSACOLA scheduled for similar treatment, depending upon results with SALT LAKE CITY.

(c) MUGFORD, WAINWRIGHT and CONYNGHAM to be boarded by ship's parties, wearing protective clothing, for vigorous cleaning with scrubbers.

(d) MAYRANT, TRIPPE and CARTERET to be washed down with high pressure stream.

RESTRICTED

C O M M A N D E R J O I N T T A S K F O R C E O N E

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VII - SPECIAL REPORTS

SECTION (A) - LOGISTICS

1. INTRODUCTION

a. Joint Task Force ONE had its origin on 10 January 1946 on which date the President of the United States approved the Joint Chiefs of Staff's proposal to conduct Atomic Bomb Tests. At this time Admiral BLANDY was designated to command the Task Force.

b. Plans for the organization of the Task Force and for the operation actively started on this date. The Assistant Chief of Staff for Logistics was faced with the necessity of developing supply, evacuation, and administrative policies and procedures coincident with the procurement of personnel for and the organization of the Logistic Division, and the initiation of action to insure timely procurement and delivery of equipment and supplies necessary to support the operation.

c. The basic logistic requirements of the Task Force appeared to be very similar to those required for an amphibious operation. The scientific aspects of the tests injected peculiar requirements for which no background was available.

d. Due to the short time interval between the approval of this project and the tentative date for the first test (15 May), it was necessary to formulate and publish policies and directives concurrent with detailed planning for the logistic support of the operation.

2. PLANNING AND PREPARATION PHASE

a. General

(1) On 7 January 1946, Admiral BLANDY, in anticipation of presidential approval of the Joint Chiefs of

RESTRICTED DATA
VII-A(A)-1 - 1946
SPECIFIC [illegible] CLEARANCE NOT REQUIRED

SPECIFIC RESTRICTIONS
USE MILITARY OR OTHERWISE
RESTRICTED

Staff's proposal, invited several officers of the Army and Navy to attend a conference in the Navy Department, Washington, D.C., to discuss the organization of the Task Force. Colonel David N. BLAKELOCK, G.S.C., (then Brigadier General), later appointed Assistant Chief of Staff for Logistics, attended this conference. The following matters were discussed:

(a) Staff organization for CJTF-ONE.
(b) Task Force organization.
(c) General outline of the tests to be conducted.
(d) Site for the conduct of the tests (BIKINI Atoll)
(e) Site for advanced Army Air Bases (KWAJALEIN and ENIWETOK).

(2) Based on the information received at the 7 January conference, a tentative outline for the logistic support of the Task Force was drafted and approved by CJTF-ONE on 15 January 1946. This outline provided in general that:

(a) Normal supply policies and procedures in effect in the Pacific would be followed for the support of the Task Force.

(b) As far as practicable all facilities in the BIKINI area would be maintained afloat.

(c) Existing facilities at KWAJALEIN and ENIWETOK would be utilized to the utmost for support of aviation units to be based there.

(d) Construction at BIKINI would be limited to that necessary for instrumentation essential to the tests and recreational facilities.

(e) Construction at ENIWETOK and KWAJALEIN would be limited to that essential for the efficient operation of the air units and for the scientific personnel to be based on those atolls.

(f) Existing hospital facilities in the forward area would be utilized to the maximum extent and augmented by hospital ships as required.

(g) Special air lift facilities would be required, to augment the existing ATC and NATS service, for the lift of high priority equipment, material and personnel.

(3) The Joint Chiefs of Staff dispatch 112120Z January, to Chief of Naval Operations, Chief of Staff United States Army, Commanding General Army Air Forces, Commanding General Manhattan District, Commander in Chief United States Army Forces Pacific, and Commander in Chief Pacific Fleet, announced the organization of JTF-ONE and prescribed that it would operate under control of the Joint Chiefs of Staff with administrative and logistic support of CinCPAC and CinCAFPAC and with the full support of agencies of the War and Navy Departments. CJTF-ONE was authorized to deal directly with interested agencies. This directive was implemented by the following:

(a) CNO dispatch 161500Z January, directed all Navy Department agencies to furnish all practicable support and assistance as requested by JTF-ONE and to submit to him any desired projects for inclusion in the tests.

(b) War Department dispatch 261750Z, January, directed CinCAFPAC, COMGENAFMIDPAC and CG Western Defense Command to inform all interested subordinate agencies to furnish all practicable support and assistance requested by CJTF-ONE.

(c) Headquarters Army Service Forces Immediate Action letter, subject: "CROSSROADS Project - Atomic Bomb Tests - Pacific", dated 6 Feburary 1946, to all Chiefs of Technical Services, directed immediate action be taken on all

VII RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC CLEARANCE NOT REQUIRED

requests for Army supplies for the support of CROSSROADS, assigned priority handling A-1-a for all correspondence, supplies and materials connected with CROSSROADS Project and directed that all depots be notified that requisitions for supplies and materials required for CROSSROADS have prior approval of the War Department. This letter proved invaluable in expediting procurement from Army Service Force depots.

(4) CinCPAC on 9 February proposed to CinCAFPAC a division of logistic responsibility for support of CROSSROADS. CinCAFPAC dispatch 13 February, concurred in the proposed division of logistic responsibilities, directed COMGENAFMIDPAC and COMGENPACUSA to provide necessary logistic support to JTF-CNE and authorized direct communication with CinCPAC and with CJTF-CNE in connection therewith. The following is the division of responsibility agreed upon:

(a) Navy to provide complete logistic support to all Naval forces.

(b) Navy to provide Army forces with facilities for housing, storage, messing, air field operation, laundry, medical assistance and hospitalization; with Class I, Class III medical, ship service, housekeeping supplies and other normally used common items; and with local ground transportation.

(c) Army to provide organizational equipment and spare parts peculiar to the Army and resupply for same and to furnish such operating personnel as are normally attached to participating units, for proportionate share in upkeep and operation of Navy provided facilities.

(5) Following initial conference on 7 January, organization of the Logistics Division was pushed and requisitions for Army, Navy, and Marine personnel were submitted. Due to demobilization of both the Army and Navy, the procurement of qualified personnel was very slow and difficult. Key personnel reported

for duty as follows:

Name	Position	Date
Col. F.[illegible] CTT, AC	Chief Army Supply Section	14 Jan
Maj. R.L. DuBOSE, AC	Construction Representative, Kwajalein	17 Jan
Capt. W.[illegible] WALSH (MC), USN	Task Force Surgeon	20 Jan
Comdr K.C. LOVELL, (CEC), USN	Chief Construction Section	24 Jan
Lt(jg) J.A. SMOOT, (SC), USNR	Acting Chief Navy Supply Section and later Chief Administrative Section	20 Jan
Maj. C.F. GUILICI, USMC	Transport Quartermaster	4 Feb
Comdr. J.J. FEE, USN	Force Maintenance Officer	5 Feb
Capt. M.A. NORCROSS (SC), USN	Executive Officer	11 Feb
Col.A.D. HIGGINS, T.C.	Chief Transportation Section	3 Mar
Lt. A.G. MOORE, (SC), USNR	Assistant and later Chief Navy Supply Section	11 Apr

Many of the officers assigned had no experience in amphibious or joint operations and little or no experience in staff procedures. As a result, the division was badly handicapped as a great deal of time and effort had to be expended on indoctrination and training concurrent with the development of plans and procedures. The final organization of the Logistics Division, forward and rear echelons, and the duties assigned to the several sections are shown in appendices A, B, and C.

(6) Based on information gained from successive staff conferences and discussions with various Army and Navy agencies, a tentative logistic plan was drafted and distributed to all interested agencies on 16 February 1946 as Annex Baker (Tentative) to CJTF-ONE Operation Plan 1-46. An accompaning letter requested addresses

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
[illegible]

BEST AVAILABLE COPY

to submit comments and recommendations. Very helpful recommendations were received from CinCPac and ComServPac which were incorporated into a revision of the tentative plan which was completed 23 March, the date on which test ABLE was postponed from 15 May to 1 July. This postponement required further revision and the completed plan was distributed as Annex BAKER to CJTF-ONE Op-Plan 1-46 on 25 April 1946. The early publication of the tentative plan on 16 February proved very helpful to all concerned and served as a basic guide in the field throughout initial planning and preparation phases. The importance of disseminating logistic plans and information at the earliest possible date cannot be stressed too strongly.

(7) Following dissemination of JCS dispatch of 11 January, action was initiated to obtain appointment of Logistic Representative at various locations where considerable CROSSROADS operations would be conducted. These officers were to act as coordinators and expediters in their respective localities and became a focal point for inquiries concerning all CROSSROADS business. In all cases it was intended that the representatives would be part of the command, from which appointed, and would utilize the existing facilities for discharging their functions.

(a) Representatives were appointed by the following commands for additional duty with CJTF-ONE:
At Los Alamos, N.M., by ComGen Manhattan District.
At San Francisco, Calif., by ComWesSeaFron
At Terminal Island, Calif., by OinC Naval Supply Base, San Pedro, Calif.
At Pearl Harbor by ComServPac.
At Kwajalein by AtCom Kwajalein.

(b) Headquarters AAF appointed officers for duty at the following air fields, through which CROSSROADS aircraft operated. These officers were to supervise the operation and maintenance of organization

aircraft of TG 1.5 and coordinate movement of freight and personnel on TG 1.5 cargo planes (Green Hornets) and ATC planes assigned for CROSSROADS use. Offices separate from ATC activities were set up and separate organizations were established to perform assigned missions.

Hamilton Field, California.
Hickam Field, Oahu, T. H.

(c) Representatives were also established at Kwajalein and Bikini to supervise special construction for the task force. These representatives were provided by the J-4 Division. The representative at Bikini was assigned duty as CTU 1.8.6 (Construction Troops) in addition to his duties as Logistic Representative.

(8) Early decision was made by both War and Navy Departments that costs of CROSSROADS would be defrayed from current appropriations and that supplemental appropriations would not be requested unless found necessary. Action was initiated with Fiscal Directors of the War and Navy Departments in March to determine procedure for compiling the cost of the operation. By 26 April an estimated cost was compiled and procedures were established to report actual costs from 1 January 1946 to the conclusion of the operation.

(9) As plans for the operation progressed it became evident that a rear echelon, to remain at the Navy Department, Washington, D.C., would be necessary. It was anticipated that the rear echelon would maintain liaison with War and Navy Department agencies, would assign priorities for continental and over ocean air lift and would be coordinators and expediters for all CROSSROADS procurement activities in the United States. The development of personnel for this important task was undertaken and , prior to the departure of the Staff for Bikini, a small strong division was organized and functioning.

RESTRICTED DATA

(10) On 30 April the Staff left Washington for San Francisco by rail to board the Flagship, MT. McKINLEY (AGC-7). Key members of the Logistics Division remained in Washington with the Rear Echelon and departed by NATS 5 May for San Francisco. At 0001, 6 May the flag of JTF-CNE was established on board the MT. McKINLEY, and the Rear Echelon started functioning. The succeeding paragraphs outline the activities of the several sections of the Logistics Division during the Planning and Preparation Phase of Operation CROSSROADS.

b. Navy Supply

(1) Organization. The Navy Supply Section, as initially organized, was divided into three branches, Fuel, Provisions, and Other Supplies. It called for an allowance of three officers and three enlisted men. Difficulty was encountered in filling these billets due to the Navy's Demobilization program, and it was not until just before departure of the forward echelon from Washington on 30 April that they were filled. This lack of qualified personnel created a handicap in the planning phase of the operation.

(2) Planning for Supplies. The Navy Supply Section was created to exercise staff supervision over Navy Supply activities in the Force. Another important function was to arrange for the procurement and delivery to the Task Force of special supplies and equipment to be furnished by the Navy.

(3) Initial Supplies. Naval Supply activities were to be responsible for furnishing initial supplies, materials, and equipment for all ships of JTF-CNE prior to their departure for the target area. This procedure was modified in several instances. For example, the Navy Supply Section initiated procurement of special equipment and supplies which could not ordinarily be furnished through normal channels or in

cases where the time of delivery element was of the essence. Special items ordered included such things as binoculars, wrist watches, shorts, khaki and utility clothing, jeeps, typewriters, and other office equipment and supplies.

Another instance was that of the Director of Ships Material who had a Supply Officer attached to his staff and temporarily assigned to duty in the WHARTON. This officer reported to the ship on the West Coast and assisted in the ordering and placing aboard this vessel, many of the regular and special items required by the DSM for accomplishment of his mission.

(4) Resupply. The resupply afloat instructions were set up in Logistic Annex BAKER, which provided that CinCPac was to be responsible through ComServPac for furnishing the following logistic support:

Fresh and dry provisions from stores ships in the target area.
General stores from general stores issue ships in the target area.
Fuel to be provided by fleet oilers in the target area.
Fresh water for vessels which could not distill sufficient for their own use, by a water ship stationed at Bikini.

(5) Organization of TG 1.8. On 3 February 1946, CNO approved a proposal by CinCPac that a special service division be assigned for furnishing logistic support to the Force. Service Division ELEVEN (designated TG 1.8) was established at Pearl Harbor on 2 March 1946 under command of Captain G.H. LYTTLE, USN.

The following vessels were originally assigned to TG 1.8:

2 AO's (One in Water) 1 AKS (GSK)

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA
RESTRICTED

1	IX	(GSK)	1	IX	(Provisions)
1	AOG	(Water)	1	AW	(Water)
10	YF	(Barges)	1	YC	(Barge)

The following additional vessels were later assigned to TG 1.8:

1	AO		1	YW	
2	YOG		1	AKS	
2	YO				

Original plans called for TG 1.8 to assemble at Bikini with the Target Group by about 15 April. When the Target date for Test ABLE was postponed to 1 July, the assembly date at Bikini was established as the latter part of May.

(6) ComServPac Plans. Most of resupply plans for the Force were formulated by ComServPac. On 31 January 1946, ComServPac drew up tentative plans for the support of 20,000, which was the original estimated personnel afloat in the Margils area.

On 8 March 1946, these supply estimates were revised to meet the new estimated afloat population of forty thousand (40,000). Copy of ComServPac plans was furnished J-4 for information and review. The following is a summary of the estimated requirements, by approximate measurement tonnages, and list of vessels assigned to meet these requirements, contained in this plan.

TYPE	REQMTS	POLLUX	QUARTZ	LIMESTONE	HESPERIA	TOTALS
DRY	7,800	- - -	5,000	- - - -	2,000	7,000
GSK	4,400	3,300	- - -	5,000	- - -	8,300
C&SS	800	200	- - -	- - - -	600	800
SSS	2,400	600	- - -	- - - -	1,800	2,400

This plan proposed that Fresh Provisions and

incidental dry provisions would be provided by sending a reefer into the Margil area approximately every three weeks, and if necessary, that some reefers would be routed to that area on a "stopover" basis only.

(7) Visit by ComServPac. Admiral BADGER, Commander Service Force Pacific, Commodore BOUNDY, Supply Officer of Service Force Pacific, and Captain LYTTLE, Commander Service Division ELEVEN (TG1.8) arrived in Washington 12 March 1946 for the purpose of discussing Logistic Support for the Task Force. They attended a regular weekly staff meeting of CJTF-ONE, and Admiral BADGER briefed the Staff as to the services ComServPac was able to provide. During the three days the members of his party remained in Washington, the details of the logistic support required by the Task Force and the ability of ComServPac and ServDiv 11 to provide same, were discussed and the general principles of procedure were established. These informal conferences proved most helpful to all concerned.

Prior to his departure from Washington, Commodore BOUNDY was given J-41's estimated preliminary fuel requirements as follows:

	Period up to 1 May			Period 1 May to 1 June		
	Black (Bbl)	Diesel (Bbl)	Mogas (Gal)	Black (Bbl)	Diesel (Bbl)	Mogas (Gal)
NonTarget Vessels	200,000	20,000	---	145,000	15,000	----
Target Vessels	41,000	7,000	---	----	----	---
Small Boats	----	8,000	5,000	----	40,000	40,000
Total	241,000	35,000	5,000	145,000	55,000	40,000

(8) Population Build-up. As the plans for the assembly

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC PERMISSION
RESTRICTED

of the Task Force at Bikini were developed J-41 made an estimate of build up of the afloat population at Bikini. This information was furnished ComServPac and ComServDiv 11 by dispatch on 17 April for planning purposes.

Date	Population	Date	Population
21 April	5,100	21 June	39,200
1 May	6,800	11 August	32,500
11 May	8,000	21 August	25,000
21 May	30,000	1 Sept	12,000
1 June	36,400	11 Sept	3,500
11 June	37,100	1 Oct	None

(9) Special Problems.

Provision accounting in Target Vessel Group. In view of the unusual condition under which vessels of the Target Group of Operation CROSSROADS were to operate, CJTF-ONE recommended to the Bureau of Supplies and Accounts that the submission of ration returns be waived for those vessels while in the Target area. That Bureau approved the request on 19 February 1946 and issued the necessary accounting instructions for the handling of provisions in the target vessel group.

Pay. Pay for all vessels of the Task Force, except Target Vessels, was handled in the normal manner.

Disbursing arrangements for target vessels presented a difficult problem. Two plans were considered:

First: A transfer of accounts of target vessel personnel to the disbursing officers of the ships of the transport group which would evacuate Target Ship Personnel.

Second: Have each disbursing officer of the target vessel group set up his own disbursing office, complete with records, as a separate functional unit on the

transport used to evacuate its personnel. Under the second plan, public funds aboard the target vessels were to be transferred to the disbursing officers of the respective evacuation ships and would be drawn as needed. The Bureau of Supplies and Accounts agreed with the second method in view of the inexperience of the disbursing officers on the transports, and the fact that disbursing officers with greater experience in disbursing had been assigned to certain target vessels. The second plan was decided upon and TG 1.2 was directed to proceed accordingly. However, it was realized, prior to the departure of the staff from Washington, that this method would have to be amended in practice, due to the Navy's demobilization program, and it was determined that the method to be finally used would be decided after consultation with the staff supply officer of CTG 1.2 at Pearl Harbor. This phase will be covered later in the report.

Civilians. There was a consistent demand from civilians attached to the Task Force for authority to purchase items of clothing and small stores for their use in the forward area. This matter was presented to the Secretary of the Navy and authority was obtained for the sale of these items to civilians at Terminal Island, Treasure Island, Pearl Harbor, Kwajalein, and Eniwetok, and on board vessels of the Task Force. Presentation of CROSSROADS I.D. cards by the individual constituted his authority to purchase.

Expenses of Observers. On 11 February 1946, the Acting Secretary of the Navy in a letter to the Director, Bureau of the Budget, requested funds be made available for the expenses of subsistence of observers in connection with the atomic bomb tests. Subsequently, $35,000.00 was allotted by the Secretary of the Navy from the appropriation "17X0300 - Naval Emergency Fund" to cover such expenses. To control and process all disbursements, Lieut. A.G. MOORE, SC, USNR, of the J-41 Section of the Staff was nominated and later

RESTRICTED DATA

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS ON DISSEMINATION MAY BE INVOLVED
RESTRICTED USE MILITARY CLASSIFICATION SAME AS ABOVE

appointed Agent Cashier. However, on 10 April 1946, the War Department advised CJTF-ONE of its willingness to process and make payment of claims presented by the entire group of non-participating scientific observers and bill the Navy Department for half the expense incurred. All other observers were either members of the military services, in direct employment of the U.S. Government or were to be reimbursed from funds other than those available to the CROSSROADS Agent Cashier. Consequently, it was not necessary for the Agent Cashier to make any payments at all.

c. Army Supply Section.

The principal problem of the Army Supply Section was to arrange for and supervise the delivery of all ASF and AAF supply items to the Army Ground and Air Groups, Task Groups 1.4 and 1.5 respectively, and the several Technical Groups and the Staff of Joint Task Force ONE. Existing supply facilities and procedures were to be followed wherever possible.

(1) Initial Supply Army Air Group - Task Group 1.5

(a) Project Officer. Upon receipt of JCS Directive, CG AAF appointed a Project Officer in accordance with existing practice where special projects were involved. Then as directives were received in the lower AAF command levels implementing the JCS directive, CROSSROADS Project Officers were designated at each level.

(b) Coordination. CG AAF was responsible for the organization, equipment, initial supply and training of the AAF units, which were to form TG 1.5. The CG AAF directed the CG 58th Bombardment Wing V.H. to organize, equip and train TG 1.5. Accordingly, the CG 58th B W reorganized certain units of his Wing for their special missions and organized others from personnel and equipment furnished to him for the purpose by the CGAAF. TG 1.5 was not to come under operational control of CJTF-ONE until

after their departure from the states, and all matters in connection with their organization and equipment had to be channeled through the HQ AAF Project Officer. Coordination was attempted by weekly meetings between members of the Staff, JTF ONE and the Hq AAF Project Officer. Following these conferences, instructions to TG 1.5 flowed through the following channel of command: CAF (Later Strategic Air Command) - 4th Air Force - 58th Wing - TG 1.5. This failure to have direct dealings with TG 1.5 units delayed, hampered, and colored information received on both sides. Staff visits during this period would have insured better coordination.

(c) Control Depots. In accordance with SOP for Air Technical Service Command (later redesignated as Air Materiel Command), Oklahoma City Air Materiel Command Depot was designated in February as the Control Depot and Modification Center for TG 1.5 units participating in CROSSROADS Operation. About 1 March the supply load and modification program overburdened the Oklahoma City Air Materiel Command Depot to such an extent that it was necessary to designate the San Antonio Army Air Depot as Control Depot for certain classes of supplies, mainly B-17 spares.

(d) Supply channels. AAF Class IV E supplies were procured through the control depots mentioned above. All other classes of Army supplies for TG 1.5 were requisitioned through appropriate ASF depots serving AAF Base Roswell Field, N.M., where the TG 1.5 units were organized.

(e) Priorities. The expeditious handling of ASF supplies provided by the ASF Immediate Action Letter referred to and outlined in Paragraph 2 a (3) (c) above was of inestimable value in enabling TG 1.5 to obtain needed equipment prior

RESTRICTED DATA

RESTRICTED DATA
AEC/DOE/NRC
SPECIFIC RESTRICTIONS APPLY - SEE CLASSIFICATION GUIDE
RESTRICTED MILITARY INFORMATION CATEGORIES

to their embarkation date of 1 March. AAF supplies were granted Blue Streak handling involving telephone orders and premium transportation. Some delay was experienced in obtaining controlled items due to the fact that no approved TO and T/E's were available.

(f) Initial Supply Action. Standard TO's and T/E's did not apply to units of TG 1.5, as the group was being organized and equipped for special missions and some of their units were of an experimental nature. The organization of TG 1.5 started late in January 1946 and was not firm until early February. The ground echelon was scheduled to sail 1 March (later changed to 10 March) to meet the original schedule for Test ABLE on 15 May. The delay in reaching a decision on composition and missions of TG 1.5 units resulted in requisitions being submitted for excess equipment to meet all eventualities and consequently an estimated 25% excess equipment was shipped to the forward area. Special TO's and T/E's were later prepared by TG 1.5 but were too late to assist in outfitting the units. In spite of the need for haste, no shortages of major items of equipment developed during the operation

(2) Initial Supply Army Ground Group - TG 1.4

(a) Method. Each Army Technical Service and the Army Air Forces had items of equipment they desired exposed to the action of the atomic bomb. Representatives from each of these services were on Staff of CTG 1.4 and worked closely with Director of Ship Material who allocated space on target ships for the exposure of the test material. Personnel of TG 1.4 and the several Army Technical Services and AAF assisted Navy Shipyard Personnel in securing equipment aboard target ships. CTG 1.4 working with the Army Technical Services and AAF, was charged with the responsibility of arranging for the procurement and transportation

of test material to the proper target ship. J-4 Division, assisted in obtaining special air or surface lifts when normal means failed because of time limitations.

(b) Priorities. Expeditious handling of ASF supplies was provided by ASF Immediate Action Letter referred to and outlined in paragraph 2 a (3) (c) above. Without its aid, it is doubtful if TG 1.4 could have met their time schedule. However, lack of a similar implementation by AAF seriously handicapped CTG 1.4 in accomplishing the AAF part of their program.

(3) Supply of Technical Groups. Because of their peculiar missions, the needs for these groups were extremely varied. Items of equipment from practically all of the Army Technical Services and the AAF were requested, some on extremely short notice. These special requirements included instruments of all kinds, watches, regular and special cameras and various kinds of clothing. Requests were channeled to the Logistics Division and supplies were secured from the ASF, AAF, or Navy as appropriate. There were no precedents on which to predict requirements, and as needs developed, the Army Supply Section arranged for the procurement and delivery of the ASF and AAF supply items requested.

(4) Plan for Supply in the Forward Area.

(a) AAF Group - TG 1.5.

1. Preliminary Reconnaissance by TG 1.5. Early in February CTG 1.5 sent a party to the forward area to survey the situation and confer with ATOLL Commander Kwajalein concerning the available facilities for housing, storage, messing, airfield operation, laundry, medical assistance and hospitalization and the assistance CTG 1.5 would furnish for the operation and maintenance of these Navy provided facilities. Unfortunately logistics

RESTRICTED DATA

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC PROHIBITIONS
RESTRICTED

personnel were not included in the inspection party, and theatre agencies were not visited in Hawaii. As a result the staff of CTG 1.5 failed to secure a complete picture of available facilities in the forward area or the capabilities of the theatre supply agencies. This resulted in later misunderstandings and confusion

2. Supply Channels. Upon request of CJTF-ONE, CG AAF asked PACUSA to designate AAF supply channels in the forward area. Accordingly, PACUSA designated Hawaiian Air Depot as Control Depot for Class IV E supplies and assigned the ARU-6, Alfred J. LYON, to Kwajalein as sub-depot for TG 1.5. The ARU-6 was an Aviation Repair Ship and contained complete machine, sheet metal, and electrical shops, a small helicopter landing deck forward to facilitate ship to shore communications, and store rooms for a complete stock of aircraft spares. The ARU-6 was to load a complete stock of B-29 spares at Guam prior to arrival at Kwajalein and all requisitions for Class IV E supplies were to be submitted to her for processing. Guam Air Depot was designated to supply B-29 spares, not available in the ARU-6, and the Hawaiian Air Depot was to provide B-17 and C-54 spares. The supply arrangements thus made functioned unsatisfactorily and different arrangements had to be made as outlined later in this report. For other than Class IV E supplies, the AAF units were to submit requests to island commanders for supplies through established supply channels.

(b) Army Group - TG 1.4. As the Army Group was to be split into small detachments on various ships of the Task Force, no problem was presented as they were to be supplied by the ships to which attached. Required supplies, not available on the ships, were to be requested through J-42, who was responsible for procurement.

d. Transportation Section.

(1) General. The Transportation Section, Logistics Division, was primarily responsible for:

(a) Arranging for the shipment of personnel, supplies, and equipment between the west coast and the forward area.

(b) Arranging for adequate quarters afloat for construction personnel and crews of target ships at Bikini Lagoon.

(c) Providing continental and overseas air transportation for lifting priority personnel and vital equipment and supplies.

(d) Arranging special rail movements for groups of Staff personnel between Washington and the West Coast during the movements of the staff to and from Bikini.

(2) Ships and Shipping.

(a) Policy. In order to conserve facilities to the maximum, the policy was adopted to utilize ships allocated to the Force to the greatest possible extent in moving its personnel and equipment. In addition, arrangements were made for supplementary shipping to take care of traffic which would not be available for movement on task force vessels.

(b) Ships of the Transport Group (TG 1.3). The original estimate for ships of this group was contained in CJTF-ONE Serial Letter 48 of 28 January, Subject: "General Information on Atomic Bomb Tests". This estimate totaled five APA's, an AGC, two AKA's and two LST's to take care of the principal personnel and cargo movements

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SATISFACTORY

and to provide quarters afloat for construction forces, representatives of the press and target ships' crews during the tests. Later two additional AGC's were requested to handle observers. As plans developed the target ship crews increased to approximately 600 officers and 9500 enlisted men and a total of 9 APA's were requested to provide quarters for the target ship crews and the 1000 Sea Bees at Bikini.

In line with the policy mentioned in the preceding paragraph, many of the ships in the Transport Group, before taking up their eventual mission as quarters ships, were utilized for CROSSROADS tasks as indicated below:

A. The ST. CROIX, APA 231, departed from San Francisco 19 February and stopped at Pearl to pick up a small Sea Bee survey party, Sea Bee equipment, landing craft and petroleum products. It arrived at Bikini 5 March where it became the station ship and quarters ship for Sea Bees.

B. The two AKA's, OTTAWA (101) and ROLETTE (99), were loaded with construction material at Port Hueneme and sailed with 200 Sea Bees to Bikini on 5 March. On arrival 20 March they served as barracks and material stores ships for the Sea Bees.

C. The two LST's, 881 and 817, were loaded at Pearl with construction materials and Sea Bees. The 881 sailed on 3 March and reached Bikini 14 March while the 817 departed 5 March and arrived there 19 March. At Bikini, both ships served as barracks and storage ships for Sea Bees.

D. The largest lift of personnel and cargo that had to be made, was that of the 58th Bombardment Wing, later to become TG 1.5. Based on

original tonnage estimates submitted by the Wing, four APA's were set up. As the cargo for this group began to arrive in San Francisco, CWSF, who was keeping a close check on the shipping situation, reported that it was apparent that the APA's could not handle all the cargo offered. The 58th Wing was requested to review their estimates. As a result, it was found that many large vehicles and other bulky equipment which could not be loaded on an APA, were included in the shipment. CWSF was requested to provide an AKA to handle this shut out cargo. The TATE (AKA 70) was designated for this purpose. The four APA's, CLYMER (27), ROCKINGHAM (220), ROCKWALL (230) and ROCKBRIDGE (228) sailed from Oakland on 10 March, and the TATE left on 16 March. The total reported tonnage lifted by these five ships amounted to 2307 short and 8632 measure tons. Their cargos were discharged at Kwajalein and Eniwetok, where TG 1.5 had their bases of operation.

Shortly after their arrival in the forward area, the atom bomb tests were postponed and CJTF-ONE temporarily released the four APA's for "Magic Carpet" trips.

E. Class B moorings, Sea Bee material, oceanographic gear, armor samples, and other CROSSROADS cargo were loaded on the APA's BAYFIELD (33) and HENRICO (45) which sailed from Port Hueneme on 22 March. The following day the tests were postponed. At Pearl the oceanographic material (destined for Wake and Midway) was discharged, and the BAYFIELD took on plywood and personnel and sailed for Bikini immediately, arriving 12 April. Because its cargo was not immediately needed, the HENRICO remained at Pearl until 1 May to give its personnel opportunity for liberty. It arrived at Bikini about 8 May.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA

Both of these ships made special trips with returnees shortly after this arrival at Bikini getting back to Bikini prior to Test ABLE.

F. The remaining two APA's of the Transport Group, BEXAR (237) and BOTTINEAU (235), did not report under operational control of CJTF-ONE until arrival at Bikini. The BEXAR was loaded with 30,000 cases of beer and emergency ground tackle (from Mare Island and Pearl), armor samples, spare chain fittings, cement, and miscellaneous CROSSROADS cargo, and sailed from San Francisco for Bikini via Pearl Harbor 21 May, arriving 10 June. The BOTTINEAU, which was held in reserve at San Pedro for last minute lift, sailed 25 May with 37 tons of miscellaneous cargo and proceeded directly to Bikini, reaching there 7 June.

G. The APPALACHIAN (AGC-1) transported and housed the press personnel, and the two AGC's BLUE RIDGE (2) and PANAMINT (13) performed the same function for the official observers.

(c) Utilization of Other "Force" Ships. Various ships assigned to groups other than the Transport Group, were used for special lifts. Among these were the following:

A. USS BURLESON (APA 67)lifted the animals to be used in the tests and was used as an animal laboratory.

B. USS CUMBERLAND SOUND (AV 17) carried reels of submarine cable.

C. USS HAVEN (APH 112) loaded freight for the damage control safety section, radiological safety section and oceanographic cargo.

D. USS KENNETH WHITING (AV 14) transported underwater blasting gear, lumber, anchor chain sinkers, net buoys, and airplane assembly parts.

E. Some of the vessels of the Target Group lifted items of test material, particularly heavy lifts, such as tanks, armored cars, and airplanes, while others lifted construction items such as pontoon causeways, magazines, and miscellaneous Sea Bee items, as well as petroleum products and ammunition.

F. USS SHANGRI-LA (CV 38) was used to move the drone planes, and the USS SAIDOR (CVE 117) lifted from the west coast the helicopter and photo unit, together with their equipment, and the drone boat control planes.

G. The two LSD's GUNSTON HALL (5) and SAN MARCOS (25) of the service group, brought to the forward area a large number of small craft for the Boat Pool and Despatch Boat unit, pontoon causeways and a barge with 80T Crane.

(d) Shipping Obtained from other Sources. Supplementary shipping was obtained through arrangements with CWSF. Space for CROSSROADS cargo was provided on regular shipping destined for ports in the western Pacific. The ships were to be routed for discharge at Kwajalein and/or Bikini. CWSF agreed to give top priority to such cargo and advised that selected ships, commonly called "express ships", would leave San Francisco at approximately ten day intervals, and would load such JTF-ONE cargo and passengers as were available at the time of sailing.

In addition to this shipping, the Logistics Division also arranged to secure space on ships

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA [illegible]

coming under the control of ComServPac, with which agency arrangements were also made to take advantage of eastbound shipping for the movement of returnees and the return of material which had been exposed to the tests.

(3) Shuttle Craft.

In utilizing the supplementary shipping, two factors controlled the discharge point in the Bikini-Kwajalein area. Primarily, for security and safety reasons, it had been decided not to permit merchant shipping in Bikini Lagoon. This made it necessary to discharge ships with merchant crews at Kwajalein. The second factor was the desire on the part of CWSF to hold down to the minimum the number of ports of call. Since most ships had cargo for Kwajalein and Bikini and as Bikini had no facilities for handling cargo to be transhipped, it was decided to discharge Bikini cargo at Kwajalein.

In consequence of the above, it became necessary to plan for a water shuttle service between Kwajalein and Bikini. Attempts were made to secure LSM's, which it was felt would prove to be the most efficient craft, but these vessels were not available and LCI's were finally designated. They were found to be most unsatisfactory, as will be discussed later in this report.

(4) Rail Movements.

(a) Freight

The major portion of the rail movement of freight was handled through regular Army and Navy channels. These shipments, consisting of

materials for ship preparation, for technical requirements or for test purposes, were forwarded directly from depots, bases and contractors to ports of embarkation or other places where needed. Except in cases where special priorities or safety precautions had to be considered, J-43 did not enter the picture. In some few instances, as a matter of protection, or in order to make sure an important shipment was followed through to destination, an officer courier was provided by J-43 to accompany the shipment.

(b) Personnel

Prior to the postponement of the Atomic Bomb Tests, two special trains were tentatively booked to transport personnel of the Staff and Technical groups from Washington to the West Coast. Changes brought about by the postponement resulted in the following rail transportation being used for the purpose:

A. Passengers for the USS KENNETH WHITING left Washington for San Pedro on 29 April in three standard Pullman cars attached to a regularly scheduled train.

B. Another group, for the USS WHARTON, USS AVERY ISLAND and USS BURLESON, sailing from Oakland, also left on 29 April using three standard and two tourist Pullmans attached to a regular train. A special baggage cars for handling biologicals were also used by this group.

C. Personnel destined for the Force Flagship USS MOUNT McKINLEY, departed for San Francisco on 30 April in a special train made up with five Pullmans, five Tourist sleepers, two baggage cars and two diners.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

RESTRICTED DATA
AT MIS - PART - SEC
SPECIFIC RESTRICTIONS CONTAINED IN THE REQUIRED
RESTRICTED MILITARY CLASSIFICATION CATEGORIES

(5) Planned Air Movements

(a) Overseas. The Logistics Division determined air lift requirements by consultation with other staff divisions and Manhattan District personnel. NATS and the CROSSROADS Project Officer for AAF were then approached by the Air Operations Section of the J-3 Division to implement these requirements. As a result of these contacts 20 C-54's were set up for flights between the West Coast and Kwajalein to handle CROSSROADS traffic. These planes were to be operated and maintained by ATC. This service started 1 March and was to provide an average of 1½ trips or 4.5 short tons per day. Mail and overflow of personnel were to be handled by NATS.

(b) Domestic. Lifts in the United States were to be handled on regularly scheduled ATC and NATS flights. It was arranged that supplementary cargo would be lifted by Troop Carrier Command, which would carry traffic beyond the capacity of scheduled flights or from points not served by NATS or ATC.

(c) Green Hornets. The Air Transport Unit (TU 1.5.4, Green Hornets) consisting of 10 C-54's was scheduled to move to the target area TG 1.5 equipment and personnel which, because of the training program, could not be released in time for water lift. Excess cargo and personnel, which could not be handled on these planes, were to be lifted by the special ATC aircraft provided for CROSSROADS. During the planning period the Green Hornets operated one round trip a week between Los Alamos and Washington.

(d) Establishment of air priorities was a responsibility of the J-4 Division. JTF-ONE Serial Letter 684, of 7 March 1946, subject: "CROSSROADS Overseas Air Movements and Priorities," which

outlines regulations governing these priorities, is attached as Appendix D.

(e) CJTF-1 Serial 48 contemplated the use of a seaplane squadron to furnish air shuttle service between Kwajalein and Bikini and for other duties. This service was inaugurated on an intermittent basis on 10 March. The squadron was based at Ebeye, five miles from Kwajalein, which was terminal of the land planes. To transport freight and passengers between Ebeye and Kwajalein a small boat service was established by AtCom Kwajalein. A seaplane tender was requested to provide turn about service for the seaplanes at Bikini.

(6) Special Directives

In connection with the operation of the Transportation Section, procedures had to be worked out to cover certain continuing operations. Among the important special directives issued were the following:

(a) Red Tag Procedure. The J-4 Division in conjunction with representative from DSM worked out a detailed procedure for handling shipments of test materials to the United States for study. This procedure was published in JTF-ONE Serial 1662, dated 25 March 1946, subject: "Use of Special Shipping Tag and Shipping Procedures on Tested Material." A copy of this directive, as later revised, is attached as Appendix E.

(b) Freight and Passenger Procedures at Bikini. In the course of conferences in Washington with Captain LYTTLE, ComServDiv ELEVEN (CTG 1.8), the Transportation Section developed procedures for handling freight and passenger traffic at Bikini. These procedures involved inbound and outbound movement of passengers and cargo by air and water and the use of an intransit cargo ship. A directive covering these procedures was then prepared.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
[illegible] PERMANENT NOT REQUIRED

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC RESTRICTIONS CONTAINED IN SECURITY REQUIREMENTS
RESTRICTED MILITARY SECURITY INFORMATION

e. Force Maintenance and Boat Pool Section

(1) Organization of the Section

(a) Task. The Force Maintenance Section of the Logistics Division was faced with the problem of planning for the organization of, and exercising staff supervision over, the maintenance facilities of the Repair and Service Unit (TU 1.8.1). These were the facilities set up to provide necessary repair and maintenance for both operating and target ships of the Task Force in the Bikini area. The Force Maintenance Section was also assigned staff supervision over the organization and operation of the Despatch Boat and Boat Pool Unit (TU 1.8.3) discussed in paragraph (5) of this report.

(b) Personnel. Officer personnel of the section included a hull officer, a machinery assistant and a boat pool assistant.

(2) Planning Maintenance Facilities

(a) Preliminary Arrangements. Prior to the date on which the Force Maintenance Officer reported, a letter containing general information regarding the plans for the conduct of the Atomic Bomb Tests was disseminated to all interested activities. This letter, CJTF-ONE Serial 48 of 28 January 1946, contemplated the assignment, among other facilities, of the following vessels for ship maintenace in the Force:

1 AR, 3 ATF's, 2 ASR's, 1 ARD, and 2 LSD's.

(b) Salvage Unit. The same letter tentatively planned that a Salvage Unit consisting of the below listed vessels would form a part of the Service Group:

1 ARS(T), 4 ARS's, 4 ATF's, 4 LCT's (with A-frames), and 2 ARS(D)'s.

There was considerable discussion in the Staff with regard to whether this Salvage Unit should be part of the Service Group or should operate under the Commander Target Group, as a part of the operational portion of the Task Force, as opposed to the Logistics component. Some discussion also took place as to whether the Salvage Unit should be organized under the staff supervision of the Operations Division or the Logistics Division. There was a distinct division of opinion on the matter. The Logistics Division maintained that the functions of the Salvage Unit and the Service Group were so closely interrelated that any division of staff supervision between the facilities of the two might result in inefficiency and confusion. However, the decision was eventually made to place the Salvage Unit under the Commander Target Group, with supervision vested in the Operations Division of the Staff.

(c) Considerations. In planning for the ship repair and maintenance facilities, consideration was given to the following distinct divisions of the task:

(1) Repair and maintenance of operational ships.
(2) Maintenance of target ships.
(3) Preparation of target ships for Test ABLE.
(4) Repair of target ships between Tests ABLE and BAKER.
(5) Preparation of target ships for Test BAKER.
(6) Necessary repairs for disposition of target subsequent to Test BAKER.

In order to plan the procurement of facilities and equipment to accomplish the work required by each of the above divisions, the following steps were taken:

(1) Complete analysis was made of the number and type of ships assigned to the Task Force.

RESTRICTED DATA
OCT - 1948
CLASSIFICATION NOT REQUIRED

RESTRICTED DATA

(2) Conferences were held with Material Bureaus of the Navy and with the technical sections of the Staff to obtain information as to the nature and extent of the preparations required on target vessels in the target area for both Tests ABLE and BAKER.

(3) An estimate was made of the probable nature and extent of the damage to be expected from the bomb explosions, and of the nature of the material and equipment required to accomplish the necessary repairs required to prepare targets for the second test, and for return of target ships which survived to desired destinations, subsequent to Test BAKER.

(d) Needs. On the basis of preliminary analysis of the above factors, it appeared that the facilities contemplated by Serial 48 would be woefully inadequate to handle the target ships, without considering the requirements of the non-target ships of the force. This was particularly true in view of the personnel deficiencies which had been created in the tenders and repair ships as a result of the demobilization program. Further, practically all of the vessels being assigned to the Task Force were in poor material condition from continuous war steaming, with no opportunity for extensive overhauls since release from former assignments.

(e) Assignment of Facilities. While this analysis was being conducted, CinCPac proposed to establish a special service division for furnishing logistic support to the Task Force. This proposed service division provided facilities for maintenance and repair much increased over those set forth in Serial 48, and they were fully adequate. Commander Joint Task Force ONE recommended approval of

CinCPac's proposal with minor modifications. On 8 February 1946, CNO directed assignment of the units to CJTF-1 as proposed. The Service Group, as organized by ComServPac, was designated Service Division ELEVEN (Task Group 1.8 under CJTF-ONE) and contained the following maintenance and repair vessels:

1 AR, 1 AD, 1 AG, 2 ARL's, 1 AS, 1 ARG, 3 ARB's,

1 ARD, 2 LSD's, 2 ATR's, 2 ATA's. and 3 ATF's.

This Service Division was established at Pearl Harbor on 2 March 1946 under the command of Captain G. H. LYTTLE, USN.

(3) Material Planning

(a) Routine Maintenance. For the purpose of planning routine maintenance of the ships of the Task Force, the following steps were taken:

(1) ComServPac and ComServDivEleven were kept constantly informed of the composition of the Task Force.

(2) Booklets of plans, ship characteristics cards, and booklets of instruction for all assigned ships were procured.

(3) ComServDivEleven was requested to procure special repair materials peculiar to vessels of the types assigned to the Task Force, and to load these materials on the repair vessels. Also they were asked to have all tenders and repair ships submit necessary requisitions to regular supply agencies in order to obtain complete stocks of general repair materials prior to reporting for duty to the Task Force.

721478 O—49—14

RESTRICTED DATA

ATOMIC ENERGY ACT - 1946

REFERENCE NOT REQUIRED

RESTRICTED DATA
SPECIFIC REQUIRED

(b) Special Materials. Many and frequent conferences were held with all activities concerned to determine the nature of the demands which would be placed on the Service Group facilities in the target area, for preparation of target vessels for the tests. On the basis of information obtained, ComServDivEleven was kept informed as to the nature of these requirements in order that he might prepare for the work. Special materials were procured and shipped to appropriate destinations, to be available as needed. In many cases, special equipment to augment that already on hand in the tenders and repair ships was necessary, to make possible the special operations required. The procurement and shipment of this equipment was coordinated with ComServDivEleven and the Transportation Section of the Staff. Complete records of all special requirements submitted by the various Material Bureaus and technical sections were maintained, as well as data regarding procurement and shipment of all special materials and equipment.

(c) Damage Repairs. For the purpose of insuring necessary materials and equipment to accomplish anticipated repairs to bomb damage after tests, ComServDivEleven was requested to provide large stocks of items considered necessary. These included among other items the following:

Structural steel plates, shapes and pipe.
Shoring material and lumber.
Electric cable and fittings.
Special emergency power generators.
Emergency blowers and lights.
Safety testing equipment.
Fuel oil removal equipment.
Special clothing and boots.

(4) Liaison with Pearl Harbor Activities.

(a) ComServDivEleven Visit. As planning progressed, it became increasingly evident that there was need for personal liaison between the Staff in Washington and ComServDivEleven in Pearl Harbor. With this in mind, it was requested that Captain LYTTLE proceed to Washington for conference with the Staff. In responce to the request, ComServ-DivEleven, accompanied by ComServPac and the Fleet Supply Officer, arrived about 12 March 1946 for a three-day stay. Many questions were discussed during this period and much confusion and duplication in planning eliminated. As a result of this conference, however, several new questions of detail arose which indicated the need for further liaison at an early date.

(b) Force Maintenance Officer Trip. On 29 March 1946, Comdr. J. J. FEE, USN, (J-44) flew to Pearl Harbor to confer with ComServPac and ComServDivEleven. In the course of the trip, the following agencies were also contacted:

NavShpYd Terminal Island and Pearl Harbor
ComNavTaskGrps JTF-1
CTU 1.2.7
BuShips Crossroads Rep at Pearl Harbor and Terminal Island
JTF-1 Log Reps at San Francisco, Terminal Island, Pearl Harbor, and Hickam Field

Comdr. FEE was the first member of the Logistics Division who had visited Pearl Harbor, and, therefore, many questions not strictly connected with maintenance and repair work were gone over. In fact, any matter involving Operation CROSS-ROADS on which any of the activities contacted desired information was treated. Matters generally covered included personnel, anchorage assignments, fueling, provisions and supplies, organization of the Service Group, ComServDiv-Eleven Bulletin of Information, Boat Pool

RESTRICTED DATA
AUG - 1946
APPROVED FOR RELEASE

organization and equipment, operation of repair facilities at Bikini, prospective projects and facilities, material and spare parts, distribution of anchorage charts, preparation and distribution of operation plan, and administrative control of vessels of the Task Force.

(c) Value of Liaison. As a result of these discussions with the above mentioned agencies, many details were settled and much misunderstanding ironed out. It was forcibly demonstrated during these visits that lack of personal contact to supplement information transmitted by correspondence had made the tasks of both the Washington and Pearl Harbor activities very much more difficult than was necessary. In future operations of this nature, it is believed that frequent personal contacts between members of the staffs of portions of the Task Force in different places should be arranged to start at an early stage of the operation, and be effected as frequently as practicable. This will eliminate duplication of effort and insure that all endeavors are directed toward the same objective.

(5) Boat Pool

(a) Initial Plan. As originally conceived in the organization of the Task Force, a Despatch-Boat and Boat Pool Unit, TU1.8.3, was to be organized under the Commander Service Group. CJTF-ONE Serial 48 of 28 January 1946 contemplated two LSD's to be the nucleus of this unit, with boats to be carried out for Boat Pool use on each target APA and AKA. On recommendation by CJTF-ONE, CNO dispatch Ø11912 (Feb) directed that one of the LSD's carry 12 LCM and 12 LCVP with crews. At a later date CNO, by his Ø81339 (Feb) in response to CinCPac's Ø6Ø111 (Feb), directed that six PGM's and two LCI's be furnished

the Service Group. The former were for dispatch boat service and the latter for the Bikini - Kwajalein shuttle service, both under the Boat Pool Unit.

(b) Functions. The function of the Bikini Boat Pool was established as follows: "To provide at Bikini ship to ship, ship to shore, and other special boat operations to augment the boat and landing craft facilities specifically available to activities of Joint Task Force ONE and to permit them to accomplish their required functions in support of the operation."

(c) Planning Requirements. At the outset of planning it was necessary to pursue a course as follows:

(1) Determine as soon as possible the boat requirements of the Task Force as a whole. This included the needs of such groups as Instrumentation, Photographic, Electronics, Press, Observers, initial boarding parties, evacuations, Radiological, liberty parties, etc.

(2) Collect information as to the total number of boats by types, available to the Task Force on the ships assigned and in the Boat Pool as originally constituted.

(3) Compare the estimated requirements with the facilities available, to determine prospective shortages with due regard to possibilities of loss, damage, and breakdown of boats.

(4) Examine sources of additional boats, and set up means of lifting boats obtained to the operating area.

(5) Make provision for maintaining all boats in the Bikini area and for evacuation during tests.

RESTRICTED DATA
ATOMIC ... ACT - 1946
SPECIFIC ... REQUIRED
UNE ...

RESTRICTED DATA
USE MILITARY

(6) Secure necessary equipment and spare parts for repair of boats and provide for other logistics.

(7) Arrange for personnel and facilities to operate and maintain the craft assigned to the Boat Pool.

(d) Procurement of Facilities. In executing the plans evolved for the Boat Pool, the following steps were taken with respect to the program outlined in subparagraph (c) above.

(1) A Staff Memorandum was circulated to all activities requesting best estimates of prospective boat requirements at Bikini. Numerous conferences were held with the principal groups to discuss special small craft needs. All information received was tabulated for later reference. Investigation of weather conditions at Bikini was conducted to determine types of boats most suitable for work there.

(2) Information was obtained from BuShips as to the on-board allowances and actual boat carrying capacity of all ships of the Task Force.

(3) The total of estimated requirements by types was compared with the boats available in the Task Force.

(4) CNO and BuShips were consulted and arrangements made for temporary modification of boat allowances on many ships, while additional boats required were loaded on others.

(5) Provision for housing personnel of the Boat Pool, and providing moorings for boats was instituted through ComServDivEleven.

(6) When information as to total boats available for the operation had been obtained, ComServPac was requested to provide spare parts, special equipment, fuel, and maintenance materials for supporting the Boat Pool.

(7) ComServDivEleven was kept informed of developments in the Boat Pool in order that sufficient information on which to base requests for personnel would be at hand.

(e) Contact with ComServDivEleven. Constant contact was maintained by mail with the Boat Pool Officer on the Staff of Commander Service Division Eleven. Information as to formulation of plans was supplied at all times, in order to join the efforts of activities in Washington and in Pearl Harbor in working to a common end. During the visit of J-44 to Pearl Harbor in April a large portion of the time was spent in discussing details of plans for the Boat Pool. As a result of the conferences, a much clearer understanding of the overall picture was realized by all participants.

(6) Operation Plan

The responsibilities and functions of the Ship Maintenance facilities of the Service Group (TG 1.8) during the operation, were prepared for incorporation in CJTF-ONE Operation Plan No. 1-46, as Appendix II to Annex B. The organization and functions of the Despatch Boat and Boat Pool Unit, as finally developed, were incorporated as Annex U to the Operation Plan.

f. Medical Section

(1) Personnel

(a) Target Ships

Combatant Type. Large ships such as BB's, CV's and CL's were widely separated and operated independently

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED

prior to assembly at Bikini. It was therefore necessary to provide a complement for each vessel. The NAGATO and SAKAWA, being under CinCPac control, were supplied with their complement by that agency. Destroyers were already at Pearl Harbor and were to operate as divisions until arrival at the forward area. One medical officer was supplied for each division with a corpsman on each DD. Submarines had a corpsman on each sub.

Non-Combatant Type. This type, consisting of APA's were provided with a medical officer for each group of six and a corpsman on each ship.

(b) Other Task Force Ships

All other ships of the task force were set up with their usual medical complement.

(c) Observer and Press Ships.

BuPers and BuMed provided carefully screened medical personnel for these ships, which were to operate independently during the major portion of the operation.

(d) Ashore.

Regular medical and dental care was provided for Army personnel based at Kwajalein and Eniwetok, using attached Army medical personnel. Shore based Navy personnel were handled by existing naval facilities.

(2) Hospitals.

(a) Afloat.

It was estimated with a Task Force of about 40,000 personnel, the normal rate of hospitalization would require facilities for about 1600 patients. Two hospital ships, BOUNTIFUL (AH-9)

and BENEVOLENCE (AH-13), with a combined bed capacity of 1400 were assigned by CNO to meet this need. In addition, to cover emergencies, the hospital ship HAVEN (AH-112), carrying the radiological safety group, was available for use as a supplementary ship. Staff for the HAVEN was to be provided from the Target Group and/or the Radiological Safety Group. The non-target ships provided an additional 600 bed capacity in their sick bays.

(b) Ashore

Shore based personnel, both Army and Navy, were to be handled through the use of Naval hospital facilities on Kwajalein, Eniwetok, Roi, and Ebeye, which had a total bed capacity of 463.

(3) Evacuation of Casualties.

Personnel requiring either special care beyond the capacity of the facilities in the area, or care for periods in excess of 45 days, were to be evacuated. It was planned to evacuate patients by air, when feasible, to Honolulu, where they would be transferred to their respective service hospitals for treatment.

(4) Special Problems.

The special safety problems brought about by the use of the atomic bomb were primarily the concern of the Radiological Safety Group, and the Damage Control Safety Section. However, through frequent conferences with these groups, the Force Medical officer maintained constant liaison as to measures designed to safeguard the health of the force.

(5) Disposition of Remains.

Since the end of hostilities it has been the policy of BuMed not to bury remains at sea except in case

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MILITARY ... ICATION SAFEGUARDS

of emergency. In furtherance of this policy it was, therefore, planned to provide for burials at Kwajalein or to hold remains on hospital ships until surface transportation was available to return them to the United States.

(6) Sanitation

To insure the highest possible state of health, the Task Force Medical Officer planned for frequent sanitary inspections to be made by himself, assisted by other medical officers of the force. These inspections were to cover the normal points involved in sanitation and were to be both scheduled and unscheduled, in order to maintain a constant check on conditions. In addition, periodic Sanitary Reports were to be called for, to reveal defects and steps taken to correct them.

(7) Medical Supply

(a) Initial Supply. The Materiel Division, BuMed, directed that all target ships stock medical supplies sufficient to take care of their respective complements for six months. Prior to Test ABLE, it was planned to remove from these ships sufficient supplies for two months. These supplies would then be replaced aboard the ships from which they came, after the ships were declared safe for occupancy. Ships other than target, were to carry normal allowances.

(b) Resupply. The YF-754 was provided as the source of resupply and was stationed at Kwajalein under the control of the Service Group (TG 1.8). Procedures for drawing supplies from this vessel were prescribed by CTG 1.8

(c) Special Supplies. Through frequent conferences with the Medical Research Section and the Medical

Section of Damage Control, the Force Medical Officer assisted in the planning and procurement of materiel and personnel necessary to carry out their functions.

g. Construction Section

(1) General

(a) In the absence of background or previous experience in this particular type of operation the Construction Section had to depend largely on the technical groups of the staff and other agencies for a clear statement of technical requirements. During January and February a series of conferences in Washington developed these technical details. They were then correlated and combined with other requirements, for which the construction engineer had a background, (such as amphibious landing aids, recreational facilities and other auxiliary items) to work out the full project.

(b) In the formulation of details for the technical requirements, the cognizant technical group first obtained approval from the Technical Director for the desired instrumentation and construction. After approval of the project the J-46 Section met with the cognizant technical personnel to work out the details of the project. The several projects were then combined and submitted to the Technical Director for approval.

(c) Based on 15 May as the date for the first test, completion dates for construction in the forward area were set as shown below:

1. Requirements for Army Air Force Units (TG 1.5) on Kwajalein and Eniwetok by 15 April, the date the unit was to become operational.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION ... CLEARANCE NOT REQUIRED

2. Facilities at Bikini by 1 May.
3. Facilities required by scientists on all islands by 1 May.

The original time schedule was barely sufficient to allow completion of essential projects. The delay in target date to 1 July eased the time schedule, thus materially aiding the construction forces.

(2) Construction on Bikini.

(a) Three criteria were set up for determining the feasibility of proposed construction projects on Bikini.

1. Total construction and types of construction must be held to a minimum because of shortage of time and lack of competent personnel.

2. The number of islands involved must also be kept at a minimum, to reduce requirements for hazardous amphibious landings.

3. Wherever possible, surplus stocks of wartime equipment and structures must be used to save procurement time and permit the construction to be completed with greatest economy.

(b) As a result of the application of the above criteria, it was possible to limit major construction to four islands. Only two types of structures were used - a 75' steel airfield control tower and a 20' x 20' steel arch magazine. Both of these items were standard Navy advance base structures, available from surplus wartime stocks. This simplified the preparation of detailed design and erection plans, and the formulation of material and equipment lists. The facilities of BuDocks, which had been offered to the Task Force, were utilized to develop these details and proved to be most helpful.

(c) Conferences and discussions having developed requirements, the construction was mapped, and the principal items were authorized in CJTF-ONE letters, Serial 145 of 8 February 1946 and Serial 506 of 28 February 1946, which had full staff approval and which provided a directive to the field force. Due to the nebulous state of some technical details and the lack of specific knowledge of the terrain at Bikini, minor modifications were authorized to be made in the field as the need therefore was demonstrated.

(d) The approved plans provided for the construction of the following structures at Bikini on eight islands of the atoll:

1. Twelve 75' steel Instrument Towers.
2. Fourteen 20' x 20' Arch Magazines.
3. Four 15' x 100' Photo Reference Crosses.
4. Five 25' Wooden Observation Towers.
5. Five 8' x 12' Wooden Seismic Huts.
6. One Radio Beacon.
7. One Radar Beacon.
8. One 75' x 550' Bombing Target.
9. Recreation Area capable of handling 1000 officers and civilians and 6000 enlisted personnel daily.

(e) On 13 February 1946, after initial plans had been made, Commander K.C. LOVELL, (CEC), USN, flew to Pearl Harbor to arrange with ComServPac for implementing the plans. Upon completion of conferences there he returned to Washington, stopping at Port Hueneme enroute. The following agreements were made:

1. 500 Sea Bees of the 53rd CB were to be transferred from Guam to reach Bikini about 15 March.

VII (A) 43
RESTRICTED DATA
SPECIFIC
OCT - 1946
CLEARANCE NOT REQUIRED

2. 175 stevedore and 75 pontoon personnel were to be transferred from Pearl Harbor to the 53rd CB, arriving also, about 15 March.

3. 200 Construction personnel were to be transferred into the battalion from Port Hueneme and were to be shipped to arrive about 20 March.

4. ComServPac was to ship from Pearl Harbor as much as possible of the material required. This shipment was to be made on two LST's, to reach Bikini about 15 March.

5. The balance of required materiel was to be shipped from Port Hueneme to reach Bikini about 20 March aboard two AKA's.

6. Additional pontoons needed were to be shipped (side carried) on LST's of the Target Vessel group, to arrive as soon as practicable after 15 March.

7. Pearl Harbor Agencies would advise Port Hueneme of any material shortages that could not be filled at Pearl, or carried on the LST's from there, so that the shortages might be lifted by the AKA's from Huenome.

8. Port Hueneme was furnished a list of items to be furnished from there and advised that Pearl Harbor agencies would notify them of additional items to be added.

9. The two LST and 2 AKA used for lifting material, were to be used as quarter ships and floating bases for the 53 NCB.

(f) On return to Washington, Commander LOVELL completed final layout plans and designs and on 28 February departed for Bikini to take charge of construction activities there. Enroute a stop was made

to confer with the Los Alamos scientists to obtain final approval of designs and additional data on location of certain of their structures. On 5 March he left Port Hueneme aboard one of the AKA's transporting Sea Bees to Bikini.

(3) Construction on Other Pacific Islands.

(a) The construction required on other Pacific islands was handled on a different basis from that at Bikini. In general the preparation of plans and designs followed the same pattern. Approved plans and specifications were forwarded to the island commanders concerned, through ComServPac, with a request that construction be accomplished by forces available on the islands. In the case of Kwajalein, the requirements covered a rather broad scope and Major R. L. DuBOSE, Army Engineer, was sent from the J-4 Division on 1 February as liaison officer for this work.

(b) In general the materials required were relatively minor and were to be furnished by the base. At Kwajalein, sufficient materials and equipment were not available and special shipments to meet the shortages had to be made. Arrangements were also made for flying necessary scientific instruments and technical personnel to the islands for installation of the equipment in the facilities provided.

(c) The planned scope of the work on these other Islands included:

1. Kwajalein

Air-conditioned Photo Lab
Air-conditioned Radio-Chemistry Lab
Los Alamos Air Coordination Hut

RESTRICTED DATA
ACT - 1946

Kwajalein - (cont.)

Seismograph
Tide Guage
Plane Parking Area
Fire Protection System

2. Roi-Namur

Los Alamos Air Coordination Hut
Seismograph
Tide Gauge

3. Eniwetok

Los Alamos Air Coordination Hut
Air-conditioned Instrument Lab
Tide Gauge
Seismograph

4. Wake

Seismograph
Tide Gauge

5. Marcus

Seismograph
Tide Gauge

(4) Later Planning.

(a) After departure of Commander LOVELL for Bikini on 28 February, the duties of J-46 were carried on by Commander R. LAMOREAUX, (CEC), USN, who was given additional duty with the Division from the Director of Ship Material. This officer performed liaison duties with Commander N.C. COXE, (CEC), USN, and Mr. T.A. FRIEDMAN of BuDocks who assisted materially in detailed design and in providing materials.

(b) Construction problems, prior to the departure of the Staff for Bikini, were relatively minor and involved changes and additions to the basic plans. All requests for changes were reviewed carefully and the field agencies notified of the revised requirements. Additional materials required by these changes were procured and arrangements made for shipment to destination.

3. OPERATIONAL PHASE

a. General

(1) The Flagship sailed from San Francisco 8 May for Pearl. J-4 accompanied by J-41 and J-44, left the same day by air for Honolulu. On arrival, officers were established at CinCPac Headquarters and a series of conferences was initiated with Staffs of CTG 1.2 and CTG 1.8 relative to Logistic details. Contacts were also made with all other agencies in the Pearl Harbor area and many details of organization, operation and Logistic support were developed.

(2) The Flagship arrived on the 15th and remained at Pearl until the 22nd. During this period members of the J-4 Division visited the various agencies and ironed out many details. This was the first time most of the officers had visited Honolulu, and it afforded them an opportunity to become acquainted with the resources available and the individuals who would be responsible for our support from that area. This period proved most helpful.

(3) Enroute to Bikini the MT. McKINLEY stopped at Kwajalein for three days and here contacts were made with the Staff of the Commander Kwajalein Atoll and of CTG 1.5. Installations were inspected, logistic details discussed and some minor operational details adjusted. TG 1.5 was found well

721479 O—46——17

RESTRICTED DATA

established and operational. The special construction that had been requested was complete and in operation. One serious shortage existed - sufficient power for operation of air-conditioning units and utilities in the Army occupied area. This was caused by the failure of the main generating unit, which had been previously reported. Action had been initiated by CTG 1.5 and ComServPac to meet the deficiencies and restoration of power, through use of several advanced base type generators, was practically complete. ComServPac also had ordered a DE to Kwajalein to furnish power, pending repairs to the main generating unit, and action was under way to install distribution lines to connect with this vessel on arrival..

(4) While at Kwajalein the Force Surgeon (J-45) visited the NEW YORK, which was anchored in the lagoon, and obtained first hand information as to the seriousness of the dysentery epidemic which threatened to incapacitate the crew. Details of this epidemic and steps taken to check same are covered in the report of the Medical Section which follows.

(5) On 2 June the MT. McKINLEY anchored at Bikini amid the imposing array of vessels of the Task Force. It was the first opportunity many of the officers of J-4 had to meet their opposite members in the different groups and little time was wasted in getting acquainted and adjusting operational details.

(6) The latter part of April CTU 1.8.6 had been directed to establish a mooring on one of the southwest islands of the Atoll for the purpose of conducting a test to determine the feasibility of tethering ships for Test CHARLIE. The mooring was completed on ORUK Island and in early June a string of four ships (DD, APA, CA, BB) was secured thereto

in tandem and influenced by the weak trade wind, they held position in satisfactory manner. Based on the success of this test, the Sea Bees were directed to establish moorings on the five Southwest islands. These moorings were completed by 20 August and are available for Test CHARLIE.

(7) The following are the main logistic problems which confronted the J-4 Division during the operation.

(a) Boat Service. Demands for small boats for flag officers, scientists, instrumentation, VIP observers, and general utility were extremely heavy. A reasonably adequate supply of boats had been provided for but due to heavy casualties, inexperienced operators, heavy weather and lack of adequate and experienced repair personnel, a shortage soon developed and stringent control became necessary. Priorities were given to scientists and instrumentation work, and ship preparation for the tests was not unduly handicapped.

(b) Repair. Due to shortage of repair personnel (particularly motor machinist, electrician and machinist mates) in the tenders, and their general inexperience, it was impossible to accomplish more than essential repairs on operating ships of the force.

(c) Evacuation. Evacuation of the lagoon for Tests ABLE and BAKER presented no particular difficulties except as follows:

Available lift for boats of the boat pool was insufficient to evacuate all boats at one time. For the QUEEN Day Test evacuation it was decided to moor excess boats (including LCT's) in lee of Amen Island, about 6 miles

RESTRICTED DATA
ACT - 1946

from the target array. A shift of wind and heavy swells proved disasterous and many craft were lost or badly damaged. The moorings were changed to the lee of Enyu Island between QUEEN and ABLE days and the remaining boats were satisfactorily secured there for the ABLE test.

For the BAKER test boats were evacuated to Rongelap, 80 miles east of Bikini. For this test no boats were left on moorings at Bikini. Several pontoon causeway sections were left at moorings, about 5 miles from the target array, and suffered no damage.

Disposition of construction and other equipment on Bikini Island presented a serious problem due to uncertainty as to the effects of the bomb. For Test ABLE, the Sea Bees evacuated part of their construction equipment by LST. The equipment that was left was moved to the far side of the island, tentage in the recreation area was struck and pontoon causeways were removed to anchorage in lee of Amen. No damage was sustained from the effects of the bomb.

For Test BAKER it was initially feared that Bikini Island would be inundated as a result of this underwater shot. After careful analysis with the Technical Director and his Staff it was decided that equipment on the island would be safe and none was evacuated. Prior to Test BAKER all of the pontoon causeways, except one, were removed from Bikini Island to anchorage in the lee of Amen. The one causeway left on Bikini was displaced some distance by the 10 foot wave which hit the beach as a result of the BAKER shot, but was undamaged. It is believed that the

anchor placed to seaward from the offshore end of this causeway prevented broaching. None of the equipment left ashore on Bikini was damaged in any way.

(d) Plans for Test CHARLIE. After successful completion of the streaming test from the Southwest Islands, a recommendation was made to the Joint Chiefs of Staff that Test CHARLIE be conducted with ships moored from the Southwest Islands. March 1 was recommended as the target date in order to take advantage of the strong and steady trade winds that could be expected at that time. This was approved by the JCS for planning purposes. Later the target date was changed to 1 April. Immediate logistic planning was started, particularly with respect to construction and boat pool requirements. Definite requirements on these two matters were determined and some detailed planning was completed prior to departure of the Staff from Bikini. Commander LOVELL, J-46, was detached 15 July and was sent to Port Hueneme to initiate detail planning for the Construction personnel and equipment required.

(e) Disposition TG 1.5 Equipment. Participation of TG 1.5 on Test CHARLIE was discussed at several conferences and the decision was made that this group would participate. Recommendations were made to CG AAF that TG 1.5 leave transportation and other equipment, that could be stored without undue deterioration, at Kwajalein with a caretaking detachment for use in Test CHARLIE. This recommendation was made in the interest of economy of shipping. This proposal was

RESTRICTED DATA
AEC - 1948

finally approved by AAF and water lift to the United States for TG 1.5 property was materially reduced.

(f) Disposition of Sea Bee Equipment. Much of the Sea Bee equipment was in a very bad state of repair by the end of the operation due to five months' hard usage and the fact that most of it was not new when received. Careful analysis indicated that it would not be suitable for use in Test CHARLIE. Recommendations were made to ComServPac that the best items of equipment be sent to Kwajalein and Eniwetok, that economically repairable items be returned to Port Hueneme and that items beyond economical repair be abandoned. This recommendation was approved.

(g) Decontamination Materials. Unexpected, heavy demands for materials required for decontamination developed after BAKER Day. Immediate demands were met by air shipments from Pearl and the States and provisions made to ship the balance by surface.

(8) It soon became apparent after Test BAKER that the radiological contamination of the majority of the target ships was such that it would be a long time before they could be inspected, repaired, and moved under their own power to Pearl Harbor. CJTF - ONE decided to leave the area 10 August and turn over command in the forward area to CTG 1.2 with title of ComNavTaskGroups JTF-ONE and ComAdvEch JTF-ONE. The J-4 Division worked closely with the Staff of CTG 1.2 and CTG 1.8 in connection with this change in command, and Logistic functions of the J-4 Division were transferred with minimum of confusion.

(9) During the operation, the Logistic Representative rendered invaluable services in expediting procurement and the shipment of both personnel and

supplies. The Log. Rep San Francisco coordinated all CROSSROADS activities in the Bay area and greatly facilitated the movement of the many observers, technicians, and casuals who departed from and returned to the West Coast.

The Log Reps of Hamilton and Hickam Fields were provided with officer and enlisted assistants by CTG 1.5 and supervised the operation and maintenance of TG 1.5 aircraft in addition to supervising movement of freight and passengers for CJTF-ONE. These offices were closed approximately 1 September and the Commanding General, Pacific Division ATC appointed ATC officers at those two fields and at Kwajalein to handle the residual CROSSROADS air traffic problems.

The Log Reps at Los Alamos, San Francisco, Terminal Island, Pearl Harbor and Kwajalein were not furnished with additional assistants. These officers utilized the services of the organizations from which they were appointed. This proved very satisfactory except at Kwajalein where the reduction in Naval personnel made it extremely difficult for the Log Rep there to handle the many details of his office. This was particularly true with regard to transhipment of supplies to Bikini which arrived at Kwajalein by air and water. This proved to be a decided bottle-neck and operations at Bikini were often handicapped due to the time required for transhipment.

The policy of having Logistic Representatives at strategic locations proved very sound and they contributed greatly to the successful conduct of the operation.

(10) The Logistic Division of the Rear Echelon functioned very satisfactorily and expedited action on innumerable requests from the forward area.

RESTRICTED DATA
OCT - 1948
CLEARANCE NOT REQUIRED
CLASSIFICATION CANCELLED

(11) The MT. McKINLEY sailed from Bikini on 10 August, stopped at Pearl from the 16th to 19th, and arrived San Francisco 26 August. Succeeding paragraphs outline the activities of the several sections of the Logistic Division during the Operational Phase of CROSSROADS.

b. Navy Supply Operations

The following paragraphs outline the more important procedures and problems encountered by the Navy Supply Section, Logistics Division during the operating phase of Operation CROSSROADS.

(1) Pay. When the Staff arrived at Pearl Harbor it was learned from the Logistic officer TG 1.2 that the original plan for paying target ship personnel was inadequate because of the rapid demobilization of the experienced disbursing storekeeper personnel remaining among the target vessels. This problem was solved by establishing "Central Disbursing Offices" on two non-target evacuation transports, utilizing the few remaining Disbursing Officers and experienced disbursing storekeeper personnel. The two Disbursing Offices were set up on the HENRICO and BAYFIELD and disbursing accounts and records of the target vessels were disbributed equitably between them. This resulted in the most efficient employment of the personnel with disbursing experience, and the disbursing records of all target ship personnel were handled with thoroughness and regularity. During the period the Central Disbursing Offices were operating, over 12,000 pay records were serviced and closed out and a similar number of new pay records opened with the beginning of the new fiscal year on 1 July 1946.

(2) Supply. Receipts of supplies from scheduled supply ships during the operation, in addition to supplies which were originally brought into the

area by the ships of the task force, proved, with few exceptions, to be adequate. In accordance with Annex Baker to CJTF-ONE Op-Plan 1-46, CTG 1.8 was responsible for supply at Bikini and was charged with the promulgation of instructions to the force regarding the method of submitting requests for and the issuing of supplies. Commander Service Division ELEVEN's Service Information Bulletin, Serial 5[illegible], dated 1 May 1946, and subsequent directives assigned "Mother Ships" to make issues of all supplies except fuel to destroyers and smaller vessels. Larger ships were directed to obtain GSK, SSS, C&SS stocks from the POLLUX (AKS-4) or the HESPERIA (AKS-13) and dry provisions from the QUARTZ (IX-150). Issues of refrigerated provisions were made from ComServPac reefers on a 5-ton fleet unit basis to the larger ships, with smaller ships receiving desired amounts as required from the designated "Mother Ships". Prior to the arrival of each ComServPac reefer CTG 1.8 promulgated a provisioning plan based on the overall requirements of fresh and frozen provisions. Requests for fuel were submitted direct to CTG 1.8 who established fueling schedules with the following exception: Destroyers and vessels smaller than LST's contacted either the CHIKASKIA (AO-54) or the ENOREE (AO-69) direct for fueling assignments. The practice of assigning small ships to "Mother Ships" and larger ships direct to supply vessels proved very satisfactory.

Ships unable to obtain required materials from their assigned source of supply went direct to CTG 1.8 for assistance. CJTF-ONE originated "All Ships Present" messages requesting the required materials when advised by CTG 1.8 that the Service Force ships (TG 1.8) were unable to supply. All such materials which were urgently required and unavailable at Bikini were ordered by CTG 1.8 from ComServPac. Ships of the task force located at Kwajalein drew supplies from the supply facilities

RESTRICTED DATA
AEC - 1948

located there. Weekly logistics reports were developed by J-4, and by means of these, CTG 1.8 relayed to CJTF-ONE pertinent information regarding issues, receipts, stocks of various supplies on hand within the immediate area and anticipated arrivals of additional supplies. These forms provided a complete picture of the supply status as of the time they were submitted. A schedule of supply ships arriving in the forward area appears as Appendix F to this report.

(3) Resupply. The estimate of population build-up projected during the planning phase of the operation proved to be very accurate. From these estimates a schedule of replenishments of supplies was prepared. ComServPac and CTG 1.8 in conjunction with the Navy Supply Section of the Logistics Division developed a reefer and tanker schedule which proved adequate. The condition of the provisions received was excellent, except for the supply of flour on one vessel which was contaminated with weevils. This flour had been loaded at an advanced base which may account for the contamination. No trouble was experienced with flour arriving from the States on regular provision ships.

(4) Excess Provisions. Contrary to instructions issued by CTG 1.2 many target vessels arrived at the target area with more than enough provisions to last them through the scheduled date of test ABLE. Approximately 800 short tons of these excess provisions were transferred to evacuation transports, various other non-target vessels and a covered YF. After Test ABLE the provisions on the YF were made available to the entire task force. Instructions were issued to non-target vessels receiving these provisions to record them as a gain by inventory from CROSSROADS.

(5) Decontamination Supplies. Shortly after Test BAKER, DSM made known his requirements for various items and materials needed in the decontamination of target vessels. It was discovered immediately that sufficient quantities of such material were not available at Bikini. CJTF-ONE and CTG 1.8 placed orders for the balance of required materials, not available locally, with ComServPac at Pearl Harbor. Air priority Tare, later raised to Jig, was authorized, and deliveries were made by deadline delivery dates set by DSM.

(6) Handling of Contaminated Clothing. Clothing, which became radioactive as a result of work on target ships after Test BAKER, presented a new and unforseen problem. Clothing which gave a Geiger reading of more than 0.5 roentgens per 24 hours constituted a danger to personal health and had to be destroyed by sinking at sea. Clothing with a reading of less than 0.5 roentgens per 24 hours was not destroyed but received laundering separately from uncontaminated clothing. BuSandA authorized CJTF-ONE to replace items of personal clothing of civilian scientists and military personnel which had to be destroyed because of radioactive contamination from C & SS stocks up to a total amount of five hundred dollars. Receipt of this authority made it unnecessary for individual claims to be submitted. Such C & SS issues were to be expended from Clothing and Small Stores Account on S & A invoice form 127 as a charge to Clothing and Small Stores Fund and expenditure account 46501.

As a protective measure BuSandA authorized the establishment of a clothing pool to consist of 5000 each of the following items - undershirts, undershorts, towels, and pairs of socks. This clothing was to augment the utility outer garments worn by decontamination crews and was to receive special laundering after each exposure aboard a target vessel.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS
USE MILITARY CLEARANCE NOT REQUIRED
INFORMATION SAFEGUARDS

To expedite and simplify the laundering process, an APL laundry barge was towed to Bikini from Kwajalein and moored alongside a decontaminated target transport, GENEVA, where the clothing pool was established. Each decontamination crew, prior to reporting for work aboard a target ship, reported to the clothing pool. Here they removed their personal clothing and donned pool clothing. Upon completion of their work aboard the target vessel these crews returned to the clothing pool, removed their contaminated pool clothing, bathed and donned their personal clothing again. The contaminated clothing was then laundered and returned to the pool for reissue, or destroyed if radioactive content was above the safety limit.

(7) Special Supplies. During the planning phase of the operation CJTF-ONE directed that certain items of title "B" equipage such as binoculars, jeeps, watches, labor saving devices, etc., be placed aboard certain ships of the task force. These items were for use by the Staff, members of the press, scientists and observers. Following Test BAKER, the ships receiving these special items were directed to turn all such items in to stock at NSD Oakland or NSD San Pedro upon their return to the United States. At the request of CJTF-ONE, each of these two supply depots designated one officer as a temporary liaison officer to assist ships' supply officers in disposing of such equipment. The names, location, and phone numbers of these liaison officers were dispatched to all JTF-ONE.

(8) Cancellation of Outstanding Requisitions. Prior to Test ABLE, CJTF-ONE advised ComWesSeaFron that the last delivery of CROSSROADS cargo should be sailed to arrive at Bikini 20-25 August 1946. When the date for Test BAKER was scheduled for 25 July 1946, the last date for delivery of supplies at Bikini was advanced to 5 August 1946. Shortly after Test BAKER was fired, 25 July, ComWesSeaFron

requested information concerning possible change of cut-off date and ComServPac made recommendations in this regard. CJTF-ONE thereupon requested that all CROSSROADS requisitions dated prior to 25 July 1946 which were being processed by Naval activities be cancelled with the following exceptions: Material with an air priority, requisitions originated by ships, and requisitions for material still needed for the operation, providing dispatch advice of its continued need was furnished the procuring agency prior to 10 August 1946. Requisitions originated by individual ships of the Task Force were to be held by the procuring agency until the destination of that ship following its release from Crossroads was determined. This action prevented shipment of considerable quantities of supplies no longer needed at Bikini and prevented a reshipment problem.

c. Army Supply Operations.

The principal problem of the Army Supply Section in the forward area was revising the channel of supply for Class IV E items for TG 1.5 from that originally planned. It was found that the plans for supply of Class IV E items had been based upon insufficient information of theatre supply agencies capabilities, primarily those of Guam Air Depot.

(1) Difficulties Because of Lack of Information at Hawaii. The staff arrived at Honolulu, T.H., 14 May 1946. It was then learned that very little information about Operation CROSSROADS Had been received in Hawaii outside of Service Force, Pacific Fleet and the Hawaiian Air Depot, prior to the receipt of the complete Operation Plan 1-46 which was forwarded from Washington, D.C., in the middle of April. This lack of information by the theatre commands had severely handicapped the Logistic Representative, Hickam Field, in securing personnel and facilities and also TG 1.4, the personnel of which were engaged in securing

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION OF ... CLEARANCE NOT REQUIRED
THIS MATERIAL ... ACTION PROHIBITED

ASF and AAF test material aboard target ships. PACUSA had authorized the issuance of certain items for exposure on target vessels, Unfortunately, the request to PACUSA for authority to issue items for exposure did not include tools and other items needed to secure the test material to the decks and superstructures. The needed materials were finally obtained from AAF Base, Hickam Field, T.H. No difficulty occurred in obtaining needed supplies from ASF depots after they had been provided with a copy of ASF Immediate Action Letter previously referred to in paragraph 2, a, (3), (c), above. All ASF depots were exceedingly helpful and cooperative and their aid cannot be praised too highly.

(2) Failure of Planned Supply Channels for B-29 Spares. Upon arrival at Kwajalein, 24 May 1946, it was learned that the Class IV E supply channel and procedures were not operating as planned. Through some misunderstanding the ARU-6 had not been stocked with B-29 parts at Guam although ARU-6 personnel had prepared requisitions to properly stock the ship. Instead it had arrived at Kwajalein with a small supply of P-47 and P-51 parts. Also, instead of trained machinists, etc., its force was largely composed of men with very little service, recently transferred from the Infantry. The one main exception was the camera repair shop which did valuable service, repairing and overhauling cameras. A very few aircraft accessories were also overhauled. In addition to the lack of trained personnel, the radio transmitter which was to enable the ARU-6 to contact Guam and Hawaiian Air Depots direct failed to function. Meanwhile, requisitions which TG 1.5 had sent in to Guam Air Depot were starting to return after 2-3 weeks delay, marked "Extract Direct".

(3) B-17 and C-54 Spares. No difficulty was experienced in securing B-17 and C54 spares. The cooperation of the Hawaiian Air Depot was excellent.

(4) Remedies. As the result of the failure to secure B-29 spares through their pickup by the ARU-6 from Guam Air Depot, arrangements were made to requisition B-29 spares directly on Pacific Ocean Air Materiel Command Depot, Alameda, California. The POAMC Depot took immediate action on the radio requisitions and thereafter little difficulty was experienced. This arrangement, however, added air lift requirements which had not been planned.

(5) Preliminary Plans for Test CHARLIE

(a) Equipment. Recommendation was made 28 June 1946 to ComGen AAF that equipment required for Test CHARLIE be left at Kwajalein under a small caretaking detachment, that equipment be transferred to Army and Navy units permanently based on Kwajalein as requested by them and approved by proper authority, and that the remainder be shipped back to the States.

This plan was finally approved on 25 July 1946 by ComGenAir with the proviso that ComGen PACUSA, ComGenPASC and ComGen AF MidPac be consulted on the disposition. Prior to the receipt of AAF approval, CTG 1.5 received dispatches from ComGen PASC and ComGen AF MidPac detailing their desires for disposition of AAF and ASF equipment pertaining to TG 1.5. As arrangements had been made to lift this property in early August, it was impossible to consult these agencies further and CTG 1.5 completed his plans for disposal of this property in accordance with the original recommendation, modified where possible to meet the desires of ComGen PASC and ComGen AF MidPac. As a result of these modifications all C-54 spares were left on Kwajalein with ATC and B-17 spares and some ASF equipment was shipped to

RESTRICTED DATA
VII - [illegible] 61 [illegible] OCT - 1946
SPECIFIC RESTRICTION [illegible] REQUIRED
(DOE MILITARY [illegible]

Hawaiian Air Depot. Lists of TG 1.5 equipment retained on Kwajalein for Test Charlie was forwarded to ComGen AAF, ComGen PACUSA and ComGen at MidPac.

(b) Interim Support. The caretaking detachment left at Kwajalein consisted of 5 officers and 47 enlisted men. This unit was attached to the ATC detachment for rations and quarters. Personnel in this detachment was barely sufficient to maintain the stored equipment, and assistance for the operation of utilities in the Army area was required. On 17 August 1946 a conference was held at Pearl Harbor to discuss support required by Forward Detachment TG 1.5 between Tests Baker and Charlie. Present were ComServPac, members of his staff, and representatives from CJTF ONE, ComGen AF MidPac, ComGen PacDiv, ATC and CTG 1.5. The basic plan for mission, composition and support of the Forward Detachment TG 1.5 was discussed and general agreement reached on details of desired support. Result of the conference was embodied in CJTF ONE letter, Serial 4511, dated 26 August 1946, to all interested agencies.

(c) Test Charlie Support. A short discussion of support for TG 1.5 for Test Charlie was held at the above conference, but no decisions were reached as the overall plans for participation of TG 1.5 in Test Charlie had not been firmed. The discussion was primarily for the purpose of providing theatre agencies with that advance information which previous experience in Tests Able and Baker had shown was badly needed in the forward areas.

d. Transportation Operations.

In general the plans outlined in the planning and

preparation phase of this report were closely followed in respect to transportation matters. The following paragraphs cover variations, amplifications and special situations which arose during the action phase of Operation Crossroads.

(1) Ships and Shipping.

The extent to which the policy of utilizing Task Force facilities in shipping was followed is outlined in Part I, Appendix G of this report. Part II of the same appendix shows the utilization of other shipping.

(2) Shuttle Craft.

The use of LCI's for shuttling freight between Kwajalein and Bikini was found to be very unsatisfactory. Their limited cargo capacity was reduced still further by their small hatches, making it frequently necessary to break up bundles to permit entry of cargo into the hold. The LSM's originally requested, but not available, are a type of ship much better suited to this kind of operation.

(3) Rail Movements.

(a) Observers' Special Train. After the departure of the Staff, JTF-1, a special train was set up to transport from Washington to the west coast, congressmen, scientific, military and foreign observers and members of the press. The details of this train were arranged by the rear echelon of the Transportation Section and appear in the report of Rear Echelon operations.

(b) Return Rail Movements. Upon the return of the Staff to the west coast, a large proportion of the officers and enlisted men went directly on leave without returning to Washington.

RESTRICTED DATA

721479 O--46----18

AT - 1943

Arrangements were made through the Logistics Representative at San Francisco, to set up one Regular Pullman, four Tourist Pullmans, a baggage car and a diner, to handle about 30 officers and civilians and 90 enlisted men from the MOUNT McKINLEY and KENNETH WHITING to Washington. The train to which these cars were attached left Oakland at 1530 on 26 August and arrived in Washington at 1630 on 30 August.

Two Pullman cars and one baggage car were utilized to transport 4 officers, 19 civilians, 23 enlisted men and 30,000 lbs. of baggage from the USS WHARTON leaving San Francisco 8 September and arriving Washington 12 September.

(c) Casual Rail Passengers. In addition to arranging for special cars, the Log Rep San Francisco, upon receipt of detailed information from the J1 Section of the Staff, arranged for the issuance of TR's, not only for the personnel going in these cars, but for the personnel proceeding on leave as well as personnel from other ships. At the same time, train reservations were made as far as possible, so that immediately upon arrival these casuals could depart for their leave destinations.

(4) Air Transportation.

(a) General. The officer assigned to air transportation returned to the States for separation shortly after Test Able and as no replacement was available, the duties of this officer were assumed by air force officers in the J42 Section. Otherwise no special problems arose in connection with the operation of the air lifts which were furnished closely in accordance with original plans. Ample lift

for both passengers and freight was available at all times.

(b) Airlift Statistics. Total tonnage of CROSSROADS cargo (including freight and passengers (8 per ton)) carried from 1 March to 11 August 46 by the various agencies are listed below for the routes shown.

ATC	GREEN HORNETS	NATS	OTHER A/C	TOTAL TONS	NO. OF PASSENGERS
		STATES TO HAWAII			
274.4	336.3	381.7	34.9	1027.3	3,089
		HAWAII TO KWAJALEIN			
559.3	303.4	499.3	95.5	1457.5	4,348
		KWAJALEIN TO HAWAII			
146.8	203.9	184.8	48.2	583.7	3,012
		HAWAII TO STATES			
134.3	102.0	9.1*	56.0	301.4	1,838*

* NATS figures incomplete - do not include passengers and mail.

Charts in Appendix H show the details of above lift by weeks.

Total number of CROSSROADS passenger and freight tonnage shuttled by Task Units of JTF CNE from 21 April to 4 August 46 are listed in table following:

	EBEYE-BIKINI (TU 1.6.3)	KWAJ-ENIW (TU 1.5.4)	TOTALS
No. of Passengers	1649	1174	2823
Cargo Incl. Passengers	370.8	253.1	623.9
	BIKINI-EBEYE	ENIW-KWAJ	TOTALS
No. of Passengers	1581	1144	2725
Cargo Incl. Passengers	289.3	209.8	499.1

Number of passengers are shown in this table,

RESTRICTED DATA
AT [illegible] ACT - 1946
[illegible] CLEARANCE NOT REQUIRED
[illegible] ARDS

as they presented a problem in the KWAJ-BIKINI shuttle because of the limited capacity (20 passengers) of the seaplanes used. Prior to Test ABLE one trip per day with occasional special planes was sufficient to handle traffic. After Test ABLE two trips per day were necessary. The detailed figures and charts of above CROSSROADS air lift may be found in Annex C, Air Operations Report on file in office of CG AAF.

(5) Motor Transportation at Pearl.

(a) On West Bound Trip. During the stopover at Pearl Harbor on the way to Bikini, automotive transportation was provided for use of force personnel by JCC FOURTEEN. This transportation included personnel sedans for Flag and General officers, top ranking scientists and Chiefs of Staff Divisions.

Report of operations of the pool showed 441 business trips made in chauffeur driven vehicles, 247 recreation trips in self driven jeeps (serving 741 officers) and a total mileage covered by pool vehicles of 44,850, during the period from 0800 13 May to 2300 21 May.

(b) On the Return Trip. On the return from Bikini, automotive transportation similar to that provided on the outbound trip was furnished for the four day stopover.

(6) Special Procedures.

(a) Tested Material Shipments. Upon arrival in the forward area it was found that revisions in the procedure for handling tested material were necessary, primarily because of the shortage of supply officers. Duties that were originally prescribed to be performed

by supply officers were added to the duties of target coordinating officers. In addition, to reduce paper work to a minimum, a special Ocean Manifest Form was devised and the method of using it was set forth in the directive. NSD Oakland was contacted and approved the procedure so far as their part of it was involved. A special form (JTF Shipping Form No. 2) was designed to handle outgoing items that had to be placed on the Intransit Cargo ship prior to placing on the ship lifting to USA, but in actual practice all cargo was placed directly on lifting ship, so this form was never used.

The procedures as finally promulgated in Serial No. 3532, of 1 June 46, Subject: "Use of Special Shipping Tag and Shipping Procedures on Tested Material (Revised)" (Appendix E) proved entirely satisfactory and about 1500 shipments of tested material were made totalling 789 S/T and 1757 M/T.

(b) Other Shipments. From time to time it was found necessary to ship freight other than tested material. To cover this situation JTF-1 Shipping Form No. 3 "Notice of Booking" and No. 4 "Shipping Notification" were devised, and appear as Appendix J. Regular shipping papers, rather than the special JTF-1 Ocean Manifest form, were used on freight of this type.

(c) Ultimate Handling of Shipments. Upon the departure of the J43 Section from the forward area on 10 August, the handling of all shipments back to the United States was taken over by CTG 1.8.

(d) Passengers and Freight at Bikini. Upon arrival at Bikini it was found that the original

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION OR CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

directive covering the handling of passengers and freight at Bikini had not been received in the forward area. A new directive was therefore issued as Serial 3563, dated 5 June 46, Subject: "Procedure for Handling Passengers and Freight at Bikini (Revised)". This directive, with revisions covered by Serial 3727 dated 12 June 46, appears as Appendix K.

The USS ROLETTE was initially designated as Intransit Cargo Ship and upon her departure following Test Baker the SYLVANIA took over the handling of intransit freight.

In actual practice it was found desirable to have incoming seaplane passengers taken directly to their destination ships or to the TG 1.8 Personnel Officer on the AJAX rather than to J1, for assignment of quarters. The function of booking of outgoing passengers also was transferred from J1 Division to TG 1.8 Personnel Officer. These two changes were promulgated in Serial 3727 referred to above.

(7) Special Problems.

(a) Intransit Cargo Ship. The use of an AKA as an Intransit Cargo ship was not entirely satisfactory. It was not possible to spread out the cargo being handled in such a manner as to readily control or dispatch it. It is believed that an LST with 3 - 5 T caterpillar crane would prove considerably more practical for this purpose.

(b) Return of TG 1.5. After Test Baker the problem arose of returning to USA such personnel and equipment of TG 1.5 as was not to be returned by air or to be left in anticipation

of Test Charlie. For this purpose the USS APPLING (APA-58) and LST-989 were sent to Eniwetok to pick up approximately 192 personnel and 2305 M/Ts cargo. The USS BAYFIELD (APA-33) and LST-871 were used to pick up 777 personnel and 919 M/Ts of the cargo of this group located on Kwajalein.

At Eniwetok difficulties were encountered in loading the cargo in the allotted ships due to the inexperience of personnel charged with the operation and their failure to make a loading plan. To aid in straightening out the situation, the J43 Section flew a TQM to Eniwetok, but on arrival it was found that the cargo had been properly reloaded.

e. Force Maintenance and Boat Pool Operations.

(1) Preliminary Operations.

Prior to departure for Bikini, Washington activities were turned over to the Rear Echelon. Enroute to Bikini, the following agencies were visited by the Force Maintenance Officer.

San Francisco Area

Commander Western Sea Frontier
JTF-1 Logistics Office, San Francisco
Radiological Safety Section, Oakland Army Base

Pearl Harbor Area

Commander Service Force Pacific Fleet
Commander in Chief Pacific Fleet
Naval Shipyard Pearl Harbor
JTF-1 Logistics Office, Pearl Harbor
Commander Naval Task Groups, JTF-1
Commander Service Division Eleven
Naval Supply Center, Pearl Harbor

With these agencies, final details were arranged

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION [illegible] CLEARANCE NOT REQUIRED

and remaining plans for operations at Bikini were formulated. Additional items of special material and equipment were ordered for shipment. Additional plans and machinery instruction books were obtained at Pearl Harbor to supplement those obtained in Washington. Final maintenance problems of Task Force One ships at Pearl Harbor were dealt with successfully. The principal item in the latter category was preparation of PRINZ EUGEN for steaming to Bikini, which entailed granting the ship a ten day availability at Naval Shipyard Pearl for machinery repairs and an emergency Diesel generator installation.

(2) Assembly of facilities at Bikini.

On 18 April 1946, DIXIE, Flagship of CTG 1.8, sailed from Pearl Harbor for Bikini. The balance of the maintenance facilities had already arrived or were enroute. As finally assembled the maintenance and repair facilities of the Service Group (TG 1.8) included the following:

DIXIE	(AD-14)	TELAMON	(ARB-8)
AJAX	(AR-6)	PHAON	(ARB-3)
FULTON	(AS-11)	CREON	(ARL-11)
COASTERS HARBOR	(AG-74)	SPHINX	(ARL-24)
CEBU	(ARG-6)	ARD-29	
SIOUX	(ATF-75)	ATA-124	
CHOWANOC	(ATF-100)	ATA-187	
MUNSEE	(ATF-107)	YF-733	(Structural Steel & Lumber)
WENATCHEE	(ATF-118)	YF-990	(Movie Exchange)

To expedite the handling of dispatch traffic, the Service Group Repair and Maintenance Officer, operating in the AJAX, was designated CTU 1.8.11 and assigned an individual visual and radio call.

Upon arrival of the bulk of the Task Force at Bikini about 1 June 1946, the maintenance and repair facilities were ready to operate. Some work had

already been accomplished on the NAGATO and SAKAWA. These ships had proceeded directly from Japan and it was necessary for the service group to accomplish all instrumentation work as well as considerable repairs.

(3) Assignment of Tenders.

Prior to arrival at Bikini, ComServDiv Eleven (CTG 1.8) issued his Service Information Bulletin, Serial 599 dated 1 May 46, which described all facilities available in the area, set forth procedure for obtaining services and material, and assigned each ship of the Task Force, target and non-target, to a tender for maintenance, repair work or materials. The maintenance section of this bulletin also described in considerable detail the manner in which availabilities would be granted and the procedure for submission of work requests. This bulletin proved very helpful to all concerned and the procedures outlined therein were very sound.

(4) Scope of Repairs.

(a) Non-Target Vessels.

In general, routine repair work on all non-target vessels of the Task Force proceeded very smoothly. Most of the tugs of the Salvage Unit (TU 1.2.7) and many of the Service Group ships were in very poor material condition and badly in need of engine overhaul work upon arrival at Bikini. However, the schedule of operations put such heavy demands on the salvage unit vessels that it was not possible to accomplish other than minimum repairs required to keep them in operation. Even these repairs placed a heavy load on all Diesel engine repair facilities in the group.

Limitations of time and available personnel rendered repairs impractical prior to release of

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMIT OF [illegible] CLEARANCE NOT REQUIRED
[illegible] SAFEGUARDS

the following vessels from CROSSROADS:

DELIVER (ARS-23)	- All main bearings, thrust bearing and # 7 crank-bearing wiped, shaft badly scored.
CLAMP (ARS-33)	- No. 2 Aux. engine, Cooper-Bessemer Type FS 6, crankshaft cracked across forward web.
ATA-165	- Broken crankshaft one main engine.
O'BRIEN (DD-725)	- Burned out tubes in one boiler.

The above vessels continued in operation with the equipment affected inoperative.

Repair work on non-target vessels consisted principally of Diesel engine work, electrical repairs, radio repairs, and general machinery items, the magnitude of which was in the order listed.

(b) Target Vessels.

A. Prior to Test Able.

The principal work accomplished on target vessels was completion of instrumentation. As stated above, NAGATO and SAKAWA were completely instrumented at Bikini. A large number of pallets and holding down gear were installed on selected target ships for holding ammunition and army test material for exposure during the test. Also, a considerable amount of watertight integrity work and air testing of compartments in NAGATO were completed. Armor samples, shipped out for the purpose, were secured to ARKANSAS deck for test exposure. Radar repairs were accomplished

on several target ships and many items of repair work were undertaken incident to maintaining target ships in habitable condition and keeping machinery running.

B. Between Tests Able and Baker. Subsequent to Test Able, the Force Maintenance Officer conferred with the Director of Ship Material and arrangements were made to commence repairs as soon as ships were cleared, in preparation for Test Baker. Several ships had suffered severe boiler damage and some had stacks and portions of uptakes wrecked to the extent that boilers could not be steamed without repair work. Wreckage was cleared, temporary stacks fabricated and erected, and boilers were repaired. It is a great credit to the Service Group that within twelve days after Test Able, every surviving ship was able to steam at least one boiler. A total of six ships received major boiler repairs in this period. Considerable watertight integrity work was accomplished on INDEPENDENCE to prepare that ship for Test Baker. In addition, repairs to decks on ARKANSAS and NEVADA were accomplished. Wreckage was cleared on SKATE, some temporary repairs effected to brace topside fittings, and plans prepared and prefabrication commenced for installation of a temporary bridge and catwalk, to permit the vessel to steam to Pearl Harbor after Test Baker. New instrumentation was completed on several ships and large quantities of Test Baker sample materials were placed and secured. New deflection scratch gages were manufactured and installed on a total of eighteen targets. In addition to the above, repairs of a general nature were performed on many targets to permit them to operate and accommodate the crews on board between tests.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AND CLEARANCE NOT REQUIRED
FOR MILITARY APPLICATION SAFEGUARDS

C. Subsequent to Test Baker. The Force Maintenance Officer conferred with the staffs of the Director of Ship Material and Commander Target Group for the purpose of planning repairs and disposition of target vessels after completion of material inspections. Policies as evolved were submitted by the Task Force Commander to CNC for approval. CNC approved the proposals which are outlined in the following paragraphs.

I. In cases where damage is not too extensive to permit ships being made seaworthy with facilities at Bikini they will be returned to Pearl Harbor either under own power or in tow.

II. Where ships cannot be made seaworthy without excessive expenditure of time, manpower and materials, they will be sunk.

III. As an exception to I., some vessels, even though capable of being made seaworthy, will be in such condition through damage or deterioration as to make it unprofitable to expend repair and towing facilities on them, in view of lack of requirement for future use. Such will be sunk. Probable examples are ARDC-13, YC-160, YCC-83, and target landing ships and craft.

IV. Some ships, although badly damaged and of no future use, will be towed to Pearl Harbor to permit docking and detailed study of damage. Possible example is INDEPENDENCE.

In addition it was stated that no ship would be sunk without obtaining prior approval from CNC and that before sinking, all usable material and equipment which could be salvaged in the time available, would be removed for delivery to Naval Supply Center, Pearl Harbor.

For some time after Test BAKER, most target ships in the array were not radiologically safe for inspection or for prosecution of repair work. Necessary repairs were, however, commenced on those ships falling in category I above, which were radiologically safe, and they were placed in condition for proceeding from the area in a very short period. As rapidly as other targets became safe for occupancy inspections were made, repairs commenced and every effort made to prepare for sea those target ships designated to leave the area.

Boiler and stack work, generator and other electrical repairs, and watertight integrity were the principal items involved. Stack sections were prefabricated for immediate installation on those ships whose superstructures had been damaged during Test ABLE. Installation of a catwalk and temporary bridge on SKATE was commenced. Because of persistent radioactivity, material inspections of many targets were delayed and final recommendations as to disposition were deferred until vessels were safe for reboarding.

(5) Work Load.

During the period between 1 June and 25 July 1946, the average percent of utilization of repair ships was as follows:

DIXIE	90%	CREON	60%
AJAX	72%	SPHINX	82%
FULTON	85%	PHAON	60%
CEBU	75%	TELAMON	70%
COASTERS HARBOR	68%		

The above tabulation is somewhat misleading in view of the fact that electrical, Diesel, and

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

boat repair facilities on all tenders and repair ships were overloaded with Priority One work at all times. Thus the work load on tenders was almost constantly unbalanced in this respect.

The average number of non-target ships assigned formal availability for repair work per week was 16 during this period. An average of 95 work requests were complied with per week on non-target ships under informal availability.

ARD-2° accomplished 1° separate dockings during the period 1 June to 1 August 1946. No target vessels required docking prior to 1 August but it was planned that certain ones would be docked for inspection and damage evaluation prior to completion of the Operation. The dock was in practically constant use except when weather or evacuation conditions prohibited There were always one or more vessels awaiting docking. In addition, ARD-2° rendered much valuable service in assisting with boat repair work.

(6) Boat Pool.

(a) Assembly of Facilities. The Boat Pool facilities were assembled in the Marshalls Area about 5 April 1946, for the purposes of training personnel, obtaining additional boats and landing craft, and effecting repairs to equipment. During this period, 28 surveyed LCM's were obtained at Eniwetok, and necessary work accomplished to repair hulls and re-engine these craft for use at Bikini. As finally assembled at Bikini, the Dispatch Boat and Boat Pool had the following vessels assigned:

SAN MARCOS (LSD-25) (Flag)
GUNSTON HALL (LSD-5)
PRESQUE ISLE (APB-44)

PGM's 23,24,25,26,31,32
LCI's 1082, 1067, 1091
LCT's 1361, 1461

SPHINX (ARL-24) assigned to CTG 1.8 also worked with the Boat Pool on boat repairs.

The maximum number of boats assigned to this Pool was reached on 19 June and were of the following types:

38 LCM	30 PPB
34 LCVP	3 45' PB
44 LCPR	1 LCC
1 LCPL	1 35' MB

These boats except those obtained at Eniwetok were transported to Bikini by target vessels, LSD, ARD, deck loads in express ships and other carriers.

(b) Assignment of Boats. Requests for assignment of boats by the Boat Pool were submitted directly to CTU 1.8.3. The Force Maintenance Officer established overall priorities and policies with respect to assignments to activities of the Task Force and, when necessary, arranged for procurement of additional boats from other ships present. At no time during the course of the Operation did the Boat Pool have sufficient operable boats to meet all requirements. By agreement between CTG 1.3 and CTG 1.8, the Transport Group (TG 1.3) provided all boat transportation for vessels of the target group (TG 1.2) directly, without sending requests through the Boat Pool. This arrangement was highly satisfactory and reduced the load considerably on the Boat Pool.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION OF THE MILITARY ... CLEARANCE NOT REQUIRED ... NAVIGATION CANCELLED

(c) Personnel. Shortage of personnel, both operational and repair, in the Boat Pool was acute throughout the entire Operation. Out of a total of 313 originally in the area, 85 were lost by 10 June through discharge, emergency leave or transfer to other Task Force activities. This left a critical shortage of operating personnel. A proportional shortage in repair and maintenance personnel was also experienced.

In order to alleviate the deficiency above 80 operational and repair personnel were obtained through ComServPac, an additional 50 were received from the DIXIE, and 50 were obtained from destroyers of the Surface Patrol group (TG 1.7). Although the deficiency in personnel was never completely eliminated, further alleviation was obtained from vessels which furnished crews for boats which were assigned to them for use by the Boat Pool. This expedient was poor policy at best and often was not practicable, particularly with respect to technical group assignments.

The additional personnel enumerated above were for the most part untrained. An in-service training program was instituted for the new personnel, but because of operational demands it was conducted only under great difficulty.

The repair personnel in LSD's and SPHINX (ARL-24) were employed exclusively in boat repairs. However, they were so few in number and so poorly trained that it was impossible for them to keep up with emergency repairs, even with no routine checking and preventive

maintenance in boats. To make this situation worse, the personnel provided for boat crews were, with negligible exceptions, non-rated men with little or no previous experience whatsoever in either operation or repair of boats.

(d) Repairs. With all available facilities at work, the number of boats in operation continually decreased. This situation was very much aggravated by the damage, beaching, and sinking of 42 boats moored in the vicinity of Amen Island during the QUEEN Day evacuation. This was caused by a combination of heavy weather, inadequate moorings, and an LCT breaking loose and drifting through the boat moorings. As an example of the difficulties encountered in repair, it is significant to note that on 19 June, 134 of 202 boats assigned to the Boat Pool were in operation, whereas on 31 July, only 93 boats were in operating condition.

(e) Other Craft in Dispatch Boat and Boat Pool Unit. The three LCI's assigned to CTU 1.8.3 were employed in providing surface shuttle for passengers and freight between Bikini and Kwajalein every other day. This service was frequently interrupted by breakdown of LCI's. The small cargo carrying capacity and the small hatches of the LCI's were serious handicaps. LSM's would have been much more suitable for this type of service.

The six PGM's assigned to CTU 1.8.3 commenced training with the Radiological Safety Group and from that time until detached from CROSSROADS, were released for dispatch service only for a few special missions. Boats assigned to the Radiological group were used exclusively by them.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MISCONDUCT ... VIOLATION SAFEGUARDS

721479 O—48——19

Ten spare target LCT's, originally included in the Target Group (TG 1.2), were reassigned to the Dispatch Boat and Boat Pool Unit (TU 1.8.3) for operational and administrative control, to be used for utility purposes. These LCT's were in deplorable condition, both as to material and personnel. They were organized about 8 July as LCT Group 15 under CTU 1.8.3, together with LCT's 1361 and 1461, and were based on CREON. A staff was organized and adequate personnel obtained from crews of sunken targets to man the craft. Repairs were accomplished and nine of the twelve LCT's were placed in running condition. Two of these were later placed in the target array for Test BAKER. LCT Group 15 performed valuable freight and passenger transportation services for the duration of the Operation.

(f) Material Deficiencies. In spite of elaborate steps to procure adequate spare parts and repair equipment for boat maintenance, there existed throughout the operation considerable shortages of several important items. The principal among these were: Chrysler marine engine spares - particularly carburetors, starters, transmissions, clutches and ignition parts; boat anchors; LCVP rudders and skegs; 175-ampere hour storage batteries; 3/8" marine waterproof plywood; Grey marine engine spares, in latter part of period, principally governors and clutches; and boat beading and 1" cypress for boat repairs.

The reasons for these shortages were: delays in transshipment at Kwajalein; non-arrival of parts ordered originally; non-delivery of replacement parts ordered;

failure of ships carrying boats to fill on-board allowances of spares prior to arrival at Bikini; exceptionally heavy repair load; and, heavy requisitions by technical groups on battery stocks which otherwise would have been ample.

(7) Special Requirements

The following special requirements arose during the course of the operation:

(a) There were frequent calls for portable emergency generator units, principally from APL's, the NAGATO and SAKAWA. Large Diesel and gasoline engine driven units were available locally, but were not self-contained and required considerable time for connecting heat exchangers, fresh and salt water cooling systems, and fuel supply. The Force Maintenance Officer consequently directed installation of two large units, one AC and one DC, on LCT's which were then used as portable power barges. A later requirement arose on a destroyer, but before a suitable generator was obtained, repairs to the destroyer Diesel generator were effected.

(b) Considerable difficulty was experienced in attempting to keep ships alongside each other due to heavy swells which frequently were encountered in Bikini lagoon. Camels on hand, although six feet in diameter, could not prevent damage, particularly to ships placed alongside the old battleships of TG 1.2 which have blisters protruding below waterline. Several schemes were tried but no satisfactory solution could be provided with facilities available.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTION AND CLEARANCE NOT REQUIRED

(c) Initial boarding teams required large numbers of explosion meters, flame safety lamps and hydrogen sulfide detectors. These were ordered for air shipment, delivered in ample time, and distributed from AJAX.

(d) A great need arose for barges and covered boats, due to the rough water encountered in the lagoon, for use of flag officers, evacuation boards, VIP observers and press. These were provided only by improvised means and with considerable difficulty.

(e) Radiological patrol LCPL's had to be equipped with voice radio equipment, chart tables, sextants, protractors and water supply for special radiological instruments. Voice radio equipment and chart tables were installed locally. Sextants were obtained from target ships. Three-armed protractors were made up from Hoey position plotters. Salt water supply for instruments was provided by tapping Diesel engine circulating water lines.

(f) Boat skids were not available in sufficient numbers. Oil drums were utilized instead to stow LCPR's and LCVP's in LCM's for evacuation from the lagoon by LSD.

(g) The Boat Pool had an urgent need for a YTL to tow disabled boats and for an LCM properly fitted out for boat salvage work.

(h) A large quantity of 2" and 2½" pipe was required for scratch gages for DSM. The pipe was finally located by searching all available sources.

(8) Material Deficiencies

Additional material deficiencies encountered during the Operation, other than those noted in paragraph e (6) (f) above, were; engine spares for ATA's, ARS's and ATF's; copper magnet wire and ribbon for small motors - particularly 15; 2" x 4" lumber; and, LCT generators.

(9) Conclusions

(a) Adequate tenders, repair ships and docks were provided for the Operation, but personnel on board were not balanced to meet requirements. Electrical shops, inside machine shops and boat repair shops were always overloaded. Diesel repair personnel were lacking to a dangerous degree.

(b) Sufficient boats were provided for support of the Operation, but operating and repair personnel were badly deficient in numbers and training. Also, there was a great need for more covered boats and special barges for flag officers and VIP's.

(c) Material requirements, were, in general, very well met with the exception of boat spares.

(d) Division of the Boat Pool personnel between three ships was a serious handicap and jeopardized the proper administration greatly.

(e) Organization of LCT's into a group, with group commander and staff, was most beneficial and tremendously improved efficiency and services rendered.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

(f) Personnel changes immediately prior to and during the Operation, as well as lack of trained replacements, hampered the work of the Service Group to a very great degree.

(g) Both the ship maintenance and repair vessels and the Boat Pool of the Service Group performed excellently. The Operation could not have been completed successfully without the sterling effort and outstanding cooperation of the personnel of these groups. Their work was accomplished under great material and personnel handicaps.

(10) Recommendations.

For similar operations of this nature conducted in the future the following recommendations are submitted:

(a) The number of repair ships and tenders can be reduced without jeopardy to the Force, but only if the number of personnel in the criticalal trades is considerably increased. These rates include electrician's mates, motor machinist's mates, machinist's mates, and carpenter's mates.

(b) For a considerable period in advance of sailing of repair vessels and docks for forward area, stabilize personnel, effect necessary training, provide ample period for loading with necessary materials, give attention to provision of materials on each ship suitable for type of vessels to be handled, and insure that the same personnel who load the ship will remain on board throughout the Operation.

(c) Material and spare parts expected to be required early during the Operation should be loaded on ships of the Task Force prior to sailing for the target area. Subsequent orders for material must be placed well in advance and should be shipped direct to destination. Transhipment should be avoided.

(d) Provide adequate number of wooden or other flexible camels eight feet wide by three feet thick by twenty feet long. These are required for keeping ships alongside with safety in a lagoon such as Bikini.

(e) Provide a number of shore-base type, self-contained, Diesel or gasoline engine driven generator units both AC and DC. These should be maintained ready so they can be placed on decks of ships and connected to ships' electrical systems for immediate service.

(f) For organizational efficiency, the Boat Pool personnel should be based on the beach. If this is not possible, all operational and dispatching personnel must be on one ship where they can be organized, trained, and administered as a unit. The larger the number of divisions of the Boat Pool personnel between ships, the greater confusion and inefficiency.

(g) Wood hull boat repairs should be accomplished on the beach, using a Jehemy to lift out boats to relieve the load on limited LSD space which can be reached only by crane.

(h) A supply center should be established on the beach to store spare parts and materials for maintenance work, and to relieve the crowding

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS ... REQUIRED
USE ...

of limited storeroom space on tenders and repair ships.

(i) Insofar as practicable, make regular assignments of all ships of the Task Force to tenders and repair ships to which they can go directly for work. This system has worked very satisfactorily and saves time and unnecessary work.

(j) Emphasis should be laid on providing a large number of covered boats for all purposes. Boating in lagoons, such as Bikini, is highly unsatisfactory in open boats. If open boats must be utilized, tarpaulins should be provided.

f. Medical Section Operations

(1) Personnel

(a) General. Adequate medical and dental personnel were available throughout the major portion of Operation CROSSROADS. However, Navy demobilization plans necessitated considerable turnover during July. Many of the original officers became eligible for release and were replaced by newly assigned officers. Others were retained until after Test BAKER, but were returned to the United States in time to reach separation centers.

(b) Special Uses of Personnel.

A. Epidemiology Unit. The outbreak of bacillary dysentery on the NEW YORK, AJAX, and TURNER required a thorough epidemiological survey. This was provided by members of Epidemiological Unit #106 based at Pearl Harbor. This unit composed of an officer and two enlisted men, arrived on 22 May. It was later supplemented on 18 June by an additional officer and

enlisted man. The entire unit departed for Pearl Harbor on 23 July after completion of the survey.

B. Animal Autopsies. After Test ABLE, ten medical officers were assigned from ships present to additional duty of one week on the BURLESON for the performance of autopsies on test animals.

C. Inspections. Informal inspections of medical personnel and facilities were made at irregular intervals by the officers of the Force Medical Section.

(2) Hospitals

Facilities were more than adequate to meet the needs of the force. The incidence of disease was low and hospitalization requirements afloat and ashore were easily met. A detailed summary of hospitalization activities is attached as Appendix L.

(3) Evacuation of Casualties.

Evacuation of patients was carried out in accordance with plans. The majority were evacuated by air, a few on water lifts, and some by the hospital ship leaving after Test BAKER. Air evacuation from Bikini and Roi to Kwajalein was accompliahed by Navy seaplanes from TU 1.6.3, from Eniwetok to Kwajalein by Army land planes of TG 1.5, and Kwajalein to Oahu by Green Hornet planes of TG 1.5, or by special arrangement with ATC or NATS. The total evacuation was small and placed no extra burden on the air lift facilities. Detailed tabulation appears in Appendix L.

(4) Special Problems.

(a) Infectious and Contagious Diseases.

An outbreak of bacillary dysentery began aboard the NEW YORK on 20 May enroute to Bikini. The

VIA RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AND CLEARANCE NOT REQUIRED
USN MILITARY OPERATION SAFEGUARDS

disease spread rapidly among the men of the crew. The ship was diverted to Kwajalein where an epidemiologic study was conducted by Epidemiological Unit #106. The etiologic agent was identified as Shigella Flexner type III. Sulfonamide therapy was ineffective. Repeated rectal cultures were made of the total complement and positive cases were isolated. Beginning on 10 June a total of 96 men were transferred from the NEW YORK to USN Base Hospital #21, Kwajalein, where streptomycin therapy was instituted and found effective. The NEW YORK arrived at Bikini in time for Test ABLE and remained free of further infection.

On 10 May a mild outbreak of bacillary dysentery began aboard the AJAX while enroute from Pearl Harbor to Bikini. Nine cases occurred in May. In June a total of thirty positive and suspicious cases occurred. Three complete rectal culture surveys of the ships' complement were made by members of Epidemiologic Unit #106. Eight positive cultures were found in the first survey, five in the second, and none in the third. The etiologic agent was identified as Shigella Flexner type III. Sulfadiazine therapy was found to be effective in the cases on this ship. Men with positive cultures were transferred to the BENEVOLENCE for isolation. The ship was placed on medical restriction on 4 June and was released from restriction on 27 June 1946.

While at Pearl Harbor, the TURNER was found to have four carriers of Shigella Flexner type III. Sporadic cases of diarrhoea occurred during the voyage enroute to Bikini and after arrival of the ship. Accordingly, a complete rectal culture survey of the ship's complement was performed by Epidiemiological Unit #106. A total of 28 cases of Shigella Flexner type III were found. Some of these cases were transferred to a hospital ship, the others to Base Hospital #221.

- -

One case of bacillary dysentery Shigella Flexner type III occurred in June aboard the OTTAWA. The ship was isolated from 5 June to 28 June. A partial survey revealed no carriers and no further cases occurred.

One case of cerebrospinal fever, verified by bacteriologic examination, occurred aboard the WHARTON. No other cases appeared.

The incidence of communicable diseases was otherwise not unusual.

(b) Radsafe Activities.

Close liaison was maintained between the Force Medical Officer, the Safety Advisor and the Radiological Safety Advisor. Frequent inspections of Target Vessels were made and methods of prevention of injury to personnel discussed and directives promulgated to the Task Force. In addition, all necessary laboratory work requested by the Radiological Safety Advisor was carried out.

(5) Disposition of Remains

Five deaths occured among JTF-ONE personnel as follows:

(a) On 25 March a Navy enlisted man was drowned at Bikini. The body was not recovered.

(b) On 24 June an Army Ordnance Captain was accidentally killed by an airplane propellor at Kwajalein. Burial was in San Marcos Cemetary at Kwajalein.

(c) On 4 July a Navy enlisted man was accidentally electrocuted on the ALBEMARLE. The body was embalmed and placed aboard the USS CHILTON for return to the United States.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

(d) On 9 July a Naval Lieutenant was killed in an airplane crash near Roi. The body was not recovered.

(e) On 24 July a Navy enlisted man died as the result of methyl alcohol poisoning. The body was returned to the United States on the USS ST. CROIX.

(6) Sanitation.

(a) General Conditions. Sanitary conditions throughout the Force were generally satisfactory.

(b) Food. For the most part, food was adequate and of satisfactory quality. Two outbreaks of food intoxication occurred in June. One was on the USS NEVADA and involved 100 men, all of whom recovered within 24 hours. The other was on the USS MOUNT McKINLEY in which 18 men were affected. In both cases spoiled ham was the source of infection.

(c) Water. The water supply for drinking and bathing was adequate. On many ships, water rationing was instituted to conserve the supply, but no hardships or danger to health resulted. Drinking water on all ships was chlorinated. Frequent bacteriological examinations were made of drinking water to insure satisfactory standards of potability.

(d) Bathing Facilities. Water at the bathing beaches in the Bikini fleet recreation area was submitted daily for bacteriological testing. Permission for swimming was guided by reports on these tests. Bacteriological contamination of the beaches proved to be a troublesome problem and was extremely "spotty" in nature. While the officers' and enlisted men's beaches were adjacent, there were times that one would be contaminated while the other remained bacteriologically safe.

Toward the end of the operation all areas were quite consistently contaminated. This was due to the large population of the Force, variable winds from the previously prevailing direction and ground swells resulting from distant typhoons. There was also the factor of water exchange, as only one-half of the volume was exchanged in the lagoon over a period of 25 days.

(e) Quarters. Living quarters were satisfactory except for some instances of moderate overcrowding due to the addition of staff personnel to normal ships' company complements.

(f) Rubbish and Sewage. The disposal of rubbish and sewage presented no difficulties. Ships afloat disposed of rubbish by incineration. Ashore, at Bikini, rubbish was incinerated and pit latrines used.

(7) Medical Supply

On the whole, medical supplies were adequate to meet requirements. The large scale epidemiological surveys conducted in connection with the outbreaks of bacillary dysentery required that some supplementary bacteriological supplies be flown from Pearl Harbor. There were no other unusual supply problems, the demands being met by supplies at Bikini and in the medical supply barge YF-754 anchored at Kwajalein.

g. Construction Operations

(1) Personnel

(a) Survey Party. The initial group of the Sea Bees to reach Bikini was the survey party of the 53rd Bn, which arrived aboard the USS ST. CROIX on 11 March. This group of surveyors immediately coordinated their work with that of the party on

RESTRICTED DATA
OCT - 1948

the USS SUMNER, which was already on the site, engaged in hydrographic survey and underwater demolition work. By 24 March the staking out of all planned structures had been completed without any unusual difficulties or incidents.

(b) Main Body. On 13 March 550 men of the 53rd Bn, accompanied by organizational gear, arrived at Bikini from Guam aboard the USS RANDALL and were transferred to the ST. CROIX for berthing. These were followed on 14 March by 175 stevedores on the LST-881, and on 19 March by 75 pontoon personnel on the LST-817, both groups coming from Pearl Harbor. On 20 March the USS ROLETTE and USS OTTAWA arrived with 200 men from Hueneme, completing the planned complement.

(c) Allotment of Personnel. The battalion, when completed, was divided to provide stevedore crews on the ST. CROIX, OTTAWA, and ROLETTE, with balanced work crews on the LST-817 for the construction on Amen, and on the LST-881 for construction on Enyu. The remainder of the battalion was quartered on the ST. CROIX to handle the construction on Bikini and the minor islands.

(d) Personnel Problems. It was realized from the start that demobilization had so seriously curtailed the ranks of the Sea Bees that a reasonably well trained battalion could not be expected. However, the actual personnel situation of the Battalion, when it was fully assembled, was even more alarming than had been feared. Among the 1006 men who formed the Battalion at its maximum strength, there were no chief petty officers, though allowance was 78, and only one first class petty officer, against an allowance of 184. Numerous attempts were made to rectify

these administrative deficiencies, but no better men or higher rated men were available. Further, the battalion was not permitted to advance worthy individuals to higher ratings, where they could have been administratively more valuable, because of minimum time requirements for such advancement. In view of these deficiencies, the problems of discipline and supervision were added to those connected with the use of untrained personnel. The one bright spot in the picture was the excellent classification during recruit training and the careful selection that had been applied at Guam. The application of these factors provided the battalion with a group of men who had good mechanical ability and, in some few cases, a background in civilian construction experiences.

(e) Other Uses of Personnel. About 175 stevedores were active between 20 March and 17 June, handling CROSSROADS cargo and assemblying moorings for the target array. Many of them were also used for assisting in installation of instruments and assembling sonobuoys and life rafts.

(f) Loss of Personnel. The announced delay in Test ABLE from 15 May to 1 July produced serious personnel complications because of the demobilization program. Two hundred men were released early in May when due, and construction was pushed as rapidly as possible so that an additional 522 men could be released early in June, when all originally planned construction was essentially complete. The remaining 300 personnel were able to maintain installations and perform miscellaneous construction jobs as they arose by dint of hard work and careful distribution of manpower. All remaining USNR enlisted personnel (except 5 CROSSROADS volunteers) were released 19 June, 1946, upon the arrival of USN replacements (all of whom were S 2/c). This

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS
ADMITTANCE NOT REQUIRED
DATE BOARDED

left the Battalion with an enlisted strength of 246 men to finish CROSSROADS operations. Twenty-one officers were released late in May. They were replaced by six Ensigns, all of whom were released 3 August, along with other USNR officer personnel, upon the arrival of 2 permanent and 4 temporary duty Ensigns to finish up CROSSROADS operations. Such personnel complications reduced efficiency of operations but were accepted as an inevitable result of the transition period from reserve to regular Navy organization.

(2) Material and Equipment.

The two LST's from Pearl and the two AKA's from Hueneme, mentioned above, transported construction materials and equipment as planned, in addition to the personnel.

However, soon after construction got under way, the existence of serious material deficiencies and shortages were discovered. Much of the equipment shipped from Pearl was not new and had not been properly reconditioned, while most of the new equipment sent from that base had been intended for the invasion of Japan and, consequently, was winterized. Adequate spare parts and tropical lubricants also were lacking.

As to shortages, J-46 had furnished Y & D Branch, NSC, Pearl, with a marked copy of the complete bill of materials, showing what was available at Pearl. A rough tonnage computation had indicated that this tonnage should fit into two LST's, but it was agreed that agencies at Pearl would notify Port Hueneme of any short shipments, in order that they might be included in the cargos of the two AKA's coming from that point. A similar marked copy was delivered to the Advance Base Depot at Hueneme, with instructions to load all items shown as not available at Pearl,

plus overflow beyond the capacity of the two LST's. J-46 believed it to be generally understood that all construction material had to be aboard these four ships in order to arrive at Bikini on time.

In line with this understanding, no report of shortages having been received from Pearl, Port Hueneme sailed the two AKA's with only those items shown as not available at the NSC there, assuming that Pearl had loaded all of their items on the LST's.

Upon the arrival of the LST's at Bikini, it was learned that only a small portion of the Pearl items were aboard. Despatch inquiries elicited the information that errors had existed in the inventories at Pearl and that some of the material expected from there was not even available. It was further reported that such items as were actually on hand would be shipped aboard the target LST's together with the pontoons required.

Only after a trip to Pearl, was J-46 able to get all vital items, or adequate substitutes therefor. These left Pearl for Bikini on 4 April, 34 days later than had been originally planned.

(3) Construction Problems.

(a) Instrument Towers. During the month of March the wind at Bikini blew at a velocity of about 25 knots. Because of this, it was determined that the vertical erection of the steel towers would be much too hazardous for the untrained personnel available. It was, therefore, decided that all of the twelve towers would be constructed horizontally, on the ground, and rotated or hoisted to their vertical positions.

Complete fulfillment of this plan was prevented by the modifications required on the six photographic towers, but the other six were erected in this manner.

721479 O—46——30

RESTRICTED DATA
VII - (A) - 96
ACT - 1948
SPECIFIC

(b) Photographic Towers. The one incident which affected the general policy of making modifications in the field, involved the photographic towers. On 1 February J-46 met in New York with the representatives of the Navy Photographic Service and of the Fairchild Company, who were under contract to provide the steel boxes for housing batteries of cameras, to be installed on the towers. The proposal to use the standard 75' tower, with 8' x 8' top deck was agreed upon. The Fairchild Company expressed satisfaction with these dimensions and stated that, although the design of these boxes had not been completed, their largest box would not exceed 6' x 4' x 4'. The fact that sufficient space for lead sheathing around the boxes would be required, was particularly stressed in these discussions. On the basis of these apparently mutually satisfactory arrangements, BuDocks proceeded with the detailed design of the towers. These designs were completed on 28 February and personally delivered by J-46 to the Photographic Section. On 26 March, dispatch from CJTF-ONE was received by J-46 at Bikini to stop work on the towers, as it had been found that the camera boxes were too large to be mounted on the existing platform. This dispatch also advised that the top of the towers were being redesigned and that special structural steel was being obtained and would be shipped from the States. Work on these towers was stopped pending receipt of new drawings and the required structural steel.

Fortunately, by the time the steel was received, the wind had abated sufficiently so that the towers could be erected vertically. The modification steel was received unpunched or drilled so it was not possible to assemble the towers by bolting as originally designed.

Instead, the modifications were welded in the field. These complications brought about a delay in completion of the towers beyond the original planned date, though still prior to date of requirement.

(c) Additional Construction. Only two major changes, both additions, were made in the construction projects as set up in the directives mentioned in the Planning Phase. One of these was the installation of an Army radar set on Prayer Island, ordered on 22 April, and involving the construction of a 25-man camp and reventments for the equipment. The other was covered in a directive received 16 May, and provided for the installation of a heavy "dead-man" anchorage on Boku Island, to be used in the Test CHARLIE trials early in June.

The first of these additional projects was accomplished without incident, but difficulties in landing heavy equipment on Boku resulted in moving the anchorage to Oruk (by local authority). The construction was then completed without further delay.

Upon the arrival of the Task Force during the last week in May, numerous requests for additional minor construction were received from the technical sections. All were referred to CJTF-ONE for approval as to necessity and for establishment of priority. None of these additional items involved any special difficulties and all were accomplished without incident.

(d) Test CHARLIE Anchorages. Upon the successful completion of Test CHARLIE trials mentioned above, the construction of four additional "dead-man" anchorages, one each on Aran, Maxy,

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

Boku, and Boro Islands - plus alteration of the anchorage on Oruk - was undertaken. Construction was started after "QUEEN" Day re-entry and completed on 15 August. Materials for a possible sixth anchorage were procured and stored on Bikini Island. The USS BOWDITCH extended the geodetic survey of the atoll to include the islands involved.

(e) See Appendix M for detail listing of construction projects.

(4) Evacuation for Tests ABLE and BAKER.

Since the effect of the atomic bomb on shore installations on Bikini Island could not be predicted with finality, all feasible protection methods were employed. Evacuation was complicated by the fact that it was necessary to maintain operations - including the Fleet Recreation Area - until "ABLE Minus One" was announced. To secure the island, all causeways except one work dock and one recreation landing were removed and moored at Amen Island along with barges and boats. The roofs of all buildings were removed as protection against blast, and all reefers, generators and distillation units were secured and covered with tarps. Half of the Sea Bee equipment and tools were evacuated on LST's and balance parked in a clearing prepared on high ground on the east side of Bikini. Adequate stocks of gasoline were left to operate generators for test instrumentation. Evacuation procedure began on a carefully planned schedule when the signal was received at 0030 on A-1 day and was completed by 1500. Ships evacuating personnel were underway at 1700. Based on knowledge gained from test ABLE, the evacuation for Test BAKER consisted principally of removing all pontoon structures and boats to Amen except for one recreation causeway. Equipment was again parked on high ground in the clearing provided and installations were secured as before,

but no equipment was evacuated. Damage was minor in both tests and installations were operating 24 hours after re-entry.

(5) Closeout.

(a) Inactivation of 53rd NCB. Since its mission was essentially accomplished and the strength of the Battalion had been reduced to 246 men, the 53rd NCB was inactivated on 3 August, and all 240 USN enlisted transferred to CBD 1156, which was activated the same date to finish CROSSROADS closeout work. Two officers were permanently assigned to the detachment, which was scheduled to go to Eniwetok when released by CJTF - ONE.

(b) Disposition of Equipment and Material. In accordance with instructions, equipment and material was transferred to Kwajalein and Eniwetok upon receipt of requests from them. The remainder of equipment was placed aboard ship for return to Port Hueneme, California, if usable, or surveyed. Durable materials useful for Test CHARLIE were stored at Bikini; all remaining material was returned to Port Hueneme, California. Installed equipment, such as reefers, generators, ice machines and distillation units, was protected and left in place on Bikini for Test CHARLIE use.

h. Rear Echelon Operations

(1) Organization

On 6 May the Rear Echelon, Logistics Division, was officially activated. In the initial organization the various sections of the division were represented by the following personnel:

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Section	Officers	Enlisted Men
J-4R	1-A	3-A 2-N
J-41R	1-N	1-N
J-42R	(Handled by J-4R)	
J-43R	5-A 4-N	1-A
J-44R	1-N	1-A

J-45 and J-46 had no rear echelon representation.

During the period in which this division operated, five officers and three enlisted men were lost through attrition. As volume of work was decreasing, they were not replaced.

(2) Duties

The principal duties of the Rear Echelon of the Logistics Division involved assisting the ComRearEch, maintaining liaison with agencies of the War and Navy Departments, arranging for air priorities, and furnishing security and courier officers. In addition, matters of interest to the forward echelon were reported through the medium of the Rear Echelon Weekly Summary and by means of special letters.

(3) Operations and Special Problems

(a) J-41R (Navy Supply) Section

The principal activity of this section consisted of immediately following up in the Bureaus those matters discussed in dispatches from the forward area on which Rear Echelon was info addee. In view of the fact that the Rear Echelon received dispatches sooner than the Bureaus did, this action frequently resulted in items being enroute for delivery before the Bureaus had received the requests through normal channels.

At the request of J-2R, automotive transportation was secured through INSMAT at Vernon, California, for a Security group set up at Hollywood.

Information was procured for the forward echelon on the Navy Policy concerning extent of reimbursement for supplies used jointly by the Army and Navy in Operation CROSSROADS. (Similar information was obtained by J-42R Section from the Chief of Finance regarding Army policy).

(b) J-42R (Army Supply) Section.

On request of J-2R Section, automotive transportation for about 120 days was procured for the security groups at Rochester and Binghamton film processing plants. The transportation at Rochester was obtained from the AAF Government Furnished Equipment Depot at Rochester (through JTF-ONE Project Officer at HQ AAF), and that for Binghamton was furnished by the Binghamton Medical Depot, through the Surgeon General's Office.

(c) J-43P (Transportation) Section

The principal activity of this section was the booking of passengers and freight on rail, water, and air transportation.

This section participated in arranging for a special train to transport 132 observers consisting of members of Congress, civilian scientists, foreign observers, and representatives of the Army, Navy, and Press. This train left Washington 8 June. Special arrangements were made through the Washington Military District for Military travel and police booths to handle TR's on date of departure, and to

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

accumulate and list personal baggage. To expedite handling, the baggage was segregated in baggage car by ships for which destined.

An illustration of the special service given this group was the case of a member of the press who reported at the last minute that he could not locate his baggage which had arrived on an incoming train earlier in the evening. The baggage was located after his departure and arrangements were made to forward it by an officer who was flying to Oakland to join the group there.

Seven passengers and approximately sixty tons of freight were booked by J-43R on seven vessels.

Aside from routine bookings of air passengers and freight on regular military airlines, this section arranged special flights with AAF, ATC, and NATS for the movement of scientific instruments, Engineer Project Yoke material, airplane propellers and parts, and Signal Corps material, as well as for special personnel lifts for Manhattan District and Radiological groups.

A special service set up at the request of J-2R was the daily air delivery of thirty copies each of one San Francisco and two New York papers to Log Offices at San Francisco, Pearl Harbor and Kwajalein, for delivery to the APPALACHIAN, BLUE RIDGE, and PANAMINT when at these points and Bikini.

Cargo security and courier officers were used to make twelve trips between Washington and such points as Pearl Harbor, Los Alamos, Rochester, Kwajalein, and Bikini. This service was supplemented by the use of other officers proceeding to Bikini at times when members of the Cargo Security Group were not available.

(d) J-44R (Force Maintenance) Section

Due to the illness of the officer assigned to this section and to the relatively light work load in it, the necessary liaison was performed by J-4R and J-41R in addition to their normal duties. The activities were confined to liaison with Navy Bureaus and follow-up on CJTF-ONE requests from the forward area.

(e) Emergency Projects

(1) Main Power Plant Breakdown at Kwajalein

The Logistics Representative for JTF-ONE at San Francisco telephoned J-4R at 1615 hours on Friday 18 May stating that a TG 1.5 Representative had just arrived in San Francisco via special C-54 plane from Kwajalein to pick up circuit breakers and Diesel engine parts for the main power plant on Kwajalein which had broken down. He requested this office to initiate and complete the following action prior to the ETA of the TG 1.5 Rep in Washington at 1400 hours Saturday 19 May: Contract for services of Fairbanks Morse and Company technician to return to Kwajalein via special plane with TG 1.5 Rep; obtain loyalty clearance for technician; issue travel orders to Kwajalein and arrange for his immunization; contact Corps of Engineers, U. S. Army for all continental sources of supply for Diesel engine parts; and arrange hotel accomodations for six officers and six enlisted men in Washington.

Contractual arrangements were made with Fairbanks Morse and Company, Beloit, Wisconsin, by BuDocks; travel orders were issued

RESTRICTED DATA
OCT - 1946

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
UNAUTHORIZED DISCLOSURE SUBJECT TO ADMINISTRATIVE AND PENAL SANCTIONS

by J-1R; loyalty clearance was initiated by J-2R; source of supply information was obtained from Corps of Engineers; and hotel accomodations were arranged. All of this was accomplished by 1400 hours 19 May. Arrangements were made to have technician immunized enroute.

No parts for the type of Diesel engines on Kwajalein were available in Army stocks and only a partial supply of required parts was available in Navy Supply. The vital parts were located in the strike bound Fairbanks Morse and Company plant at Beloit, Wisconsin. It was necessary for the Chief of BuDocks to telephone Union Officials at Milwaukee, Wisconsin, to get these parts released to the TG 1.5 Rep.

The technician and required parts were picked up at Beloit, Wisconsin, on 21 May by the TG 1.5 Rep. The circuit breakers were picked up at the Fairfax Airport, Kansas City, Missouri, having been previously procured and prepared for shipment through BuDocks.

(2) Breakdown of Distillation Units at Bikini

Immediately on receipt of CJTF-ONE dispatch 280829Z (July) to BuDocks (info CREJTF-ONE), BuDocks cooperating with Rear Echelon arranged for the employment of and issuance of orders on Cleaver Brooks Company technician to repair distillation units at Bikini. Loyalty clearance for technician was obtained by J-2R on a priority basis.

There were no spare parts for these units available in Navy or factory stock. It was necessary for BuDocks to obtain permission from the War Assets Administration to remove compressors, shoes, and other needed parts from units in their storage at Salt Lake City, Utah. The Cleaver Brooks Company sent the technician who had been employed and an assistant from Chicago, Illinois, to Salt Lake City, Utah, to assist in removing the required parts. The Navy furnished air lift for the technician and spare parts to Fairfield-Suisun AAB and this office arranged for CROSSROADS air lift to Bikini on 4 July 1946.

(4) Comments and Recommendations

(a) On the whole, the Logistics Division, Rear Echelon, operated smoothly without serious difficulty. The many problems generally associated with logistics matters were solved as they arose. Liaison relations with the Navy Bureaus and Army Agencies were at all times cordial, and were beneficial to the support of the operation.

(b) In addition to the anticipated work loads, there were many unforseen tasks to perform and problems to solve. Therefore, based upon the experience gained during the period of operation of the Rear Echelon, it is recommended that in future operations of this nature and magnitude, the Logistics Division maintain an adequately staffed Rear Echelon.

4. Rollup Phase

(1) During the period 26 August to 16 September the Rear Echelon assumed the functions of CJTF-ONE pending return of the bulk of the Staff to Washington.

RESTRICTED DATA
OCT - 1948
NOT REQUIRED

(2) Pursuant to instructions from the President, Test CHARLIE was indefinitely postponed on 9 September. CJTF-ONE Dispatch ØØ16ØØZ September to ComNavTaskGrps JTF-ONE, with information copies to all interested activities, instructing him to cease all preparations for Tect CHARLIE and to terminate CROSSROADS as soon as practicable consistent with procurement of valuable scientific data and leaving in usable condition all target vessels which might furnish future data of value.

(3) The problem thus presented to J-4 consisted of disposing in proper fashion of all material which had been ordered or was being held for Test CHARLIE; assembly of records which would be of historical value or of use when Test CHARLIE or a similar test should be authorized at some future date; and release of personnel.

(4) Investigation of operational ships of the Task Force revealed that most of the vessels which had been anchored in Bikini lagoon for a cumulative period in excess of ten days were radioactively contaminated and many would require considerable decontamination work before unconditional clearance could be granted. The Force Medical Officer (J-45) was assigned to additional temporary duty on 26 August with the District Medical Officer, Twelfth Naval District, San Francisco, to assist in coordinating radiological monitoring and clearance of ships in the 11th, 12th, 13th, and 14th Naval Districts and at Guam. In this capacity he was required to assign monitors and instruments to districts and to promulgate necessary instructions to monitors.

(5) A considerable amount of Sea Bee material and some other equipment had been left on Bikini Island in anticipation of early prosecution of the underwater test. With the indefinite postponement of Test CHARLIE it became necessary to remove much of the remaining material. To accomplish this, a detail

of thirty Sea Bees from the 1156th NCB was obtained from Eniwetok and lifted by air to Bikini on 11 September. LST-388 arrived at Bikini on 15 September to provide necessary transportation for the items removed. It was decided to leave towers in place and to retain the moorings on the Southwest islands for possible future use. Removal of all other salvable material, including lead sheathing from the photographic towers, was undertaken with ultimate disposition to be determined by ComServPac.

(6) All of the property of TG 1.5, which had been left at Kwajalein for use in Test CHARLIE, was released to ComGen AAF for disposition by CJTF-ONE Dispatch 171717Z September. ComGen AAF was offered assistance in effecting distribution of this property by water, if it was found that Army shipping was not available.

(7) From 26 August until 15 September, J-41 maintained close liaison with NSD Oakland in identifying and arranging for shipment of CROSSROADS material being cleared through San Francisco. During the latter portion of the period he also worked with J-45 in procurement of material and instruments incident to the radiological clearance program.

(8) From 16 September on, all sections proceeded with the final work of completing the history of the operational phase of CROSSROADS, issuing necessary directives for disposition of material and equipment, and assembly of files and records which would be of value to the Logistics Division if and when Test CHARLIE or a similar test might be authorized. Particular care was exercised to compile in convenient form for ready reference all data on specific planning work which had been accomplished for the deep underwater test.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC AUTHORIZATION NOT REQUIRED

(9) Personnel of the Logistics Division were released as soon as their services could be spared. Preparations were made to release all personnel by 1 November with the exception of J-4 and J-40 who were held until 1 December to handle any final contingencies which might arise incident to dissolution of the Task Force.

(10) Comments and recommendations appear in Part III, Section (D).

APPENDIX A
ORGANIZATION CHART
LOGISTICS DIVISION-STAFF JTF-ONE

FORWARD ECHELON
(30 April 1946)

J-4
Asst C/S for Logistics
Col.David N. BLAKELOCK,GSC,USA

J-40
Executive
Capt.M.A.Norcross,(SC)USN
1 Stenographer-A

J-41 Navy Supply Sec.	J-42 Army Supply Sec.	J-43 Transportation Sec.	J-44 Maintenance Sec.
Comdr.H.Gatchell (SC)N Lt.P.G.Moore (SC) N Lt(jg)J.O.Mark (SC) N 1 C.P.O. - N 2 Storekeepers - N 1 Yeoman - N	Col. F.W.Ott,AC Major J.O.Oldson,AC 1 Chief Clerk-A	Col.A.D.Higgins,TC Maj.C.F.Quilici,USMC Capt.I.W.Smith,AC 1 Chief Clerk USMC 1 Clerk-Typist-A	Comdr.J.J.Fee N LtCdr.A.F.BENSON Lt(jg)O.S.McKnight 1 C.P.O.-N 1 Clerk-Typist-A

J-45 Medical Section	J-46 Construction Section	J-401 Administrative Section
Capt.W.E.Walsh (MC)N Capt.I.M.London,MC,A 1 C.P.O.-N	Cmdr. K.C. Lovell(CEC)N	Lt.J.A.Smott(SC)N 1 Chief Clerk-A 4 Clerk-Typists-A

RESTRICTED DATA
ATOMIC ENERGY ACT 1946

APPENDIX B

ORGANIZATION CHART
LOGISTICS DIVISION-STAFF JTF-ONE

REAR ECHELON
(30 Apr 46)

J-4R
Asst C/S for Logistics
Major W.H. Lollar,AC

J-41R	J-42R	J-43R	J-44R
Navy Supply Sec.	Army Supply Sec.	Transportation Sec.	Maintenance Sec.
Lt. J.A.Conolly (SC)N	Major W.H.Lollar,AC	Capt.H.C.Johnston,TC Capt.A.F.Helfort,AC	Lt(jg)W.E.Whitmer K

Cargo Security and
Courier Officer Pool

Capt. J. Paladino, TC
1st Lt. R.O. Kenney, TC
Lt(jg) A.J. Cain, N
Lt(jg) J.J. Irwin, N
Lt(jg) F.P. Crowley, N
Lt(jg) D.L. Foster, N
Lt(jg) [illegible] King, N
2nd Lt. [illegible] Parmenter, TC

Clerk Pool

1 Chief Clerk - A
5 Clerks or typists-N
3 Clerks or typists*A

RESTRICTED DATA
SPECIFIC RESTRICTIONS
USE MILITARY

APPENDIX C

Functions of Sections, Logistics Division, Staff JTF One.

1. J-4. Assistant Chief of Staff for Logistics.
The principal assistant and advisor to CJTF ONE in all matters pertaining to logistic support of the operation.

2. J-40. Executive.
Assists J-4 in planning, supervising and coordinating the work of all logistics sections and by dealing with other staff sections on routine or minor matters. Responsible for efficient functioning of Administration in the Division.

3. J-401. Administration.
a. Operates under the supervision of the Executive Officer.
b. Recieves, distributes, records and files documents, dispatches, etc. Maintains custody of secret files.
c. Arranges for the receipt of information for, prepares and distributes, periodic logistic reports.
d. Maintains records of funds alloted for the operation of the Task Force.

4. J-41. Navy Supply Section.
a. Prepares directives with respect to and exercises staff supervision over Navy supply activities in the Force. Maintains supply data.
b. Arranges for the procurement and delivery of special supplies and equipment to be furnished by the Navy.
c. Prepares supply paragraphs of logistic plans, annexes to operation orders, logistic policies and directives as pertain to the Navy.
d. Reviews and initiates appropriate action on recommendations, plans and projects, involving Navy supply matters, submitted to the Task Force Commander.

5. J-42. Army Supply Section.
a. Prepares directives with respect to and exercises staff supervision over Army supply activities in the Force. Maintains supply data.
b. Arranges for the procurement and delivery of special supplies and equipment to be furnished by the Army.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
REFERENCE NOT REQUIRED

72147 O—48—21

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC RESTRICTED ... REQUIRED
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

c. Prepares supply paragraphs of logistic plans, annexes to operation orders, logistic policies and directives as pertains to the Army.

d. Reviews and initiates appropriate action on recommendations, plans, and projects, involving Army supply matters, submitted to the Task Force Commander.

6. J-43. Transportation Section.

a. Estimates requirements, prepares plans, and arranges for surface shipping (except tankers), land and air transportation.

b. Establishes procedures to coordinate and allocate shipping (except tankers). Cooperates closely with J-3 on shipping matters.

c. Arranges for special shipping needs (water, rail and air).

d. Provides security officers to accompany special shipments of equipment and supplies, required for the tests, from the place of origin to destination.

e. Prepares transportation paragraphs of logistic plans, annexes to operation orders, logistic policies and directives.

f. Maintain data and information on shipping, land and air transportation.

g. Reviews and initiates appropriate action on recommendations, plans and projects, involving transportation matters, submitted to the Task Force Commander.

7. J-44. Force Maintenance Section.

a. Estimates requirements, prepares plans for and exercises staff supervision over ship maintenance, ship repair and boat pool activities in the Force. Maintains maintenance data.

b. Arranges with J-3 for procurement of necessary repair ships, tenders, drydocks, and boat pool facilities.

c. Prepares ship repair, maintenance and boat pool paragraphs of logistic plans, annexes to operation orders, logistic policies and directives.

d. Reviews and initiates appropriate action on recommendations, plans and projects involving ship repair, maintenance, and boat pool matters submitted to the Task Force Commander.

8. J-45. Force Medical Section.

a. Estimates requirements, prepares plans for and exercises staff supervision over medical activities in the Force.

b. Prepares medical (supply, evacuation, sanitation, and hospitalization) paragraphs of logistic plans, annexes to operation orders, logistic policies and directives.

c. Maintains data on hospitalization and evacuation.

d. Coordinates with Medical Section of the Technical Staff with respect to radiological and other safety measures.

e. Reviews and initiates appropriate action on recommendations, plans and projects, involving medical matters, submitted to the Task Force Commander.

9. J-46. Construction Section.

a. Estimates requirements, prepares plans for and exercises staff supervision over construction activities in the Force. Maintains construction data.

b. Coordinates with the Technical Staff with respect to special construction projects required for the prosecution of the tests.

c. Prepares construction or engineering paragraphs to logistic plans, annexes to operation orders, logistic policies and directives.

d. Reviews and initiates appropriate action on recommendation, plans and projects, involving construction requirements, submitted to the Task Force Commander.

10. Logistic Representatives.

a. Act as liaison officer with respect to special matters delegated to the representative at each locality.

b. Furnish such reports as may be called for by J-4.

c. Carry out special instruction issued by the Task Force Commander.

11. Rear Echelon.

a. Assist the Commander Rear Echelon in all matters pertaining to logistics.

b. Maintain liaison with the various bureaus of the Navy Department in carrying out the requests of CJTF ONE.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED

c. Maintain liaison with the agencies of the War Department in carrying out the requests of CJTF ONE.

d. Arrange for shipment by water of such supplies and equipment as may be requested by CJTF ONE.

e. Arrange for necessary domestic air lift.

f. Arrange for overseas air lift for personnel and cargo previously approved and scheduled.

g. Transmit to CJTF ONE requests for overseas air lift which exceeds previously approved tonnages. Upon approval, arrange for the necessary lift.

h. Arrange for such rail transportation as may be required.

i. Furnish security officers to accompany special shipments as necessary.

j. Maintain data and information with respect to activities of the Logistic Division, rear echelon.

k. Keep J-4 informed of the activities of the Logistic Division, rear echelon.

APPENDIX D

Directive on Air Priorities

JOINT TASK FORCE ONE
NAVY DEPARTMENT
WASHINGTON 25, D.C.

JTF-1/J-4/L21/lw
Serial: 684

7 March 1946

RESTRICTED

From: Commander, Joint Task Force ONE.
To: Distribution List.

Subject: Crossroads Overseas Air Movements and Priorities.

1. Limited overseas air transportation available to JTF ONE for the support of the Crossroads Operation necessitates close control over movement of personnel and cargo by air. Crossroads personnel and equipment required for the operation are being accepted for air movement overseas only when surface transportation will not suffice to meet time schedules. Applications for air lift received to date are being screened and agencies notified of acceptance and priorities assigned. Lifts are assigned for weekly periods. To insure lift in week assigned, cargo and personnel should arrive on Saturday previous to week scheduled as far as practicable.

2. Priorities applicable to Crossroads transportation only.

a. Crossroads priority J.
First precedence over all other Crossroads traffic on Crossroads transportation. Will only be granted to personnel and cargo, the lack of which will jeopardize or cause postponement of the operation.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE WITH

b. Crossroads priority T.
Second precedence over other Crossroads traffic on Crossroads transportation will be assigned to personnel and cargo which is highly desirable but whose lack will not jeopardize or cause postponement of the operation. CROSSROADS mail is included in this classification.

c. Crossroads priority F.
Last precedence. Assigned to all other personnel and cargo using Crossroads transportation.

d. The priority classification will be assigned by JTF ONE when requested lift is accepted for Air movement and agencies submitting request will be notified accordingly. Priority assigned will be based upon information furnished with application. See paragraph 5 below for instructions.

e. Markings. Agencies will notify shippers to mark shipping papers and cargo with Crossroads priority assigned. Personnel orders will also include Crossroads priority assigned and deadline date at destination if feasible. If not feasible to include in orders, personnel should be furnished a statement by authority issuing orders of Crossroads priority assigned and deadline date at destination.

3. Prior to 2 April 1946, future requests for air lift will be submitted by letter or dispatch to CJTF ONE, thru the agencies indicated below.

a. Request by Engineer Project Y, for air movements of personnel or cargo will be submitted direct to CJTF ONE, Room 1727, Main Navy Building, Washington, 25, D.C., Telephone Republic 7400, Ext. 2339.

b. Request for air movement of Army Ground Force and Army Service Force personnel and cargo will be submitted thru CTG 1.4, Room 2109, Main Navy Building, Washington, 25, D.C., Telephone Republic 7400, Ext. 63191.

c. Requests for air movement of Army Air Force personnel and cargo, including TG 1.5, will be submitted thru the AAF Crossroads Liaison Officer, Room 4D1083, Pentagon Building, Washington, D.C., Telephone Republic 6700, Ext. 72233.

d. Requests for air movement of Navy Crossroads cargo by Navy Bureaus will be submitted thru the Bureau of Supplies and Accounts, Air Cargo Branch, Main Navy Building, Washington 25, D.C. Telephone Republic 7400, Ext. 63103.

e. Request for air movement of Navy Crossroads personnel by Navy Bureaus will be submitted direct to CJTF ONE, same address as in above.

4. After 2 April 1946, request for air lift will be submitted by dispatch to CJTF ONE, thru the agencies indicated below.

a. Request originating overseas will be submitted by respective Task Group Commanders.

b. Requests originating in the United States will be submitted direct to Rear Echelon, CJTF ONE, Room 1727 Main Navy Building, Washington 25, D.C. Telephone Republic 7400, Ext. 2339.

5. It is of utmost importance that the individual making application for air lift and routing instructions for personnel and cargo, submit the following information in substantiation:

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION FOR CLEARANCE NOT REQUIRED

CJTF - ONE
Operational Report - CROSSROADS - PART VII - Special Reports
Section (A) - Logistics

a. Type of Cargo and Task Group to which assigned.
b. Further information upon which to base priority classification.
c. Point of origin.
d. Date shipment will be available at Hamilton Field for lift.
e. Deadline delivery date required at final destination.
f. Number of pieces, weight, and cube of shipment.
g. Weight and dimensions of largest package.

/s/ DAVID H. BLAKELOCK
/t/ DAVID H. BLAKELOCK
By direction

Distribution:

APPENDIX E

JOINT TASK FORCE ONE
U.S.S. MOUNT MCKINLEY (AGC-7), Flagship
c/o FPO, San Francisco, Calif.

CJTF-1/J-43/lvr
File No: L-21
Serial No.: 3532

1 June 1946

From: Commander Joint Task Force ONE.
To : Distribution List.

Subject: Use of Special Shipping Tag and Shipping Procedures on Tested Material (Revised)

Reference: (a) CJTF-1/J-43/L-21/mw, Serial No. 1662, of 25 March 1946, same subject.

Enclosures: (A) JTF-1 Shipping Form No. 1.
(B) JTF-1 Shipping Form No. 2.

1. Reference (a) is hereby cancelled and superceded by this letter. Following revised procedure will be used in returning tested material to the United States.

a. Procedure Prior to Shipment.

a. SHIPPING TAG.

To identify items of tested material and central shipment thereof, a five part shipping tag will be furnished to target ship inspectors and other persons authorized to initiate shipments.

The tag will show:

(1) Date item was inspected.
(2) Technical Activity initiating shipment. (BuShips, BuOrd, Ordnance Dept., etc.).
(3) The headquarters ship, in the target area, housing technical activity in (2).

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED USE MILITARY CLEARANCE NOT REQUIRED
CLASSIFICATION SAFEGUARDS

(4) Brief description of item.
(5) Target ship from which item is being taken.
(6) Test designation. (Able, Baker or both)
(7) Consignee with ultimate destination address in USA.
(8) Signature of authorized officer.
(9) Additional information may be placed on the back of any section of tag where pertinent or necessary.

b. Authorized Officer will dispose of each section of the shipping tag as follows:

(1) Section A

(a) Securely attached to item to be shipped. On large items such as armor plate, tanks, etc., tag identification number will be painted in large figures on the item to identify it in the event that tag becomes detached or blurred.

(b) When item is removed from target ship the name of ship lifting item to U.S.A. will be written in upper right hand corner of this section.

(2) Section B

(a) Give to Target Coordinating Officer of Target Ship involved, who will forward to appropriate technical headquarters in the target area. This will be done at the time item is removed from target ship. Notation will be made on back of stub as to the date of removal from target ship and name of ship lifting item to U.S.A.

(3) Section C,D, and E.

(a) Turn in directly to appropriate

technical headquarters in target area. On back of Section C, the authorizing officer will note approximate cube and weight of item.

c. Air Shipment. Where air lift is essential to prevent deterioration, the word "AIR" will be written in upper right hand corner of all stubs. Stubs will then follow normal course, but special action on item will be taken in accordance with procedure outlined in par. 3 a. (1)

d. Each Technical headquarters in the target area will take following action on sections of the shipping tag received by them:

(1) Section C
Deliver to Transportation Section, (J-43), Logistics Division of JTF ONE, as notification of item requiring shipment.

(2) Section D
Retain for permanent record.

(3) Section E
Airmail to consignee after receiving.
Section B from Target Coordinating Officer.
Section B will then be attached to Section D to confirm removal from target ship.

e. Logistics Division JTF ONE.

(1) On receipt of Section C or on receipt of notification from Target Coordinating Officer that air lift is required, J-43 will allocate item to lift.

(2) Fill out JTF-1 Shipping Form No. 1. (Enclosure A)

3. Shipping procedures.

a. Outgoing tested material will be handled as follows:

(1) Items requiring air shipment to prevent

RESTRICTED DATA
ATOMIC ENERGY ACT - 1948
SPECIFIC CLEARANCE NOT REQUIRED

deterioration will be removed from Target Ship on orders of Target Coordinating Officer after arranging with J-43 for air shipment to Kwajalein, for further shipment by air to USA.

(2) Items for water shipment. The Target Coordinating Officer concerned will arrange for removal to ship lifting item to USA or to intransit cargo ship as directed by J-43.

b. (1) J-43 Section will secure information from CTG 1.3 as to space available on ships of that group, and from Port Director as to available space on other ships bound for USA. The Target Coordinating Officer will be notified of the ships designated for transportation of each item, using JTF-1 Shipping Form No. 1.

(2) J-43 Section will furnish appropriate West Coast Agencies with copies of manifests as outlined in paragraph 4, in order that proper arrangements for receipt, handling and transshipment to ultimate destination can be made.

(3) J-43 Section will maintain a log on all Section C stubs received from headquarters of technical services and on manifests issued showing:

(a) Date stub was received.
(b) Name of ship or aircraft designated to receive item.
(c) Date that Target Coordinating Officer was notified of this designation.
(d) Date item was placed aboard ship, lifting it to USA.
(e) Serial number on manifest involved and date it was airmailed by J-43 Section to West Coast Agencies.

e. In the event special crating or handling is required, beyond the capacity of the Target Ship's crew, CTG 1.8 will provide necessary service.

4. Use of JTF-1 Shipping Form No. 1, Ocean Manifest for Tested Material.

a. This form will be filled in at J-43 office and will serve dual purpose of ocean manifest and notification to Target Coordinating Officer as to the ship on which material is to be placed.

b. The form will be prepared with original (white), 3 white, 2 green, and 2 canary colored copies. Distribution and use of copies will be as follows:

(a) Water lift. On notification that shipment is aboard ship lifting it to USA, original and first white copy will be airmailed by J-43 to SO, NSD, Oakland (Freight Transhipment Branch). These copies will furnish information necessary to prepare bladings for shipment of material within USA.

(b) Air lift. In the case of material going by air, original and first white copy will be airmailed by J-43 to JTF-1 Log Office, Fairfield Suisun, AAB, Fairfield, California so that preparations for forwarding material by ATC to consignees can be made.

(c) Green copies

(a) Both copies will go to Target Coordinating Officer. One copy will accompany material to ship or plane designated by J-43 to lift item from

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

Bikini, where it will be signed by Cargo Officer and returned to Target Coordinating Officer as his receipt. The second copy will be retained by Target Coordinating Officer for record until receipted copy is returned.

(3) Canary Copies

(a) Will accompany green copies to Target Coordinating Officer and then pass with material from Target Ship to ship or plane lifting material from Bikini. One copy will be retained by the carrier involved and second copy will accompany items when turned over to NSD, Oakland, or to JTF-ONE Log Office at Fairfield Suisun AAB, whichever is applicable.

5. Manifests covering tested material to be temporarily placed aboard an intransit cargo ship will have JTF-1 Shipping Form No. 2 (Enclosure B) attached in triplicate. The original will be retained by the Cargo Officer of the intransit cargo ship; one receipted copy will be returned to the Target Coordinating Officer and second receipted copy will be sent to J-43 section as notification that cargo is aboard this ship.

DAVID H. BLAKELOCK
By direction

Distribution List:

JTF-1 SHIPPING FORM NO. 1
JTF-1 OCEAN MANIFEST FOR TESTED MATERIAL

Serial No. _____ Date _____

Shipped Via Surface or Air [Delete one]

Shipped on _____ [If by surface] From _____

[Ship lifting to U.S.A.] [Target Ship]

TAG NO.	CONSIGNEE WITH ADDRESS	DESCRIPTION OF ITEM	WEIGHT	CUBE.

I have this date received the above items

[Signed] _____

Cargo Officer, _____

[Carrier from Bikini]

I have this date received above items from Cargo Officer, _____ [SHIP]

[Signed] _____

[For NSD Cashier or JTF-1 Shipping Office Fairfield Suisun, Calif.]

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

ENCLOSURE (A) VII - (A) - 125

JTF-1 SHIPPING FORM NO. 2

_____
(Date)

From: J-43 Section, JTF-ONE
To : Cargo Officer, _____
(Intransit Cargo Ship)
Information: Target Coordinating Officer, _____
(Target Ship)

Freight covered by attached JTF-ONE, Ocean Manifest, Serial No. _____ is to be held on your ship until the ship lifting it to USA is ready to receive it. At that time you will receive notification from J-43.

(Signed) _____
For J-43 Section, JTF-ONE

- -

To: (1) Target Coordinating Officer, _____
(Target Vessel)
(2) J-43 Section, USS Mount McKinley

I have this date received items listed on JTF-ONE Ocean Manifest, Serial No. _____ for temporary storage.

(Signed) _____

Cargo Officer, _____
Intransit Cargo Ship

Enclosure B.

APPENDIX F

The following vessels of TG 1.8 furnished supplies for Crossroads Operation as noted.

BIKINI

SHIP	DATE	SUPPLIES
QUARTZ IX-150	6 April 1946	Dry Provisions
TOMBIGBEE AOG-11	12 April 1946	Water
YO-132	17 April 1946	Fuel Oil
AJAX AR-6	4 May 1946	See note (1)
WILDCAT AW-2	12 May 1946	Water
YW-92	12 May 1946	Water
YOG-63	14 May 1946	Diesel Oil (4)
YO-199	19 May 1946	Fuel Oil
POLLUX AKS-4	20 May 1946-	GSK, SSS, and C&SS
YOG-70	21 May 1946	Diesel Oil and MoGas(4)
TOLOVANA AO-64	23 May 1946	Diesel Oil and Lubricants
SEVERN AO(W)-61	24 May 1946	Water (3)
DIXIE AD-14	24 May 1946	See note (1)
FULTON AS-11	24 May 1946	See note (1)
AUCILLA AO-56	25 May 1946	Fuel Oil, Diesel Oil and Lubricants
CHIKASKIA AO-54	26 May 1946	Fuel Oil and Lubricants (2)
ENOREE AO-69	13 June 1946	Fuel Oil, Diesel Oil and Lubricants

KWAJALEIN

YF-754	22 April 1946	Medical Supplies
YC-1009	7 May 1946	Mooring Gear
YF-734	7 May 1946	GSK
LIMESTONE IX-158	13 May 1946	GSK
YF-991	14 May 1946	Electronic Spares
YF-992	14 May 1946	Electronic Spares
YF-385	28 May 1946	Fresh and Frozen Provisions
YF-752	28 May 1946	Dry Provisions

The following ComServPac reefer ships made deliveries of fresh and frozen provisions to ships at Bikini and Kwaj-

721479 O—46——22

alein during Crossroads Operation.

SHIP	DATE
GRAFFIAS AF-29	5 April 1946 (5)
KIRSTEN AF-34	20 April 1946
KARIN AF-33	19 May 1946 (6)
VALENTINE AF-47	20 May 1946
MERAPI AF-38	25 June 1946
HYADES AF-28	17 August 1946
ALSTEDE AF-48	25 September 1946

Notes:
(1) Acted as "Mother Ship" providing fresh, frozen and dry provisions, GSK, SSS, and C&SS items to destroyers and smaller sized vessels as required. Replenished stocks for issue to these vessels from supply ships.
(2) Made two trips to Kwajalein to refill from tank farm during Operation.
(3) Made two trips to Pearl Harbor to refill during Operation.
(4) Made one trip to Kwajalein to refill from tank farm during Operation.
(5) Made second delivery 16 June 1946.
(6) Made unscheduled partial discharge when refrigeration plant in one hold broke down while passing through area.

APPENDIX G
PART I
UTILIZATION OF TASK FORCE SHIPS:
Cargo and Personnel Moved to Forward Area

SHIP		CARGO S/Tons	CARGO M/Tons	PERSONNEL Off/Civ	PERSONNEL Enl	PERSONNEL Tot.
USS ROLETTE (AKA99)		2528	3681		NCB Detachment	
USS OTTAWA (AKA101)		1933	4497		NCB Detachment	
USS GEO. CLYMER (APA 27)		483	1728	25	418	443
USS ROCKINGHAM (APA 229)	1st Trip	286	1058		TG 1.5 personnel	
USS ROCKINGHAM (APA 229)	2nd trip	150	322		Misc. XRoads Pers (Repl)	
USS ROCKWALL (APA 230)	1st Trip	494	1412		TG 1.5 personnel	
USS ROCKWALL (APA 230)	2nd Trip	30	61		Misc. XRoads Pers (Repl)	
USS ROCKBRIDGE (APA 228)	1st Trip	136	297	1		1
USS ROCKBRIDGE (APA 228)	2nd Trip	272	608		Misc. XRoads Pers (Repl)	
USS BAYFIELD (APA 33)		1210	2093	20	27	47
USS BONITO (APA 45)		2634	3517	29	40	69
USS BEXAR (APA 237)		1267	3106	37	504	541
USS BOTTINEAU (APA 235)		32	63		No XRoads personnel	
USS SAINT CROIX (APA 231)		CB Equipment			NCB Detachment	
LST 52		CB Equipment				
LST 133		Pontoon Causeways				
LST 220		CB Equipment				
LST 388		Pontoon Causeways				
LST 817		CB Equipment			NCB Detachment	
LST 881		CB Equipment			NCB Detachment	
USS ARTEMIS (AKA 21)		591	557		Army Ground Group Det.	
USS INDEPENDENCE (CVL 22)		28	37			
USS SHANGRI LA (CV 38)		112	876		Technical personnel	
USS HAVEN (AH 12)		34	67			
USS KENNETH WHITING (AV 14)		1	7			
USS PANAMINT (AGC 13)		7	11		Observers	
USS BLUE RIDGE (AGC 2)					Observers	
USS APPALACHIAN (AGC 1)					Press	
		12,228	23,998			

RESTRICTED DATA
VII - [illegible]
ATOMIC ENERGY ACT - 1946
USE MILITARY CLASSIFICATION SAFEGUARDS

Part I (Cont'd)

Cargo and Personnel Moved to Re r Areas as of 10 August 1966

SHIP			Off/Civ	Enl	Total
USS [illegible]CKINGHAM (APA 237)			35	835	9.0

Task Group 1.5 Movement

SHIP	CARGO S/Ts	CARGO M/Ts	PERSONNEL Off/Civ	PERSONNEL Enl.	PERSONNEL Total
USS MAYFIELD (APA 33)	250	410	48	729	777
USS APPLING (APA 58)	150	280	16	176	192
LST 871	380	1509	Cargo Security Detachment		
LST 969	475	2025	Cargo Security Detachment		
	1,255	4,224	99	1,790	1,889

"REDTAG" Shipments

USS SAINT CROIX (APA 231)			Casuals and Separatees
USS ARTEMIS (AKA 21)			Army Ground Group Detachment
USS ROCKINGHAM (APA 229)	638	1209	Target Ship Crews
USS ROCBRIDGE (APA 228)			Target Ship Crews
USS APPLING (APA 58)			16 176 192 (TG 1.5)
USS AVERY ISLAND (AG 76)			Technical Personnel and Casuals

MISCELLANEOUS AND CASUAL FREIGHT

USS SAINT CROIX (APA 231)		
USS ARTEMIS (AKA 21)	196	1078
USS ROCKINGHAM (APA 229)		

SPECIAL [illegible] USS MISSILE [illegible] SUBJECT [illegible]

PART II

OTHER SHIPPING

Cargo and Personnel Moved to Forward Area

SHIP	CARGO S/Tons	CARGO M/Tons	PERSONNEL Off/Civ	PERSONNEL Enl.	PERSONNEL Total
USS TATE (AKA 70)	908	4137	2	62	64
SS CAPE HENRY	15	64	No XRoads Personnel		
USS SHOSHONE (AKA 65)	38	78	No XRoads Personnel		
SS WESTERN RESERVE VICTORY	58	245	No XRoads Personnel		
USS THOMAS JEFFERSON (APA 30)	71	792	No XRoads Personnel		
USAT CHAS ALLISON ORTH	1	2	7	87	94
USS ALAMANCE (AKA 75)	425	1079	No XRoads Personnel		
USS OGLETHORPE (AKA 100)	252	1100	7	1	8
USS MURZIM (AK 95)	41	60	No XRoads Personnel		
USS OAKHILL (LSD 7)	17	36	2		2
USS KERSHAW (APA 176)	78	61		35	35
USS VALENTINE (AF 47)	3	5	No XRoads Personnel		
USS FREMONT (APA 44)	129	286	4	78	82
USS PRES. HAYES (APA 20) 1st Trip	3	4	No XRoads Personnel		
USS PRES. HAYES (APA 20) 2nd Trip	8	10		466	466
USS ANDROMEDA (AKA 15) 1st Trip	30	72	No XRoads Personnel		
USS ANDROMEDA (AKA 15) 2nd Trip	3	9	No Passengers		
SS TOLOA (Comm Oper)	20	9	No XRoads Personnel		
SS MICHAEL [illegible]	317	628	No XRoads Personnel		
USS GLYNN (APA 239)	202	325	No XRoads Personnel		
SS SEVIER (APA 233)	21	30	No XRoads Personnel		
USS WHITESIDE (AKA 90)	53	76	No XRoads Personnel		
USS BOLLINGER (APA 234)	466	590	No XRoads Personnel		
USS LEO (AKA 60)	217	497	No XRoads Personnel		
SS LIBERTY VICTORY	1	1	No XRoads Personnel		
SS LONGVIEW VICTORY	147	283	No XRoads Personnel		
SS SEA CAPTAIN (Comm Oper)	17	252	No XRoads Personnel		
SS ZANESVILLE VICTORY	12	41	No XRoads Personnel		
USS SYLVIA (AF 28)	27	106	No XRoads Personnel		
	3,580	10,378			

Authority NND 760305
By [illegible] NARA, Date 1976
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

RESTRICTED DATA

PART II (Cont'd)

Cargo and Personnel Moved to Rear Area as of 10 Aug. 1946

"RED TAG" SHIPMENTS

SHIP	CARGO S/Tons	CARGO M/Tons	PERSONNEL
USS CHILTON (APA-38)	151	549	Casuals and Separatees

MISCELLANEOUS AND CASUAL FREIGHT

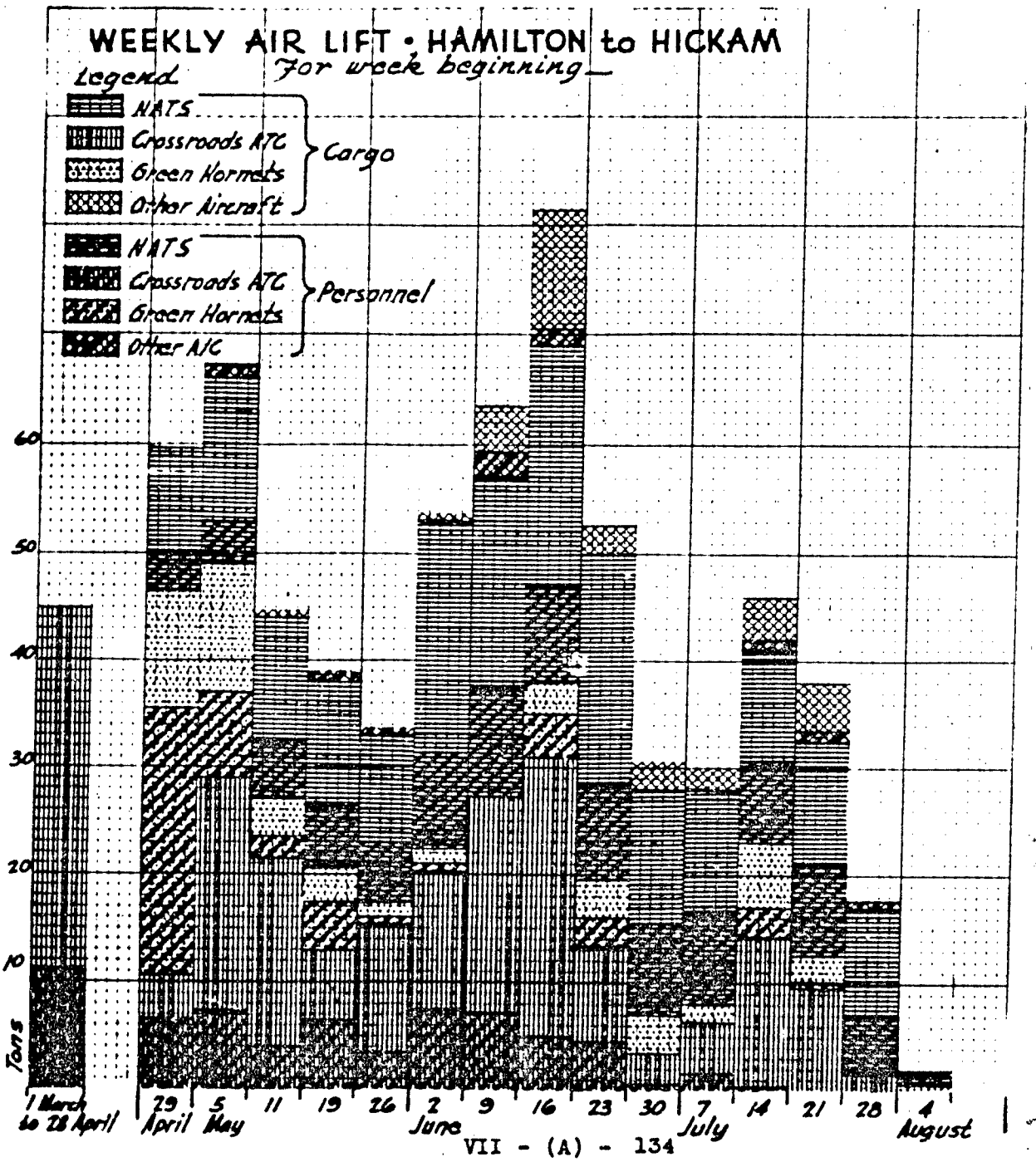
USS BOLLINGER(APA-234)) USS CHILTON (APA-38))	21	55	Casuals and Separatees

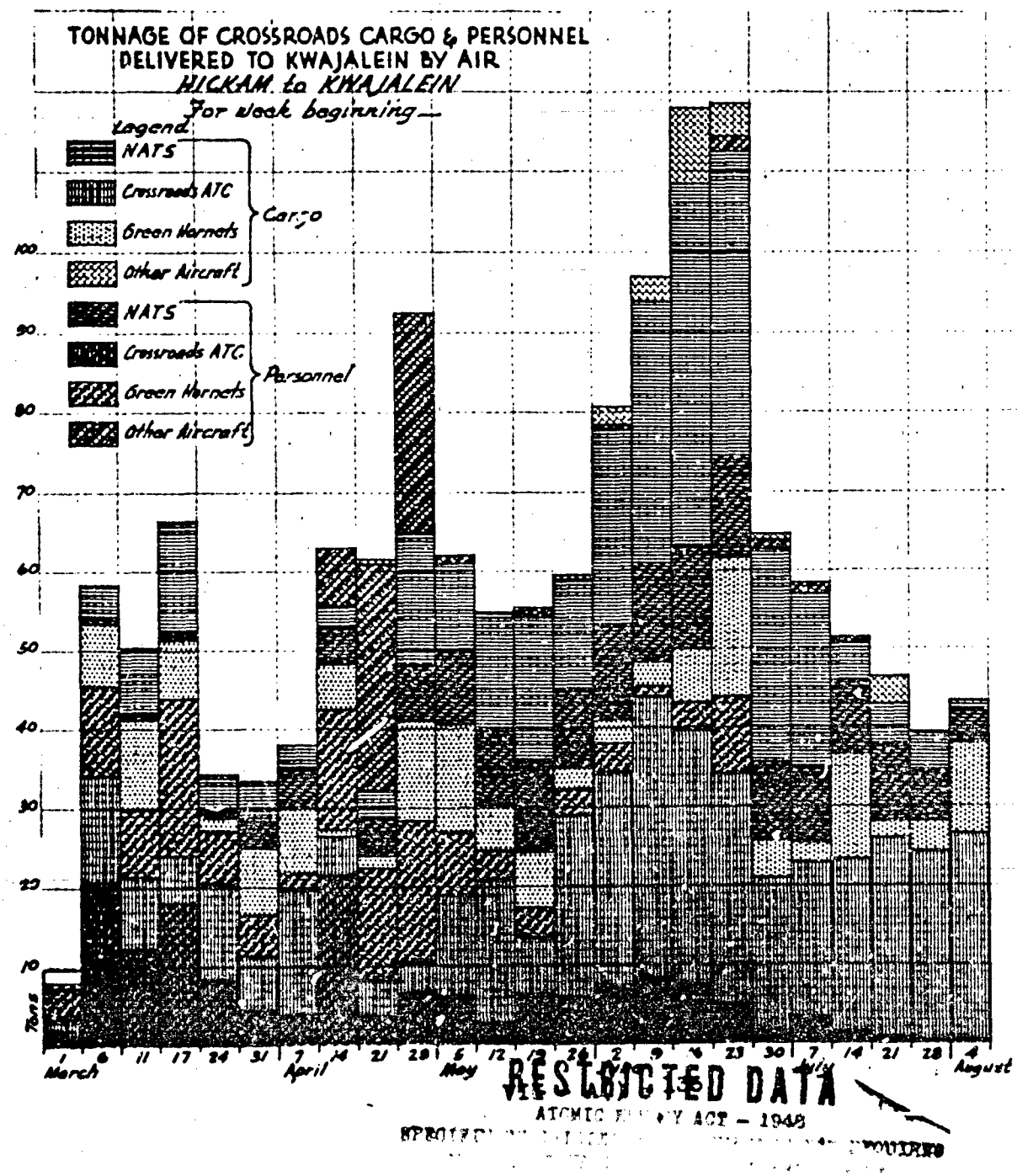
APPENDIX H

AIR LIFT CHARTS

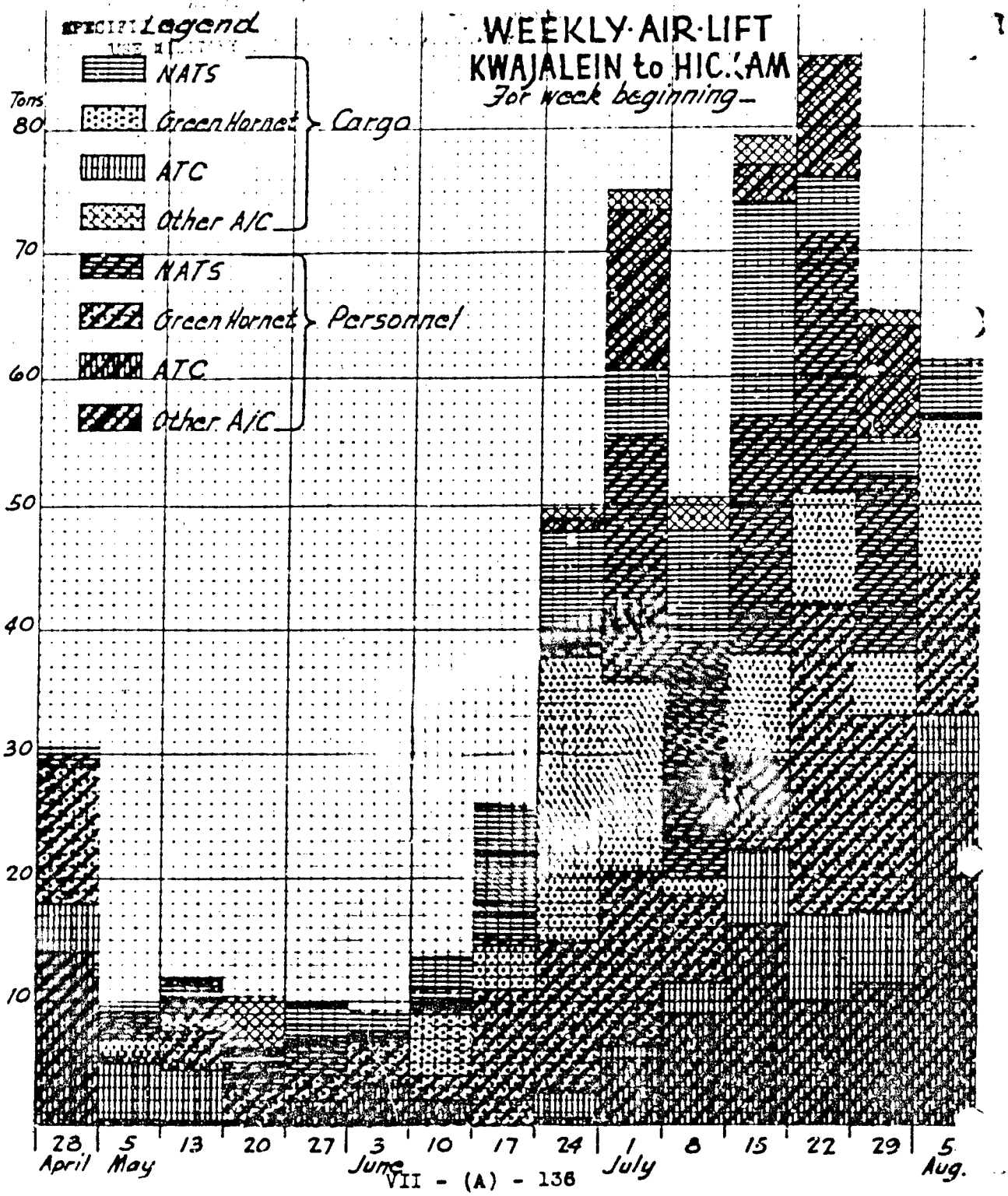
VII - (A) RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

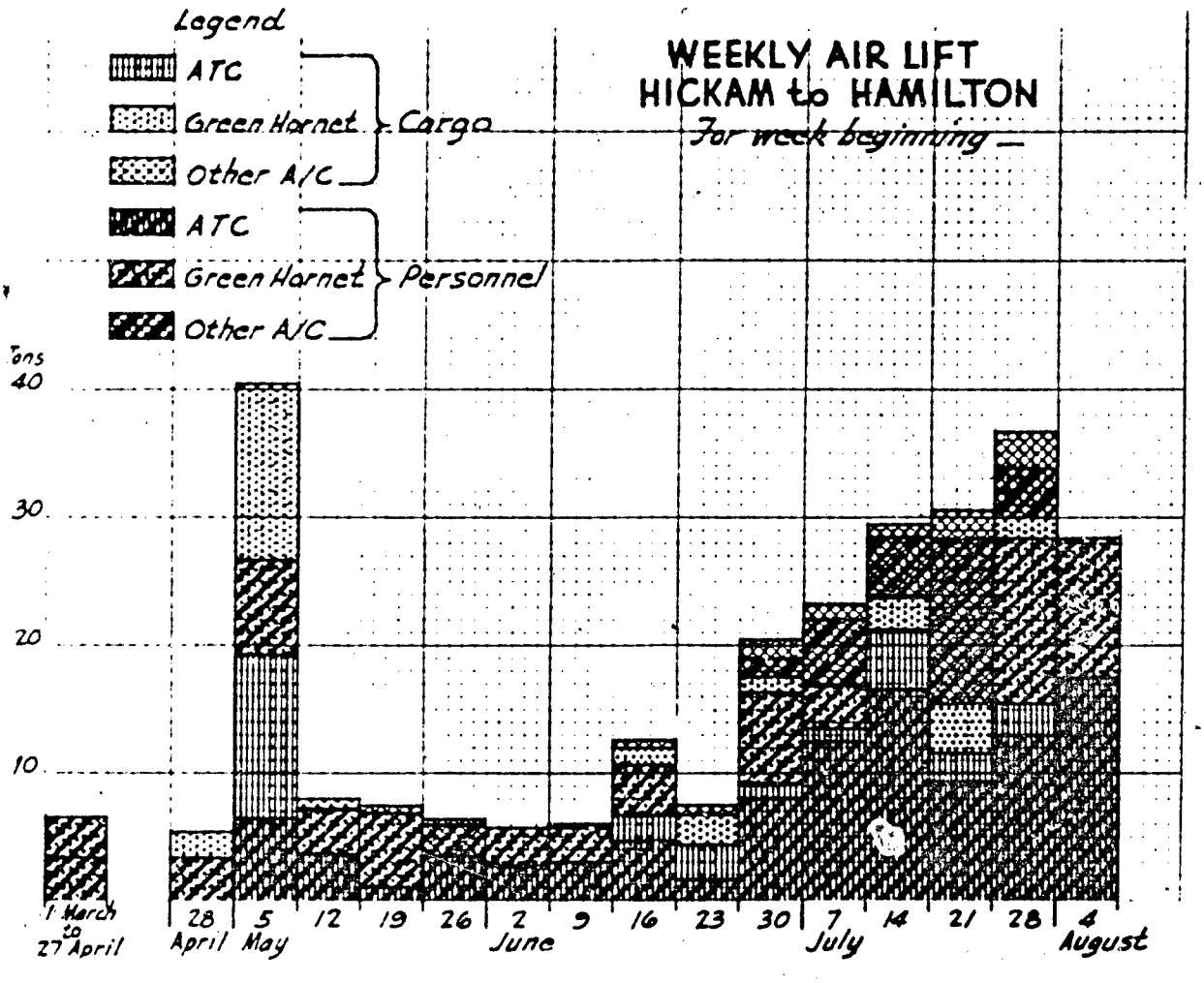
RESTRICTED DATA





RESTRICTED DATA
ATOMIC ENERGY ACT – 1946


WEEKLY AIR-LIFT
KWAJALEIN to HIC.AM
For week beginning—
Legend
NATS
Green Hornet
ATC
Other A/C
Cargo
NATS
Green Hornet
ATC
Other A/C
Personnel
Tons
80
70
60
50
40
30
20
10
28 April
5 May
13
20
27
3 June
10
17
24
1 July
8
15
22
29
5 Aug.



RESTRICTED DATA
ATOMIC ENERGY ACT – 1946

RESTRICTED DATA

JTF ONE SHIPPING FORM NO. 3
NOTICE OF BOOKING

NO. _____

_____
(Date)

From: J-43 Section, JTF One.

To: _____

_____

Subject: Booking of Cargo.

1. Your request to lift _____ Lbs., _____ Cube of cargo from _____ to _____ is at hand.

2. At the present time no lift is available. Your request is therefore being booked, and as soon as lift becomes available, notification and instructions will be sent you by dispatch or letter. In future correspondence use above reference number.

J-43 Section, JTF One.

By _____

- -

JTF ONE SHIPPING FROM NO. 4
SHIPPING NOTIFICATION

NO. _____

_____
(Date)

From: J-43 Section, JTF One.

To: _____

_____

Subject: Shipping of Cargo.

1. In accordance with your (Request) (Notice of Booking No. _____, dated _____), your lift covering _____Lbs., _____ Cube cargo destined for shipment from _____ to _____, has been assigned for lift to _____ ; ETD _____.
(Name of Ship) (Date)

Delivery should be made to (this ship) (USS ROLETTE, AKA 99, Intransit Cargo Ship) by _____.

J-43 Section, JTF ONE

By _____

APPENDIX K

JOINT TASK FORCE ONE
U.S.S. MOUNT MCKINLEY (AGC-7), Flagship
c/o FPO, San Francisco, Calif.

CJTF-1/J-43/L20-1/L21-1/lvr 5 June 1946
Serial No. 3563 (With revisions made by Serial 3737 of 12 June '46, in paragraphs 3a and 4b)

From: Commander Joint Task Force ONE
To: Distribution List

Subject: Procedure for Handling Passengers and Freight at Bikini (Revised)

Reference: (a) CJTF-1/J-43/L20-1/lvr of 5 April 1946, same subject.

Enclosure: (A) Operating Schedule, LCI Shuttle Service, Bikini to Kwajalein.

1. Reference (a) is hereby cancelled and superseded by this letter.

2. Following procedures will be used in handling passengers and freight traffic at Bikini.

3. Inbound Passengers.

a. By Seaplane. Passengers will be transferred from the seaplane to the seaplane tender, ORCA (AVP-49), by facilities of that ship. TU 1.8.3 will have boat at ORCA to transfer passengers to the ship for which destined or to USS AJAX where they will report to Personnel Officer (CTU 1.8.14) for quarters assignment.

(REVISION)

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

b. By Water. CJTF-1 (J-1 Division) will advise Port Director as to the ships to which arriving passengers will be assigned for quarters. The Port Director will arrange with TU 1.8.3 for necessary craft to transfer passengers to their assigned ships.

4. Outbound Passengers.

a. By Seaplane. Individuals will book passage with CJTF-1 (J-4 Division) who will specify time individuals are to report on board the seaplane tender. Transportation to the seaplane tender will be by boat from the individual's ship or by boat furnished by TU 1.8.3 on request. The seaplane tender will be responsible for placing passengers on board the outbound plane.

b. Casuals by Water. Individuals will book passage with Personnel Officer (CTU 1.8.14) on USS AJAX who will designate the ship that will make the lift and the time for boarding. Transportation to the assigned ship will be by boat from the individual's ship or by boat furnished by TU 1.8.3 on request.

(REVISION)

5. Outbound Freight.

a. By Air. Information as to weight, cube, ready date, and reason for requesting air lift will be given CJTF-1 (J-4 Division) who will arrange for air lift and notify consignor when the shipment should be placed aboard the seaplane tender. CTG 1.8 will notify CJTF-1 (J-4 Division) of the weight of outgoing air mail and will place same aboard the seaplane tender without prior booking. Transportation to the seaplane tender will be by consignor's boat or will be furnished by TU 1.8.3 on request.

b. By Water. Information as to weight, cube, and ready date will be given CJTF-1 (J-4 Division) who will designate ship to make the lift. Transportation to the designated ship will be by consignor's boat or will be furnished by TU 1.8.3 on request.

c. Tested Material. Procedure outlined in CJTF-ONE Serial 3532, dated 1 June 1946, Subject: "Use of Special Shipping Tag and Shipping Procedures on Tested Material, Revised," will be followed.

d. Shipping Documents. The Supply Officer of the organization or ship, which initiates a shipment, will be responsible for the preparation of necessary shipping documents.

6. Intransit Cargo Ship.

a. The USS ROLETTE (AKA-99) has been designated as an intransit cargo ship and will be used to hold incoming freight until delivery can be made to consignee, and as an assembly point for outgoing freight awaiting availability of outbound lift.

b. Procedures covering use of this ship are outlined in "Commander Service Division ELEVEN Service Information Bulletin--Change No. 3" dated 31 May 1946 and in par. 5, "Use of Special Shipping Tag and Shipping Procedures on Tested Material (Revised) dated 1 June 1946.

Distribution List.

J. A. SNACKENBERG
Chief of Staff

COMSERVPAC	(2)
ATCOM Kwajalein	(5)
LOG REP Kwajalein	(5)
CJTF-1 List 1	(2 each adee)
CJTF-1 List 11	
FILE	(50)

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIAL VII (A) CLEARANCE NOT REQUIRED

APPENDIX L

HOSPITALIZATION ACTIVITIES

Hospitals	Beds Empty	Beds Occupied	Sick with Communicable Diseases	Force Strength	To Duty	Disposition To Pearl Harbor By Air	By Water	To Hospitals [illegible]
			Week ending 26 June 1946					
Shore Hosp	203	78	58	2948 Ashore	49	4	0	2
Sick Bays	1050	125	42)		154	0	0	32
Hosp Ships	1041	163	41)	34918 Afloat	35	4	0	0
Totals	2294	366	141	37866	238	8	0	34
			Week ending 3 July 1946					
Shore Hosp	246	44	24	2900 Ashore	42	6	0	0
Sick Bays	970	133	24)		160	0	0	42
Hosp Ships	1030	174	32)	35837 Afloat	71	5	0	0
Totals	2246	351	80	38737	273	11	0	42
			Week ending 10 July 1946					
Shore Hosp	179	65	29	2867 Ashore	16	2	0	5
Sick Bays	931	124	36)		150	0	0	46
Hosp Ships	987	218	30)	35451 Afloat	50	0	10	0
Totals	2097	407	95	38318	216	2	10	51
			Week ending 17 July 1946					
Shore Hosp	190	50	20	2863 Ashore	28	11	0	2
Sick Bays	1013	116	27)		145	0	0	41
Hosp Ships	999	205	16)	36754 Afloat	67	3	0	19
Totals	2202	371	63	39617	241	14	0	62
			Week ending 24 July 1946					
Shore Hosp*				2600 Ashore				
Sick Bays	560	96	22)		89	0	0	17
Hosp Ships	682	74	7)	33566 Afloat	36	0	62	0
Totals	1242	170	29	36166	125	0	62	17

RESTRICTED
CJTF - ONE
Operational Report - CROSSROADS - PART VIII - Special Reports
Section (A) - Logistics

Hospitals	Beds Empty	Beds Occupied	Sick with Communicable diseases	Force Strength	DISPOSITION To Duty	To Pearl Harbor by Air	To Pearl Harbor by Water	To Hosp Ship or Shore Hosp
Week ending 31 July 1946								
				1594 Ashore				
Shore Hosp*								
Sick Bays	566	101	29)	29669 Afloat	89	0	0	17
Hosp Ships	687	69	5)		27	0	0	0
Totals	1253	170	34	31263	116	0	0	17
Week ending 7 August 1946								
				1058 Ashore				
Shore Hosp*								
Sick Bays	419	83	16)	25823 Afloat	92	0	0	15
Hosp Ships	668	88	9)		37	0	0	0
Totals	1087	171	25	26881	129	0	0	15

* Indicates no report received.

RESTRICTED DATA

APPENDIX M

CONSTRUCTION AT BIKINI ATOLL

FOR TESTS ABLE AND BAKER

BIKINI:

5 @ 75 ft. steel towers and site clearing

4 @ 20 by 20 ft. steel huts

2 @ 25 ft. wood towers

1 Air Coordination unit

6 Pontoon causeways

2 Swim floats

Sea Bee shops and other facilities

Seaplane landing ramp

10 Wave measurement piles, plus sight clearing and painted trees.

Fleet Recreation Area for 1000 civilians and officers and 6000 enlisted men, including:

Water distillation (use 8000 g.p.d.) and Distribution system

Swimming facilities

Shore Patrol and dispensary building

3 Life guard platforms

Enlisted men's club 16 x 300 ft.

Officers club 20 x 200 ft.

- -

5	Enlisted men's concrete basketball courts
10	Enlisted men's volley ball courts
4	Enlisted men's softball diamonds
	Trap shooting range
	Officers concrete athletic court, 100 x 100 ft.
26	Dressing tents
14	Heads and urinals
3	Photo Beacons
	Sonobuoy work shop and assembly area
	Instrument raft assembly yard
4	Moorings
	Security fence

AMEN:

4 @	75 ft. steel towers
5 @	20 by 20 ft. steel huts
	Sonobuoy receiver platform
	Portable radar installation
	Seismic hut
	35 Man camp
	Ball diamond

RESTRICTED DATA
VII - (A) - ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CONTAINED

Sea Bee shop installations

10 Barge evacuation moorings

Wave measurement piles

Photo beacons

Pontoon causeways

ENYU:

3 @ 75 ft. steel towers and site clearing

3 @ 20 by 20 ft. steel huts

1 @ 25 ft. wooden tower

Seismograph hut

Camera vision clearing

Wave measurement clearing and painted trees

Sea Bee shops

Pontoon causeway

Concrete basketball court

Radio beacon installation

2 Photo beacons

25 man camp

ERIK:

Practice bombing target

Radar installation

Radio beacon

2 @ 25 ft. wooden bomb spotting towers

RESTRICTED DATA
SPECIFIC PE... REQUIRED
USE MI... ...ADS
RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VII - SPECIAL REPORTS

SECTION (B) - COMMUNICATIONS AND ELECTRONICS

1. INTRODUCTION.

1.1. The important part played by communications and electronics in the successful completion of Atomic Bomb Tests Able and Baker is best indicated by the following statement made for publication by Commander Joint Task Force ONE at the request of Electronic Exhibitors:

> "Electronics, one of the outstanding developments of World War II, also proved to be of major importance in the recently completed Atomic Bomb Tests at Bikini. The communication and electronic plan for these great peace-time scientific and military experiments contained a total of 203 different channels involving 348 frequencies ranging from 300 kcs to 30,000 mcs. These included such functions as: Task Force communications; shipborne, airborne and land based radar and other navigational aids; press radio teletype, radio photo and broadcast; television and telemetering; control of drone boats and drone aircraft; and the use of radio signals for the remote operation of scientific instruments and to fire the bomb in Test Baker."

Some conception of the relative importance of the communication and electronic facilities involved may be obtained from the following recapitulation of channels and frequencies mentioned above:

Command and Administration	85 Channels 163 Frequencies

2 @ 25 man camps

PRAYER:

Army aerological installation

Revetment

25 man camp

CHERRY:

Seismograph hut

ROMAR:

Photo beacon

YURO:

Seismograph hut

NAMU:

Seismograph hut

ARAN:

Anchorage for test Charlie

MAXY:

Anchorage for test Charlie

ORUK:

Anchorage for test Charlie

BOKU:

Anchorage for test Charlie

BORO:

Anchorage for test Charlie

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

Electronic Instrumentation	107 Channels 107 Frequencies
Press (Radio Photo, Broadcast and Press Teletype)	11 Channels 78 Frequencies

1.2. The following report on communications and electronics during Operation Crossroads is presented from the operational standpoint. It makes no attempt to go into a detailed discussion of the Communication and Electronics Plan (Annex "C" to CJTF-1 OpPlan No. 1-46) nor of routine communications and electronics during the operation, but contains only such information as might be of assistance in future joint operations of a similar nature. The report is divided into three main parts: Planning and Preparation; Execution; and Comments and Recommendations.

2. PLANNING AND PREPARATION.

2.1. Personnel. The officer personnel of the Communication Section of the Staff was composed of the following:

Force Communication and Electronic Officer - Navy Captain
Deputy Communication and Electronic Officer - AAF Colonel
Ass't. for Army Communication & Electronics - Signal Corps Colonel
Ass't. for Navy Communication & Electronics - Navy Lt. Comdr.
Ass'ts. for Press Communication - Navy Comdr. & Signal Corps Major
Signal Officer (also Flag Lieutenant) - Navy Lt. Comdr.
Radio Officer - Navy Lieutenant
CWO's, Coding Officers, etc. aboard Flagship - 25 Navy Junior Officers

The enlisted complement was composed of 20 signalmen, 20 teletype operators, 20 ETM's, 6 yeomen and 120 radiomen. These figures are exclusive of the

RESTRICTED DATA

11 officers and approximately 160 Army and Navy enlisted communication and electronic personnel supplied by Commander Joint Task Force ONE to Kwajalein, Guam and Eniwetok for Operation Crossroads.

2.2. Equipment. Considerable special electronic equipment, such as radio teletype, radio photo, radio broadcast, television, and additional receivers and high-powered transmitters were installed on board key ships of the Task Force and on the island bases by the Army and Navy. Special cryptographic systems (CSP 1515 and One Time Tape - known by the Army as Sigcom and Sigtot, respectively) were provided in addition to the standard Army-Navy ECM's to simplify the coding and speed up the handling of classified technical traffic within the Task Force and to the Rear Echelon and Manhattan District. With the above exceptions, standard Army and Navy communication and electronic equipment already installed was considered to be sufficient.

2.3. Communication and Electronic Plan. The Communication and Electronic Plan (Annex "C") was prepared at the Navy Department Headquarters of Joint Task Force ONE in February and advance copies were mailed to interested commands and activities early in March. It was based primarily on PAC 70(B), the Communication Plan which had served so well for joint operations during the recent war in the Pacific, and provided the various functional channels described in 1.1 above. Details of this plan and the supporting Air Communication Plan were worked out by the Army and Navy officers of the Communication Section of the Joint Task Force Staff, with the active assistance of representatives of the Director of Naval Communications, the Chief Signal Officer and the Air Communications Officer. Special administrative calls for all of the major commands and activities within the Task Force were established, cleared and promulgated on a joint

basis to the Army and Navy Communication Services. Frequency allocations were similarly requested, cleared and assigned to the 203 channels involved while still in Washington, employing in this connection the simple but vital rule that any one frequency would be allocated for only one purpose. Finally, it was decided to use the Naval Communication Service as the primary means of handling the Task Force communications, inasmuch as a large majority of the units involved were naval, but this was to be augmented as necessary by Army Communication facilities, and joint procedure was to be used throughout.

2.4. Training. The establishment of a Joint Task Force ONE Communication Office in the Navy Department at an early date in the planning stage, and the later installation of a teletype station, provided valuable training for Communication Watch Officers and teletype operators, in addition to relieving the Navy Department Communication Office of some of the burden of handling the large volume of Task Force traffic. The assistance of Radio Washington in training teletype operators, supervisors and coding officers and of the Communication Security Section of the Division of Naval Communications in training communication officers in cryptographic security was also of great value. Finally, the fact that the Flagship MT. MCKINLEY steamed singly from the West Coast to Bikini, with stops at Pearl and Kwajalein enroute, provided a good opportunity for the consolidation of the flag and ship communication personnel and the shaking down of this organization into a reasonably well-trained group before it had to assume direct control of Task Force Communications in the Bikini area.

2.5. Other Preparations. Radio teletype conferences on communication plans and problems (the latter being largely personnel), were held with

RESTRICTED DATA
AT
SPECIAL HANDLING REQUIRED
NOT RELEASABLE TO FOREIGN NATIONALS
RESTRICTED - MILITARY CLASSIFICATION SAFEGUARDS

- -

CinCPac and ComGenAFMidPac communication officers prior to departure of the Staff from Washington. An Army Signal Corps major was sent to Pearl in April to act as Joint Task Force ONE liaison officer there and at Kwajalein, and to coordinate the activities of the Press Ship SPINDLE EYE at Kwajalein -- a conference of interested representatives of the Chief Signal Officer, the Director of Naval Communications and Army and Navy officers from the Public Information and Communication Sections of the Staff having decided that the services of this well-equipped but slow ship could best be used at that important Task Force base. Also, the Navy Comdr. in Charge of JCC Kwajalein was ordered to temporary additional duty with CJTF-1 Staff for liaison purposes. The stops of the Flagship at Pearl and Kwajalein enroute to Bikini made possible further valuable conferences between Task Force and Pacific Army and Navy communication officers; and the conference at the Submarine Base Auditorium in Pearl, at which members of the Staff briefed the task group commanders and commanding officers on the Operation Plan, gave the Force Communication and Electronic Officer an excellent opportunity to state the communication policy for the operation. This policy, based on Annex "C", as modified of necessity by the acute shortage of communication personnel in the Task Force as a whole, was briefly:

> Do not send any dispatches which are not absolutely necessary; Draft dispatches whenever practical so that they may be sent plain language and thus avoid coding delays and difficulties; and use dispatch boat, visual and radio, in the order named, for delivery of traffic at Bikini.

3. EXECUTION.

In general, the provisions of Annex "C" were

adequate and communications and electronics functioned satisfactorily during the entire operation. The following paragraphs discuss certain factors and conditions which affected performance, or are otherwise worthy of mention.

3.1. Personnel. The lack of sufficient communication and electronic personnel, and the inexperience of a considerable percentage of the personnel available, was one of the most serious handicaps in the conduct of communications and the operation and maintenance of electronic equipment. This acute shortage of trained personnel, an inevitable result of the demobilization period in both the Army and Navy, was felt most seriously by the communication facilities at Kwajalein, Eniwetok, Roi and Guam, and by Task Group 1.5, (Army Air Group). A barely adequate number of personnel was made available to the operating ships and to the island bases only by stripping target vessels to one radioman and one to three ETM's each, and by transfers from CJTF-1's flag allowance and between the operating ships.

3.2. Frequencies and Propagation. Frequency assignments made during the planning period in Washington from the list of frequencies obtained by joint allocation did not have the benefit of being based on detailed ionospheric studies or local experience in the Bikini-Kwajalein area. As a consequence, many frequencies did not prove satisfactory upon arrival in the operating area. This was particularly true of those assigned to the radio teletype circuits between the MT. MCKINLEY and Kwajalein and Pearl, and the voice conference circuit between the flagship and Kwajalein. A poor initial assignment of frequencies was complicated by the propagation difficulties encountered over the two hundred and ten miles separating Bikini and Kwajalein. It was only after numerous shifts of frequencies, based on ionospheric

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

predictions and local experience that satisfactory voice and teletype communications were obtained, and this never reached the point of being completely reliable twenty-four hours a day. The teletype frequencies which proved most satisfactory between the flagship and Kwajalein were 2232, 5805 and 8265 kcs; and to Pearl - 10810, 15990 and 18250 kcs. The voice conference circuit was finally established on a fairly satisfactory basis by using three frequencies, (2390, 6410 and 8775), and changing three times a day on schedule. Surface ship aircraft and Los Alamos communication frequencies, press and electronic instrumentation frequency assignments were almost all satisfactory, however, with only a few changes being necessary.

3.3. Interference. The large number of frequencies involved, the rather narrow guard bands in some cases, the wide variety of functions being performed and the inexperience of many of the operating personnel indicated in advance the probability of an extremely serious interference problem when all the various channels were on the air. Actually, however, very little difficulty was experienced on this score, with the exception of the terrific local interference at Kwajalein and aboard the APPALACHIAN (press ship) and the MT. MCKINLEY. Such normal interference as developed was solved by the assigning of new frequencies and by the imposition of communication and electronic silence on all but essential command, press and instrumentation channels during rehearsals and on actual bomb firing days.

3.31. The introduction of radio teletype and public information voice broadcast facilities aboard the MT. MCKINLEY and APPALACHIAN (press ship) greatly aggravated the already serious interference problem experienced by AGC's during the war. The nature of radio teletype and voice broadcast, which require the carrier frequency to be on

constantly rather than intermittently as in CW Operation, and the close proximity of transmitting and receiving antennas produced an acute interference problem throughout the communication part of the frequency spectrum. In the MT. MCKINLEY, where conditions were the worst, there were as many as six radio teletype and broadcast carriers on the air simultaneously. The re-radiating and multiple heterodyning of these frequencies and their harmonics resulted in a myriad of interfering signals. The situation was so bad at times that it was necessary to actually shut down one circuit in order to permit more important transmissions on another.

3.32. The local interference problem at Kwajalein was largely a matter of mutual interference between the Joint Communication Center, Army Air Communication Service, the SPINDLE EYE (Army Press Ship), the ALBEMARLE (while there) and Headquarters of Task Group 1.5. It was alleviated, but never completely solved, because of the large number of powerful transmitters concentrated in such a small area, by various shifts in frequency assignment and exact tuning of transmitters.

3.4 Task Force Communication.

3.41. Call Signs. The special administrative call signs established for the various commands and activities of the Task Force greatly facilitated communications, even though they were occasionally ignored or used improperly. The lack of similar addressee call signs for the Joint Chiefs of Staff, (later assigned), and such important Army commands as the War Department Chief of Staff, ComGenAAF, ComGenAFMidPac and ComGenArmyForcesPacific greatly complicated the rapid delivery of dispatches to such addressees. The tactical call signs, including aircraft, proved satisfactory in general despite a

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

lack of understanding on the part of some inexperienced communication personnel of Task Group 1.5.

3.42. Classification and Precedence. The main difficulty here, as usual, was the occasional overclassification or the use of too high precedence on a dispatch. Here, again, Task Group 1.5 was the worst offender, although there were plenty of others.

3.43. Procedure and Circuit Discipline. The joint procedure worked satisfactorily on all circuits and circuit discipline was generally good. A notable exception was the outbreak of a series of lewd, lascivious and profane transmissions on the TBS circuit at night after the Task Force had been at Bikini about a month. These transmissions were similar in nature and equally as difficult to detect the origin of and stop as those which occurred during the landings at IWO Jima and Okinawa during the war. They were finally broken up by requiring all ships which could not maintain competent officer or CPO supervision of the TBS (and a shortage of personnel on most ships prevented this) to keep their microphones in the custody of the OOD or Commanding Officer, with a provision for surprise inspections by a member of CJTF-1 Staff to insure compliance.

3.44. Harbor Communication, Fox Schedules and Ship Shore Traffic. The flagship took the NPH Fox and Ship Shore guard for all ships in the Task Force during the periods they were at anchor at Bikini. This traffic, together with local traffic, was delivered to addressees primarily by boat, with visual and radio (TBS, 34.8, 2716 and/or 383) being reserved for traffic of high precedence or obvious immediate importance. A dispatch boat schedule of four trips daily (0830, 1030, 1400 and 1700), from the MT. MCKINLEY to the Task Group flags and key technical ships, was established, with the requirement that the ships on these routes would in turn

deliver traffic to their units. This system was subsequently modified by: (a) eliminating the 1030 scheduled trip; (b) delivering all traffic for ships not on either route direct to the LST-861, the very efficient post-office ship, where it was picked up at least once daily along with the ships mail; and (c), backing this up by delivering important fox messages via a 0800 and 2000 daily Task Force Fox. Complete N.P.M. Fox schedules, hydros and daily press news, along with routine intra-Task Force traffic was delivered successfully by this system to all ships throughout the operation. Radio teletype was used primarily for delivery of traffic between the flagship and Pearl and Kwajalein.

3.45. Technical Conference Circuits - Radio Teletype and Voice. These channels, which were provided as a result of a request made during the planning stage in Washington by the Deputy Task Force Commander for Technical Direction, proved invaluable even though neither functioned as smoothly as desired. The main difficulty in holding teletype conferences between more than two stations simultaneously (there were originally seven, and finally five stations on this net) was the obvious one of lining up the various receivers -- a difficulty aggravated in this instance by the inexperienced personnel involved and by the fact that one of the key stations, the ALBEMARLE, was at Kwajalein until after Test Able. Both simplex and duplex operation were tried; and, finally, the latter was adopted. The controlling station transmitted on one frequency to as many stations as were lined up at the beginning of the conference, or reporting period, and received from them individually on another frequency. Stations missing all or parts of the conference or reports received them at the end. This procedure enabled the various technical group leaders to inter-change situation summaries and to hold technical conferences quickly, with the added advantage that the use of the

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

CSP 1515 System provided the necessary security without the delay of encrypting and decrypting the subject matter.

The voice conference circuit was equally useful for the technical personnel, and provided a channel for the Deputy Task Force Commander for Aviation to talk with his two Air Commanders and to hold aerology conferences when the need for this arose in the operating area -- although here the lack of any scrambler system meant that this circuit possessed no security, and its reliable operation suffered from the frequency and interference difficulties previously discussed. When the ALBEMARLE moved to Bikini after Test Able, this circuit was shifted to 73.5 (using LRF or TBS equipment) and the high frequency channel was turned over entirely to the aviation and aerology conferences. The VHF Voice net functioned with practically the same speed and reliability as a dial telephone, judging from remarks made by the various technical leaders; but the high frequency circuit to Kwajelein and to the SHANGRI-LA continued to be plagued by interference and propagation troubles to the last.

3.46. Cryptographic Systems. The standard Army-Navy joint ECM System, the Navy ECM Systems, and the Special CSP 1515 already mentioned served to handle adequately the comparatively small volume of encrypted traffic. There were the usual cases where addressees, particularly Army commands, received encrypted traffic in systems not held; and, once again, inexperienced personnel complicated the picture. But the general results were satisfactory.

3.5. Press Communications. This item, insofar as data concerning the amount of press teletype, radio photo and broadcast programs handled is concerned, together with the basic policies prescribed,

is covered in detail in Section K -- Public Information. The only discussion necessary in this report deals with the press communication facilities provided and with the controversy which arose over the employment of the SPINDLE EYE.

3.51. Press Communication Facilities. These were adequate to support the Public Information plan and policies, although inexperienced personnel did not always obtain maximum performance from them. In at least one instance, poor personnel performance, coupled with the lack of experience of the press ship with local conditions in the Bikini area, resulted in the poor transmission to the West Coast of a broadcast program. This, unfortunately, was the "pooled" broadcast immediately following the bomb burst on Test Able, and the poor reception of this program in the United States provoked an outburst of criticism by commercial broadcast companies. This criticism is answered in detail in Section VII-K of the Operation Crossroads report and will not be discussed any further here. The fact that the Baker Day broadcast, using the same facilities with only a change in the method of control of the programs, was highly successful is ample evidence that the facilities were adequate, despite the admitted fact that more powerful transmitters, (preferably shorebased on Bikini, had safety considerations permitted), would have provided a better margin of reliable performance. The press teletype and radio photo facilities functioned very satisfactorily on both tests, and the broadcast, radio photo and press teletype in the U.T. MCKINLEY gave good service during the intervening periods.

3.52. The SPINDLE EYE Controversy. This tempest in a teapot was the direct outgrowth of the poor Able Day broadcast mentioned above. Certain mis-informed critics of the handling of this broadcast asserted that the poor results would

RESTRICTED DATA

721479 O—46——24

never have occured if the services of the SPINDLE EYE had been available at Bikini; but that the Navy had refuded to permit this because she was an Army press ship. Without even discussing the comparative merits of the broadcast installations aboard the MT. MCKINLEY, APPALACHIAN and SPINDLE EYE, (where the main advantage of the latter was in having a more powerful transmitter), it is apparent that such irresponsible criticism ignores two facts: (a) The original decision to use the SPINDLE EYE at Kwajalien was a joint decision reached in Washington at a conference attended by representatives of the Chief Signal Officer, the Director of Naval Communications and Army and Navy members of the Communication and Public Information Section of the Joint Task Force Staff. (b) The subsequent decision to retain the SPINDLE EYE at Kwajalien, and later send her to pearl for Test Baker was also a joint staff decision and was conburred in by the Army Signal Corps major in charge of the press facilities aboard the SPINDLE EYE.

3.6 Radar and CIC. The doctrine prescribed in Appendix VI to Annex "C" proved very sactisfactory in controlling the very complex air phase of both tests and is discussed in Section (S) - Combat Information Center. It should be remarked, however, that the imposition of a general air and surface search radar silence from one hour before until 15 minutes after each bomb burst occasioned concern on the part of some commanding officers and OODs. This indicates the perhaps too complete dependence of some officers on this valuable navigational aid even under the excellent weather conditions obtained on both tests.

4. Comments and Recommendations.

4.1. The Radar, CIC, communication and electronic

instrumentation policies and plans as originally laid down were fundamentally sound and might well serve as a pattern for future operations of a similar nature.

4.2. A Joint Communication Instruction, thoroughly understood and habitually used by all services, would greatly faciliate the conduct of communications in joint operations.

4.3. The assignment of addressee call signs to important Army commands and activities appears highly desirable from the standpoint of joint operations. It is understood that the new JANP series of joint call signs is a step in this direction.

4.4. If practicable, communication facilities in an operation similar to Crossroads should be set up in the area well in advance, and frequencies, propagation conditions and equipment tested and worked out on the spot.

4.5. The need for an adequate number of qualified communication and electronic personnel (preferably experienced in joint operations) is obvious.

4.6. Press broadcast and teletype facilities using powerful transmitters should be established on an island base in the area if practicable. For example, Bikini would serve admirably for this purpose in Test Charlie, should it be conducted. Kwajalien would not have been a satisfactory base for Tests Able and Baker, however.

4.7. The simple but vital rule of assigning one frequency to only one use is sound and should be followed in future operations.

4.8. Radio teletype equipment, a comparatively new factor aboard ship, proved invaluable during Crossroads and an extension of its use is highly

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

recommended in spite of the interference and maintenance problems which will result.

4.9. A suggested solution for the terrific local interference problems encountered aboard the MT. MCKINLEY and the APPALACHIAN would be to have AGCs with duplicate equipment operate in pairs. The flagship would do all the receiving and would control remotely the medium and high frequency transmitters on the other ship by means of VHF tone carrier equipment. A variation of this suggestion would be to have only receiving equipment in the flagship and transmitting in the other, again using remote control of the transmitters from the flagship. This system should work satisfactorily in peacetime, but is not believed practicable during war, where the loss of either ship would completely disrupt one's communications. It is realized that the idea of losing direct control of one's transmitters will not appeal to many commanders or communication officers, but the system proposed furnishes at least one practicable approach to the solution of an increasingly serious interference problem aboard headquarters and command ships.

4.10. Any voice conference facilities desired, particularly if medium of high frequencies are to be used, should be requested during the planning stage in order that suitable equipment (including speech scramblers) may be provided and frequencies assigned. The requirement for an aviation and aerology conference circuit between the flagship and Kwajalein which developed in the operating area, could only be met by assigning shared use of the technical voice conference circuit already established -- an obviously unsatisfactory solution.

4.11. The allocation of blocks of frequencies and call signs to task group commanders for assignment locally by SOPs, as recommended by Commander Task Group 1.5 upon the completion of the operation,

is not considered practicable in so complex an operation. The provision of an overall frequency allocation plan and call sign list is considered mandatory, in spite of the admitted necessity of frequent changes to such a master plan.

4.12. Communication and electronic equipment throughout the Task Force held up remarkably well during the operation, particularly in view of the scarcity of experienced upkeep and maintenance personnel. There were no serious equipment failures aboard the flagship.

4.13. The reliance of many naval officers on their radars for station keeping and navigation, even under conditions of excellent visibility, may prove a handicap in a future war, where enemy guided missiles and electronic countermeasures may be expected to capitalize on our indiscriminate employment of radar. It is suggested that the pendulum should swing back somewhat in the direction of using the so-called "seaman's eye", the stadimeter and the range finder for such purposes, as a matter of training for such an eventuality.

4.14. Radio broadcast engineers attached to the Staff should be assigned to the Communication and Electronic Section instead of to the Public Information Section in future Staff organizations. It is considered that their duties and responsibilities place them more properly under this section, hence this recommendation, which is made in spite of the completely harmonious and cooperative relations which existed between the two sections concerned during Operation Crossroads.

4.15. A large volume of dispatch traffic (the average load on the MT. MCKINLEY ran between 500 - 700 messages a day) can be handled satisfactorily in an anchorage by dispatch boat, augmented by visual and radio (harbor circuits and/or local fox) as necessary.

RESTRICTED DATA
ATOMIC ENERGY ACT
RESTRICTED

4.16. One, and preferably more conferences between Task Force Staff Communication Officer and officers responsible for the relay and delivery of traffic (including press) at shore radio stations concerned should be held at least two weeks prior to an operation similar to Crossroads in order to exchange information on problems involved and to work out details.

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VII - SPECIAL REPORTS

SECTION (C) - SAFETY PLAN (INCLUDING RADIOLOGICAL)

A. PRELIMINARY PLANNING.

The Radiological Safety Section came into being with the establishment of the Task Force on 11 January 1946. Planning had been carried out much earlier on an informal basis. In November 1945, the LeMay committee conducted preliminary considerations of an atomic bomb test with representatives of the Manhattan Engineering District. Meetings of Colonel S. L. WARREN and Captain G. M. LYON with Vice Admiral McINTIRE and with General GROVES on 8 December 1945 set the basic form of the major safety and medical functions. By 15 December a group of medical officers of the Army, Navy and Public Health Service had been selected to take training in the safety aspects of an atomic explosion.

On 7 January 1946 Admiral BLANDY met with General GROVES with the result that the Manhattan Engineering District would assume the responsibility of radiological safety aspects. The planning in this and later phases was slightly complicated by the fact that Colonel S. L. WARREN, who had been asked to be Chief of this section was not able to spend as much time as he would have liked in Washington. This difficulty was compensated for by the presence of Captain G. M. LYON in Washington and the close understanding and cooperation received from him.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC RESTRICTIONS
USE MILITARY INFORMATION CONTROL SECRET
AUTHORIZED

After the establishment of the Joint Task Force on 11 January, there were many organizing committee meetings including personnel with previous experience in atomic explosions. The first staff conference on 18 January started a series of such conferences in which the many aspects of the test were discussed. It was at this time that Colonel S. L. Warren was made Radiological Safety Advisor as well as Chief of the then comparatively small Radiological Safety Section and that Captain G. H. Lyon was made Safety Advisor of the Task Force.

As these staff conferences continued definite plans were formed. On 9 February 1946, the format of the operation plan was explained and work on it started. By the 15th of April an original rough safety plan and a radiological safety plan was submitted and after many conferences and some revision the plan was accepted as firm on 28 April. Between that time and test ABLE no significant change was made in the plan.

B. ORGANIZATION

The relationship of the Radiological Safety Advisor and the Radiological Safety Section to the rest of the Task Force was twofold. For purposes of instrumentation, technical advice and reports the radiological safety advisor and the section were under the Technical Director. During the operations, however, the Radiological Safety Advisor acted as a member of the staff of the task force commander and the section operated directly under the assistant Chief of Staff for Operations. At first it was feared that some conflict might arise because of this dual chain of command. This was not the case however and these relationships worked out very smoothly. Within the section there was a normal administrative organization. The operational organization of the

section was somewhat more complicated however; the Chief of the Section had directly under him an advisory board and a medical-legal board composed of eminent radiologists of national reputation that met at least daily during the test period.

During the first phase of each test, that is between Able or Baker minus one and the time when the waters of the lagoon were declared radiologically safe, there were two main departments, operations and technical.

(1) The operations department was responsible for:

(a) The movement of all radiological planes and ships.
(b) The receipt of all radiological intelligence in the Radiological Safety Center on the Mt. McKinley.
(c) The plotting and analysing of that information.
(d) The transmission of radiological safety advice to CJTF-1 to enable him to control the movement of the Task Force.

(2) The technical department was responsible for:

(a) Maintenance of instruments
(b) Analysis of water, soil and other samples including fish for vital radiological information.

During the second phase, after the water in the lagoon was declared safe a third section became most prominent and that was the technical operations division which was responsible for the monitoring of target and non-target ships.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC PERMISSION ... CLEARANCE NOT REQUIRED
... SAFEGUARDS

RESTRICTED

C. PERSONNEL

It is impossible to understand or to evaluate this section of Joint Task Force ONE without a complete appreciation of the personnel involved.

When the section was formed in January it was felt that only about fifty or sixty people were needed. Twenty to thirty of these would be experienced RadSafe scientists, officers and technicians of the Manhattan District and thirty were to be Army and Navy Medical officers who were to be selected immediately and given three months training by Manhattan District. However, the overall operation increased in size and the scope of the activities of this section in particular increased by leaps and bounds. The presence of 381 people in the section for test Able was just enough to meet the requirements. In order to obtain enough men experienced in this work it was not only necessary to drain the Manhattan District seriously, but it was also essential that many civilians be drawn from the ranks of the universities and research laboratories. In most cases these were men who had worked very hard for the government through the war and were just getting back into their civilian jobs with some relief. Most of their Universities and companies were loth to release them. In order to get them it was necessary to specify certain maximum periods of time that they would leave the Continental limits of the United States. These periods varied widely but came generally into one of the following groupings:

(a) Out by ship (USS Haven) May 29.
(b) Out by air leaving the U.S. June 15 - June 20.
(c) Out by air leaving the U.S. July 10 - July 15.
(d) Back by air leaving Bikini July 10 - July 15.
(e) Back by air leaving Bikini August 5 - Aug. 10.
(f) Back by ship leaving Bikini before August 16.

A similar set-up had been arranged for the first

schedule of tests and the postponement of the tests forced many civilians to cancel and necessitated a further frantic search for replacements. These odd dates enforced on the section had many disadvantages. First, the Haven arrived at Bikini June 15, some time after the bulk of the Task Force. This meant the loss of very valuable organizing, training and rehearsal time. Second, the arrival of a large percentage of the section between Queen and Able Days and between William and Baker Days greatly decreased their value to the section and greatly increased the last minute technical and administrative load of the section. Third, the loss between Able and Baker of so many people who had gained invaluable experience in Able was unfortunate and fourth, the absolute deadline of August 16 for return of the bulk of the section, civilian and Navy, was very distressing. The above disadvantages had to be accepted, however, as it would not have been possible to do the assigned mission without these people and those were the requirements of their procurement.

After the postponement, when the personnel situation looked blackest, fifty officers each were requested from the Army and the Navy. Of these the Navy furnished fifty-five and the Army fifteen. These officers arrived just prior to departure from the United States. Unfortunately they were almost entirely reserve officers. The following statistics are considered significant. They include only officers and civilians.

(a)	Test Able -	130 Civilians	43 %
		77 Navy	25 %
		96 Army	32 %
(b)	Test Baker -	93 Civilians	36 %
		102 Navy	40 %
		63 Army	24 %

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AS TO DISCLOSURE AND PENALTIES REQUIRED
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

- -

In addition there were 105 enlisted men attached to the section, all but four Yeomen being Army.

A breakdown of the civilians involved in Test Able showed:

36 Doctors of Medicine
20 with Degrees in Physics
19 with Degrees in Chemistry
7 Biologists
12 with Engineering Degrees
3 with PhD's in Anatomy

D. TRAINING

The training of the section falls into two phases:

(a) Training of a small group prior to departure from the country.
(b) Training of the whole group aboard the Haven.

In the first phase a group consisting of two United States Public Health Officers, eight Naval Officers, twenty-two Army Doctors and, one Chemical Warfare Officer was given a fairly thorough two and a half months course. These officers were sent to Oak Ridge, The University of Chicago, University of Rochester, Los Alamos and the University of California. They received lectures on Basic Physics, Basic Electronics, Nuclear Physics, effects of radiation, medical aspects of nuclear fission, plant safety and the use of instruments for radiation detection.

The second phase of training which started the day the Haven departed from the United States was divided into basic training and job training. This consisted of lectures to all hands including Indoctrination into Navy life, the operation in general, and Radsafe Operations in particular, Nuclear Physics, Tolerances, security, communications, etc. At the end of the first week jobs were assigned and a large

part of the training was given by job groups; i.e., the Destroyer Monitors; the Air Monitors; the PGM Monitors, etc. Their duties were explained to them in detail. They were given practical work in the use of instruments. During this week and thereafter except for a few operational days, one or two hours of the basic type lecture was given all members of the section.

E. JUNE 12 TO JUNE 30 (ABLE MINUS ONE DAY).

On June 12 the HAVEN joined the Task Force at Bikini. The next day the operations staff set up a Radiological Safety Center in the Joint Operations Room of the MOUNT MC KINLEY. The section assumed virtual control over twenty Navy enlisted men of various rates who were being trained on the Flagship as radio voice talkers. Various charts were put up around the room for plotting and analyzing the radiological data sent in by the many and varied units including a lagoon patrol of six PGM's and twenty LCPL's, a destroyer patrol of eight ships, and air patrol of two PBM's and four B-29's and a drone boat patrol. Other sources of information were automatic radio broadcasting instruments from target vessels and many monitors attached to such other units as initial boarding teams. This information came in to the center on sixteen separate channels. It was necessary to so organize the center that with a minimum of confusion a very large volume of intelligence could flow in to the plotters, be analyzed and result in fast correct advice from the section chief to the Task Force Commander and his staff.

The first drill was held the following day June 14 and went very badly. Two outstanding problems developed. The radios on the MOUNT MC KINLEY were almost impossible to operate successfully because of the very large communication load thrown on the ship and the small number of electronics personnel available to the Task Force. The twenty-four landing craft assigned to the section were in very poor shape and their radios in worse shape.

RESTRICTED DATA
ATOMIC ... ACT - 1946
SPECIFIC ... CLEARANCE NOT REQUIRED
... SAFEGUARDS

RESTRICTED DATA

In that first drill only six of the twenty-four took part initially and four of these broke down within three hours. This was the beginning of a long battle to get the communications and the landing craft of the section into shape for test Able.

Starting on the fifteenth, communication drills were held daily. An Electronics Officer was borrowed from the E.C.O. and thirty E.T.M.'s were made available for the actual operations days. Many changes were made in the circuits with several relay stations interposed. Progress at first was discouragingly slow and even the Queen Day rehearsal was not satisfactory. The first day that communications were really satisfactory was Able Day and then they were excellent.

The condition of the LCPL's assigned to the section was equally poor. They were assigned to the HENRICO, ARLING and ARTEMIS, each boat delivered from a different transport. All were in bad need of repairs. Many required an almost complete rebuilding and some had engines in irrepairable condition and had to be replaced. Here again the first completely satisfactory performance was during the operation itself when all boats operated straight through without a failure of boat, engine or radio.

The boat officers of the LCPL's were either Ensign of Junior Lieutenants. The senior monitor in each boat was either a senior Army or Navy Officer or a civilian. The boat officer, however was in charge. It is a tribute to both groups that there was practically no friction caused by this situation.

It became very evident during this period that the all important decision as to whether the shot could be fired on a particular day depended on the radiological situation anticipated for certain wind and weather conditions. A system was developed to compute quickly the area which would be radiologically dangerous to ships or planes with each new set of meteorological data.

Three dimensional models were used to demonstrate this and two important terms came into use.

(a) Radex (Radiological Danger Sector).
Which was the forbidden air space above a sector bounded by two true bearings drawn from the target and further bounded by an arc whose radius increased with time after detonation.

(b) Surface Survey Sector.
The dangerous area on the surface within a sector bounded by two true bearings drawn from the target and further bounded by an arc whose radius increased with time after detonation. This only applied to the area outside the lagoon.

For operations within the lagoon, the following were instituted for safety purposes:

(a) Red line bounding the area within which no ships or boats could operate.

(b) Blue line between which the red line ships or boats could operate only with specific permission from RadSafe and for specified lengths of time.

(c) Anchorage Area Able. An area within which non-target ships could anchor on one hour notice.

(d) Anchorage Area Baker. Unrestricted Anchorage Area. Prior to Queen Day two more all section rehearsals were held and these combined with the official rehearsal and constant drilling enabled the section to operate with surprising smoothness thru the actual operation.

F. JUNE 30 (ABLE MINUS ONE) TO JULY 10 (ABLE PLUS NINE).

On June 30, based on translation of the early morning aerology reports into terms of Radiological Safety, the decision was made to attempt to fire test Able on July first.

RESTRICTED DATA
OCT - 1948
CLEARANCE NOT REQUIRED

After receiving the signal of this decision at about 0910 the dispersion plan of the section functioned smoothly and all monitors reached their assigned ships well before the time of clearing the lagoon.

At the time of the detonation all ships were in their assigned sectors. These sectors were based on the Radiological axis which was 050 degrees true during the night of 30 June and changed to 055 degrees true at 0430, 1 July.

After the detonation, air operations were the main concern of the section and all missions were carried out on schedule. The last Radex, given at 0730, 1 July was 125-325 degrees true. This was the radex used at the beginning of the air operations, but at 1000 it was expanded to 180-350 degrees true and remained at that angle the remainder of the day. RadSafe's part in this stage of the air operations was primarily the safety of the plane crews. In this respect monitors were placed on photographic planes, reconnaissance planes, drone planes, air-sea-rescue units and press and observations planes. Although there were no monitors in the F6F drone control planes, the pilots of these planes had geiger counters with earphones. All of these pilots had been indoctrinated in use of this same equipment over the site of the first atomic explosion in New Mexico and had enough understanding of the problem to know when to take evasive action. An air unit whose primary mission was Radiological reconnaissance was the Cloud Tracking Unit. This unit followed the cloud through out Able Day by visual and instrument means. About 1600 based largely on the information from these planes the chief of the section was able to advise CJTF-ONE that the alert on Eniwetok could be lifted and the transpacific airways could be reopened. This unit was secured before dark. Two precipitron carrying B-29's flew a night mission into the predicted area of radioactivity to collect samples of fission products. The prediction was correct and very good samples were obtained.

A different type of air mission was flown by the PBY Lagoon Reconnaissance Unit. The mission of this unit was to get the first readings over the target area by flying a set pattern, parallel to and normal to the radiological axis. This was done at the following altitudes, with conversion factors as shown, to get a rough approximation of the surface readings:

2000 feet	250
1000 feet	30
500 feet	10

Note: A reading of 1 roentgen at 2000 feet meant approximately 250 roentgen at sea level.

This data was extremely useful in early evaluation of the situation and later it was shown that the conversion factors were reasonably accurate.

During these air operations the surface patrol units were moving toward the lagoon entrance. Among the first of these was the USS BEGOR, control ship of the drone boats. Through conning officers in TBM's, each of which also carried a monitor, drone boats were guided into the center of the target array to collect water samples and take geiger counter readings which were radioed back to the BEGOR and RadSafe on the MOUNT MC KINLEY. The readings received from this unit proved to be of no value because of their great variation from later reading s made by the lagoon patrol.

The USS BARTON swept the lagoon entrance and finding no radioactivity continued on to her station in the downwind destroyer unit. With this clearance the PGM's followed by their LCPL's, which had just been launched from transports at the lagoon entrance, proceeded into the lagoon and to their respective sectors. From the periphery of the target array the patrols moved toward the center of the array reporting the readings as they converged and eventually outlined the dangerous zone about the center. At 1300 the Eastern boundary of the contaminated area was almost at the target center. However, dispersion later pushed this line several thousand

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
RADIATION SAFEGUARDS

yards to the East during the afternoon.

LCPL's circled target ships in their sectors and reported water around some of the ships as clear or below tolerance levels. As the boundary of the danger areas was outlined, the patrols moved westward along its northern and southern margins in an attempt to completely encircle the area but because of approaching darkness this was not completed.

Closely following on the heels of the lagoon patrol were the vessels of the salvage unit, all eager to enter the target array to fight fires, attempt salvage of sinking ships or start boarding operations. Ten of these vessels had initial boarding teams aboard, two members of each team being Radsafe monitors, the others had no monitors. After the lagoon patrol had proceeded into the target array and found low readings, the salvage vessels were dispatched to their various duties in the cleared areas. The primary duty at this time was to get fires under control. Boarding teams started clearing ships shortly after noon and by the time they secured, had cleared 19 target ships for further boarding by ships company teams, and had put out all fires except on the INDEPENDENCE which was inside the dangerous area.

Coordinating the various reconnaissance units of the section was the control unit on the MT. MCKINLEY. It was their duty to direct all units of Radsafe so that the safety of the task force could be best maintained. It was essential to keep CJTF-1 and his operational staff informed of the radiological situation so that necessary action could be taken. In this respect Red and Blue lines (see definitions above) were plotted and each change reported to CJTF-1 and DSM. Anchorage areas Able and Baker were outlined by mid-afternoon so that ships of the task force could enter the lagoon and anchor. All of the operations mentioned in this report were under the control of this unit, the clearance of movements of all parts of Radsafe were constantly directed by this control unit.

A unit of ten destroyers patrolled outside the lagoon to check, and attempt to outline, the fall out of the radioactive material from the cloud. Six of these destroyers formed the downwind patrol whose duties were to make sweeps of the surface survey section to find the

amount of radioactive material falling out of the cloud. No sweeps were made until a particular destroyer reported on station at the initial point of its sweep and was then given clearance by the control unit. This clearance was based on wind velocity and predicted fall out time of particles of various sizes from various altitudes and allowed for complete settling of radioactive material. This surface survey section at the time of detonation extended from 135 to 325 degrees true and before the first destroyer made its sweep was changed to 170 to 350 degrees true where it remained until cleared on Able plus 1.

The other four destroyers were a part of the upwind patrol whose duty was to guard the task force against contamination of radioactive material in each of their areas. No significant readings were found by these ships. One of these destroyers, USS MOALE, picked up water samples from the drone boats at the lagoon entrance as they finished their run through the target array and delivered these samples to Kwajalein for analysis. This ship returned to Bikini with the air monitors and their badly needed instruments on Able plus one.

Technical service units were in the background on Able Day, having been more than busy previous to that time and anticipating much more work as the operation progressed. Radio-Biologists were in LCPL's of the lagoon patrol and while carrying on their monitoring duties, were on the lookout for any marine life they could gather. This group had made an excellent study of the lagoon fish life and now were prepared to gather material to compare with these carefully collected samples. The various branches of the Radiochemistry unit were still unaware of the deluge of questions and material that would pour down upon them.

The photometry group is of special interest in this technical unit. Their work was largely limited by the number of film badges they had available. All monitors and a representative number of crew members had been given film badges. These films offered positive evidence of the amount of radiation the man had received over the length of time he had worn the badge and as such offered the best testimony of the success or failure of the safety factors as set up and carried out in the

OCT - 1948
CLEARANCE NOT REQUIRED

operation.

The instrument section, after many warm and busy hours preparing adequate instruments for all monitors were now only hoping that the meager supply would hold out. It was hoped that the expected arrival of instruments of air monitors, on Able plus one would relieve the shortage.

By the evening of Able Day outlying ships of the target array were cleared, the lagoon patrol had moved almost to the target center in following the tolerance line of radioactivity, and the continuation of the sector plan for the lagoon patrol seemed unnecessary. Therefore, after reviewing the night reports of the PCMs, the operations officer and the plotting officer drew up new plans for the second days patrol. In order to better outline the contour of the dangerous radioactive area, the lagoon patrol followed straight grid lines and made an east to west sweep of the target area. In this manner early clearance was given to the center portion of the target array. Salvage vessels then went to work on the more badly damaged ships. In attempting to board the SAKAWA the initial boarding team found the ship radiologically unsafe. While attempting to get two lines on the SAKAWA, it began to settle and units had to abandon their beaching efforts. In the late morning of Able plus one the blue line was discontinued just as the red line had been discontinued earlier that morning. Salvage vessels towed the INDEPENDENCE, whose fires had burned out during the night, out of the target array but finding she was not in danger of sinking moored her out of the general target area. Initial boarding team activities continued throughout the day and by evening the majority of the target ships were cleared. In the afternoon the lagoon patrol, having completed their patrol of outlined areas, searched for and outlined the areas of highest intensities.

Air monitoring an Able plus one was nominal. Several weather flights with monitors aboard and a low altitude photographic mission over the target array were carried out. In addition ground monitors at the bases for the drone planes had an advisory job in further study of these planes.

During Able night the destroyers of the downwind patrol had completed sweeps of the surface survey sector and found little radioactivity. The group was then ordered to the various entrances of the Atoll to get surface and deep water readings of water leaving the lagoon. These destroyers continued this operation until secured on Able plus five. This operation was as much for studying oceanographic data in regard to prognostication for Baker as for actual data related to the Able test.

The control unit moved from the MT. MCKINLEY to the HAVEN on the afternoon of Able plus one. They continued to function on the HAVEN in more direct control over monitors. This move was made so that briefing of monitors, boat officers and ships commanding officers could be more simply carried out.

Many miscellaneous jobs fell into the laps of the section on the next few days. Routine target ship clearance continued until all ships were finally cleared, except for isolated areas, on Able plus four. PCEs made daily patrols testing surface and deep water and collecting water samples. Destroyers continued their watch at the lagoon entrances.

Slowly emerging from the torrent of request for monitors, some urgent and necessary others definitely sightseeing trips, the section attempted to answer all requests. LCPLs of the lagoon patrol became a water taxi service to various jobs. Samples of water, foodstuffs, clothing, drugs, and GSK items found their way to the HAVEN from all ships and the radio chemistry unit was swamped. Definite lessons were learned from all of this material and many questions were answered concerning the safety. All beaches and islands were cleared; instruments, film badges and various samples of material were collected; VIPs were escorted here and there with a geiger man in their midst; these and other tasks occupied the main part of the section from Able plus two until normalcy returned on Able plus five.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
DISTRIBUTION FORBIDDEN

A unit little heard from during early stages of the operation now came in for more than their share of work, that is the Medical Legal Board. This unit made up of outstanding radiologists throughout the country acted in an advisory capacity with the Chief of the Section in establishing policies for future action. Among the numerous problems raised perhaps the most important were use of drinking water in tanks on the target ships; use of water made by target and non-target ships during the blast; sleeping on decks topside; daily check of swimming beaches and water; exposure of personnel; and contamination of non-target ships. These problems are only a few of the many, but serve to illustrate the importance of this unit.

Carrying over in this post Able period was a definite anxiety about test Baker and much study was made of the Able results, especially in connection with diffusion rates, current action and decay rates to attemnt in part a prognostication of the Baker test.

G. JULY 10 (BAKER MINUS 15) TO AUGUST 15 (BAKER PLUS 21).

Except for a few PGM's and Destroyers which were used to study further diffusion and decay of the radioactivity, the section started on the task of preparing for the second test. Due to the different phenomena expected for Test Baker and the predicted long duration of work for the various units of the section, it was necessary to alter and add to Annex Easy of Operations Plan 1-46. To do this again required long hours of conferences and study by the senior members of all units, and of the various Staff members. On 14 July the revised Annex Easy was submitted. Personnel were added to the control unit so that a working watch could be maintained on the MT MCKINLEY 24 hours a day during the expected long period of time before ships could return to their normal anchorage. Other shifts in personnel were made based on observations able. It was found for example, that fewer monitors were needed in the LCPL's, that a large pool of DSM monitors would be required, and that a group of monitors must be assigned to cover special requests after the initial phases of the operation. In addition a large number of monitors from Test Able returned to the states by Air and only a few new moniotrs were expected.

To aid in the work of planning and preparation for Test Baker senior members of various units were given more responsibility in the organization of their unit, thus freeing members of the Staff for higher echelon duties. Most of the personnel were trained and these readily assisted the newcomers; in this way the only additional training needed was the orientation of all members in the change necessary for Test Baker and drills to increase the efficiency of men in new positions. In this regard daily communication drills were held with PGM's, LCPL's, Drone Boat circuits, and the MT MCKINLEY in order to overcome defects in transmission and to establish the most efficient use of all circuits and radio personnel. A control unit drill was held on the MT MCKINLEY on 16 July to train new members of that unit in their exact duties.

Members of other sections spent several evenings with the Radiological Safety Section giving phenomenologist's views of what could be expected in the Baker Test and what the primary dangers or pitfalls were. These men, Comdr. Revelle, Dr. O'Brien, Dr. Hirschfelder, Dr. Magee, and Dr. Penny, gave ample warning of the days to follow and did much to prepare the section for Test Baker.

The Instrumentation unit was better able to supply instruments to monitors because of new shipments by air and the shortage of instruments was fairly well overcome. In addition, that unit prepared radio counters on various target ships, which would give continuous counts from the target array before any other instruments could be brought into the highly radioactive area. The Photometry Unit again placed intensometers and film badges on various target ships. The Radio Chemistry Unit became "pill peddlers" and the Radiolobiologists continued collecting their samples of marine life. The Destroyer Unit gained the USS LOWRY and returned the USS MAYRANT to her place in the target array.

On William Day minus one, 18 July, the section again dispersed to their various assignments and left the lagoon. Permission was granted to RadSafe to extend their part of

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIAL HANDLING REQUIRED
CLEARANCE NOT REQUIRED
INFORMATION SAFEGUARDS

the rehearsal through William plus one evening so that all units, especially the control unit, could give all shifts the benefit of the rehearsal. In spite of the general staleness of the section, the rehearsal was a success, and was completed with a better understanding by all hands of their particular duties. Because of the cloudy weather the air operation was delayed and part of it canceled; however, a complete air rehearsal had been held on 14 July and that unit was well integrated with the remainder of the Task Force. Communications, especially with DSM were still a problem but further steps were taken to bring this up to a functioning level.

A change was made in the definition of the Redex and the Surface Survey Sector so that there was no practical difference between the two. This was possible because the cloud was not expected to rise above 15,000 feet and would therefore be influenced only by the winds up to that height. The two names were continued only because the operational units were familiar with them.

Red and Blue lines were expected to conform with the same radiation intensities as before but arrangements were made to allow a few special salvage ships with senior monitors aboard to operate independantly inside the blue line. Anchorage areas continued as for Test Able but in addition a boating area, in which unrestricted small boat traffic was permitted, was formulated to have more control over small boats during the extended period of dangerous radioactivity.

Between William and Baker days final briefing conferences with monitors, small boat officers and PGM Commanding Officers were held. Two communication drills were held with final preparation of all equipment and personnel completed 25 July.

The recommendations for selection of Baker Day were again made in part by Radsafe. Winds up to 20,000 feet were considered and the use of the three dimensional "fall out"

model was continued. On the morning of 24 July the winds were mainly southerly and the predicted Radiological axis was 130 degrees true, a rather rare occurrence at Bikini. This was a favorable direction however, and Baker Day was officially proclaimed as 25 July.

RadSafe personnel were again dispersed without mishap and the 21 ships received their proper personnel in adequate time before leaving the lagoon. On the evening of 24 July, Baker minus one day, the first Radex was dispatched with values of 260 to 360 degrees true.

Early on the morning of Baker Day the Radiological axis was changed to 120 degrees but the Radex and Surface Survey Sector remained 260 to 360 degrees true. About 0940, Mike plus one hour these values were changed to 270 to 360 degrees true at which value they remained until the area outside the lagoon was cleared on Baker plus one day.

After detonation the air units were again the first concern of Radsafe. Monitors were aboard photographic planes, reconnaissance planes and observation planes guarding the personnel against over tolerance exposure to radiation. Army and Navy drones and drone control planes were again active but because of the low wide formation of the cloud only one of each, F6F and B-17, were sufficiently contaminated to be of an aid in recovering samples of fission products.

Cloud tracking units began following the radioactive cloud at Mike plus thirty (30) minutes and continued until secured at 1400. Two (2) relief planes patroled the area northwest of Bikini in an attempt to keep contact with the wispy remains of the cloud. At about 1400, 25 July it was decided that the remnants of the cloud would pass well to the north of Eniwetok and it was recommended that the alert for evacuation of Eniwetok be dropped.

PBM lagoon reconnaissance planes started their patrol at Mike plus 40 minutes. Because of the expected higher radiation the first flight was scheduled to be at 4000 feet altitude with a conversion factor of 7000 for radiation at

RESTRICTED DATA
VIA (C) - '45 - 1948
CLEARANCE NOT REQUIRED
SPECIAL PERSONNEL
USE MILITARY CLASSIFICATION SAFEGUARDS

the surface. Additional patterns were flown at 3,000 feet, 2,000 feet, and 1000 feet with highest converted readings of 15 R/24 hours over the center of the target. As in test Able two PBM's flew these missions on different axis to get better contours of the radioactivity. The data received from this unit was considerably higher than that from surface lagoon units. This was probably due to the high radioactivity on the target ships as compared to that on the lagoon surface. Special missions were flown by one of the PBM's in the afternoon of Baker Day. Of these a flight to clear an area for low altitude photography, another over Bikini and Amen Islands, and a third at 1000 feet over the target array completed the days duties.

Surface units began to move in closer to the lagoon led by the U.S.S. BECOR, control ship of the drone boats. TBM's with conning officers aboard were over the East end of the lagoon and commenced the drone boat patrol at about Mike plus 35 minutes. These drone boats moved into the center of the target array to collect water samples and to record radioactivity on the radio Geiger counter. However, because of instrumentation difficulties and poor correlation of the readings with other data this operation was not as successful as had been hoped. The missions were continued on the afternoon of Baker day with about the same results. Water samples were picked up and taken to Kwajalein by the Albemarle for analysis.

Two destroyers, Barton and O'Brien, reconnoittered the lagoon entrance and finding no radioactivity moved out to take their positions in the downwind destroyer unit. PGM's with their LCPL's followed the destroyers into the lagoon and commenced their patrols. In order to get valuable equipment from Enyu and Bikini at the earliest possible time, one PGM and LCPL were assigned the task of getting to Bikini and two LCPL's to Enyu. Special land parties were assigned to each of these patrol groups. The remainder of the patrols were to cover their sectors as on Able Day. The Enyu landing party was placed ashore at 1225 and picked up at 1300 after finding only nominal radioactivity and all equipment in good order

The Bikini landing party was delayed by the necessity of slow cautious approach to the island, but landed at 1320 and was picked up at 1455. Radioactivity was rather high on the Northern part of Bikini. Since this was no attempt to clear or record land readings but only a means of rescuing photographic material before it became too badly fogged by irradiation, no detailed observations were made.

In the meantime the other patrols were converging toward the center of the target. The convergent nature of the courses of these PGM's and LCPLs was soon stopped by a rather sharply rising boundary of dangerous radioactivity. The water around a few ships was cleared, all of these being outermost ships on the southern and eastern portions of the target array. The patrol with the Bikini landing party pronounced the water around the outermost LCT in the array clear but later had to reverse this report because of the drifting of the radioactive material Northeastward. As the day progressed it became more and more apparent that Bikini and the water between the target array and the eastern reef would be too contaminated to allow patrol units to operate in it. The Bikini land party and its patrol finished its job and withdrew through the narrowing corridor shortly before the intensities of radiation had increased to this dangerous level.

During these patrols various members of the patrol had touched some "hot" spots. PGM 31 in attempting to find a route to the sinking Saratoga used up a good part of its daily tolerance and during the attempt got enough contamination on the ship itself so that it had to be secured and the crew evacuated for the night. Other units also reported high readings but no others of such intensities that they had to be evacuated to keep personnel from getting more than tolerance doses.

The salvage vessels found themselves with little to do on Baker day. Intensities of radiation were such that no salvage operations could be attempted and there were no fires to fight. A few ships were outside the danger area and Initial Boarding team personnel boarded and cleared what they could of these ships. In all, seven ships were cleared on Baker Day.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIAL CLEARANCE NOT REQUIRED
SECURITY INFORMATION SAFEGUARDS

The Control unit on the Mt. McKinley was carrying on its function. To keep watch on so many groups of persons and maintain the safety factors in the face of such large amounts of radioactivity as existed in the lagoon at this time was a momentous task. Direction of units away from known dangerous areas or to other unknown areas was a continuous job. In order to maintain the safety factors the first Red and Blue lines were placed across the North end of Enyu making all but the lagoon entrance inaccessible. As the lagoon patrol moved into the lagoon the lines were cautiously moved northward. After careful study of data the lines were altered so that the Bikini land party could complete their mission. Then as indications of movement of the contaminated area were received the blue line was moved to cut off the corridor to Bikini. This last Blue line, at 1700 was placed slightly farther south than required by definition but was placed there to account for expected dispersion of activity during the night.

Anchorage area Able was established in the lee of Enyu Island with no anchorage area Baker but boating permitted in the Able area.

The destroyers of the down wind patrol moved to positions for starting their sweeps of the surface survey sector. Because of the high activity of the cloud, the patrol was held outside the survey sector slightly longer than the predicted time in order to be assured of safety of personnel. At 1800 clearance was given for all destroyers to start their sweeps The sweeps were of such length and so much time was needed for deep readings and water sampling that only two of the destroyers completed their first sweeps prior to midnight of 25 July. Eight such crossings were made that night and on Baker plus one day. Three of the upwind destroyers were brought into the lagoon Baker night to assist the PCM's in standing radiological watch over the ships of the Task Force anchored inside the lagoon.

On the morning of the twenty-sixth the lagoon patrols made an approach to the target array from the South and West and were able to approach closer (5000 yards) than had been expected. The spread of contamination to the West was slower

than anticipated. During this and succeeding days a great deal of trouble was had with the PGM's as they were retaining radioactivity in quantities that frequently caused them to be evacuated at night. It was frequently necessary to go into areas of such radiation strength that the crew received their daily tolerance in one or two hours and had to discontinue work. The daily tolerance limit was adhered to very strictly by the section both in the operation of their own personnel and in their advises to the Task Force Commander and cognizant members of his staff.

By Baker plus two morning about half of the target ships had been cleared in so far as the water in their vicinity was concerned. At 1041, Baker plus five, the blue line and boating restrictions were eliminated with the provision that no boat without a monitor aboard could approach within fifty yards of a target ship not cleared by the initial boarding teams.

During the night of 27 to 28 July it became evident that the anchorage near Enyu was about to become contaminated so it was recommended that the anchorage be moved West about four miles, which was done on the twenty-eighth. However, it became possible on the next day to allow the Task Force to resume almost all of its normal berths near Bikini Island. Another shift of the non-target ships became necessary.

It became obvious that certain parts of the ships were accumulating radioactivity from the water faster than could be handled by normal decay. In particular this applied to evaporators and ships sides. Therefore, on August second the Northern anchorage was abandoned in favor of the Southern one near the channel entrance. All ships were instructed to scrape off marine growth near waterlines and not to dismantle evaporators without a monitor being present. Special non-target ship monitoring teams were organized to make radiological inspections of all such ships and to make recommendations to the Task Force Commander and the Captain of the ship.

RESTRICTED (C) 23 DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
INFORMATION SAFEGUARDED

Meanwhile the Director of Ship Material had been vigorously pushing a decontamination program for the target ships with varying success. Monitors marked off the ships into sections of various radiation strengths describing each such section in terms of hours which stated the total time a man could stand or work there without getting more than his daily tolerance. Although there were occasions when individuals got slightly more than their daily tolerances no such case was sufficiently high to cause worry. In several cases, to be absolutely safe, individuals were laid off for one or two days.

On August 16th the bulk of the section sailed from Bikini on the U.S.S. HENRICO. A nucleus remained behind to assist in caring for the target vessels.

H. RECOMMENDATIONS.

1. That all Naval bases should have a radiological safety organization similar in general to this section. Only one or a very few of the personnel involved need be assigned to this duty alone but frequent drills and rehearsals should be held to familiarize the temporary personnel with their duties.

2. That at least one officer on each Naval ship should be trained in Radiological safety and be capable of training selected enlisted men as monitors.

3. That a joint Army-Navy board be set up immediately to study the instrument question. The present bottleneck of limited production must be eliminated. New types to fit the peculiar needs of the services in the field must be designed.

4. That a Radiological Training Center be set up with the following missions:

(a) To produce instructors capable of teaching the general subject at the Naval Academy, at Damage Control Schools, in Fleet Schools, etc.

(b) To produce RADSAFE advisors for commands such as Navy Yards, districts, bases, etc.

(c) To produce RADSAFE instrument repair personnel.

5. That a joint committee of scientists, physicians, Army and Navy personnel be commissioned to write basic text books on Radiological hazards, at least one of these should be classified no higher than restricted, at least one should be secret.

I. Damage Control Safety Section operational report is included under the Operations Report of Director of Ship Material.

J. General Safety Measures applicable to personnel of the force were carried out according to plan. The moisture in the air reduced the transmission of light and heat waves to such an extent that the 4.5 ND goggles would not have been required in Test ABLE.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
INFORMATION SAFEGUARDS

DAMAGE CONTROL SAFETY SECTION

TABLE OF CONTENTS

I. Introduction

II. Narrative of Operation

III. Special Reports

IV. Chronological account

V. Special Comments and Information

VI. Personnel Performance

VII. Lessons Learned, Conclusions and Recommendations

CJTF - ONE
Operational Report - CROSSROADS - PART VII - Special Reports
Section (C) - Safety Plan
(including Radiological).

I. INTRODUCTION

A. Statement of Mission.

The mission of the Damage Control Safety Section was to develop and execute a plan to protect personnel from hazards incident to material damage to a ship which may result from an atomic bomb explosion. The specific tasks of the Section were outlined in the Safety Plan, Annex E to Operation Plan 1-46, Appendix III, Par. 4.

B. Synopsis of Operation.

Preliminary plans for the Damage Control Safety Section were formulated in February 1946. A staff of medical and clerical personnel was assigned, and the administrative organization developed. Training of staff personnel was effected concurrently with the procurement of material for the operation. When the tests were postponed in March, indoctrination of task force units in safety was begun on the West Coast and was continued during and after movement to the Bikini area, where, upon arrival, the operational staff of the section was assigned to the Director of Ship Material for duty as Safety Officers with Boarding teams. The remainder of the operation of the Damage Control Safety Section proceeded through tests ABLE and BAKER essentially as planned. The mission of providing safety for personnel was completed.

C. Organization of Section.

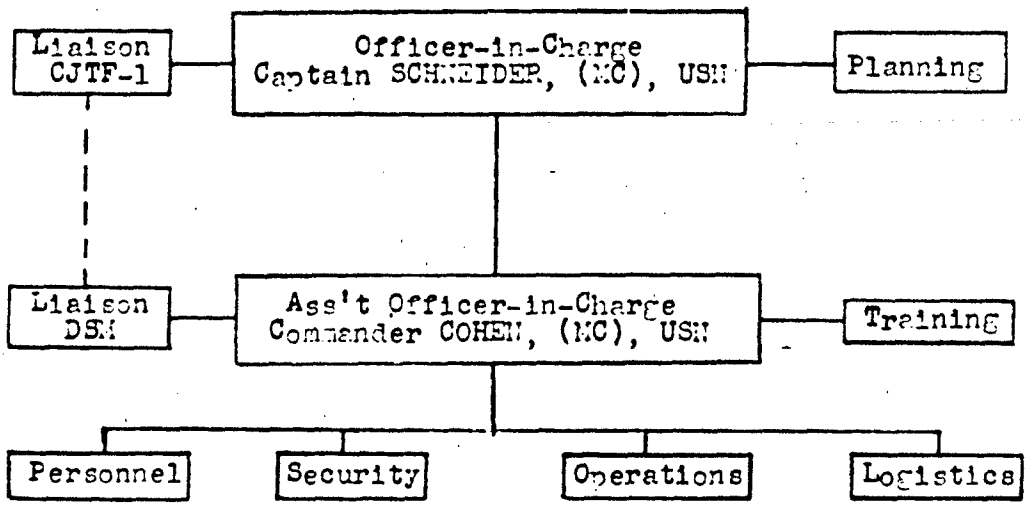
The organization of the Damage Control Safety Section was developed and patterned after that of the Joint Task Force itself. It consisted of the Chief of the Section, in general charge; and assistant to carry out the administration and operations; and

RESTRICTED DATA
ATOMIC ... ACT - 1946
SPECIFIC ... CLEARANCE NOT REQUIRED

under him four sub-sections, one each for personnel, security, operations, and logistics, as shown in the accompanying diagram. The function of planning was carried out by the Chief of the Section, that of training direction by his assistant. Liaison with the Staff of Commander Joint Task Force ONE and with the Director of Ship Material was likewise provided by the Section Chief and his assistant.

COMMANDER JOINT TASK FORCE ONE

ORGANIZATION OF DAMAGE CONTROL SAFETY SECTION



Lt. BROWDY

Lt. MORRISON

Lt. Comdr. McCOY Lt(jg) ROGERS
Lt. Comdr. ROBBINS
Lt. Comdr. BANKHEAD
Lt. Comdr. EMMETT
Lt. GOLAS
Lt. TIDWELL
Lt. WILLIS
Lt(jg) SYKES
Lt(jg) SARSFIELD
Lt(jg) HARDIN
Ens. Von RADESKY

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

II. NARRATIVE OF THE OPERATION

A. Preliminary Planning.

Early in February 1946 attention was given to hazards other than radiological in reboarding target vessels after the burst and Safety Advisor of the Task Force, Capt. G. M. Lyon (MC) formulated a preliminary plan for a Damage Control Safety Section which would be responsible for the determination of these hazards. On 19 February Capt. O. Schneider was appointed head of this section. After conferences with the Safety Advisor who explained the relationship of the section with the Radiological Safety Section under Col. S. L. Warren (MC) in the general safety plan for the Task Force, Captain Schneider conferred with members of the Bureau of Ships Group concerning personnel and training for carrying out their safety requirements in reboarding and inspection.

The Damage Control Safety Section was organized as one of the two medical groups under the Director of Ship Material, the other being the Naval Medical Research Section. However, in effect, if not in the organizational schematic, the Damage Control Safety section formed a part of the general Safety Organization of the Task Force. Since it must protect personnel from hazards incident to material damage to target ships, this Section functioned in the organization of the Director of Ship Material where it was responsible for the development and execution of a plan to provide this protection, as well as for the training of personnel for this purpose and procurement of necessary material. In this connection, the Section supported the Reboarding and Inspection Plan (Op. Plan 1-46, Annex X). Elaborate planning for safety was all the more necessary because of the unprecedented scope of the proposed tests and because of the lack of complete knowledge as to the nature of the hazards which might be encountered in carrying them out.

It was assumed that the explosions would produce sufficient damage to the inner ships of the target array, the damage resulting primarily from heat and blast, and secondarily, as the result of burning or explosion of ammunition, fuel oil, gasoline, or other material. There were obvious physical hazards, such as loosened structure, flooded compartments, and heat produced from ruptured steam lines, fires and secondary explosions. Chemical hazards which seemed more formidable, might arise from toxic concentrations of carbon monoxide, reduction of oxygen in compartments, nitrous gases from burning explosives, film or lacquers, refrigerant gases and fuel vapors, as well as from chemical warfare munitions loaded on certain target ships. Physiological hazards, such as the use of contaminated food and drinking water and the effects of excessive heat had also to be avoided.

To effect its safety program, the Section planned to provide a Damage Control Safety Officer, specially trained, for each of the ten Initial Boarding Teams, which were to give clearance for reboarding by the ships' crews and by the Technical Inspection Groups under the Director of Ship Material. These safety officers were to be provided with equipment and instruments commonly used for detection of toxic gases and vapors. It was also anticipated that some of these safety officers might be required to assist the later reboarding of target vessels by their own crews. However, this proved to be unnecessary, as shown later.

B. Training and Advance Preparations.

Since Medical personnel were to be concerned with problems of damage control, a training program was necessary. Late in February arrangements were made with the Damage Control Section of the Bureau of Ships to send ten Hospital Corps officers, who had recently reported for duty with the Task Force, to the Damage Control Training Center at Philadelphia for a week's intensive training. Six Medical officers,

RESTRICTED DATA
VII (C) - 31 OCT - 1948
ATOMIC ENERGY ACT
SPECIAL HANDLING REQUIRED
NOT RELEASABLE TO FOREIGN NATIONALS

reporting later, also received the same training. The Industrial Medicine Section of the Bureau of Medicine and Surgery provided lectures and demonstrations at the Naval Gun Factory in industrial hazards and detection of toxic gases. Additional training in general and technical subjects including nuclear physics, theories of damage control, communication procedure and use of technical equipment were provided during movement of the group to Bikini.

The preliminary training, however, was completed by the end of March. Thirteen officers of the section then proceeded to the West Coast. At this time the tests were postponed by Presidential order. Nevertheless, logistics headquarters were established at the Oakland Army Base by Lt.(jg) A. L. Rogers, (HC), while the remaining twelve of these officers began a program of familiarizing themselves with target vessels at San Pedro and San Francisco. An important adjunct to this program was the education and indoctrination of the crews of these target vessels in all matters pertaining to Damage Control Safety, and assistance in the organization of the ships' reboarding teams into efficient working units from the standpoint of accident prevention. This program was continued until the USS HAVEN sailed for Pearl Harbor on 29 May, at which time all the Section personnel were embarked aboard that vessel except Comdr. M. Cohen (MC) and Lt. S. V. Golas (HC). These two officers had already departed for Bikini aboard the USS WHARTON on 6 May to continue their part of the indoctrination program and to maintain liaison with the Director of Ship Material. They instructed the crews of target vessels at Pearl Harbor and Bikini in safety matters and also gave lectures and demonstrations in the use of gas-testing equipment for DSM personnel aboard the WHARTON. Arrangements were made to procure safety equipment for the target vessels lacking these items through the supply depot at Pearl Harbor and by air from supply points in the United States. The Force Maintenance Officer aboard the Mt. McKINLEY assisted in these supply problems.

Meanwhile aboard the HAVEN this Section was rounding out its own training program by means of lectures, demonstrations, and conferences, and by working with members of the Radiological Safety Section assigned to boarding teams.

The final steps were taken when all the ships arrived at Bikini. Two Safety conferences were held at the Bikini Officers' Club on 12 and 13 June for Commanding Officers, Damage Control Officers, Target Coordination Officers, and Medical Officers of all target vessels, as well as Initial Boarding Team personnel from the DSM staff. At these conferences plans were presented for assuring that safe conditions would be maintained in target ships during the re-occupation and technical inspections of the vessels. The radiological safety program was explained in detail, as well as the methods which had been worked out for collaboration between Radiological Safety Section and Damage Control Safety Section personnel.

The assignment of individual Damage Control Safety officers to the various Initial Boarding Teams was made in accordance with the Initial Boarding Plan (Op. Plan 1-46 Annex X App. X.). The following table shows the Team Captain, Damage Control Safety Officer and Senior Radiological Monitor of each team.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

SPECIFIC RESTRICTED ... REQUIRED
USE MILITARY CLASSIFICATION ...

ASSIGNMENT OF SAFETY MEMBERS TO INITIAL BOARDING TEAMS.

TEST ABLE

TEAM & VESSEL	DSM REPRESENTATIVE.	DAMAGE CONTROL SAFETY OFFICER	SENIOR RADIOLOGICAL SAFETY MONITOR
1. PRESERVER (ARS-8)	Captain R. C. BELL, U.S.N.	Lt. Comdr. J. J. McCOY, (MC) U.S.N.	Lt. Comdr. R. GERSTELL, H(S) USNR.
2. CLAMP (ARS-33)	Captain P.S. REASOR, U.S.N.	Lt. Comdr. J. E. EMMET, (MC) U.S.N.	Lieut. E. W. BARNES, (MC) U.S.N.
3. CURRENT (ARS-22)	Captain T.C. LONNQUEST, U.S.N.	Lt. Comdr. A.J. BANKHEAD, (MC) U.S.N.	Lieut. W.J. CHADBOURN, (MC) U.S.N.
4. DELIVER (ARS-23)	Captain E.B. MOTT, U.S.N.	Lt. Comdr. J. J. ROBBINS, (MC) U.S.N.	Lieut. R.D. ROSS, (MC) U.S.N.
5. CONSERVER (ARS-39)	Captain F.W. SLAVEN, U.S.N.	Lieut. S.V. GOLAS, (HC) U.S.N.	Captain D.L. WAKE, (MC) AUS.
6. RECLAIMER (ARS-42)	Captain W.S. MAXWELL, U.S.N.	Lieut. H.B. TIDWELL, (HC) U.S.N.	1st Lieut. M. MALLORY, Jr. (MC) AUS.
7. ETLAH (AN-79)	Comdr. C.L. GAASTERLAND U.S.N.	Lieut. R.E. WILLIS, (HC) U.S.N.	Lieut. E.S. BILL, (MC) U.S.N.
8. SHAKAMAXON (AN-88)	Captain J.E. DODSON, U.S.N.	Lt(jg) J.J. SARSFIELD (HC) U.S.N.	Lieut. T.G. HENNESSY, (MC) U.S.N.
9. ONEOTA (AN-85)	Comdr. E.H. BATCHELLER, U.S.N.	Lt(jg) F.W. SYKES, (HC) U.S.N.	1st Lieut. M.A. BLOCK, (MC) AUS.
10. SUNCOCK (AN-80)	Captain E.W. LAMONS, U.S.N.	Lt(jg) L.V. HARDIN, (HC) U.S.N.	1st Lieut. R.D. TEBBETT, (MC) AUS.

NOTE: Alternate damage control safety officers not shown in table: Lt. G.W. Morrison, Jr. (HC) USN, Ens. H. Von Radesky (HC) USN. Also not shown: ten assistant radiological monitors and twenty radiological monitors of the boarding pool in USS HAVEN.

Initial Boarding Team drills were held on 15 and 19 June, and details of communications and task assignments were further developed.

The QUEEN Day rehearsal went smoothly and disclosed no need for any major changes in the plans for re-boarding on ABLE Day.

Similar detailed plans and assignments were made for test BAKER and are presented in Operation Plan 1-46 as an addendum to Appendix X, Annex X. However, because of the slowing of the re-boarding phase due to excessive radioactivity, not all of the teams were needed each day. Also the composition of the teams had to be modified to suit the nature of each day's operations. Therefore no table for test BAKER teams can be shown.

C. Summary of Results of Operation.

(1) Test ABLE - On ABLE Day the operation proceeded almost exactly as planned. After the atomic bomb burst the ARS's and AN's carrying the Initial Boarding Teams began their approach for re-entering Bikini Atoll. During the afternoon of ABLE Day some of the Initial Boarding teams boarded and inspected the topsides of certain vessels in radiologically clear areas of the lagoon.

The initial boarding of all target vessels was completed on ABLE Day plus three. By that time the ships which had been declared safe were being opened up by their own teams.

In general the operations of the Damage Control Safety Section in test ABLE were carried out successfully and without any special difficulties. There were few occasions on which it was found necessary to employ the safety testing equipment, since nearly all the Initial Boarding Team Inspectors were limited to the topsides of vessels, and since the target ship's re-boarding teams were provided with their own equipment for opening up spaces below.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
... MILITARY ... PUBLICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED DATA RESTRICTED. CLEARANCE NOT REQUIRED
USE MILITARY SECURITY CLASSIFICATION CATEGORIES

During the entire test there was no report of any injury to personnel which could in any sense be attributed to the bomb explosion or to subsequent events and operations incident to the test. It appeared that the Safety Program had succeeded in making all personnel safety-conscious and had thereby yielded the desired results.

Test BAKER also proceeded along anticipated lines, but the excessive radioactivity of some of the target ships prevented early reboarding. Decontamination procedures had to be tried out and developed. Eventually it became possible to board and inspect the ships for evaluation of damage. Again all precautions were taken to prevent injury to personnel going aboard, and with equally good results.

- -

III. SPECIAL REPORTS, DAMAGE CONTROL SAFETY SECTION

A. LOGISTICS

1. Personnel.

The Navy provided all personnel for the Damage Control Safety Section as follows:

Officers:	No.	Enlisted Men	No.
Captain, MC, USN	1	Chief Yeoman	1
Commander, MC, USN	1	Yeoman 1c	2
Lt. Comdr., MC, USN	5	PhM 1c	1
Lieutenant, MC, USN	5	SK3c	2
Lieut. (jg) MC, USN	4	Sea 1c	1
Ensign, MC, USN	1	Sea 2c	1
	17		8

2. Facilities.

a. The Army provided desk space and storage space for advance echelon of the Section at Bldg. #2001, Oakland Army Base, 14th & Ferry Sts., Oakland, California.

b. The Navy provided one office for the Chief of Section, a combined administrative office and conference room, and a storeroom for supplies and equipment aboard the USS HAVEN (AH-12)

3. Living Accommodations - were provided aboard the HAVEN for officers and men of the section.

RESTRICTED DATA
SPECIFIC VII - (C) - 37 OCT - 1948
USE MISTAKE
CLEARANCE NOT REQUIRED
DECLASSIFICATION SAYSTRUARD

4. Transporation - was provided to and from Bikini by the Navy, for all supplies and equipment, and for all personnel except as follows:

a. Transportation for the Chief of the Section from Hickam Field to Kwajalein by ATC.

b. Transportation for the following members of the section by CROSSROADS aircraft from Bikini to San Francisco:

Capt. O. SCHNEIDER

Lt. Comdr. A. J. BANKHEAD

Lieut. H. B. TIDWELL

Lieut. R. E. WILLIS

Lieut. G. W. MORRISON

Lt(jg) J. J. SARSFIELD

Lt(jg) A. L. ROGERS

Ens. H. Von RADESKY

5. Supplies - The following is a complete list of all material provided for the Damage Control Safety Section, showing quantities, name of item, and source:

QUANTITY	STOCK NO.	ITEM:	SOURCE
40	16-R	RADIO, Handie Talkie	Army
160	17-B-337	BATTERIES, 3A37	Army
160	17-B-338	BATTERIES, 3A38	Army
340	17-B-7210	BATTERIES, Flash-light	Navy
100	17-B-7725	BATTERIES, Dry Cell	Navy

QUANTITY	STOCK NO.	ITEM	SOURCE
10	17-B-9450	TRAYS, 6V-SRL-15	Navy
30	17-F-13550	FLASHLIGHTS, 2 Cell	Navy
1	A-17-K-5720600	KITS, Repair, Electric	Navy
16	17-F	FLASHLIGHTS, 3 Cell	Navy
50	17-L-6340	LIGHTS, Flashlight 3 Cell	Navy
20	17-L-7780	LANTERNS, Electric Hand	Navy
30	18-B-1142	BINOCULARS	BuShips
30	18-C-137	CANISTERS, Dehydrating	Navy
19	18-I-555	INDICATOR, Combustible Gas	Navy
9	18-I-370-50	INDICATOR, CO	Navy
16	2-495	KIT, First Aid	BuMed
16	S2-1460	POUCH, Hosp. Corps, large, empty	BuMed
30	L-18-R-137	HOPCOLITE REFILLS DS-8991	Navy
4	18-S-255	SCALES, Triangle, 12"	Navy
4	18-T-3060	TRIANGLES, 30-60 degree, 8"	Navy
4	18-T-3735	TRIANGLES, 45-45 degree, 8"	Navy

RESTRICTED DATA
VII ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS
CLEARANCE NOT REQUIRED

QUANTITY	STOCK NO.	ITEM	SOURCE
20	21-C-225	CORD, Sash, 5/16"	Navy
7	21-L-285	LINE, Fishing flex No.1, 5/16" Cir.	Navy
5	21-T-200	TWINE, Cotton 24 Ply 1/2 lb. ball	Navy
60*	23-B-6985(	BREATHING APPARATUS, OXYGEN	Navy
300	23-C-1210	CANISTERS, for OBA	Navy
59	23-L-270	LINE, Safety Steel wire, hook & ring	Navy
29	23-P-169	PRESERVERS, Life	Navy
30	25-W-2400	WATCHES, Wrist	BuAer
19	31-L-278	LAMPS, Flame Safety	Navy
500	L-33-T-233	TUBING, Rubber 3/16" x 1/8"	Navy
121	37-C-2160	RAINCOATS, Slicker size 36---15-No. " 38---16-" " 38---10-" " 40---28-" " 40---15-" " 42--- 2-" " 42---15-" " 44---10-" " 44---10-"	Navy
150	37-#-495-50	EYESHIELDS	Navy

* - 30 Procured for use of RadSafSec by D.C.S.S.

QUANTITY	STOCK NO.	ITEM	SOURCE
28	37-O-970	SUNGLASSES	BuAer
50	37-G-3575	FRAMES, Lens	BuShips
39	37-H-625-	HATS, Protective	BuShips
	10	Size, 6 3/4--1-No	
	15	" 6-7/8--2-No	
	20	" 7 --6-No	
	25	" 7-1/8--4-No	
	30	" 7-1/4--9-No	
		" 7-3/8--2-No	
		" 7-1/2--15-No	
30	37-H-625	HATS, Rain So'Wester Size-7 8-No " -7 1/4-15-No " -7 1/2- 7-No	BuShips
275*	37-H-1629	HELMETS, SUN	BuShips
91	37-L-237	LENS, SHADE	BuShips
60	37-S-2180	SOCKS, Wool, Heavy Size--10 -24-No " --11 -24-No " --12 -12-No	BuShips
1	40-D-351-50	DRILL, Electric	BuShips
2	40-D-1250	DRILLS, wire gauge 0 to 60	BuShips
4	41-H-185	HAMMER, Claw	BuShips
2	41-H-520	HAMMER, BallPein 3/4 lb.	BuShips
2	41-H-520	HAMMER, BallPein 1/2 lb.	BuShips

* For use of D.C.S.S., RadSafSec & Oceanographic Group.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

QUANTITY	STOCK NO.	ITEM	SOURCE
6	41-K-610	KNIVES, Sheath	BuShips
1	41-I-688	IRON, Soldering electric	BuShips
2	41-S-1325	SCREWDRIVERS, Jewelers	Navy
1	41-S-2030	SCRIBERS, Mach	Navy
1	41-V-272	VISE, 3" jaw	Navy
1	41-W-485	WRENCHES, Adjust.	Navy
96	42-R-2000	RINGS, Key	Navy
96	42-H-32500	HOOKS, Snap Bolt	Navy
200	51-G-123	GAS, CO_2, for life belts	Navy
1	51-C-2075	CYLINDER, SA, No. DS-10519	Navy
50	51-D-453	DYE, Sea marker	Navy
25	51-G-132	GAS, (CO), for testing CO Indicators	Navy
55	53-B-22320	BOOKS, Memo 5 x 8	Navy
11	53-B-22510	BOOKS, Memo 3½x6	Navy
36	53-B-22770	BOOKS, Note	Navy
4	53-B-23200	BOOKS, record, cash 8½ x 14	Navy

CJTF - ONE
Operational Report - CROSSROADS - PART VII - Special Reports
Section (C) - Safety Plan
(including Radiological).

QUANTITY	STOCK NO.	ITEM	SOURCE
4	53-B-23200	BOOKS, Record, cash 8½x14	Navy
7	53-B-14858	COVERS, Loose leaf 3 ring, 8x10½ paper	Navy
187	53-E-1820	ENVELOPES, Manila 8½ x 11½	Navy
296	53-E-2096	ENVELOPES, Manila 4 1/8x9½, franked	Navy
162	53-E-2720	ENVELOPES, Manila 10x15	Navy
382	53-E-3748	ENVELOPES, Manila 3 7/8 x 8 7/8	Navy
12	53-E-5810	ERASERS, Typewriter	Navy
5	53-F-986	FASTENERS, Paper, ½"	Navy
5	53-F-998	FASTENERS, Paper, 1"	Navy
5	53-F-1010	FASTENERS, Paper, 1½"	Navy
12	53-F-2320	FILE BOARDS, Clip	Navy
2	53-I-3948	INK, Stamp pad, green.	Navy
2	53-I-4112	INK, Red, 4 oz.	Navy
6	53-I-4494	INK, Blue-Black	Navy
1	53-P-1528	PADS, Stamp, Black	Navy
124	53-P-1124	PADS, Scratch 5x8	Navy
114	53-P-1148	PADS, Scratch, ruled 8x10½	Navy

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED AEC CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED

QUANTITY	STOCK NO.	ITEM	SOURCE
8	53-P-2507	PAPER, Blotters	Navy
36	53-P-2610	PAPER, Blotters, Desk, 19x24"	Navy
24	53-P-3286	PAPER, 3 ring, for loose leaf notebook	Navy
8	53-P-8302	PAPER, Carbon, 8x10½	Navy
2	53-P-10746	PAPER, Cross Section 20 sq. per inch	Navy
2	53-P-10747	PAPER, Cross Section 10 sq. per inch	Navy
10	53-P-25490	PAPER, Green, 8x10½"	Navy
10	53-P-16185	PAPER, Mimeograph 8x10½	Navy
65	53-P-16185	PAPER " "	Navy
31	53-P-20836	STENCILS, Mimeograph Blue, 8½ x 18"	Navy
10	53-P-22544-65	PAPER, White, rag bond, 25%, 8x10½"	Navy
41	53-P-22736	PAPER, White, manifold 8x10½"	Navy
5	L-53-P-22752	PAPER, Yellow, 8x13" Sulphite, manifold	Navy
2	53-P-27240	LEADS, for Mech. Pencils, black #2	Navy

QUANTITY	STOCK NO.	ITEM	SOURCE
36	53-P-28700	PENCILS, Mechanical Black 12-No 24-No	Navy
12	53-P-29600	PENCILS, Indelible	Navy
24	53-P-29844	PENCILS, Drawing, 4M	Navy
12	53-P-28971	PENCILS, China marking, blue	Navy
36	53-P-28977	PENCILS, China marking, Red	Navy
144	53-P-3004	PENCILS, Writing, #2	Navy
7	53-P-36000	PERFORATOR, Paper 2 hole	Navy
5	53-P-53000	SETS, Pen, Desk	Navy
6	53-R-4200	RULERS, 12" beveled	Navy
24	53-R-3045	RIBBONS, Typewriter Black & red	Navy
10	53-R-908	REINFORCEMENTS, Circular	Navy
6	53-S-900	SHEARS, Office	Navy
2	53-S-36000	SHARPENERS, Pencil	Navy
20	53-S	STAMPS, Rubber, 1/4" JTF-1 No-2 Secret No-2 Restricted No-2 D.C.S.S. No-2 Fragile No-2 Air Mail No-2 USS HAVEN No-2 BuShips No-2 BuMed No-2 Urgent No-2	Navy

RESTRICTED DATA
VII A (6) - 25 ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

JJTF - ONE
Operational Report - CROSSROADS - PART VII - Special Reports
Section (C) - Safety Plan
(including Radiological).

QUANTITY	STOCK NO.	ITEM	SOURCE
5	53-S-4660	SPONGES	Navy
1	53-S-4740	STAMPS, Date, 4 band	Navy
11	53-T-1145-50	TAPE, Scotch 1/2"	Navy
12	53-T-1337	TAPE, Masking 2"	Navy
1	54-M-3163	MACHINE, Stapling	Navy
2	54-R-1425	RECEPTACLES, Waste Paper	Navy
1	54-M-4795	MACHINE, Adding Remington	Navy
4*	54-T-5702	TYPEWRITERS, Remington	Navy
10**	54-T-5900	TYPEWRITERS, Royal	Navy
4*	54-T-6416	TYPEWRITERS, L.C.Smith	Navy
96	54-R-9595	RATIONS, "K"	Navy
164	56-R-5800	RATIONS, "C"	Navy
10	57-I-432	INDICATORS, CO_2	Navy
9	57-DY-9318	DETECTOR TUBES, H_2S	Navy
1	57-J-11093	CHECKING OUTFIT, CO Indicator, No. DS-11093	Navy

* - one (1) each for use of D.C.S.S.
** - two (2) for use of D.C.S.S. Remainder of typewriters for use of RadSafSec and Administrative Officers.

QUANTITY	STOCK NO.	ITEM	SOURCE
19	74-B-	BAGS, Musette	Navy
57	74-P-145	CASES, For first aid packets	Navy
30	74-C-80	CANTEENS, Water type	Navy
30	74-C-300	COVERS, Canteen, water	Navy
30	74-B-265	BELTS, Web, side arm	Navy
30	72-S-75560-606	SHOES, Navy Field Size, 6-E Pr-3 " 6½-EE Pr-1 " 7-D Pr-3 " 8-E Pr-9 " 9-D Pr-7 " 10-D Pr-4 " 11-D Pr-3	Navy
32	72-B-1220- 60 70 80 90 100	BOOTS, Rubber, Knee Size 6 Pr-2 Size 7 Pr-10 " 8 Pr-4 " 9 Pr-8 " 10 Pr-8	Navy
16	37-G-3050	GOGGLES, Anti-radiation	Manhattan District
9	57-DY-2317	DETECTOR, Hydrogen Sulphide	Navy

On 31 July, Lt(jg) A. L. Rogers, HC, USN, was sent to San Francisco to expedite the return and disposition of the above material in accordance with existing instructions, upon arrival of the HAVEN in that port.

VII RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
SECURITY SAFEGUARDS

RESTRICTED
SECURITY INFORMATION
MILITARY CLASSIFICATION SAFEGUARDS

B. Security.

1. Since the mission of the Damage Control Safety Section was almost entirely operational in nature, rather than technical, very little material was handled which required classification higher than RESTRICTED. J-2 representative in HAVEN provided facilities for handling material of higher classification. Photographic requirements of the section were met by other units of the Task Force (Director of Ship Material and Photographic Section, J-2).

C. Public Information.

On 13 April 1946, after proper clearance, a lecture was presented by Capt. O. Schneider, head of the Section, for the staff of the Naval Medical Research Institute, at Bethesda, Md. on the medical organizations of Joint Task Force ONE. The outline of the lecture is given below.

1. Joint Task Force ONE organization.
2. Director of Ship Material Organization.
3. Medical Organizations.
   - A. Task Force
   - B. Safety Organization - Radiological Safety.
   - C. Damage Control Safety.
   - D. Naval Medical Research Section.
4. Damage Control Safety - Historical Review.
   - Task
   - Planning
   - Procurement
   - Training
   - Organization
   - Operations
   - Logistics
5. Summary
6. Discussion

NOTE - Historical and organizational phases of subject matter were discussed, largely.

IV. CHRONOLOGY OF DAMAGE CONTROL SAFETY SECTION

19 Feb. 1946 - Capt. O. Schneider ordered and reported to Commander Joint Task Force ONE as head of Damage Control Safety Section.

21 Feb. 1946 - Officer personnel ordered for Damage Control Safety Section staff.

27 - 28 Feb. - Ten Hospital Corps Officers reported.

1 March 1946 - Seven of above officers ordered to Damage Control Training Center, Philadelphia.

1 - 4 March - Planning. Requisitioning of supplies and equipment.

5 March - Four Medical Officers U.S. Navy reported.

8 - 15 March - First group of Hospital Corps officers returned from Damage Control Training Center and second group ordered there for training. Lectures and demonstrations at Naval Gun Factory. Major plans of Damage Control Safety Section completed.

16 - 18 March - Lectures for second group at Naval Gun Factory.

19 - 23 March - Seven Medical and Hospital Corps officers departed for West Coast.

22 March - Postponement of atomic bomb tests by President. Lt(jg) Rogers, logistics officer of Section, arrived at Oakland Army Base to establish advance headquarters.

26 March - Ens. Von Radesky (MC) reported aboard HAVEN for duty with section.

26 - 31 March - Three Medical Officers departed for West Coast.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AND CLEARANCE NOT REQUIRED
FOR MEANS OF PROTECTION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT
RESTRICTED
USE MILITARY CLASSIFICATION

---

29 March - Orders modified for officers on West Coast directing all except Lt. Rogers to proceed to San Pedro for indoctrination, and familiarization with target vessels.

1 - 5 April - Above officers reported at Terminal Island. Additional training course for officers at Damage Control School and at chemical laboratory, Terminal Island. At same time inspection of target vessels began.

6 - 30 April - Following target ships examined by members of Damage Control Safety group at San Pedro: NEVADA, ARKANSAS, PENSACOLA, SALT LAKE CITY, PENNSYLVANIA, INDEPENDENCE, PRINZ EUGEN, KENNETH WHITING, GUNSTON HALL, CUMBERLAND SOUND. (Note: The last three vessels were later removed from target group).

Several lectures were given in most of these ships on safety and on use of gas detection equipment. On 12 April a lecture was presented by Capt. Schneider at Naval Medical Research Institute, Bethesda, Md. on the Medical Organizations of Operation CROSSROADS.

30 April - Target Ships SARATOGA and NEW YORK inspected at San Francisco.

1 May - Comdr. Cohen and Lt. Golas ordered to staff of Director of Ship Material USS WHARTON, to carry on indoctrination work in target group and for liaison.

2 May - Target group departed for Pearl Harbor.

6 May - WHARTON departed for Pearl Harbor.

6 - 11 May - Equipment and supplies for Damage Control Safety Section loaded on board USS HAVEN.

12 May - WHARTON arrived in Pearl Harbor.

12 - 21 May - Conferences and indoctrinal work in target vessels at Pearl Harbor. Consultation with OinC, Gas Detection Unit, at US Naval Shipyard, Pearl Harbor.

22 May - Target group and all other Task Groups of Joint Task Force ONE departed Pearl Harbor for Bikini.

29 May - USS HAVEN with main body of Damage Control Safety Section departed for Pearl Harbor. USS WHARTON arrived Bikini.

30 May - 3 June - Instruction in general and technical subjects on board HAVEN. Test equipment and instruments unpacked, assembled, and checked. Comdr. Cohen and Lt. Golas at Bikini continue visits to target vessels.

4 June - USS HAVEN arrived Pearl Harbor.

5 June - Additional equipment procured at Pearl Harbor and loaded aboard HAVEN. Capt. O. Schneider, with Capt. G. M. Lyon (MC) Safety Adviser, Joint Task Force ONE, departed for Bikini by air lift. HAVEN departed for Bikini.

7 June (East longitude date) - Capt. Lyon and Capt. Schneider arrived Bikini. Capt. Lyon reported to Commander Joint Task Force ONE in MOUNT McKINLEY. Capt. Schneider reported to Director of Ship Material in USS WHARTON.

8 - 12 June - Lectures and demonstrations by Comdr. Cohen and Lt. Golas for DSM Staff. Lectures and drills continued in USS HAVEN.

12 June - USS HAVEN arrived Bikini.

12 - 13 June - Safety conferences at Bikini Officers' Club for Commanding Officers, Damage Control Officers, and Medical Officers as well as DSM personnel. General and radiological safety discussed. Capt. Schneider returned to HAVEN.

15 June - First Initial Boarding Team Drill.

19 June - Second Initial Boarding Team Drill.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

- -

22 June - QUEEN Day minus one. Boarding team personnel left HAVEN, mustered aboard WHARTON and embarked in target inspection vessels. Evacuation of Bikini atoll.

23 June - QUEEN Day postponed, owing to unfavorable weather conditions.

24 June - QUEEN Day rehearsal conducted. Results satisfactory.

28 June - Conference in PILOTFISH SS-386 dealing with procedure for handling excessive quantities of hydrogen in submarines.

30 June - ABLE Day minus one. Same procedure followed as for QUEEN Day rehearsal.

1 July - ABLE Day:

0900 (About) Bomb dropped on schedule.
1300 (About) Target inspection vessels reentered lagoon.
1600 (About) Initial boarding of eighteen target vessels completed in radiologically clear areas of lagoon.
Operations suspended.

2 July - ABLE Day plus one. 0700 - Initial Boarding resumed, and continued throughout the day. Jap cruiser SAKAWA sunk about 1015. Nearly all target ships were boarded by the close of ABLE Day plus one, and found safe for re-boarding by ships' teams.

3 July - ABLE Day plus two. Critique of Damage Control Safety Section activities on board HAVEN. Instructions issued for compilation of reports.

4 July - ABLE Day plus three. All Initial Boarding of targets completed. Re-boarding by ships' teams and DSM technical inspections under way. No reports of any accidents resulting in injury to personnel throughout entire test.

- -

5 - 17 July - Planning for test BAKER.

18 July - WILLIAM Day minus one. Evacuation of atoll for rehearsal of Test BAKER. Damage Control Safety Section personnel and Radiological monitors of Initial Boarding Teams remained aboard HAVEN.

19 July - WILLIAM Day. Rehearsal calls for re-entry into lagoon, initial boarding to be accomplished by means of small boats. Safety personnel did not participate in the boarding operations on that day.

22 July - Conference in MOUNT McKINLEY, subject critique of WILLIAM Day. Progress reports for Test BAKER.

24 July - BAKER Day minus one - all DCS officers reported with their teams to their respective salvage vessels. Lagoon evacuated.

25 July - BAKER Day:

0835 - Bomb exploded on schedule.
1130 - Salvage group re-entered lagoon.
1210 - Boarding team #1 in USS PRESERVER (ARS-8) boarded USS NIAGARA (APA-87), stayed aboard 15 minutes. No non-radiological hazards.
1220 - Boarding team #2 in USS CLAM (ARS-33) boarded USS BLADEN (APA-63). No non-radiological hazards topside except oil on after well deck.
1230 - 1600 - Ten additional ships boarded. All 12 of the ships boarded on BAKER Day were in outer zone of target array. Ten of these ships were cleared as safe for reboarding by their own crews. Numerous other target ships were approached but were too radioactive for boarding.. All the initial boarding teams except Nos. 1, 3 and 5 returned their safety officers to the HAVEN. SARATOGA sank about 1600. HAVEN anchored near entrance of lagoon.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED

LCT - ONE
Operational Report - CROSSROADS - PART VII - Special Reports
Section (C) - Safety Plan
(including Radiological).

- -

26 July - BAKER Day plus ONE. All target ships approached were too radioactive for reboarding. USS HUGHES (DD-410) berthed. Three initial boarding teams operating.

27 July - BAKER Day plus TWO. USS FALLON (APA-81) berthed. Five teams operating. Two LCI's and four APA's boarded. Ships apparently undamaged. Instruments removed.

28 July - BAKER Day plus THREE. Three teams operating. Six ships boarded. None cleared. Decontamination procedures tried out.

29 July - BAKER Day plus FOUR. Three teams operating. Proceeding with decontamination measures. Two PB2Y's boarded. Five ships boarded. Two for the second time. ARKANSAS sunk during night.

30 July - BAKER Day plus FIVE. Five teams out. [redacted] returned to usual berthing area. Eight ships boarded. All too radioactive. Drifting capsized LCT demolished and sunk.

31 July - BAKER Day plus SIX. Seven teams out. Eleven ships in array boarded. Team #9 on Bikini beach and boarded thirty landing craft. Decontamination continued. 53rd CB area on Bikini inspected. Lt(jg) A. L. ROGERS departed for San Francisco to arrange for disposition of material of Section.

1 August - BAKER plus SEVEN. Two teams out. NEW YORK and NEVADA boarded. Very radioactive. Decontamination continued on five ships. PENSACOLA boarded. One LCI cleared.

2 August - BAKER plus EIGHT. Four teams out. Instruments removed from BRISCOE (APA-65). PRINZ EUGEN boarded. Salvage operations on SALT LAKE CITY. Four additional ships boarded. All "sour".

- -

3 August - BAKER plus NINE. Two teams out. Below decks survey of PRINZ EUGEN and BRACKEN. One DD boarded, very "sour".

(Remainder of chronology continued in Appendix I of this report).

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

V. SPECIAL CONTENT AND INFORMATION

A. Accident rate low - Two accidental deaths occurred in the Task Force during the test ABLE phase of the operation. One occurred during the test BAKER phase. None of these deaths can be considered as having any direct connection with the tests.

There were no injuries reported. These surprisingly few casualties, occurring in a Force of this size over such a relatively long period of time constitute a remarkable record and can only be ascribed to the painstaking preparations of the entire safety organization and to the splendid cooperation and alertness of all Task Force personnel.

B. Conditions as predicted: In general, the pattern of events in tests ABLE and BAKER followed quite closely, as regards damage to targets and potential hazards to personnel, the estimates outlined in the Safety Plan.

C. Damage Control Activities - Much credit for the success of the program of the Damage Control Safety Section is due to the enthusiastic cooperation of the Damage Control Section of the Bureau of Ships in providing information, equipment and advice, as well as for making arrangements for the training of Section personnel at the Damage Control Training Centers in Philadelphia and at Terminal Island. The instruction given at these schools was most practical, especially in methods of fire-fighting, and general safety practice.

D. Procurement of Material - The procurement of needed supplies and equipment proved to be a relatively easy matter, despite the fact that this material was provided from no less than six different sources. This reflects much credit on the supply system of the Task Force and upon the willingness and cooperation of all supply activities involved.

E. Training value - The training and experience gained by members of the Damage Control Safety Section in planning and organization and in the operational and technical phases of the Sections' activities are considered to be of great value. A nucleus of personnel in the Medical and Hospital Corps of the Navy is now available who should be able efficiently to carry out a safety program not only in future similar operations, but in any sort of operation or assignment having to do with safety aboard ship.

The task force in general, as is shown by their high degree of cooperation in the safety program, has also received a valuable lesson in the potentialities of accident prevention.

F. Dangerous Materials. - The presence of considerable quantities of dangerous materials including chemical warfare munitions and other toxic substances, notably methyl bromide, as well as explosives and inflammables, all displayed aboard for test purposes, naturally added considerably to the potential hazards of reboarding the damaged ships. Additional preparation and protection had to be provided in order to protect against these special hazards.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

VI. PERSONNEL PERFORMANCE.

A. All personnel of the Damage Control Safety Section rendered a very satisfactory performance of their duties. Those officers assigned to Initial Boarding Teams particularly showed considerable endurance in accomplishing their arduous tasks. No individual can be singled out for any outstanding feat, but rather, credit belongs to all for the successful accomplishment of the mission of this section, and for their ability to work effectively with other team members.

B. No Comment.

C. No Comment.

VII. LESSONS LEARNED, CONCLUSIONS AND RECOMMENDATIONS.

A. Accident Prevention. - The success of the safety program of Operation CROSSROADS has once more borne out the familiar but often poorly-applied principle that accidents are nearly always preventable. The key role which the entire Safety Organization played in achieving the fine safety record of Task Force ONE is an indication that other task forces and establishments could reduce their operational casualty rates by instituting a similar active program. There was no lack of cooperation on the part of the Task Force in general; undoubtedly a similar degree of cooperation could be attained in other organizations, given a safety program fitted to their needs. No one wants to get hurt. If he is shown that the possibility of injury exists and that he can avoid the injury, he will almost never get hurt.

B. Plans and Personnel available for future tests. - In the event of future tests requiring the inclusion of a Damage Control Safety unit, the plans, files, and reports will be available for study and reference. It is likely that considerable time would be saved in the organizational phases of such units by using these files.

Furthermore most of the personnel trained for this Section will also be available for possible future test

work, since all of the officers are in the regular Naval Service. Additional personnel conversant with safety work are now to be found in the organization of the Director of Ship Material, and throughout the Task Force as a whole.

C. Training Program Recommended. The successful safety record of the Operation would seem to indicate the desirability of establishing a continuous program of training for medical and hospital corps officers in safety work at one or more of the Damage Control Training Centers. Such courses should be of somewhat longer duration than those given the personnel of this section, say three to six weeks. In this connection it would simplify this training program if instruction in detection of toxic gases were included in the Training Center course.

The establishement of a safety training program would provide a backlog of safety officers not only for test operations but for general purposes as well. The personnel training should include both junior and senior officers. An important additional result of this training would be that those officers would gain a better insight into the problems of the line officers and be better qualified to assist them. It is recommended that such a training program be proposed for consideration and comment by the Bureau of Medicine and Surgery, the Bureau of Ships, and other interested agencies.

D. General Recommendations.

1. Modification of Safety Organization - Although the present scheme of using medical personnel as general safety officers has worked out satisfactorily, it is by no means implied that officers in non-medical classifications could not have functioned at least as well. Indeed, it would seem that the whole field of Damage Control and salvage work with which safety practices are closely allied, lies more within the province of the line officer or engineer than in that of the medical or hospital corps officer. It might therefore be more feasible in future planning to provide that the safety program be placed in the

59
ACT - 1946
CLEARANCE NOT REQUIRED
SAFEGUARDS

hands of qualified line officers or engineers, with perhaps medical personnel in advisory capacity. It is felt that this arrangement might place a safety program on a more solid foundation.

It is also believed that a safety organization should be provided with a staff of expert instructors as well as a public relations advisor and photographic staff. These additions would greatly facilitate the safety indoctrination program.

2. It might prove desirable in the event of future tests conducted on a similar scale, for all target units to send representatives to some central point for indoctrination in safety procedures. This would save considerable time and the quality of the instruction could doubtless be improved.

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VII - SPECIAL REPORTS

SECTION (D) - SECURITY REPORT

(A). MISSION OF SECURITY SECTION: To assure the maintenance of security of classified information relative to and classified equipment and material used in the planning and execution of OPERATION CROSSROADS, in accordance with the SECURITY DIRECTIVE issued to Commander Task Force ONE by the Joint Chiefs of Staff.

(1) OBJECTIVES: PERSONNEL SECURITY

(a). To screen the large number of scientists, technicians, and specialists recruited from Universities, Government Agencies, War and Navy Departments, and private corporations and enterprises, for possible attempted infiltration into the Task Force of Personnel with subversive associations.

(b). To check those personnel of the Armed Services associated with the Task Force who would be exposed to more than routine classified information concerning CROSSROADS in the performance of their required duties. In some cases this demanded the checking of entire ships' companies with additional checkings at intervals to ascertain that subversive elements had not infiltrated into the crews of these ships.

(c). To furnish convenient and easily recognizable identification for personnel of Joint Task Force ONE who had received personnel check and whose duties required access to more than routine classified information, restricted areas, and target ships in the routine performance of their duties.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
EDUCATION SAFEGUARDS

ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
FOR MILITARY CLASSIFICATION SAFEGUARDS
RESTRICTED

- -

(2) OBJECTIVES: PHYSICAL SECURITY

(a). To restrict access to classified information, material, and equipment connected with the tests, including damage to target ships, to those persons properly cleared for and requiring access to such classified matter.

NARRATIVE OF THE OPERATION

(A). PRELIMINARY PLANNING

(1) PERSONNEL SECURITY

(a). It was apparent at the outset that any subversive activity wishing to obtain unauthorized information concerning the Atomic Bomb and its tactical use might attempt to have agents or sympathizers infiltrate into the large groups of scientists, technicians, and other civilians that were to be procured for CROSSROADS. As security interests of the Manhattan Engineer District were closely involved in CROSSROADS, and since that organization was thoroughly familiar with problems concerning investigation of large numbers of personnel, working liaison was established with the Intelligence Division of Manhattan Engineer District immediately upon formation of the Intelligence Division. After full consideration of personnel security problems, it was decided that a Personnel Security Section would be organized with the Intelligence Division for the purpose of checking all civilian personnel procured for the operation and those members of the Armed Services who would be exposed to more than routine classified information. This check was to be made with the Federal Bureau of Investigation, Office of Naval Intelligence, Military Intelligence Department, and, in special cases, with police organizations in home towns of individuals, to ascertain whether these agencies possessed any police record or record of subversive associations.

(2) PHYSICAL SECURITY

(a). Because of the nature of Operation CROSSROADS, it was realized that strict adherence to the principle of

compartmentation of personnel with regard to access to classified information, material, and equipment concerned in the operation could not be practicable. Accordingly, a policy of limited compartmentation in this respect was adopted. It was decided that all personnel requiring more than routine access to classified information would be given special Joint Task Force ONE Identification Cards after receiving clearance from the agencies involved in checking personnel. Only these personnel were to have freedom of movement within the Task Force. In order to further safeguard information relative to equipment and projects under Manhattan Engineer District cognizance, a distinctive card entitled persons to whom issued access to areas and laboratory spaces restricted to the holder of ordinary JTF-1 Identification Card.

(b). Security Plan: The Security Plan for the Task Force was issued in the form of an annex to the Operation Plan (CJTF-1 OpPlan 1-46, Annex D). This plan was formulated to meet the security requirements specified in the Security Directive issued to Commander Joint Task Force ONE by the Joint Chiefs of Staff.

(c). Physical Security Section: The Physical Security Section was organized to train relatively inexperienced Intelligence personnel in the requirements of Joint Task Force ONE security objectives, and to coordinate the activities of Security personnel so trained and subsequently given security assignments in the Task Force. An exception to this training program was made in the case of Manhattan Engineer District Security Officers made available to the Task Force. These Officers were thoroughly familiar with security problems anticipated in the assignments planned for them and since the need for their services on laboratory ships and advanced bases arose immediately after their assignment to the Task Force, these officers were dispatched after brief indoctrination in Task Force security plans and policies. Without exception, these officers performed their duties outstandingly.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED DATA DELETED
USE MILITARY CLASSIFICATION CATEGORIES

(B). ADVANCE PREPARATIONS

(1) ORGANIZATION AND TRAINING OF PHOTO REVIEW PANELS

(a). Formation of Photo Review Panels: The J-2 Panel for Photo Review was organized for service at the Photo Science Laboratory, Anacostia, for the purpose of reviewing for possible release or proper classification still and motion pictures arriving from the forward area. This project served a multiple purpose, i.e., it expedited the release of newsworthy pictures already beginning to arrive from the scene of operations, it provided training for certain of the Intelligence Division officers assigned to serve on a Composite Panel to be formed subsequently, and it protected the security information involved in CROSSROADS photography. Prior to assignment to this Panel, the officers were trained by the Physical Security Section of the Security Branch in CROSSROADS security requirements and objectives.

(b). Training of Photo Review Officers for Forward Area: In order to expedite the release of newsworthy unclassified pictures by radiophoto from the forward area, a training program was undertaken for officers to be assigned to this duty. These officers were assigned to temporary duty with the J-2 Panel at the Photo Science Laboratory, Anacostia. After so serving for a brief period, they were dispatched to the forward area for a familiarization tour of Kwajalein, Bikini, and Eniwetok Atolls. Those officers from Manhattan Engineer District, Army Air Forces and Army Ground Forces who were assigned this duty were given further familiarization with naval subjects. This familiarization tour of the forward area proved sufficiently valuable that similar tours were given members of the J-2 Panel serving at the Photo Science Laboratory.

(c). Formation of Composite Panel: As the operation progressed and both quantity and variety of subjects photographed increased, it became apparent that, in order to

expedite the release of photographs of an unclassified nature and to protect the security interests of all participants, agencies concerned in the War and Navy Departments and in the Manhattan Engineer District were requested to designate representatives to serve on a Composite Panel at the Photo Science Laboratory. As finally organized, the Composite Panel consisted of representatives from:

JTF-1 Intelligence Division	CNC
Manhattan Engineer District	BUORD
Army Air Forces	BUAER
Bureau of Public Relations (War Dept.)	BUSHIPS
Office of Public Information (Navy Dept.)	

Commander Joint Task Force ONE letter Serial 3178 of 24 April 1946 was issued as directive to the Composite Panel. This Panel passed on almost all CROSSROADS pictures taken after the last week in June 1946.

(2) ORGANIZATION OF CORRESPONDENCE SECTION

(a). As plans for the operation progressed, and news concerning CROSSROADS was given wider dissemination by the press, a great many letters objecting to the holding of the tests or of certain features of the tests were received by the Task Force Commander. As many of the questions raised by correspondents involved matters of security, the task of replying to this correspondence was assigned to the Security Branch. With the departure of the staff to the operating area, this function was transferred to the Security Element of the Rear Echelon. Objections raised usually concerned the following points:

1. Use of individual ships.
2. Needless destruction of Navy ships.
3. Threatening gesture to other nations and a threat to world peace.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

4. Endangering safety of the world or portions thereof.
5. Tests not being held under auspices of United Nations.
6. Use of animals.
7. Cost of tests.
8. Wasting of nation's resources (steel).

A relatively few letters were received expressing approval of the tests. Still other letters were received from persons volunteering to serve as "human guinea pigs."

(3) ORGANIZATION OF REAR ECHELON

(a) Prior to the middle of March 1946, the demands for personnel for the forward area and for the Staff to be embarked in the flagship absorbed the personnel then available for service in the Security Branch. However, by the third week in March it was possible to form a nuclear organization to be trained in the duties to be assumed by the Rear Echelon after departure of Commander Joint Task Force ONE Staff for the forward area. The majority of these personnel were assigned to personnel security to handle the great amount of paper work involved in processing the clearance of personnel as previously outlined. As the organization of the Rear Echelon progressed, the functions previously performed by the Security Staff scheduled to embark in the flagship were gradually transferred to it. This transfer of responsibility was completed prior to departure of Staff to forward area.

(4) ASSIGNMENT OF FILM PROCESSING PLANT SECURITY OFFICERS

(a). Since the Photographic Plan for CROSSROADS called for the processing of large quantities of motion picture film at several civilian plants, the Security Branch

initiated an inquiry of the clearance status of the plants concerned for the processing of classified material. This investigation revealed that the wartime contracts held by all of these corporations providing for the maintenance of proper security measures had lapsed, but a relatively large number of properly investigated personnel were still working in the laboratories of the plants concerned. Accordingly, in order to ascertain that all classified film would be processed under the custody and supervision of officers, two security officers were obtained for each of the following film processing plants.

Eastman Kodak Company	Rochester, N. Y.
Ansco Corporation	Binghamton, N. Y.
Hal Roach Studios	Los Angeles, Calif.
Consolidated Films	Los Angeles, Calif.
Technicolor Corporation	Los Angeles, Calif.

The Army officers assigned to security duty at the above film plants were obtained from the Provost Marshal General. Their procurement and administration was a function of the Security Branch, Rear Echelon.

(b). In addition to the above plants, Kodak, Hawaii at Honolulu was used extensively for the processing of 16mm Kodachrome film. An investigation conducted by the Intelligence Division while the flagship was in Pearl Harbor revealed that this plant, with one exception, was employing only personnel cleared by the District Intelligence Officer, 14th Naval District, in the processing and handling of 16mm Kodachrome film. A security officer was detailed from the Security Branch to serve at this plant. Necessary M.P. guards were obtained from the Army at Fort Shafter. A total of approximately fifty enlisted men were supplied by the Army for necessary guard duty at processing plants and storage vaults in the Los Angeles area.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(5) INSPECTION OF SECURITY PROVISIONS FOR SHIPPING LOS ALAMOS MATERIAL

(a). Prior to the shipping in late February of classified Los Alamos equipment and material to Kwajalein and to the Los Alamos laboratory ships on the West Coast, Major T. O. JONES, C.E., was despatched to investigate and make arrangements for maintenance of security of shipments while enroute and while being stored and handled at the several ports involved. It was his opinion that adequate security measures had been taken.

(6) MOVEMENT TO OBJECTIVE

(a). Broadly, the movement of Intelligence personnel to the target area or to their assigned ships was accomplished in two phases:

1. Movement to Objective - First Phase: The first phase occurred after the procurement of security personnel from the Manhattan Engineer District. As previously explained, these officers were despatched shortly after joining the Security Section in February and early March. Their assignments were:

A. Security Officer, Kwajalein.
Major Emmons B. BROWN, CEC, was despatched to serve as Joint Task Force ONE Security Representative at Kwajalein. An additional fifty Marines were requested and obtained for that island, and, under Major Brown's direction, assisted in the guarding of Joint Task Force ONE classified installations on that island. Transients passing through Kwajalein were screened, necessary security checks were obtained on personnel required to have access to classified matter on the island, and Major Brown acted as adviser for Joint Task Force ONE security matters to Atoll Commander, Kwajalein, and Commander Task Group 1.5. In addition,

Major Brown assisted in photo review and in certain Public Relations functions. When additional security personnel became available, two assistants were assigned to him, one being a Naval officer and one an officer from the Marine Corps.

B. Security Officer, Bikini.

Lieut. R. P. BROWN, USNR, after undergoing training in the Physical Security Section of the Security Branch, was despatched to Bikini in March to serve under SOPA, Bikini, as Joint Task Force ONE Security Representative at that atoll, prior to arrival of CJTF-1 in Mount McKinley. In April, an assistant, Lieut. J. L. KIRALY, USNR, was despatched to aid Lieut. Brown in his increasing duties. At the request of Lieut. Brown, a Marine detachment of one officer and forty-nine enlisted men was procured to guard vital instrumentation on the three important islands at Bikini Atoll: AMEN, ENYU, and BIKINI. Lieuts. Brown and Kiraly rejoined the Staff on the arrival of the flagship at Bikini.

C. Security Officer, U.S.S. ALBEMARLE

Capt. J. A. KING, CEC, was assigned as Security Officer in U.S.S. Albemarle, one of the Los Alamos laboratory ships. He joined the ship in late February while it was undergoing alterations on the West Coast. His security functions largely involved Los Alamos personnel and equipment.

D. Security Officer, U.S.S. CUMBERLAND SOUND

Lieut. J. J. O'CONNEL, CEC, was assigned as Security Officer in U.S.S. CUMBERLAND SOUND, another of the Los Alamos laboratory

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC AUTHORIZATION CLEARANCE NOT REQUIRED
FOR VISIT TO [illegible] ISLANDS

ships. His security functions closely paralleled those of the security officer of the ALBEMARLE.

2. Movement to Objective - Second Phase: The second phase occurred at the time of and subsequent to departure of Commander Joint Task Force ONE Staff from Washington for the flagship. Personnel involved in this movement were, by assignments, the following:

A. Security Staff Members in U.S.S. MOUNT McKINLEY.

Members of the Security Section Staff assigned to MOUNT McKINLEY departed Washington on 30 April 1946 for the flagship.

B. Security Officer, U.S.S. HAVEN

Lt. Comdr. A. E. AMAN, USNR, after undergoing training in the Security Section, joined U.S.S. HAVEN at San Francisco as Security Officer for the Radiological Safety Group to function in that ship.

C. Security Officer, U.S.S. APPALACHIAN

Lt. Comdr. David P. KLAIN, USNR, after undergoing training in the Security Section and at the Photo Science Laboratory, and after making a tour of the target area, joined the Press Ship, the U.S.S. APPALACHIAN, in early June as Senior Security and Photo Review Officer. He was assisted by Major R. C. SMITH, CEC, of the Manhattan Engineer District.

D. Security Officer, U.S.S. PANAMINT

Lieut. A. J. McCORMICK, after undergoing training in the Security Section joined U.S.S. PANAMINT as Security Officer prior to departure of that ship with foreign and other non-participating observers embarked.

(C). TRAINING OF TASK GROUPS

(1) SECURITY LIAISON OFFICERS, U.S.S. WHARTON, KENNETH WHITING, AVERY ISLAND

(a). At the request of the Security Branch the Director of Ship Material, the Technical Director, and the Electronics Coordinating Officer each designated an officer on his staff to serve as Security Officer and to maintain close liaison between his respective technical staff and the Security Branch. Officers so designated were indoctrinated in Joint Task Force ONE security policies, procedures, and objectives. These officers were the following:

U.S.S. WHARTON - Comdr. N. W. EDSON, USNR
U.S.S. KENNETH WHITING - Ens. H. M. ARCHER, USNR
U.S.S. AVERY ISLAND - Comdr. J. C. MILLER, USNR

(2) SECURITY LIAISON OFFICERS, TARGET SHIPS AND C.T.G. AND C.T.U. STAFFS.

(a). In order to carry out and coordinate the security indoctrination of all target ship personnel and of staffs concerned at Bikini, all Commanders Task Groups and Commanders Task Units, and Commanding Officers of target ships were required to appoint security liaison officers. These officers were given instructions at a series of conferences in the flagship, at which time explanations of security plans, policies, and requirements were held and problems discussed. Despatches and written memoranda concerning these matters were also distributed. In addition, the officers of the Security Branch made systematic and routine visits to all target ships to discuss security problems with commanding officers and to ascertain effectiveness of the security program within the Task Force. Periodic inspections were also carried out to ascertain the effectiveness of security guards at restricted areas ashore.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
SECURITY INFORMATION SAFEGUARDS

(D). SUMMARY OF RESULTS OF TESTS ABLE AND BAKER WITH CONCLUSIONS AS TO OPERATIONAL ASPECTS ONLY.

(1) The maintenance of Security, Operation CROSSROADS, was undertaken with the knowledge that in the last analysis the mission involved the security of information and that some forfeiture of that security was inevitable. The basic problem was thus to minimize rather than absolutely to prevent, this loss. Insofar as the true secrets of the atomic bomb and its precise effects are concerned, it is believed that the mission was substantially accomplished, although the public interest required the divulging of considerable information which in an absolute sense it would have been desirable to withhold.

(2) From the security standpoint, the unique feature of the tests lay in the fact that the value of much of the information to be safeguarded was not intrinsic but lay in its correlation with other information. A single piece of information often was harmless by itself, but where combined with other harmless bits of information, the end product frequently required the most careful handling. In this respect, the maintenance of security with minimum prejudice to operational efficiency entailed the exercise of judgment by relatively large numbers of personnel.

(3) Security during the operation had two great assets. These were the isolation of the site and the diffusion of information. Only the bomb itself could be an espionage target for a single agent. To obtain a comprehensive picture of any other feature would require the services of a well-organized espionage team. With the consolidation of reports now in progress the security risk obviously is increasing.

(4) The tests involved no unorthodox security features.

(5) The security organization worked and the security plan was implemented as anticipated. The only major problem presented in this regard was the cumbersome nature of the machinery devised to handle the classification and where practicable to facilitate the release of photography. This problem is under study, but its simplification is beset with practical difficulties.

(6) It is desired to emphasize the fact that the real danger to the security of Operation CROSSROADS, implicit in the consolidation of technical reports, is a continuing one and is actually increasing. The safeguarding of these data, while at the same time permitting access thereto by properly authorized personnel is a task which will transcend the life of Joint Task Force ONE.

COMMENTS AND RECOMMENDATIONS

Although the objectives of general security regulations and requirements in Operation CROSSROADS was at a fairly high level, the need for continually stressing the importance of security cannot be underestimated or overemphasized. An increased appreciation of the importance of security as well as an appreciation of the type of information to be found useful by outside interested sources and the methods which might be employed by them is of vital importance in security work.

The great value of having fully trained security personnel immediately available to the Army and Navy was amply demonstrated in CROSSROADS by the excellent performance of duty rendered by Manhattan Engineer District Security Officers assigned to the Task Force. Without the assistance of this group, the security obligations of the Task Force at the start of the operations could not have

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
DISSEMINATION SAFEGUARDS

RESTRICTED DATA
AT WILL [illegible]
RESTRICTED [illegible] REQUIRED
USE MILITARY [illegible] SAFEGUARDS

- -

been fulfilled in the manner in which they were met. It is believed that a similar well trained group of security officers might very advantageously be trained and kept available to the Naval Service as well.

The value of ONI, MID, and FBI personnel file records were thoroughly proved in this operation in which it became necessary to execute security checks hurriedly on a number of people so great that, had all the agencies concerned used their combined facilities for this purpose exclusively, no more than a negligible percent of the total could possibly have been investigated. This system of checking can never by comparable to individual investigations, but in order to meet requirements such as those imposed by CROSSROADS where speed is a prime necessity, adequate and thorough files of this type maintained by the Army and Navy Intelligence Agencies are essential.

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VII - SPECIAL REPORTS

SECTION (E) - AIR OPERATIONS

INDEX

I Synopsis of Air Operation.
II Statement of Mission.
III Command and Organization.
- A. Command
- B. Staff
  - 1. Personnel
  - 2. Intelligence and Security
  - 3. Operations
  - 4. Logistics
- C. Army Air Group (Task Group 1.5)
- D. Navy Air Group (Task Group 1.6)

IV Operations.
- A. Preparation and Plans
- B. Training and Rehearsal
- C. Movement to Target
- D. Conduct of Test ABLE
- E. Preparation and Training for Test BAKER
- F. Participation in Test BAKER

V Lessons Learned.

VI Comments and Recommendations.

721479 O - 46 — 29

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CONTAINED IN CONTRACT WITH OR LICENSE FROM U.S. ATOMIC ENERGY COMMISSION APPLY

RESTRICTED
USE MILITARY CLASSIFICATION SAFEGUARDS

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VII - SPECIAL REPORTS

SECTION (E) - AIR OPERATIONS

I SYNOPSIS OF AIR OPERATION

The primary mission of the Air Units of Joint Task Force ONE was to provide aircraft to drop the atomic bomb for Test ABLE, as well as air facilities to assist in accumulating data in each test concerning the effects of the bomb on military and Naval targets. For both tests, ABLE and BAKER, these data were to include information concerning the effectiveness of the bomb at various distances as well as other related scientific phenomena. A secondary mission was the training of Air Units and personnel in the employment and techniques of atomic weapons.

The command authority over aviation and air activities in Joint Task Force ONE was delegated on 4 January 1946 by the Task Force Commander to the Deputy Task Force Commander for Aviation. He was aided by two Assistant Deputy Task Force Commanders for Aviation and an Air Staff, which was organized early in January. In addition, he utilized the staff of the Commander, Joint Task Force ONE and particularly three sections of J-3; The Air Operations Section, the Communications and Electronics Section, and the Aerology Section. During the preparation and training period (January - April) he coordinated and exercised supervision over air activities from the Headquarters of the Commander, Joint Task Force ONE, in Washington, D. C. As the command function during this period was effected through established channels, he transmitted

requests through the Commanding General, Army Air Forces, and the Chief of Naval Operations, to Project Officers supervising CROSSROADS activities in the Army and Navy units concerned.

Task Group 1.5, the Army Air Group, and Task Group 1.6, the Navy Air Group, were established as provisional groups. They continued to operate through normal channels in their respective services as long as they remained in this country. It was not until movement overseas that they came under the direct authority of the Task Force Commander.

Task Group 1.5 (Provisional) consisted of a staff and eight Task Units. The staff was largely comprised of personnel from Headquarters of the 58th Wing of the Fourth Air Force. Personnel of subordinate units were obtained from the 509th Composite Group of the Second Air Force, with augmentation of key technicians from throughout the Army Air Forces. Headquarters were established at ROSWELL, NEW MEXICO, with satelite training fields at ALBUQUERQUE and CLOVIS.

Task Group 1.6 (Provisional) consisted of a staff and four Task Units. The Commander and staff of Carrier Division THREE were assigned corresponding duties with the Task Group. Subordinate units were formed consisting of the SHANGRI-LA, the SAIDOR, and auxiliary vessels, with necessary additional personnel from various Navy installations in this country and overseas. Headquarters were established at NAVAL AIR STATION, SAN DIEGO, CALIFORNIA and later in the SHANGRI-LA at SAN DIEGO.

During the preparation and training period, the Deputy Task Force Commander for Aviation and his staff at Washington supervised air activity in the field, screened and established test requirements, and prepared an air operations plan. Extensive modifications of aircraft and equipment were effected by Army Air Force and Navy material agencies. An air transportation system was organized which tied together various CROSSROADS installations in the UNITED STATES and linked these with Task Force units overseas.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIAL REPORT CLEARANCE NOT REQUIRED
DISSEMINATION SAFEGUARDS

RESTRICTED
SPECIFIC RESTRICTIONS ARE CONTAINED IN THE SECURITY INFORMATION SAFEGUARDS
USE, REPRODUCTION OR DISCLOSURE OF THIS CLASSIFIED INFORMATION SAFEGUARDS
RESTRICTED

- -

In NEW MEXICO, Task Group 1.5, having been supplied with proper equipment, inaugurated an intensive training program. Great emphasis was placed upon bombing, with five crews training competitively at the ALBUQUERQUE and ALAMOGORDO Bombing Ranges. Numerous devices were employed to attain the greatest possible degree of precision, such as the use of simulated atomic bombs, radar tracking, improvement of bombing tables, and calculation of ballistic winds. Pioneer training with remote controlled B-17s at CLOVIS proceeded with marked success. Photographic and instrumentation equipment was installed and rigorously tested. Two partial air rehearsals were held in NEW MEXICO and one off the coast near SAN DIEGO.

Navy training was conducted at ATLANTIC CITY, BROOKLYN, SAN PEDRO, and SAN DIEGO and from the carriers off the CALIFORNIA coast. Particular emphasis was placed upon training with the remote controlled F6Fs, with constant practice in taking off from the carrier and landing on an airfield. Training in remote control of drone boats was also conducted. Photographic and instrumentation equipment was installed and tested.

Between 1 March and 5 June the Air Units of Joint Task Force ONE moved overseas to the MARSHALL ISLANDS, with most of the air movement taking place during the last weeks in April. Task Group 1.5 was established on KWAJALEIN, except for the Instrumentation and Drone Units and a part of the Air-Sea Rescue Unit, which were on ENIWETOK. The Commander of Task Group 1.6 was in the SHANGRI-LA, and land bases of the Task Group were located at ROI and EBEYE. Sea units were operating in the BIKINI AREA. The Deputy Task Force Commander for Aviation reached BIKINI aboard the MT. MCKINLEY on 2 June, by which time practically all air units were in place.

CJTF - ONE
Operational Report - CROSSROADS - PART VII - Special Reports
Section (E) - Air
Operations

Army Air Force training was resumed on arrival overseas of Task Group 1.5. Navy training on the other hand had been conducted enroute to the MARSHALLS and was continued after reaching the area. Two complete air rehearsals and one Task Force rehearsal were held before Test ABLE. During this period air operations, communications, and weather observation were coordinated and perfected.

On ABLE Day the Air Units carried out their assignments as planned. Notified the previous day that the air drop would be made on the morning of 1 July, personnel made final preparations during the night, and the first of eighty-five aircraft to be airborne during the day took off at 0130. Shortly before detonation, all aircraft scheduled to be on specific positions in the air pattern reported on station. Air Command Aircraft, carrying the two Assistant Deputy Task Force Commanders for Aviation, made final changes in the pattern from the air. The Bomb Carrying Aircraft released the bomb on the first live run at the prescribed time and altitude. Photographic aircraft, including ten Army Air Force planes and eleven Navy planes, made a complete photographic coverage of the test, before, during, and after detonation. Four Army Air Force drones and three Navy Drones (a fourth was lost just before the bomb run) were flown through the atomic cloud and cloud area by remote control from mother aircraft. They collected air samples and obtained photographic, flight characteristics, and electronics data. Further instrumentation was effected by two Pressure Gauge B-29s, a Radiometric PB4, and by ultra-high-speed cameras, photometers, and spectrographs on the Photographic C-54s. Additional aircraft included four planes for press, radio, and observers, six air-sea-rescue planes, four planes for conning drone boats, six radiological reconnaissance aircraft, and three weather reconnaissance aircraft. Special photographic and precipitron missions were flown some hours after detonation.

VII RESTRICTED DATA
AEC - 1946
SPECIFIC RESTRICTION CLEARANCE NOT REQUIRED

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
REQUIRED RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SATISFACTORILY

During the period between the two tests a second air operations plan was issued which resembled the ABLE Test plan except for the elimination of several aircraft, such as the Bomb Carrying Aircraft. Because less blast and airborne radioactivity were expected, the basic flight pattern was compressed in altitude to 18,000 feet and in radius to 7 MI. Plans were made for placing two Army Air Force drones and one photographic aircraft almost directly over the detonation to obtain vertical photography and further information on the effect of the blast on flight and structure. An air rehearsal and a Task Force rehearsal were held before the under-water test.

Air operations on BAKER Day, 25 July, were conducted as planned. Full photographic coverage was obtained; many valuable electronics, photometric, and spectrographic data were obtained; and the seven drones were successfully flown over the target, two at the instant of detonation and the rest several moments later. Air samples were collected and pressure gauges dropped and telemetered. Weather, radiological reconnaissance, air-sea-rescue, and press, radio, and observer aircraft were provided essentially as for the first test. Drone boat conning continued for most of BAKER Day and special photographic missions were flown for the next several days.

Most of the members of the Air Staff left BIKINI shortly after BAKER Day and reassembled in WASHINGTON, D. C. on 12 August under Commander Joint Task Force ONE (Rear Echelon). The field groups began their return movement to the UNITED STATES shortly after the second test.

II MISSION

A. The mission of the Air Units of Joint Task Force ONE was, for Test ABLE, to drop an atomic bomb on the Target Array in BIKINI ATOLL, MARSHALL ISLANDS; and, for Tests ABLE and BAKER, to provide

aircraft and air facilities in order to assist in accumulating data from which the effects of an atomic bomb on military and naval targets, and its effectiveness at various distances, as well as other scientific phenomena, might be determined.

B. A secondary mission was the training of Air Units and personnel in the employment and techniques of atomic weapons.

III Command and Organization

A. Command

1. General

The command authority over all aviation and air activities in Joint Task Force ONE was vested in the Deputy Task Force Commander for Aviation who was responsible to the Task Force Commander. He was also the principal assistant and advisor to the Task Force Commander in all matters pertaining to air activities. (Reference: Staff Instructions, Commander Joint Task Force ONE, April 1946).

2. Air Commander's Staff

To assist the Deputy Task Force Commander for Aviation in carrying out his functions his immediate staff consisted of a First Assistant Deputy, an Army Air Forces Brigadier General, and a Second Assistant Deputy, a Navy Captain, and an executive for administration. The total number of personnel assigned to the Air Staff was ten officers, ten

RESTRICTED DATA
ATOMIC ... OCT - 1948
SPECIFIC RESTRICTIONS ... CLEARANCE NOT REQUIRED
USE MILITARY ... SAFEGUARDS

enlisted men and two civilians. In addition, the Deputy Task Force Commander for Aviation utilized the personnel of the Air Operations Section (J-32) consisting of ten officers and twelve enlisted men.

3. Sub-sections, Air Commander's Staff

Because of their direct relationship to air problems, organized as sub-sections of the Deputy Commander's immediate staff, and responsible to him, were the:

Bombing Analysis Section, which was charged with supervision of bombing techniques, with particular emphasis on bomb ballistic tables, scoring methods, calibration and training techniques. In addition this sub-section was charged with the preparation of a deductive study of the above subjects for the Deputy Task Force Commander for Aviation.

AAF Requirements Section, which was responsible to the Deputy Commander for Aviation for the screening of Army Air Force test requirements and the coordination of all agencies participating in the tests to insure the proper accomplishment of Air Force requirements.

B. Task Force Staff

The staff of the Commander Joint Task Force ONE was utilized by the Deputy Task Force Commander for Aviation in carrying out his functions. It was

organized as a joint staff and comprised of U. S. Army, U. S. Navy and civilian personnel. Functions assigned to sections were similar to those found in typical general staff organization with activities of sub-sections within each section, where necessary or appropriate, to permit proper planning and supervision of the air phases of the operation. In utilizing the Task Force Staff in the furtherance of the air mission, matters of particular importance to the Deputy Commander for Air within the various sections were:

1. J-1 - Personnel

   Procurement of qualified personnel, maintenance of personnel records, and the administration, quartering, messing, pay, recreation and welfare of all air units.

2. J-2 - Intelligence

   Public information and security measures pertaining to air operations and air units and arrangements for official observers. However, public relations and publicity were controlled by the Task Force Commander through the Task Force Public Relations Officer. The only independent contact with the press by the Deputy Task Force Commander for Aviation consisted of a press conference in Washington prior to the movement of the Task Force overseas, and the briefing of correspondents and

RESTRICTED DATA
VFFCMA(E) - 8 Oct - 1948
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

official observers at KWAJALEIN on 28 June, prior to ABLE Day, and on 23 July, prior to BAKER Day. At other times no press matters were handled by the Deputy Task Force Commander for Aviation except to attend press conferences conducted by the Task Force Commander.

3. J-3 - Operations

Preparation and integration of plans and orders for carrying out the air operations and air movements conducted by the Task Force; training, state of readiness and capabilities of the air units; conduct of communications and electronics activities as related to aviation, and the gathering, evaluating, and dissemination of aerological information.

a. The Air Operations Section (J-32), a sub-section of J-3, maintained direct contact with the Deputy Commander for Aviation on all aviation problems and procedures. This section had the important function of planning and conducting air operations. In actual practice, its activities were directly supervised and coordinated by the Deputy Commander for Aviation. Plans and instructions approved by the Deputy Commander were cleared by J-3, authenticated and distributed through regular Task Force channels.

b. The Communications and Electronics Section (J-33), a sub-section of J-3, responsible for assignment of frequencies, electronic instrumentation, methods of employment or radio and radar equipment, was also directly utilized by the Deputy Commander for Aviation in the communications and electronics phases of the air operation.

c. The Aerological Section (J-34), a sub-section of J-3, responsible for assembling weather data and forecasting weather conditions affecting the air operations, a vital function in formulating air plans and decisions, was directly utilized to the maximum extent by the Deputy Commander for Aviation.

4. J-4 - Logistics

Estimation of requirements, preparation of plans, procurement and supervision of delivery of aviation supplies; supervision of aviation maintenance activities; control of air transportation, and construction of shore based facilities for air units.

a. The Aviation Supply Branch (J-42A), a sub-section of J-4, responsible for aviation supplies, aircraft maintenance, assisted and advised the Deputy Commander for Aviation in supply and maintenance matters.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

b. The Air Transportation Branch (J-43B), a sub-division of J-4, responsible for plans relative to air lift requirements, coordination of air transportation requests and assignment of priorities for personnel and cargo maintained close contact with the Deputy Commander for Aviation.

C. Army Air Group (Task Group 1.5)

The Army Air Group, composed of provisional Army Air Force Units designated as Task Group 1.5, was assigned the task of delivering the attack on the Target Array with the atomic bomb in Test ABLE, and furnishing aircraft and facilities in Tests ABLE and BAKER for photography, meteorological reconnaissance, collection of physical data and air transport. It was commanded by a Brigadier General, Army Air Forces, and organized into Task Units with assignments as follows:

Task Unit 1.5.10 - Headquarters Air Unit - KWAJALEIN.

Command and Staff Elements of Task Group 1.5

Task Unit 1.5.1 - Tactical Operations Unit - KWAJALEIN.

Train crews, prepare equipment for atomic bomb tests and conduct air operations including dropping the atomic bomb on ABLE Day; establish SCR-584 Air Search Radar (modified) in BIKINI ATOLL AREA and provide radar analysis of practice

bombing runs and information on winds at various altitudes in the vicinity of the Bomb Carrying Aircraft. Conduct long range weather reconnaissance flights.

Task Unit 1.5.2 - Army Air Photographic Unit - KWAJALEIN

Conduct photographic operations, train crews and prepare equipment for the photographic missions; furnish aircraft to conduct radiological reconnaissance flights.

Task Unit 1.5.3 - Instrumentation and Test Requirements Unit - ENIWETOK

Provide special scientific equipment, technical advice, and trained personnel for all air units of Joint Task Force ONE.

Task Unit 1.5.4 - Air Transport Unit - KWAJALEIN

Provide air lift between ROSWELL FIELD, NEW MEXICO via OAHU, T.H. and JOHNSTON ISLAND to KWAJALEIN ISLAND and other terminals for high priority freight certified by Commander Joint Task Force ONE, provide air shuttle service between KWAJALEIN and ENIWETOK, and be prepared to evacuate personnel from ENIWETOK following the detonation on ABLE Day and BAKER Day.

Task Unit 1.5.5 - Air Service Unit - KWAJALEIN

Provide repair, maintenance, and related services for aircraft of the Army Air Group, and service itinerant aircraft of the Navy Air Group at ENIWETOK ISLAND.

RESTRICTED DATA
VII A[illegible](E) [illegible] ACT - 1948
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT 1946
SPECIFIC RESTRICTED INFORMATION CONTAINED
RESTRICTED DATA AND MILITARY CLASSIFICATION SAFEGUARDS REQUIRED

Task Unit 1.5.6 - Army Drone Unit - ENIWETOK

Conduct drone aircraft operations; train personnel and prepare equipment for atomic bomb tests; provide rescue aircraft at ENIWETOK for assistance of aircraft in distress.

Task Unit 1.5.7 - Army Air Meteorological Unit - KWAJALEIN

Provide weather observations; forecasts and trained meteorological personnel for aircrews; furnish aircraft for radiological reconnaissance flights.

Task Unit 1.5.8 - Air Orientation Unit - KWAJALEIN

Provide facilities for radio broadcasts, press photography, and accredited official observers.

(See Appendix II for composition of Army Air Group Task Units).

D. Navy Air Group (Task Group 1.6)

The Navy Air Group, composed of U. S. Naval Air Units designated as Task Group 1.6, was assigned the task of conducting carrier, plane guard destroyer and air operations in Tests ABLE and BAKER for photography, collection of physical data, drone boat control, radiological reconnaissance, air-sea rescue and air transportation between EBEYE and BIKINI, and provide a surface sea marker for control at Reference Point NAN. It was commanded by a Rear Admiral, U. S. Navy, and organized into Task Units with assignments as follows:

Task Unit 1.6.1 - Drone Carrier Unit -
USS SHANGRI-LA

Train personnel and prepare equipment for atomic bomb tests; conduct drone aircraft operations engaged in collection of water samples in Target Area on ABLE Day and BAKER Day; operate drone carrier and plane guard destroyers as necessary to carry out air operations of embarked units.

Task Unit 1.6.2 - Photographic Carrier Unit -
USS SAIDOR

Train crews and prepare equipment for atomic bomb tests; on ABLE Day and BAKER Day conduct photographic operations, operate helicopter aircraft for radiological reconnaissance, photography, and photographic utility flights, conduct conning of drone boats, operate photographic carrier and plane guard destroyers as necessary to carry out air operations of embarked units; and to provide mapping and other photography before and after both tests.

Task Unit 1.6.3 - Seaplane Unit - EBEYE

From EBEYE, conduct photographic radiological reconnaissance, air-sea rescue and patrol operations, provide air shuttle service between EBEYE and BIKINI; provide air facilities, service and maintain seaplanes of Navy Air Group.

Task Unit 1.6.4 - Seaplane Tender Unit BIKINI -
USS ORCA

Provide tender and air transport terminal services for seaplanes at BIKINI ATOLL.

(See Appendix III for composition of Navy Air Group Task Units).

WEST... DATA
... OCT - 1948
SPECIFIC EXCLUSION (E) ... CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC
RESTRICTED
USE MILITARY

IV Operations

A. Plans and Preparation

1. General

a. While the utilization of aircraft in the conduct of atomic bomb tests against naval vessels was contemplated almost with the first conceptions of the tests themselves, the proposals of the Task Force Commander, Joint Task Force ONE, on January 5, 1946 to the Joint Chiefs of Staff, first placed in concrete form the role of air participation in the conduct of operations by the Joint Task Force. These proposals were accepted by the Joint Chiefs of Staff and incorporated in Appendix "E" of J.C.S. 1552/7, 10 January 1946, wherein it was proposed that the Army Air Forces drop an atomic bomb from a B-29 airplane from ____ feet altitude, to explode at ____ feet altitude. Later the general plan for air participation in the tests, submitted by the Task Force Commander to the Joint Chiefs of Staff, was approved, and in J.C.S. 1552/8, 23 January 1946, air participation was directed in broad terms, as follows:

(1) The first test will be a high altitude air drop, with the explosion taking place at an altitude of ____ to ____ feet. The drop will be made by a B-29 of the Army Air Forces, operating from KWAJALEIN.

Targets will be so arranged that the bomb will burst over or near a battleship, carrier, or cruiser.

(2) The Army Air Forces, in addition to making the actual air drop, will participate actively in the operation, both with regard to air transport, collection of data, observation of results, and test of Air Force equipment.

b. On 18 January 1946 the Commanding General, Army Air Forces provided the Task Force Commander with a list of test requirements for inclusion as objectives in the conduct of the atomic bomb tests. The requirements involved the obtaining of data for which the Air Forces had neither personnel or test equipment and which the Task Force was in a position to secure. The required data consisted of the collection of information of interest to the Air Forces and was concerned with the destructive-effects of the bomb as a weapon and the consequent aircraft, technical and training problems arising as a result. The requirements were screened three ways by the Deputy Task Force Commander for Aviation. First, those which would interfere with the accomplishment of the tests within the established time limits were eliminated. Secondly, those where information was already available from data in possession of the Manhattan District were deleted. Thirdly, those were eliminated where instrumentation

VII RESTRICTED DATA
AEC ACT - 1946
SPECIFIC CLEARANCE NOT REQUIRED
CLASSIFICATION SAFEGUARDS

and testing were planned by other agencies which would provide the desired information. Following the screening the remaining requirements were incorporated into the plans of the Task Force Commander. The Commanding General, Army Air Forces was advised on 30 January 1946 of the remaining test requirements and his aid requested in implementing, where necessary, those phases of Army Air Forces participation.

c. Naval requirements for the tests were not embodied in a formal document, but were presented in various conferences in the Navy Department between representatives of the Joint Task Force and those of the Office of the Chief of Naval Operations, and the Bureaus of Aeronautics, Ordnance, and Ships.

2. Formation of the Air Staff

The Deputy Task Force Commander for Aviation was designated on 4 January 1946 and reported for duty to the Commander, Joint Task Force ONE on 17 January 1946. During the period 17 January through 7 May, the Deputy Commander for Aviation, with the assistance of his staff, coordinated and exercised supervision of air activities from the Headquarters of the Commander, Joint Task Force ONE, Navy Department Building, Washington, D. C., and thereafter from the MT. MCKINLEY, flagship of the Task Force Commander. Command of prospective air units within the continental limits of the UNITED STATES did not pass to the Task Force Commander until after their

departure from the country, therefore, until after their departure orders and instructions to the Army Air Units were issued through the Commanding General, Army Air Forces and for Navy Air Units through the Chief of Naval Operations. By 21 May all air units had passed to the direct control of the Task Force Commander.

The tentative date of Test ABLE was originally fixed as 15 May 1946. At the time, this gave only four months for the organization of the staff and air units, their training, movement, and overseas rehearsals. However, late in March a directive to delay the first test until 1 July 1946 was issued by the President to permit the attendance of Congressional Observers. This delay provided additional time to perfect air organization and plans.

Selection of the majority of staff personnel for air activities was made in January and practically all had reported and were present for duty in February. In the procurement of qualified personnel for both the staff and air units some difficulty was encountered due to the rapid demobilization of the services, the virtual non-existence of sources from which military personnel experienced in matters pertaining to atomic weapons could be drawn, and also because of commitments made to a number of civilian personnel permitting them to return by 1 September 1946 to their positions at various colleges and universities.

RESTRICTED DATA
AT [illegible] ATOMIC ENERGY ACT - 1946
SPECIFIED [illegible]
USE [illegible] VII - (E) - 18 CLEARANCE NOT REQUIRED
[illegible]ICATION SAFEGUARDS

In view of the desirability of giving as many air officers as possible training in conditions governing the use of atomic weapons, all staffs were manned more heavily than normally. However, this was a fortunate circumstance that made possible the accomplishment of many additional and necessary tasks found to be inherent to the mission. These tasks increased steadily until all the staffs were vitally needed to get the work done.

3. Assembly of Task Group 1.5

The 58th Wing of the Fourth Army Air Force was designated Task Group 1.5 (Provisional) on 10 January 1946. This was effected by verbal orders of the Commanding General, Army Air Forces, and was later confirmed by letter orders, Headquarters Continental Air Forces, 29 January 1946. A selected majority of the staff of the 58th Wing was transferred from MARCH FIELD, CALIFORNIA to the ROSWELL ARMY AIR FIELD, NEW MEXICO during the period 17 to 21 January and functioned as the staff of both the 58th Wing (Advn) and Task Group 1.5 (Prov). The designation, 58th Wing (Advn), was retained to permit control of Army units still assigned to the 58th Wing but not assigned to the Task Force. The selection of the ROSWELL ARMY AIR FIELD as the center for the Army Air Group activities was dictated

- -

by its proximity to suitable terrain for practice bombing, for reasons of security, and because of the fact that most of prospective elements of Task Group 1.5 were located in that general area.

a. The 509th Group of the Second Army Air Force, which had dropped both atomic bombs on JAPAN, was transferred together with its air base, the ROSWELL ARMY AIR FIELD, to the Fourth Air Force on 17 January 1946. The 509th was a composite group and its elements became, insofar as possible, the nuclei of the various task units of Task Group 1.5.

Task Unit 1.5.10 - Headquarters Air Unit

The Headquarters Air Unit consisted of personnel drawn almost entirely from the 58th Wing Headquarters. The Headquarters and Headquarters Squadron of the 509th Group provided personnel and means for the administration of 509th Group units organized as provisional task units.

Task Unit 1.5.1 - Tactical Operations Unit

The 393rd Bombardment Squadron, of the 509th Group, became the so called "Air Attack Unit" organized as Task Unit 1.5.1.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Adjoining KIRTLAND ARMY AIR FIELD, previously in the process of being closed, was retained on a temporary active status as an intermediate training field.

Task Unit 1.5.2 - Army Air Photographic Unit

Because of large photographic requirements the Army Air Photographic Unit was organized at ROSWELL ARMY AIR FIELD on 29 January 1946. Specialized photographic personnel were drawn from the Air Material Command at WRIGHT FIELD while others were procured from other units, and by normal requisition to fill the needs of this task unit. The unit was at first administered by the 509th Group but later directly by the Task Group Headquarters.

Task Unit 1.5.3 - Instrumentation and Test Requirements Unit

This unit was organized 1 February 1946 at CLOVIS, NEW MEXICO, with personnel procured from technical sections of the Air Material Command then engaged in the development of drone aircraft, and from other Air Force sources. This unit carried out the functions of both Task Unit 1.5.6 and Task Unit 1.5.3; it was administered directly by Headquarters Task Group 1.5.

Task Unit 1.5.4 - Air Transport Unit

The 320th Troop Carrier Squadron of the 509th Group became Task Unit 1.5.4. Based at ROSWELL ARMY AIR FIELD it began actual operations on 18 January 1946, prior to its formal organization

as Task Unit 1.5.4 on 29 January 1946.

Task Unit 1.5.5 - Air Service Unit

The 603rd Engineering Squadron, 1027th Materiel Squadron, 1395th Military Police, and the 390th Headquarters and Service Squadron, all units of the 509th Group and stationed at ROSWELL ARMY AIR FIELD were organized as Task Unit 1.5.5 on 29 January 1946.

Task Unit 1.5.6 - Army Drone Unit

This unit and Task Unit 1.5.3 were one and the same.

Task Unit 1.5.7 - Army Air Meteorological Unit

This unit was organized from personnel of the 59th Reconnaissance Squadron (VLR) at CASTLE FIELD, MERCED, CALIFORNIA on 1 April 1946. Weather observers were attached to the 53rd Weather Reconnaissance Squadron, MC CHORD FIELD, WASHINGTON for training and experience in actual weather missions. The unit joined Task Group 1.5 upon its arrival overseas.

Task Unit 1.5.8 - Air Orientation Unit

This unit was organized to provide observation aircraft on ABLE and BAKER Days for official representatives of the Government and Press and for radio broadcasting and PRO Photography. The unit consisted of four aircraft and their crews and it was not assembled on KWAJALEIN until late in June. Two B-29s from the Air Material Command arrived 19 June and two C-54s from AFC arrived 28 June.

RESTRICTED DATA
ACT - 1946
CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA

4. Assembly of Task Group 1.6

The principal elements of the Navy Air Group were assembled at SAN DIEGO, ATLANTIC CITY, NORFOLK, EBEYE ISLAND, and BIKINI LAGOON prior to the movement of the headquarters of the Commander, Task Group 1.6, from the UNITED STATES on 21 May 1946. The assembly of the air group was effected as follows:

Headquarters, Commander, Task Group 1.6 - USS SHANGRI LA

A headquarters organization for the naval air units was provided by utilizing the staff of the Commander, Carrier Division THREE. By action of CinCPac on 8 February 1946, the Commander, Carrier Division THREE, was nominated to command the naval air units of Joint Task Force ONE, and on 16 February the administration of the division was transferred from the LEXINGTON to ComFAirWestCoast at the NAVAL AIR STATION, SAN DIEGO, CALIFORNIA. On 18 February, in accordance with orders of the Bureau of Personnel, the Commander, Carrier Division THREE, was detached without relief and reported to the Commander, Joint Task Force ONE as Commander, Navy Air Group. Similarly, all officers and men of his carrier division staff were detached and reported to him as the Commander, Task Group 1.6. On 22 February the Commander, Task Group 1.6, broke his flag at the NAVAL AIR STATION, SAN DIEGO; on 20 April he transferred his flag to the SHANGRI-LA at SAN DIEGO HARBOR; and on 21 May departed for PEARL HARBOR enroute for his assigned operating area off ROI ISLAND, KWAJALEIN LAGOON.

Task Unit 1.6.1 - Drone Carrier Unit - USS SHANGRI-LA

The Naval Air Drone Unit was established on 26 January 1946 as Task Group 69.6 of the Operational Development Force and assigned for training to the NAVAL AIR STATION, ATLANTIC CITY, NEW JERSEY. The Drone aircraft (30 F6F-3K) and the Drone Control aircraft (26 F6F-5) were converted at the Naval Modification Unit, JOHNSVILLE, PENNSYLVANIA, and delivered to the unit during the training period from 1 February to 14 March. The unit was directed on 7 March to report to the SHANGRI-LA (CV-38) at NORFOLK, VIRGINIA, from which port it departed on 18 March. After arrival at SAN DIEGO on 1 April, the unit was shore based at BROWN FIELD, NAVAL AUXILIARY AIR STATION, CHULA VISTA, CALIFORNIA.

The Unit for airborne control of drone boats, air-sea rescue, and utility work (10 TBM-3E) was formed between 4-18 April by the Commander, Task Group 1.6, from units and personnel available at NAVAL OPERATIONS BASE, TERMINAL ISLAND, SAN PEDRO, and the NAVAL AIR STATION, SAN DIEGO. All elements of Task Unit 1.6.1 departed on the SHANGRI-LA for ROI ISLAND on 21 May 1946.

Task Unit 1.6.2 - Photographic Carrier Unit - USS SAIDOR

The Naval Photographic Unit with 19 aircraft (8 F6F-5P, 6 TBM-3E, 5 HOS-1) operating from the SAIDOR (CVE-117) was assembled at SAN DIEGO on 1 April 1946 from units reporting from PEARL

RESTRICTED DATA
ACT - 1946
CLEARANCE NOT REQUIRED
SAFEGUARDS

HARBOR and NORFOLK. As early as 17 January the SAIDOR, at PEARL HARBOR, was directed by CinCPac to provide photographic laboratory facilities for Operation CROSSROADS. Modification of the SAIDOR was immediately started at the PEARL HARBOR NAVY YARD, while the Fighter Photo Unit assigned to the ship was moved to FORD ISLAND where F6F-5P and TBM-3E aircraft were depreserved and commissioned for the units use as photographic planes. With its photographic personnel, aircraft, and equipment, the SAIDOR arrived at SAN DIEGO from PEARL HARBOR on 25 March. On 1 April the SHANGRI-LA arrived at SAN DIEGO from NORFOLK with the helicopter unit and other photographic personnel. The Helicopter unit had been transferred from the COAST GUARD AIR STATION, BROOKLYN, to NORFOLK on 11 March in time for transportation to the west coast in the SHANGRI-LA. The Photographic Unit completed its assembly in the period 5 April - 5 May at the NAVAL AIR STATION, SAN DIEGO, and departed for BIKINI LAGOON on 7 May 1946.

Task Unit 1.6.3 - Seaplane Unit - EBEYE ISLAND

The Seaplane Unit with patrol bombers converted to transport and air-sea rescue aircraft was organized from FPB-32 (9 PBM-5) and VH-4 (6 PBM-5) at SAIPAN, MARIANA ISLANDS. Aircraft of VH-4 arrived at EBEYE ISLAND on 10 March and those of VPB-32 between 16-22 March. On 20 March elements of both squadrons reported to Commander, Task Group 1.6 as Task Unit 1.6.3.

Task Unit 1.C.4 - Seaplane Tender Unit - BIKINI LAGOON

The Seaplane Tender ORCA (AVP-49) arrived at BIKINI LAGOON on 7 May 1946 to assume her assigned duties. It was felt however that provision should be made for air-sea rescue units both at BIKINI and KWAJALEIN in case of take-off accidents. By 15 June an AVR air-sea rescue boat had been obtained for the BIKINI LAGOON. During operating hours the boat was stationed at the seaplane runway but once in the early morning and again in the late afternoon it made sweeps of the area to make sure the take-off space was clear. At about this time CinCPac was requested by ComMarianas to furnish two destroyers for air-sea rescue service at KWAJALEIN, one to be stationed within the lagoon and the other in the ocean near the runway. But CinCPac replied that the destroyers were not available in the Pacific Fleet, and it was necessary to assign vessels from Joint Task Force ONE to patrol the entrance to KWAJALEIN LAGOON for air-sea rescue duty.

5. Command Channels

Joint Chiefs of Staff Directive 1552/5 Appendix B, 22 December 1943, established the policy of using existing Army and Navy organizations and channels of command until departure of units overseas at which time they came under the direct command of the Task Force Commander.

VII RESTRICTED DATA
AUTHORITY ... DEC - 1946
CLEARANCE NOT REQUIRED
UNDER SAFEGUARDS

a. Prior to overseas movement requests of the Deputy Commander for Aviation relative to Army air matters were cleared through the Headquarters Army Air Forces. AAF Letter Order, 14 January 1946, established, under the Assistant Chief of Air Staff, A-3, Headquarters AAF, a "CROSSROADS Project Office." In conjunction with this office each major staff section of AAF Headquarters designated an individual responsible for the supervision and "follow through" of CROSSROADS matters pertaining to that section. All Task Force correspondence, instructions and requests relative to Army aviation were directed to the "CROSSROADS Project Officer" who forwarded them to the appropriate agency or Commander for action, or caused necessary orders to be issued by authority of the Commanding General, Army Air Forces.

By direction of letter, Headquarters AAF, 24 January 1946, the Strategic Air Force (then named the Continental Air Forces) was designated as the agency responsible for the execution of plans and preparations for Army air participation in CROSSROADS. To insure prompt and efficient handling of CROSSROADS matters a CROSSROADS Project Officer was set up in Headquarters, Strategic Air Forces, with representatives in each of the staff sections concerned, in a manner similar to that employed in

the AAF Headquarters. To facilitate quick action, a direct command channel was established from Headquarters Strategic Air Forces to Task Group 1.5, by-passing Headquarters Fourth Air Force, the parent Army headquarters of the air units of the Task Group.

Liaison Officers were utilized to expedite the modification of aircraft and shipment of materials of the CROSSROADS Project at the Air Material Command, WRIGHT FIELD, and at the Army Air Depots at OAKLAHOMA CITY, HAWAII and GUAM. In addition, Liaison Officers were placed along the route to the Target Area at TERMINAL ISLAND, SAN FRANCISCO POE, HAMILTON FIELD, FAIRFIELD-SUISUN, HICKAM FIELD and JOHNSTON ISLAND, to aggressively push through CROSSROADS aircraft, personnel and equipment, and to assist in any Task Force problems arising at those points.

b. Prior to overseas movement requests of the Deputy Task Force Commander for Aviation relative to Naval air matters were cleared through the Chief of Naval Operations. While a formal system of Project Officers was not employed a similar method was used which achieved the same results. Certain key officers regularly assigned to duty in the Office of the Chief of Naval Operations or in the various bureaus or offices of the Navy Department were assigned additional duty with "CROSSROADS." These officers were

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

authorized and directed to provide all possible assistance to the Staff of Commander Joint Task Force ONE in the formulation of plans, provision of material, equipment and personnel and all other matters under the cognizance of their bureaus or offices. In all Naval aviation matters falling outside of the sphere of the foregoing, the Second Assistant Deputy Task Force Commander for Aviation (Navy) dealt directly with the Deputy Chief of Naval Operations for Air (OP-05), the Chief of the Bureau of Aeronautics or the Deputy Chief of Naval Operations for Operations (OP-03). Since the headquarters of the Task Force was housed in the Navy Building in WASHINGTON prior to its movement overseas, close coordination and effective action was achieved by the attendance of representatives of the regular Navy Bureaus at Staff Conferences and direct contact with the staff of the Task Force.

6. Scope of Air Planning

From the original idea, calling for a relatively simple operation in which only five aircraft would be utilized for the air burst, the extent of air participation expanded until the final concept envisaged the use of more than 150 aircraft. With the increase in the uses and numbers of airplanes employed, the scope of planning had to be progressively broadened. While the nature of air participation had been broadly outlined by general directives from the Joint Chiefs of Staff, and, by the Commander Joint Task Force ONE, the perfecting

of methods and the means to be employed in achieving the desired objectives was a responsibility delegated to the Deputy Commander for Aviation. The scope of air planning was governed basically by these broad directives, and the specific air requirements established by the Army Air Forces, the Navy, and the Manhattan District.

However, to insure getting all the desired results from the tests, and in evolving a workable air plan, consideration had to be given and provisions made, for a variety of additional factors. The lethal character and partially unknown performance of the atomic bomb necessitated unusual safety precautions. The great importance of winds and visibility required a high degree of flexibility in the scheme of maneuver. The need for perfect control and synchronism in the air operation, to make possible the use of split-second instrumentation, demanded a comprehensive and reliable system of communications. The numbers of aircraft moving at high speed along different flight paths in a relatively small space near an area of dangerous radioactivity, required devising a flight pattern which had little resemblance to that for any normal air mission.

Planning was affected by compromise between tactical and scientific considerations. The Joint Chiefs of Staff stated that it was desirable to approximate in the test, to the extent practicable, actual combat

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

conditions, in the delivery of the bomb and in the disposition of the targets. The Joint Chiefs of Staff also directed that the tests be so arranged as to take advantage of opportunities to obtain the effects of atomic explosions against ground and air targets and to obtain, if practical, scientific data of general value. The nature of the tests obviated actual combat conditions for in the case of the target vessels, a normal disposition of ships at an anchorage or a tactical disposition at sea would have made impossible the desired graduation of damage from maximum to minimum; and, if closely spaced ships had been loaded with fuel and ammunition as under service conditions, the resulting conflagration might have destroyed much of the technical and scientific information from the tests.

Consequently, the disposition and loading of the Target Array constituted a compromise between divergent points of view, and represented a departure from a combat condition, but was also short of acceptance of the principle that the target ships would be utilized as "pressure gauges" for the experiments.

Conditions for the dropping of the bomb were also considerably at variance from actual combat. Not only were the ordinary hazards of combat absent, but the air crew was aided by search lights and flashers in the NEVADA as well as by her bright coat of orange paint.

7. Determination and Implementation of Test Requirements.

Preparation for participation by Army and Navy air in the atomic tests involved three basic steps: (a) the determination of requirements, (b) the implementation of these requirements through the provision of aircraft and equipment, and (c) preparation of an air operations plan which would effectively utilize these aircraft for test purposes and synchronize their movements with the activities of the Task Force as a whole. In practice these steps developed progressively only in the broadest terms; actually, new requirements were added after the operations plan was completed, thus making necessary changes in that plan and further material modification by the agencies involved. On the other hand, field tests frequently called for alterations of the operations plan, additional aircraft modifications, and, in a few cases, affected requirements. However, for the sake of clarity, determination of test requirements, their implementation, and preparation of the air operations plan, will be discussed separately and progressively in this report, in spite of the fact that each depended upon the others.

a. Determination of Test Requirements

In the early planning stages, the AAF, the Navy, the Manhattan District, and other agencies concerned in the tests submitted lists of requirements which involved air participation

RESTRICTED DATA
AT [illegible] OCT - 1948
CLEARANCE NOT REQUIRED
USE MILITARY [illegible] SAFEGUARDS

designed to implement and supplement the broad directives of the JCS and CJTF-1. These were screened in order to avoid duplication. The time element and the availability for data from earlier tests were additional criteria in eliminating requirements. Eventually air requirements were adopted which involved extensive use of AAF and Navy aircraft and personnel. It was soon apparent that all agencies involved in the test would, in addition to carrying out their own requirements, benefit by the data obtained by the other agencies. Thus, a list of air requirements does not by any means include all information to be obtained for the air units. On the other hand, many of the tests made by the air units were made to obtain information for other agencies, such as the Manhattan District. (See Appendix IV).

b. Implementation of Test Requirements (AAF)

On 30 January 1946 the Commanding General, Army Air Forces was advised of test requirements to be implemented by the AAF; these included provisions for dropping the bomb and for obtaining air samples, scientific measurements, and photographic data. On 1 February 1946 the task of supplying engineering, and modifying aircraft, technical equipment, and static tests materials was assigned

- -

to the Air Materiel Command at WRIGHT FIELD, which also undertook to provide technical experts in photography, electronics, and radio-controlled aircraft to accompany the Task Force. Modifications of aircraft, installation of equipment, and design and construction of special devices were effected at WRIGHT FIELD and at Air Materiel Command depots in SAN ANTONIO, OKLAHOMA CITY, and MIDDLETOWN. OKLAHOMA CITY Air Depot was designated Air Corps Supply Depot for the CROSSROADS Project. Modified aircraft were delivered progressively to ROSWELL ARMY AIR FIELD, all modifications being completed by 25 April 1946.

The following aircraft to be airborne during ABLE and BAKER Tests were provided: one B-29 modified to carry and drop the bomb, two B-29s modified to drop and telemeter pressure gauge instruments, two B-29s for radiological reconnaissance, one B-29 Command Aircraft, two B-29s modified for use by press and radio, two B-29s for precipitron missions, three B-29s for weather reconnaissance, eight F-13s (three of which were scheduled to fly two separate missions each) and two C-54s as photographic aircraft, four radio-controlled B-17 Drones and five control B-17s, three B-17s for Air Sea Rescue, and two C-54s for observation by VIPs. Ample spare aircraft for training, attrition, and possible aborts were also provided.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Instrumentation installed to meet Manhattan District requirements included air sampler bags, special sampling filters, carburetor filters, precipitrons, and pressure gauge instruments to be dropped by parachute. Information on flight characteristics, structural strengths, and power plant performance of aircraft was to be obtained from data televised and telemetered from the drones, and from automatic flight analyzers and other recorders in the drones and B-29s.

Photographic equipment included all types of standard Air Corps still cameras, motion picture and ultra-high-speed cameras, and a variety of specially devised photometric and spectrographic devices. By using many types of filters, shutters, lenses, and photographic emulsions, full documentary and photometric data, before, during and after the test, were assured. Particular emphasis was placed upon the use of Fastax ultra-high speed cameras, blur cameras, and other devices, to obtain accurate data with high time resolution of the first milliseconds of the blast. Special timing and time-recording devices were developed. Provisions were made for a full photographic historical coverage of AAF participation in the project.

In addition to extensive communications and navigational radio and radar equipment, special sets were provided to record the propagation and reflection of electro-magnetic impulses during the tests. These consisted of radio and radar scanners, assorted recorders, radar scope cameras and special photographic devices. Provision was made for tests of ground to ground, ground to air, air to ground, and air to air, transmission and reception, with extensive automatic transmission from the drones.

By an early agreement, static tests were apportioned so that the Navy would expose complete aircraft in combat-ready conditions and the Army Air Forces would expose miscellaneous ground equipment and aircraft materials. Static tests of AAF armament, munitions, and electronic equipment were to be made by Army Ordnance and the Signal Corps. Selected items of ground equipment, ranging from methyl bromide cylinders to crash trucks, and of assorted aircraft materials such as wing panels of various materials, stabilizer sections, and cable samples, together with P-47 fuselages exposed to test the low-pressure oxygen system, were placed on the decks of the NEVADA, INDEPENDENCE, and NEW YORK. The function of installing these static test materials and recording the effects of the exposure was assigned to the air unit under the jurisdiction of the Army Ground Group.

RESTRICTED
AUTHORITY
SPECIFIC RESTRICTIONS
USE MILITARY CLASSIFICATION SAFEGUARDS

c. Implementation of Test Requirements (Navy)

Requirements implemented for Test ABLE by the Navy Bureau of Aeronautics and the Deputy Chief of Naval Operations, Air included, in addition to the testing of airborne equipment through the use of remote controlled planes and the obtaining of adequate technical and photographic coverage, the meeting of certain requirements established by other agencies such as the Bureau of Ships and the Manhattan Project. These requirements ultimately included the following aircraft, to be airborne during the tests: four F6F Drones and sixteen F6F Drone Control Aircraft operating from the SHANGRI-LA; eight F6F and two TBM photographic airplanes and four TBM Drone Boat Conning Aircraft operating from the SAIPOR; two TBMs for air-sea rescue; and nine PBM Seaplanes, including three photo, one radiometric, two radiological reconnaissance, and three air-sea rescue aircraft, operating from EBEYE in KWAJALEIN ATOLL. Ample spares in all categories for training and standby were also to be provided.

The primary function of the Navy drones was to collect air samples for the Manhattan District by means of specially designed filters; in addition the drones were to provide data on the effects on aircraft of

forces released by the explosion by means of automatic recorders and to obtain close-up photography of the blast through the use of gun cameras in all drones and a remote controlled standard motion picture camera in one drone. Originally intended to control the drone boats collecting water samples after detonation, two TBM aircraft with two airborne replacements were assigned to conning the boats, which were to be controlled by a surface craft.

The eight F6F Photographic Aircraft were equipped with cameras to provide vertical and trimetrogon stills, strip photos, and a limited amount of motion picture coverage; their primary duty was to obtain vertical and trimetrogon photography of the Target Array just prior to detonation but in addition they were to make mosaics of the Target Area and Sone-strip photos of BIKINI BEACH before and after the tests.

Sone-strip photos were required of BIKINI, ENYU, AMEN and YORAN island beaches, and they were also provided from upwind toward the center of the Target Array to calibrate the wave measurement equipment. One F6F was in addition to obtain motion pictures of the Target Array and cloud phenomena after detonation. Two PBM Photographic Aircraft were to take high obliques before, during, and after the blast for documentary purposes and for possible radio transmission. The Three PBM Photographic Aircraft were specially equipped to obtain motion pictures of the blast for blast analysis, and to obtain still photos for photogrammetric analysis, documentary records, and possible radio photo transmission.

RESTRICTED DATA
ATOMIC ENERGY ACT 1946
SPECIFIC RESTRICTIONS CONTAINED HEREIN NOT REQUIRED
UNTIL LIFTING OF CLASSIFICATION SAFEGUARDS

The Radiometric PBM, originally planned only for Test BAKER, was to carry radiometric equipment to measure intensity of radiant energy as a function of time. The two PBM Radiological Reconnaissance Aircraft carried equipment to determine the safe time for re-entry into the lagoon and the three PBM Rescue Aircraft were of the JUMBO type. All aircraft carried normal communications equipment; tests of electro-magnetic propagation were confined to observe reactions of this equipment, of radio control equipment, and of television reception on the two PBMs.

Two PBM Radiological Reconnaissance Aircraft also carried equipment to record the observations made by the Ship Observer (voice recorder), photographic equipment, special gas masks (assault type) and other equipment. The PBMs for photographic wave measurement also carried special transmitters for actuation of camera towers (and cameras in other PBMs), sono-buoy receivers with scope cameras, and television receivers. Since some of the equipment was non-standard, considerable refitting was necessary in the PBMs. This was accomplished in the field by the PATSU at EBEYE and by technicians from Joint Task Force ONE.

In addition to testing airborne equipment, the Navy Bureau of Aeronautics was assigned the responsibility for providing all complete aircraft static installations. Seventy-one carrier type aircraft, including fighters, scout bombers, torpedo bombers, and observation scouts, placed on decks of target vessels, and two patrol bombers, floating on the lagoon, were to be exposed at graded distances from the point of detonation. These aircraft were fully equipped and in "combat ready" condition except for limitations on inflammable and destructive items, such as fuel, oil, bombs, rockets, ammunition, and parachutes. Two aircraft on the after end of the flight deck of each target carrier were to have full fuel and lubricating tanks.

8. Preparation of the Air Plan and Related Orders.

The writing of the Air Operations Plan was undertaken almost coincident with with organization of the Air Operations Section (J-32) in late January. By mid-February the Air Plan had been reduced to a tentative draft form, the first mimeographed plan was completed on 12 March, a revised mimeograph on 9 April, and the printed plan (Operation Plan, ComJointTaskForOne No. 1-46, Annex F) was distributed on 23 April. The last of necessary changes to the plan was published and distributed on 27 June.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

a. Appreciation and Criteria

Preparation of the Air Plan for Operation CROSSROADS was complicated by a variety of unique factors. The operation was without precedent in the entire history of the Armed Forces. Essentially it was a huge outdoor laboratory experiment conducted for the purpose of obtaining scientific information on the effects of the atomic bomb. Thus because of the unusual objectives, many problems had to be surmounted which would not normally be encountered in either peacetime training or combat operations. It was necessary to establish safety factors against blast, radioactivity, heat, and light produced by the bomb. Difficulties in formulating the Air Plan were increased, prior to the concept of RADEX, by the reluctance of the Radiological Safety Section to establish limiting safety distances in terms of miles and time, before, during, and after the atomic detonations. Beyond the capabilities of the aircraft to be employed, there were actually few precedents to serve as guides. Moreover, the Air Plan had to be adapted to meet the requirements of the Army and the Navy as well as the scientists of the Manhattan District. Actually no one agency knew in January 1946 what its precise requirements were. Consequently the plan evolved with additional requirements being constantly submitted, or modifications

of accepted requirements being proposed, with resultant changes necessitated in all phases of the plan. This tendency to propose changes persisted up to the time the bomb was dropped. As time grew short, a deadline date of 28 February was set after which no additions or deletions would be considered unless there were material advantages which would outweigh the confusion the change would entail. Part of January and most of February were absorbed in formal and informal conferences with scientists from the Manhattan District, with representatives of various bureaus of the Navy, and representatives of the Army Air and Ground Forces.

The following criteria were established for preparation of the Air Operation Plan:

(1) Positive control of all aircraft by the Joint Task Force Commander from his flagship, the MT MCKINLEY, through the use of Airborne Command Aircraft.

(2) Specific instructions to each Task Unit and each airplane or flight as to its task.

(3) Flexibility. In view of the fact that the wind direction might change considerably, flexibility was essential. The proposal was first made to prepare variable plans in order to meet all

VI RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

probable wind shift conditions. This was eventually rejected because of its complexity. To afford flexibility, points were given with reference to bearings and distance from the Target Center; hence, in event of a shift in wind direction, the Orbit and Reference Points might be rotated singly or together depending on circumstances.

(4) Weather had to be constantly studied with relation to the problem. In order to insure the maximum chance for success of the bombing mission, it was prescribed that the bombardier would make at least onepractice run, dropping the bomb on a subsequent run when acceptable and favorable meteorological and bombing conditions prevailed. It was believed that such action would permit successful accomplishment of the mission under less than ideal conditions.

(5) Time control had to be firmly established. The entire operation had to be precisely controlled on an exact time basis in order that scientific instruments might be activated at the correct instant. For this purpose three basic time fixes were established:

XRAY HOUR - Originally Bomb Carrying Aircraft scheduled to commence first run.
- Subsequently revised to 60 minutes before Bomb Carrying Aircraft scheduled to commence first run.

HOW HOUR - Predicted time of detonation.

MIKE HOUR - Actual time of detonation.

(6) Simplicity was of paramount importance. Since the operation was a complex one, to insure clarity and prevent misunderstanding it was necessary to write the Air Plan as clearly and simply as possible.

b. Form and Content

The Air Plan and related orders were an annex (Annex F) of the overall Task Force Operations Plan. As finally evolved Annex F consisted of the Air Plan and appendices thereto. The Air Plan briefly covered the composition of Air Task Units, information and a statement of the general air mission, air task assignments of each unit, references relative to logistics and air communications, and prescribed the locations of Air Commanders. The appendices to the Air Plan consisted of specific orders, instructions and information covering all phases of the Air Operation. Subjects covered in the appendices were:

Air Training Program
Air Operations Orders
Air Maps
Briefing and Mission Reports
Air Communications Plan
Air Control and Radar Doctrine
Air Photographic Plan
Air Evacuation Plan
Air Instrumentation and Test Requirements Plan
Air Supply Plan

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Air Transportation Plan
Air Radiological Safety Plan
Air Orientation Plan
Aircraft Identification Markings Plan
Transient Aircraft Control Plan
Air Typhoon Evacuation Plan.

9. Air Transportation

It was apparent that Operation CROSSROADS would require considerable air lift to transport passengers and essential freight both within the UNITED STATES and to overseas bases. The need for an air transport service within the Task Force, directly under Task Force control, was recognized as necessary to insure the rapid movement of priority passengers and vital freight in time to meet the numerous preparations required before the tests, and to support the Force during them. The need for the Joint Task Force ONE airline outside the continental UNITED STATES was accentuated by the reduction in service by ATC and NATS caused by demobilization.

a. Supervision of air lift was vested in the Air Transportation Section of Air Operations. The Section worked through J-3 in close cooperation with J-4. To meet the need for air lift Task Unit 1.5.4 was organized, and arrangements were made with the Army Air Transport Command and the Naval Air Transport Service to provide air lift on domestic and overseas routes.

(1) Task Unit 1.5.4 was set up to maintain domestic and limited overseas air transport services. The domestic service consisted of transcontinental line between ROSWELL, N.M. via SANTA FE, N.M., and WASHINGTON, D.C., and local service, first, between WASHINGTON and cities of the east coast and, second, between SANTA FE, N.M., and cities of the west coast. The overseas service was between ROSWELL, N.M., SANTA FE, N.M., ALBUQUERQUE, N.M. and KWAJALEIN via HAMILTON FIELD. Task Unit 1.5.4 was equipped with 10 C-54s and 20 C-46s. The domestic service began 18 January and the overseas service began 1 March. The aircraft operated by Task Unit 1.5.4 were sometimes referred to as the "Green Hornet Line." During February and March it seemed questionable whether planes could be repaired or spare parts procured in time to meet the air lift requirements of Joint Task Force ONE with ABLE Day scheduled for May. The situation was alleviated when the test was postponed until July. Task Unit 1.5.4 domestic air lift was practically discontinued after 15 May, but the overseas service continued. After arrival overseas a daily shuttle between KWAJALEIN and ENIWETOK was operated in addition to special local and return flights to the UNITED STATES.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(2) ATC was asked to provide the overseas air lift with 20 C-54s to carry 135 tons monthly from the UNITED STATES to KWAJALEIN. This was later reduced to 100 tons per month at the request of Joint Task Force ONE. The reason being that NATS had been lifting CROSSROADS cargo, instead of transferring it to ATC CROSS-ROADS, thus reducing the requirements. Due to the progress of demobilization ATC was unable to provide all the ground personnel necessary for the maintenance of these planes and to solve the problem the Army Air Forces loaned 500 men to help ATC with the maintenance work. The first ATC flight for KWAJALEIN left HAMILTON FIELD 1 March but round trip service did not begin until 7 March.

(3) Without being assigned a specific mission NATS agreed to furnish such transportation, at first estimated at not more than 20% of the total lift, as might be required beyond the limitations of Task Unit 1.5.4 and ATC. Later, NATS agreed to transport all mail for Joint Task Force ONE (approximately 40,000 pounds per month) beginning 4 April; return 90 persons to the UNITED STATES after ABLE Day and, if BAKER Day should be delayed beyond 15 August, to assist Task Unit 1.5.4 and ATC in returning personnel to the UNITED STATES.

- -

(4) Task Unit 1.6.3 provided daily shuttle service between EBEYE (the seaplane base near KWAJALEIN) and BIKINI. Mariner seaplanes were used for these flights. In addition, seaplanes of this unit were used for special flights within the local area. The slow boat service between KWAJALEIN and EBEYE complicated the air movement of both passengers and freight, and the same condition was true to a lesser extent at BIKINI LAGOON. Sufficient personnel to keep the boats operating were simply not available to the Task Force.

b. The air lift was adequate to meet the needs of Joint Task Force ONE. By 4 August 1946 the following number of passengers and pounds of freight had been transported by Task Unit 1.5.4, ATC, NATS, and other aircraft. These figures are not complete since operations were continued to 1 September 1946:

	TU 1.5.4	ATC	NATS	OTHER
Passengers. . .	3,878	3,039	3,034	1,434
Freight (Pounds)	837,800	1,315,400	1,172,000	155,200

	TOTAL
Passengers.	11,385
Freight (Pounds). . . .	3,280,400

RESTRICTED DATA
VII - (E) - 42 ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

c. Air lift transported by shuttles in the test area as of 1 July 1946:

	TU 1.6.3	TU 1.5.4	TOTAL
Passengers	3,302	2,287	5,589
Freight (Pounds)	515,000	343,200	858,200

B. TRAINING AND REHEARSALS

1. General

The purpose of air training was two-fold:

a. For Test ABLE, to train a crew to drop visually one atomic bomb with maximum attainable precision from approximately _ _ _ _ altitude.

b. For Tests ABLE and BAKER, to train crews to operate photographic, weather reconnaissance, command, observation, radiometry and transport aircraft and equipment, to drop blast pressure gauges; and to operate drone and drone control aircraft and equipment.

It was hoped that the bomb could be dropped within 500 feet of the aiming point, and training indicated that this was an attainable objective. However, the Target Array and the instrumentation were so arranged that a miss of considerably greater proportions would not seriously affect the results of the test.

As a training requirement the minimum objective accuracy in placement was defined as being withing 500 feet of

the aiming point, which was the base of the mainmast of the NEVADA. The degree of precision required of the bombardier was so great, that, assuming the same accuracy obtained under combat conditions during the war, the chances of success were only 1 in 4; assuming the proficiency required of bombardier school graduates under target range conditions, the chances of success were only 50 - 50. The precision required, despite ballistic and weather difficulties, demanded a training program which would reduce the margin of error to a minimum. Shoran and other methods involving radio were considered as alternatives to visual bombing, but were discarded as being even more difficult to accomplish.

In the other phases of training, standard Army and Navy training procedures were employed as far as possible, but there were few or no precedents for many of the highly specialized aspects of the operation. While the Army Air Forces had acquired limited experience from dropping the only two aerial atomic bombs in history, never before had an attempt been made to employ radio-controlled land based four-engine drones or single-engine drones from carriers as provided in the Air Operation Plan. In addition, other technical requirements of the tests such as the dropping of pressure gauges, the use of special goggles and geiger counters, and photography technique included here were without precedent. The high security of the atomic bomb itself plus radiological safety requirements likewise created a variety of training problems. Hence, new methods had to be improvised at the initiation of the training program, and these methods were subjected to constant revision as preparations for the operation progressed.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION CATEGORIES

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC RESTRICTIONS APPLY
RESTRICTED

2. Factors Affecting Training and Operations

a. Personnel

(1) Selection of Bombing Crew

To assure success in attaining the required accuracy in the air bombing, there was initiated within the training program a project which had two aspects:

(a) Training of a specially selected group of crews to the highest possible degree of proficiency.

(b) Selection of the best obtainable crew by means of elimination.

Five crews with outstanding war records were selected early in February to compete for the distinction of dropping the live atomic bomb at BIKINI. From then on the selection and training were carried on simultaneously by means of actual release of practice bombs. The results of each practice mission were analyzed and scored on the following points:

(a) Measured circular error of each bomb.

(b) The bombing run as recorded by the SCR 584 Radar with 294 plotting equipment.

(c) Complete report on readings, computations, and data settings as reported by the bombardier and audited by an experienced staff bombardier.

(d) Reports of impartial observers who flew in the bombing aircraft to watch the procedure, performance, and teamwork of the crew.

As a result of these detailed data corrective procedures were recommended which aided further to increase crew proficiency.

At the conclusion of the training program in the middle of June a final selection was made on the basis of a thorough review of the records of the crews and a detailed statistical analysis of their scores.

(2) Weaponeers

One of the key members of an aircraft crew in dropping an atomic bomb is the weaponeer. His duties consist of flying with the crew and making the final checks and adjustments of the bomb to insure that it will function properly.

The Army Air Forces had no personnel qualified as weaponeers when the decision was made to conduct the Atomic Bomb Tests. Since the first test was to be accomplished by dropping an atomic bomb from a B-29 aircraft it was desirable that a qualified Army Air Force officer act as weaponeer on the combat crew.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

A suitable officer was immediately selected and ordered to duty with the Manhattan Engineering District for training. Subsequently several other officers were also selected for similar training in order to provide the Army Air Forces with qualified personnel who understood and could perform the duties of this important position.

b. Technical
(1) Bombing Tables

VII - RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(2) Ballistic Winds

In high altitude bombing, the winds prevailing between the bombing altitude and the target can cause substantial bombing errors if they differ considerably from the wind at bombing altitude. As a bomb falls through varying winds at different altitudes, each wind in turn affects the flight of the bomb, and the influence of each wind is approximately proportional to the length of time the bomb requires to fall through it. Thus, to predict the influence of intermediate level winds it is necessary to conduct upper air wind soundings and to average the winds observed at different altitudes according to a time-of-fall weighting formula.

The Radar Bomb Scoring Unit was given intensive training in making upper air wind soundings by means of radar and in computing the so-called "ballistic wind" from the results. At the same time, the bombing crews were trained in making corrections for the effects of thedifferences between the ballistic winds observed by the radar unit and the winds at bombing altitude.

A unique situation arose at BIKINI where it was noted that winds at, say, 20,000 feet might be at right angles to the winds at bombing altitudes. Conventional methods for ballistic wind corrections did not allow for compensating for a cross-trial component of this sort. For a while it looked as though the efforts to obtain high accuracy bombing might be defeated by this exceptional wind structure, but a method was found for estimating the deflection error which would result from such a wind and correcting for it.

The Safety Plan required that the Radar station used for observing ballistic winds be evacuated on ABLE Day. Consequently personnel from Task Unit 1.5.16 were placed in the FALL RIVER on QUEEN and ABLE Days and the radar personnel in the FALL RIVER were trained in the technique of observing and computing ballistic winds. The ballistic winds on ABLE Day were observed and computed on this ship and transmitted to the bombardier via the Combat Information Center in the MT. MCKINLEY.

(3) Practice Bombs

In order to meet the requirements of extreme accuracy desired in the air burst test it was necessary to utilize simulated atomic bombs for practice purposes.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USN MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AT MOST ...
SPECIFIC RESTRICTION ...
USE, MILITARY SECRET ... REQUIRED
RESTRICTED

- -

- -

c. Meteorological

Before Operation CROSSROADS could be successfully executed it was necessary to establish a method of obtaining the meteorological data required by Joint Task Force ONE in assisting the Deputy Commander for Aviation to determine ABLE Day with assurance that weather would not cause a late cancellation of plans. With the site of operations located in a region not previously subjected to thorough meteorological exploration, Task Force requirements demanded a scientific study over wide areas to discover details of the prevailing weather system and the wind patterns in the vicinity of the target locale.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
DECLASSIFIED DATA CLEARANCE NOT REQUIRED
UNDER MILITARY CLASSIFICATION SAFEGUARDING

RESTRICTED DATA
AT
RESTRICTED
USE MILITARY

(1) It was found at a relatively early date that the climatology of BIKINI, especially after postponement of ABLE Day from May to July, would present the Joint Task Force with two meteorological difficulties peculiar to the general locality of Operation CROSSROADS activities:

(a) The movement of the inter-tropical front northwards from the GILBERTS toward the MARSHALLS during late June and early July was expected to result in increased cloudiness over BIKINI reducing the number of operational days on which surface targets would be visible from an altitude of _ _ _ feet. Statistics for the BIKINI ATOLL were lacking, but in view of observations made at ENIWETOK in 1945 it was feared that there would be only seven operational days in July and eight in August. Approximately the same number of days were classified as questionable from an operational standpoint, and it was thought the remainder of the time would be definitely non-operational. The value of the estimation depended upon 1945 and 1946 both being years of average weather for that section of the PACIFIC. Nevertheless with probability of only a few days each month remaining free of cloud hinderances it became imperative to

forecast with as much accuracy as possible in order to take advantage of the first opportunity to drop the bomb.

(b) The problem was further complicated by the altitudinal variations of wind at BIKINI. It was found that at times wind changes were sufficiently acute to describe an ellipse above the Target Area, being easterly up to 25,000 feet, westerly at 30,000 feet and back to easterly at 60,000 feet, the base of the stratosphere. It was foreseen that under such circumstances the radioactive elements of the atomic cloud would "fall-out" at different levels covering a large elliptical area and endangering aircraft operations immediately after detonation. Also the possibility had to be considered of a scattered atomic cloud endangering nearby islands as well as ships of the Task Force. It was therefore conceivable that some days otherwise operational might be made non-operational by wind.

(2) There had been set up in J-3 an Aerology Section to determine the policy throughout the Command on matters pertaining to weather, and reports were sent regularly to the Aerology Section by the Pacific Aerology Network, by the Navy

RESTRICTED
CLEARANCE NOT REQUIRED
SPECIFIC RESTRICTIONS
USE MILITARY CLASSIFICATION SAFEGUARDS

Weather Reconnaissance Detachment on KWAJALEIN, and by ships of the Joint Task Force equipped with aerological units. It was also intended to activate under Task Group 1.5 an AAF Meteorology Unit to be known as Task Unit 1.5.7 consisting of a Weather Central and three weather reconnaissance planes with observers, flight crews and maintenance crews. Eventually however the Weather Central became part of the Task Group 1.5 staff organization as a section of A-3, and Task Unit 1.5.7 became largely an AAF Weather Reconnaissance Unit. It was then arranged for the Weather Central to supervise the activities of Task Unit 1.5.7 to collect reports from the Army and Navy weather reconnaissance planes, and to prepare, and forward to the Aerology Section of Joint Task Force ONE, preliminary weather analysis.

(3) By early June weather organizations were sufficiently in operation to permit them to play their part in all rehearsals of Operation CROSSROADS though this had not been possible without difficulties. Originally demobilization had made it hard to find personnel qualified to operate and maintain the highly specialized instruments

used by meteorology. There had also been some trouble at first in having Communications deliver weather messages with sufficient dispatch to avoid decay in the value of the message. In the course of rehearsals it was felt that more reconnaissance planes were needed in order to provide adequate weather coverage at critical point in the area and also that instruments were needed to obtain data on wind runs, temperature and pressure at altitudes which could not be reached with surface equipment. Nevertheless accurate predictions of weather could be made by the Aerology Section. Coordinated daily weather reconnaissance flights were made by Task Unit 1.5.7 and the Navy Reconnaissance Detachment on KWAJALEIN. Briefing and interrogating of Army and Navy weather crews was carried out by Task Group 1.5 Weather Central. The standard search area for the Army Air Force planes lay to the east of KWAJALEIN and the Navy area was to the west. Each search area consisted of a square approximately 15 degrees of latitude on a side. The total area for search extended over more than 350,000 square miles. Reconnaissance vessels needed for key weather stations could not be provided because of the shortage of crews, and valuable weather data was thus unavailable.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

In addition to the aerial weather reports derived from the Army and Navy weather aircraft frequent reports were received from other military aircraft such as ATC and MATS. All these reports were processed through Task Group 1.5 Weather Central and relayed as priority messages to the Aerology Section on board the MT MCKINLEY. There the reports from the Weather Central were correlated with the reports received from all other sources and a complete analysis and forecast was submitted daily to the Deputy Commander for Aviation. Upon receipt of this information the Deputy Commander rendered his decision for operations of the succeeding day.

d. Communications

Up to and including the QUEEN Day rehearsal, communications facilities and electronic implementation functioned sufficiently well to permit air operations and rehearsals to proceed successfully although considerable improvement in communications was considered necessary. The lack of trained personnel, particularly technicians, for maintaining the complicated equipment was a very serious problem. There were delays in getting the system operating and a great deal of efficiency was lost as a result of the loss of trained personnel by both services due to demobilization.

(1) The Air Communications System

This consisted of point to point networks and the air to air and air to ground communications, and proved to be completely satisfactory save for frequent failures in the Deputy Commander for Aviation's voice conferences with Task Group 1.5 and Task Group 1.6. Voice conference failures were a definite handicap during the training period, and the system became reasonably satisfactory only near the end of Test BAKER.

(2) Task Force Communications

Insofar as Air Operations were concerned, facilities and channels for the Task Force Command communications proved to be adequate with one exception. When the original plans were drawn a Task Group Commander's CW radio net and a voice conference net, primarily for technical use, were provided. At the time these plans were drawn it appeared that these facilities would meet all requirements. It was later found that in an operation such as this a separate CW net and a separate voice conference net from the Deputy Task Force Commander for Aviation to his next subordinate Air Commanders should have been provided. This voice conference net must be provided with adequate secrecy equipment.

RESTRICTED DATA

ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(3) Due to insufficient time and lack of qualified personnel to make frequency studies employing ionospheric prediction charts it was found upon arrival in the operating area that many of the frequency assignments were not suitable for the distances involved, particularly the circuits between BIKINI, KWAJALEIN, and ENIWETOK. It should be pointed out that even using ionospheric prediction charts, as was done later in the operating area, final frequency assignments must be made by actual tests under the specific operating conditions. By QUEEN Day frequencies had been adjusted and fairly satisfactory communications were obtained on QUEEN and ABLE Days.

(4) Interference

It was expected in a communications problem of this magnitude that there would be some difficulty from interference between various channels. Spare frequencies were provided for such contingencies. The normal interference problems were quickly solved by assignment of new frequencies. However one problem of interference arose from conditions which had never been experienced previously by any of the services. The introduction of numerous radioteletype and voice broadcast facilities aboard the flagship resulted in terrific interference aboard that ship.

Radioteletype by its nature, and voice broadcast, require radio frequency carriers to be on constantly rather than intermittently as in the case of the CW keyed transmitters. With the close proximity of transmitting and receiving antennas aboard ship the resultant spurious frequencies or beats between these constant carriers produced terrific frequency problems throughout the communications part of the frequency spectrum. For example, as many as six teletype and broadcast carriers were operated simultaneously. This resulted in as many as fifteen spurious beats which in turn were multiplied by as many as eight harmonics from the transmitters, resulting in as many as 120 interfering signals being picked up on all receivers on board ship.

The only immediate solution to this problem was to enforce a very strict radio silence during the critical period of the Bomb Carrying Aircraft's operations. This radio silence permitted satisfactory communications and control of the air operations

3. Training Prior to Overseas Movement

a. Air Staff

Prior to its departure from the UNITED STATES the Air Staff was engaged in the preparation of the Air Plan and the monitoring of activities of lower air echelons. Staff visits were made to

VII RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

lower units to aid them and coordinate their activities. During this period the Air Staff became fully conversant in Joint Staff procedures and perfected its own internal organization. Briefing and War Rooms were maintained where the planned air operations and scheme of maneuver were visually portrayed by the use of small scale model aircraft and vessels. This facilitated the indoctrination of members of the staff in the details of the air operation as well as providing a means for familiarizing officials and members of the Press with the broad concept of the Air Plan.

b. Task Group 1.5

(1) The training objective of the Task Group 1.5 was to train Army Air Force crews to drop an atomic bomb, to drop pressure gauges, to operate observer, photographic, weather reconnaissance, transport, and radio controlled drone and drone control aircraft as directed in the Air Plan (Annex F to CJTF-1 Op-Plan No. 1-46).

(2) Training memoranda for each phase of training were published by Task Group 1.5 commencing on 30 January 1946. Although much of the data contained in the training memoranda came as verbal instruction from the Office of the Deputy Commander for Aviation, or from consultations with representatives of LOS ALAMOS and WRIGHT FIELD, the bulk of the material came from knowledge of past experience possessed by personnel in the Army Air Group.

(3) The original training schedule called for all units to complete ground and flying training by 22 March in order that the aircraft could be grounded for necessary maintenance prior to mass movement overseas beginning on 1 April. The Ground Echelon of course had left for KWAJALEIN early to prepare the way for the aircraft, and the unit was actually being landed on the island when Test ABLE was postponed to 1 July. The postponement made it possible to delat the air movement overseas to 15 April, permitting additional time for training both in the UNITED STATES and overseas.

(4) Installations whose facilities were utilized by units of Task Group 1.5 in carrying on its training program prior to movement overseas included the following:

ROSWELL ARMY AIR FIELD,
ROSWELL, NEW MEXICO.

CLOVIS ARMY AIR BASE,
CLOVIS, NEW MEXICO.

KIRTLAND ARMY AIR FIELD,
ALBUQUERQUE, NEW MEXICO.

CASTLE ARMY AIR FIELD,
MERCED, CALIFORNIA.

BOMBING RANGE,
ALBUQUERQUE, NEW MEXICO.

BOMBING RANGE,
ALAMOGORDO, NEW MEXICO.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(a) Training at the ROSWELL ARMY AIR FIELD included ground and flying training for the Tactical Operations, TU 1.5.1, Army Air Photographic, TU 1.5.2, units. From ROSWELL ARMY AIR FIELD bombing and photographic training was carried on at the ALAMOGORDO and ALBUQUERQUE bombing ranges. Ground instruction included refresher courses in the types of aircraft to be used by the units, the B-29, F-13 and C-54, and supersonic, loran, bomb, and navigation trainer courses. Technicians also gave instructions in the special modifications incorporated into the pressure drop, and photographic aircraft. Since the air crews were selected veterans, flying training concentrated upon practice in the ABLE Day air operations plan, with primary emphasis upon bombing.

(b) Training at the CLOVIS ARMY AIR BASE was carried on by the Air Instrumentation and Test Requirements Unit (TU 1.5.3) in the operation of four-engine drones and drone control aircraft. Directed by technicians from WRIGHT FIELD, experienced B-17 air crews were trained in taking-off and landing drones by remote control from the ground and from the air. They were also given refresher courses in ground and flying training.

(c) Training at KIRTLAND ARMY AIR FIELD was limited to servicing of the Bomb Carrying Aircraft in their practice missions over the ALBUQUERQUE bombing range.

(d) Training at CASTLE ARMY AIR FIELD was limited to a period of thirty days during which time part of an experienced weather reconnaissance unit, equipped with three B-29 aircraft modified for weather reconnaissance trained for its part of the Air Plan while preparing itself for overseas movement.

(5) Training of Tactical Operations Unit - TU 1.5.1

(a) The training objective of the Tactical Operations Unit (TU 1.5.1) was to train air crews to operate the following aircraft; bomb carrying, pressure drop, radiological reconnaissance, and radar tracking.

(b) The primary training objective, however, was to train one crew to drop one atomic bomb with great precision from high altitude. Five experienced bombing crews were originally selected for training, with the team making the lowest consistent circular error, coupled with all requirements of competition, to be selected to make the drop on ABLE Day. Thus the training program concentrated upon bombing in all its aspects. The schedule called for dropping three types of bombs. For purposes of providing crew

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
REDACTED RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CONTAINED IN CLEARANCE ARE REQUIRED
RESTRICTED BY CLASSIFICATION SAFEGUARDS

coordination and syncronization practice for the bombardiers, 100 pound practice bombs, and 500 and 1000 pound GP demolition bombs were dropped at the ALAMOGORDO bombing range. By April 15 when training ceased 117 of these bombs had been dropped at ALAMOGORDE.

(c) Bombing training immediately brought out the need for refinement of ballistic tables, the incorporation of differential ballistic wind data, and better instrument calibration. As corrections were made, the circular error was consistently reduced until the four leading teams taken overseas to continue training had circular errors of 313, 365, 434, and 444 feet for 1, 6, 9, and 6 drops respectively, all well within the 500 foot requirement.

(d) Three special missions were carried out embracing all or the majority of the unit's aircraft which would participate on ABLE Day. These missions were as follows: 8 March, 9 March, both at ALBUQUERQUE bombing range, and Operation ZEBRA 15 March, 100 Miles SW of SAN DIEGO. Both ALBUQUERQUE missions provided satisfactory bombing and formation practice results.

(e) Operation ZEBRA was a full-scale dress rehearsal against a Navy LCI target vessel stationed approximately 100 miles southwest of SAN DIEGO, CALIFORNIA. The mission was flown in conjunction with personnel of the Navy, in order to test equipment and tactics to be used in the actual test at BIKINI. Participating aircraft included one bomb carrying and three pressure instrument B-29 aircraft taking off from KIRTLAND ARMY AIR FIELD, and eight photographic F-13 aircraft from ROSWELL ARMY AIR FIELD on 15 March. One pressure instrument aircraft aborted, all others completed the mission. Conditions of the sea, with heavy winds and white caps, made it impossible to pick up the target with radar, and only a short visual run was made on

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1954
SPECIFIC RESTRICTIONS APPLY AND DISSEMINATION PROHIBITED
RESTRICTED

- -

the LCI. The bomb was dropped, good photographic results were obtained and the operation was of value for testing equipment and tactics than all the previous deliveries of "Pumpkins" at ALBUQUERQUE.

(6) Training of Army Air Photographic Unit - TU 1.5.2

The training objective of the Photographic Unit was to train crews to operate the F-13 and two C-54 Photographic Aircraft and equipment according to the Air Plan. These crews were trained with the Tactical Operations Unit at ROSWELL ARMY AIR FIELD, participating in the ground and flying training instruction as well as in the special rehearsal missions.

(7)Training of Air Transport Unit - TU 1.5.4

The Air Transport Unit's training was also carried on at ROSWELL ARMY AIR FIELD in conjunction with the training of Tactical Operations Unit. In addition to refresher ground courses, the transport crews were instructed in participation in the Air Plan.

(8) Training of Air Instrumentation and Test Requirements Unit - TU 1.5.3 and Army Drone Unit - TU 1.5.6

(a) The Air Instrumentation and Test Requirements Unit and the Army Drone Unit actually functioned as a single unit with the former being the technical echelon and the latter the air echelon. At CLOVIS ARMY AIR BASE the objectives of the Group were to train ground and air crews to operate four B-17 Drone Aircraft, four B-17 Drone Control Aircraft, and one B-17 Master Drone Control Aircraft. The four drones were specially equipped with air filters and air-collector bags to gather air samples of the cloud and cloud columns resulting from the atomic bomb burst. Cameras were also installed in the drones to photograph the cloud at close range.

(b) A WRIGHT FIELD technical section was attached to the group to assist in training personnel in drone operations, and special courses in the use of radio-controlled equipment were instituted.

(c) The first training flights were flown on 11 February, and training of radio-control pilots, utilizing both airborne and ground-control equipment, was

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

started on 15 February. Flight training stressed long-range navigation and cruise-control missions, radio-controlled landings and take-offs, and both high and low-altitude missions to achieve coordination between mother and drone aircraft. Also much time was devoted to ground approach and the development of standard operating procedures for all phases of drone operations and control.

(d) Training was initiated for sixteen crews, and 138 flying hours of radio control, and 90 hours of metal stick training were flown prior to the termination of training at CLOVIS ARMY AIR BASE. The average individual flying training completed was as follows: pilots, co-pilots and radio-control pilots 19:30 hours; navigators 37:30 hours; radio operators 17:30 hours; RCM observers 4:00 hours.

(9) Training of Army Air Meteorological Unit - TU 1.5.7

The training objective of the Meteorological Unit was to train three weather reconnaissance crews and to indoctrinate them in the Air Plan. On 28 February the 59th Weather Reconnaissance Squadron (VLR) was directed to organize and train three weather crews by 1 April.

Since the three B-29 aircraft were not immediately available, the weather observers were sent to MC-CHORD FIELD, WASHINGTON, for experience in weather missions with the 53rd Weather Reconnaissance Squadron (VLR), while the remainder of the crews started ground training. An intensive flight training schedule followed the arrival of the three B-29 aircraft on 13 March, and the crews completed 114 hours of day-time and 59 hours of night flying before termination of training on 1 April preparatory to movement overseas.

(10) Problems Encountered Prior to Movement Overseas

In this training phase wherein trained maintenance and operating personnel were brought together from various units and agencies into a newly formed organization for limited training to perform a specialized mission, various problems were encountered in the course of the training process. Among the primary ones prior to the group's movement overseas, were the following:

(a) Coordination

Since position and coordination are vitally essential, emphasis must be placed continuously on the observance of air and radar discipline. Thus coordinated

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

rehearsals were conducted as often as it was possible with the aircraft available. However, due to the inexperience of personnel in operating remote control drone aircraft, no attempt was made to incorporate the air operations of drones and mothers into the group's rehearsals prior to movement overseas. Training was thus restricted in the UNITED STATES to the take-off, air operation, and landing of the drones.

(b) Use of Radar

Initially it was felt that aircraft could maintain their required positions during the operation by visual means with reference to the target itself or to the land areas of the atoll. During training, however, this procedure failed to provide the accuracy required especially with the C-54 aircraft. With the delay in the schedule to 1 July for Test ABLE, and the prospect of less favorable weather conditions in the Target Area, the problem of proper positioning became even more acute. The decision was made, therefore, to install radar equipment for navigational and positioning purposes in

- -

all aircraft operating within twenty miles of the Target Area. This required the installation of AN/APS-10 radar search sets in mother B-17 and in C-54 photo aircraft.

(c) High Altitude Operation of Drones

In the operation of remote controlled aircraft many flights were made at altitudes above 25,000 feet to test the reliability of the control equipment and the televising and telemetering devices for the collection of data. It was learned that the drones could be controlled satisfactorily up to the maximum ceiling of the B-17 aircraft employed, but that above 28,000 feet considerable difficulty developed in the operation of the television equipment due to arcing of the brushes. Consequently, new high altitude brushes were installed and additional high altitude test flights were made. Although the results were not entirely satisfactory, it was decided to continue further tests overseas before undertaking modification of the Air Plan.

(d) The initial instructions directed that the Bomb Carrying Aircraft would make a high speed diving turn of about 150° after release of the bomb. During training

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

several difficulties resulted from this method. One difficulty was the loss of power and even the failure of the two engines on the lower side of the aircraft during the dive. This appeared to be the result of fuel starvation creating a dangerous situation with the two engines on the upper side tending to throw the aircraft over on its back. Also increase in airspeed during the breakaway in several cases caused excessive vibration. As a result of these difficulties, the "tactical doctrine" was modified to provide for a moderate turn away from the target by the Bomb Carrying Aircraft with a simultaneous loss of altitude and with no increase in airspeed until completion of the turn.

(e) Differential Braking of Drone Aircraft.

Initially the braking on drone B-17s was controlled through valves which allowed only one braking action which was transmitted with equal force to each wheel. This limitation on braking was definitely hazardous, particularly in crosswind landings. Thus a device was incorporated into the braking system whereby differential braking was possible. This device operates so that an application of right or left rudder produces a similar application of the right or left brake, and has resulted in considerably more positive control during the landing roll.

(f) High Altitude Operation of B-29 Engines

Although it was known that high altitude operation of B-29 aircraft reduced the life of the engines, additional information was obtained during the training period in NEW MEXICO. It was learned that between 175 and 200 hours was the critical period on the 3350 type of engine for high altitude operation. During this period a maximum number of engine failures could be expected, and any unnecessary operation at high altitude would increase the possibility of engine failures. With the planned training schedule for overseas, the majority of the group's engines would approach the critical operative time by ABLE Day. Due to this fact the Army Air Group recommended that the number of practice runs by the Bomb Carrying Aircraft be reduced from three to one, thus eliminating as far as possible the chances for an air abort due to engine failure.

c. Task Group 1.6 - Training.

(1) The training objectives of Task Group 1.6 prior to movement overseas were to train naval air and ground crews to operate drone and drone control aircraft and equipment, and photographic aircraft and equipment as directed in the Air Plan (Annex F to CJTF-1 Op-Plan No. 1-46).

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(2) The original schedule called for all training to be completed in the UNITED STATES prior to 3 April, the date set for the overseas movement of the final units and headquarters of the Naval Air Group. following the postponement of Test ABLE to 1 July, however, schedules were revised and training was continued until shortly before the task group flagship sailed on 21 May.

(3) Installations and ships utilized by units of Task Group 1.6 in its training program prior to departure for the MARSHALL ISLANDS included the following:

NAVAL AIR STATION,
ATLANTIC CITY, NEW JERSEY

COAST GUARD AIR STATION,
BROOKLYN, NEW YORK

NAVAL AIR STATION,
SAN DIEGO, CALIFORNIA

NAVAL OPERATING BASE,
TERMINAL ISLAND,
SAN PEDRO, CALIFORNIA

BROWN FIELD, NAAS,
CHULA VISTA, CALIFORNIA

U.S.S. SHANGRI-LA (CV-38)

U.S.S. SAIDOR (CVE-117)

Naval Air Stations, FORD ISLAND, and BARBER'S POINT, OAHU, were used by TU 1.6.23 and TU 1.6.24 before movement to SAN DIEGO, CALIFORNIA.

(4) Training of Drone Carrier Unit - TU 1.6.1 - USS SHANGRI-LA

The training objectives of the Drone Carrier Unit were to train the personnel of the Field Recovery Unit; to train radio control and air crews to operate drones and drone control aircraft; and to train crews to operate drone boat control and air-sea rescue aircraft.

(a) Field Recovery and Drone and Drone Control Units.

1 Training of the crews of TU 1.6.14 to operate the four F6F drones and sixteen F6F control aircraft on ABLE Day was initiated on 26 January at the NAVAL AIR STATION, ATLANTIC CITY, NEW JERSEY. Squadron XVJ25 designated to handle the Navy drone operation was currently operating at ATLANTIC CITY, and to it were added experienced personnel from Navy stations within Continental UNITED STATES and from outlying bases. The unit transferred to the SHANGRI-LA on 14 March, and training was continued enroute from NORFOLK to SAN DIEGO between 18-31 March; and from 1 April to 21 May training was carried on from the unit's base at BROWN FIELD, NAAS, CHULA VISTA, CALIFORNIA, and from the deck of the SHANGRI-LA when available

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

at SAN DIEGO. Training of the Field Recovery Unit (TU 1.6.13) was carried on simultaneously with other elements of the drone unit.

2 Although the pilots and technicians assembled for training collectively represented many thousands of hours of specialized drone experience, few had flown modern fighter aircraft, or had served recently aboard an aircraft carrier, thus an intensive pilot training program was inaugurated embracing familiarization with F6F aircraft, instrument flying, navigational problems, high altitude indoctrination, carrier landings, and all operations peculiar to the atomic bomb operation plan. The program included the following:

a 26 January - 14 March at ATLANTIC CITY: Refresher training in F6F aircraft, drone and drone control operations.

b 18-31 March aboard SHANGRI-LA enroute to SAN DIEGO: Refresher training in carrier take-offs and landings.

c 1-15 April at BROWN FIELD: Complete tactical operations were carried on each day that weather ceilings permitted. The training

routine for these operations included early morning checkouts by mechanics and electronics personnel before the primary and secondary control aircraft were airborne. The Field Control Unit took over next and checked out drones for each airborne control group. When a satisfactory check to all stations was completed, a safety pilot made a normal take-off in each drone. The primary control group then took over at a safe altitude and proceeded with the drone to the practice area. The drones were climbed to their assigned altitudes, leveled off, and their speeds stabilized. On the "bombs away" signal they were released on course for the target, and the primary control groups fell astern. The secondary groups then flew a precise zig-zag course calculated to intercept the drone after it passed over and was a safe distance from the target. Recovery was by the Field Recovery Unit at BROWN FIELD. The afternoon training program included radio control work, test and familiarization flights, auto-pilot run-ins on drones, and practice control landings.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AT VIEW
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
SEE MILITARY CLASSIFICATION SAFEGUARDS

d 15-16 April a training mission was flown from BROWN FIELD to ALAMOGORDO, NEW MEXICO, for the purpose of viewing the site of the first atomic bomb test and to familiarize the crews in the use of the Geiger counter warning indicators in the control planes. Each aircraft made runs over the crater site at several altitudes.

e 17 April - 21 May from BROWN FIELD and aboard the SHANGRI-LA at or in the vicinity of SAN DIEGO HARBOR: an underway training program was carried out from 23-24 April, and 30 April - 3 May in an operating area laid out to represent the Operation CROSSROADS area, using the south end of SANTA ROSA ISLAND off the CALIFORNIA coast to represent BIKINI LAGOON and BROWN FIELD to represent ROI ISLAND. On 24 and 25 April full rehearsals were held with the four drones and sixteen control aircraft taking off from the carrier, circling over the target at SANTA ROSA, and being recovered at BROWN FIELD. On 3 May another full rehearsal was conducted during which was staged the first launching of a F6F DOLO (or pilotless aircraft) from a carrier deck.

Control of the actual drone launching was exercised by a pilot sitting in a chair on the flight deck. The intensive period of training was concluded on 3 May, and the remaining time in the UNITED STATES was given over to refresher instruction in lost plane, homing, and fighter direction procedures, and further practice in drone launchings and recoveries. However, a press show was conducted from the SHANGRI-LA on 9 May consisting of a complete rehearsal with four drone launchings, including one NOLO.

3 Problems Encountered

a It was found that without an automatic pilot in the F6F control aircraft that it was not feasible to employ protective goggles through which the pilot had substantially no vision. To provide a substitute, and a method to enable instrument flight in case of emergency such as communications failure on the actual operation, a two-colored goggle cockpit enclosure combination was adopted after exhaustive test by the Radiological Safety Section of Joint Task Force ONE. The hood was lined with amber plexiglass, and two .030" blue plexiglass lenses were inserted into the goggle frames, both colors of material

RESTRICTED DATA
This document contains information affecting the National Defense of the United States within the meaning of the Espionage Act, 50 U.S.C. 31 and 32. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.
Atomic Energy Act 1946
CLEARANCE NOT REQUIRED
SPECIFIC RESTRICTIONS
USE MILITARY CLASSIFICATION SAFEGUARDS

being especially provided for this type of work. In order to obtain ample vision inside the cockpit, bright spotlights were installed to illuminate the instrument panel.

b Training also revealed certain typical failures in the drones. It was found that the hydraulic gauges in the auto-pilot failed because they oscillated radically with the servo movements. This was remedied by a stricting "snubber" placed in the pressure gauge lines. It was also found that the turn centering switches in both drones and control airplanes were failing and a "microswitch" was substituted to insure positive action in obtaining simultaneous closure of the necessary switches.

c Six weeks were too short a time to allow for the training and shaking down of new ground personnel, new pilots, and newly received equipment, particularly second-hand, for an operation such as CROSSROADS. The postponement of the first test for six weeks, providing additional time for training, was highly profitable from the standpoint of both training and material performance.

(b) Drone Boat Control and Air-Sea Rescue Unit.

1 Training of the crews of TU 1.6.15 to operate six TBMs to control six drone LCVPs in obtaining water samples from the lagoon immediately following the detonations, was initiated at the NAVAL OPERATING BASE, TERMINAL ISLAND, SAN PEDRO, CALIFORNIA, on 3 May. The Drone Boat Control Aircraft were based at NAVAL AIR STATION, SAN DIEGO, and one aircraft was flown daily to TERMINAL ISLAND where it carried out a training mission with the control officer controlling the one available drone boat. Both the airplane and the pilot were alternated daily. Training was terminated for both pilots and control officers on 16 May in order that both aircraft and boats could be loaded on the SHANGRI-LA for departure on 21 May.

2 Training for the four utility and air-sea rescue TBM's crews was carried on simultaneously with the drone boat control crews at SAN DIEGO with all crews participating in carrier operation, navigation, towing, radar, air-sea rescue, and flight instruction.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AS TO CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

3 The original plan called for the TBMs with the AN/ARW-3 radio transmitters for drone boat control actually to control the boats. In training tests therein the airplane controlled the boat, both before and after an arrested landing and a catapult take-off, the gear functioned normally and excellent control was maintained. It was decided, however, at a conference at TERMINAL ISLAND 1 May that due to maintenance difficulties, voice radio conning would be more satisfactory. Tests with this method proved satisfactory, and two techniques were then available in case of need.

(5) Training of the Photographic Carrier Unit - TU 1.6.2 - USS SAIDOR.

The original training objectives of the Photographic Carrier Unit were to train ground and flight personnel to operate F6F and TBM Photographic Aircraft and equipment, and HOS-1 aircraft.

(a) Carrier Based F6Fs and TBMs

1 Training for aircrews and technicians for the six F6Fs of Task Unit 1.6.23 and four TBMs of Task Unit 1.6.24 was initiated on 6 February aboard the SAIDOR at PEARL HARBOR, OAHU. Other training was carried on at FORD ISLAND and BARBER'S POINT on OAHU

before the units sailed in the SAIDOR for SAN DIEGO on 19 March. The following training was completed in HAWAII:

a The Fighter Photo Unit was moved from the SAIDOR to FORD ISLAND where with other Photographic personnel a ground school and flight operations program was undertaken. Pilots also received special photographic training at BARBER'S POINT.

b During the period 6-7 March the pilots of the photographic aircraft were embarked and refreshed with 20 carrier landings each.

2 Training meanwhile had been inaugurated for 25 officers and enlisted men of the photographic unit who sailed from NORFOLK on 18 March in the SHANGRI-LA to rendezvous with the SAIDOR at SAN DIEGO on 31 March.

3. At SAN DIEGO the elements of the Photographic Unit were consolidated first aboard the SHANGRI-LA because of orders to the SAIDOR to proceed to the east coast on a ferry mission. When the SHANGRI-LA was also made available for a ferry mission to HAWAII,

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

the unit was transferred on 5 April to the NAVAL AIR STATION, SAN DIEGO, where training was continued until 5 May. When available in the area the SHANGRI-LA was used for field carrier practice. The training program from SAN DIEGO included the following:

a An intensive flight and ground schedule was inaugurated on 7 April during which pilots made almost daily morning and afternoon flights with camera men. The crew of the TBMs practiced aerial photography with still and motion picture cameras, and the F6Fs engaged in mapping flights for the purpose of making mosaics.

b Carrier catapult launchings and landings on the SHANGRI-LA when she was available in the area.

c A special mission was flown on 21 April to ALAMOGORDO, NEW MEXICO, to gain experience in the use of Geiger-Mueller counters by testing the radioactivity at the site of the first atomic bomb burst.

d A total of 381.1 hours were flown during this period.

(b) Carrier Based Helicopters

1 Training for aircrews and technicians of Task Unit 1.6.25 to operate the 2 HOS-1s of the photographic unit was initiated at the COAST GUARD NAVAL STATION, BROOKLYN, NEW YORK, on 19 February. The unit was transferred to the SHANGRI-LA on 11 March for transportation to SAN DIEGO where from the NAVAL AIR STATION training was continued until 6 May when the entire photographic unit departed in the SAIDOR. The training program included the following:

a 18 February - 10 March at BROOKLYN: The unit was instructed in servicing and maintaining HOS-1s of the Coast Guard until 26 February when a routine program of flights was instituted with its own assigned helicopters.

b 16-31 March enroute to SAN DIEGO on SHANGRI-LA: Training in maintenance and flights from the carrier including photographing the carrier's passage through the PANAMA CANAL.

c 5 April - 5 May at SAN DIEGO: Routine training flights and maintenance.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CONTAINED IN MILITARY SECURITY REQUIREMENTS
RESTRICTED OR MILITARY SECURITY INFORMATION SAFEGUARDS

4. Overseas Training

The intensive training program which had been inaugurated in the Zone of the Interior was renewed overseas as rapidly as the Air Staff and air units were established at their overseas anchorages and island bases. And once renewed, training was continued with increasing tempo until 30 June when the air burst was set definitely for 1 July. The Aircraft and crews of the Army Air Group (Task Group 1.5) were flown to the MARSHALL ISLANDS in late April to join the service and ground personnel which had begun to arrive in early March, and by 1 May the group was virtually in place. The air and ground echelons of the primary Navy air units, however, moved overseas in aircraft carriers, the first of which departed from the west coast on 5 May. Consequently, the Navy Air Group (Task Group 1.6) was not in place until 5 June when the group flagship, the SHANGRI-LA, anchored in KWAJALEIN LAGOON off ROI ISLAND. The Army air units were thus in training overseas for more than a month, and had completed three rehearsals of the Air Operation Plan, before the Navy units were on station and ready to commence joint operations. Meanwhile, however, the Navy air units had been carrying on training and executing similar rehearsals of the Air Plan off the CALIFORNIA coast and while enroute in the aircraft carriers to the BIKINI AREA, and were ready to commence joint rehearsals on their arrival. With the assembly of all air units, as well as the staff of the Deputy Commander for Aviation aboard the MT MCKINLEY in BIKINI LAGOON, training centered about preparation for and execution of three coordinated rehearsals of the entire Air Plan for ABLE Day. They were carried out as follows:

10 June - Rehearsal of all air units.
20 June - Rehearsal of all air units.
24 June - QUEEN Day - Full-dress rehearsal of all units of the Task Force, both air and surface.

QUEEN Day represented the culmination of the entire period of training and preparation, for on 24 June was carried out every phase of the entire ABLE Day operation plan. Operating from ABLE Day bases and stations, every air and surface unit, as well as every staff section, executed every major aspect of the plan which was carried out for the air burst on 1 July. The only exception of note was that the Bomb Carrying Aircraft dropped an H.E. bomb over the Target Array rather than an atomic bomb. The accuracy of this drop met the training requirement of 500 feet circular error which had been established previously. With the successful staging of the QUEEN Day rehearsal, the Air Staff and all air units had acquired complete familiarity with the plan for ABLE Day, as well as a high degree of precision in its execution.

a. Air Staff

Upon arrival in the test area the Air Staff became an operating as well as planning staff. The normal staff activities necessary in connection with the receipt of Air Group Operational Status Reports, Daily Air Intents for Training, and other unit records, were augmented by the requirement that the Air Staff be trained as a team to assist the Deputy Commander for Aviation in exercising direct and effectual control of airborne elements of test days.

RESTRICTED DATA
OCT - 1948
CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED
SPECIAL RESTRICTED
RESTRICTED

- -

The Air Staff was organized and trained to present to the Commander on test days a complete picture of the current air situation. It was the function of the CIC room to supply the detailed air picture to the Flag Bridge, which was the station of the Deputy Air Commanderduring the tests. On the Flag Bridge, and Air Plot Room was established to present the situation as relayed by CIC, and to maintain liaison with the Aerology, Surface Vessel, Radiological Safety, and Communications Sections of the Joint Staff. Its function was to present the entire air situation with respect to positions of aircraft, air-sea rescue, air radiological safety, weather, and communications available to the Commander, in order that he might have at all times complete information for command purposes. Also, by means of communications facilities located in Air Plot, the Commander was provided constant radio contact with his Airborne Commander in the command plane. Facilities and plots maintained by the Air Staff in the Air Plot Room were:

(1) Aircraft Plotting Board, showing horizontal position of bombing aircraft at all times. In addition, all aircraft were plotted vertically and horizontally with regard to station, time on station, and time off station.

(2) Aircraft Status Chart which showed:

(a) Task Unit Designation
(b) Base
(c) Type A/C
(d) Name of A/C
(e) A/C Scheduled (No.)
(f) A/C Airborne (No.)
(g) Purpose of A/C
(h) Station
(i) Station Altitude
(j) Radio Call Sign
(k) Proposed Take-off Time
(l) Actual Take-off Time
(m) Time Due on Station
(n) Reported Time on Station
(o) Time Due off Station
(p) Reported Time off Station
(q) Proposed Time of Landing
(r) Actual Time of Landing
(s) Remarks

(3) Aircraft Distress Board Plot:

(a) Facilities:

1 Type Facility Available
2 Base of Facility
3 Command
4 Total Available
5 Mission, Departure, Time, Date
6 Estimated Time of Return
7 Remaining Facilities Available
8 Remarks

(b) Distress Calls:

1 Date
2 Radio Call
3 Type A/C
4 Name A/C
5 Task Unit
6 Base
7 Time of First Call
8 Position of First Call
9 Time of Last Call

SPECIFIC AEC APPROVAL REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS
CLEARANCE NOT REQUIRED

RESTRICTED DATA

10 Last Report Position
11 Action Taken
12 Remarks

(c) Maps of Area

(4) Radiological Danger Area Plot:

(a) Maps of area with predicted danger areas and reported danger areas plotted.

(5) Aerological data which showed predicted and actual cloud levels; predicted and actual winds.

(6) Command Aircraft Radio Circuit.

(7) Interior communications to all parts of ship with direct lines to CIC, Radiological Safety Section, Communications, Surface Vessel Plot, and Commanders.

The training of the Air Staff in Air Plot duties was begun immediately upon arrival at BIKINI. Informal and formal CPX problems were conducted for training purposes using simulated reports and dispatches. Actual plotting of, and communication with, Task Force aircraft engaged in daily training flights in the Target Area, was accomplished. Full air rehearsals were conducted prior to test days with all staff sections participating.

Combat Information Center

Efficient operation of the Combat Information Center in the MT MCKINLEY was vital for effective control and safety of the airborne elements during the conduct of the

tests. The CIC personnel, officer and enlisted, had, for the most part, only very limited previous experience. They had never worked together as a team or operated in a CIC which covered as extensive a scope of functions as called for in this joint operation. Rather than train all CIC personnel to man all stations within the CIC and undertake an extensive overall training program in such a short period, each man was assigned to a station and trained to perform the duties of that one station. Thus, each man became a specialist at his particular job insuring efficient performance during the stress of operations.

Commencing with the departure from SAN FRANCISCO, two hours daily of intensive formal drill in CIC duties were scheduled as follows:

(a) Radar Operators: Aircraft tracking, reporting aircraft targets from cursor, sound power telephone techniques and procedures, familiarization with air plan to anticipate tracks of all aircraft.

(b) Plotters: Spot plotting, track plotting, writing backward, reading sound powered transmissions, plotting symbols, a knowledge of the prospective task of all aircraft according to the Air Plan.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(c) Talkers: Sound powered techniques, keeping of logs, where incoming and outgoing information went and why.

(d) Recorders: Reading of radio transmissions, recording symbols, how to keep logs, where information received should go and who would be cognizant of each transmission.

(e) Status Board Keeper: Designation and mission of all aircraft, approximate time of take-off, reporting on station, reporting departure, and landing, and radio channeling.

(f) Radio Guards: Radio Channeling, reading transmissions, techniques and proper voice procedures for transmissions, knowledge of his responsibilities to assigned aircraft, dissemination of information received to those who need to know, a thorough and complete understanding of all communication assignments, keeping of radio logs.

After this training was well under way, relationships with Air Plot, Radiological Safety and Aerology were worked into the instruction. Methods and procedures in receiving and disseminating information were worked out. Drills were coordinated with other sections to smooth out operating difficulties. These drills also developed and delineated

- -

the responsibilities of CIC, Air Plot, and the Radiological Safety Section. On 14 June during ABLE Day staff rehearsals CIC was adjudged ready to carry out all of its functions within the internal organization in the MT. MCKINLEY.

The last phase of CIC training was in relation to other CIC's of the Task Force. Following conferences with CIC personnel of Radar Guard ships and Fighter Director ships, in which responsibilities and functions of each were made clear, daily tests and drills were held which emphasized radio procedures and the passing of radar information from Radar Guard Ships to the flagship. By the 18th of June this phase of training was satisfactory and the CIC of the MT. MCKINLEY was fully trained and prepared to carry out its duties in operation CROSSROADS.

(g) Relief Radar Guard Ships:
- Training was also given to CIC personnel of the PANAMINT, BLUE RIDGE and APPALACHIAN, all AGC's, to enable them (particularly the APPALACHIAN) to relieve the MT. MCKINLEY in the event a major power failure occurred in the Force Flagship on ABLE or BAKER Days.

b. Overseas Training of Army Air Units - Task Group 1.5.

By the first week in May all units of Task Group 1.5 were in place on KWAJALEIN and ENIWETOK ISLANDS.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

With BIKINI LAGOON the two islands from which the Army units operated formed a triangle with the three points separated by the following distances:

KWAJALEIN - 220 NM southeast of BIKINI
BIKINI - 185 NM east of ENIWETOK
ENIWETOK - 325 NM northwest of KWAJALEIN.

In this area of the MARSHALL ISLANDS the Army units immediately resumed the preparations which had been interrupted by the movement overseas. On practically every day which followed before ABLE Day the Bomb Carrying, Photographic, Drone or other aircraft of the Army group were over the BIKINI AREA, while the Weather Reconnaissance aircraft made daily flights. Six full scale air rehearsals were participated in by the Army air units during which either inert or H.E. bombs were dropped either over ERIK ISLAND or the Target Array. The first three of these rehearsals were carried out by Army aircraft only, while the last three were coordinated Army-Navy operations. The schedule of the six rehearsals for Army air units was as follows:

MISSION	DATE	TYPE BOMB	PARTICIPATING
KN-2	20 May	Inert	Army Air Units
KN-4	30 May	Inert	Army Air Units
KN-5	6 June	Inert	Army Air Units
KN-3	10 June	Inert	Army-Navy Air Units
KN-6	20 June	H.E.	Army-Navy Air Units
KN-7	24 June	H.E.	QUEEN DAY - All Units

Building the training program around the missions of the Bomb Carrying Aircraft, the Army units had completed the following overseas training prior to ABLE Day:

(a) Scheduled Bombing Missions - 44
(b) Completed Bombing Missions - 29
(c) Total Training Hours Flown:

Air Attack Unit	- TU 1.5.1	441:00
Air Photo Unit	- TU 1.5.2	458:55
Drone Unit	- TU 1.5.6	610:50
Weather Unit	- TU 1.5.7	546:25
TOTAL		2,057:10

(1) Training on KWAJALEIN

KWAJALEIN was the primary base for the Army air units. It was the site for Headquarters, Task Group 1.5, as well as the Air Attack Unit (TU 1.5.1), Air Photo Unit (TU 1.5.2), Air Transport Unit (TU 1.5.4), Air Service Unit (TU 1.5.5), Air Meteorological Unit (TU 1.5.7), and Air Orientation Unit (TU 1.5.8). However, only three of these units, the Attack, Photo, and Meteorological, carried on active training programs to prepare them for their ABLE Day missions. The functions of the other units were such as to preclude training programs as such.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED SPECIFIC RESTRICTIONS [illegible] REQUIRED
USE MILITARY CLASSIFICATION SAILORDS

(a) Air Attack Unit - TU 1.5.1

As in the UNITED STATES, training of the Attack Unit, comprising the Bomb Carrying, Instrument Dropping, and Radiological Reconnaissance Aircraft, revolved around the Bomb Carrying Aircraft. However, concurrently with the training for bombing crews, the aircrews for the other aircraft of the unit were being prepared for their ABLE Day missions. Likewise the practice missions of the Photographic and Weather Reconnaissance Units were directly correlated with the training of the bombing crews.

1 Practice Bombing Range on ERIK ISLAND.

To simulate the bombing mission for Test ABLE, a bombing range was constructed on BIKINI ATOLL southwest of the Target Array on ERIK ISLAND. For the bombing target a coral strip was cleared with dimensions approximately those of the INDEPENDENCE which had originally been designated as the target vessel. This strip, approximately 550 by 75 feet, was not changed after the substitution of the NEVADA as the target ship. An APN-6 Radar beacon was provided to aid in bombing and two spotting towers

manned by LOS ALAMOS personnel were located at each end of the target island for plotting the bomb strikes by transit. In addition an SCR 584 Radar Detachment was established on PRAYER ISLAND, one and one-half miles east of ERIK ISLAND, for purposes of tracking the Bomb Carrying Aircraft, communicating with the bomb commander, estimating the bomb impacts, securing ballistic wind data, and weather reporting.

2 Bombing Practice

The Air Attack Unit carried out 23 primary practice missions on which bombs were dropped in addition to the six rehearsals, or a total of 29 major training operations. Exclusive of the H.E. bomb which was detonated over the Target Array with a high degree of accuracy on QUEEN Day, and one unqualified drop on 2 June, 27 practice bombs were dropped over ERIK ISLAND with an average circular error of 537 feet.

3 Practice Other Than Bombing

While the Bomb Carrying Aircraft used the coral strip to the southwest of the Target Array as its aiming point on

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED

all practice missions, all other aircraft of the unit flew their assigned courses, orbited on their ABLE Day stations in the exact positions and altitudes prescribed by the Air Plan. After the practice drop, the Bomb Carrying Aircraft frequently made dry runs with the NEVADA as the simulated target.

(b) Air Photo Unit - TU 1.5.2

Overseas training for the Air Photo Unit which operated eight F-13s and two C-54s on ABLE Day, in addition to preparation of its photographic equipment for its assignment, consisted primarily of participation in the six Army air group rehearsals. A total of 458:55 training hours were flown from KWAJALEIN.

(c) Air Meteorological Unit-
TU 1.5.7

Beginning on 25 April, four days after the arrival of the first airplane of the unit, daily missions were flown over the BIKINI and adjacent areas from KWAJALEIN by aircraft of the Air Meteorological Unit. Altogether the unit's three weather reconnaissance B-29s flew 65 missions prior to ABLE Day, covering approximately 2,200 NM, and averaging 12 hours on each

mission. The usual procedure on these missions was as follows: A low level flight at the 960 millibar level, 1,486 feet on the pressure altimeter set at 29.92 to BIKINI; vertical ascents to 9,878 feet, the 700 millibar level, during which atmospheric soundings were made by the weather observer. By means of V.H.F. radio, the bombing weather conditions and the forecast of the next four wind hours were reported to PRIEST, the call name of the flagship, the MT MCKINLEY. Also complete observations were reported each half hour to the Weather Center at KWAJALEIN.

(d) Ground Training

While no synthetic trainers were available to the units on KWAJALEIN, a ground training program was accomplished by means of lectures and on-the-job instruction. The subjects covered in the ground training included the following:

Task Force Organization
Air Organization and Air Plan
Communications
Nuclear Theory
Safety and Security Plan
Target Array and Vessel Identification
Oceanography, Typhoon Plan, Air Sea Rescue
C-1 Auto Pilot, Fuselage, Landing Gear, Brakes

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Island Geography
Radar Bomb Run Procedures,
Bomb Tables
Flight Planning and Reporting
Electrical Systems
Bomb Sight Trouble Shooting
Fuel System, Fuel Injection
System
Review Radar Operation and Logs
Practical Trouble Shooting
Turbos, Turbo Regulators,
Electric Props
Navigational Facilities in
the Marshall Islands
Indirect Bombing
Engine and Engine Systems
In-Flight Maintenance
Control System, Bomb-Door
System, Cabin Pressure
and Heating
Bomb Computors
Fires (Cabin, Nacelle, Engine)

(2) Drone Training on ENIWETOK

Training of the drone air and ground units (Task Unit 1.5.3 and Task Unit 1.5.6) involved preparation for an operation never before attempted. While four-engined drones had been taken off and landed entirely by remote control during training at CLOVIS, and ENIWETOK, in each instance a safety pilot for emergencies was carried in the airplane. Thus, prior to 1 July 1946, no Army four-engined drone aircraft had ever been taken off and landed by remote control without a safety pilot aboard. This was not due to lack of confidence but because it was desirable to take no chance with these aircraft which had been specially modified for the Atom Bomb Tests.

Eight practice missions were flown by the drones and control aircraft over the BIKINI AREA between 14 May and 24 June. Included in the missions in addition to the six dress rehearsals for all units of Task Group 1.5 was a special mission for drone and control aircraft only on 14 May, and an abortive rehearsal of the Army Air Group on 27 May which was cancelled after the four drones and five control aircraft were already on station over BIKINI LAGOON. Including the almost daily practice flights for the ground and airborne drone operators, a total of 610:50 hours of training flying was completed.

(a) Air Training

The objective of the drone air training overseas was to perfect ground and airborne radio-control operators in the techniques of taking off, flying, and landing drone aircraft by remote control. Emphasis was placed particularly upon coordination between the operators who controlled the take-offs and landings from two control jeeps stationed just off the runways, and the airborne operator in the drone control or mother aircraft who assumed control as soon as the drone was airborne, guided it in flight, and returned it to the ground operators for landing.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC CLEARANCE NOT REQUIRED
SAFEGUARDS

During the period of training on ENIWETOK, the ground drone operators completed successfully 124 take-offs and 140 landings, and the airborne drone operators carried out 89 successful training flights for a total of 273:20 hours for control aircraft. The complete summary of training flights at ENIWETOK through 30 June is as follows:

GROUND DRONE OPERATORS

	TAKE-OFFS			LANDINGS		
Operator	Total	Cmpltd	% Cmpltd	Total	Cmpltd	% Cmpltd
No. 1	4	3	75.00	4	3	75.00
No. 2	64	57	89.00	86	69	80.23
No. 3	72	64	88.89	86	68	79.07
TOTALS	140	124	88.57	176	140	79.55

AIRBORNE DRONE OPERATORS

	TRAINING FLIGHTS			FLIGHT TIME	
Operator	Total	Cmpltd	% Cmpltd	Total	Average
No. 1	22	14	63.64	49:45	2:16
No. 2	9	9	100.00	28:55	3:10
No. 3	23	22	95.65	57:10	2:28
No. 4	16	14	87.50	51:15	3:12
No. 5	12	11	91.67	26:55	2:42
No. 6	17	14	82.35	45:55	2:42
No. 7	5	5	100.00	13:45	2:45
TOTALS	104	89	85.57	273.20	2:36

Rehearsals

The training program was built around the dress rehearsals during which the unit carried through its ABLE Day Air Plan of operating four drone B-17s and five drone control B-17s over BIKINI. On seven occasions four drone B-17s were taken off remotely by operators in a pair of control jeeps, taken over by control aircraft, and guided to their respective altitudes on station over BIKINI LAGOON, and then controlled through two ABLE Day flight patterns, released on auto-pilot over the Target Array, intercepted, guided back to ENIWETOK, returned to the control of the ground units, landed, and brought to a full stop all without the safety pilot aboard assuming manual control on any one of the four drones with the following exceptions:

20 May Rehearsal

No exceptions

27 May Rehearsal (mission cancelled after drones on ABLE Day stations)

Drone FOX was taken over by safety pilot eight seconds after wheels left runway when the aircraft swerved and would have crashed without manual correction.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AEC ACT - 1946
SPECIFIC REVIEW AND CLEARANCE BY DOE REQUIRED
RESTRICTED - SUBJECT TO CRIMINAL SANCTIONS

30 May Rehearsal

Drone GEORGE at 30,000 feet was affected by a spurious or stray signal which caused it to go into a steep climb. The safety pilot took over manually until remote control could be regained by control aircraft GEORGE.

6 June Rehearsal

Drone FOX 40 minutes after take-off suffered a broken antenna lead as a result of corrosion. Radio-control was completely broken and had not the safety pilot returned the drone manually to base, it would have been lost.

10 June Rehearsal

Drone GEORGE was controlled manually in landing by the safety pilot to prevent it from leaving the runway.

20 June Rehearsal

No exceptions to the completion of the mission by remote control. However, over the Target Array the loss of Drone HOW was simulated by control aircraft HOW, and the Master Control B-17 controlled the drone for the remainder of the mission.

24 June - QUEEN Day Rehearsal

Drone GEORGE aborted 40 minutes after the take-off because of the malfunctioning of the inlet valve of the air bag in the bomb bay, causing air to enter the empty bag, and upon ascending to the lower pressures at high altitude the bag began to expand, and would have burst if the ascent to the assigned mission altitude had been continued. Consequently, the safety pilot called control aircraft GEORGE to return. The landing was poor, and the safety pilot completed it manually.

(b) Ground Training

Ground training for air and ground crews consisted in instructions in the use of the special drone and drone control equipment. In addition to instruction by technicians of the Radio-Control Section who had been furnished the unit by WRIGHT FIELD, other specialists on temporary duty gave special training in electronics, installation of air-bags and air-filters, aerial cameras, and in the use of Geiger counters and other devices for detecting radioactivity.

72147U41 46 —36

VII RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED — CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(3) Problems Encountered

The various training missions and rehearsals revealed the need for changes in plans and procedures. Among the problems encountered in training overseas were the following:

(a) Practice Bomb Runs

During training at ROSWELL it became obvious that three practice bomb runs not only caused excessive engine trouble but increased the possibility of an abortive mission. The number of bomb runs was not reduced in the STATES however, because it was feared that poor visibility in the Target Area would require multiple runs to pre-set bombing data. Actual experience in dress rehearsals proved the concern to be unwarranted, and the operation plan was changed to provide for only one practice run.

(b) Breakaway of BAKER Flight F-13

The plan to have an F-13 follow the Bomb Carrying Aircraft throughout its flight and through the breakaway proved to be both hazardous and impractical. The danger of collision in the breakaway led to modify the Air Plan to provide that the F-13 would turn to the right in the breakaway while the Bomb Carrying Aircraft turned to the left.

(c) Breakaway or Blast Gauge Aircraft

When the Blast Gauge Aircraft were operating at 27,000 feet and losing 1,000 feet in the breakaway, they flew out through the orbit of the F-13 aircraft at 26,000 feet. Although the probability of collision was remote, the hazard was present, hence the loss of altitude in the breakaway was limited to 500 feet.

(d) Distance of Photo Aircraft from Target

The character of the weather in the Target Area made visibility a major problem, since cloud and haze might be found at different times and at all levels. Thus, in spite of the desire to maintain the F-13 and C-54 photo aircraft at the safer distance of 15 NM slant range, they were moved to 12 NM slant range in order to assure better scale and definition in the photography. This decision was fully vindicated in the operation during Test ABLE.

(e) Orbit of Flight ABLE Photo Aircraft

To take advantage of the best visibility possible at the best time and altitude, a more flexible plan was provided for the photo aircraft. All F-13 aircraft available, except the one

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AT
RESTRICTED IC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

following the Bomb Carrying Aircraft, were placed on a common orbit with equal spacing. This assured photographic coverage from all directions and minimized the danger of cloud interference. Provision was also made for an alternate altitude for the F-13s if reconnaissance of the weather by the Command Aircraft indicated that a change was desirable.

(f) Broadcast by Bomb Carrying Aircraft

Timing and spacing became acute problems with the participation of all air units in coordinated missions. In order for the drone control aircraft and C-54 Photo Aircraft to be at exact positions at detonation, the time warnings broadcast by the Bomb Carrying Aircraft had to be very accurate. In the case of the drone, the degree of accuracy necessary was attained by changing the voice commentary procedure to give the exact time warnings required. In that of the C-54 Photo Aircraft, an attempt to evolve an exact time distance problem over open water on DR from a time warning signal was not satisfactory, and the pattern was changed to a simple circular orbit.

(g) Visibility

As a result of clouds blowing across the Target Area, a system was devised whereby the bomb run could be made at the time of best visibility. The plan established was for surface observers to calculate visibility prospects, and for the Force Fighter Director to hold the Bomb Carrying Aircraft off Point BAKER until the most opportune time for the bomb run.

(h) Target Aids to Identification

Lights, radar, and special paint were used on the target ship, the NEVADA, in order to insure the bombardier a sighting run of maximum length. With the sun to the bombardier's back, the original red color of the target made it clearly distinguishable, but with the sun to the side or front as normally encountered on the bomb run, the color made little difference in the ship's visibility. Test spots of white and yellow Paint, however, proved to be of value, and additional white paint was applied to the turrets of the target vessel. Elevated and trained lights also proved of value in distinguishing the target vessel at greater distances.

RESTRICTED DATA
ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(1) Tokyo Tanks for Drones

The flight duration of the B-17 drones created a problem when a more flexible time schedule was established for the Bomb Carrying Aircraft, since their flight time limited the possible variation in dropping time to approximately 40 minutes. The use of Tokyo Tanks extended the time considerably, but it created a new problem of variable trim in the drones. This was overcome by placing ballast in the tail to bring the center of gravity back to approximately the location of the gas tanks.

c. Task Group 1.6

Since training was continued enroute to the MARSHALL ISLANDS from the decks of the two aircraft carriers which transported all Navy air units overseas, excepting the patrol and air-sea rescue units which had been assembled on EBEYE ISLAND, movement from the Zone of the Interior caused no material interruption in the training of Task Group 1.6. The SAIPOR bearing the Photographic Carrier Unit (TU 1.6.2) departed SAN DIEGO on 7 May and arrived at its assigned station in BIKINI LAGOON on 23 May, and the SHANGRI-LA bearing the Drone Carrier Unit (TU 1.6.1) departed SAN DIEGO on 21 May and took up its position off ROI ISLAND in KWAJALEIN LAGOON

on 5 June. Although practice missions were flown almost daily by the Navy air units from the date of arrival in the MARSHALL ISLANDS until ABLE Day, almost all basic training had been completed in the UNITED STATES or enroute, and subsequent training activities centered about perfecting the execution of the ABLE Day air plan through participation in the three coordinated full dress air rehearsals on 10 and 20 June, and QUEEN Day on 24 June. This final training was carried on from the two aircraft carriers and the bases on ROI and EBEYE ISLANDS.

(1) Drone Training in the SHANGRI-LA and on ROI ISLAND - TU 1.6.1

Personnel and equipment of the Drone Carrier Unit (TU 1.6.14) the Drone Boat Control Unit (TU 1.6.15) and the Field Recovery Unit (TU 1.6.13) were transported overseas on the SHANGRI-LA. Because of the heavy freight load to PEARL HARBOR, no flight training was undertaken prior to departure from HAWAII after which an extensive program of take-off and recoveries was initiated. Before arrival at ROI on 5 June, 62 F6F and 22 TBM launchings and recoveries had been completed. Training was also given enroute in navigation, homing, fighter direction, general communications, and the ABLE Day Air Operation Plan.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA

On 10 June the 4 TBMs of the Drone Boat Control Unit (TU 1.6.15) were transferred to the SAIDOR, leaving only the Drone Carrier Unit (TU 1.6.14) aboard the SHANGRI-LA inasmuch as the Field Recovery Unit (TU 1.6.13) was set-up on ROI ISLAND.

Drone training overseas for Test ABLE was organized around participation in the three coordinated air rehearsals on 10, 20 and 24 June when all Army and Navy aircraft carried out the ABLE Day Air Operation Plan. For each of these joint rehearsals, 4 Drone F6Fs, 16 Control F6Fs, and 2 Air-Sea Rescue TBMs were launched from the SHANGRI-LA from its position near Point TARE 40 NM from the center of BIKINI ISLAND. The prescribed procedure for the execution of the carrier drone phase of the operation plan which was undertaken for each of the three rehearsals was as follows:

(a) Four Primary Drone Control Flights (RED, WHITE, BLUE, YELLOW) of 2 F6Fs each were launched and rendezvoused over the SHANGRI-LA to await the launching of 4 F6F Drones (RED, WHITE, BLUE, YELLOW).

(b) As each of the 4 F6F Drones was launched (each carrying a safety pilot), the correspondingly colored flight of the Primary Drone Control Aircraft assumed control of the drone and conducted it to its ABLE Day station over BIKINI LAGOON.

(c) Four Secondary Drone Control Flights (RED, WHITE, BLUE, YELLOW) of 2 F6Fs each took off next and proceeded to their stations opposite the point where it was expected that the drones would be directed into the atomic cloud on ABLE Day by the correspondingly colored Primary Drone Control aircraft.

(d) Each of the Secondary Drone Control Flights then undertook to assume control of its drone after passage through the area of the expected cloud column and to control it approximately 175 NM to ROI ISLAND where the landing was effected by the Field Recovery Unit.

(e) The Primary Control Aircraft returned to the carrier, while the Secondary Control Aircraft landed on ROI ISLAND.

The drone unit was not successful in carrying out all the details of the plan for the first two rehearsals, but the QUEEN Day rehearsal was accomplished almost perfectly. The material improvement produced during the training period is indicated in the following summarization of the results of the three rehearsals:

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

June 10 Air Rehearsal -

RED Drone developed elevator trouble soon after launching, and safety pilot returned it to ROI

WHITE Drone developed engine trouble soon after launching, and the WHITE Group was forced to return to ROI without completing its mission.

BLUE Drone could not be located by the BLUE Secondary Control Flight after the rehearsal, but after the safety pilot radioed its position, the drone was taken under control to ROI. On arrival, however, the Field Unit was unable to gain control and the safety pilot effected the landing.

YELLOW Drone completed the rehearsal, but control was lost by the YELLOW Secondary Control Flight before arrival at ROI, necessitating that the safety pilot make the landing.

June 20 Air Rehearsal -

WHITE, BLUE, YELLOW Drones completed the rehearsal according to plan, and landed under control at ROI.

RED Drone developed aileron trouble shortly after launching, and the safety pilot assumed control and completed the mission manually.

June 24 Air Rehearsal - QUEEN Day

All four drones completed the rehearsal and landed under control at ROI.

Three of the drones carried safety pilots, while the YELLOW Drone was a NOLO. This was the fourth drone to be launched and recovered without damage by the drone unit since the inception of the training program, but it was the only NOLO flight made overseas prior to Test ABLE.

During the period from arrival off ROI ISLAND to ABLE Day there was a total of 139 take-offs from the SHANGRI-LA, including 110 catapults, and 87 aircraft were recovered on the deck.

(2) Photographic Training in the SAIDOR TU 1.6.2

Personnel and equipment of the F6F Photo Unit (TU 1.6.23), the TBM Photo Unit (TU 1.6.24), and the Helicopter Unit (TU 1.6.25) were transported overseas in the SAIDOR. The Drone Boat Control Unit (TU 1.6.15) also joined the carrier on 10 June at BIKINI.

Enroute from SAN DIEGO to PEARL HARBOR between 7-13 May the personnel of the Photographic Units were instructed in the ABLE Day photographic assignments. On the trip from HAWAII to BIKINI, 16 to 24 May, extensive flight training was undertaken, as follows:

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

17 May - 10 photo aircraft made a combination navigation and radar calibration flight.

18 May - 12 photo aircraft simulated the ABLE Day photographic mission in a flight over JOHNSTON ISLAND.

19-21 May- A total of 20 photo aircraft made practice navigational radar calibration, and fighter direction flights.

22 May - 10 photo aircraft simulated the ABLE Day photographic mission in a flight over WOTJE ISLAND.

23 May - 10 photo aircraft simulated the ABLE Day photographic mission over BIKINI LAGOON.

After arrival at BIKINI the training of the two Photographic Carrier Units (TU 1.6.23 and 1.6.24) consisted primarily of preparation for the execution of the three air rehearsals on 10, 20, and 24 June in which all phases of the ABLE Day mission were carried out as directed. In addition, the photographic units completed various extraneous assignments for photographic coverage prior to Test ABLE.

The Helicopter Unit (TU 1.6.25) had also continued its training enroute to BIKINI in the SAIDOR, completing numerous test hops, and photographic missions. At BIKINI the Helicopters

were utilized in observations of the Target Array and in inspections of target installations. Considerable difficulty was experienced in the operation of the Helicopters, one being damaged beyond repair in a test landing on ENYU ISLAND on 30 May, and another was salvaged following a forced landing in BIKINI LAGOON on 3 June.

The Drone Boat Control Unit (TU 1.6.15) which was transferred to the SAIDOR from the SHANGRI-LA on 10 June, had continued its training enroute to BIKINI. The Unit's overseas training consisted primarily of carrying out its ABLE Day assignments in the three dress rehearsals. Originally intended to control directly the drone boats of Task Unit 1.1.3, this function had been assigned to the BEGOR (APD-127), altering the mission of the TBMs to that of conning by voice radio the speed and course of the drone boats. In the early practice mission in the BIKINI AREA the drone boats were released prematurely from their moorings, and to guard against the possibility that the releasing signals had originated in deck-testing or adjustment of the ARW-3 transmitters in the Drone Boat Control TBMs, all transmitters were removed from the aircraft.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] PERMIT REQUIRED
RESTRICTED USE MILITARY CLASSIFICATION SATISFACTORY

(3) Seaplane Training at EBEYE NAVAL AIR BASE - TU 1.6.3

Training for the Seaplane Unit (TU 1.6.3) was carried on at the EBEYE NAVAL AIR BASE (TU 1.6.31) for the aircrews of the Patrol Seaplane Squadron (TU 1.6.32) and the Air-Sea Rescue Squadron (TU 1.6.33). Both of these PBM equipped units had been organized in the area in mid-March 1946.

(a) Patrol Seaplane Squadron - TU 1.6.32

Since the Seaplane Squadron was actively engaged in flight operations, its training for Test ABLE was limited almost exclusively to preparation for and participation in the three dress rehearsals. In addition to numerous special flights, the unit was responsible for a minimum of one daily flight from EBEYE to BIKINI and return. Inclusive of the three rehearsals, the 9 PBMs of the unit flew 1,139.8 hours during the period from 16 March to 30 June, transporting 1,521 passengers, 184,104 pounds of mail, and 73,469 pounds of freight.

(b) Air-Sea Rescue Squadron - TU 1.6.33

The Air-Sea Rescue Squadron was likewise actively engaged in flight operations, and its training for Test ABLE was thus also almost exclusively limited to its participation in the dress rehearsals. The unit was directed to maintain one PBM on the water in each area, EBEYE and BIKINI for air-sea rescue missions from 2 hours after sunrise to 2 hours before sunset. The unit engaged in a search for an ATC C-54 and a Task Group 1.5 B-17 DUMBO from 29 May to 5 June, and again on 9 June engaged in a search mission for the missing B-17. The unit also assisted the Patrol Seaplane Unit with overflow CROSSROADS passenger and freight transportation. A total of 714.3 hours was flown by the 6 PBMs of the unit between 11 March and 30 June.

(4) Miscellaneous Training of Task Group 1.6

In addition to the training by the staff and air units of Task Group 1.6, surface units which trained personnel to carry out the ABLE Day mission of the Navy air units included the following:

TU 1.6.11 - USS SHANGRI-LA (CV-38)
TU 1.6.12 - Two Drone Carrier Guard Destroyers.
TU 1.6.21 - USS SAIDOR (CVE-117)
TU 1.6.22 - Two Photographic Plane Guard Destroyers.
TU 1.6.31 - EBEYE NAVAL AIR BASE.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION CATEGORIES

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED - ATOMIC ENERGY ACT - 1946 - EXCISE REQUIRED
USE MILITARY CLASSIFICATION CATEGORIES

TU 1.6.41 - USS ORCA (AVP-49) Stationed in BIKINI LAGOON as terminal for BIKINI-EBEYE seaplane shuttle service.

C. Movement to the Target

Transporting the various elements of the Army and Navy air groups to the Target Area overseas commenced on 1 March with the departure of a small advance echelon of Task Group 1.5 for KWAJALEIN. On 2 June when the MT MCKINLEY, the Task Force Flagship bearing the staff of the Deputy Commander for Aviation, anchored at her station in BIKINI LAGOON all air units were in place.

1. Movement of the Air Staff

The majority of the staff of the Deputy Commander for Aviation departed from WASHINGTON, D. C., by special train on 30 April for SAN FRANCISCO to board the MT MCKINLEY (AGC-7), the flagship of the Commander Joint Task Force ONE, to which the Air Staff was assigned for the overseas phase of Operation CROSSROADS. The itinerary of the flagship to the Target Area was as follows: 8 May departed SAN FRANCISCO; 14 May arrived and 22 May departed PEARL HARBOR; 29 May arrived and 1 June departed KWAJALEIN; 2 June took up her duty station in BIKINI LAGOON.

2. Movement of Army Air Group - Task Group 1.5

The overseas movement of Task Group 1.5 commenced on 1 March and continued through 6 May when all essential elements were in place on KWAJALEIN and ENIWETOK islands.

Air movement was initiated by both the Air Transport Unit (TU 1.5.4) and the Air Transport Command on 1 March with flights carrying both personnel and equipment to KWAJALEIN. Water movement began on 11 March when four APAs of the Transport Group (Task Group 1.3) sailed from SAN FRANCISCO. To facilitate overseas movement, Operation CROSSROADS Liaison Offices were established at HAMILTON FIELD, FAIRFIELD-SUISUN, SAN FRANCISCO POE, HICKAM FIELD, and JOHNSTON ISLAND.

a. Headquarters, Task Group 1.5

Following a preliminary survey in February of facilities at HAMILTON FIELD, HICKAM FIELD, JOHN RODGERS FIELD, and JOHNSTON ISLAND through which aircraft would be routed to the Target Area, and the facilities available on KWAJALEIN and ENIWETOK islands where the units would be based, an advance echelon headquarters for Task Group 1.5 was established on KWAJALEIN ISLAND on 2 March. While a few individuals and most of the headquarters equipment were transported in the intervening weeks, the greater part of the headquarters personnel was moved from ROSWELL ARMY AIR FIELD to KWAJALEIN between 22 April and 6 May in tactical and transport aircraft of Task Unit 1.5.1 and Task Unit 1.5.4. The advance echelon headquarters was closed at 2400 on 6 May, and Task Group 1.5 Headquarters was opened on KWAJALEIN at 0001, 7 May. A rear echelon headquarters for Task Group 1.5 was continued at ROSWELL ARMY AIR FIELD throughout the period of the tests.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

721470 O—46——27

b. Units at KWAJALEIN

In addition to group headquarters, all units of Task Group 1.5 were stationed on KWAJALEIN ISLAND with the exception of the Instrumentation and Drone Units (Task Unit 1.5.3 and Task Unit 1.5.6). Following the arrival of the first shipments by air in early March, four APAs, the GEORGE CLYMER, ROCKWALL, ROCKBRIDGE, and ROCKINGHAM, arrived from SAN FRANCISCO on 24 March with personnel, unit equipment and supplies. Almost all the personnel and equipment of the Air Service Unit (TU 1.5.5) was included in the shipment. Supplementary movements by air and water continued throughout the remainder of March and April. Aircrews and equipment of the Tactical Operations Unit (TU 1.5.1) and the Photographic Unit (TU 1.5.2) departed in organizational aircraft from ROSWELL ARMY AIR FIELD on 21 April and by 6 May all had arrived at KWAJALEIN. The air echelon of the Weather Unit departed from CASTLE FIELD, MERCED, CALIFORNIA, on 15 April and arrived at KWAJALEIN on 21 April. The normal routing for the B-29s and F-13s was HAMILTON FIELD, JOHN RODGERS FIELD, and KWAJALEIN.

c. Units at ENIWETOK

The Air Instrumentation and Test Requirements Unit (TU 1.5.3) was stationed at ENIWETOK where an air echelon established an advance headquarters on 12 March. The water

echelon arrived on the ROCKINGHAM from SAN FRANCISCO via KWAJALEIN on 26 March. The air echelon left CLOVIS ARMY AIR BASE on 19, 20, 22 and 23 April via HAMILTON FIELD, HICKAM FIELD, JOHNSTON ISLAND, and direct to ENIWETOK ISLAND. All personnel and equipment were in place by 6 May.

3. Movement of Navy Air Group - Task Group 1.6

The primary elements of Task Group 1.6 were moved to the Target Area overseas as follows:

a. USS SHANGRI-LA off ROI ISLAND

On 21 May the Commander of Task Group 1.6 in the SHANGRI-LA and remaining units of the Drone Carrier Unit (TU 1.6.1) departed from SAN DIEGO. The Group flagship arrived in her assigned operating area on 5 June.

b. USS SAIDOR in BIKINI LAGOON

The SAIDOR, bearing the Photographic F6Fs and TBMs, the Helicopters and other unit equipment, and the Guard Destroyers of the Photographic Carrier Unit (TU 1.6.2) departed from SAN DIEGO on 7 May and arrived at BIKINI LAGOON on 24 May.

c. EBEYE ISLAND

Aircraft of the Seaplane Unit (TU 1.6.3) departed SAIPAN between 10 and 21 March, arriving at EBEYE ISLAND between 11 and 22 March. The Unit Commander reported for duty to the Commander Task Group 1.6, on 20 March.

VII RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AT 42[illegible]
[illegible] ACT REQUIRED
[illegible] APPLICABLE CLASSIFICATION GUIDES

d. USS ORCA in BIKINI LAGOON

The Seaplane Tender Unit (TU 1.4) took up its station in BIKINI LAGOON on 7 May with the arrival of the ORCA (AVP-49) from SAIPAN.

D. CONDUCT OF TEST ABLE.

1. Introduction: Command Echelon.

a. Decision to Execute Test ABLE on 1 July

Following the weather briefing held aboard the MT MCKINLEY at 0330 on 30 June the Commander, Joint Task Force ONE, decided that the atomic bomb would be dropped the next morning. Thereupon the following order was sent to Task Group 1.5 and Task Group 1.6: "One July is ABLE Day. Execute Air Op Order Number One Dash Forty Six. XRAY Hour is zero six forty nine love. HOW Hour is zero eight thirty."

b. Final Confirmation of Decision

The Aerological Section had predicted in the morning of 30 June favorable weather for the following day undisturbed by the low pressure system in the vicinity of GUAM. It was estimated that there would not be more than two to three tenths cloudiness over the BIKINI AREA at HOW Hour. The prediction was carefully checked throughout the day. The Weather Reconnaissance Unit made many soundings in the BIKINI locality and at more distant critical points. An increasing moisture was found over the BIKINI AREA at levels below 5,000 feet and this was expected to result in considerable nocturnal cloudiness. But since there were no other important changes in the prevailing conditions, the weather conference held in the MT MCKINLEY at 2200 confirmed the earlier prediction. The Commander, Joint Task Force ONE, then made firm his decision to hold Test ABLE on 1 July and a dispatch to that effect was sent to all concerned.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

c. Postponement of HOW Hour from 0830 to 0900

During the night of 30 June - 1 July the nocturnal cloudiness became heavier than had been anticipated but the observations made by the Weather Reconnaissance aircraft between 0100 and 0500 in the BIKINI AREA supported the belief that the clouds would be dissipated in the early forenoon. The final weather briefing was held at 0500 and no change in plans was recommended. But in order to guarantee that the bomb could be dropped on the first live run it was decided by the Deputy Commander for Aviation, in conference with the Commander, Joint Task Force ONE, at 0538, to postpone HOW Hour from 0830 to 0900. In addition to the 30 minutes gained for the further dissipation of clouds, the postponement made it possible for the Command Aircraft, already on station above BIKINI, to make a last minute reconnaissance upwind for the distance clouds might be expected to travel in three hours. At 0625 the Command Aircraft sent word that the weather definitely would be satisfactory for the first live run. At 0830 the total cloudiness over the Target Area was two to three tenths, as predicted 24 hours earlier; at 0900 the cloudiness had decreased and was only one to two tenths.

d. Effect of Postponement of HOW Hour

When it was agreed to postpone HOW Hour to 0900 it was specified that aircraft should take off as scheduled. Notification of the change in HOW Hour was sent from the MT MCKINLEY at 0547 and was understood by all aircraft by 0600. The postponement automatically moved XRAY Hour from 0649 to 0719. Upon receipt of the dispatch air crews immediately altered plans in order to accomplish the mission on the new schedule. No confusion resulted. The aircraft reported themselves on station at the hour originally planned and merely orbited for an additional 30 minutes.

e. Evacuation of BIKINI LAGOON

When the decision was made to fix ABLE Day on 1 July, the Deputy Task Force Commander for Aviation and the Air Staff were aboard the MT MCKINLEY, which was still in BIKINI LAGOON along with many other ships waiting to be evacuated before the bomb could be dropped. By sunset on 30 June most of the ships had reached the open seas, and the evacuation was resumed early in the morning of ABLE Day. The MT MCKINLEY was the last to leave and cleared the ENYU entrance to the lagoon at 0630. The target was ready for bombing. Upon reaching the sea the MT MCKINLEY proceeded to a position in the vicinity of Point WILLYS, located at the intersection of the SECTOR AXIS with the circumference of the eight mile circle drawn around point AUTO. Point AUTO was the center of BIKINI ISLAND.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

The SECTOR AXIS was a line drawn from Point AUTO into the wind direction averaged for all winds below 20,000 feet. This placed the MT MCKINLEY 11.7 MI from the center of the Target Array and slightly to the northeast. From there the Air Staff observed operations.

f. All-Clear Signal

With ABLE Day set for 1 July, the lagoon certain to be completely evacuated in sufficient time, and HOW Hour set at 0900, permission was given at 0542 for the Bomb Carrying Aircraft, waiting at KWAJALEIN, to take off. It had been held on the ground to make sure weather would not necessitate a postponement of the drop and thus require landing the plane still loaded with the atomic bomb. Thus ABLE Day air operations officially got underway, although several Army and Navy aircraft had already taken off early in the morning with the understanding that the test would be held.

g. Summary of Air Operation Plan

For the air operations of ABLE Day to be fully appreciated, the Air Operation Plan should be understood first, as a military and scientific experiment and second, as a tactical operation involving the employment of 85 aircraft in a relatively tight and intricate geometric formation.

The extent to which the operation was a military and scientific experiment is indicated by the missions assigned the 85 aircraft as shown in the following table:

PRIMARY MISSION	NUMBER OF AIRCRAFT ARMY	NAVY	TOTAL
Command	1	0	1
Bomb Carrying	1	0	1
Drones	4	4	8
Drone Control	5	16	21
Drone Boat Control	0	4	4
Day Photography	10	11	21
Night Photography	1	0	1
Radiological Survey	4	2	6
Pressure Gauge Dropping	2	0	2
Radiometry	0	1	1
Precipitron Sampling	2	0	2
Oceanography	0	2	2
Air-Sea Rescue	3	5	8
Weather Reconnaissance	3	0	3
Orientation	4	0	4
TOTAL	40	45	85

Although 85 aircraft were airborne at sometime during ABLE Day and participated in the Air Plan only 58 of them (29 Army and 29 Navy) were scheduled to play a part in the somewhat close pattern to be woven above BIKINI ATOLL and its vicinity just prior to and immediately after HOUR Hour. Of the 40 Army aircraft involved in ABLE Day sorties three weather reconnaissance and three air-sea rescue aircraft were in flight at HOUR Hour far from BIKINI and five other aircraft were not to be airborne until late in the day. Of the 45 Navy aircraft five F6F photographic

VII-36 RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION GUIDANCE

planes were intended to complete their mission and return to the carrier sometime before H-0 Hour; five air-sea rescue aircraft were on stations outside the circle of operations in the vicinity of the Target Array; and six aircraft were not to be airborne until after the detonation.

In brief the air pattern designed above the Target Array, or nearby, had as its center the vertical projection of the Aiming Point or Target Center carried to an altitude of 30,000 feet. Around this perpendicular line were circumscribed six circles for 15 Army aircraft orbiting the Target Center. The first and highest circle had a radius, slant range, of 7 NM and an altitude of 28,000 feet. The next two circles had identical radii, slant range of 12 NM but altitudes of 26,000 feet and 12,500 feet. The last three circles all had identical radii, horizontal range of 20 NM but altitudes of 7,500 feet, 7,000 feet, and 4,000 feet. Still taking the Aiming Point as a center there were established upon its true bearings 15 fixed geographical points which in their vertical projections at various altitudes between 2,000 feet and 30,000 feet, became Orbit Points for 11 Army and 36 Navy aircraft. Beginning with bearing 015°(T) and continuing clockwise these Orbit Points, their bearing and distance from the Target Center, were as follows:

ORBIT POINT	BEARING FROM TARGET CENTER	DISTANCE FROM TARGET CENTER
015°(T)	015°(T)	15 NM
YOKE	030°(T)	20 NM
UNCLE	045°(T)	30 NM
ABLE	045°(T)	20 NM
DOG	082°(T)	15 NM
EASY	090°(T)	20 NM
KING	132°(T)	15 NM
TARE	135°(T)	40 NM
SUGAR	135°(T)	20 NM
CHARLIE	169°(T)	15 NM
BAKER	225°(T)	50 NM
INITIAL POINT	225°(T)	35 NM
WILLIAM	270°(T)	30 NM
LOVE	315°(T)	30 NM
VICTOR	315°(T)	20 NM

In order to have complete knowledge and control of the air situation as it developed it was decided to have ABLE Day operations observed and checked by a Command Aircraft, flying within the pattern but without a fixed flight. This aircraft carried the two Assistant Deputy Task Force Commanders for Aviation who, while in flight, were designated Airborne Commander and Deputy Airborne Commander, respectively. They were charged with the responsibility of keeping the Deputy Task Force Commander informed, through direct voice transmission, of the execution of the Air Plan as it progressed momentarily. The Command Aircraft was also given authority to alter the altitude of aircraft in flight if required by changing conditions. If changes ordered were not acknowledged due to radio difficulties it was provided to have them

ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION ONLY

routed through CIC and CIC listened in and noted all other changes authorized by the command Aircraft. In either case plotters were enabled to keep accurate data on the position of the various aircraft. As a secondary mission it was decided to charge the Command Aircraft with the additional responsibility of making short run weather reconnaissance flights when so directed by the Deputy Task Force Commander for Aviation. It was realized that the Command Aircraft would need considerable latitude in its flight properly to fulfill its mission. The only specific requirements of the Command Aircraft were to remain at least 20 NM from the Target Center at the moment of detonation and to maintain an altitude of not more than 28,000 feet.

h. Radiological Safety for Aircraft

After long discussions with the Radiological Safety Section a scheme had been devised whereby the air space likely to be contaminated by the atomic cloud was recognized as the Radiological Danger SECTOR. At first it was assumed that the wind would blow from the same direction at all altitudes. But it was found that wind shears in the BIKINI area would cause the atomic cloud to break into segments at several altitudes and

would spread over a much wider area than a quadrant. This area was called RADEX and all aircraft were forbidden to fly in the danger sector after the first six minutes following detonation. It was then agreed however that between MIKE Hour plus 6 minutes and MIKE Hour plus 18 minutes aircraft might operate within the RADEX angle if they kept beyond the red arc. And between MIKE Hour plus 18 minutes and MIKE Hour plus 30 minutes aircraft could continue to operate within the danger sector if flying outside the blue arc. The RADEX area would have to be determined by the wind shears as existing on ABLE Day and the red and blue arcs would have their radii determined by the velocities of the wind.

As a radiological safety measure no Army or Navy aircraft not directly participating in Operation CROSSROADS was permitted to fly within a radius of 500 NM of BIKINI between 25 June and ABLE Day.

In drawing up the Air Plan, three principles were kept constantly in mind. First, to keep safe distances between all levels of flight. Second, to keep the quadrant between bearings 090° (T) and 180° (T) as free as possible of Army aircraft, for this was the general area from which all Navy drone planes were to be sent off and in which they were to be recovered. And third, to have all aircraft, with a single exception, orbit counter clockwise so pilots might have an unhampered view of the area being circled.

VII-E-34 RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE FOR [redacted]
USE MILITARY CLASSIFICATION SAFEGUARDS

2. Participation in ABLE Day Operations by Army Air Forces.

a. AAF Preparations on 30 June for ABLE Day

When the Commander, Task Group 1.5, received the dispatch sent at 0917 on 30 June naming 1 July ABLE Day, immediate action was taken to place all units of the Task Group in readiness for their missions of the following day. Field Orders were issued with such Annexes as would enable subordinate units to carry out their assigned parts. At 1200 two C-54 aircraft departed for ROI and ENIWETOK preparatory to returning on ABLE Day with air samples delivered by Army and Navy Drones. Also at 1200 five C-54 aircraft, whose crews had been briefed at 1000, took off at 30 seconds intervals for ENIWETOK to serve as an emergency evacuation unit should the island be threatened by dangerous radioactivity. At 1250 the Command, Task Group 1.5, proposed 045° as AXIS OF ATTACK and this decision remained firm. During the afternoon and night of 30 June the aircraft were given an exacting inspection, and installation was made of special equipment. A cage of white mice was put aboard two drones, HOW and LOVE, and 25 bacteria smears were placed on the surface of the four drones. All camera equipment on drones and

mothers at ENIWETOK as well as on the regular F-13s and C-54 Photographic Aircraft at KWAJALEIN, was serviced, loaded and set by 2400. Careful attention was devoted to DAVE'S DREAM, the Bomb Carrier. Equipment inspection of this aircraft was precise in every detail and bombing instruments were completely checked by trained specialists. All equipment was reported to be in perfect condition. At late hours, last minute briefings were given and instructions issued. By midnight all aircraft, special instruments, and personnel of Task Group 1.5 were virtually in readiness for take-off time, and the Bomb Carrying Aircraft remained under constant guard until it was airborne.

b. Take-Off and Missions of Weather Reconnaissance Aircraft on ABLE Day

The first aircraft to leave KWAJALEIN on ABLE Day was B-29 No. 796 of the Weather Reconnaissance Unit. It took off at 0130, reached BIKINI at an altitude of 1,500 feet and remained over the area for three hours making vertical ascent to 30,000 feet. It made many soundings and constantly advised the MT MCKINLEY of weather conditions. At 0600 this aircraft departed for the east, making normal weather reconnaissance. The second to leave was Weather Reconnaissance Aircraft No. 128 which took-off at 0215. It flew on a 10 hour mission to the north and east getting meteorological information in case there should be a late cancelling of the drop and consequent need for another forecast.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Enroute the aircraft flew to BIKINI and also advised the flagship of weather conditions. The third aircraft to leave KWAJALEIN was Weather Reconnaissance Aircraft No. 891 which took-off at 0315 and went north and west of BIKINI making normal observations. These three aircraft returned to KWAJALEIN between 1015 and 1345.

c. Take-Off from Base and Arrival on Stations of Other AAF Aircraft

(1) One Command Aircraft (arrived on station 0527)

At 0423 the B-29 Command Aircraft (TU 1.5.11 for 3rd and 4th echelon maintenance only) left KWAJALEIN to assume its station in the vicinity of BIKINI ATOLL. The aircraft reached Orbit Point TARE and entered the operational area with an altitude of 23,000 feet. Thence it proceeded to the target and reported itself ready for duty at 0527.

(2) Four Orientation Aircraft (arrived on stations 0650 - 0709)

The Orientation Aircraft included the Radio Broadcast B-29 (TU 1.5.81), the Press Photography B-29 (TU 1.5.82), and the two C-54s used by official observers (TU 1.5.83). The Radio Broadcast Aircraft took-off at KWAJALEIN at 0537 and arrived at Orbit Point EASY at 0650, at an altitude of 7,000 feet. At the

same time, 0650, the Press Photography Aircraft which left KWAJALEIN at 0539 also arrived at Orbit Point EASY but with an altitude of 4,000 feet. The aircraft requested and received clearance to change altitude temporarily to 6,500 feet to avoid cloud interference. The two C-54 Observer Aircraft took-off at 0556 and 0557 and reached Orbit Point EASY at 0707 and 0709 at an altitude of 7,500 feet. All four of these aircraft, immediately upon their arrival at Orbit Point EASY, closed in on the Target Array to within five miles of its outer fringe, where they circled until 0834 and then, preserving their set altitudes, withdrew to the circles with a radius of 20 miles from the Target Center and there awaited MIKE Hour with altitudes of 4,000 feet, 7,000 feet, and 7,500 feet. Thus the four aircraft stationed on the three circles 20 miles from the Target Center constituted the first group of Army Aircraft to arrive.

(3) Nine Photographic Aircraft (arrived on station 0704 - 0737)

The second group to report on station was that of the nine Photographic Aircraft, seven of them being F-13s (TU 1.5.21) and two C-54s (TU 1.5.6). The F-13s were given the code name of EGGLESTON ONE, TWO, THREE, FOUR, FIVE, SIX, and SEVEN.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE AND SECURITY
AND MILITARY CLASSIFICATION SAFEGUARDS

(There was also another F-13 EGGLESTON EIGHT, which served as the photographic aircraft accompanying the Bomb Carrying Aircraft, but that will be mentioned later). The two C-54s were given the code names of PLAYBOY ONE and TWO. The seven EGGLESTONS took-off from KWAJALEIN at one minute intervals between 0516 and 0522 in the order of their numbers. They reached Orbit Point TARE at 0704 and proceeded as a group across the Target Array, bearing 315°(T), then, turning, crossed the array a second time, photographing throughout the maneuver. After the second crossing the seven aircraft took individual stations equally spaced on the circle with the radius of 12 miles from the Target Center. It had been intended to have these photographic aircraft maintain an altitude of 26,000 feet but the Command Aircraft noticed a thin skim of cloud below 24,000 feet, and ordered the EGGLESTONS to level off at an altitude of 23,000 feet and maintain it until MIKE Hour. PLAYBOY ONE and PLAYBOY TWO, with the mission of shock wave analysis, left KWAJALEIN at 0630 and 0631. They also went first to Orbit Point TARE, then across the Target Array and thence to stations on the circle with a radius of 12 miles but at an altitude of 12,500 feet, that is 10,500 feet below the seven EGGLESTONS which were circling on the same radius. The two PLAYBOY aircraft reported on station at 0737.

(4) Two Pressure Gauge Aircraft
(arrived on station at 0730)

While the nine photographic aircraft were taking their positions along the middle circles, the third group arrived. It consisted of two B-29 Pressure Gauge Aircraft (TU 1.5.13) which took-off from KWAJALEIN at 0545 and 0546. At 0730 they reached their stations, 180° apart on the circle with a slant range radius of seven miles at an altitude of 28,000 feet. Their mission was to drop pressure gauge instruments immediately after the bomb release. These were the last of the aircraft to occupy positions on any one of the circles concentric with the Target Center.

(5) Two Radiological Aircraft
(arrived on station at 0800)

Two B-29 Radiological Reconnaissance Aircraft (TU 1.5.15) known by the code names of ANTIQUE ONE and ANTIQUE THREE constituted the nucleus of the two radiological flights JIG and KING whose primary mission was tracking the cloud from the time of its drift away from BIKINI until it was lost to view either by disintegration or by the approach of darkness. It was not expected that JIG and KING would have to begin their mission until after MIKE plus 30 minutes or even later. ANTIQUES

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

ONE and THREE took-off from KWAJALEIN at 0640 and 0705. At 0800 they reported on station, ANTIQUE ONE at Orbit Point LOVE and ANTIQUE THREE at a point five miles east of Orbit Point TARE. Both were at an altitude of 25,000 feet. Before beginning their mission ANTIQUE ONE and ANTIQUE THREE awaited the arrival of EGGLESTON SIX and EGGLESTON FOUR transferred to the radiological work upon the completion of their photographic work at MIKE plus 30 minutes to insure adequate still and motion picture photography of the radioactive cloud throughout the remainder of its existence cycle. EGGLESTON SIX was destined to become ANTIQUE TWO and EGGLESTON FOUR was to become ANTIQUE FOUR, pairing with ANTIQUE ONE and ANTIQUE THREE respectively.

(6) Five Drone Control and Four Drone Aircraft (arrived on station at 0804)

The Drone Aircraft consisted of nine B-17s; a Master Control designated MARMALADE ONE and four pairs of control and drone aircraft known as MARMALADE TWO, THREE, FOUR and FIVE, and FOX, GEORGE, HOW and LOVE (TU 1.5.6). The four drone control aircraft took off from ENIWETOK at 0527, 0529, 0532, and 0534 and assumed control of the drones as the latter

left the field. LOVE took off at 0545, HOW at 0559, GEORGE at 0607, and FOX at 0615. MARMALADE ONE took off at 0620. All nine aircraft were on station at 0804. MARMALADE TWO and FOX were at Orbit Point WILLIAM, altitude 24,000 feet. MARMALADE THREE and GEORGE, MARMALADE FOUR and HOW, and MARMALADE FIVE and LOVE were all six at Orbit Point UNCLE but with altitudes of 30,000 feet, 18,000 feet, and 13,000 feet. MARMALADE ONE took a position five miles north of Orbit Point EASY with an altitude of 24,000 feet. This group of nine aircraft therefore upon reaching the air activity area were divided so that two of them were at Orbit Point WILLIAM, six at Orbit Point UNCLE, and one near Orbit Point EASY. The Master Control Plane was most advantageously situated to assist any of the other four control aircraft in an emergency.

) Three Air-Sea Rescue Aircraft (arrived on station at 0804)

At the same time that MARMALADE TWO and FOX, arrived at Orbit Point WILLIAM at altitude 24,000 feet, the B-17 Air-Sea Rescue Aircraft, MILKPAIL NINE (TU 1.5.9), which had left KWAJALEIN at 0450, also arrived at Orbit Point WILLIAM but at an altitude of 6,500 feet, to supplement air-sea rescue facilities provided primarily by regular trained and equipped ASR

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Units. Upon arrival at Orbit Point WILLIAM the aircraft contacted the Force Fighter Director in the MT MCKINLEY for possible change in orders. However, no accident having occurred, this air-sea rescue aircraft proceeded as briefed to DR Point 11° 30' N - 162° 50' E just 30 NM east of ENIWETOK. Throughout the remainder of its mission the aircraft held that station and maintained its altitude of 6,500 feet. There were also two B-17 DUMBOs on station between ENIWETOK and BIKINI.

d. Summary of Army Aircraft Airborne at HOW Hour

By 0845, that is 15 minutes before HOW Hour, 35 Army aircraft were airborne and either performing missions or awaiting the bomb release to begin the performance of missions. Of these 35 aircraft, three were engaged in weather reconnaissance far to the east and north of BIKINI; three were on station between BIKINI and ENIWETOK for possible air-sea rescue work; and 29 were circling the Target Center or Orbit Points nearby in the close pattern over the Target Array and its immediate vicinity. In addition to the 35 aircraft in flight at HOW Hour, five additional sorties were to be dispatched during the afternoon and evening making a total of 40 sorties flown by Army aircraft in ABLE Day Operation.

At HOW Hour the only variations from the Air Operation Plan on the part of Army aircraft had been the order for the EGGLESTONS to drop the altitude of their orbiting from 26,000 feet to 23,000 feet and permission for the Press Photography aircraft to lift its altitude temporarily from 4,000 to 6,500 feet.

e. Flight of the Bomb Carrying Aircraft

After QUEEN Day the Commander, Task Group 1.5, was instructed to hold the departure of the Bomb Carrying Aircraft on ABLE Day, regardless of schedule, until release authorization had been received from the MT. McKINLEY. A system was then established at KWAJALEIN whereby the expected message could be immediately delivered to the Commander, Task Group 1.5. EGGLESTON EIGHT took off on scheduled time at 0525 and by the scheduled hour of take-off at 0534, the Bomb Carrying Aircraft, loaded with the bomb, was ready to begin flight. The dispatch authorizing release of the Bomb Carrying Aircraft was received at KWAJALEIN by voice radio intercept at 0542, eight minutes after the original time set for take-off, and three minutes later, at 0545, DAVE'S DREAM started to taxi to the take-off position at the West end of the runway. Take-off occurred at 0555, only 13 minutes after release was authorized, but 21 minutes later than scheduled. Plans had previously been made to cut short the route of the Bomb Carrying Aircraft

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY INFORMATION SAFEGUARDS

to the target to compensate to a maximum of 30 minutes for any possible delay in take-off. However, three minutes after take-off word was received of the postponement of HOW Hour by 30 minutes. Therefore the Bomb Carrying Aircraft proceeded as originally briefed. The aircraft reached bombing altitude over WOTHO ATOLL. Arrival over the Target Array was at 0803. Then the Bomb Carrying Aircraft and EGGLESTON EIGHT made the prescribed wind run to Orbit point BAKER for the dry run which began at 0820. During the dry run the Edgerton flasher on the NEVADA could be clearly seen and was used to synchronize on the target. Also the radar beacon was picked up 50 miles away and was used to time and maintain the desired course. The bombardier was further aided in recognition of the target by the white turrets of the NEVADA which had been specially painted to contrast with the ship's coating of bright orange paint when it was found that the orange color was indistinct on flights into the sun. Visibility was excellent and the interference by the two tenths clouds was negligible. Simulated release was at 0831. The dry run was considered successful.

The Bomb Carrying Aircraft and the accompanying F-13, EGGLESTON EIGHT, returned to Orbit Point BAKER from the target and began the live run at 0850. Bombing altitude was maintained with calibrated-indicated air speed of 190 miles per hour. Ballistic winds were obtained from the radar unit aboard the MT MCKINLEY, after the

completion of the dry run. The bombardier corrected for wind, and bomb weight, and added a small compensation for inherent errors. The bombardier's calculations were later checked and found to be correct. For the first three minutes of the live run clouds obscured the target but there remained four minutes for unhindered sighting operations. Previous attempts to parallel the HF tone timing transmission had been abandoned after trials proved it liable to failure. Consequently only the HF transmission was used. Even this HF tone timing transmission was found to be unsatisfactory on the dry run though it was received by a majority of the participating units. The Aircraft's radio operator performed minor adjustments to the transmitter between runs and there was a satisfactory tone signal transmission on the live run. Timing was very nearly perfect. Accepting actual release as the basis for measuring errors, the 10 minute signal was 14 seconds late, the five minute signal was 12 seconds late, the two minute signal was eight seconds late, and the one minute signal was only three seconds late. Release occurred at 0859:46, exactly 14 seconds early.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SATISFACTORY

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DISSEMINATION REQUIRED
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

Upon release of the bomb, the pilot executed a 150° level turn to the left, then a shallow dive losing 1,000 feet while increasing air speed to 240 miles per hour. The shock wave was felt 84 seconds after release and the secondary wave immediately thereafter. Neither affected control of the ship though an odor was noticed in the aircraft for the next 30 seconds similar to that in a laboratory during the generation of high voltage. The aircraft returned to Orbit Point BAKER as briefed and from there went direct to the base at KWAJALEIN. There was no rendezvous with EGGLESTON EIGHT at Orbit Point BAKER after detonation as the latter remained in the area briefly for further photography.

f. Placement of the Bomb

The circular error in the placement of the bomb over the Target Array was 1500 to 2000 feet which was appreciably greater than had been indicated by the practice drops as the maximum likely error. This error might have been due to any one of three factors, namely: the crew, the equipment, or the ballistic characteristics of the atomic bomb. A thorough analysis of these factors was instituted immediately, and no evidence has been found to show that either a crew or any equipment failure caused an error of such magnitude. Further studies of all aspects of the drop are in progress.

- -

However, the Target Array and the instrumentation were so arranged that the location of the burst did not seriously affect the results desired from the test. In fact, 12 vessels, including one capital ship, were within the area of the burst, while a perfect placement would have brought 14 vessels within the bomb's radius.

g. Missions After Bomb Release

(1) Pressure Gauge Aircraft

Within 10 seconds after the bomb release both Pressure Gauge aircraft released their instruments successfully. The gauges functioned properly. The shock wave increased the rate of climb of the aircraft up to approximately 1,000 feet per second for five or six seconds. After the blast both aircraft returned directly to the KWAJALEIN base.

(2) Photographic Aircraft

When the auto bomb release signal was received the photographic equipment of the seven EGGLESTONS and the two PLAYBOYS began to operate in accordance with the Air Photographic Plan. Immediately after detonation these aircraft moved in and circled the cloud and column on a radius of eight NM. At six minutes after detonation EGGLESTON ONE, TWO, THREE and FIVE left the area and began the flight back to KWAJALEIN. After detonation plus six minutes all further circling of the cloud was discontinued by Photographic aircraft because of

VII RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

necessity of avoiding the RADEX. At 2236 on 30 June the predicted RADEX was between 085°(T) and 290° (T) clockwise; by 0612 on ABLE Day it was changed to 140°(T) to 306° (T); and by 1002 it was established as 180°(T) to 300°(T). Therefore after 0906 the remaining three EGGLESTONS began to operate with an eight mile radius on that portion of the arc of the circle not included in the RADEX area. They reversed their direction by a turn away from the cloud. One EGGLESTON rose to 30,000 feet; the second climbed from 23,000 feet to 26,500 feet; and the third went up from 23,000 feet to 25,500 feet. At 30 minutes after detonation, that is approximately 0930, the three EGGLESTONS left their stations. EGGLESTON SEVEN returned directly to KWAJALEIN. Of the other two, EGGLESTON SIX kept rendezvous with ANTIQUE ONE and became ANTIQUE TWO, and EGGLESTON FOUR kept rendezvous with ANTIQUE THREE and became ANTIQUE FOUR. ANTIQUE ONE and TWO at Orbit Point LOVE then became JIG Flight and ANTIQUE THREE and FOUR near Orbit Point TARE became KING Flight.

Meanwhile the two PLAYBOYS had also moved in to eight miles after the passage of the shock wave and commenced to photograph the cloud. At 0906 these aircraft likewise ceased to circle the cloud and took position upwind at a minimum distance of eight miles and continued to track and photograph the cloud until 0930 when they began their return flight to KWAJALEIN.

(3) Radiological Reconnaissance Aircraft

At approximately 1000, Flight JIG began tracking and photographing the cloud to determine its persistence and its radioactivity. The cloud was dissipated more quickly than had been anticipated, and at 1359 JIG was ordered back to base passing over the Target Area at an altitude of 5,000 feet for observation. To execute this order it was necessary for JIG to avoid contamination by going 60 miles north of BIKINI and then south again to the target. During most of this time, Flight KING continued to circle its Orbit Point. At 1245 KING was ordered to a point 15 miles north of the target. But this point could not be reached because of a concentration of radioactive material. At 1406 KING was ordered off station. Meanwhile there had been two changes in the composition of Flights JIG and KING. At 1136 EGGLESTON THREE took off from KWAJALEIN to relieve EGGLESTON SIX as ANTIQUE TWO and at 1144 EGGLESTON FIVE took off to relieve EGGLESTON FOUR as ANTIQUE FOUR. EGGLESTON FOUR and EGGLESTON SIX were relieved at 1335 and returned to KWAJALEIN. The four aircraft still operating as JIG and KING came in soon after.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(4) Orientation Aircraft

Three of the four Orientation Aircraft, the Press Photography and the two C-54s for official observers, closed to eight miles after detonation, but the Radio Broadcast Aircraft circled at Orbit Point EASY. At 0930 the Press Photography and the two Official Observer Aircraft left the area for KWAJALEIN. But the Radio Broadcast Aircraft requested authority to remain longer in the area for better observation. With the approval of the Radiological Safety Section the aircraft was given permission to remain upwind until 1000.

(5) Drone Aircraft

Shortly after detonation MARMALADE TWO dispatched the FOX drone toward the center of the cloud at an altitude of 24,000 feet. FOX entered the cloud at 0908. MARMALADE TWO then skirted the cloud in a clockwise direction. This was the only exception to the counter clockwise pattern of orbiting and it was done in order to avoid the Navy drone recovery quarter. As FOX quietly emerged from the cloud it was recovered by MARMALADE TWO assisted by the Master Control Plane.

At 0920, 0921, and 0922 the drones GEORGE, HOW, and LOVE were sent into the edges of the cloud by their control aircraft at altitudes of 30,000 feet, 18,000 feet and 13,000 feet. Throughout the operation the radio control equipment functioned exceptionally well. During and after the period of detonation no interference with control was experienced by the mothers with the single exception that MARMALADE FIVE found LOVE momentarily agitated by a signal at 0909:30. The operation of the sampling bags was satisfactory. They were opened remotely when the plane was seen to enter the cloud or when the Geiger counter showed by radio transmission that the drone was in the midst of sufficiently radioactive material to warrant sampling. All bags were closed automatically by Agstat relay 15 seconds after opening.

The interception of the drones was excellent except that GEORGE was recovered only after considerable pursuit by MARMALADE THREE. The control aircraft was slowed by additional fuel, critical at 30,000 feet and resulting in the loss of air speed.

All drones were landed by Army Field Recovery Unit (TU 1.5.62). The aircraft taxied to the Radiological Safety Area without incident. FOX however seemed to be approaching too low and was kept airborne by the ground control. Recovery by the mother was routine and the subsequent landing was entirely

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC CLEARANCE NOT REQUIRED
SECURITY INFORMATION SAFEGUARDS

satisfactory. HOW caused some uneasiness because of the differential braking system being unserviceable for remote control. But the standard non-differential braking system proved adequate and the landing was routine. All engines were cut by remote control except one aboard HOW which contrived to run until shut off manually. After the engines were cut a tail wheel locking system was used to disengage the tail wheel. The aircraft were then pulled into a parking area and the radiologists and Manhattan Project personnel assumed temporary control. GEORGE and FOX were especially "hot". The air bags and fuselage filters were then transferred to the transport aircraft and they were flown to KWAJALEIN as scheduled.

MARMALADE ONE came in at 1021. GEORGE and MARMALADE THREE landed at 1032 and 1136; LOVE and MARMALADE FIVE at 1100 and 1133; HOW and MARMALADE FOUR at 1125 and 1135; and FOX and MARMALADE TWO at 1132 and 1146.

(6) Air-Sea Rescue Aircraft

The Air-Sea Rescue Aircraft remained at its position 30 NM east of ENIWETOK throughout its mission. The aircraft left station at 0936 and returned to KWAJALEIN via ENIWETOK and landed at 1238. It should be mentioned that as an extra precaution the Army Drone

Unit on ENIWETOK (TU 1.5.6) also sent up two B-17 Dumbos not listed in the Air Plan, but given confirmative approval by the Deputy Commander for Aviation. These aircraft took off after the drones and controls were on course. The two dumbos orbited over points 20 NM north and south of the 50 NM radius intercept of the course line. The aircraft remained on station until the drones and controls had passed on the return flight to ENIWETOK.

(7) Command Aircraft

The Command Aircraft was cleared to return to base at 0940. It landed at KWAJALEIN at 1038.

h. ENIWETOK Emergency Air Evacuation Unit

Throughout ABLE Day the ENIWETOK Emergency Air Evacuation Unit (TU 1.5.42) with five C-54s stoodby on ENIWETOK to evacuate personnel from the island in case of danger. The evacuation was not necessary, and the alert was cancelled at 1411. The aircraft were ordered to return to KWAJALEIN on ABLE plus one.

i. Late Activities of Army Air Force Units on ABLE Day

(1) Additional instructions to the Commander, Task Group 1.5, in the form of Operations Orders No. 3-46 and No. 4-46 were issued. No. 3 called for a NIGHTOWL continuous photography mission over the Target Array commencing at four hours after

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTION CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

721479 O—46—38

detonation. No. 4 required a precipitron mission to collect contaminated air samples commencing at 17 hours after detonation.

(2) NIGHTOWL Mission

At 1212 EGGLESTON ONE took off to perform the NIGHTOWL mission. The Aircraft was on station at 1343 and was ordered not to secure until darkness and to remain above 5,000 feet, photographing intermittently. At 1559 the night mission was cancelled at 1627 the NIGHTOWL was off station. The aircraft landed at 1740. It was planned for the NIGHTOWL to take-off again at dawn on 2 July but at 0002 on that date all further NIGHTOWL missions were cancelled.

(3) Precipitron Mission

Two B-29 Radiological Reconnaissance Aircraft, No. 302 and No. 347, were dispatched to the BIKINI area toward midnight of 1 July to trace radioactivity. No. 302 took-off at 2039 to a point 15 miles north of BIKINI. It was then instructed to fly the northeast quadrant at an altitude of 21,000 feet. Radioactivity was found at 11° 50' N - 165° 14' E. Samples were continuously taken until a maximum of 16 M/R was encountered at 12° 45' N - 167° 57' E. This aircraft then returned to base and landed at 2355. Aircraft No. 347 took-off at 2147 and proceeded to the BIKINI AREA at an

altitude of 25,000 feet. Slight radioactivity was encountered at 12° 55' N - 165° 55' E. A maximum of 20 M/R per hour was found at 12° 30' N - 165° 40' E. The aircraft returned to base and landed at 0145 on 2 July. Both those aircraft were too contaminated upon landing to permit immediate post flight inspection.

3. Participation in ABLE Day Operations by Navy Air Units

a. Navy Preparation for ABLE Day on ABLE Minus One

Following receipt of the dispatch sent at 0917 on 30 June by the Commander, Joint Task Force ONE, designating 1 July as ABLE DAY, action was immediately taken by the Commander, Task Group 1.6, to execute the applicable sections of the Air Operation Annex of Operation Plan No. 1-46. The aircraft carriers were the first elements of the group to begin movement to ABLE Day stations. At 1400 on 30 June the SAIDOR, accompanied by the guard destroyers FURSE and N.K. PERRY, left BIKINI lagoon to take up position in the area of Reference Point ZEBRA, bearing 000° (T), 40 NM from the center of BIKINI ISLAND (Point AUTO); and at 1625 the SHANGRI-LA, the group flagship, accompanied by the guard destroyers TURNER and CECIL, got underway from the anchorage at ROI ISLAND to take station within 15 NM of Reference Point TARE, bearing 135° (T), 40 NM from the center of BIKINI ISLAND. The last

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

seaplane cleared BIKINI LAGOON at 1534, and at 1648 the seaplane tender ORCA moved from the lagoon to its station in Area PAIGE near Reference Point NAN, bearing 000° (T), 20 NM from the center of BIKINI ISLAND.

Meanwhile, final inspection of aircraft and special equipment had been initiated. Commencing at 1005, the Drone Carrier Unit in the SHANGRI-LA started a deck check-out for each drone and drone control aircraft, and also bench check-outs of all IFF equipment on these aircraft. In addition, all the special equipment on the aircraft such as Geiger-Mueller counters, air filters, cameras, and recording devices were given final testings. By 2130 all aircraft to be launched the next morning had been spotted on the deck ready for the take-off signal. Similar final preparations were made aboard the SAIPCR and at the EBEYE NAVAL AIR BASE, and by the end of 30 June all was in readiness for the execution of Test ABLE the following morning.

b. Operations Prior to Detonation at 0900

(1) Take-Off and Arrival on Station of Nine Seaplanes From EBEYE (0503 - 0730)

The first Navy aircraft to be airborne on ABLE Day were nine seaplanes from EBEYE which took-off between 0503 and 0620, and reported themselves at their respective stations off BIKINI LAGOON between 0639 and 0730. Their movements were as follows:

(a) Six PBMs of Seaplane Patrol Squadron (TU 1.6.32)

HOTPOINT, the Radiometry Seaplane, taking off at 0503, was the first Navy aircraft to depart, and at 0710 it was orbiting on its ABLE Day station 15 NM from the Target Center, bearing 015° (T), at 9,500 feet. Following almost immediately, two Radiological Reconnaissance Seaplanes CHARLIE and DOG, took-off at 0514 and 0515, and reported on station at 0730 at Orbit Point UNCLE, 30 NM from the Target Center, where they orbited at 2,000 feet. Three Photographic Seaplanes, TARE, UNCLE and WILLIAM, were next off the water between 0519 and 0529, and by 0658 all had reported on station at Orbit Points CHARLIE, KING and DOG, respectively, each 15 NM from the Target Center, where TARE and UNCLE orbited at 12,000 feet and WILLIAM at 5,000.

(b) Three PBMs of Air-Sea Rescue Squadron (TU 1.6.33)

Meanwhile, three seaplanes or the Air-Sea Rescue Squadron were also taking-off from the lagoon at EBEYE. The first, DUMBO TWO, was airborne at 0505 and at 0639 arrived at its station at Orbit Point UNCLE. DUMBO ONE was off the water next at 0510, and at 0642 was on station at Orbit Point LOVE. Both seaplanes were stationed 30 NM from the Target Center, and

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

orbited at 3,000 feet. DUMBO THREE was the last to take-off at 0620, and at 0710 reported on station at 7,000 feet over WOTHO ATOLL, 90 NM from the Target Center

(2) Take-Off and Mission Before Detonation of Six Photo F6Fs from the SAIDOR (0712 - 0900)

Six F6Fs, a QUEEN Flight of four, and SUGAR and ROGER, part of the Photographic Carrier Unit (TU 1.6.2), were launched from the SAIDOR between 0712 and 0715. The mission of the group was to obtain vertical and trimetrogen photography of the BIKINI TARGET AREA immediately prior to detonation of the atomic bomb. The F6Fs flew directly from the carrier to positions 5 NM east of BIKINI ATOLL. All reported on station at 0725, but the first photographic run was delayed to allow time for the dissipation of the low stratus and cumulus clouds. The first run made by the QUEEN flight from 10,000 feet was a vertical one with good visibility at 0757. After completing the 10,000 feet run, the QUEEN Flight returned to a position 5 NM east of BIKINI ATOLL where from 20,000 feet a second vertical run was made at 0826. Its mission completed, the QUEEN Flight left the Target area at 0830 and by 0840 all had landed on the parent carrier.

F6F SUGAR in the meantime had made a calibration run over BIKINI ATOLL at 0725 from 3,500 feet, and had then returned to make three trimetrogon flights over the Target Array at 0742, 0750, and 0800, maintaining an

altitude of 3,500 feet for each run. From 750 feet SUGAR made a final calibration run at 0810 before it returned to the SAIDOR at 0839. Aircraft ROGER, meanwhile, had also commenced its operation. It first made a calibrating run from 700 feet at 0729, and then returned to a position 5 NM east of BIKINI ATOLL where at 0759 from 8,000 feet a trimetrogon photographic run was made over the Target Array and a similar run was made at 14,000 feet altitude. F6F ROGER then proceeded to its ABLE Day station at Orbit Point ABLE, 20 NM from the Target Center, where, orbiting at 14,000 feet, it reported in position at 0827.

(3) Take-Off and Arrival on Station of Two Photo TBMs from the SAIDOR (0734 - 0800)

Two TBMs, NAN and OBOE, of the Photographic Carrier Unit (TU 1.6.24) were launched from the SAIDOR at 0734 and 0736 and at 0800 were on station at Orbit Points YOKE and SUGAR, both 20 NM from the Target Center. At MIKE Hour NAN was orbiting at 9,000 feet, and OBOE at 4,000 feet.

(4) Take-Off and Arrival on Station of Four Drone and Sixteen Drone Control F6Fs from the SHANGRI-LA (0711 - 0830)

The launching of 20 F6Fs of the Drone Carrier Unit (TU 1.6.14) from the SHANGRI-LA commenced at 0714, with the two aircraft of each of the four Primary Drone Control Sections, RED,

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTION CLEARANCE NOT REQUIRED
USS MILITARY CLASSIFICATION SAFEGUARDS

WHITE, BLUE and YELLOW, taking-off between 0714 and 0717. The eight control F6Fs rendezvoused over the carrier in position to intercept the drones. Launching the four drone F6Fs was completed between 0725 and 0745, with the RED, WHITE, BLUE and YELLOW drones taking-off in order. As each drone was airborne control was established by its Primary Control Section, and by 0828 all drones had been controlled to their respective stations at Orbit Point VICTOR, bearing 312° (T), 20 NM from Target Center, at the following altitudes: RED 28,000 feet; WHITE 20,000 feet, BLUE 15,000 feet, and YELLOW 10,000 feet. Meanwhile the four Secondary Drone Control Sections, RED, WHITE, BLUE, and YELLOW, of 2 F6Fs each, were launched between 0747 and 0750, and by 0830 all were on station at Orbit Point SUGAR, bearing 135° (T), 20 NM from Target Center, at altitudes corresponding to the drones and Primary Drone Control Sections across the center of the target axis.

Although no difficulties were encountered in launching the drones or in controlling them to station, the RED drone, after arrival at Orbit Point VICTOR and orbiting at 28,000 feet, went out of control at 0842 with a stuck aileron, and crashed into the sea at 0850. Following the loss of the drone, the RED Primary and Secondary Control Sections were ordered to return to base at 0900. Two Air-Sea Rescue TBMs, DAGGER ONE, and DAGGER TWO, were launched at 0757

from the SHANGRI-LA and stoodby over the carrier until 1150.

(5) Status of Navy Aircraft at Detonation (0900)

A total of 39 Navy aircraft had been launched between 0503 and 0750. Of these, five Photographic F6Fs had completed the final pre-blast photography of the Target Array and had returned to base as planned. Five others, three PBM and two TBM Air-Sea Rescue aircraft, were on station outside the area of the close air pattern. Of the 29 aircraft scheduled to participate in the pattern, the RED Drone had crashed into the sea at 0850 and the four RED Control F6Fs had withdrawn from their stations prior to the burst. That left 24 Navy aircraft actually participating in the close pattern as it was executed at MIKE Hour and immediately thereafter. Yet to be airborne were four Drone Boat Control TBMs, and two Oceanography Survey F6Fs, making a total of 45 Navy aircraft to participate in ABLE Day operations.

c. Operations After Detonation at 0900

(1) The seaplane HOTPOINT was orbiting at 9,500 feet 15 NM northeast of the Target Center at the time of detonation. Equipped with special radiometry instruments to photograph and measure the heat radiation of the blast, the HOTPOINT remained on station only six minutes making its recordings of the blast phenomena.

VII (E) 1 RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(2) Three Photo Wave Measurement PBMs

Three seaplanes, TARE, UNCLE and WILLIAM were equipped with special television and photographic equipment for the primary mission of measuring the waves resulting from the burst. They were also instructed to monitor readings of the sono-buoys placed in the Target Array and to obtain the receiver scope photographs. Incidentally these attempts proved abortive because of the distance away from the Target Array required by the Air Plan. UNCLE was also charged with the actuating by radio of the synchronized cameras in the photography towers on ENYU, BIKINI and AMEN ISLANDS as well as those in PBMs TARE and WILLIAM. At 0900 all three of these seaplanes were on station 15 NM from the Target Center with TARE and UNCLE at 12,000 feet, and WILLIAM at 5,000 feet. At the instant of detonation the three seaplanes carried out the following missions: TARE started from Orbit Point CHARLIE, and flew Track 349° (T) for 4 NM, then changed Track right to 037° (T) for 20 NM, maintaining a ground speed of approximately 150 knots; UNCLE started from Orbit Point KING, and flew Track 000° (T) for 20 NM, maintaining a ground speed of approximately 150 knots; and WILLIAM started from Orbit Point DOG, and flew Track 309° (T) for 16 NM, maintaining a ground speed of approximately 135 knots. Photographic and television equipment was turned on either immediately prior to or at the instant of the flash, and pictures and recordings were made throughout the runs which continued until approximately 0923.

(3) One Photographic F6F

At the instant of detonation ROGER, the only photographic F6F still airborne, was approximately 12 NM away flying directly toward the Target Center at 10,000 feet. Approaching within 8 NM of the burst, motion pictures and other photography was obtained of the cloud column and the target ships. The photographic mission was continued until 0927 when ROGER left the Target Area for its parent carrier.

(4) Two Photographic TBMs

The Photographic TBM OBOE was orbiting at 4,000 feet 20 NM from the Target Center at MIKE Hour. It moved in as close as 8 NM during the first six minutes following the flash, and made oblique photographs of the cloud column. OBOE departed from the area at 0906 and returned to its carrier base. The Photographic TBM NAW was approximately 12 NM from the Target Center at 0900, and immediately following the burst began circling the cloud column counter clockwise, and taking photographs of the cloud and of other aircraft in the area. Six minutes after the detonation NAW began to fly a 270° arc at a minimum radius of 8 NM from the target, continually reversing its direction by executing a turn away from the area whenever necessary to avoid dangerous radioactivity. Motion picture photography had been started immediately preceding the flash, and was continue until 0933 when NAW left the area for its carrier base.

RESTRICTED DATA
ACT - 1946
CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED PACIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(5) Three Drone and Twelve Drone Control FGFs

The WHITE, BLUE, and YELLOW drone groups, of one drone and four Drone Control FGFs each, were at their respective stations 20 NM from the target. All pilots had adjusted their goggles to shield their eyes from the blinding flash of light at the instant of detonation, and some confusion resulted when the pilots, expecting a much stronger flash, momentarily were uncertain whether the burst had occurred as scheduled. However, no serious delay resulted and the Primary Control Sections commenced controlling the drones toward the cloud column as follows: at 0906 the YELLOW drone at 10,000 feet, at 0909 the WHITE drone at 20,000 feet, and at 0910 the BLUE drone at 15,000 feet. Passage through the cloud column was made without major incident with the exception of the WHITE drone which had increased its altitude from 20,000 feet to 26,000 feet. This change in altitude was probably due both to the strong upward currents within the cloud and to the fact that at the time of its release from the Primary Drone Control Section the WHITE drone had a slight nose-up attitude. The secondary Drone Control Sections successfully completed the interceptions as follows: YELLOW drone at 0923, BLUE Drone at 0924, and WHITE drone at 0953. The WHITE drone was recaptured over WOTHO ATOLL 43 minutes after its release. Control was then maintained by the mother aircraft and the WHITE drone was returned to ROI

without damage. This was a remarkable performance. All drones landed safely at ROI between 1028 and 1046, and all control aircraft returned to base aboard the SHANGRI-LA or ROI between 0957 and 1056.

(6) Four Drone Boat Control TBMs

Between 0910 and 0918 four Drone Boat Control TBMs BUKCO ONE, TWO, THREE and FOUR, of Task Unit 1.6.15, were launched from the SAIDOR. Immediately after take-off, BUCKO ONE and THREE proceeded to station 5 NM upwind from the Drone Boats FACTORY ONE and FACTORY THREE. Meanwhile BUCKO TWO and BUCKO FOUR stood-by circling the parent carrier as replacements which, it developed, were needed almost immediately. BUCKO ONE reported a hydraulic leak shortly after take-off and was replaced by BUCKO TWO, and at 1015 BUCKO THREE developed generator trouble which resulted in a complete communications failure, and was replaced by BUCKO FOUR. The TBMs remained about 5 NM upwind from the Drone Boats which were controlled on course and speed by the BEGOR from its station outside the lagoon near Reference Point NAW, 20 NM from the Target Center. The TBMs conned the course of the Drone Boats as they moved through the radioactive Target Area by means of voice radio to the BEGOR, and also reported on the degree of radioactivity in the area in which they were flying. BUCKO TWO and BUCKO FOUR completed their mission and were out of the area by 1238.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
RESTRICTED
USE MILITARY INFORMATION CONTROL REQUIRED
USE - C.E

(7) Two Radiological Reconnaissance PBMs

The radiological reconnaissance seaplanes, CHARLIE and DOG, were on station at 2,000 feet, 30 NM from the Target Center at the time of the burst. Leaving their stations shortly after MIKE Hour, CHARLIE and DOG moved up to positions approximately 5 NM upwind from the detonation point, where they awaited voice radio instructions from the Radiological Safety Officer to begin testing radioactivity over the Target Area. While DOG orbited on its new station, CHARLIE at 0952 approached within approximately 3 NM of the Target Center, and then began traversing the Target Area in a series of parallel sweeps, flying normal to the wind direction, and covering a rectangle roughly 6 NM by 5 NM with the Target Area at the center. The path of the sweeps along the rectangle were not regular, however, since the seaplane was also instructed to reduce progressively the distance of the sweeps from the contaminated area. Also each time dangerous radioactivity was encountered, the PBM turned abruptly, circled upwind, and turned back for the next sweep along the rectangular course. On completion of the runs at 2,000 feet, CHARLIE dropped down to 1,000 feet at 1045, and carried through a series of similar sweeps at the new altitude. At 1126 the altitude was lowered to 500 feet, and the pattern of radiological sweeps again was repeated. As soon as CHARLIE had completed its sweeps at one altitude, DOG moved in and carried

through the same pattern of operation. DOG commenced its 2,000 feet sweeps at 1055, its 1,000 feet sweeps at 1140, and its 500 feet sweeps at 1231. On completion of the flights at the three altitudes, both seaplanes made radiological runs over the Target Area, and at 1310 DOG flew directly over the Target Center at 3,000 feet. Additional sweeps over the Target Area at varying altitudes were continued until 1402 when CHARLIE departed for EBEYE and until 1427 when DOG departed.

(8) Three Air-Sea Rescue PBMs

At detonation DUMBO ONE and DUMBO TWO were on station 30 NM from the Target Center, while DUMBO THREE was near WOTHO ATOLL, 90 NM away. The mission of the three seaplanes continued to be that of standing-by for air-sea rescue calls. At 0806 DUMBO THREE reported its Geiger-Mueller counter was out of order, but when DUMBO FOUR, the stand-by PBM at EBEYE, was ordered as a replacement, it replied that it had no counter. Nonetheless, DUMBO THREE was ordered to return to EBEYE, while DUMBO TWO was shifted to the position over WOTHO, and DUMBO ONE was transferred to Orbit Point UNCLE. The two seaplanes remained on station until 1425 at UNCLE and 1455 over WOTHO.

(9) Two Oceanography Survey F6Fs

At 1013 the Photographic Carrier Unit (TU 1.6.2) was directed to prepare two F6F photographic aircraft of Task Unit 1.6.23 with strip cameras loaded

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED AEA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

with aero kodacolor film for a special oceanography survey mission in BIKINI LAGOON. The F6Fs, SONAR ONE and SONAR TWO, were launched from the SAIDOR at 1615, and proceeded immediately over the lagoon. Both aircraft made their 5one-strip color photographic runs from bearings 180° and 000° between 250 and 400 feet altitude over the Target Area. The mission was completed and the aircraft had landed by 1715.

(10) Helicopter Unit (TU 1.6.25)

Although not actually employed on ABLE Day, the Helicopter Unit was standing-by for air-sea rescue and miscellaneous missions which might be directed. Moreover, its employment on ABLE Minus One Day, when a Helicopter delivered repair parts to ALLEN ISLAND, insured the operation of the photographic towers on that island on ABLE Day.

4. Summary of ABLE Day Air Operations

a. Flying time of all aircraft participating in the ABLE Day operation on 1 July 1946 was as follows:

ARMY AIR FORCES

Mission A/C	Type A/C	Air-borne	Hours Airborne Total	Hours Airborne Avge	Hours on Station Total	Hours on Station Avge
Command	B-29	1	6:35	6:35	4:06	4:06
Bomb Carrying	B-29	1	4:23	4:23	1:04	1:04
Radiological	B-29	2	17:53	8:56	12:32	6:16

ARMY AIR FORCES

Mission A/C	Type A/C	Air-borne	Hours Airborne Total	Hours Airborne Avge	Hours on Station Total	Hours on Station Avge
Blast Gauge	B-29	2	8:45	4:23	3:28	1:44
Press & Radio	B-29	2	11:10	5:35	5:43	2:52
Total	B-29	8	48:46	6:06	26:53	3:22
VLR Photo	F-13	10	59:20	5:56	29:23	2:56
BCA Photo	F-13	1	4:53	4:53	1:02	1:02
Total	F-13	11	64:13	5:50	30:25	2:46
Drone Control	B-17	5	28:15	5:39	8:09	1:38
Drones	B-17	4	20:32	5:08	6:32	1:38
Air-Sea Rescue	B-17	1	7:48	7:48	1:33	1:33
Total	B-17	10	56:35	5:39	16:14	1:37
VIP Observer	C-54	2	10:06	5:03	4:44	2:22
Wave Analysis	C-54	2	9:36	4:48	3:54	1:57
Total	C-54	4	19:42	4:55	8:38	2:09
TOTAL	----	33	189:16	5:44	82:10	2:30

In addition there were seven miscellaneous Army Air Forces aircraft for which statistics comparable to those above are not available. These aircraft were as follows:

Mission A/C	Type A/C	Air-borne	Hours Total	Airborne Average
Weather Reco	B-29	3	29:30	9:50
Precipitron	B-29	2	7:14	3:57
Air-Sea Rescue	L-17	2	10:52	5:26 (Approximate)
Total	----	7	47:36	6:48

TOTAL AAF AIRCRAFT AIRBORNE: 40

TOTAL AAF AIRBORNE HOURS: 236:52

RESTRICTED DATA

ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

721479 O - 46 - 40

RESTRICTED DATA
AT... REQUIRES ... PERMIT
FOR MILITARY ... INFORMATION SATISFACTORY

NAVY AIR UNITS

Mission A/C	Type A/C	Air-borne	Hours Airborne Total	Hours Airborne Avge	Hours on Station Total	Hours on Station Avge
Air-Sea Rescue	PBM	3	26:34	8:51	18:57	6:19
Radiometry	PBM	1	5:39	5:39	1:56	1:56
Radiological	PBM	2	21:48	10:54	13:34	6:47
Wave Photo	PBM	3	16:59	5:40	6:53	2:18
Total	PBM	9	71:00	7:53	41:20	4:22
Air-Sea Rescue	TBM	2	6:58	3:29	4:04	2:02
Photo	TBM	2	4:18	2:09	2:27	1:14
Drone Boat Control	TBM	4	9:18*	2:19*	5:12*	1:18*
Total	TBM	8	20:34*	2:33*	11:43*	1:23*
Vert - Trimet Photo	F6F	5	7:37	1:31	5:02	1:00
General Photo	F6F	1	2:31	2:31	2:04	2:04
Fish Survey	F6F	2	1:43	0:51	1:08	0:34
Drone Control	F6F	16	40:38	2:55	19:14	1:12
Drones	F6F	4	10:57**	2:4[illegible]**	5:4[illegible]**	1:17**
Total	F6F	28	69:23**	2:[illegible]**	38:15**	1:11**
Total Navy	All	45	160:57***	3:[illegible]***	[illegible]***	1:55***
Total AAF-Navy	All	85	397:49***			

Note: * Includes 2 A/C abortive
** Includes 1 A/C abortive
*** Includes 3 A/C abortive

b. Recapitualation:

(1) Aircraft Airborne

ARMY		NAVY	
B-17	12	PBM	9
B-29	13	TBM	8
F-13	11	F6F	28
C-54	4	Total	45
Total	40		

(2) Aircraft Aborted

Army - None
Navy - 1 FGF RED Drone at 0850
1 TBM BUCKO ONE at 0932
1 TBM BUCKO THREE at 1015

(3) Aircraft Lost

Navy - 1 FGF Drone

(4) Personnel Lost

None

E. PREPARATION AND TRAINING FOR TEST BAKER

In its primary aspects the Air Operation Plan for Test BAKER was essentially the same as for Test ABLE except for the elimination of the Bomb Carrying Aircraft. However, additional information of the safety factors necessary in an atomic bomb operation, which were learned from Test ABLE, as well as the reduced blast wave intensity for the underwater test, warranted various changes in operational procedures. The basic air pattern consequently was compressed in altitude to 18,000 feet, except for three aircraft (two pressure drop and one photographic), and reduced in radius to 7 NM, but the missions of the aircraft airborne on 25 July for Test BAKER were in most instances similar to or identical with those which had flown on 1 July in Test ABLE. Notwithstanding the similarity of the two plans, and the intensive preparations which had preceded Test ABLE, active training programs were initiated for the second test, and two full scale air rehearsals were staged. The first rehearsal including only air units was held on 14 July, and the second on 19 July when all units of Joint Task Force ONE participated in the WILLIAM Day full dress rehearsal. The weather on WILLIAM Day, however, reduced air participation to a minimum.

SPECIAL CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ... AS AMENDED ... PROHIBITED
RESTRICTED ... USE MILITARY ...

1. Air Staff

Upon completion of Test ABLE the primary and most difficult task facing the Air Staff was formulating the plan of air operations for Test BAKER. The plan evolved was basically the same as for Test ABLE, but in view of the lessons learned various aircraft were directed to perform their missions in a different manner. Distribution of the plan also brought suggestions for changes from units of the Task Force. Revisions were made in the plan and an intensive period of familiarization began.

In order for the Air Staff and Air Plot to function at peak efficiency each officer and enlisted man became thoroughly familiar with the tasks to be performed and the tracks which would be flown by every airplane participating. Such intimacy with the plan enabled Air Plot to anticipate actions of the aircraft and to become aware immediately of any variations from the plan which might occur during its execution. While manning Air Plot, Flag Bridge, and CIC during the air rehearsal on 14 July, and the WILLIAM Day exercise conducted 19 July, Air Staff personnel put their knowledge of the plan to the test of actual operation, and were provided with an opportunity to perfect their mechanism of air control.

Scientific requirements dictated flying a much greater number of missions in the days immediately following Test BAKER than had been flown after ABLE. These missions

placed on the Air Staff the burden of planning the flights to gather the maximum information. Positive air control was needed and CIC was kept completely manned and operating while aircraft involved were in the BIKINI AREA.

2. Army Air Units (TG 1.5)

During the period 2 July through 24 July, Task Group 1.5 concentrated on preparing air crews, equipment and aircraft for Test BAKER. While awaiting the completion of the BAKER Day Air Operation Plan, necessary maintenance on all aircraft and equipment was performed, and the bomb dropping crews continued aircrew training by dropping all available practice bombs, five Pumpkins and 28 inert 1,000 pounders, on ERIK ISLAND bombing ranges. Also such extra aircraft as were available were used to make weather reconnaissance. On 10 July the new plan was received and the Army air units immediately began practicing for BAKER Day and all aircraft participated in the coordinated air rehearsal of 14 July and the full dress rehearsal on WILLIAM Day, 19 July. The primary modification in the missions of the air units, and the preparations for the execution of the BAKER Day plan are summarized as follows:

a. Air Attack Unit (TU 1.5.1)

The Command Aircraft (TU 1.5.11) had the same function on BAKER Day as it had had on ABLE Day, but an auxiliary or assistant aircraft was now added.

RESTRICTED DATA
AEC - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AT MIS[illegible]
RESTRICTED DATA AS DEFINED IN THE ATOMIC ENERGY ACT OF 1946
USE MILITARY SEA [illegible]

The reason for the additional aircraft was that on WILLIAM Day an entirely new problem arose; namely the weather closed in over the Target Area, making it necessary to abandon the mission because no safe alternate altitude could be found. At the critique for WILLIAM Day the point was made that if a similar situation arose on BAKER Day in which the cloud cover was only temporary, the aircraft could take stations in a clear area and resume their assigned positions when the Target Area cleared. Consequently the assistant or auxiliary Command Aircraft was added to assist in locating an open area for the formations.

The two Pressure Drop Aircraft (TU 1.5.13) had the same missions as for Test ABLE, but at altitudes of 24,000 and 25,000 feet. Both aircraft were prepared to fly on instruments if required. The two air rehearsals sufficed as preparation for the BAKER Day operation.

The Weather Reconnaissance Unit (TU 1.5.14) performed the same function during the period between the two tests as it had prior to Test ABLE. At least one B-29 was dispatched daily to gather information for the weather forecasts; and on WILLIAM Day minus 3, 2, and 1 and BAKER Day minus 3, 2, and 1, two weather reconnaissance aircraft were dispatched daily. The procedure followed was to dispatch the aircraft over the route that the weather was calculated to traverse in a period of three days, on BAKER and WILLIAM minus 3, and proportionately lessen this distance for minus 2 and 1.

b. Army Air Photographic Unit (TU 1.5.2)

One of the most important changes in procedure for BAKER Day from ABLE Day occurred in the tactics of the Army Photographic aircraft. The ABLE Flight of seven F-13s was moved from an altitude of 26,000 feet to 16,000 feet and to an orbiting distance of 7 NM slant range from the target. The two C-54 PLAYBOY aircraft were also brought in to the 7 NM slant range on a free orbit 90° apart. BAKER Flight of one F-13 was assigned the task of taking approximately vertical photographs of the burst from an altitude of 30,000 feet. The photographic unit practiced the new tactics of two special missions in addition to the two full scale rehearsals of all air units. Also, commencing on 15 July, an F-13 was dispatched daily over the target to determine the average weather that would be encountered for vertical photography; and two night practice missions were flown by the F-13 scheduled for the NIGHT OWL missions. These latter practice missions involved dropping photo flash bombs from an altitude of 15,000 feet at night over a deserted island in the KWAJALEIN ATOLL and taking photographs of the island.

c. Air Transport Unit (TU 1.5.4)

The Army Transport Unit continued to make daily flights to ENIWETOK during the period, as well as additional flights to the UNITED STATES after ABLE Day to carry the film exposed on 1 July and immediately following the test.

RESTRICTED DATA
ACT - 1946
CLEARANCE NOT REQUIRED
EDUCATION SAFEGUARDS

On WILLIAM Day, the two C-54s assigned to carry radiological samples from ROI and ENIWETOK to KWAJALEIN practiced their assignments. Five C-54s were also made ready to carry out the evacuation of personnel from ENIWETOK in case need arose under the same plan as in effect during Test ABLE.

d. Army Drone Unit (TU 1.5.6)

The Army Drone Unit's mission was also changed considerably for Test BAKER. Two drones were designated to arrive over the target at the instant of detonation on a bearing of 90° (T), at altitudes of 6,000 and 16,000 feet respectively. The other two drones were to pass through the bomb cloud at MIKE plus 5 and 8 minutes respectively at 7,000 and 11,000 feet on a bearing of 270° (T). These tactics involved more exact timing than on the first test, and practice missions were flown daily by the unit over either BIKINI or the ENIWETOK area. All drone control aircraft participated in the two rehearsals. After WILLIAM Day the special electronic equipment in all drone and control aircraft was tested, aligned, and calibrated on the ground and in the air during local test flights. Also a radio beacon was installed on a target vessel because of the extreme accuracy required in putting the drone aircraft over the point of detonation. In addition a radio compass was installed on the telemetering panel of each of the two drones scheduled to arrive over the

target at detonation time in order to have them home on the beacon installed in the Target Array. An extra television transmitter, to be directed vertically at the target, was installed in the drone scheduled for 16,000 feet and was to be monitored by the Mother Aircraft MIKE and a recording made by the television camera. Commencing on 15 July and continuing through 24 July, one of the unit's B-17 aircraft was dispatched daily to the Target Area at 16,000 feet to obtain supplementary weather data.

e. Air Orientation Unit (TU 1.5.8)

Originally two B-29s and two C-54s of the Air Orientation Unit were scheduled to participate in Test BAKER in the same capacities as on ABLE Day, but on 23 July one of the C-54s was withdrawn from the plan and replaced by EAGLE EYE, a Navy seaplane. These aircraft had no definite orbiting pattern, and, as their participation included a simple navigation problem, only the Radio Broadcast and Press Photography B-29s participated in the first coordinated rehearsal on 14 July. The Observation C-54 was not in the area on WILLIAM Day, and the two C-54s of Task Unit 1.5.4 were dispatched on the mission to keep the formation intact.

f. Air-Sea Rescue Unit (TU 1.5.9)

The Air-Sea Rescue B-17's mission for BAKER Day was the same as for ABLE Day; namely, to reinforce air-sea rescue facilities for the drone control aircraft between ENIWETOK and the Target Area. The air-sea rescue aircraft participated in both rehearsal missions.

OCT - 1948
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED CIVIC RESTRICTED AS A CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

g. Problems Encountered

In the Army air training for Test BAKER the following problems were encountered:

(1) Blast Gauge Aircraft

The pressure gauge dropping aircraft originally were placed at 7 NM slant range from the center of the Target Array, one at 24,000 feet and the other at 25,000 feet with each to remain at opposite sides of concentric circular patterns. The lower circle was approximately 3,000 feet greater in circumference than the higher one, and at the same indicated air speed the plane at 25,000 feet flew several miles an hour faster than the other because of the effect of the altitude. Thus, in order to maintain opposite positions on the orbit, the air speed of the lower aircraft was increased.

(2) Vertical Photography

Originally it was planned to fly one F-13 directly over the target at 35,000 feet at the moment of detonation, but excessive cylinder temperatures and other engine trouble made the high level operation difficult. Although the blast column rising directly over the target prohibited vertical photography at an altitude lower than 35,000 feet, the blast effect at one mile from the vertical blast column was tolerable. Thus the F-13 was changed to operate at 30,000 feet one NM from the vertical position to procure "near vertical" photography of the detonation.

(3) Drones

As originally planned, the B-17 drones were to pass over the Target Center from the east at 6,000, 16,000, 7,000 and 11,000 feet altitude at MIKE time, MIKE time, MIKE time plus 5 minutes and MIKE time plus 8 minutes respectively. It was essential that the drones at 6,000 and 16,000 feet be directly over the target at detonation, and the rehearsal of 14 July revealed that this could not be effected consistently if the drones approached from the east where there was no land or other fixed mark to use as a time distance control for projecting these drones on their entry path. Consequently the path of the drones was reversed so that they approached the cloud from the west where BORO ISLAND on the western end of BIKINI ATOLL was used as a fixed starting point.

(4) Photographic Timing

To preclude against the possibility of failure of automatic timing devices to activate the ultra-high cameras, only 60% of the cameras were set for automatic activation, while 40% were set for manual activation.

3. Navy Air Units (TG 1.6)

The Air Operation Plan for BAKER Day provided for the Navy aircraft to execute missions closely paralleling those carried out on ABLE Day. The period between the

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

two tests was devoted primarily to the preparation and maintenance of aircraft and equipment, and training was confined largely to participation in the two coordinated air rehearsals. The basic changes in the missions of the Navy air units and the preparations for accomplishing these missions on BAKER Day are summarized as follows:

a. Drone Carrier Unit (TU 1.6.1)

The Air Operation Plan for Test BAKER provided for the active use of only three drones with control aircraft rather than four as in the first test, as follows: the RED Drone at 14,000 feet at MIKE plus 6 minutes; the WHITE Drone at 9,000 feet at MIKE plus 10 minutes; and the BLUE Drone at 5,000 feet at MIKE plus 12 minutes. A fourth group, the YELLOW, remained in readiness to take over in case one of the other control sections developed trouble. In addition to routine maintenance and test flights, the following preparations were made to execute the revised plan for BAKER Day:

(1) Since safety restrictions were relaxed, the tactical problem was changed to bring the control group closer to the Target Area, with one section in each group being in position to be in sight contact of the drone at all times. The amber shield over the cockpit greenhouse and the blue goggles were discarded along with the period of flying on instruments.

(2) The WHITE Drone was modified to include the installation of a Mitchell camera.

(3) The RED Drone was modified to include the installation of a K-17 type aerial camera.

Immediately following Test ABLE all aircraft aboard the Drone Carrier, the SHANGRI-LA, were launched and landed on ROI ISLAND where they were checked and flight tested. On 13 July all drones and drone control airplanes were barged from the island to the ship which departed the same day for the BIKINI AREA to participate in the first air rehearsal. On 14 July all drone groups carried out the BAKER Day plan with a high degree of precision, but on WILLIAM Day on 19 July the drone phase of the rehearsal was cancelled because of adverse weather after the control groups had been launched. Including participation in the two rehearsals, aircraft of the Drone Carrier Unit, between 2 and 25 July, made 493 flights for a total of 466.4 training hours for Test BAKER. On 9 July one drone and its safety pilot were lost on a routine test flight off ROI ISLAND when the drone, while under control of the field unit, suddenly rolled over a very low altitude and spun into the sea.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC [illegible] CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

b. Photographic Carrier Unit (TU 1.6.2)

The mission of the units aboard the Photographic Carrier, the SAIDOR, remained almost unchanged for Test BAKER. Thus preparations for the test by the F6F Photo Unit (TU 1.6.23), the TBM Photo Unit (TU 1.6.24), and the Drone Boat Control Unit (TU 1.6.15) were essentially a repetition of those for the first test. The period from 2 July through 24 July consequently was devoted primarily to maintenance of aircraft and equipment with training concentrated largely in the two coordinated air rehearsals. In addition, seven F6Fs and four TBMs carried out special photographic missions over the BIKINI Target Area on 5 July, while four TBM drone boat control aircraft on the same day practiced their BAKER Day assignments in conjunction with the BEGOR. The 14 July rehearsal was carried out with a high degree of success, but on WILLIAM Day on 19 July adverse weather forced the return of all aircraft before the missions were completed. Two F6Fs were involved in accidents during the training period; one plane was lost on 5 July when it spun into the sea while approaching the carrier, and another was badly damaged on WILLIAM Day when the tail wheel gave way in landing.

Throughout the training period for Test BAKER the Helicopter Unit flew utility flights consisting of radar calibration, transportation of personnel and small equipment, and prepared all aircraft and personnel for its standby assignment on 25 July.

c. Seaplane Unit (TU 1.6.3)

In addition to providing air transportation between EBEYE and BIKINI in the period between the two tests, and also preparing six PBMs to perform assignments similar to those executed on ABLE Day, Task Unit 1.6.32 prepared two new seaplanes for participation in Test BAKER; namely CHARLIE TWO, a radiological reconnaissance PBM, and EAGLE EYE, a special observation PBM.

Task Unit 1.6.33 continued its air-sea rescue and transportation mission between the two tests. For BAKER Day the unit's mission was altered to provide two PBM air-sea rescue standby aircraft, DUMBO FOUR and DUMBO FIVE, in addition to the three air-sea rescue seaplanes which had participated in Test ABLE.

Preparation for BAKER Day included maintenance and test flights of all aircraft, and participation in the two coordinated air rehearsals on 14 and 19 July. Necessary maintenance was performed by CASU (F) 34 on EBEYE.

d. Weather Reconnaissance and Air-Sea Rescue

Naval PB4Ys from VPW-1 and VP-116 under the Commander of KWAJALEIN ATOLL also assisted in weather reconnaissance and air-sea rescue missions. Maintenance of these aircraft was performed by CASU-8.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

F. PARTICIPATION IN TEST BAKER

1. Introduction: Command Echelon

a. Decision to Execute Test BAKER on 25 July

It was decided at the Staff Conference held on the MT MCKINLEY at 0830 on 24 July that the second test would be held the following day. At 0907 the Commander Joint Task Force ONE sent the following dispatch to the Commanders of Task Group 1.5, Task Group 1.6, Task Unit 1.6.3, Task Unit 1.5.6, and Task Unit 1.1.3: "Twenty Five July is BAKER Day. Execute Air Op Order Number 2-46. HOW Hour is 0835 Love."

b. Final Confirmation of Decision

Although the Aerological Section had predicted favorable weather for 25 July the forecast was made with a low degree of confidence. Throughout the morning and early afternoon of 24 July weather reconnaissance aircraft were carrying on observations. Two B-29s left KWAJALEIN at 0312 and 0413, and two PBYs took off from their base at 0605 and 0606. A fifth weather reconnaissance aircraft, a B-17, took off at 0729. The last of these aircraft landed approximately at 1430. The reports from these aircraft showed improvement in the prevailing situation. At the weather briefing held at 2200 it was predicted that despite possible showers during the night the following day would be favorable for the test. Therefore at 2204 the Commander, Joint Task Force ONE sent a dispatch to the

Commanders of Task Groups 1.5 and 1.6 and to the Commanders of Task Units 1.6.3, 1.5.6, and 1.1.3 confirming his decision to hold Test BAKER on 25 July. The first predicted RADEX was set as "two six zero clockwise to three six zero true. Red ten Blue fourteen." Further predictions before final briefing were promised if available.

c. Evacuation of BIKINI LAGOON

The evacuation of BIKINI LAGOON began during the afternoon of 24 July and was practically completed by sunset with only a few ships of the observer fleet remaining overnight in the lagoon. As in Test ABLE the MT MCKINLEY carrying the Commander, Joint Task Force ONE and the Deputy Task Force Commaner for Aviation was the last ship to depart, reaching the open seas at 0630 on 25 July. The flagship then proceeded to Point ZEBRA, bearing 090° (T), 10 NM from the center of the Target Array. It was from this point that the Air Staff observed Test BAKER.

d. Summary of Air Operation Plan

The Air Operation Plan for BAKER Day differed but slightly from that of ABLE Day, and the number of aircraft remained approximately the same. The similarity in scope and purpose of the two tests may be seen by comparing the following table with that on page VII - (E) - 136:

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC [illegible] CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

PRIMARY MISSION	NUMBER OF AIRCRAFT ARMY	NAVY	TOTAL
Command	2	0	2
Drones	4	3	7
Drone Control	5	12	17
Drone Boat Control	0	4	4
Day Photography	10	12	22
Night Photography	1	0	1
Radiological Survey	3	3	6
Pressure Gauge Dropping	2	0	2
Radiometry	0	1	1
Air Sea Rescue	3	4	7
Weather Reconnaissance	3	0	3
Orientation	3	1	4
Sonor	1	0	1
Total	37	40	77

The plan of operations was also essentially the same as that used on ABLE Day. There were eight circles circumscribed around the perpendicular projection of the center of the Target Array at various altitudes. The first and highest of the circles was on a radius of one NM horizontal range at an altitude of 30,000 feet. There were four circles at altitudes of 25,000 feet, 24,000 feet, 15,000 feet and 12,500 feet with radii of seven NM slant range. Again, as on ABLE Day there were Orbit Points fixed upon true bearings of the Center of the Target Array but they were drawn much closer to the point of detonation as may be seen by comparing the table on page VII - (E) - 138 with that given below:

ORBIT POINT	BEARING FROM TARGET CENTER	DISTANCE FROM TARGET CENTER
ABLE	045°(T)	20 NM
EASY	090°(T)	20 NM
SUGAR	135°(T)	20 NM
BAKER	225°(T)	20 NM
WILLIAM	270°(T)	20 NM
LOVE	315°(T)	30 NM
VICTOR	315°(T)	20 NM
YOKE	045°(T)	07 NM
ZEBRA	090°(T)	10 NM
CHARLIE	177°(T)	09 NM
KING	225°(T)	09 NM
DOG	328°(T)	09 NM

REFERENCE POINT	BEARING FROM CENTER BIKINI ISLAND	DISTANCE FROM CENTER BIKINI ISLAND
NAN	000°(T)	20 NM
TARE	135°(T)	40 NM

There was no bomber aircraft in Test BAKER, but there were two Command Aircraft. The requirements were that they should arrive within the vicinity of BIKINI with an altitude of 16,500 feet and be not closer to the Center of the Target Array than seven NM at detonation.

The pattern of operations for BAKER Day was pulled in toward the Center of the Target Array from a maximum distance of 50 NM to 20 NM and from a minimum distance 7 NM slant range to one NM horizontal range. With the exception of the first circle circumscribed about the projection of the Center of the Target Array at 30,000 feet, and the

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
NO MILITARY CLASSIFICATION SAFEGUARDS

circles of the two Blast Gauge Aircraft at 25,000 feet and 24,000 feet, all other aircraft were kept at 18,000 feet or below.

The radiological safety measures remained essentially the same for Test BAKER.

2. Participation in BAKER Day Operations by Army Air Forces

a. AAF Preparations for BAKER Day

During the three weeks between ABLE Day and BAKER minus one all AAF Units were put in readiness for the second test. Changes in the Operation Plan were practiced, and the necessary maintenance on aircraft was properly performed. Consequently when the dispatch came through on 24 July from the Commander, Joint Task Force ONE designating the morrow as BAKER Day no further preparations were required other than final briefings and the routine last minute inspections of aircraft and equipment.

b. Take-Off and Mission of Three Weather Reconnaissance Aircraft on BAKER Day

As on ABLE Day, so on BAKER Day the first aircraft to be airborne were the three B-29s of the Weather Reconnaissance Unit. They took-off at 0108, 0222 and 0231. They made weather patrols to the north and east of BIKINI LAGOON. Then from 0500 to shortly before HOW Hour

the three aircraft orbited the area of the lagoon, with a radius of approximately 30 miles, collecting and forwarding complete weather data. They maintained altitudes of 1,500 feet, 8,000 feet, and 14,000 feet.

c. Take-Off From Base and Arrival on Stations of Other AAF Aircraft

(1) Two Command Aircraft (arrived on station 0547 and 0625)

At 0506 the Command Aircraft and 0526 the assistant Command Aircraft, both B-29s, took-off from KWAJALEIN. They arrived off BIKINI at 0547 and 0625 at altitudes of 16,500 feet.

(2) Nine Photographic Aircraft (arrived on station 0708 and 0715)

The nine photographic aircraft were divided into two flights, the first consisting of seven F-13s, known as EGGLESTONS, and the second consisting of two C-54s, known as PLAYBOYS.

The EGGLESTONS left KWAJALEIN at one minute intervals between 0535 and 0542. They proceeded to a Reference Point, TARE, bearing 135° (T), 40 NM from the Center of the Target Array. From there they proceeded across the Target Array at an altitude of 15,000 feet on a course of 315° (T). Then turning right, they crossed the Target Array again on a course of 225° (T). After the second

RESTRICTED DATA
CIVIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

crossing they took individual stations equally spaced on a circle with a radius of seven miles slant and circled counter clockwise. They reported on station at 0708.

The PLAYBOYS took-off at 0630 and 0631 and reached Reference Point TARE with an altitude of 12,500 feet. They then crossed the Target Array once and took stations 90° apart on a circle which also had a radius of 7 NM slant range from the Center of the Target Array. They reported on station at 0715.

(3) Three Orientation Aircraft (arrived on stations 0714 - 0727)

There were three orientation aircraft, a C-54 for important observers, a B-29 for radio broadcast, and a B-29 for press photography. Originally it had been planned to have two C-54 (observer) aircraft but on 23 July the Commander, Joint Task Force ONE ordered one of these aircraft to be eliminated and a PBM to carry the Joint Chiefs of Staff Evaluation Board was substituted. Hence there were only three AAF orientation aircraft participating in Test BAKER. The C-54 took-off from KWAJALEIN at 0714. The press photography and radio broadcast aircraft left KWAJALEIN at 0617 and 0614 and arrived at Orbit Point ABLE at 0723

and 0727 with altitudes of 7,000 and 4,000 feet. Immediately upon arrival at Orbit Point ABLE these aircraft closed to a distance of five NM from the extremities of the Target Array where they circled counter clockwise until 0805. Then, preserving their altitudes, they withdrew to three circles with radii of not less than 10 NM slant range from the center of the Target Array where they orbited until MIKE Hour.

(4) Two Pressure Gauge Aircraft (arrived on station at 0732)

The two B-29 Pressure Gauge aircraft, known by code names as APPENDIX ONE and TWO, took-off at 0550 and 0551 and proceeded to Orbit Point ABLE. Thence they took stations, at 0732, separated by 180°, on a circle with a radius of seven NM slant range from the Center of the Target Array. One had an altitude of 25,000 and the other 24,000 feet.

(5) Three B-17 Air-Sea Rescue Aircraft (arrived on station 0757)

The function of the B-17 Air-Sea Rescue aircraft known as MILKPAIL NINE was to reinforce air-sea rescue facilities for the Drone Control aircraft between the target and ENIWETOK. MILKPAIL NINE took-off from KWAJALEIN at 0521. It proceeded to DR Point 11° 21' N - 163° 00' E and thence to Orbit Point WILLIAM where it reported at

RESTRICTED DATA
ATOMIC ... OCT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USN MILITARY CLASSIFICATION SAFEGUARDS

0757 with an altitude of 6,500 feet. It then continued its flight to DR Point 11° 32' N - 164° 32' E where it remained throughout the operations. Two Dumbos were stationed along the route of the drones from ENIWETOK to BIKINI.

(6) Five Drone Control and Four Drone Aircraft (arrived on station at 0803)

These nine aircraft left ENIWETOK approximately at 0535 and reported on their stations at 0803. Originally, it had been planned to have all four drones enter the cloud from the east. But since it was essential to have Drones FOX and GEORGE directly over the target at HOW Hour, exact timing in their flights became important. It was decided to have these two aircraft enter the cloud from the west so they could use BORO ISLAND, in the west end of the atoll, as a fixed starting point for this run. Therefore FOX and GEORGE had as their station an Orbit Point one mile south of BORO ISLAND with altitudes of 6,000 feet and 16,000 feet. HOW and LOVE had Orbit Point EASY as their station and altitudes of 7,000 and 11,000 feet. The Master control aircraft was at Orbit Point WILLIAM. At first it was intended for the Master Control to have an altitude of 7,000 feet but it was found that a greater height would improve visual and radio control. Hence the altitude

of the Master Control was increased to 18,000 feet. Between the time of their arrival on station and 0915, Drones FOX and GEORGE were sent on two practice runs across the Target Array. Just before HOW Hour FOX and GEORGE were both dispatched toward the Center of the Target Array to be directly over the point of detonation at the moment of the explosion. In order to assist them in their operation a radio beacon was installed on a ship in the Target Array and this proved to be of great assistance in placing the drones over the point of detonation with precise timing and proper positioning.

(7) One F-13 for Vertical Photography (arrived on station at 0735)

One F-13, EGGLESTON TEN, was used for vertical photography of the blast. The aircraft took-off at KWAJALEIN at 0542 and at 0735 it reported on station, 10 NM upwind from the center of BIKINI ISLAND. Originally it had been intended to have this aircraft directly over the Center of the Target Array at HOW Hour. It was found however that the F-13 could not take such high altitude without mechanical difficulties. But the blast "cap" rising directly over the target prohibited operation at a lower altitude for vertical photography. Therefore a compromise became necessary and

RESTRICTED DATA
AEC - 1946
CLEARANCE NOT REQUIRED
MILITARY CLASSIFICATION SAFEGUARDS

EGGLESTON TEN was directed to leave its station in time to reach a point at the instant of detonation, tangent to a circle centered directly above the Center of the Target Array, with a radius of one NM horizontal range, to procure "near vertical" photography.

d. Summary of Army Air Forces Aircraft Airborne at HOW Hour

At 0835 there were 32 Army aircraft operating near BIKINI LAGOON or actually participating in the pattern of air activity over the Target Area and its immediate vicinity. To the west of BIKINI were three air-sea rescue aircraft. To the north and east were three weather reconnaissance aircraft. Near the scene of operations were two B-29 Command Aircraft. Within the pattern of Orbit Points and circles concentric with the Center of the Target Array at altitudes between 4,000 and 30,000 feet were nine B-17 Drone and Drone Control aircraft, two C-54 and eight F-13 Photographic aircraft, two B-29 and one C-54 Orientation aircraft, and two B-29 Pressure Gauge aircraft. Later in the day five other Army aircraft performed missions making a total of 37 AAF aircraft airborne during BAKER Day.

e. Detonation occurred at 0835.

f. Missions After Detonation

(1) Five Drone Control and Four Drone Aircraft (off station at 0850)

At the moment of detonation Drone FOX and Drone GEORGE were over the target, the former at 6,000 feet and the latter at 16,000 feet. Drone FOX was damaged by the shock wave which struck the aircraft at MIKE Hour plus five seconds.

The plane gained about 60 feet in altitude, the bomb bay doors were warped, all inspection plates were blown open, the tail gunner's escape hatch was blown inside the aircraft, the canvas covering over the tail wheel well was split, and standard aircraft cushions inside were burst. At MIKE Hour plus 10 seconds the shock wave struck Drone GEORGE. The aircraft gained 300 feet but sustained no visible damage. Drone HOW and Drone LOVE passed over the Center of the Target Array at MIKE Hour plus five minutes and eight seconds and at MIKE Hour plus seven and one-half minutes. Drone HOW passed through the atomic cloud at 7,000 feet and Drone LOVE at 11,000 feet passed over the top of the cloud. On the route back to ENIWETOK the radio control transmitter failed aboard Control LOVE, but Drone LOVE held course, altitude and air speed until the spare Control aircraft made interception.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AUG 1 - 1946
CLEARANCE NOT REQUIRED
RESTRICTED SPECIFIC RESTRICTIONS
USE MILITARY CLASSIFICATION SAFEGUARDS

- -

When the Controls and Drones reached ENIWETOK the Army Field Recovery Unit (TU 1.5.62) took over. Landing of all nine aircraft was accomplished between 0943 and 1001. Drone HOW was damaged when it ran off the end of the runway and over an embankment due to weak braking and down wind landing conditions. No other landing incident occurred. Drone engines were cut remotely, the tailwheels were disengaged from outside the aircraft and each aircraft was towed to the parking area where filters, air bags, and films were removed by Manhattan personnel and were flown to KWAJALEIN for processing.

(2) Three B-17 Air-Sea Rescue Aircraft (off station at 0913)

The B-17 Air-Sea Rescue Patrol remained on station at DR Point 11° 32' N - 164° 32' E until the drones passed on their return flight to base. Then the air-sea rescue patrol left for KWAJALEIN and landed at 1236. The two DUMBOS stationed along the route also returned to base at ENIWETOK following the drones.

(3) Three Weather Reconnaissance Aircraft (off station 0919 - 0930)

The mission of the three weather reconnaissance aircraft was completed at MIKE Hour but they remained on station for nearly another hour. They landed between 1018 and 1032.

(4) One F-13 for Vertical Photography (off station at 0850)

The F-13 used for vertical photography, EGGLESTON TEN, made its run over the target at detonation time arriving six seconds early at its briefed position of 30,000 feet one mile horizontal range from the vertical projection of the Center of the Target Array. It accomplished its mission successfully, left its station at 0850 and landed 0950.

(5) Two B-29 Pressure Gauge Aircraft (off station at 0851)

One of the B-29 Pressure Gauge aircraft developed an oil leak through the rocker box cover and cross-over line plug in #3 engine which may have caused the smoking as reported by one of the lookouts aboard the MT MCKINLEY. These difficulties however did not interfere with the successful release of the blast gauge instruments. The aircraft were off station at 0851 and landed at 0950 and 0959.

(6) Nine Photographic Aircraft (off station at 0858 and 0906)

After the shock wave the nine photographic aircraft closed in to five miles of the atomic cloud. Seven EGGLESTONS were off station at 0858 and five of them landed at KWAJALEIN between 1012 and 1029. Two others, EGGLESTON SIX and EGGLESTON SEVEN, assumed new stations as radiological aircraft.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
FOR MILITARY CLASSIFICATION SAFEGUARDS

The two C-54 Photographic aircraft, PLAYBOY ONE and PLAYBOY TWO, were off station at 0906 and landed at KWAJALEIN at 1021 and 1022.

The entire mission of the photographic aircraft was performed as briefed. There were several minor mechanical malfunctions encountered by the aircraft but none was sufficiently serious to interfere with the execution of the mission. There were 166 motion picture cameras installed on the photographic aircraft and 45,760 feet of motion picture film were taken. There were 111 still cameras and 12,567 exposures.

(7) Three Orientation Aircraft (off station at 0906, 0932 and 1005)

After the passing of the shock wave the three orientation aircraft were permitted to close to five miles from the atomic cloud but north of its east-west line. The first of these aircraft to go off station was the B-29 Radio Broadcast aircraft which left at 0906 and landed at 1010.

At 0900 the B-29 Press Photography aircraft requested and received permission to remain in operation 30 minutes longer. It was off station at 0932 and landed at 1033.

At 0851 the C-54 VIP Observers' aircraft requested an extra 30 minutes. The request was repeated at 0935. Both requests were granted. This aircraft therefore was not off station until 1005, MIKE Hour plus 90 minutes. It landed at 1120.

(8) Two B-29 Command Aircraft (off station at 0903 and 1040)

By 0900 a large portion of participating aircraft were off station and bound for base. Accordingly it was deemed no longer necessary to have the Assistant Command Aircraft in the area. This aircraft left station at 0900 and landed at 1019.

The Command Aircraft remained on station until 1040 when it too departed and landed at 1159.

(9) Late Missions of EGGLESTONS and PLAYBOYS

When the seven EGGLESTONS and two PLAYBOYS went off stations at 0858 and 0903 their work for the day was by no means finished.

EGGLESTON SEVEN and EGGLESTON SIX went immediately to a point 30 NM north of the cloud at an altitude of 15,000 feet and, serving as the Radiological Aircraft ANTIQUE TWO and ANTIQUE FOUR, continued to track and photograph the atomic cloud. At 1343

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

they were relieved respectively by EGGLESTON FIVE and EGGLESTON THREE. Observation of the cloud by the radiological aircraft continued until 1750 by which time EGGLESTON THREE and EGGLESTON FIVE were both off station.

Meanwhile at 1246 and 1252 EGGLESTON ONE and PLAYBOY ONE took-off, the former for Sone-strip and the latter for regular photographic work over the Target Array. They reported on station near the Target Area at 1355 and 1402. Between then and the time they were off station they made sweeps over the Target Array at low altitudes between 1500 and 1200 feet and photographed unusual incidents such as the sinking of the SARATOGA. PLAYBOY ONE was off station at 1635 and EGGLESTON ONE was off station at 1653.

At 1540 EGGLESTON FOUR took-off from KWAJALEIN as the NIGHTOWL, and reported on station in the vicinity of BIKINI at 1649. The NIGHTOWL continued its mission throughout the remainder of the afternoon and landed at 1907, thus concluding AAF operations on BAKER Day.

(10) Alerted Aircraft Which Were Not Airborne

Throughout the day five C-54s were on ENIWETOK prepared to evacuate personnel should an emergency arise.

There were also two B-17 DUMBOS on KWAJALEIN prepared to become airborne on 20 minutes notice. The alert for the FILMSTOCK Evacuation Unit was cancelled at 1411. The alert for the DUMBOS lapsed with the coming of darkness.

3. Participation in BAKER Day Operations by Navy Air Units

a. Navy Preparation for BAKER Day on BAKER Minus One

The first elements of the Navy Air Group which began movement to BAKER Day stations were the aircraft carriers and their guard destroyers. At 0630, 24 July, the SAIDOR, the Photographic Carrier, accompanied by the destroyers PURSE and H. K. PERRY, departed from BIKINI LAGOON to take up position within a sector limited by 45° and 75° north of the Sector Axis (Area PAIGE); and at 1610 the SHANGRILLA, the Drone Carrier, accompanied by the destroyers TURNER and CECIL, got underway from her anchorage off ROI ISLAND to assume her position within 15 NM of Reference Point TARE, 40 NM from the center of BIKINI ISLAND. The last seaplane from BIKINI landed at EBEYE at 1614, and the last photographic F6F had completed its BAKER minus one photography and had landed on the SAIDOR at 1745. Final inspections of all aircraft and equipment had been completed meanwhile and by the end of 24 July all were in readiness for the execution of the BAKER Day air plan the following morning.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

b. Operations Prior to Detonation at 0835

(1) Take-Off and Arrival on Station of Ten PBMs from EBEYE (0502 - 0713)

The first Navy aircraft to be airborne on 25 July were 10 PBMs of Task Unit 1.6.3 from EBEYE which took-off between 0501 and 0617, reporting to their respective stations in the BIKINI AREA between 0645 and 0713. The movement of these seaplanes was as follows:

(a) Seven PBMs of Seaplane Patrol Squadron (TU 1.6.32)

A radiological reconnaissance seaplane, DOG, taking-off at 0501, was the first Navy aircraft to depart from EBEYE for BIKINI on BAKER Day. It was followed at 0516 by a second radiological reconnaissance seaplane, CHARLIE ONE. By 0655 both DOG and CHARLIE ONE were orbiting on their assigned stations at Orbit Point ABLE, bearing 045° (T), 20 NM from the Target Center at 2,000 feet. Meanwhile, three photographic seaplanes, TARE, UNCLE and WILLIAM were airborne between 0537 and 0542, and by 0705 all had reported on station at Orbit Points CHARLIE, KING and JOG, respectively, each 9 NM from the Target Center, where TARE

and UNCLE orbited in a loose formation at 10,000 feet, and WILLIAM at 8,000 feet. The Reflectometry Seaplane, HOTPOINT, departed at 0505 and at 0645 was on station at Orbit Point YOKE, bearing 045° (T), at 9,500 feet, 7 NM from the Target Center. EAGLE EYE, the Observation PBM which had replaced one of the Army C-54s which had performed a similar mission in Test ABLE, was off the water at 0545 and at 0713 was at its station approximately 10 NM from the Target Center, bearing 285° (T), at 8,000 feet.

(b) Three PBMs of the Air-Sea Rescue Squadron (TU 1.6.35)

Three air-sea rescue seaplanes were also taking-off from the lagoon at EBEYE during the same interval. DUMBO ONE was airborne at 0510 and at 0646 arrived at its station at Orbit Point LOVE, bearing 315° (T), 30 NM from Target Center at 3,000 feet. DUMBO TWO departed at 0513 and at 0647 assumed its position at Orbit Point ABLE, bearing 045° (T), 20 NM from the Target Center at 3,000 feet. DUMBO THREE departed last at 0617 and at 0709 was on station at 7,000 feet over MOTHO ATOLL, 90 NM from the Target Center.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

(c) Take-Off and Pre-Detonation Mission of Six Photo FGFs From the SAIDOR (0835 - 0750)

Six F6F Photographic aircraft, a QUEEN Flight of four, SUGAR, and ROGER, of the Photographic Carrier Unit (TU 1.3.6) were launched from the SAIDOR between 0835 and 0704. The mission of the group was primarily to obtain vertical and trimetrogon photography of the Target Array immediately prior to the detonation of the atomic bomb. All six of the F6Fs flew directly from the Photographic Carrier to positions 5 ... east of BIKINI ATOLL, reporting on station between 0710 and 0715. The QUEEN Flight made the first run accomplishing vertical mapping of the Target Array at 0742 from 10,000 feet, bearing 225° (T), with a 3/10th cloud cover; and at 0820 the flight made a second vertical mapping run from 20,000 feet from the same direction and with the cloud coverage unchanged. Its mission completed, the QUEEN Flight left the Target Area at 0835 and returned to the SAIDOR. In the interval, F6F SUGAR at 0710 made a camera calibration run over BIKINI ISLAND at 500 feet, then climbed to 3,500 feet where at 0725 it commenced trimetrogon photography of the Target Array, making runs from bearings 040° (T) and 320° (T) before returning to the SAIDOR at 0835. F6F ROGER made a pass

over BIKINI ISLAND from 600 feet at 0750 and took up station 10 NM northeast of the Target Array to await the detonation and the continuation of its assignment.

(3) Take-Off, Arrival on Station, and Pre-Detonation Mission of Three Photo TBMs From the SAIDOR (0659 - 0745)

Three TBMs, NAN ONE, NAN TWO, and OBOE, of the Photographic Carrier Unit (TU 1.6.2) were launched from the SAIDOR between 0659 and 0710, and by 0745 all were on station. The two NANs were at Orbit Point YOKE, bearing 045° (T), 7 NM from the Target Center at 10,500 feet. OBOE, however, proceeded first to NAMU ISLAND on BIKINI ATOLL where from 4,000 feet it turned counter-clockwise around the Target Center to enable the turret photographer to make obliques of the target disposition. At 0745 OBOE was on station one NM southeast of the south tip of ENYU ISLAND, and at MIKE Hour it was again circling the Target Center from 4,000 feet.

(4) Take-Off and Arrival on Station of Three Drone and Twelve Drone Control F6Fs From the SHANGRI-LA (0730 - 0814)

Launching of three F6F Drones and 12 F6F Drone Control aircraft of the Drone Carrier Unit (TU 1.6.1)

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
U.S. MILITARY CLASSIFICATION SAFEGUARDS

started at 0703, and by 0814 the three drone groups were on station. First to be launched were the two F6Fs of each the RED, WHITE and BLUE Primary Drone Control Sections; then the RED, WHITE and BLUE F6F Drones; and last the two F6Fs of each the RED, WHITE and BLUE Secondary Drone Control Sections. All aircraft of the three groups rendezvoused over the Drone Carrier before proceeding to their assigned stations. At MIKE Hour the Primary Drone Control Sections were orbiting with their drones at Orbit Point VICTOR, bearing 315° (T), 20 NM from the Target Center, at the following altitudes: RED 14,000 feet, WHITE 9,000 feet, and BLUE 5,000 feet. The Secondary Drone Control Sections took up their positions on the opposite side of the Target Axis at Orbit Point SUGAR, bearing 135° (T), 20 NM from the Target Center, at altitudes corresponding to the other elements of their respective groups.

c. Status of Navy Aircraft at Detonation at 0835

A total of 34 Navy aircraft had been launched between 0701 and 0750, and 28 were orbiting on station at the time of detonation. Five F6Fs of the Photographic Carrier Unit had completed pre-explosion photography of the Target Array and had returned to the SARATOGA.

In readiness to be airborne were two PBMs, CHARLIE TWO and DUMBO FOUR at EBEYE, and four TBMs, BUCKO ONE, TWO, THREE and FOUR, aboard the SAILOR.

d. Operations After Detonation at 0835

(1) One Radiometry PBM

The Seaplane HOTPOINT at 0835, from its orbit point at 9,500 feet, 7 NM from the Target Center, took up a course heading 335° (T) so that the point of detonation was within 5° of the bore-sighted axis of the radiometric equipment. Remaining at the same altitude, successful operation of the radiometric, photometric, and spectrographic equipment was effected before HOTPOINT's departure from the area at 0852.

(2) One minute before the detonation three seaplanes, TARE, UNCLE and WILLIAM, moved from their Orbit Points to positions tangent to the circle approximately 8 NM from the Target Center. TARE and UNCLE then flew a course from 12,000 feet generally along the periphery of the circle in a counter-clockwise direction. Each plane flew at approximately 135 knots taking synchronized photographs of the waves and water column thrown up by the explosion. Seaplane TARE at 0834 and 0845 also transmitted synchronizing signals in order to effect simultaneous operation of the airborne and ground tower cameras. The three PBMs completed their runs by 0907 and immediately departed for EBEYE.

RESTRICTED DATA
VII - (E) - 224 ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
FOR MILITARY CLASSIFICATION SAFEGUARDS

(3) One Photographic F6F

ROGER, the only Photographic F6F still airborne at detonation, was orbiting at 11,000 feet, 10 NM northeast of the Target Center. It immediately approached within 5 NM of the cloud column, taking motion pictures and other photographs of the cloud column and aircraft in the vicinity. The mission was completed by 0900 when ROGER returned to the Photographic Carrier.

(4) Three Photographic TBMs

Two of the Photographic TBMs, NAN ONE and NAN TWO, were orbiting in loose formation 7 NM from the Target Center at MIKE Hour. Both then began to circle the cloud column at approximately 5 NM from its center in a counter-clockwise direction, and photographed the cloud and the aircraft in the vicinity from an altitude of 10,500 feet. Meanwhile, the third Photographic TBM, OBOE, moved from its station one NM from the southeast of the south tip of ENYU ISLAND to within approximately 5 NM of the cloud column where from 4,000 feet it also circled in a counter-clockwise direction while effecting photography of the cloud and the aircraft in the vicinity. The three planes completed their missions between 0905 and 0908 and returned to the SAIDOR.

(5) One Observation PBM

The Observation Seaplane, EAGLE EYE, was on course 285° (T) at 7,900 feet approximately 10 NM from the Target Center at the time of detonation. It orbited in the same general position until 0908 when it returned to EBEYE.

(6) Three Drone and Twelve Drone Control F6Fs

The RED, WHITE and BLUE drone groups, of one drone and four Drone Control F6Fs each, were at their stations 20 NM from the Target Center, at the time of detonation. Moving toward the Target Array after the explosion, the Primary Drone Control Sections controlled the drones into the cloud column as follows: the RED Drone at 0841 from 14,000 feet; the WHITE Drone at 0845 from 9,000 feet; and the BLUE Drone at 0847 from 5,000 feet. The Secondary Drone Control Section reported "Tally-Ho" of the drones at approximately the same altitudes as follows: RED at 0850, WHITE at 0847, and BLUE at 0849. Since the cloud of water and steam did not reach the altitude which had been expected, the RED and WHITE Drones at the higher altitudes passed over the top of the cloud, and the BLUE Drone at 5,000 feet flew through the upper portions of the column.

RESTRICTED DATA
ATOMIC ... ACT - 1946
... CLEARANCE NOT REQUIRED
... MILITARY ... IFICATION SAFEGUARDS

Interception was effected without difficulty in each case, and all drones were controlled to ROI ISLAND and landed without damage between 0950 and 1006. All air filters, cameras and other special installations operated satisfactorily except for the camera installation in the RED Drone where a relay failed to provide power for the operation of the K-17 and gun cameras.

(7) Four Drone Boat Control TBMs

At detonation the four Drone Boat Control TBMs, BUCKO ONE, TWO, THREE and FOUR, were standing by aboard the SAIDOR ready for launching. All four took-off between 0846 and 0849. BUCKO TWO and BUCKO FOUR stood by in the air over the carrier as replacements while BUCKO ONE and BUCKO THREE proceeded to an upwind position from the Drone Boats, FACTORY ONE and FACTORY THREE. Remaining approximately 5 NM upwind of the drone boats which were controlled on course and speed by the BEGOR from its position outside the lagoon, BUCKO ONE at 2,300 and BUCKO THREE at 2,600 feet, conned the courses of FACTORY ONE and FACTORY THREE by voice radio as they moved through the radioactive waters near the Target Area. They also carried out instructions received

by voice radio from the BEGOR. BUCKO ONE completed its conning assignment at 1055 and BUCKO THREE at 1105. The two standby aircraft were also off station at 1105. In the afternoon, between 1508 and 1754, similar conning assignments were carried out by BUCKO TWO and BUCKO FOUR, while BUCKO THREE stood by in the air over the SAIDOR as a replacement.

(8) Three Radiological Reconnaissance PBMs

Two radiological reconnaissance seaplanes, CHARLIE ONE and DOG, were orbiting at 2,000 feet 20 NM from the Target Center at MIKE Hour. Immediately after the explosion, CHARLIE ONE proceeded to a position 5 NM upwind from the Target Center, then approached within approximately 3 NM at 4,000 feet, and at 0915 began traversing the radiologically active area in a series of sweeps along parallel tracks normal to the wind direction, covering a rectangle roughly 6 NM by 5 NM. The paths of the sweeps were not regular because the course was shifted each time a highly contaminated area was encountered. CHARLIE ONE made sweeps at 3,000, 2,000, 1,000 and 500 feet, and then orbited the Target Array at 500 feet from 4 NM before departing for EBEYE at 1304 after being relieved by CHARLIE TWO. PBM DOG

RESTRICTED DATA
ACT - 1946
CLEARANCE NOT REQUIRED
CATION SAFEGUARDS

in the meantime had first made sweeps over the area occupied by the vessels of Joint Task Force ONE northeast of BIKINI ATOLL, reporting on the radioactivity encountered. Then as CHARLIE ONE reported completion of each of its sweeps over the Target Area, DOG came in at 1008 and flew four similar flight patterns at the same altitudes. After completing its radiological sweeps at 1214, DOG orbited over the Target Area and photographed the SARATOGA between 1215 and 1319 and then departed for EBEYE. After relieving CHARLIE ONE at 1258 CHARLIE TWO at 1330 and 1334 made photographic runs over the SARATOGA, and then at 1400 commenced the first of two photographic runs over the Target Array at 1,500 feet. After lowering to 1,000 feet, CHARLIE TWO made eight radiological reconnaissance sweeps over the contaminated area between 1425 and 1506. Then at 400 feet it executed a Sonar run 2 NM west of the Target Area between 1535 and 1545. From 1,000 feet photography of the sinking of the SARATOGA was taken between 1552 and 1610. CHARLIE TWO departed for EBEYE at 1615.

(9) Three Air-Sea Rescue PBMs

No rescue incidents developed and the air-sea rescue seaplanes left the area as follows: DUMBO THREE at 0952, DUMBO TWO at 1120, and DUMBO ONE at 1243. DUMBO FOUR which relieved DUMBO ONE at 1243 remained on station until 1619.

4. Summary of BAKER Day Air Operations

a. Flying time of all aircraft participating in the BAKER Day operation on 25 July 1946 was as follows:

ARMY AIR FORCES

Mission	Model	Airborne	Total Time Airborne	Total Time On Station	Average Time Airborne	Average Time On Station
Command	B-29	2	11:46	7:34	5:53	3:56
Press & Radio	B-29	2	8:15	3:48	4:08	1:54
Tactical Recomn	B-29	3	24:19	20:18	8:06	6:42
Blast Gauge	B-29	2	8:03	2:36	8:08	2:36
Total	B-29	9	52:23	33:10	5:50	3:41
WLR Photo	F-13	7	32:00	13:00	4:50*	1:50
Navy Photo	F-13	1	4:08	0:57	4:08	0:57
Camera	F-13	1	5:17	3:03	5:17	3:03
Radiological Recomn	F-13	3	14:58	12:14	3:27	3:39
Total	F-13	12	58:13	35:14	4:51*	2:39
ASW Patrol	B-17	3	15:58	1:16	5:19	1:16
Drone Control	B-17	5	21:45	3:57	4:21	0:47
Drones	B-17	4	17:34	3:08	4:24	0:47
Total	B-17	12	55:17	3:21	4:36	0:50
Shock Wave Photo	C-54	2	7:42	3:42	3:51	1:51
Observer	C-54	1	5:26	2:51	5:26	2:51
Radiological Recomn	C-54	1	5:04	2:33	5:04	2:33
Total	C-54	4	18:42	9:06	4:41	2:17
TOTAL AAF	All	37	184:40	85:51	5:59	2:19

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS.

RESTRICTED DATA
RESTRICTED AUG - 1946
USE MILITARY CLASSIFICATION SAFEGUARDS CLEARANCE NOT REQUIRED

NAVY AIR UNITS

Mission	Model	Airborne	Total Time Airborne	Total Time On Station	Average Time Airborne	Average Time On Station
Air-Sea Rescue	PBM	4	27:12	16:54	6:48	4:14
Radiol Reconn & Radiom	PBM	7	47:49	22:02	6:50	3:09
VIP Observer	PBM	1	5:11	2:41	5:11	2:41
Total	PBM	12	80:12	41:39	6:41	3:28
Photo	TBM	3	7:21	5:13	2:27	1:44
Drone Boat Conning	TBM	4	19:10	17:08	2:44	2:27
Total	TBM	7	26:31	22:21	2:39	2:14
Vert & Trimet Photo	F6F	6	14:42	7:02	2:27	1:00
Drone Control	F6F	12	22:28	11:10	1:14	0:12
Drones	F6F	3	6:42	2:49	2:14	0:56
Total	F6F	21	44:12	21:01	2:06	0:57
TOTAL NAVY	All	40	150:55	85:01	3:31	1:25
TOTAL AAF AND NAVY	All	77	335:35	170:52	4:12	2:08

b. Recapitulation:

(1) Aircraft Airborne:

ARMY		NAVY	
B-17	12	PBM	12
B-29	9	TBM	7
F-13	12	F6F	21
C-54	4		40
	37		

(2) Aircraft Aborted: None.

(3) Aircraft Lost: None.

(4) Personnel Lost: None.

5. Activity of Army and Navy Aircraft From BAKER Plus One Day Through BAKER Plus Six Days

a. Contamination of Lagoon Water by Radioactivity

The contamination of the waters of BIKINI LAGOON was much more pronounced and of much greater duration after Test BAKER than was the case after Test ABLE. Consequently there was need for continuation of Army and Navy air activity from BAKER plus one through BAKER plus six. This activity was primarily concerned with radiological reconnaissance and of course it involved drone boat conning. But there were also other missions to be flown. The instruments located on some of the islands along the lagoon reef required attention and they could be reached only by Helicopter transports. For five days after Test BAKER photography of the Target Array was an important function of aviation, and for the first three days there were also observer aircraft. Naturally this air activity necessitated the presence of air-sea rescue aircraft.

b. Number of Sorties Per Day

The most active day after Test BAKER was 26 July, or BAKER plus one day, when there were 28 sorties. On BAKER plus two days there were only 15, and on BAKER plus three days there were 14 sorties. Thereafter the number of sorties was steadily decreased. On

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

BAKER plus four days there were 10 sorties. On BAKER plus five days there were 4; and on 31 July, BAKER plus six days, there were 2 sorties. A total of 73 sorties were made during the six days; 29 by the Army and 44 by the Navy units.

c. Cessation of Operations

At 1631 on 31 July 1946, that is BAKER plus six days, the Commander, Joint Task Force ONE sent the following dispatch to Commanders, Task Group 1.5, Task Unit 1.6.3 and Task Unit 1.6.4: "Only air requirement for BAKER plus seven days are those of BIKINI-EBEYE shuttle...and ASR.... All NIGHTOWL and PLAYBOY missions have been completed."

d. The following table shows the nature and number of the missions flown from BAKER Day plus one through six:

DATE	MISSION	ARMY	SORTIES	NAVY	SORTIES	TOTAL
26 July	Radiological	F-13	6	PBM	2	8
	Drone Boat Conning		0	TBM	6	6
	Photography	C-54	2	F6F	3	5
	Observer	C-54	1		0	1
		B-29	1		0	1
	Helicopter		0	HOS	5	5
	Air-Sea Rescue		0	PBM	2	2
	TOTAL		10		18	28
27 July	Radiological	F-13	2		0	2
	Drone Boat Conning		0	TBM	3	3
	Photography	C-54	2	F6F	2	4
			0	PBM	1	1
	Observer	C-47	1		0	1
		C-54	2		0	2
	Air-Sea Rescue		0	PBM	2	2
	TOTAL		7		8	15

DATE	MISSION	ARMY	SORTIES	NAVY	SORTIES	TOTAL
28 July	Radiological	F-13	2	PBM	1	3
	Drone Boat Conning		0	TBM	4	4
	Photography	C-54	1		0	1
	Observer	C-47	1		0	1
		C-54	2		0	2
	Helicopter		0	HOS	1	1
	Air-Sea Rescue		0	PBM	2	2
	TOTAL		6		8	14
29 July	Radiological	F-13	1		0	1
		C-54	1		0	1
	Photography		0	F6F	4	4
				PBM	1	1
	Helicopter		0	HOS	2	2
	Air-Sea Rescue		0	PBM	1	1
	TOTAL		2		8	10
30 July	Radiological	F-13	1		0	1
		C-54	1		0	1
	Photography	F-13	1		0	1
	Air-Sea Rescue		0	PBM	1	1
	TOTAL		3		1	4
31 July	Radiological	F-13	1		0	1
	Air-Sea Rescue		0	PBM	1	1
	TOTAL		1		1	2
	GRAND TOTALS		29		44	73

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

V LESSONS LEARNED

A. Army and Navy weather reconnaissance aircraft were indispensable to the successful accomplishment of the aerological mission. The organization, set up to obtain the weather information that was so vitally important for the conduct of the tests, was able to provide accurate forecasts and factual weather information largely because of the data obtained by weather reconnaissance aircraft. The mobility of these aircraft permitted the collection of weather reports equivalent to the dense network of surface weather stations, and, in addition, they provided more detailed reports of cloud conditions then possible from surface stations. Care must be taken not to overlook the value of weather reconnaissance aircraft when meteorological information is of vital importance, or to underestimate the number of aircraft that are necessary.

B. The value of photography of all types was emphasized by this operation. There is no doubt that still photographs and moving pictures afford one of the most economical, rapid and accurate methods of recording data and events. On numerous occasions photographs were instrumental in detecting the inadequacies and inaccuracies of human observations. Moreover, photographic information may be studied leisurely for as long as necessary when analysis and evaluation are in process.

C. The soundness of having organizational air lift, such as Task Unit 1.5.4, was proved. Its usefulness in assisting in carrying peak loads, its ability to rapidly move personnel and cargo to and from points located off the established ATC and NATS lines, and its utility in performing miscellaneous tasks, demonstrated the advantages of having a unit of this type

included in the Task Force organization. Estimated or planned air lift requirements may be given to established air transportation agencies such as ATC and NATS, but in addition, organic air transport units should be provided in future Task Forces to take care of unforeseen emergencies and the almost inevitable bumps which occur in air traffic.

D. In the initial planning the need for 24 hour Voice Radio communications between the Deputy Task Force Commander for Aviation and his subordinate Air Commanders was not foreseen. As the operation progressed it became more and more apparent that such service was required. To provide it, utilization was made of press circuits to KWAJALEIN, and the XJ-4 voice radio circuit which had been set up primarily for the Deputy Task Force Commander for Technical Direction. After ABLE Day the last circuit was turned over to the Deputy Task Force Commander for Aviation. These expedients were not entirely satisfactory. It is vital that the Deputy Task Force Commander for Aviation have 24 hour voice radio communications or radio teletype conference facilities, with security safeguards, to his air units. This operation demonstrated the necessity for rapid and adequate communications to meet the need for urgent last minute conferences without which the efficiency of air operations might well have been jeopardized.

E. In the logistic support furnished at KWAJALEIN such items as water and electricity were at times inadequate. It was also necessary to divert personnel of air units from training and operations to stevedore and police work.

RESTRICTED DATA
AT VII [illegible] ACT - 1946
SPECIFIC RESTRICTIONS [illegible] CLEARANCE NOT REQUIRED
USE MILITARY [illegible] SECTION 7(c) GUARDS

While in these instances the deficiencies caused only minor inconvenience, and aggravation of these conditions could have jeopardized the air operations. It is important that a clear understanding of responsibilities for logistical support be had by all echelons of command. Facilities and services available should be surveyed early and any deficiencies brought to the attention of the Commander responsible. It is desirable in a specialized operation of this type, which is of short duration and limited scope as compared with full scale wartime operations, that air units be made as self sufficient as practicable, thus obviating much coordination with and reliance upon logistical agencies that are not adequately manned or equipped to support an operation of this kind.

F. The ABLE Day bombing produced a gross error which was four times the expected probable bombing error. A careful analysis of the possible causes for this error resulted in a preliminary finding that the crew performed its functions correctly and that there was no malfunction in the operation of the bombing equipment. Further study is being made on this subject.

G. The analysis of the bombing error also emphasized the need for more adequate data as to the position of the bombing plane during the bombing run by the use of ground radar, data recording motion picture cameras, and a better distribution of accurately surveyed ground check points.

H. Despite all efforts to the contrary on the part of the Task Force Commander and his officers in charge of public relations, news releases and publicity in the majority of cases tended to create, in the mind of the public, the impression that the tests were primarily a naval activity rather than a joint effort in which all services were participating and in which they were equally entitled to praise or censure. That this impression was easily, though unintentionally, made is not difficult to understand. One of the first purposes of the tests was to determine the effect of atomic bombs against naval vessels. The initial press releases describing famous naval vessels to be used as targets probably created the first impressions, accenting in the public mind the part of the tests naval in character. The locale of the tests, news items based upon the activities aboard ships of the Task Force, tended to heighten this aspect. No doubt the fact that the Task Force Commander and the ranking public relations officer were Naval Officers, the housing of the Commander and staff in the Navy Building, the predominance there of Navy Officers at early conferences and on duty in Task Force offices, furthered the effect upon correspondents and observers that this was primarily a Navy effort. At sea, Navy facilities for releasing press items were convenient, and headlines actually carried such comments as "Navy Atom Bomb Tests". A combination of these and other circumstances apparently tended to influence reporting and to a certain degree prevented the public from receiving a precise conception of the exact nature of the operation and the efforts being made by all the services. In addition there were occasional unauthorized releases which

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

further detracted from the efforts of the Task Force Commander to present the joint efforts of the operation. Obviously the influences described above made difficult the task of securing perfectly balanced, objective reporting of Operation CROSSROADS. In future operations of this kind great care should be exercised in preparing the initial releases lest impressions are made that will be difficult to erase later on. Publicity in joint operations should be a matter of active and continued study to reach solutions which will satisfy all agencies participating. It is believed desirable that publicity and public relations be controlled through a committee composed of representatives of the interested services. By this method the interests of all concerned would be fostered and protected and differences reconciled. Deadlocked issues could be settled by the Task Force Commander.

I. An operation of this type cannot be surpassed as a medium for training commanders and staffs in joint operations. The experience gained in planning, operations, and logistics is greatly increased by the fact that the problem is "live" and of great interest as compared with normal peacetime maneuvers which may tend to be lifeless and dull because they lack an objective that generates appeal, enthusiasm and interest.

VI COMMENTS AND RECOMMENDATIONS

A. Comments

1. Since the task of using atomic bombs in the defense of the UNITED STATES must fall upon our Armed Forces, it is of the utmost importance that they have a complete understanding of the tactics

and techniques used in their employment and be thoroughly trained in their use. The organization, training, equipment and deployments of units to use the atomic bombs should be carefully reviewed and perfected. Obviously there can be no lengthy period for reorganization and training after the outbreak of hostilities. The ability to use this weapon must keep pace with its development in the scientific laboratory. Any future war may certainly include the use of atomic bombs by both adversaries in which case victory may well go to the nation which most quickly and completely exploits the capacilities of this new weapon.

2. Since guidance and direction are necessary to units in the field, there should be established a section, on the staff of each of the major services which will concern itself with the problems involved in the military use of atomic weapons. These are the focal points at which our present knowledge should be gathered, the lessons learned in Operation CROSSROADS digested, and further advances initiated to exploit the use of atomic weapons for both offensive and defensive purposes.

3. The need for the establishment of a Radiological School seems most apparent. The radioactivity associated with the use of the atomic bomb is a new and dangerous aspect not heretofore encountered in military weapons. It concerns the civilian population as well as the military. A Radiological

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

School would provide an initial source for the dissemination of information relative to safety precautions in the handling of atomic weapons and the decontamination of exposed equipment. It could train radiological monitors and inspection teams. Suitable methods of passive defense and of counteracting the effects of radioactivity might be studied and developed for the safety of troop concentrations, industrial centers, and the civil population of heavily populated areas.

4. It is apparent that histories and reports of joint operations such as CROSSROADS will have great value and importance as references in the future. To insure balance and true perspective, it is desirable that each of the participating services contribute qualified personnel to collaborate in the preparation of reports and histories.

5. The variety and magnitude of the tasks performed by the Air Operations Section (J-32), and the importance of these tasks in the operations of Joint Task Force ONE, can hardly be over-emphasized.

Under direction of the Deputy Commander for Aviation this section accomplished all air planning, evolved the Air Operations Plan, assisted in supervising its execution, and devised methods to meet the day to day proolems encountered in training and in the employment of aircraft in the Atomic Bomb Tests. It was responsible for supervision of air-sea rescue activities within 150 miles of BIKINI. The air transport operation of Joint Task Force ONE in itself was comparable to the operation of a large commercial airline. In view of its importance to the Joint Task Force, the Air Operations Section should be separated and on an equal plane with other major sections in any future operations of this type. There is no reason why the close coordination cannot be effected that existed between J-1, J-2, J-3, and J-4. As in standard staff procedure the section having the paramount interest in an event or activity would be charged with the responsibility for coordination with other sections of the staff. The wide variance in technique and tactical employment of air operations, as contrasted with surface vessel operations, makes a division in the J-3 Section desirable. It is not necessary to carry this principle into the J-1, J-2, and J-4 Sections where the breach is not so marked. The Aerology Section should be a part of the Air Operations Section rather than J-3 under the plan proposed above.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
RESTRICTED SECURITY CLASSIFICATION SAFEGUARDS

6. The Deputy Task Force Commander for aviation was not always promptly furnished with copies of important communications pertinent to his office. Navy procedure was followed throughout by the Office of the Flag Secretary in effecting distribution of correspondence. It is suggested that in Joint Task Forces a combined Flag Secretary and Adjutant General be employed and that the administrative procedures of all services be considered and a satisfactory compromise procedure be adopted.

7. At times there was confusion in the minds of originators of messages as to how a message could be delivered to its destination without getting lost or delayed enroute. This confusion was due primarily to the lack of administrative call signes for Army commands and agencies. Many messages required extensive routing instructions within their bodies directed at signal centers to prevent mis-routing and delays. These instructions had to be wirtten by staff officers unfamiliar with the communications system. The assignment of administrative call signs to all Army agencies and thorough dissemination throughout Army and Navy agencies would have eliminated this confusion not only for the writers but also for the personnel who handled the messages.

8. Due to intensive boating between BIKINI and the Target Array which, for Test CHARLIE, will be outside the lagoon on the southwest side, the Helicopter Unit should be expanded to provide passenger shuttle.

9. The use of PBM-5A's rather than PBM-5's for the KWAJALEIN-BIKINI shuttle is desirable in order to eliminate boating of passengers, mail and freight between EBEYE and KWAJALEIN.

10. It is questionable whether information relative to the altitude from which the atomic bomb can be dropped should be restricted for reasons of security. it is self-evident that the safety of the bombing aircraft is the primary factor governing the altitude from which the bomb is dropped.

B. Recommendations

It is recommended that:

1. Studies now being conducted on the ballistic characteristics of the present atomic bomb be continued.

2. The procedures developed during this operation for the use of ballistic wind data to attain accurate bombing be incorporated in standard visual bombing methods.

3. The organization, training and equipment of air units designated to use atomic bombs be perfected.

4. A staff section in each of the major services be established to aggressively follow up the lessons learned and continue to give direction and impetus to the development of the tactics and techniques of atomic warface.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RECIPIENT ... CLEARANCE NOT REQUIRED
... MILITARY ... DISSEMINATION SAFEGUARDS

RESTRICTED DATA
AT. MIC. ... ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS
RESTRICTED

5. A Radiological School be established to disseminate information and instruct personnel in safety precautions and passive defense measures necessary to counteract the dangerous effects of radioactivity.

6. The development and use of weather reconnaissance aircraft be furthered.

7. In future joint operations similar to Operation CROSSROADS air units be made as self sufficient logistically as practicable.

8. Joint Army-Navy Communications Procedure be utilized throughout all services at all times so that joint operations will not be delayed due to the necessity for additional training for personnel from the services involved.

9. The use of Helicopters in Test CHARLIE be expanded to provide passenger shuttle between the Target Array and the Bikini anchorage.

10. PBM-5A's be used for the KWAJALEIN-BIKINI shuttle in Test CHARLIE.

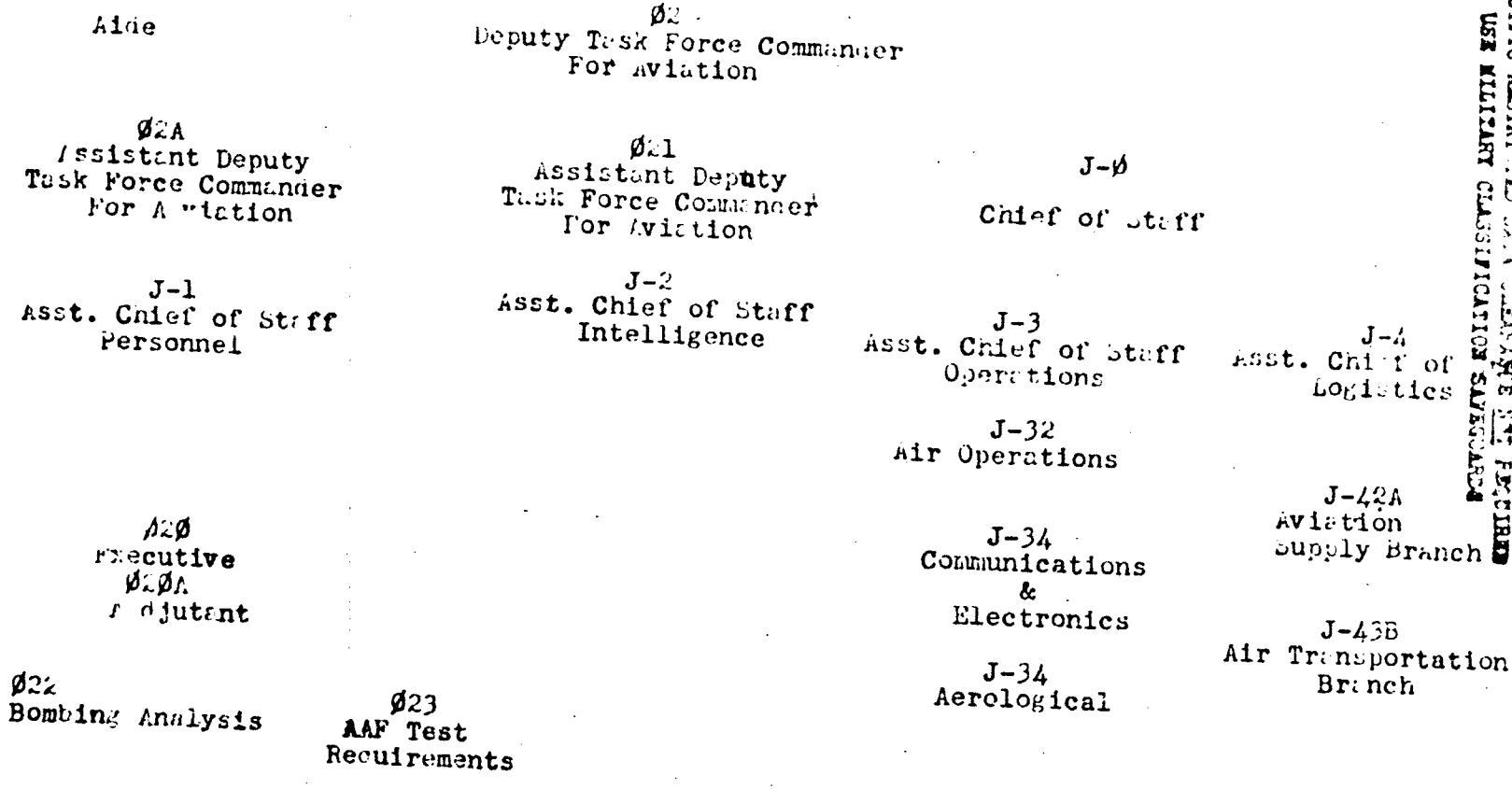
11. Publicity be controlled through a committee composed of representatives of the interested services, and initial press releases be carefully prepared to insure a balanced and complete presentation of information to the public.

APPENDICES:

I - Staff Organization Deputy Task Force Commander for Aviation
II - Composition of Task Group 1.5 (Army Air Group)
III - Composition of Task Group 1.6 (Navy Air Group)
IV - Air Force Test Requirements
V - Aircraft Position and Altitude at Bomb Release Time (Test ABLE)
VI - Aircraft Position and Altitude at HOW Hour (Test BAKER)

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
[illegible] CLEARANCE NOT REQUIRED
[illegible] MILITARY CLASSIFICATION SAFEGUARDS

APPENDIX I
STAFF ORGANIZATION DEPUTY TASK FORCE COMMANDER
FOR AVIATION



SPECIFIC RESTRICTED
USE MILITARY CLASSIFICATION SAFEGUARDS

APPENDIX II

COMPOSITION OF TASK GROUP 1.5 ARMY AIR GROUP

TASK UNIT 1.5.1 TACTICAL OPERATIONS UNIT

1 B-29 Command Aircraft
1 B-29 Bomb Carrying Airplane (Test Able Only)
2 B-29 Pressure Drop Aircraft
2 F-13 VLR Radiological Reconnaissance Aircraft
3 B-29 Spare Aircraft

TASK UNIT 1.5.2 ARMY AIR PHOTOGRAPHIC UNIT

8 F-13 VLR Photographic Aircraft
2 C-54 Photographic Aircraft

TASK UNIT 1.5.4 AIR TRANSPORT UNIT

10 C-54 Air Passenger and Freight Aircraft (also used for Eniwetok Evacuation)

TASK UNIT 1.5.6 ARMY DRONE UNIT

5 B-17 Drone Control Aircraft
4 B-17 Drone Aircraft
2 B-17 Dumbos (Air-Sea Rescue)
1 B-17 Drone Control Spare Aircraft
6 B-17 Drone Spare Aircraft

TASK UNIT 1.5.7 ARMY AIR METEOROLOGICAL UNIT

3 B-29 Weather Reconnaissance Aircraft

TASK UNIT 1.5.8 AIR ORIENTATION UNIT

1 B-29 Radio Broadcast
1 B-29 Press Photography Aircraft
2 C-54 Observation Aircraft (These planes were on loan from ATC for a few days during each test, but were never assigned to the unit.)

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

ATOMIC ENERGY ACT - 1
SPECIFIC RESTRICTED DATA CLEARANCE (C) REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS
RESTRICTED

APPENDIX III

COMPOSITION OF TASK GROUP 1.6 NAVY AIR GROUP

TASK UNIT 1.6.1 DRONE CARRIER UNIT

4 F6F Drone Aircraft
16 F6F Drone Control Aircraft
22 F6F Spare Drone Aircraft
15 F6F Spare Drone Control Aircraft
4 TBM Drone Boat Control Aircraft
8 F6F Spare Aircraft for familiarization
2 SNR Spare Drone Control Aircraft

TASK UNIT 1.6.2 PHOTOGRAPHIC CARRIER UNIT

6 F6F Photo Aircraft
4 TBM Photo Aircraft
2 HOS Helicopters
1 F6F Spare Aircraft
1 TBM Spare Aircraft
2 HOS Spare Helicopters

TASK UNIT 1.6.3 SEAPLANE UNIT

9 PBM Patrol Seaplanes (for transport between Bikini and Ebeye)
6 PBM Air-Sea Rescue Seaplanes

6. BLAST PRESSURE MEASUREMENT

An elaborate installation of measuring instruments will be installed throughout the Target Array. Two (2) B-29 airplanes will each drop three (3) pressure recording instruments by parachute.

7. INFRA-RED RADIATION MEASUREMENT

Instruments to measure light radiation will be installed on a surface vessel for Test A and in a Navy airplane for Test B.

8. PHYSIOLOGICAL EFFECTS

An elaborate program under direction of the Naval Medical Research laboratories will include exposure to sheep, goats, rats, and various types of protective materials. The Air Surgeon's office is participating in this program and a Flight Surgeon is assigned for the tests.

9. EFFECT ON PHOTOGRAPHY AND PHOTO MATERIALS

The complete photographic coverage together with exposure of photographic materials will cover the effects of the test.

10. RADIO-ACTIVITY IN AIR

Samples of air will be collected by air sampler bags installed in Drone Aircraft. The bags are opened and closed by control from the Mother aircraft.

11. DEVELOPMENT

(a) Pilotless aircraft.
(b) Bomb ballistics.
(c) Logistic data for support of special operations.
(d) Organization of and planning for special type operations.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE [illegible] REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

12. GENERAL INFORMATION

In addition to the above, much detailed information including radioactivity, radio frequency phenomena, seismographic measurements, oceanography, spherics, and associated phenomena will be obtained.

APPENDIX IV

AIR FORCE TEST REQUIREMENTS

1. EXPOSURE OF COMPLETE AIRCRAFT

Thirty-nine (39) Naval aircraft in "Combat Ready" condition will be exposed on twenty-two (22) target ships.

2. EXPOSURE OF AIRCRAFT IN FLIGHT

One (1) Army Drone and four (4) Navy Drones will be flown through the cloud, and three (3) Army Drones will be flown around edges of the cloud for thirty (30) minutes.

3. EXPOSURE OF AIR FORCE MATERIALS

Wing panels, samples of alloy materials, fire extinguishers, gas cylinders, gasoline tanks, fire truck, various types of aircraft instruments, and aircraft fuel and oil will be exposed on target ships. This will be supplemented by exposure of all types of Army Ordnance, Quartermaster, Signal Corps, Chemical Warfare, and Engineer equipment on the ships.

4. RADIO WAVE PROPAGATION AND RADIO OPERATION

Drone aircraft will have automatic transmitters monitored by Mother aircraft and by ground stations. Various types of equipment on target vessels will be in operation.

5. RADAR OPERATION AND PHENOMENA

Drone aircraft will automatically transmit on Radar frequencies monitored by search receivers on Mother ships and ground stations. Several surface radar stations will be in operation to study effects.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

C O M M A N D E R J O I N T T A S K F O R C E O N E

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

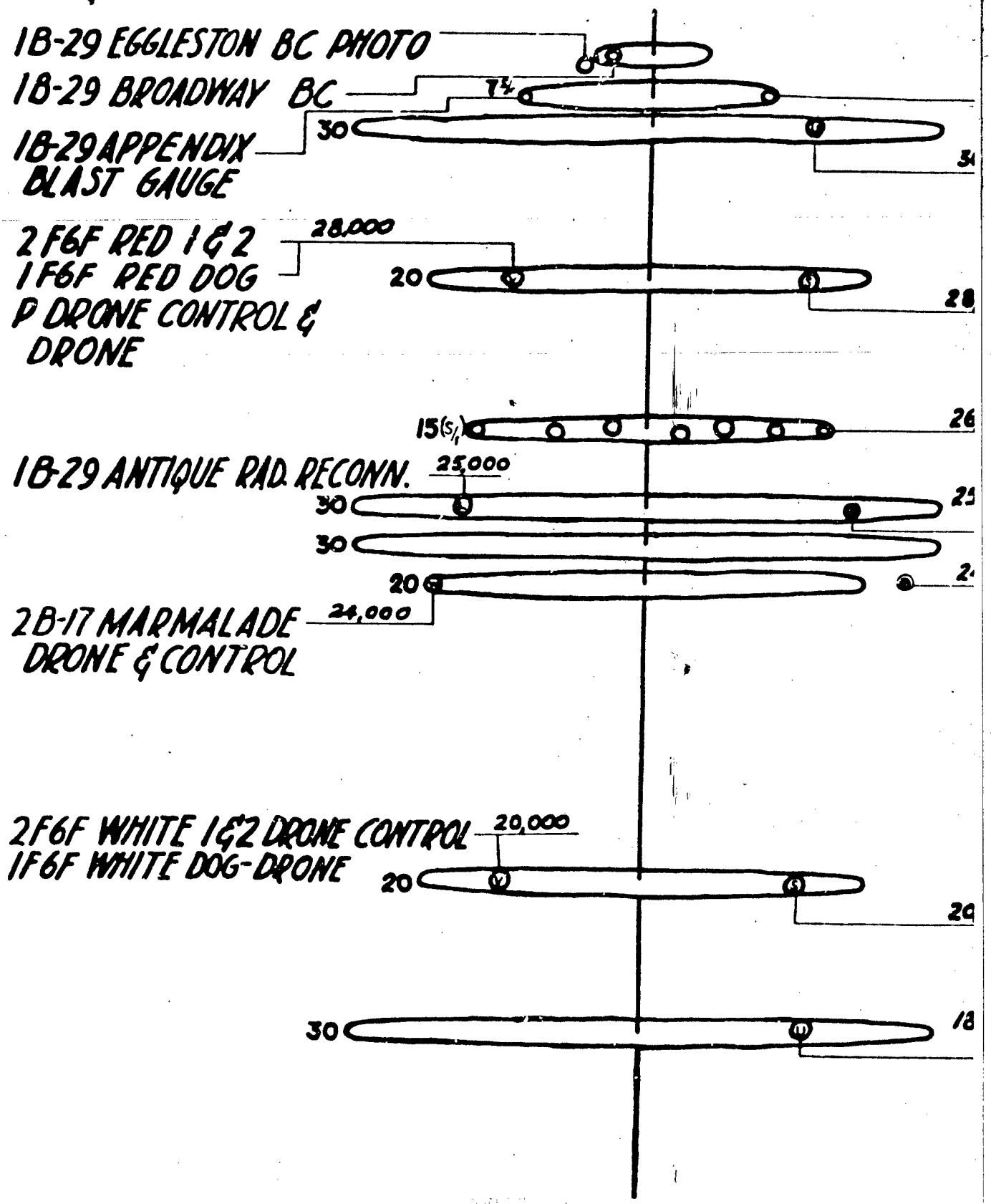
PART VII - SPECIAL REPORTS

SECTION (F) - SHIP OPERATIONS

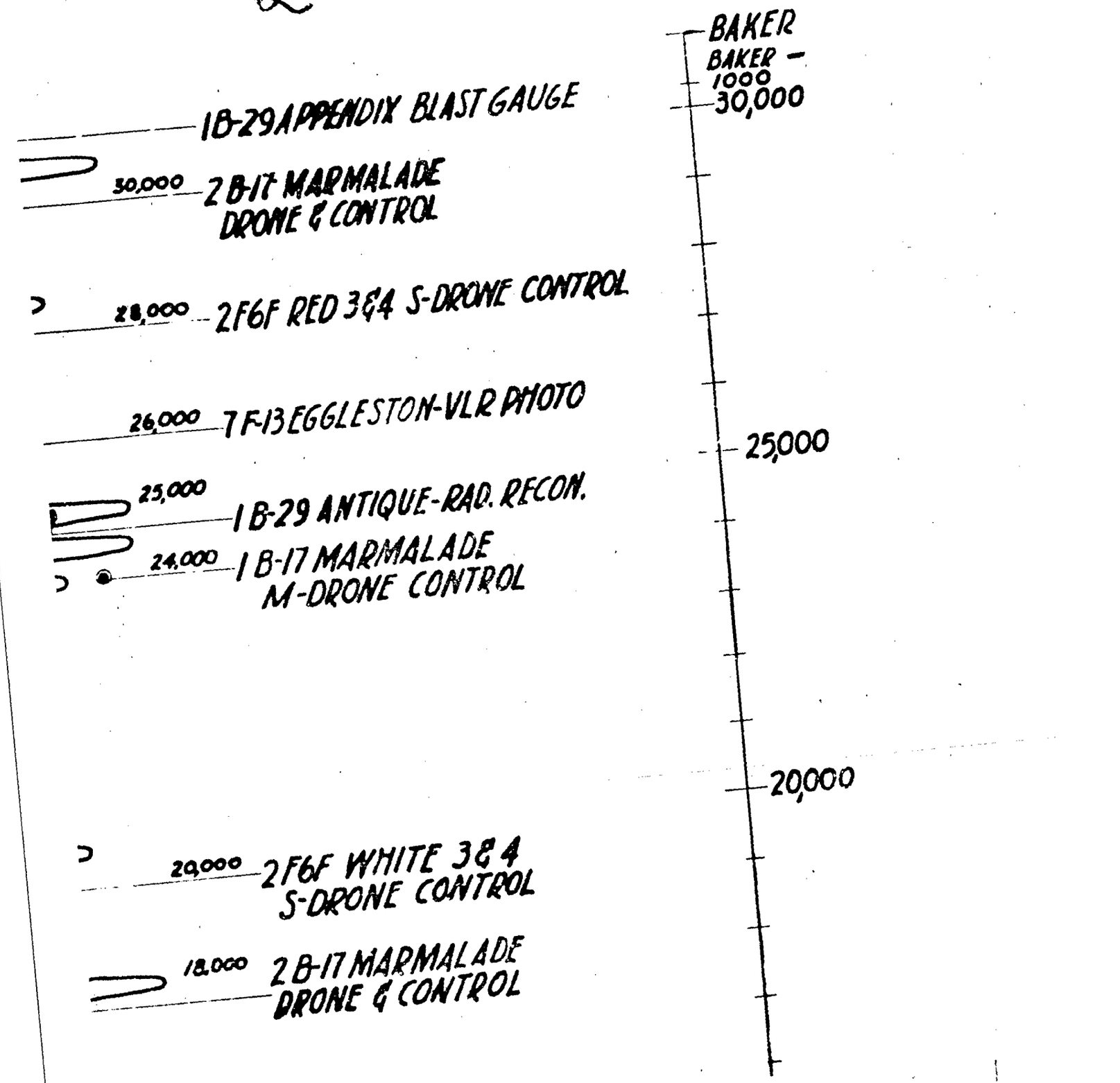
1. Within the Staff of Joint Task Force ONE, the J-3 division or "Operation" as it was designated, exercised overall operational control over the various air and naval units attached to the Task Force. Within this section, various subdivisions were created to administer and control various specific aspects of operations. The J-31 section's primary function was Ship Movements. Through this section, the various orders and directives were issued to assemble the many target and non-target vessels and craft attached to Joint Task Force ONE and govern their movements to ensure that each one fulfilled its particular mission in the atomic bomb tests. The head of the J-31 section was Captain Walter C. WINN, USN, who worked directly under Captain Charles H. LYMAN, USN, the Assistant Chief of Staff for Operations, (J-3).

2. With the approval by the President of the Atomic Bomb tests, on 11 January 1946, the designating of ships for Joint Task Force ONE began rapidly. Directives from the Joint Chiefs of Staff and the Chief of Naval Operations ordered the Commander in Chief Pacific Fleet to lend all possible assistance to CJTF-1. The majority of ships were made available from the Pacific Fleet and assembled by CinCPac as requested by CJTF-1.

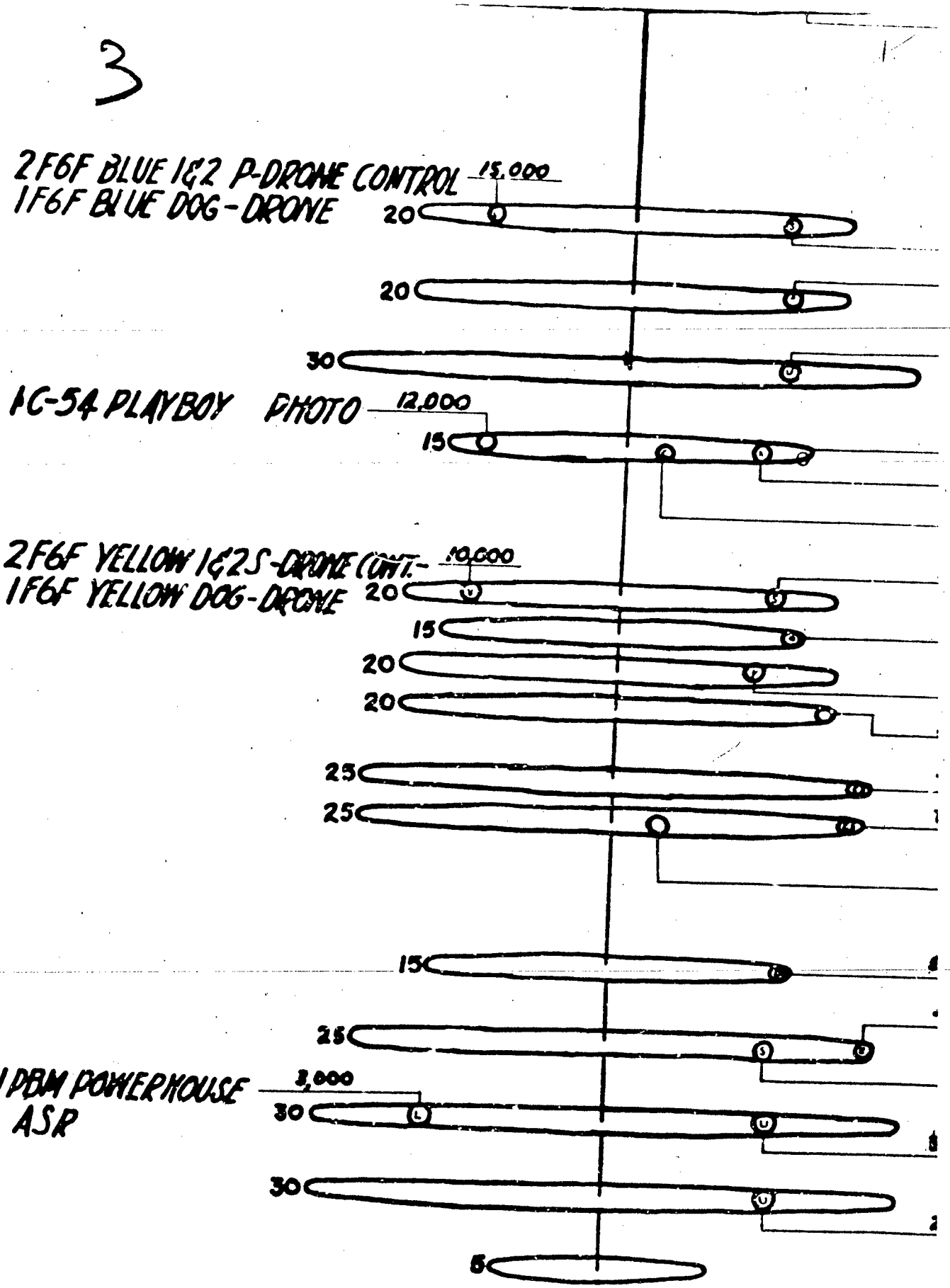
3. By the 28th of January 1946, the target vessels included five battleships, (one ex-Japanese battleship), 2 carriers, four cruisers, (one ex-Japanese cruiser and one ex-German cruiser), twenty three APA's, two AKA's, seventeen destroyers, eight submarines, six LST's, six LCI's and


1B-29 EGGLESTON BC PHOTO
1B-29 BROADWAY BC
1B-29 APPENDIX BLAST GAUGE
2 F6F RED 1 & 2
1 F6F RED DOG
P DRONE CONTROL & DRONE
28,000
20
28
15(S/)
26
1B-29 ANTIQUE RAD. RECONN.
25,000
30
30
20
2B-17 MARMALADE DRONE & CONTROL
24,000
2F6F WHITE 1&2 DRONE CONTROL
1F6F WHITE DOG-DRONE
20,000
20
30
18

1 2


BAKER
BAKER – 1000
30,000
1B-29 APPENDIX BLAST GAUGE
30,000
2 B-17 MARMALADE DRONE & CONTROL
28,000
2F6F RED 3&4 S-DRONE CONTROL
26,000
7F-13 EGGLESTON-VLR PHOTO
25,000
25,000
1B-29 ANTIQUE-RAD. RECON.
24,000
1 B-17 MARMALADE M-DRONE CONTROL
20,000
20,000
2F6F WHITE 3&4 S-DRONE CONTROL
18,000
2 B-17 MARMALADE DRONE & CONTROL

3


2F6F BLUE 1&2 P-DRONE CONTROL
15,000
1F6F BLUE DOG-DRONE
20
20
30
AC-54 PLAYBOY PHOTO
12,000
15
2F6F YELLOW 1&2S-DRONE CONT.-
10,000
1F6F YELLOW DOG-DRONE
20
15
20
20
25
25
15
25
1 PBM POWERHOUSE
ASR
3,000
30
30
6

DRONE & CONTROL

4

15,000 — 2 F6F BLUE 364 S-DRONE CONTROL

14,000 — 1 F6F SKYLIGHT PHOTO

13,000 — 28-IT MARMALADE DRONE & CONTROL

12,000 — 1 C-54 PLAYBOY PHOTO

12,000 — 1 PBM BRIGHTEYES PHOTO

12,000 — 1 PBM BRIGHTEYES PHOTO

10,000 — 2 F6F YELLOW 364 S-DRONE CONTROL

9,500 — 1 PBM BRIGHTEYES RADIOMETRY

9,000 — 1 TBM LONETREE PHOTO

8,500 — 1 B-29 BURMA ZERO COMMAND

7,500 — 2 C-54 FOLKLORE - ORIENT.

7,000 — 1 B-29 ELKRIDGE - RAD. BROAD.

7,000 — 1 PBM POWERHOUSE - ASR (45NM ORBIT WOTHO)

6,000 — 1 PBM BRIGHTEYES PHOTO

4,000 — 1 B-29 FATHEAD PRESS PHOTO

4,000 — 1 TBM LONETREE PHOTO

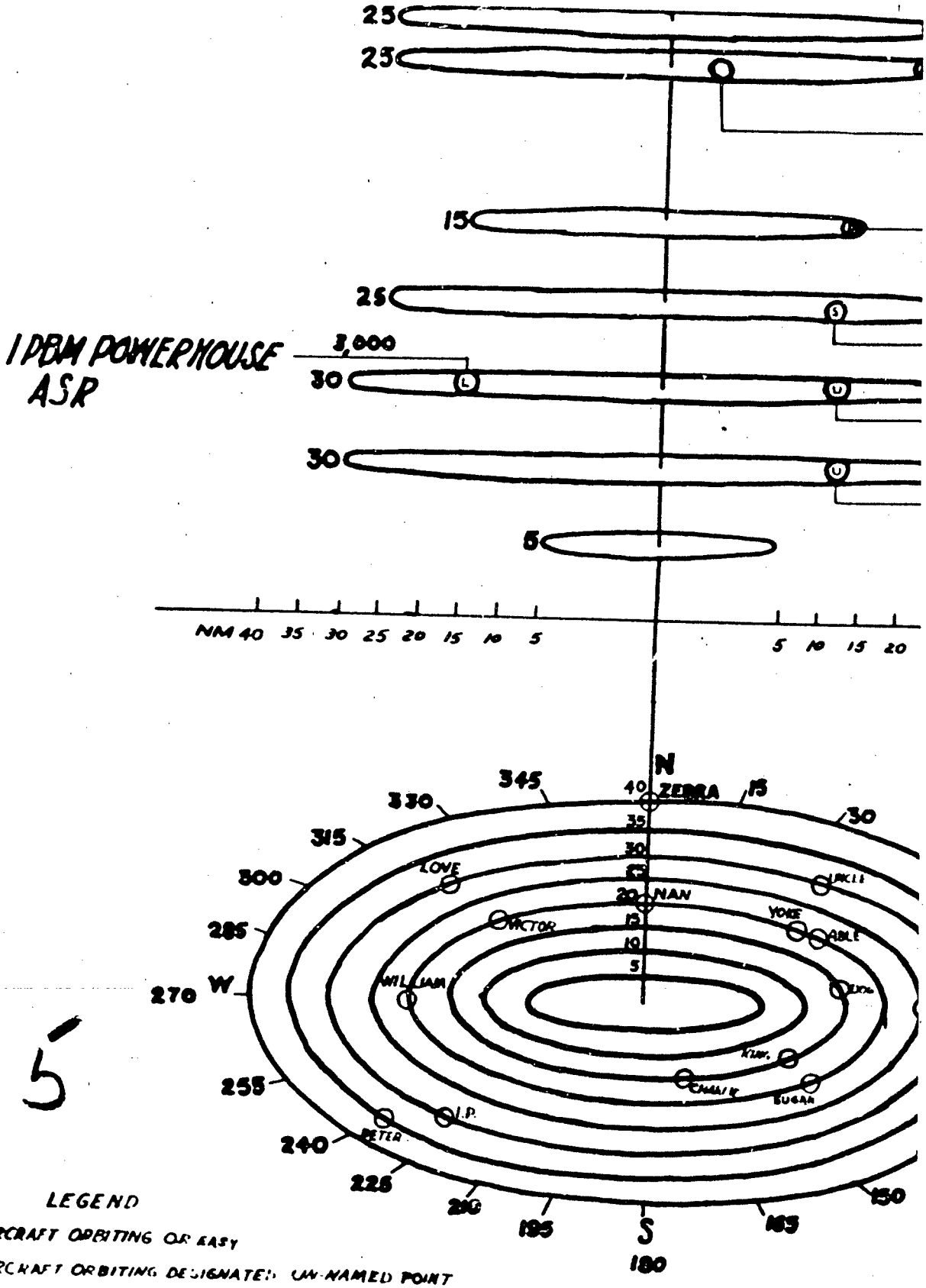
2,000 — 1 PBM POWERHOUSE ASR

2,000 — 2 PBM BRIGHTEYES RAD. RECONN.

15,000

10,000

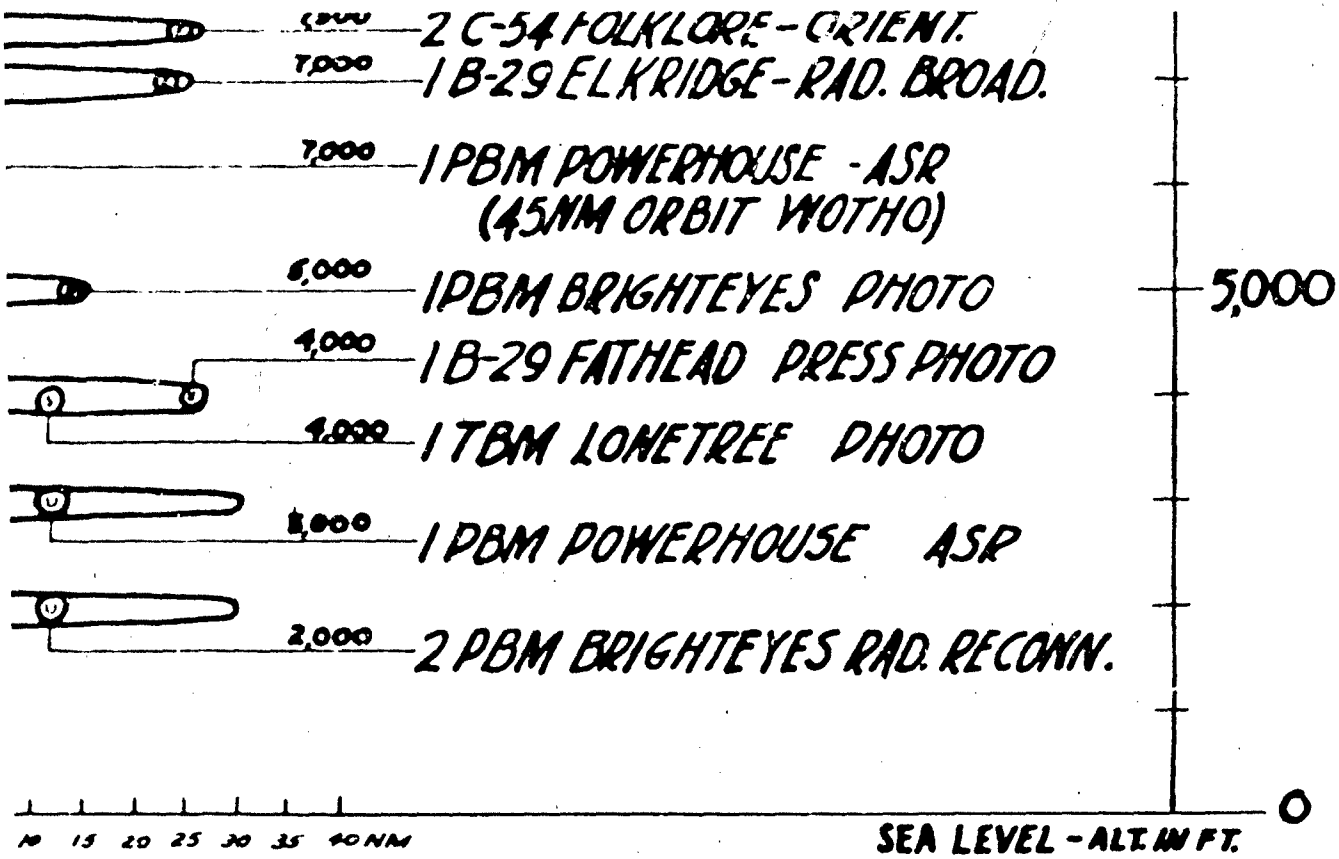
5,000

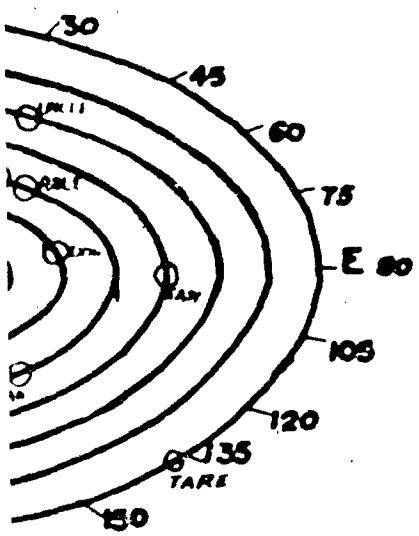


5'

LEGEND

- AIRCRAFT ORBITING OR EASY
- AIRCRAFT ORBITING DESIGNATED UN-NAMED POINT
- AIRCRAFT ORBITING TARGET
- S/ SLANT RANGE



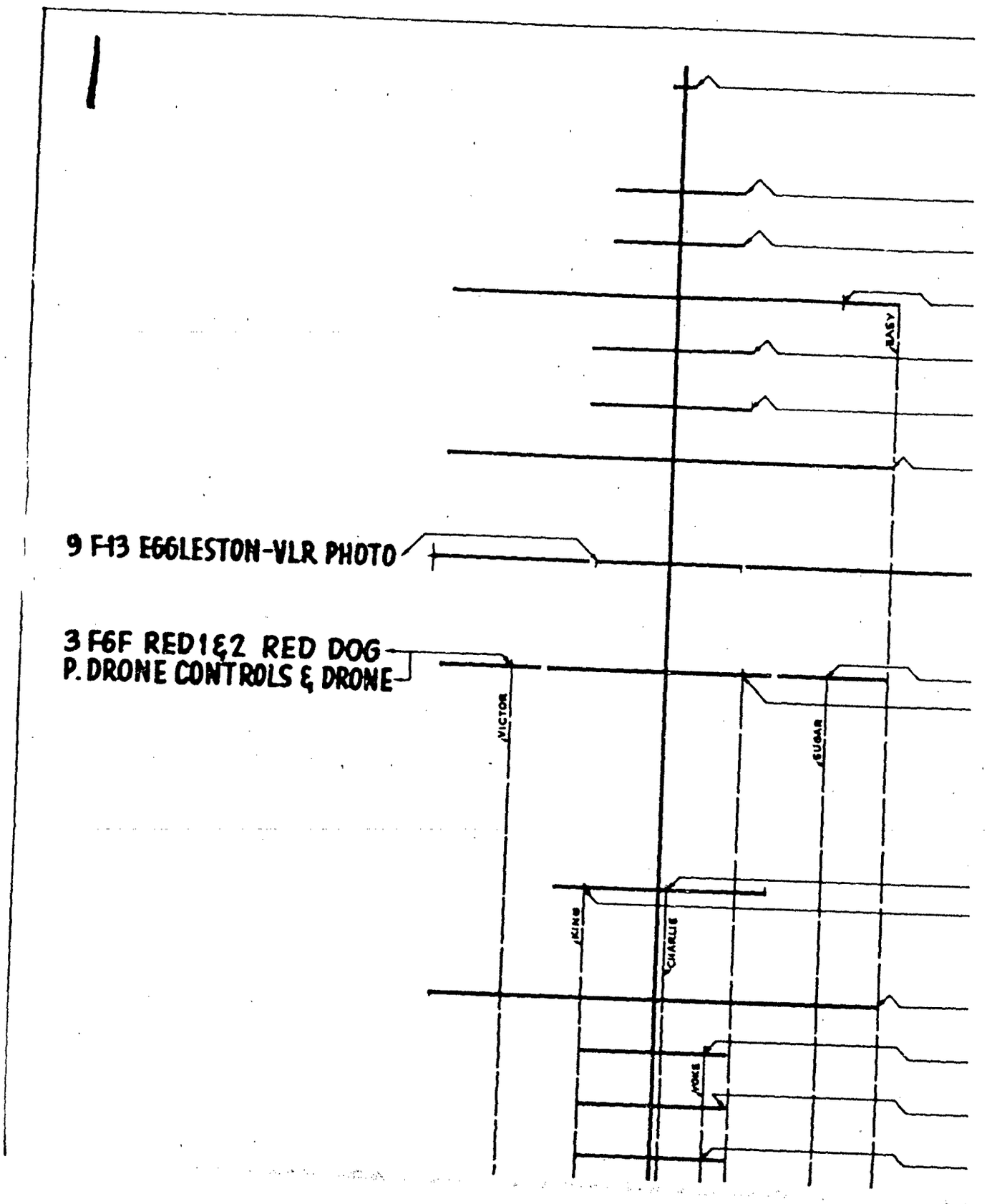


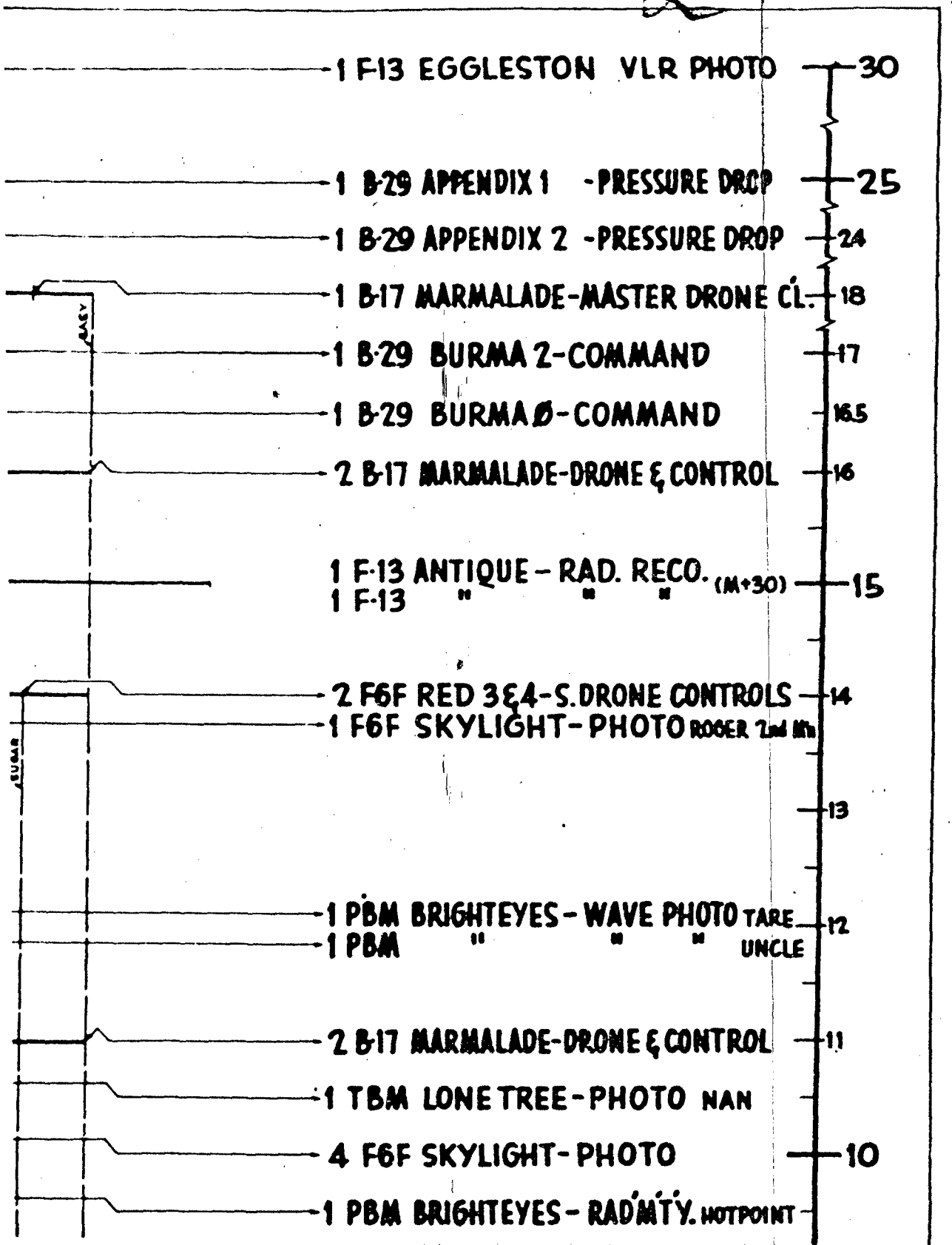
6

-TEST ABLE-

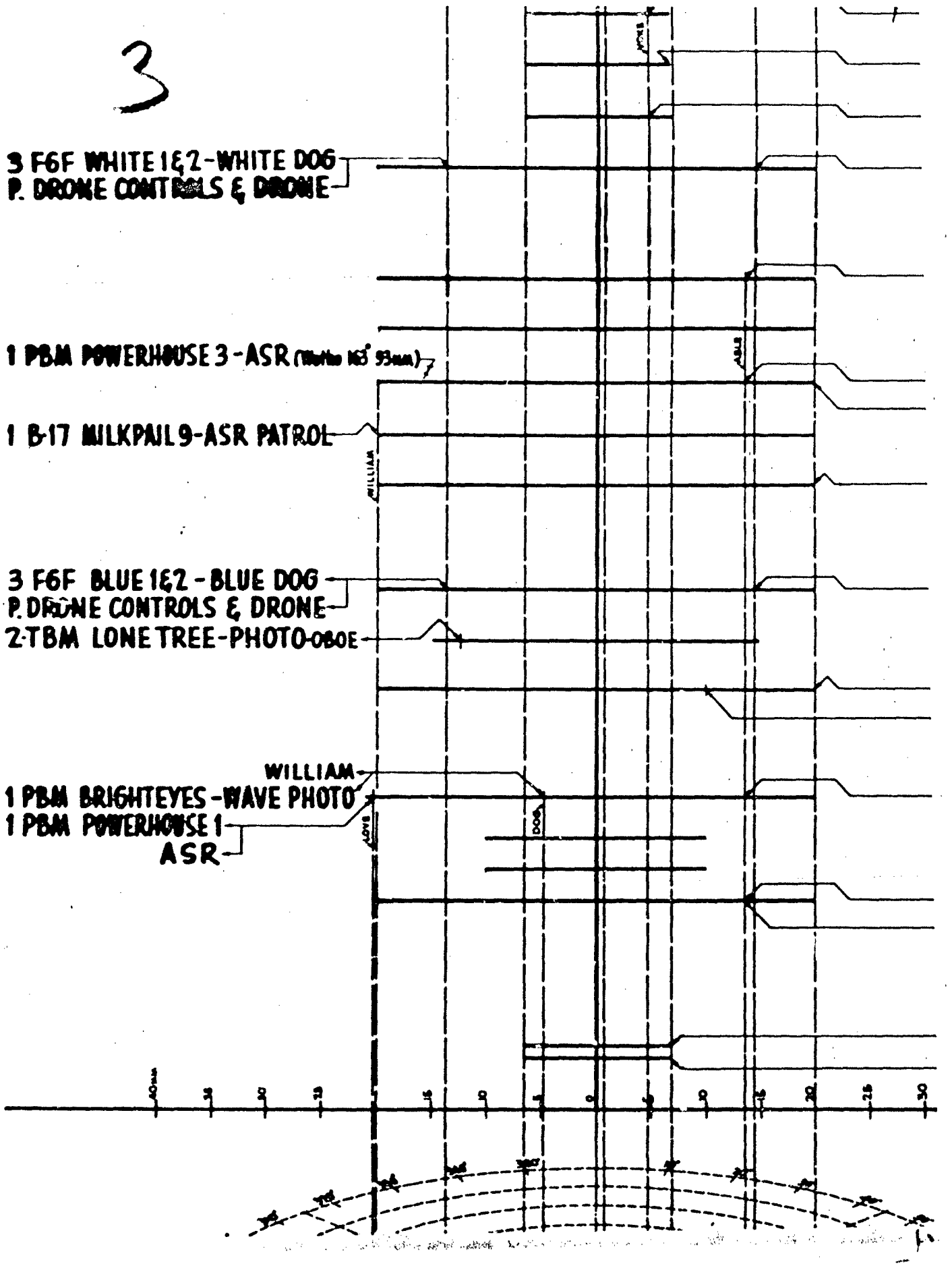
AIRCRAFT POSITION AND ALTITUDE AT BOMB RELEASE TIME

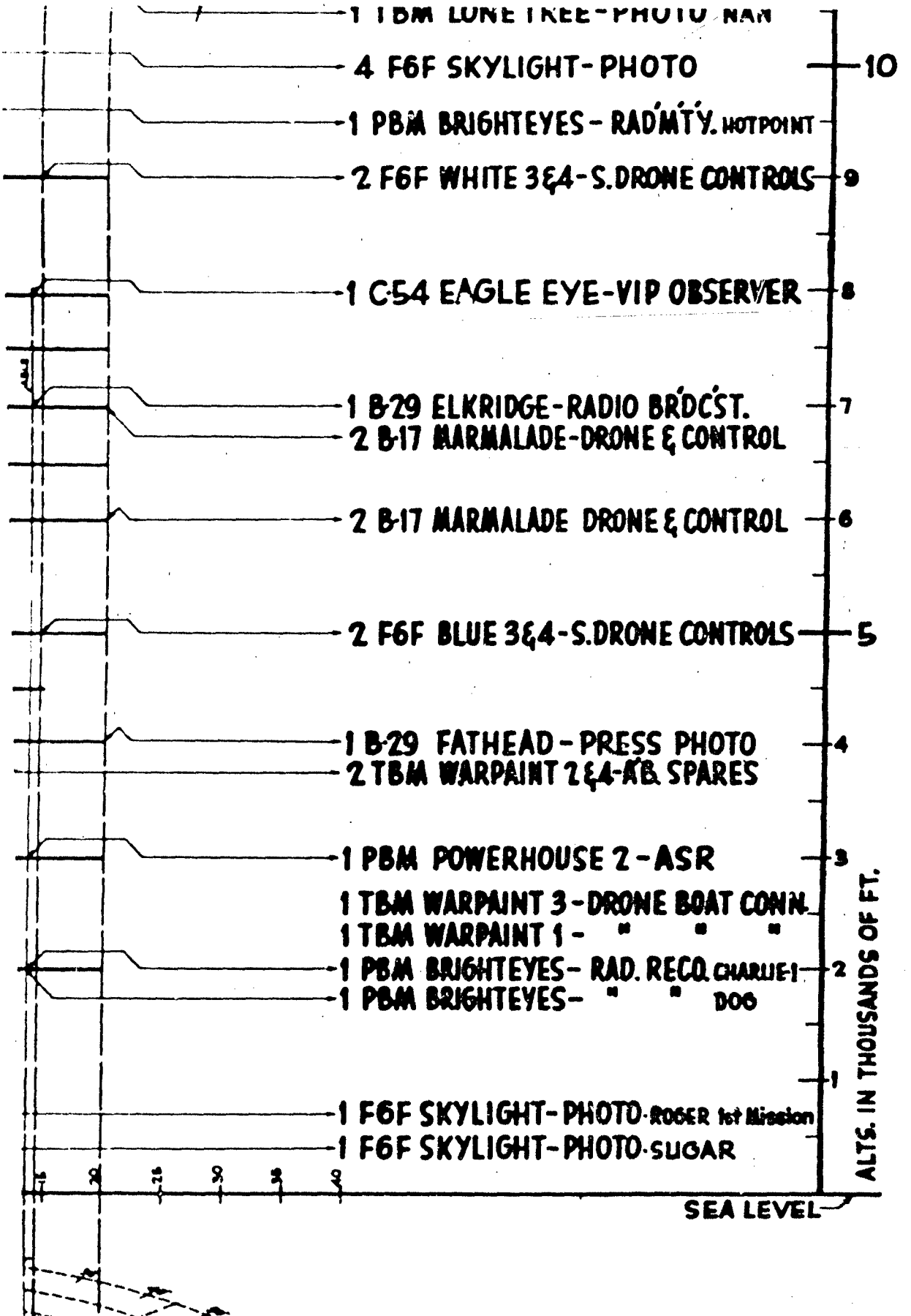
RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

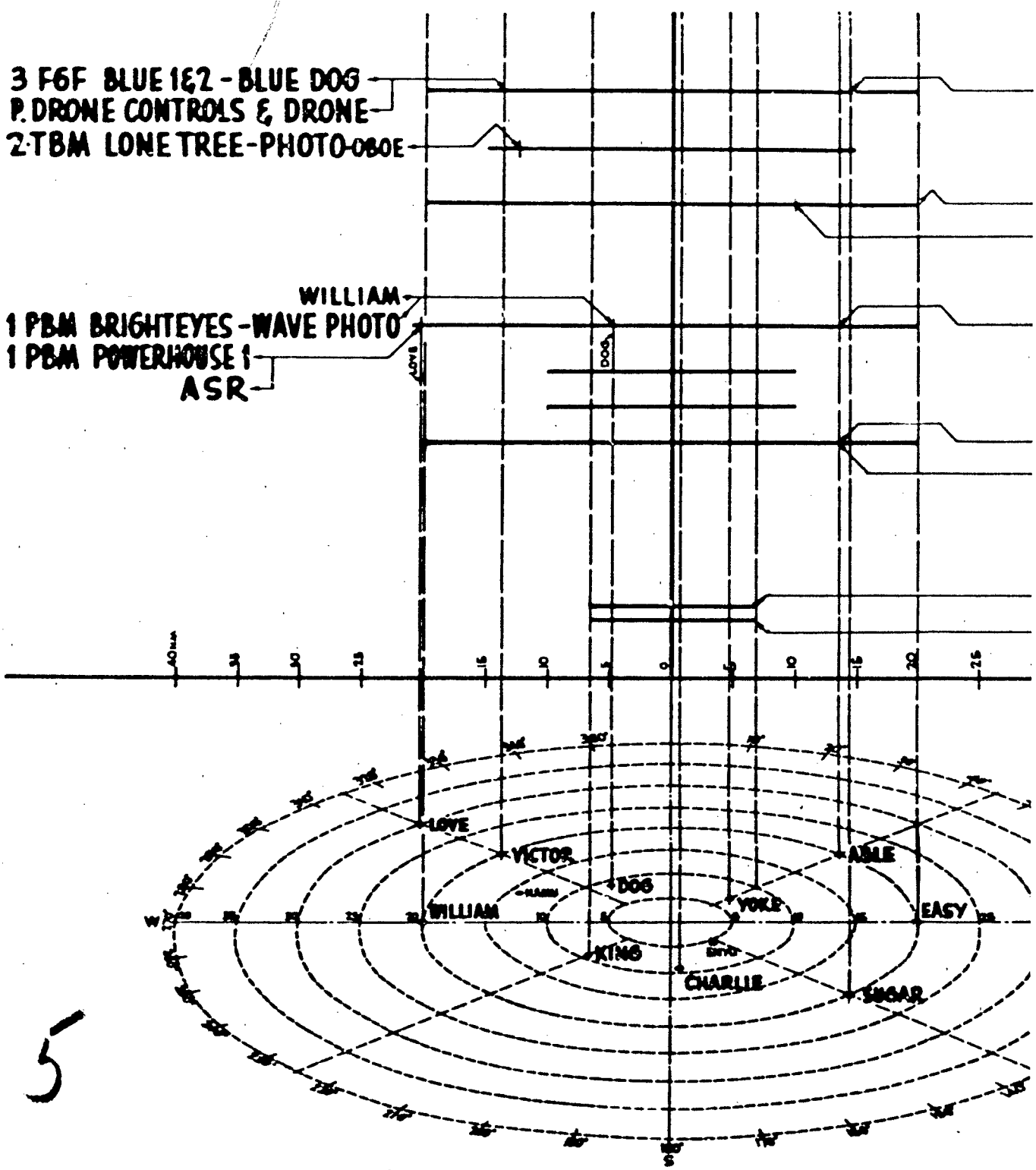

9 F-13 EGGLESTON-VLR PHOTO
3 F6F RED 1&2 RED DOG
P. DRONE CONTROLS & DRONE
EASY
VICTOR
SUGAR
KING
CHARLIE
JOKE


1 F-13 EGGLESTON VLR PHOTO
30
1 B-29 APPENDIX 1 -PRESSURE DROP
25
1 B-29 APPENDIX 2 -PRESSURE DROP
24
1 B-17 MARMALADE-MASTER DRONE CL.
18
1 B-29 BURMA 2-COMMAND
17
1 B-29 BURMA Ø-COMMAND
16.5
2 B-17 MARMALADE-DRONE & CONTROL
16
1 F-13 ANTIQUE - RAD. RECO. (M+30)
1 F-13 " " "
15
2 F6F RED 3&4-S. DRONE CONTROLS
1 F6F SKYLIGHT - PHOTO ROGER 2nd Mtn
14
13
1 PBM BRIGHTEYES - WAVE PHOTO TARE
1 PBM " " " UNCLE
12
2 B-17 MARMALADE-DRONE & CONTROL
11
1 TBM LONE TREE - PHOTO NAN
4 F6F SKYLIGHT - PHOTO
10
1 PBM BRIGHTEYES - RADAR HOTPOINT

3

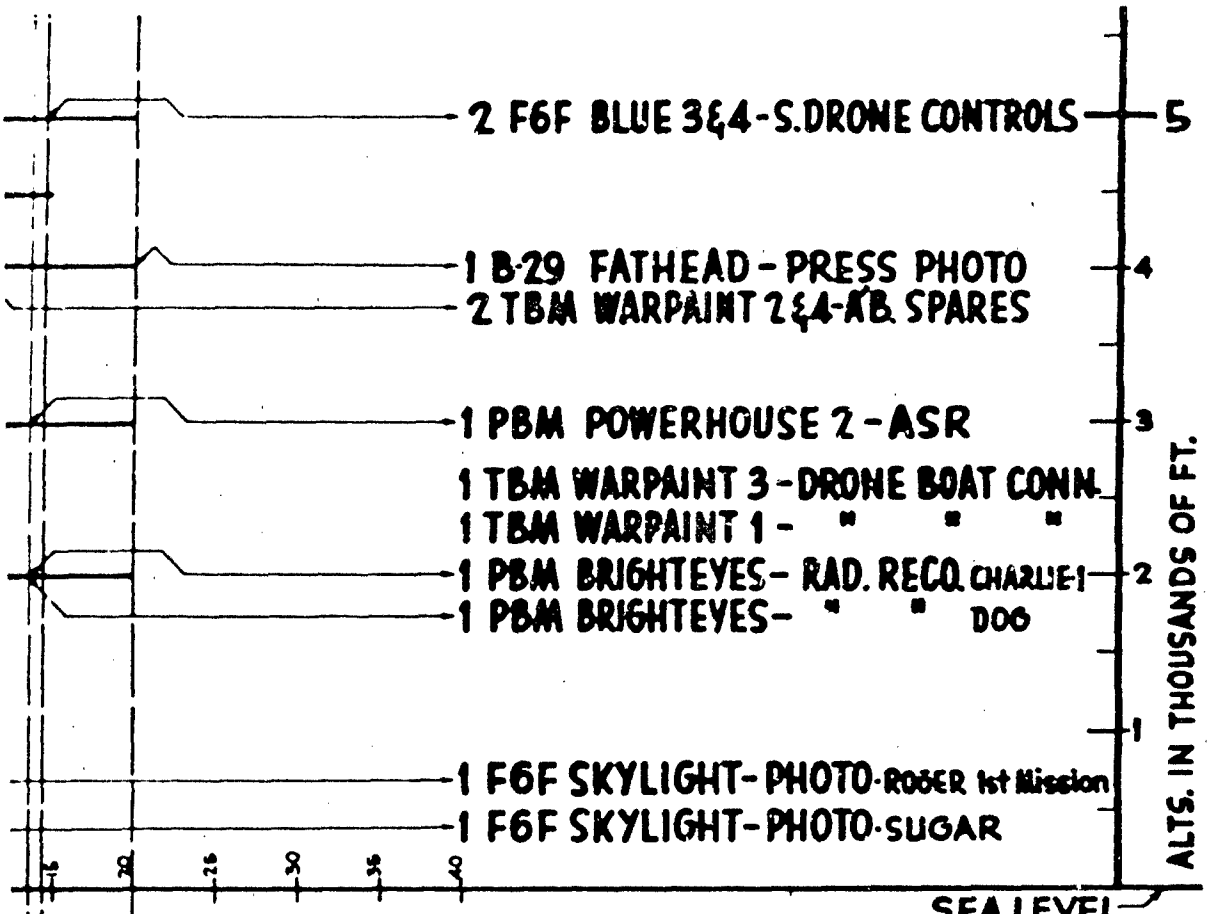

3 F6F WHITE 1&2 - WHITE DOG
P. DRONE CONTROLS & DRONE
1 PBM POWERHOUSE 3 - ASR
1 B-17 MILKPAIL 9 - ASR PATROL
3 F6F BLUE 1&2 - BLUE DOG
P. DRONE CONTROLS & DRONE
2-TBM LONE TREE - PHOTO-OBOE
WILLIAM
1 PBM BRIGHTEYES - WAVE PHOTO
1 PBM POWERHOUSE 1
ASR
WILLIAM
DOG

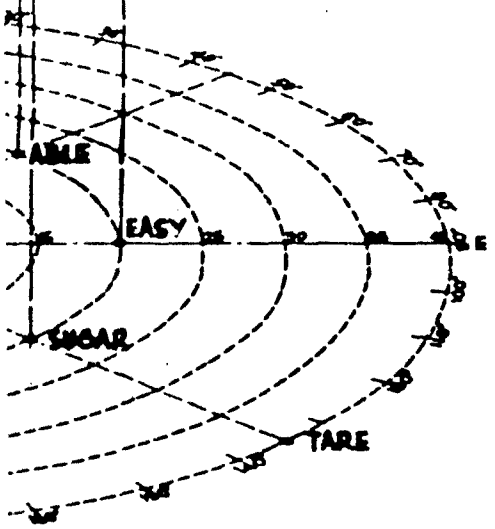

1 TBM LONE TREE-PHOTO NAN
4 F6F SKYLIGHT-PHOTO
1 PBM BRIGHTEYES-RAD'MTY. HOTPOINT
2 F6F WHITE 3&4-S.DRONE CONTROLS
1 C-54 EAGLE EYE-VIP OBSERVER
1 B-29 ELKRIDGE-RADIO BRD'CST.
2 B-17 MARMALADE-DRONE & CONTROL
2 B-17 MARMALADE DRONE & CONTROL
2 F6F BLUE 3&4-S.DRONE CONTROLS
1 B-29 FATHEAD-PRESS PHOTO
2 TBM WARPAINT 2&4-A/B SPARES
1 PBM POWERHOUSE 2-ASR
1 TBM WARPAINT 3-DRONE BOAT CONN.
1 TBM WARPAINT 1- " " "
1 PBM BRIGHTEYES-RAD. RECO. CHARLIE-1
1 PBM BRIGHTEYES- " " DOG
1 F6F SKYLIGHT-PHOTO-ROGER 1st Mission
1 F6F SKYLIGHT-PHOTO-SUGAR
10
9
8
7
6
5
4
3
2
1
ALTS. IN THOUSANDS OF FT.
SEA LEVEL



5

TEST BAKER • A/C POSITION & ALTITU





6

DRONE LIMITATIONS

Type	Time	Altitude
B-17	0-15 mins.	5000'-15000'
1 B-17 Photo above 15000		
F-6-F	0-15 mins.	5000'-15000'

Revised 29 July per ltr 1 Sept

AJS Air Operations Officer
Prepared by [illegible]
Drawn By [illegible]
Approved [illegible]
Date 19 July 1946

ALTITUDE AT HOW HOUR

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

twenty five LCT's. Many of the targets had been earmarked for special tests before specific assignment to CROSSROADS. The targets, with few exceptions, were to be assembled at Pearl Harbor and were to be sailed to arrive Bikini by 15 April. This date was advanced to 1 June when the tests were delayed. The target ships, once they reported to the Task Force, were under the command of Rear Admiral FAHRION whose administrative title was Commander Target Vessel Group and Commander, Naval Task Groups, Joint Task Force ONE.

4. The Task Organization and the various Task Group and Unit designations were authorized on 11 January 1946 and the history of the ships operations will be related in accordance with their unit assignments.

5. Force Flagship (Captain W. N. GAMET, USN) - On 9 January CinCPac had been requested to designate a Pacific Fleet AGC as flagship for the Task Force. The MOUNT MC KINLEY (AGC-7) was designated, to become available on the West Coast upon her return from the Empire Area and duty with the Far Eastern Advisory Committee. The MOUNT MC KINLEY arrived in San Francisco on 19 February and departed on 8 May with the Staff of the Task Force embarked, arriving Pearl Harbor on the 14th. The Commander, Joint Task Force ONE, Vice Admiral W. H. P. BLANDY, USN, hoisted his flag on board the MOUNT MC KINLEY on 15 May and assumed operational and administrative command of all naval vessels of the Task Force. The flagship left Pearl Harbor on 22 May, after the majority of the ships of the Force had left, and accompanied by the C. P. CECIL (DD-835) as far as Johnston Island, proceeded to Kwajalein Atoll arriving 29 May and remaining until 1 June. On 2 June the flagship arrived at Bikini to remain, except for brief sorties on Queen, Able, William, and Baker days, until 10 August when it sailed for Pearl Harbor. Vice Admiral BLANDY hauled down his flag on 18 August at Pearl Harbor and the flagship departed on 19 August for Oakland, disembarking the Staff of the Task Force on 26 August.

RESTRICTED DATA
ATOMIC [illegible] ACT - 1946
SPECIFIC RESTRICTIONS [illegible]
USE MILITARY [illegible]

DATA
RESTRICTED

6. Task Group 1.1 Technical Group (Rear Admiral W. S. PARSONS, USN): This Task Group was further divided into two Task Units; TU 1.1.1, (Laboratory Unit - Captain E. H. ECKELMEYER, USN) consisting of the ALBEMARLE (AV-5) (F), LCT(6)-1359, and the LSM-60; and TU 1.1.2, (Instrumentation Unit, Captain A. C. THORINGTON, USN), consisting of the HAVEN (AH-12) (F), WHARTON (AP-7), BURLESON (APA-67), KENNETH WHITING (AV-14), AVERY ISLAND (AG-76), and CUMBERLAND SOUND (AV-17). The function of the Laboratory Unit was to furnish laboratory and base facilities for the Technical Staff of the Task Force and the Los Alamos Laboratory. The Instrumentation Unit was to furnish laboratory and base facilities for the following:

Los Alamos Laboratory Technical Group(in CUMBERLAND SOUND)
Technical Director (in KENNETH WHITING)
Director of Ship Material (in WHARTON and AVERY ISLAND)
Naval Medical Research Unit (in BURLESON)
Radiological Safety Unit (in HAVEN)

7. The ALBEMARLE (AV-5), after extensive preparation at Terminal Island departed on 17 April from San Pedro and after a brief stopover at Pearl Harbor arrived at Kwajalein on 4 May. She proceeded to Bikini immediately after Able Day and left on Baker Day to return to San Pedro via Kwajalein arriving on 12 August. The LCT(6)-1359 was lifted to Bikini in the GUNSTON HALL (LSD-5), leaving San Pedro on 17 April and arriving at Bikini on 3 May. This craft, after Test Baker, was transferred to the Dispatch Boat and Boat Pool Unit (TU 1.8.3). The LSM-60 was lifted from San Pedro to Bikini in the EPPING FOREST (LSD-4), leaving on 15 May and arriving on 2 June. This ship carried and was destroyed by the atomic bomb which was detonated on Baker Day and was therefore deleted from her Task Unit at the instant of its detonation at 0835 (-11) on 25 July 1946.

8. It had been planned originally to have two CVE's of the 105 class serve for the functions of the Instrumentation Unit but on 17 January the CUMBERLAND SOUND (AV-17)

and KENNETH WHITING (AV-14) were designated in lieu of CVE's. The WHARTON (AP-7) was added to the Task Unit on 18 February. The AVERY ISLAND (AG-76) was added early in March as electronics repair ship, the BURLESON (APA-67) was transferred to the Task Unit on 27 March from the target group and altered to accomodate the animals which were to be used in the tests and the HAVEN (AH-12) was shifted from the Medical Unit (TU 1.8.4) on 29 March. All ships of the Task Unit were given availability in West Coast Yards to install the special equipment needed to fulfill their various missions. The CUMBERLAND SOUND (AV-17) was the first of this unit to leave, departing San Pedro 17 April and arriving Bikini 3 May via Pearl Harbor in company with the GUNSTON HALL (LSD-5). The WHARTON (AP-7), KENNETH WHITING (AV-14), and AVERY ISLAND (AG-76) departed for Pearl Harbor on 6 May arriving between the 12th and 14th and departed in company with other units of the Task Force arriving Bikini by 2 June. The HAVEN (AH-12), left Oakland on 29 May arriving Bikini 12 June via Pearl Harbor.

9. The BURLESON (APA-67) was the last ship of the unit to leave the West Coast departing San Francisco on 1 June and proceeding direct to Bikini arriving 14 June, completing the assembly of the Task Unit at Bikini. Between tests Able and Baker, the BURLESON was sailed to Kwajalein and returned to Bikini on 18 July. Another round trip was made immediately after Baker Day.

10. Task Unit 1.1.3 Drone Boat Unit (Comdr. R. R. BRADLEY, USN) - On 5 April 1946 it was decided to utilize drone boats for the collection of water samples in the target array area. The Task Unit was designated on 12 April. The BEGOR (APD-127) was ordered to Task Force ONE on 18 April to serve as the mother and control ship for the drone boats and was given immediate availability at NSY Terminal Island for installation of special control equipment. The BEGOR sailed from San Diego on 21 May carrying two drone boats in company with the SHANGRI-LA (CV-38), SUMNER (DD-692), MOALE (DD-693), and HUNTINGTON

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE REQUIRED
USE MILITARY CLASSIFICATION GUIDE

(DD-781) and arrived Pearl Harbor on 27 May. She departed Pearl Harbor in company with the same ships plus TURNER (DD-834) and PERRY (DD-883) and arrived 5 June at Bikini. She remained at Bikini except for brief sorties for air rehearsals and evacuations for Able and Baker Days until 3 August when she was sailed to San Diego via Pearl arriving San Diego 13 August.

11. The ALBEMARLE (AV-5) departed Bikini on the afternoon of Baker Day for Kwajalein and departed there on 30 July for San Pedro via Pearl Harbor accompanied by the FURSE (DD-882) arriving on 12 August. The CUMBERLAND SOUND (AV-17) was the second ship of the group to be released from Bikini, sailing on 1 August for San Diego via San Pedro. The BURLESON (APA-67) followed, leaving Bikini on 8 August to proceed to NSY, Washington, D. C. via Pearl Harbor and San Pedro. The AVERY ISLAND (AG-76) departed 7 August for San Francisco direct to report to ComServPac for temporary duty upon her arrival and the KENNETH WHITING (AV-14) left Bikini on 14 August for San Diego via Pearl Harbor and Oakland. Thus, by 15 August only the HAVEN (AH-12) and WHARTON (AP-7) remained of this Task Group at Bikini.

12. Task Group 1.2 Target Vessel Group (Rear Admiral F. G. FAHRION, USN) - This Task Group included the salvage unit in addition to all the ships and craft that were utilized as targets for Tests Able and Baker. The targets within the Task Group were assigned to Task Units according to types. Preparation, personnel adjustments and instrumentation was done in West Coast yards and Pearl Harbor except for the ex-Japanese targets and certain landing craft. Rear Admiral FAHRION's flagship and the flagship of Task Group 1.2 was the FALL RIVER (CA-131) which was assigned to the Task Force on 28 February 1946. The FALL RIVER departed San Pedro 7 March and arrived Pearl Harbor on the 12th. She departed Pearl Harbor 21 May in company with the WALKE (DD-723) and LAFFEY (DD-724) and arrived Bikini 27 May. Except for brief sorties on Queen, Able, William and Baker Days, she remained at Bikini. Rear Admiral

FARRION on 19 August 1946 again assumed the titles of Commander Naval Task Groups, Joint Task Force ONE, in which capacity he reported to CinCPac for additional duty, and Commander Advance Echelon, Joint Task Force ONE, which titles he had held from 1 February 1946 until 15 May 1946. He assumed command of the Naval Task Groups of Joint Task Force ONE and such parts of other groups or units of the Task Force as may remain in the Pacific.

13. Task Unit 1.2.1 Battleship and Cruiser Unit (Captain W. DEWEESE, USN): This target task unit contained the following ships: temporary Battleship Division Seven consisting of the ARKANSAS (BB-33), NEW YORK (BB-34) and the NAGATO (Ex-Japanese BB); temporary Battleship Division Nine consisting of the PENNSYLVANIA (BB-38), and NEVADA (BB-36); temporary Cruiser Division Twenty Three consisting of the SALT LAKE CITY (CA-25), PENSACOLA (CA-24), SAKAWA (Ex-Japanese CL) and PRINZ EUGEN (Ex-German CA). All U. S. Ships less the NEW YORK were in various yards on the West Coast when designated for CROSSROADS. The NEW YORK was sailed from NSY, Philadelphia on 4 March and arrived in San Francisco on 31 March after an intentional delay in the Canal Zone area. The PRINZ EUGEN arrived at NSY Boston from Bremerhaven, Germany. Part of her German crew was removed and she was sailed to NSY Philadelphia for further stripping on 28 January, undergoing firing tests for BuOrd enroute. The remainder of the German crew was removed at Philadelphia and she was sailed on 28 February to San Pedro arriving 22 March. The PENNSYLVANIA, SALT LAKE CITY, and PENSACOLA left San Pedro on 29 April for Pearl Harbor arriving 6 May; the NEW YORK left San Pedro on 30 April and arrived Pearl Harbor 7 May; the ARKANSAS and NEVADA departed San Pedro 1 May and arrived Pearl 8 May. The PRINZ EUGEN was retained until 3 May in the San Pedro-San Diego area and then departed on 9 May arriving in Pearl Harbor on 15 May. The NAGATO and SAKAWA departed Yokosuka, Japan in company for Eniwetok on 18 March under the Task Group designation 50.4 and were beset with mechanical difficulties, coupled with running out of

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

fuel just off Eniwetok and admitted sabotage on board the SAKAWA. The SAKAWA arrived at Eniwetok on 31 March and the NAGATO on 4 April having been assisted by the CLAMP (ARS-33) of the Salvage Unit (TU 1.2.7). Both ships departed Eniwetok 27 April and arrived Bikini on the 28th. The NEW YORK departed Pearl Harbor on 19 May for Bikini but was diverted to Kwajalein due to an outbreak of dysentery, arriving 26 May. The ARKANSAS, PENSACOLA, SALT LAKE CITY, in company with the HUGHES (DD-410); the NEVADA singly and the PENNSYLVANIA in company with the FLUSSER (DD-368) and CHICKASAW (ATF-83) all departed Pearl Harbor on 20 May and arrived Bikini on the 28th and 29th. Due to mechanical difficulties, the sailing of the PRINZ EUGEN from Pearl Harbor was delayed until 2 June when she was sailed in company with the SIOUX (ATF-75) arriving Bikini on 11 June. These ships were placed in their positions in the target array upon arrival at Bikini.

14. Three ships of this Task Unit were sunk during Tests Able and Baker. The SAKAWA sank on 2 July due to the effects of Test Able; and the ARKANSAS (BB-33) sank apparently at the instant of detonation on Baker Day and the NAGATO sank four and one half days later due to the effects of Test Baker.

15. Task Unit 1.2.2 Aircraft Carrier Unit (Captain N. M. KINDELL, USN): This target task unit consisted of the SARATOGA (CV-3) and INDEPENDENCE (CVL-22). The INDEPENDENCE was being utilized for Magic Carpet when she was designated for Crossroads on 22 January to take the place of the RANGER (CV-4) which had originally been designated. The SARATOGA was prepared at NSY San Francisco and departed 30 April arriving Pearl Harbor 7 May; the INDEPENDENCE at NSY Terminal Island, and departed 1 May and arrived Pearl Harbor 8 May.

16. The INDEPENDENCE departed Pearl Harbor in company with the STACK (DD-406) on 22 May and arrived Bikini 30 May while the SARATOGA in company with the ANDERSON (DD-411) departed Pearl Harbor the day following arriving Bikini 31 May.

17. The SARATOGA sank on the afternoon of Baker Day and the INDEPENDENCE was heavily damaged on Test Able.

18. Task Unit 1.2.3 Destroyer Unit (Comdr. L. W. SEDGWICK, USNR): The majority of the target vessels were earmarked for disposal either on the West Coast or Pearl Harbor and were being sailed to their final ports or had already been placed out of service. After being designated as targets, they were assembled at Pearl Harbor to accomplish the necessary instrumentation and preparation as target ships.

19. All destroyers were at Pearl Harbor by 19 January and on 7 March they were formed into the temporary divisions as indicated: DesDiv-1: HUGHES (DD-410), LAMSON (DD-367), RALPH TALBOT (DD-390), RHIND (DD-404), ANDERSON (DD-411); DesDiv-2: STACK (DD-406), SMITH (DD-378), HELM (DD-388), WILSON (DD-408), WAINWRIGHT (DD-419); DesDiv-3: MUGFORD (DD-389), FLUSSER (DD-368), CONYNGHAM (DD-371), MUSTIN (DD-413); DesDiv-4: BAGLEY (DD-385), MAYRANT (DD-402), TRIPPE (DD-403).

20. The MAYRANT (DD-402), TRIPPE (DD-403) and BAGLEY (DD-385) were designated as spare target vessels.

21. The FLUSSER (DD-368) was ordered to proceed to San Pedro from Pearl Harbor on 14 April to assist in a special towing exercise in that area conducted under the command of ComBatDiv-7 (Captain W. DEWEESE, USN). Due to the necessity for drydocking for voyage repairs, she did not return to Pearl Harbor until 14 May.

22. On 1 May the HELM (DD-388), SMITH (DD-378) and BAGLEY (DD-385) were detached from CROSSROADS due to an increasingly critical personnel shortage, thereby reducing the number of target destroyers to fourteen.

23. The general movement to the target area from Pearl Harbor started on 19 May when the RALPH TALBOT (DD-390) departed in company with the NEW YORK (BB-34) to be

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

diverted on 22 May to Kwajalein arriving on 25 May due to an outbreak of bacillic dysentery on board the NEW YORK. After escortin the NEW YORK to Kwajelein, the RALPH TALBOT proceeded to Bikini. Like the RALPH TALBOT, the remaining target destroyers were sailed to Bikini in company with other target vessel groups and all had arrived at Bikini by 1 June.

24. The TRIPPE (DD-403) and MAYRANT (DD-402) after being suitably equipped were transferred to the operational control of CTG 1.7 and were utilized during the Queen Day exercises for upwind radiological patrol duties. They returned to port at 1600 on Queen Day. After Queen Day the MAYRANT (DD-402) was returned to the target array and replaced by the FLUSSER (DD-368) who carried out upwind radiological patrol duties on Able Day.

25. The ANDERSON (DD-411) and LAMSON (DD-367) were sunk during Test Able.

26. The TRIPPE (DD-403) was returned to the target array for Test Baker but the FLUSSER (DD-368) was retained executing an upwind patrol mission on William Day. She was sent to Kwajalein on Baker minus one day to transport to the HAVEN (AH-12) at Bikini certain members of the President's Evaluation Commission who had witnessed Test Baker from the air. She was further utilized for three runs to Kwajalein to transport separatees and return mail to Bikini.

27. No destroyers were sunk in Test Baker, but the HUGHES (DD-410) was damaged and later beached on Enyu Island to prevent sinking.

28. Task Unit 1.2.4 Submarine Unit, (Comdr. R. A. Waugh, USN): At the time of their assignment to Crossroads as targets, the submarines of this Task Unit were located as follows: SKATE (SS-305), PARCHE (SS-384), APOGON (SS-308), PILOTFISH (SS-386) were located at

Pearl Harbor; the SEARAVEN (SS-196), which had been substituted for the SPEARFISH (SS-190), and DENTUDA (SS-335) at San Francisco; the SKIPJACK (SS-184) and TUNA (SS-203) at New London, Connecticut.

29. The SKIPJACK (SS-184), which was the oldest submarine to participate in the tests, was sailed from Boston on 30 January where she was to have been decommissioned to New London. The TUNA (SS-203) was in full commission at New London and sailed in company with the SKIPJACK (SS-184) for the Canal Zone on 7 February arriving Pearl Harbor on 2 March.

30. The DENTUDA (SS-335) which had been assigned to an interim training squadron in San Francisco was sailed for Pearl Harbor with the SEARAVEN (SS-196) on 8 February arriving on 14 February.

31. The target submarines conducted several training cruises in the Pearl Harbor area and submergence tests were held on 26 April using the APOGON (SS-308) at Lahaina Roads. The submarines were designated temporary Submarine Division Eleven in March.

32. The SKIPJACK (SS-184), SEARAVEN (SS-196), TUNA (SS-203) and SKATE (SS-305) accompanied by LAMSON (DD-367) departed Pearl Harbor on 21 May arriving Bikini on 30 May and the DENTUDA (SS-335), PARCHE (SS-384), PILOTFISH (SS-386) and APOGON (SS-308) departed on 22 May arriving Bikini on 31 May.

33. The target submarines were in the best material and personnel condition of all target ships.

34. The SKATE (SS-305) suffered heavy superstructure damage as a result of Test Able and was beached off Enyu Island. The PILOTFISH (SS-386) and APOGON (SS-308) are believed to have been heavily damaged as a result of Test

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE [illegible] REQUIRED
USE MILITARY CLASSIFICATION [illegible]

Baker although exact damage cannot be determined unless efforts to surface them prove successful. The SKIPJACK (SS-184) was moderately damaged as a result of Test Baker. The SEARAVEN (SS-196), TUNA (SS-203), SKATE (SS-305), PARCHE (SS-384) and DENTUDA (SS-335) suffered negligible damage as a result of Test Baker. Unlike Test Able when all submarines were on the surface during the explosion, all submarines less the SKATE (SS-305) and PARCHE (SS-384) were submerged for Test Baker.

35. Task Unit 1.2.5 Landing Craft Unit, (Lieut. V. C. VINT, USN): Task Force plans called for six LST's and twenty five LCT's to be in the target array. The Chief of Naval Operations directed CinCPac to designate suitable ships and craft on 16 January 1946 and by 1 February the LST's 52, 133, 220, 283, 388, 545 had been designated. By 13 February LCI's 332, 327, 329, 549, 615, and 620 were made available for target use and on 3 February thirty LCT's were made available. Of the thirty LCT's available on 3 February fourteen were available at Eniwetok, two at Kwajalein, four at Pearl Harbor, one was enroute Kwajalein on board the LST-1108, three were to be lifted to Kwajalein from Okinawa by the CASA GRANDE (LSD-13) and six were to be lifted to Kwajalein from Okinawa and Manus by the OAK HILL (LSD-7).

36. The LST-220 was sailed to Bikini from Pearl on 23 March arriving on 4 April. The LST's 52, 133, and 388 departed shortly thereafter with two target LCT's arriving on the 9th and 14th of April. Upon arrival at Bikini the LST-388 was utilized as a recreation ship originally scheduled until 1 June. On 16 May, however, due to the continuing need for such a ship, the LST-388 was transferred to Task Unit 1.8.1 (Repair and Service Unit) as a permanent recreation ship. The LST-283 grounded off Maui on 5 May and was replaced by the LST-661. The LST-661 was sailed from Pearl on 20 May and arrived Bikini 1 June, and the LST-545 was sailed on 21 May and arrived Bikini on 3 June. The LST-220 was delayed in sailing from Pearl and arrived Bikini on 12 June.

37. The LST's 133 and 220 were beached during Test Able and the others were anchored in the array. None of the LST's were extensively damaged in the first test.

38. The LST-125 was added to the Task Force for Test Baker to replace the LST-388. She sailed from Subic Bay and arrived Bikini on 9 July.

39. The LST-125 was damaged as a result of Test Baker and was sunk at sea by gunfire of the FALL RIVER (CA-131) on 14 August off Bikini. The remaining LST's are in poor mechanical and material condition.

40. The LCI's 332, 327, 329, 549, 615, and 620 had been made available to the Task Force on 13 February at Pearl. All of them sailed from Pearl Harbor in company with the MAYRANT (DD-402) on 19 May and arrived at Bikini on 1 June.

41. The LCI's 615 and 620 were beached for both tests and were damaged by wave action during Test Baker. The remainder were within the target array and remained relatively undamaged. The LCI-620 was towed to sea and sunk southwest of the lagoon entrance to Bikini on 10 August by the practice gunfire of seven destroyers of the Surface Patrol Group (TG 1.7).

42. Twenty-one target LCT's were gathered mainly at Kwajalein and Eniwetok by 6 March and three more were due to arrive at Bikini lifted by Task Force LST's. This was six less than the thirty originally made available and one less than the number planned to expose in tests Able and Baker. They had originally been scheduled to arrive at Bikini by 25 April but the delay in the test changed their schedule of arrival and the new date was set at 1 June. The twelve LCT's at Eniwetok were sailed for Kwajalein over a period of time until all arrived by 11 May. Twenty-one LCT's departed Kwajalein on 15 May escorted by the CONSERVER (ARS-39) of the Salvage Unit (TU 1.2.7) and arrived at Bikini on 16 May. The last target LCT arrived at Bikini on 3 June from Pearl Harbor on board the LST-545.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

43. All LCT's were exposed in Test Able; four were beached and the remainder in the array. None were materially damaged as a result of Test Able.

44. On 7 July the twenty-four target LCT's were divided into two groups; ten were assigned to the Dispatch Boat and Boat Pool Unit (TU 1.8.3) for general duties while the others remained as targets for Test Baker. Two were later returned to the target group before Baker Day. Those attached to TU 1.8.3 were evacuated to Rongelap for Test Baker.

45. One LCT was capsized as a result of Test Baker and was destroyed on Baker plus two day to prevent its becoming a derelict.

46. Near the end of January upon the request of the Bureau of Yards and Docks three concrete craft were included as a miscellaneous group within TU 1.2.5 to be exposed in Tests Able and Baker. The ARDC-13 was at San Pedro and the YC-160 and YOG-83 were at Eniwetok. The ARDC-13 departed San Pedro on 21 March in tow of ATA-180 and escorted by ATA-185 both of the Salvage Unit (TU 1.2.7). On 22 April the YO-160 was towed by the CLAMP (ARS-33) from Eniwetok to Bikini arriving 23 April. The ARDC-13 departed Pearl Harbor 5 May towed by CHOWANOC (ATF-100) arriving Bikini 28 May. The YOG-83 had been shifted to Kwajalein and was towed to Bikini by the WENATCHEE (ATF-118) arriving 30 May.

47. The ARDC-13 was damaged as a result of Test Able, and capsized and sank after being exposed in Test Baker. The YO-160 was badly damaged in Test Able.

48. Task Unit 1.2.6 Merchant Type Unit: (Captain W. H. STANDLEY, Jr., USN): In January 1946 the target APA's and AKA's which were to constitute TU 1.2.6, were in widely scattered locations carrying out Magic Carpet assignments. The ships with few exceptions were ordered as they became available to various naval shipyards on

the West Coast for preparation in accordance with directives of the Bureau of Ships and for personnel adjustments. Eight ships which became available at later dates were prepared at Pearl Harbor. The remainder were then ordered to Pearl Harbor for final preparation as targets. On 23 March the assigned APA's were formed into temporary Transport Divisions as follows:

TransDiv-91 - GILLIAM (APA-57), BANNER (APA-60), BRULE (APA-66), CARLISLE (APA-69), CARTERET (APA-70), and FALLON (APA-81)

TransDiv-92 - CRITTENDEN (APA-77), BARROW (APA-61), BUTTE (APA-68), CLEBURNE (APA-73), CORTLAND (APA-75), DAWSON (APA-79)

TransDiv-93 - NIAGARA (APA-87), BLADEN (APA-63), BRACKEN (APA-64), BRISCOE (APA-65), CATRON (APA-71), FILLMORE (APA-83), and GENEVA (APA-86)

TransDiv-94 - ATHENE (AKA-22), GASCONADE (APA-85), APPLING (APA-58). and ARTEMIS (AKA-21)

The BURLESON (APA-67) which had originally been assigned to TransDiv-94 was shifted to TU 1.1.2 on 27 March for use as animal laboratory ship. On 1 May the FERGUS (APA-82), CLEBURNE (APA-73) and ATHENE (AKA-22) were deleted due to an increasingly critical personnel problem.

49. By 11 March all target transportswere at Pearl Harbor less the ARTEMIS (AKA-21) which arrived on 25 March. The ART EMIS (AKA-21) was the first of the group to leave departing Pearl Harbor 14 May and arriving Bikini 27 May. The BRISCOE (APA-65), BANNER (APA-60), BRULE (APA-66), CARTERET (APA-70) and FALLON (APA-81) departed Pearl Harbor in company on 15 May and arrived Bikini 28 May. Six more left on 17 May to arrive on 30 May and eight more on 18 May to arrive Bikini 31 May. The APPLING (APA-58) was the last to leave, departing Pearl Harbor 21 May and arriving Bikini 3 June. During the voyage, no ship was

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MILITARY ... ICATION EXPECTED

delayed over one hour which was a truly remarkable feat considering the many personnel and material problems that had to be met. All ships less APPLING (APA-58) were anchored in their positions in the target array by 3 June.

50. The GILLIAM (APA-57) and CARLISLE (APA-69) were sunk on Able Day as a result of the explosion. The FALLON (APA-81) was heavily damaged as a result of Test Baker and was beached on Enyu Island on Baker plus two day to prevent sinking. The GASCONADE (APA-85) was moderately damaged and the rest received varying degrees of damage from negligible to moderate.

51. The APPLING (APA-58) and ARTEMIS (AKA-21) were not used as targets but were used as bases for radiological LCPL's and their crews. On Queen, Able, William and Baker Days they operated with the HENRICO (APA-45) of TU 1.3.1 as temporary Task Unit 1.2.8 and were among the first ships to approach the lagoon entrance to launch LCPL's.

52. Task Unit 1.2.7 Salvage Unit (Captain B. E. MANSEAU, USN): Early plans called for a Repair Service and Salvage group to be activated by Commander Service Forces Pacific to be attached to the Task Force to include repair and service vessels of all types to maintain both target and non-target types attached to the Task Force and to assist in placing the target ships in the target array. Early in February, however, plans were altered to make the salvage unit a part of the Target Vessel Group (TG 1.2) with the designation TU 1.2.7 instead of placing it in the Service Group (TG 1.8). It was to consist of one ARS(T), six ARS's, two ASR's, 3 ATA's, four LCT's with A frames and possible two ARS(D)'s from the East Coast. The duties of the Salvage Unit were to select beaching areas, to facilitate saving of damaged ships, perform all underwater work involving divers both before and after the tests, routine work of the placing of buoys, emergency repairs, fire fighting and, of course the considerable general salvage work after the tests. Procurement of the required vessels was accomplished by ComServPac

and administered by CTG 1.8 until Task Unit 1.2.7 was activated. The designation of ships for this unit progressed along with the general acquisition of ships for the Service Unit and they were assigned to the temporary Task Unit 1.8.2 with directives which required their reporting at Bikini not later than 5 May and by 25 April if practicable, (these dates were later advanced, due to the delay in the tests).

53. By 14 February the Salvage Unit consisted of the following: ATA's 180, 185 at San Francisco, ATA-192 at Pearl, PRESERVER (ARS-8) enroute San Diego from Pearl, SCHACKLE (ARS-9) at Terminal Island, CURRENT (ARS-22) at Pearl, DELIVER (ARS-23) enroute San Francisco from Pearl, CLAMP (ARS-33) at Pearl, RECLAIMER (ARS-42) at San Francisco, PALMYRA (ARS(T)-3) at Guam, CHICKASAW (ATF-83) at Pearl, ACHOMAWI (ATF-148), WIDGEON (ASR-1) at San Diego, COUCAL (ASR-8) at Terminal Island, GYPSY (ARS(D)-1) and MENDER (ARS(D)-2) building at Orange, Texas, and four LCT's with A frames which were to be lifted from Okinawa to Kwajalein by LSD's. The ETLAH (AN-79) at Pearl, SUNCOCK (AN-80) at Guam, ONEOTA (AN-85) at Pearl, and SHAKAMAXON (AN-88) at Guam were added to the Task Unit on 11 March. Those ships on the West Coast were sailed to arrive Pearl by 15 April.

54. The CLAMP (ARS-33) was the first ship of the Salvage Unit to be sailed to Bikini arriving on 15 March. She assisted the survey ship which was already present and towed various non-self propelled craft of the Task Force between Eniwetok, Kwajalein and Bikini. The four A frame LCT's arrived Kwajalein by 11 March. The four AN's were sailed from Guam and Pearl Harbor and arrived Bikini by 2 April. The majority of the Task Unit was sailed from Pearl Harbor between 11 and 22 May to arrive by 1 June at which time all ships of the Task Unit were present at Bikini except the two ARS(D)'s, four LCT's and the CURRENT (ARS-22) and DELIVER (ARS-23) which were enroute from Pearl Harbor to Bikini.

55. In the interim period, the GYPSY (ARS(D)-1) and MENDER (ARS(D)-2) had been commissioned at Houston, Texas

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
SPECIFIC RESTRICTED
USE MILITARY

on 28 February and assigned to CROSSROADS on 18 March. They had proceeded to Norfolk, Virginia for shakedown arriving 24 March and departed on 30 April for the Canal Zone. They were routed to San Diego for repairs, both ships having developed cracks in ballast tank plating. They were sailed for Pearl Harbor arriving 23 June and departed 26 June for Bikini towing a tug for delivery to Kwajalein. The MENDER (ARS(D)-2) was diverted to Bikini direct arriving on 8 July and the GYPSY (ARS(D)-1) arrived 10 July. On 14 June it was realized that there were not enough personnel to man the four LCT's assigned to the unit so two were deleted from the Task Unit and the other two (LCT's 1184 and 1420) arrived Bikini 16 June.

56. Many demands were made on this unit in the placing of the targets in the array, planting moorings, diving operations, fire fighting, and beaching of target ships. During Tests Able and Baker the unit remained in operating areas adjacent to Bikini (except that the two LCT's were evacuated to Rongelap for Test Baker) and were among the first ships to re-enter after the detonation to carry out their missions.

57. Task Unit 1.3.1 Transport Unit (Captain W.P. DAVIS, USN): The primary function of this unit was as evacuation transports for target vessel crews during Tests Able and Baker, however, they were utilized in a number of other capacities such as lifting Army Air Force personnel and equipment from San Francisco to Eniwetok and Kwajalein, lifting to and providing quarters at Bikini for Sea Bees, transporting mooring buoys, spare ground tackle, beer and miscellaneous equipment from West Coasts ports and Pearl Harbor to Bikini.

58. Task Unit 1.3.1 was designated the Transport Unit and on 12 February the Active Transport Division 31 consisting of the GEORGE CLYMER (APA-27), ROCKBRIDGE (APA-228), ROCKINGHAM (APA-229), ROCKWALL (APA-230) were designated to join the Task Force by 1 March. The ST. CROIX (APA-231), BOTTINEAU (APA-235) and BEXAR (APA-237) had been assigned

on 8 February and the ST. CROIX was chosen to be the advance station ship at Bikini. The ROLETTE (AKA-99) and OTTAWA (AKA-101) were assigned to the Task Force on the 8th and 9th of February and ordered to report at Hueneme, California, to load Sea Bee equipment. The HENRICO (APA-45) was added on 14 February and the BAYFIELD on 22 February. Thus by 22 February the Task Unit consisted of nine APA's, two AKA's and two LST's.

59. By 1 March all ships of the Task Unit were at San Francisco or Hueneme except the ST. CROIX (APA-231) and the two LST's which were at Pearl and scheduled to depart for Bikini. The ST. CROIX (APA-231) arrived Bikini on 9 March and assumed duties as SOPA Bikini and the LST-881 arrived on 14 March and the LST-817 arrived 18 March. The ROLETTE (AKA-99) and OTTAWA (AKS-101) arrived Bikini on 20 March having on board the Sea Bee Battalion and having sailed from Hueneme direct. The GEORGE CLYMER (APA-27), ROCKBRIDGE (APA-228), ROCKINGHAM (APA-229), and ROCKWALL (APA-230) departed San Francisco on 10 March for Kwajalein direct and arrived 25 March (the ROCKINGHAM (APA-229) for Eniwetok) with the ground and base forces of the Army Air Group (TG 1.5) on board. The BAYFIELD (APA-33) departed San Francisco on 20 March for Bikini via Kwajalein and Eniwetok after being diverted to Pearl Harbor to discharge oceanographic personnel and carrying general CROSSROADS cargo arrived Bikini on 12 April. The HENRICO (APA-45) sailed with general CROSSROADS cargo on 20 March from Hueneme and was also diverted to Pearl Harbor arriving on 26 March. The diversions to Pearl Harbor were due to the delay in the tests. The GEORGE CLYMER (APA-27), ROCKBRIDGE (APA-228), ROCKINGHAM (APA-229) and ROCKWALL (APA-230) were returned to Pearl Harbor from Eniwetok and Kwajalein arriving by 10 April and all less the GEORGE CLYMER were made temporarily available to Commander Service Forces Pacific for Magic Carpet duties. The new assembly date for the Task Unit at Bikini was advanced to 10 June.

60. The BAYFIELD (APA-33) was sailed from Bikini on 25 April for Pearl Harbor via Eniwetok and Kwajalein arriving 5 May and the HENRICO (APA-45) was sailed on 1 May for

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

Bikini via Kwajalein and Eniwetok and returned Pearl Harbor on 16 May.

61. The BEXAR (APA-237) departed San Francisco on 20 May for Bikini via Pearl Harbor and arrived Bikini on 10 June. The BOTTINEAU (APA-235) was sailed from San Pedro on 25 May and was sailed to Bikini direct arriving on 7 June.

62. The GEORGE CLYMER (APA-27), ROCKBRIDGE (APA-228), ROCKINGHAM (APA-229), ROCKWALL (APA-230), BAYFIELD (APA-33) and HENRICO (APA-45) all departed Pearl Harbor on 25 May and arrived Bikini on 1 June less the ROCKBRIDGE (APA-228) that had been routed via Kwajalein which arrived Bikini 4 June. The ROCKINGHAM (APA-229) made a quick run to Pearl Harbor and returned for general cargo lift before Able Day leaving Bikini on 6 June and returning on 19 June.

63. During Tests Able and Baker this Task Unit embarked personnel from the target ships and remained in operating areas in the close vicinity of Bikini. The HENRICO (APA-45) accompanied by the ARTEMIS (AKA-21) and APPLING (APA-58) acted as flagship of temporary Task Unit 1.2.6 having radiological LCPL's and personnel on board. The ST. CROIX (APA-231) was utilized as an evacuation ship for Eniwetok personnel during Test Baker and reported for temporary duty to Atoll Commander Eniwetok for that duty. She departed Bikini 18 July, embarked Eniwetok personnel and departed 21 July for Majuro arriving 24 July.

64. The ST. CROIX (APA-231) returned to Bikini on 2 August. The ROLETTE (AKA-99) proceeded to Kwajalein after the Baker Day detonation and returned to Bikini on 28 July. The OTTAWA (AKA-101) and LST's 817 and 881 proceeded to Rongelap after the Baker Day detonation and returned by 1 August.

65. By 15 August the ST. CROIX (APA-231) had loaded drone boats and departed for San Francisco via Pearl and reported to ComPhibsPac for duty; the OTTAWA (AKA-101)

had been sailed for Hueneme direct; the BAYFIELD (APA-33) had been sent to Kwajalein to load the Task Force Army Air personnel and was enroute to San Francisco via Pearl, and the BOTTINEAU (APA-235) was enroute San Francisco via Pearl. Other ships of the Task Unit were due for early release from CROSSROADS.

66. Task Unit 1.3.2 Press Unit (Captain J. B. RENN, USN) and Task Unit 1.3.3 Observers Unit (Captain W. B. AMMON, USN): The APPALACHIAN (AGC-1) was assigned to the Task Force as a press ship in the latter part of January. The PANAMINT (AGC-13) and BLUE RIDGE (AGC-2) were made available to the Task Force on 9 February. The PANAMINT (AGC-13) was at Sasebo, Japan, when assigned and was sailed to the West Coast to arrive by 1 April, authorization having been obtained to retain her in active service for the duration of CROSSROADS, and the BLUE RIDGE (AGC-2) was at Shanghai and was sailed to arrive on the West Coast by 15 March. All three AGC's with the Press, United Nations observers and Joint Chiefs of Staff Evaluation Board embarked, sailed from San Francisco on 12 June and arrived at Honolulu (BLUE RIDGE (AGC-2) to Pearl Harbor) on 18 June. All departed on 20 June, arrived and departed Kwajalein on 28 June, and arrived Bikini 29 June.

67. The three ships were in an operating area close to Bikini during Test Able and were among the first ships to re-enter the lagoon to observe the results of the detonation.

68. The APPALACHIAN (AGC-1) departed 4 July for Pearl Harbor via Kwajalein arriving on 10 July. The PANAMINT (AGC-13) and BLUE RIDGE (AGC-2) embarked on an extensive cruise between Able and Baker days in order to show the non-participating observers historic islands which had figured prominently in the Pacific war. They departed Bikini on 5 July, proceeded to Kwajalein, Majuro, Ponape, Truk, and arrived Guam on 17 July. They departed Guam on 19 July and arrived Kwajalein on 23 July and joined the Force Flagship in an operating area off Bikini on the

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
WITH MILITARY CLASSIFICATION SAFEGUARDS

DATA
ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
RESTRICTED USE MILITARY CLASSIFICATION SAFEGUARDS

morning of Baker Day. The APPALACHIAN (AGC-1) had departed Pearl Harbor and returned to Bikini via Kwajalein on 22 July. She departed the lagoon on Baker minus one day and joined the Force Flagship and the other two AGC's to witness the detonation on Baker Day. They all re-entered the lagoon with the Force Flagship on the afternoon of Baker Day.

69. The APPALACHIAN (AGC-1) and PANAMINT (AGC-13) left Bikini on 29 July and the BLUE RIDGE (AGC-2) departed on 30 July for San Francisco via Pearl and Honolulu where, upon arrival, they reported to ComPhibsPac for administrative control. The BLUE RIDGE (AGC-2) had been routed via Rongelap to transport separatees from the Task Force ships that had been evacuated to that anchorage for Test Baker.

70. Task Group 1.6 Navy Air Group (Rear Admiral C.A.F. SPRAGUE, USN): A CVE was requested from CinCPac for a photographic unit on 9 January and a CV was requested for a Navy drone unit on 26 January. The BENNINGTON (CV-20) or SHANGRI-LA (CV-38) was proposed by CinCPac but it was ascertained that the former had an inoperable elevator so the SHANGRI-LA (CV-38) was assigned to CROSSROADS on 3 February and CinCPac was directed on 4 February to sail her to Norfolk to arrive by 1 March for loading of F6F drone and control planes and a drone control unit to be landed at Roi Island. The SAIDOR (CVE-117) was designated for CROSSROADS early in February to report on 15 March at Pearl Harbor for embarkation of the photographic unit. On 21 February four fleet destroyers or destroyer escorts were requested for patrol and plane guard duty for this Task Group and the H. R. DICKSON (DD-708), HUGH PURVIS (DD-709), PURDY (DD-734) and BEATTY (DD-756) were designated. On 18 March, however, Destroyer Division 51 was substituted for the above plane guard destroyers.

71. Destroyer Division 51 consisted of the TURNER (DD-834), C.P. CECIL (DD-835), FURSE (DD-882) and N. K. PERRY (DD-883) and all were at Yokosuka, Japan and were directed to report at Bikini 5 May. They were sailed to

Pearl Harbor in company and arrived on 7 April and their reporting date was advanced to 10 June. The SHANGRI-LA (CV-38) arrived at Norfolk on 1 March and on 7 March an AVP was requested as a terminus for a PBM shuttle service between Kwajalein and Bikini and the CHINCOTEAGUE (AVP-24) at Tsingtao was designated on 11 March but was replaced by the ORCA (AVP-49) at Saipan on 3 April.

72. The SHANGRI-LA (CV-38) departed Norfolk on 18 March, as scheduled, and arrived San Diego 1 April, four days after the SAIDOR which had been sailed from Pearl Harbor. After the delay in the tests, the SAIDOR (CVE-117) was made available to ComAirPac for a quick ferry trip to Norfolk arriving 16 April, departing 20 April having been delayed by an engineering casualty, and arrived San Diego 1 May.

73. The SAIDOR (CVE-117) departed San Diego on 6 May in company with the INGRAHAM (DD-694) (of TG 1.7) and arrived Pearl Harbor on 13 May and departed 16 May arriving Bikini via Kwajalein 24 May. The ORCA (AVP-49) arrived Bikini 7 May from Saipan. The SHANGRI-LA (CV-38) departed San Diego in company with the BEGOR (APD-127)(of TU 1.1.3), and the A. M. SUMNER (DD-692), MOALE (DD-693), and HUNTINGTON (DD-781)(of TG 1.7) and arrived Pearl Harbor on 27 May and departed 29 May in company with the same ships plus the TURNER (DD-834) and N.K. PERRY (DD-883) and arrived Roi on 5 June. The PERRY (DD-883), the BEGOR (APD-127) and the destroyers of TG 1.7 continued on to Bikini to arrive the same day. The C. P. CECIL (DD-835) had arrived at Bikini on 29 May after accompanying the Force Flagship as far as Johnston Island. The FURSE (DD-882), delayed by repairs, departed Pearl Harbor on 12 June and arrived Bikini on 18 June completing the movement of the Task Group to their assigned destinations for CROSSROADS.

74. All of the Task Group less ORCA (AVP-49) and FURSE (DD-882) participated in an air rehearsal on 10 June. The SHANGRI-LA (CV-38) and C. P. CECIL (DD-835) returned to Roi on 11 June and the rest to Bikini. The SHANGRI-LA (CV-38) and C. P. CECIL (DD-835) arrived Bikini from Roi

ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

on 17 June and the same units participated in another air rehearsal on 18 June. Afterwards the SHANGRI-LA (CV-38) returned to Roi accompanied by the TURNER (DD-834) and C. P. CECIL (DD-835).

75. All units of the Task Group participated in the Queen Day rehearsal and Able Day exercises. The SHANGRI-LA, TURNER and CECIL operated in an area around a geographical reference point bearing 135° T forty nautical miles from the center of Bikini Island (Point Auto), the SAIDOR, FURSE and PERRY operated in an area bearing between 000° T and 030° T at least 18 nautical miles distant from Point Auto, and the ORCA operated around a geographical reference point bearing 000° T twenty nautical miles from Point Auto.

76, All Able Day missions were accomplished without incident and the ships returned to their bases. The N. K. PERRY (DD-883) made a trip to Kwajalein to deliver some Able Day film leaving on 4 July and returning with the FURSE (DD-882) 13 July via Roi to deliver some personnel there.

77. Another air rehearsal was held on 14 July with all units of the Task Group less ORCA (AVP-49) participating.

78. All units participated in the William Day exercises and Baker Day operation taking the same stations as on Able Day. All missions were accomplished successfully.

79. The TURNER (DD-834) was sailed for Pearl Harbor on the afternoon of Baker Day for dysentery study by epidemiological unit number 106. Operational and administrative control passed to ComDesPac upon her departure. The SHANGRI-LA (CV-38) accompanied by the C. P. CECIL (DD-835) sailed from Roi on 28 July for San Diego via Pearl Harbor. Operational and administrative control of the SHANGRI-LA reverted to ComAirPac upon completion unloading at San Diego and the CECIL's to ComDesPac when she departed Roi. The FURSE (DD-882) departed Bikini on 28 July and sailed to Kwajalein to escort the ALBEMARLE (AV-5) to San Pedro reporting to ComDesPac for administrative and operational

control upon arrival San Pedro. The SAIDOR (CVE-117) and PERRY (DD-883) departed Bikini 4 August for San Diego via Pearl Harbor. Operational and administrative control of the PERRY passed to ComDesPac upon departure and the SAIDOR reported to ComAirPac upon arrival San Diego. The ORCA (AVP-49) departed Bikini on 12 August for Guam via Kwajalein, operational and administrative control passing to Com-Marianas upon departure.

80. Task Group 1.7 Surface Patrol Group (Captain E. N. PARKER, USN): On 9 January CNO had requested an active destroyer squadron for patrol duties and Destroyer Squadron Eleven in Japanese waters was designated for CROSSROADS by 1 February. Upon representation by ComDesPac to CinCPac on 8 February and confirmed by CNO on 19 February Destroyer Squadron Seven was substituted. Four destroyers of Destroyer Squadron Eleven were reassigned to Task Group 1.6 but they, too, were replaced on 18 March.

81. Destroyer Squadron Seven consisted of the BARTON (DD-722), WALKE (DD-723), LAFFEY (DD-724), O'BRIEN (DD-725), and LOWRY (DD-770) in Destroyer Division 71 and the A. M. SUMNER (DD-692), MOALE (DD-693), INGRAHAM (DD-694) and R. K. HUNTINGTON (DD-781) in Destroyer Division 72. They were First Fleet, 2200 ton destroyers and all were at San Pedro except the LAFFEY (DD-724) when assigned. Special oceanographic and radiological equipment was installed to carry out their vital missions during the tests.

82. The WALKE (DD-723) was sailed to Pearl Harbor and arrived 25 March. DesDiv-72 was made available for plane guard duty to the SHANGRI-LA (CV-38) and SAIDOR (CVE-117) at San Diego until relieved by their regularly assigned plane guards (DesDiv-51). After the delay of the tests, the WALKE (DD-723) and LAFFEY (DD-724) were sailed to San Diego arriving 10 April and joining the rest of the squadron there. The O'BRIEN (DD-725) was made available for some special exercises at sea with the ex-German CA, PRINZ EUGEN (IX-300).

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

83. The INGRAHAM (DD-694) was the first destroyer of the Task Group to depart for the target area when it accompanied the SAIDOR (CVE-117) on 6 May from San Diego and arrived Bikini on 22 May, after a two day stopover at Pearl Harbor. The WALKE (DD-723) and LAFFEY (DD-724) were next; departing San Diego 12 May arriving Pearl Harbor on 18 May and departing 21 May escorting the FALL RIVER (CA-131) to Bikini arriving 27 May. The A. M. SUMNER (DD-692), MOALE (DD-693) and HUNTINGTON (DD-781) departed San Diego on 21 May in company with the SHANGRI-LA (CV-38) and BEGOR (APD-127) and arrived at Bikini 5 June after a two day stop at Pearl Harbor. The BARTON (DD-722), O'BRIEN (DD-725) and LOWRY (DD-770) were shifted to San Francisco on 4 May to escort the Force Flagship to Bikini, but this was cancelled on 6 May. The BARTON (DD-722) and O'BRIEN (DD-725) departed San Francisco on 5 June for Bikini via Pearl Harbor and Kwajalein arriving Bikini 15 June. The LOWRY (DD-770) was unable to arrive until the morning of Baker Day.

84. The WALKE, LAFFEY and INGRAHAM participated in an air sea rescue mission to the south of Bikini from 31 May until 3 June. The INGRAHAM, SUMNER and HUNTINGTON participated in an air rehearsal with Task Group 1.6 on 10 June. The LAFFEY departed Bikini 10 June to meet the HAVEN (AH-12) at sea to test the visual characteristics of a new type of hospital ship illumination and returned Bikini 12 June. On 17 June the entire task group less LOWRY (DD-770) departed Bikini for oceanographic exercises returning by 20 June. On 20 June the LAFFEY, O'BRIEN, SUMNER and MOALE participated in an air rehearsal with Task Group 1.6.

85. All ships of the Task Group present participated in the Queen Day rehearsal on 24 June and on 26 June the SUMNER, MOALE, INGRAHAM and HUNTINGTON departed for Kwajalein to embark Manhattan District personnel for Bikini returning on 29 June.

86. On Able Day the destroyers had many important duties both with regard to oceanographic surveys and radiological monitoring. The BARTON took station at Point Willys (075° T, eight miles from Point Auto which was located at the center

of Bikini Island) and after detonation proceeded to the lagoon entrance for radiological survey and then joined the SUMNER and MOALE on downwind patrol. The O'BRIEN was at a point bearing 225° T, 50 miles from the center of the target array and the HUNTINGTON was at a point bearing 225° T, thirty-five miles from the center of the target array. After the detonation they cleared the area to the eastward and then proceeded on downwind patrol. The WALKE and LAFFEY took station 12 miles northeast of Point Auto, and after the detonation proceeded to take downwind radiological patrol. The SUMNER and MOALE took station in an area eighteen miles southeast of Point Auto and after the detonation proceeded on upwind radiological patrol. The INGRAHAM took station at Orbit Point Victor (315° T, twenty miles from the center of the target array) and after the detonation proceeded eastward at high speed and joined the WALKE and LAFFEY and then proceeded on downwind patrol after making a sweep around the northern edge of the lagoon.

87. The MOALE took station to the southeast of the lagoon and proceeded to the lagoon entrance and picked up water samples from the BEGOR (APD-127) and proceeded with them to Kwajalein at high speed. Radiological patrols were ordered and controlled by the Radiological Safety Section embarked on the MOUNT MC KINLEY (AGC-7) and the HAVEN (AH-12). The TRIPPE (DD-403) and FLUSSER (DD-368) (of TU 1.2.3) also performed upwind patrol duties.

88. The MOALE was sailed to San Francisco via Pearl Harbor on 1 July arriving on 11 July. The remaining destroyers departed Bikini on 8 July for extensive oceanographic exercises and returned to Bikini by 14 July.

89. The LOWRY and MOALE departed San Francisco in company on 13 July for Pearl Harbor arriving 18 July and departed for Kwajalein arriving 24 July and departing prior dark and proceeded directly to their Baker Day operating areas.

90. The destroyers remaining at Bikini executed the William Day exercises without incident and conducted several oceanographic cruises. The SUMNER, INGRAHAM and HUNTINGTON

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION GUIDELINES

RESTRICTED DATA
RESTRICTED RESTRICTED DATA
USE MILITARY CLASSIFICATION

- -

were sent to Kwajalein on 22 July to embark Manhattan District personnel for return to Bikini arriving 24 July.

91. For Baker Day the BARTON again took station at Point Willys and proceeded on downwind radiological patrol. The A. M. SUMNER, HUNTINGTON, FLUSSER, and MOALE were stationed 18 miles southeast of Bikini, the HUNTINGTON, MOALE and BARTON proceeded on downwind radiological patrol after the detonation. The A. M. SUMNER and FLUSSER proceeded on upwind patrol. The WALKE, LAFFEY and O'BRIEN were twelve miles northeast of Bikini at the time of detonation and then proceeded on downwind patrol and the LOWRY which was in the same area proceeded on upwind patrol.

92. The INGRAHAM, which had been at an air reference station to the northeast of Bikini joined the WALKE and LAFFEY immediately after the detonation and proceeded with them on downwind patrol. The SUMNER which had been at an air reference point bearing 135° T, twenty miles from the center of the target array proceeded on upwind radiological patrol.

93. Many oceanographic and radiological stations after Baker Day were taken by the destroyers within and around the lagoon as the radioactivity was centered in those areas. All were within the lagoon by 6 August.

94. The WALKE and O'BRIEN departed Bikini on 8 August for their last oceanographic cruise and joined up with the remainder of the squadron which had departed Bikini on 10 August for San Diego. The seven destroyers that left Bikini on 10 August sank the damaged LCI-620 at sea to the southwest of Bikini in a gunnery exercise. Operational and administrative control passed to ComDesPac upon their departure from Bikini.

95. Task Group 1.8 Service Group (Captain G. H. LYTTLE, USN): For repairs and service to the Task Force a service group was designated on 24 January and the procuring of the many ships needed was started on 30 January. By 9 February ComServPac notified CinCPac that fifty-three ships of all

types were ready to be utilized as a service group. By 1 March ComServPac designated the Task Group Commander as Commander Service Division Eleven and Commander Task Group 16.16 until reporting to Commander Joint Task Force ONE on 15 April when he would then become Commander Task Group 1.8 This group was directed to furnish logistic support for OPERATION CROSSROADS as required. The various Task Units will be treated separately.

96. Task Unit 1.8.1 Repair and Service Unit: The duties of this unit were Destroyer repair, Submarine repair, Electronics repair, Auxiliary and Landing Craft repair, dry-docking and repair, salvage and towing, and emergency damage repair. It was also to supply provisions (GSK, Dry, Medical and Lumber); logistics (fuel, lubricants and water); a Fleet Post Office and a motion picture exchange and recreation, welfare, legal and personnel facilities. By 15 April when the unit reported to the Task Force it consisted of the following ships and craft: DIXIE (AD-14) at San Diego, COASTERS HARBOR (AG-74), CACAPON (AO-52) enroute Singapore to Bikini replaced on 5 May by the CHIKASKIA (AO-54) at Bahrien, AUCILLA (AO-56) at NS Y Terminal Island, (detached 5 June), SEVERN (AO-61) (carrying water) at San Pedro, ENOREE (AO-69) at Guam, TOMBIGBEE (AOG-11) at Bikini, POLLUX (AKS-4) at San Francisco, HESPERIA (AKS-13) at NSY Mare Island, AJAX (AR-6) at Pearl Harbor, PHAON (ARB-3) at Pearl Harbor, SARPEDON (ARB-7) at Kwajalein (deleted on 7 May), TELEMON (ARB-8) at Kwajalein, ARD-29 at Pearl Harbor, CEBU (ARG-6) at Pearl Harbor, CREON (ARL-11) at Bikini, SPHNIX (ARL-24) at Eniwetok, FULTON (AS-11) at Pearl Harbor, ATA's 124 and 187 at Pearl Harbor, SIOUX (ATF-75) at NSY Terminal Island, CHOWANOC (ATF-100) at Pearl Harbor, MUNSEE (ATF-107) at Pearl Harbor, WENATCHEE (ATF-118) enroute Bikini, WILD-CAT (AW-2) at Kwajalein, LIMESTONE (IX-158) at Kwajalein, QUARTZ (IX-150) at Bikini, LST-861 (Post Office) at Bikini, YC-1009 (Mooring Gear) at Eniwetok, YF-733 at Bikini, YF-754 at Eniwetok, YF's 889 and 890 (Reefers) at San Francisco, (deleted on 1 May), YF-990 at Eniwetok, YF's 991 and 992 (Electronics) at Eniwetok, YF's 734, and 735 (empty) at Eniwetok, YF's 385, 752, 753 (Provisions) at Eniwetok, YO-44 at Pearl Harbor, YO-113 at Kwajalein, (Later replaced by

ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AEC MILITARY ... INFORMATION SAFEGUARDS

the YO-199 at Pearl Harbor and YOG-63 at Kwajalein on 30 May), YO-132 enroute Bikini, YOG-70 at Pearl Harbor.

97. The detailed movements of this Task Unit in order to accomplish their multitudinous missions in connection with CROSSROADS will not be recorded here for it is considered that such a recount would be too voluminous and confusing. It is sufficient to say that by 14 June all ships and craft of the Task Unit were at Bikini except the HESPERIA (AKS-13) which was due at Kwajalein from Pearl Harbor on 3 June and the LIMESTONE (IX-158) (GSK Stores), YC-1009 (Mooring gear), YF-754 (Medical supplies), YF's 991 and 992 (Electronics), YF's 734 (GSK), YF-735 (empty) and YF's 385, 753, 752 (Provisions), all of which were at Kwajalein. The movements of ships and craft from the West Coast to Pearl Harbor, Pearl Harbor to Bikini, Eniwetok to Kwajalein and Kwajalein to Bikini were all accomplished without incident.

98. On Queen Day the majority of the non-self propelled craft were towed to Kwajalein to remain over Able Day with the towing vessels returning to Bikini before Able Day. On Able minus one day the majority of the Task Unit present evacuated Bikini to an operating area some eighteen miles from Bikini Island. The COASTERS HARBOR (AG-74) was the first ship of the unit to re-enter after the detonation.

99. For Test Baker eleven vessels were evacuated to Kwajalein and the remainder less DIXIE (AD-14)(unit flagship), ENOREE(AO-69) and FULTON (AS-11) proceeded to Rongelap. Some of the unit remained in operating areas near Bikini before proceeding to Kwajalein and Rongelap, in order to witness the detonation.

100. Task Unit 1.8.3 Dispatch Boat Pool Unit (Comdr. J. G. BLANCHE, Jr., USN): The mission of this Task Unit was the providing of dispatch and mail service, inter-atoll freight and passenger service and boat pool service.

101. The procurement of ships for this Task Unit was carried out coincidentally with the procurement of ships for Task Unit 1.8.1 and was initialed on 30 January. By 2 March the SAN MARCOS (LSD-25), GUNSTON HALL (LSD-5), PGM's 23, 24, 25, 29, 31 and 32, and LCI's 977 and 1067 had been assigned. The PRESQUE ISLE (APB-44) was added on 8 March.

102. The PGM's 23 and 31 departed San Francisco 18 February and after some delays arrived Pearl Harbor 6 March, the remainder of the PGM's arrived Pearl on 10 March. The SAN MARCOS (LSD-25) arrived Pearl Harbor from the west on 7 March and the GUNSTON HALL (LSD-5) reported at San Pedro 15 March for lift of two LC T's (1361 and 1461) attached to the Task Unit, and rehearsal with the ALBEMARLE (AV-5). The SAN MARCOS (LSD-25) departed Pearl Harbor for Bikini on 13 March lifting eighteen LCM's, twelve LCVP's and six 24 foot PPB's arriving 19 March and proceeding to Eniwetok on 20 March. The PRESQUE ISLE (APB-44) arrived Eniwetok 1 April. Both LCI's arrived Bikini about 29 March. LCI-1091 at San Francisco was added on 3 April.

103. The GUNSTON HALL (LSD-5) with LCT's 1361 and 1461 on board departed San Pedro on 16 April arriving Pearl Harbor on 24 April and departed 26 April and arrived Bikini 3 May in company with PGM's 23 and 32. The PRESQUE ISLE (APB-44) and SAN MARCOS(LSD-25) arrived Bikini 16 May from Eniwetok. The LCI-1091 departed San Francisco 19 April arriving Pearl Harbor 2 May. The LCI-1062 at Bikini was added to the Task Unit on 7 May. The PGM's 24, 25, 29 sailed from Pearl to arrive 14 May.

104. PGM-31 and LCI-1091 were sailed from Pearl to Bikini arriving 30 May. The LCI-1067 after a delay at Pearl Harbor arrived Bikini 18 June.

105. On 8 June, the LCI-977 was assigned air sea rescue duties at Kwajalein, there being no other suitable craft available, thus reducing to three the number of LCI's

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
RESTRICTED USE MILITARY CLASSIFICATION SAFEGUARDS

for the Bikini - Kwajalein passenger and freight shuttle.

106. For all tests and rehearsals the PGM's were assigned to lagoon radiological safety patrol. For the Queen Day rehearsal the Task Unit evacuated to an area eighteen miles northeast of Bikini Island, and re-entered with Task Group 1.8. It was found, however, that the twenty-five miles that the PGM's had to cover from their area to the mouth of the lagoon after the detonation was too far to start their valuable functions of radiological monitoring promptly and delayed the entire rehearsal. Also it was considered valuable to have the SAN MARCOS re-enter with the Technical Group in order to be able to provide boat facilities. These two changes were effected on Able Day and the PGM's were in an area with the BEGOR (APD-127) which was about twelve miles from the lagoon entrance.

107. On William Day the Task Unit remained in the harbor to take advantage of an opportunity to provision from a reefer ship. Eight LCT's were transferred to this Task Unit from Task Unit 1.2.5 between Able and Baker Days.

108. On Test Baker the same changes effected for Test Able were utilized with similar success. The Task Unit less the PGM's and the SAN MARCOS were evacuated to Rongelap.

109. PGM's 25, 29, 31, and 32 were sailed from Bikini on 10 August for Guam via Kwajalein. Operational control passed to ComMarianas upon their departure.

110. Task Unit 1.8.4 Medical Unit (Captain D. M. MACKEY, USN): The HAVEN (AH-12) and BENEVOLENCE (AH-13) had been designated to comprise the Medical Unit for CROSSROADS on 9 February. Both were available at San Francisco. The BOUNTIFUL (AH-9) at Yokosuka was also made available on 21 March and arrived San Francisco 24 April. On 29 March the HAVEN (AH-12) was shifted to Task Unit 1.1.2 (Instrumentation Unit) due to the fact that she was being fitted to house the Task Force Radiological Safety Section and, due

- -

to special equipment being installed, could not act as a hospital ship.

111. The BENEVOLENCE (AH-13) departed San Francisco 27 April for Kwajalein direct arriving 10 May to remain until 21 May and arrived Bikini 22 May. Due to the non-receipt of several dispatches, the BOUNTIFUL (AH-9) departed the West Coast later than had been intended and did not arrive Bikini until 18 June

112. The two hospital ships participated in the Queen Day rehearsal and Able Day evacuation, William Day rehearsal and Baker Day evacuation and were in an operating area eighteen miles northeast of Bikini with other elements of Task Group 1.8. On the afternoon of Baker plus two (27 July) the BOUNTIFUL (AH-9) was released and sailed for Pearl Harbor from the operating area.

113. Task Unit 1.8.5 Survey Unit (Captain C. B. SCHIANO, USN): In order to free the lagoon of Japanese mines, make a complete survey of the lagoon, wire drag the anchorage, prepare anchorage charts and other duties, the BOWDITCH (AGS-4) was assigned to the Task Force on 1 February. Small AGS's, YMS's, and YP's were requested early in February for wire dragging and to enable the Task Unit to accomplish its mission which had expanded by that time to include a complete survey of the probable biological effects of the tests on fish and other wild life and an oceanographic survey to determine the character of the ocean currents in and around the atoll. Special equipment was installed on the BOWDITCH at Mare Island in order to carry out her mission.

114. The BOWDITCH (AGS-4) was sailed from Mare Island on 15 February and arrived Bikini via Pearl Harbor on 10 March. On 7 March the YP-636 and YMS's 354, 358, and 413, all at Pearl Harbor, were added to the Task Unit and on 6 March the JOHN BLISH (AGS-10) and JAMES M. GILLISS (AGS-13) both at Pearl Harbor, were added to the Task Unit. On 16 March the BLISH and GILLIS arrived Bikini. The YMS's arrived Bikini via Johnston Island and Majuro on 27 March and the

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY INFORMATION GUIDANCE

YP-636 arrived on 8 April having sailed via Johnston Island, Majuro and Kwajalein.

115. The survey and buoy planting was accelerated by the presence of the SUMNER (AGS-5) and the REDBUD (AGL-398) under operational control of ComServPac.

116. The ships of the Task Unit operated directly under the orders of Commander Task Unit 1.8.5 and visited Eniwetok, Rongerik, Rongelap and Wotho in carrying out their studies and surveys.

117. During Queen Day rehearsal and Able Day the Task Unit based at Rongelap. The Task Unit also based at Rongelap over William Day and Baker Day.

118. Task Unit 1.8.7 Rongerik Evacuation Unit (Captain G. E. ELY, USNR): Two LST's were requested of CinCPac to evacuate the natives from Rongerik to preclude the possibility of their being harmed by the radioactive cloud on Able and Baker Days. The natives at Rongerik were those that had been evacuated from Bikini Atoll.

119. On 3 April the LST's 871 (at Guam) and 989 (at Sasebo) were designated by CinCPac and they were ordered to report Bikini by 10 June.

120. The LST-989 arrived Kwajalein on 27 April and the LST-871 sailed from Yokosuka on 3 May and arrived Kwajalein on 16 May. Both were made available to AtCom Kwajalein for relocation of natives and laborers. The 989, due to a shortage of personnel could not be utilized but the 871 was sailed to Rongerik, Wotho, Lae, Eniwetok, and Bascombe. The 989 departed 9 June and arrived Bikini on 11 June, and the 871 arrived 16 June.

121. On 22 June both ships sailed for Rongerik arriving 23 June and prepared to embark natives for evacuation. The 871 returned Bikini on 26 June due to an engineering casualty but returned on 30 June. Natives were embarked on Able Day

but no radiological danger developed at Rongerik due to Test A ble so the natives were disembarkeded and the ships returned to Bikini 5 July.

122. It was determined that there would be no danger to Rongerik on Test Baker and the two LST's were placed in an operating area adjacent to the atoll so as to enable them to witness the detonation after which they were then sailed to Kwajalein to load AAF material for return to the West Coast. Upon request they were again made available to AtCom Kwajalein for the return of evacuated natives and the 989 was sailed to Bascombe and then to Eniwetok and then loaded AAF material there and returned to Kwajalein while the 871 returned natives to Wotho, Lae andRongelap.

123. Both ships sailed in company from Kwajalein for San Francisco via Pearl Harbor and were ordered to report to ComServPac for disposal when unloaded at San Francisco.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED SPECIFIC RESTRICTED
USE MILITARY CLASSIFICATION SAFEGUARDS
C O M M A N D E R T A S K F O R C E O N E

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VII - SPECIAL REPORTS

SECTION (G) - PHOTOGRAPHIC

FORWARD

1. This historical report deals with the photographic activities in connection with Operation CROSSROADS from the date of the earliest meetings to discuss CROSSROADS photographic coverage through Baker Day. It covers specific dates of meetings, and the reasons for those meetings, progress reports, dates of departure, dates of setting up certain installations and tests. In narrative form, it gives an account of Queen Day, Able Day, William Day, Baker Day... and the rehearsals preceeding these days.

2. The report was derived largely from a mass of material covering various well-defined phases of the operation. This material is filed in folders. These folders contain letters, memoranda, charts and directives that logically belong under the selected headings. An itemized list of the contents of each folder with a brief note on what the entry contains is attached to the inside cover, enabling anyone seeking detailed information on a specific facet of the photographic project in Operation CROSSROADS to discover the needed information quickly.

3. The folders cover the following subjects:

I. ORGANIZATIONAL PLAN
II. REQUESTED COVERAGE
III. SPECIAL CAMERAS AND EQUIPMENT
IV. CONVERSION OF USS SAIPOR AS PHOTOGRAPHIC SHIP AND WORK ACCOMPLISHED
V. GENERAL HISTORY COVERAGE
VI. SECURITY MEASURES
VII. PUBLIC INFORMATION GROUP
VIII. ELECTRONICS REPORT

IX. PRE-ABLE DAY PREPARATIONS AND REHEARSALS
X. QUEEN DAY
XI. ABLE DAY ROUTINE
XII. ABLE DAY RESULTS
XIII. PRE-BAKER DAY PLANS AND PREPARATIONS
XIV. BAKER DAY ASSIGNMENTS
XV. BAKER DAY ROUTINE
XVI. USS SAIDOR PHOTOGRAPHIC LABORATORY REPORT PERSONNEL, FACILITIES, MODIFICATION AND OPERATION OF
XVII. SAIDOR - PBM - TOWER OPERATION REPORT
XVIII. REPORT ON JTF-1 1.6.2 PHOTOGRAPHIC PERSONNEL - RECOMMENDATIONS FOR TEST CHARLIE - LOCATION OF PERSONNEL - ROSTER OF TASK UNIT 1.6.2 - PHOTOGRAPHIC PASSES
XIX. CHARLIE DAY PREPARATIONS
XX. MISCELLANEOUS REPORTS

INTRODUCTION

4. The idea of holding some type of atom bomb test was proposed as early as 1944, when the Manhattan Engineer District seriously considered "testing" its newly perfected atomic bomb on Japanese installations.

5. After the bombs were used on Hiroshima and Nagasaki, various government officials and ordinary citizens voiced a request for a test of the bomb on naval vessels.

6. In August 1945 Admiral E. J. King proposed that all surviving Japanese naval vessels be destroyed, but a few weeks later General H. H. Arnold recommended that these ships be used for experiments involving atom bomb and other new weapons. It was suggested that this project be placed under the control of the Joint Chiefs of Staff.

7. Various other contributory recommendations were submitted by high ranking Army and Navy Officers, and on 11 January 1946 the Joint Chiefs of Staff formally created Joint Task Force One. Vice Admiral W.H.P. Blandy was designated as Commander of Joint Task Force One, and the code

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED DATA CLEARANCE NOT REQUIRED
USS MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

name "Operation CROSSROADS" was adopted.

8. On 21 January 1946 Vice Admiral W. H. P. Blandy recommended that the proposed tests be held at Bikini Lagoon in the Marshall Islands.

9. With the formation of Joint Task Force One, plans were begun for gathering of scientific, historical and public information data. Many conferences were held to determine organizational plans and to set up the machinery necessary to meet the requests received and anticipated from various service and civilian bureaus and groups.

10. It was understood at the beginning that photography would hold a position of great importance in the proposed project.

11. Early in the month of January, Capt. R. S. Quackenbush was nominated and ordered to report to CJTF-1 for duty as Officer in Charge of Photography. Capt. J. H. McElroy was selected as his Operations Officer. In these early January meetings the USS SAIDOR (CVE 117) was designated as the photographic ship for Operation CROSSROADS.

12. A photographic conference for the purpose of discussing technical photographic matters in connection with the proposed operation was held 23 January in room 1633, Main Navy Building in Washington, D. C.

13. The men outstanding in the photographic profession attending this meeting included Dr. W. B. Rayton, Bausch and Lomb Optical Company; Dr. J. H. Webb and Dr. J. A. Leermaker, Eastman Kodak Company; Mr. R. G. Sanders and Mr. Henry Blackstone of the Fairchild Camera and Instrument Corporation; Dr. R. A. Sawyer and Dr. E. W. Newsome of Los

Alamoa and officer representatives of the Navy Department, Marine Corps, Coast Guard, Signal Corps, Army Air Forces, and Army Pictorial Service. In all 45 officers and civilians were present at this meeting.

14. The Fairchild Corporation in New York City was asked early in January to consider problems involved in setting up various camera housing on island towers (The towers to be erected by the Navy). At that time, it was believed that only two ground stations with cameras would be needed.

15. When the idea of the electronics system was first presented to the Fairchild Corporation the Photographic requirements of CROSSROADS had not been completely formulated. It was known, however, that a large number of cameras would be required and that some means of remote control would be necessary.

16. During a meeting held with navy representatives Capt. Quackenbush, Capt. Mc Elroy, and Lieut. Chamblin, in New York City, the Fairchild Corporation was given a contract 23 January to begin designing and building the island tower camera installations. They were also to set up the link radio controls in two PBM's for the purpose of starting the cameras automatically.

17. The original plans for camera coverage was expanded to cover a large number of gun cameras as well as aerial cameras. Later it was decided that Fairchild should also concern itself with the installation of cameras operating electrically in three aircraft.

18. An aerial photographic survey of Bikini Atoll was completed by Fleet Air Wing Two on the 24th of January.

19. Public Information plans were laid early in January by Comdr. (now Captain) Ashworth, Comdr. H. A. Mc Donald and Comdr. W. C. Park. At this time a newsreel pool, feature pool, historical coverage, rear echelon control and special editing were discussed.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CIVIC RESTRICTED

20. The Commander, Naval Air Base, Kwajalein, was directed on the 29th to provide photographic laboratory facilities to support B-29 airplanes.

21. Lt. J. H. Chamblin reported at Fairchild January 29th for duty as Navy Representative. His duties consisted of liaison between Fairchild and Washington.

22. On 30 January, Comdr. W. C. Park addressed a joint meeting of the three producers associations in the office of Eric Johnston in Hollywood, California. The producers representatives were at first interested in participating in Operation CROSSROADS, but later decided against sending men and equipment to Bikini.

23. By 3 February, the Fairchild Corporation had drafted rough plans for the camera housings on the island towers. Plans called for four tower installations, but this was later expanded to six towers - two each on Bikini, Enyu and Aomoen Islands. By 10 February, drawings had been completed and a dummy layout of the electrical control system built and tested. On 26 February, the first tower installation was finished, cameras were installed, and the radio control rigged for testing. In the meantime, work was progressing on the airborne radio control gear, and by the end of the month this gear was ready for testing.

24. Fairchild had also been given a contract to furnish fourteen camera mounts and housings for installation on target ships. The radio receivers for these target ship installations were to be furnished by Los Alamos.

25. On the 5th of February Comdr. W. C. Park addressed a meeting of the editors of Pathe News, Fox Movietone News, Paramount News, Universal Newsreel and MGN News of the Day. This meeting was held in New York City and the problems involved in newsreel coverage were discussed. Certain restrictions were laid down as to security of material and censorship. A few days later the newsreel men held a meeting of their own and agreed in principle to the general set up as outlined at the previous meeting.

Mr. E. P. Genock of Paramount News was selected as pool director. The newsreel groups chose seven men to represent the pool at Bikini. Final organization of this group was achieved through meetins with Capt. Fitzhugh Lee, Public Information Officer Joint Task Force One. The seven newsreel men selected were Mr. A. P. Genock, Mr. S. Greenwald, Mr. A. Gaskill, Mr. Robert E. Donahue, Sr., Mr. I. Koverman, Mr. V. Jurgens, and Mr. T. Priestly.

26. During February, the AAF Task Units, based largely in New Mexico, began personnel training for the atom bomb tests. This training included radar, communications, maintenance, and photography.

27. In early February, Lt. Comdr. J. P. Simpson was recalled to active duty to assemble men and equipment for the purpose of setting up an underwater photographic unit.

28. CinCPac was directed the 6th of February to train photographic pilots in F6F-5P and TBM aircraft and photo mates in aerial oblique photography. Two days later BuPers directed CinCPac to provide 77 photo mates for Operation CROSSROADS.

29. On 8 February, the Oceanographic Section of Bureau of Ships set up its requirements for tower and aircraft coverage. Recommendations were made for flight lines and altitudes at which photographic planes should fly to gather required oceanographic coverage.

30. On the eleventh, the USS SAIDOR received availability at the Navy Yard, Pearl Harbor, for photographic alterations.

31. The twelfth, an Electronics Officer was assigned to the Fairchild Company to assist in the design and construction of the electronic equipment. This gear would be required to perform the following functions:

(a) Apply power to the camera tower installations
(b) Operate a gremlin timing mechanism at all stations

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USN MILITARY CLASSIFICATION SAFEGUARDS

(c) Start the cameras at all stations simultaneously and operate the shutters in synchronization
(d) Stop all cameras at the completion of the cycle
(e) Turn off power at all tower stations and close protective lead doors over the camera housings

32. On the fourteenth the Naval Medical Research Section had determined the coverage it needed to study the prevention, diagnosis and treatment of atomic bomb injuries. A plan of operation was set up and photographic coverage was requested. On this same day, Commander, Mariannas, was requested to cover motion picture and stills depicting the evacuation of the natives of Bikini Atoll to Rongerik. Seven days later Comdr. F. A. Spencer and a crew of five men went to Bikini to cover the event. The operation was under the command of Commodore B. H. Wyatt, ComKwajAtoll.

33. On the fifteenth of February photographic coverage in black and white and color of the F6F drone training at Atlantic City, N. J. was completed.

34. Lt. W. R. Sutherland departed for Pearl Harbor the 26th via NATS with four complete Sonne cameras.

35. On 1 March the first link radio control system was flight tested at Floyd Bennet Field in the PBM type aircraft. The test proved the utility of the design and disclosed minor imperfections which were easily corrected. Camera tower units were completed and tested by March 8th, and three days later were ready for shipment to San Diego.

36. On the 4th, Comdr. R. O. Sanders submitted to Capt. Quackenbush and estimate of photographic expenditures for Operation CROSSROADS. This estimate was as follows:

Aerial cameras.....	$159,766.00
Still cameras.....	8,280.00

Motion picture cameras.....	$111,503.00
Laboratory equipment.....	33,839.00
Film, paper, chemicals.....	207,219.00
Fairchild conversions.....	130,000.00
Fairchild reconversions.....	20,000.00

and on this same date Comdr. Sanders proceeded via air to Kwajalein as photographic liaison officer for Operation CROSSROADS.

37. On the 7th, Comdr. Spencer completed the photographic coverage of the evacuation of the natives from Bikini Atoll. On this same day the Commanding General of the Manhattan Engineering District informed J-2 that the Manhattan Group intended to handle its own photographic coverage on these activities:

A. All phases of bomb assembly
B. All stages of bomb handling from the ship and into the plane for Test "A" and Test "B"
C. All laboratory setups aboard ships carrying personnel of the Los Alamos Group
D. Laboratory facilities ashore staffed by the Los Alamos Group

For more general coverage the Manhattan Group planned to call on the photographic facilities of JTF-1.

38. On the 11th, CROSSROADS photographic equipment was loaded on three 30 foot trailer trucks and dispatched to Norfolk, Va. for loading aboard the USS SHANGRI-LA on the 15th.

39. On the 18th Capt. J. H. Mc Elroy and a group of twenty-five officers and men left Norfolk, Va. on the SHANGRI-LA for San Diego which had been designated as the rendezvous point for the photographic unit of Operation CROSSROADS. While enroute to San Diego via the Panama Canal, the photographic personnel took still and motion pictures of shipboard activities. Other officers and men from the west coast and photographic bases reported to the SAIDOR in San Diego and were on hand to meet Capt. Mc Elroy and his group when the SHANGRI-LA tied up in San Diego on the 31st. The SAIDOR, with the photographic personnel that had been trained in Hawaii, sailed from Pearl Harbor the 19th and

RESTRICTED DATA
VII - (G) ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT 1946
RESTRICTED SECURITY INFORMATION
USE MILITARY

headed for San Diego. Training continued throughout the trip.

40. During March pilots of 1.52 practiced for orbits.

41. Between the 10th and 18th, target vessels in west coast ports were inspected and photographed. This was done under the supervision of the BuAer Technical Group.

42. To determine the drift of current in Bikini lagoon, the survey party aboard the USS BOWDITCH conducted tests in which the markers were released in the waters of the lagoon. Aerial and surface photographs were taken which were later used in planning safety precautions for the ships in the Bikini anchorage. Approximately 200 photographs were taken daily over a period of two weeks.

43. Experimental equipment of BuOrd was loaded aboard various target vessels and loading was completed on the 20th of March. Photographs were taken of the materials for comparison of photographs that would be taken after the atomic bomb test.

44. On the 18th, photographers were assigned to safety reconnaissance planes to work with radiologists in testing airborne activity.

45. At a conference held on the 26th of March in Bldg. T-4, Washington, D.C. groups under the Director of Ship Material were requested to submit photographic requirements for Test Baker. Attending this meeting were:

Capt. R. S. Quackenbush, Jr., Technical Photography
Capt. R. S. Draeger, Bureau of Medicine and Surgery
Capt. E. D. Mott, Bureau of Ordnance
Capt. T. C. Lonnquest, Bureau of Aeronautics
Col. J. D. Gederick
Capt. C. L. Engleman, Electronics
Comdr. C. H. Gerlach, Bureau of Ships Instrumentation
Comdr. S. Branauer, Bureau of Ordnance Instrumentation

It was determined that photography requirements for these groups would be essentially the same for Able Day as for Baker Day.

46. Three Sonne High Speed cameras were flown the 26th to the Sonne Factory in Chicago for modification to double the speed of operation. This was done for NavMedResSec.

47. Prior to ship departures from the continental United States, auxiliary photographic laboratories were organized aboard the USS ALBEMARLE, APPALACHIAN, CUMBERLAND SOUND, KENNETH WHITING, BLUE RIDGE, AVERY ISLAND, MOUNT MC KINLEY, BURLESON AND PANAMINT.

48. On 5 April, Lt. Comdr. J. P. Simpson, Jr., arrived at Pearl Harbor to organize and train personnel for CROSSROADS Underwater Photography. He found one officer and seven enlisted men at Pearl Harbor who had been assigned to work with him.

49. On the tenth Lt. Comdr. Simpson and Ens. Schell flew from Pearl Harbor to Bikini to investigate Underwater Photography conditions, which were reported as being fairly good.

50. On 12 April, the following officers and civilians attached to 1.52 were designated to cover the Top Secret pictorial record of the employment of the atomic bomb:

Major John D. Craig
Major Charles F. Wilson
Major Gilbert Warrenton
Mr. Louis Hagemezer
Mr. George A. Bertram
Mr. Don Christiansen

51. A photographer was detailed at Pearl Harbor the first of May to photograph color stills and black and white stills of various target vessels enroute to Bikini.

52. On the 14th of May, the Underwater Photo Unit departed Pearl Harbor for Bikini.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

OPERATIONAL ACTIVITIES

53. On arrival at Kwajalein Atoll, 23 May 1946, one officer and two men were disembarked with the airborne link radio control gear. Later the number of men at this base was expanded to handle an increase in amount of work. A shop was set up on Ebeye island adjacent to the photographic laboratory. Three PBM aircraft from VPB-32 were assigned for the use of the photographic unit at Ebeye. Work was begun immediately on these planes, installing electronics equipment and camera gear.

54. The USS SAIDOR arrived at Bikini Atoll on 24 May and the unloading of tower station equipment began immediately. All equipment assigned to the various towers was unloaded and stored in the space provided on each of the three islands by the 24th. The towers were placed on Bikini, Aomoen, and Enyu Islands because of their nearness to the center of the target area. Seventy-five foot towers were selected because these were a standard Navy type available in quantities for immediate erection.

55. The 27th of May, the Underwater Photo Unit arrived at Bikini, and three days later began actual photographic work.

56. The initial test of tower installations from PBM aircraft was accomplished on 7 June. The test was generally satisfactory and the few minor readjustments necessary were completed prior to the departure of the aircraft from the Bikini area. From that time ground tests of all tower stations were conducted bi-weekly.

57. On 11 June the Underwater Photo Unit took 85 identification pictures for CTU 1.2.7.

58. The following laboratories were designated for the processing of all Able and Baker Day film the 15th of June:

A. Consolidated Film Industries, Hollywood, Calif. - Black and White Motion Picture Film, Television Film, Camera Time Recording Film, Radar Scope Film.

B. Technicolor Corporation, Hollywood, Calif. - 35mm Motion Picture Film (Color).

C. Eastman Kodak Company, Oahu, Hawaii, and Eastman Kodak Company, Rochester, N.Y. - 16mm Kodachrome.

D. Ansco Corporation, Binghamton, N. Y. - All Ansco Color Film.

E. Task Unit 1.52, Kwajalein; Task Unit 1.6.2, USS SAIDOR; AAF Photographic Laboratory, Washington, D. C.; Photo Science Laboratory, Anacostia, D. C. - Black and White Aerial Still Film.

F. Eastman Kodak Company, Rochester, N. Y. - All Photometric Film.

59. Actually, the major portion of the Navy's still and motion picture film was processed aboard the USS SAIDOR and at Photo Science Laboratory, Anacostia, D. D.

60. On 15 June, Commander Joint Task Force One issued a letter on the procedure to be followed in making the photogrammetric study of tower and aerial photographs for the purpose of locating the target vessels accurately. This involved the employment of obliques from towers on Bikini, Enyu, and Aomoen Islands, obliques from PBM planes "Tare," "Uncle" and "William", nearly vertical obliques from the F-13 aircraft which will follow the bomb-carrying aircraft.

61. By 15 June the photographic groups were in a most favorable condition. The photographic laboratories aboard the various ships were in complete operation. The underwater photo unit was making almost daily descents. Tower installations on the islands were complete, with the exception of putting the lead doors and backs into place. All electronic and camera equipment for the PBM's had been

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
PACIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

72147B O--46----47

installed and tested successfully. The photographic facilities at Kwajalein were producing on a regular schedule, and the C-54 and F-13 camera installations had been made and tested. The F6F photo planes, TBM's, and all drones were ready. GSAP and Jerome cameras had been installed and tested on all desired ships, with the exception of one LST. Icaroscope photography was 50 per cent complete and Sonne equipment was 90 per cent ready for installation on four ships.

62. June 15th a meeting was held aboard the USS KENNETH WHITING to summarize and coordinate all the activity on measurements of spectral distribution of light from the Air Burst. Attending the meeting were:

Dr. R. A. Sawyer
Capt. Quackenbush
Comdr. Lenger
Comdr. Ballard
Dr. Hurlburt
Dr. Frye
Dr. Katz
Lt. Quinn
Dr. Weiss

Dr. Frye and Dr. Katz presented the spectography program of the AAF Photographic Unit (1.5); while the Navy's spectographic plans were presented by Dr. Hurlburt and Comdr. R. M. Lenger.

63. On the 18th, a rehearsal of electronic equipment was held under the supervision of Capt. C. L. Engleman. This was a test of all equipment - target ships, island installations, sonobuoy, television, telemetering system, spheric receivers, infra-red detector and recorder, ionization chambers, and Geiger Counters. While there were a number of minor failures and deficiencies in some of the equipment, these failures were not so complex that they could not be easily corrected.

64. Col. P. T. Cullen reported 24 June that studies of Able Day photography, including radar scope photography, would be conducted in order to determine the following information.

(a) Height of burst point and its position with respect to the NEVADA.
(b) Position of blast gauge ships at time of release of gauges.
(c) Position of F12 and C54 (photographic aircraft) at time of detonation.
(d) Position of target ships at time of detonation with relation to the NEVADA, inner target ships position being determined first.

65. The electronic rehearsal on Queen Day was not quite an all-out rehearsal, as previous tests had indicated that a satisfactory check of equipment could be achieved by using fewer than fifteen available monitoring channels. Results were largely satisfactory, although one channel failed, due to inherently low signal strength. There was also heavy interference from at least four unidentified S-band radars. A recommendation was made that the interference be determined and eliminated. This was done prior to Able Day.

66. On the island towers, the lead door on Tower No. 1 failed to close by six inches on Queen Day. The lead door on Tower No. 3A failed to lower due to unequal weights on the top and bottom panels. The speed drive belt of the 35mm Mitchell Camera (4" lens) broke on Tower 3A. Jams occurred in 35mm Mitchell Cameras on Towers 3B and 4A, but not until these cameras had exposed 573 and 830 feet of film respectively.

67. After the Queen Day results were reviewed, the photogrammetric Section of TG 1.52 reported that "generally speaking, all aerial photographs were good." No mention was made of any camera or other mechanical failures.

ABLE DAY - 1 JULY

68. Eight F-13 Aircraft and two C-54 Aircraft participated from 1.52, divided into three groups to photograph conditions at Bikini before, during, and after the operation. Six mother and four drone type aircraft participated in this mission.

69. One F-13 plane photographed the detonation from nearly directly over the burst at 30,000 feet. The

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
THIS REPRODUCTION FOR CLEARANCE NOT REQUIRED
DOE CLASSIFICATION SAFEGUARDS

remaining F-13's photographed conditions at Bikini Atoll before, during and after detonation of the bomb. This photography was used for technical analysis of the blast reaction of target vessels to blast, and damage to target area.

70. Two C-54's photographed phenomena of atomic detonation for analysis of effects and for historical recording of action and results of the test.

71. Flight Jig and King, each composed of one F-13 traced and photographed the cloud for the purpose of determining the persistency of the radioactivity therein. One of the aircraft took position thirty minutes after detonation north of the cloud at 15,000 feet. The other took a similar altitude position south of the cloud.

72. Aircraft were on station at How hour minus ninety minutes and maintained altitude and air speed until after passage of shock wave, then at Mike hour plus 16 minutes, cleared the target area and returned to Kwajalein.

73. From the circular orbit, the aircraft photographed the activity in the target area until Mike hour plus six minutes, at Mike plus six minutes two aircraft from the flight proceeded to designated rendevous points to perform radiological reconnaissance at Mike plus thirty minutes. Remaining aircraft proceeded to base, avoiding all other aircraft and the radiological safety quadrant.

74. There were no major malfunctions in any aircraft, although there were minor defects in some planes and cameras which could be remedied on the Baker Test. Radio impulse controlled camera equipment in AC 627 and 627 were set off early, due to a false signal, with the result that the high speed blur camera failed in its mission and the entire photometer record was handicapped by the false early start.

75. All four army drones and mothers took off, performed their mission as briefed, and returned to base. Two of the drones were badly buffetted, but came through and were landed successfully. Drone How was damaged to some extent on landing when the brakes failed to hold and the drone ran off the end of the runway.

76. All Navy drones and control planes performed their mission as briefed, and returned to base. There was no serious damage to any of the planes. As soon as the drones landed at Roi boxes containing air samples were removed and were taken over by the waiting scientists.

77. One C-54 and two F-13 photo aircraft continued bomb damage assessment photography July 26th. The two F-13's continued radiological reconnaissance throughout the day. The destroyer Hughes was beached later.

78. One C-54 and one F-13 continued coverage of target area the 27th, and the transport FALLON was beached.

79. One C-54 and one F-13 continued coverage the 28th, 29th, and 30th. The ex-Japanese battleship NAGATO sank during night of 29 July.

80. A preliminary report of Baker Day results was made by Col. Cullen (1.52) on 29 July. This report revealed that the AAF had 285 cameras of various types focused on the explosion and blast effects. Of this number, seventeen cameras failed to function properly through personnel or mechenical errors. The remaining aerial cameras recorded 25,199 feet of black and white film, 17,561 feet of color film,11,355 black and white still pictures, and 1,212 color stills; while ground cameras exposed 6,010 feet of black and white film, 1,200 feet of color film and 189 still pictures.

81. 1.5 held a staff meeting at Kwajalein on the 3rd of July to prepare final details for Baker Day and to discuss changes based on results of Able Day. These changes included:

(a) Installation of manual switches for K-24's and extension of automatic circuits to additional locations, particularly in AC 999.

(b) Removal of several cameras in the drone aircraft and concentrating them in the drone B-17 that was to be flown through the burst.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
Used MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AT ALL TIMES HANDLE AS RESTRICTED DATA IN ACCORDANCE WITH ATOMIC ENERGY ACT 1946
RESTRICTED
SPECIFIC RESTRICTIONS MAY BE REQUIRED BY AUTHORITY OF THE ATOMIC ENERGY COMMISSION OR DEPARTMENT OF DEFENSE MILITARY OR GOVERNMENT AGENCIES OR BOARDS

82. Task Unit 1.52 reported that the two C-47 type aircraft received from Wright Field after Able Day were used around the clock transporting couriers, scientists and "Top Secret" material.

83. At Kwajalein, a display of Able Day photographs developed in the unit laboratory was prepared and on the 2nd day of July, Able Day plus One the President's Evaluation Board accompanied by General Ramey reviewed these prints. That same day a complete coverage on the inspection tour of the Secretary of the Navy, Mr. Forrestal, and staff was made.

84. On the 11th, Lt. Col. Leghorn assumed command of Advanced Echelon Task Unit 1.52.

85. As the William Day rehearsal had been called off 23 July, the radio broadcast B-29 conducted a communications equipment check with the APPALACHIAN and the MT MC KINLEY. On this date also, one of the C-54 orientation aircraft was withdrawn from participation in the Baker mission by order of CJTF-1.

86. Air Photo Unit of 1.5 - Able Flight F-13's were moved from an altitude of 26,000 feet to 15,000 feet and to an orbitting distance of 7NM slant range from the target. The two C-54 playboy photo aircraft were also brought in to 7NM slant range on their free orbit 90 degrees apart. The Baker flight F-13 was assigned the Task of arriving at a point one mile vertically from the center of the target at 30,000 feet altitude to take vertical photographs of the bomb burst.

87. Commencing 15 July one F-13 was dispatched daily to gather weather data for Baker Day. One B-17 was dispatched to target area for weather. Two night photography missions were accomplished by the F-13's scheduled for the night owl mission.

88. Practice missions were flown by the drone flights. After William Day, the special electronic equipment in all mother and drone aircraft was thoroughly tested, aligned and calibrated on the ground. An additional television transmitter was installed on the drone scheduled to fly at 16,000 feet.

BAKER DAY - 25 JULY

89. On 25 July, as scheduled, the second atom bomb experiment for OPERATION CROSSROADS took place. Weather was ideal for the experiment at 0835, detonation time. There were from 2 to 3 tenths clouds, ranging with bases from one thousand to tops at five thousand feet. The Army and Navy planes covered the target area at various altitudes. From Kwajalein came the Army's B-29, C-54, and F-13 photographic planes, and the B-19 drones and B-19 drone control planes. These drones were directed through the blast plume to gather air samples, to register the shock effect on the planes, and to photograph the area. From Roi flew the Navy's F6F drones and F6F drone control planes to gather air samples at a lower altitude than the army planes. Water samples were picked up by drone boats controlled by TBM's flying from the USS SAIDOR. Also from the SAIDOR were the Navy's F6F and TBM photographic planes. From Ebeye Island came the Navy's PBM's to serve as photographic planes and to carry the link radio control equipment from which radio impulses were sent to activate the island tower installations.

CONCLUSION

90. The period of 4 July to 28 July was marked by almost constant activity on the part of Task Unit 1.6.2.

91. At Ebeye, Lt. J. H. Chamblin, Lt.(jg) R. L. Warner, Ch. Ph. J. E. Richter and their crews made test runs over the Bikini area in the control and photographic PBM's to test the workability of the link radio control equipment and aerial cameras. They took a total of more than 3,000 aerial pictures on Baker Day in addition to black and white and color motion picture film. The still pictures were developed and printed in the Ebeye photographic laboratory.

92. At Kwajalein, Comdr. R. O. Sanders and his assistant, Lt. R. E. Graham maintained liaison with Army photographic units and supervised the processing of public information film emanating from Kwajalein.

RESTRICTED DATA
ATOMIC ... Y ACT - 1946
SPECIFIC RESTRICTIONS ... CLEARANCE NOT REQUIRED
... (G) - 18 ... ICATION SAFEGUARDING

RESTRICTED DATA
UNCLASSIFIED ATOMIC ENERGY ACT 1954 SPECIFIC RESTRICTIONS AND ADMINISTRATIVE REQUIREMENTS
USE MILITARY CLASSIFICATION SAFEGUARDS

93. At Roi, Lt(jg) J. R. Ford covered the drone and shipboard activities of the USS SHANGRI-LA in 35mm black and white and 16mm color film.

94. Lt. F. G. Hewitt's movie crew filmed the target array from the USS SAIDOR-based TBM's on rehearsals and on Able and Baker Days. The Movie crews also carried out documentary coverage of the fleet, the visit of Admiral Blandy to Rongerik and shipboard activities. They also cut and edited film resulting from the Able Day coverage.

95. Photo mates assigned to BuOrd photographed interior damage to target ships. Other photo mates covered autopsies on the animals exposed to radioactivity.

96. Public Information crews under Lt. Comdr. Lee Hansen, Lt. Comdr. Paul Sullivan, Lt. H. H. Anglin and Ch. Ph. John Polk, covered a large variety of assignments on and about the target ships, ashore, and arrivals and departures of important personages.

97. Comdr. K. Shafton's group, with the help of the Fairchild Corporation representatives rebuilt and rewired cameras aboard target ships that were damaged during the Able blast.

98. Lt(jg) R. L. Tomlinson handled the assigning of still picture men to the numerous jobs which were covered for the various requesting groups. The still picture personnel also covered around the clock surface photographs of the vessels in the target array.

99. Practically all still pictures taken from the air, the ships of the fleet and tower installations, with the exception of color film, were printed and the results almost exceeded the most optimistic hopes of the photographic officers who were charged with the responsibility of recording Operation CROSSROADS on film.

100. There were approximately 500 photographic personnel involved in OPERATION CROSSROADS. Insofar as was practical, officers were selected because of some special ability which they possessed. Throughout the entire period

covered by this report there were changes and additional requests for photographers, coverage, and more and different types of cameras.

101. The photography, in general, required photography from aircraft before, during, and after the detonation of the atomic bombs, photography from fixed installations on adjacent islands, and various still and motion picture photography both in the target area and in the continental United States for background purposes.

102. Photography from the air was conducted from eight Army F-13 photo planes, two Army C54 planes, six Navy F6F photo planes, four TBM airplanes, three PBM airplanes and one Army C54 for the use of press photographers assigned to cover the event.

103. In addition to the two foregoing major requirements, there were photographers in four radiological airplanes, two planes carrying instruments, and some minor photography procured from four Army B17 drones and for F6F drones. The Army drones operated from Eniwetok. Eniwetok was chosen because Kwajalein had insufficient space to handle additional airplanes. The Navy carrier-type planes operated from the USS SAIDOR. The drones were launched from the USS SHANGRI-LA and landed at Roi. Roi was selected for a similar reason as Eniwetok, that is adequate space was available there for all types of aircraft. The PBM's operated from Ebeye.

104. The types of cameras used in Operation CROSSROADS were, in general, the standard type aerial and motion picture cameras. These included the Navy F-56, focal lengths 8¼, 20-inch and 40-inch, the Army K-17 of 6-inch and 12-inch, the K-19, K-18, K-22, K-27, Sonne strip and Tri-metrogon camera installations. The motion picture cameras used were the Mitchell, Eyemo, standard 16mm gun cameras and special cameras of the Fastax, O'Brien, and Jerome type. Jerome cameras were also used as were radar scope cameras. The total number of all types of cameras used in the Joint Army and Navy operation was in excess of five hundred.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFICALLY RESTRICTED DOA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

105. The large number of cameras employed was the result of assuring positive coverage of all phases of the operation in the event that casualties to some equipment should occur. Similarly, there were many sizes of focal lenght lenses and types of film employed in order to give as wide a coverage as possible. The special cameras were selected because of certain peculiarities of those cameras which was necessary according to the requirements requested.

106. The laboratories selected in the commercial field for processing motion picture film were selected mainly because of their ability to process the type of film in question.

107. The photographic Science Laboratory, Naval Air Station, Anacostia, D. D. had been designated the depository for all CROSSROADS film because of its availability to Washington, D. C. with regard to physical storage, space, and reproduction facilities.

108. The flagship, the USS MT MC KINLEY, had not been detailed to photograph the bomb test when the operations plan was originally drafted. Since the MC KINLEY was scheduled to be stationed in the most advantageous position, Capt. Quackenbush decided to cover both events as completely as possible. He was assisted by Lieut. E. C. Brauer, USN (Ret.) who joined the staff prior to the ship's departure from San Francisco. Photographs were cleared through Public Information and despatched by the MT MC KINLEY to the United States by radio photo, the final results of which were very satisfactory. The first Able picture was received in San Francisco and delivered to the press two hours and twenty-five minutes after the blast and the first Baker picture was received and delivered on hour and forty minutes after the blast. A total of 191 Able and 174 Baker pictures were transmitted by radio. The pictures were of such good quality they were used unretouched in full page blow ups by the press. The MC KINLEY's pictures of both tests were transmitted internationally.

109. During the operation, the SAIDOR photography laboratory processed 361 rolls of aerial film totalling 176,736 exposures; 146,104 4x5 negatives; and 161,679 prints.

110. The mission of Task Unit 1.6.23 and 1.6.24, commanded by Lt. M. J. Bonner, USN, based on the USS SAIDOR, was to furnish photographic coverage, from the air, of Operation CROSSROADS.

111. Task Unit 1.6.23 was composed of eight F6F and seven F6F-5P pilots. Task Unit 1.6.24 was composed of five TBM and five TBM 3E pilots.

112. The two units flew 114 photographic missions totalling 232 hours in carrying out Able and Baker assignments photographic coverage included vertical and trimetrogon mapping, obliques and motion pictures.

113. Two accidents occurred between Able and Baker Days with the loss of one F6F at sea and one plane damaged in making a crash landing. One pilot sustained minor lacerations. Replacements for the lost and damaged planes were received from Roi on the 24th of July, Baker Day minus one.

114. Operation of the remote control system during Test Able was reported to have been 99% satisfactory. Failure due to a circuit descrepency occurred at one tower station resulting in incomplete coverage from that sector. Modifications in equipment subsequent to Test Able removed all sources of previous trouble including the provisions for local control. The operation of the system after these modifications relied on the radio link exclusively. Tests prior to the Baker test proved the radio control to be completely reliable. The operation of Test Baker was satisfactory in every respect. In view of the experience obtained during the past operation it is confidently expected that the control of the cameras to be used on Test Charlie will surpass past performance.

115. Below are listed some of the discrepencies in equipment and operation of the USS SAIDOR based aerial Photography with recommendations where applicable for Test Charlie:

(a) Cameras as received were poorly preserved, having rust and fungus growths on a majority of the cameras. Recommendations: Open all camera cases prior to departure from the United States and check equipment.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AS TO CLEARANCE NOT REQUIRED
WHEN MADE (G) - 22 - DECLASSIFICATION SAFEGUARDS

(b) San Diego mount, Local Change #113, in fighters, needed slight modification to enable operation of a non-standard dual camera installation. Recommendation: Any metal shop can accomplish change.

(c) F6F-5P's needed additional modification to enable Sonne cameras to be rigged. This consisted of rigging remote control head in the cockpit, boring a two inch hole in the after bulkhead of pilots compartment, and the installation of tubes, cables etcetera to enable duplicate sets of aircraft instruments to be installed in the after section of the fuselage to be used with the cycloramic camera. Recommendation: As planes are modified for San Diego Change #113 Sonne modifications be also included. Bureau of Aeronautics has all drawings and specifications relative to Sonne modifications.

116. At the conclusion of Test Baker, Captain Mc Elroy reported that at various times there was a critical need for certain equipment on the USS SAIDOR. There was no indication that this equipment would be needed prior to the arrival of the SAIDOR in the operational area, furthermore, space for it was not available as the laboratory was already overcrowded. This report made a number of recommendations pertaining to the photography laboratory and personnel for Test Charlie.

117. The Aide to the Electronic Coordinating Officer stated, in a report, that, a test of the Hobart Camera model AN/UFA-1 and related equipment operated prior to, during and after Test Able indicated that the production development of the entire equipment should be subject to considerations of simplicity and dependability in operation and ease in maintenance. The writer stated that there were too many small items upon which failure shut down the entire system. He pointed out that the success of operation from a tactical and military point of view depended on the rapid and continuous use of the equipment and that from this standpoint the An/UFA-1 tested was unsatisfactory.

The report further stated that the system was sound, however, and it definitely recommended that every effort be made to improve its performance and reliability. The writer mentioned that this system can be of tremendous tactical advantage aboard carriers. By means of it, planes can relay valuable information by television which can be in the hands of the CIC Officer in a matter of a few minutes.

118. It was recommended that the chemistry be investigated for the possibility of elimination some of the steps in processing the film. The report concluded with the following statement: "As a laboratory instrument the Hobart Camera is completely satisfactory. However, it will not stand up under the abuse generally accorded shipboard equipment.

119. Since the photographic equipment used in Project CROSSROADS was considered to be in immediate need of repair and preservation, and the fact that it probably would be returned aboard in many naval vessels departing the Bikini Area on various dates, a photographic CROSSROADS Unit was established temporarily at the Naval Air Station, San Diego, under CFWC to inspect, repair, preserve, repack and dispose of the equipment as instructed.

120. Task Unit 1.52 then set about putting into effect, the plans for evacuating Kwajalein. Many of the key personnel had been dispatched to the United States as couriers, ultimately arriving at St. Louis to work on the final report. Other personnel left on unit aircraft for Wright Field, Ohio, thence to Roswell, New Mexico for screening. A rear echelon commanded by Lieut. O'Neil supported by nineteen enlisted men, remained at Kwajalein to perform preventative maintenance and to guard Task Unit 1.52 equipment and supplies until continuence of operations for Charlie Day.

121. Due to a critical shortage of trained photographic personnel in the Photographic Science Laboratory, thirty-four photographers mates were transferred from the USS SAIDOR on Baker plus one to Kwajalein via the USS PLUSHER and from there by air to Washington with orders to report to Commander Rear Echelon for duty at P. S. L. On Baker plus [illegible] photo

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

mates were flown direct from Bikini to Washington with similar orders.

122. LTJG R. L. Tomlinson and fifteen photo mates were transferred to duty with CTG 1.2 before the SAIDOR sailed from Bikini for Pearl Harbor. When the ship arrived in San Francisco, thirty-one were transferred to Commander Fleet Air, West Coast to care for the CROSSROADS photographic equipment. Thirty-four photographers received fourteen days delay to count as leave in San Francisco before reporting to P.S.L. for duty.

123. At intervals, after their arrival in the United States, the staff consisting of Capt. R. S. Quackenbush, Jr., USN, Capt. J. H. McElroy, USN., Comdr. Fenning Hearon, USNR., Comdr. F. A. Spencer, USNR., Lieut. C. C. Shirley, USN., Lieut. E. C. Brauer, USN (Ret.), and Lieut. J. H. Chamblin, USN, reported to the Commander Joint Task Force One, Navy Department, Washington, D. C. for duty in connection with the completion of reports and organizational planes for Test Charlie.

124. On the 9th of September, CJTF-1 released the following dispatch to CNTG JTF-1 for the information of all units concerned with Operation CROSSROADS:

"MAKE NO FURTHER PREPARATIONS FOR TEST CHARLIE WHICH HAS BEEN POSTPONED INDEFINITELY X TERMINATE OPERATION CROSSROADS AS SOON AS PRACTICABLE CONSISTENT WITH OBTAINING VITAL INFORMATION IN REGARD TO MECHANICAL AND RADIOLOGICAL DAMAGE AND RETAINING IN USEABLE CONDITION SHIPS WHICH CONSTITUTE VALUABLE SAMPLES OF ABOVE DAMAGE."

RESTRICTED

COMMANDER JOINT TASK FORCE ONE

REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
ON 1 JULY 1946 AND 25 JULY 1946

PART VII - SPECIAL REPORTS

SECTION (H) - EVACUATION OF BIKINI

TEST ABLE

1. The evacuation of Bikini was an operation which, due to the necessity for safety and timing, took much planning and foresight. Slow moving and non-self-propelled craft had to be evacuated days before the test; Kwajalein being considered most adequate in every respect for a safe permanent anchorage. Other scientific ships had minimum time limits prior to bomb detonation that they could leave the lagoon. The entire evacuation covered a period of approximately two weeks.

2. Prior to Queen Day certain non-self-propelled craft and other ships were evacuated to other stations. On June 16 the MUNSEE (ATF-107) took the QUARTZ (IX-150) in tow to Kwajalein, arriving at Kwajalein 2200L, 18 June. MUNSEE returned to Bikini June 19. On the 18th June the SIOUX (ATF-75) left Bikini with YF-990 in tow, destination Kwajalein. These two vessels arrived in Kwajalein on June 19, SIOUX returning to Bikini June 20. Also on June 19 the following ships departed Bikini to Kwajalein: YOG-63, CHOWANOC (ATF-100) towing YF-753, and the SEVERN (AO-61). The CHOWANOC left YF-753 at Kwajalein and returned to Bikini on 22 June. On June 20 the YO-199 plus the YW-92 departed Bikini to Rongelap where they topped-off TU 1.8.5 and proceed direct to Kwajalein. The CEBU (ARG-6) departed Bikini for Kwajalein on June 20. On June 21 the PHAON (ARB-3), TELAMON (ARB-8), and CREON (ARL-11) departed Bikini to Kwajalein; also the YMS-354 and the YMS-358 departed Bikini to join TU 1.8.5 at Rongelap. All other non-self-propelled craft except the ARD-29, the YF-733, the APL-42, and the APL-20 had arrived at Kwajalein prior to this time. None of the above evacuated ships returned to Bikini until after Able Day, at which time certain required units were ordered back.

VII - (H) RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

3. We have now brought the evacuation up to June 22, which is Queen minus one day. At 0936L, June 22, CJTF-1 informed all ships that June 23 would be Queen Day. This commenced the mass evacuation of ninety ships from Bikini Lagoon. At 1200L the CHOWANOC (ATF-100) got underway towing the YF-733 to Kwajalein; the YF-733 not to return to Bikini until after Able Day. Prior to 1300 L, June 22, the CHIKASKIA (AO-54) and the LCI-1067, in the final shuttle trip to Kwajalein, had gotten underway. Also the SIOUX had the ARD-29 in tow evacuating the lagoon. At 0600L the YP-636 and the YMS-413 departed Bikini to Rongelap followed by the JAMES GILLISS (AGS-13) at 1900L. At 0900L the Rongerik evacuation unit, LST-989 and LST-871, departed for Rongerik. The MAYRANT, TRIPPE, ARTEMIS and APPLING cleared the entrance at 1300L to area Mercury leaving only TU 1.2.7 and the FALL RIVER (CA-131) of TG 1.2 to be evacuated. All destroyers of TG 1.7 except the MOALE (DD-693), acting as harbor entrance control vessel, were clear of lagoon by 1300. All of TU 1.2.7 except the ATA-180 and the CHICKASAW (ATF-83) cleared the entrance by 1400, going to area Mercury. By 1500L all target vessel personnel except "last minute personnel" had been transferred to transports of TG 1.3. SAIDOR (CVE-117), FURSE (DD-882), and C.P. CECIL (DD-835) cleared the lagoon entrance at 1515 enroute to area Paige. The PGM-24, during the afternoon of June 22, evacuated personnel from Erik and Prayer to the FALL RIVER. The PGM-24 cleared the lagoon at 1600L. MUNSEE (ATF-107) and WENATCHEE (ATF-118) cleared the lagoon at 1600L and with the APL's 42 and 20 in tow proceeded to area Packard. The LCT-1361 was anchored in lee of Enyu Island while all other LCT's had been anchored in lee of Amen Island. 1800L found only the PGM-23 of TG 1.8 remaining in the lagoon. The last ship of the transport group, TG 1.3, and the ORCA (AVP-49) cleared the lagoon soon after 1700L. Four ships of TG 1.1; the WHARTON (AP-7), AVERY ISLAND (AG-76), BURLESON (APA-67), and HAVEN (AH-12), were clear of the lagoon by 1800L, proceeding to area Graham. At 1800L the following ships remained in the lagoon to be evacuated early the next morning: KENNETH WHITING (AV-14), CUMBERLAND SOUND (AV-17), FALL RIVER (CA-131), the ATA-180, CHICKASAW (ATF-83), GEORGE CLYMER (APA-27), ROCKBRIDGE (APA-228), BEGOR (APD-127) the PGM-23, and the MOUNT MCKINLEY (AGC-7).

4. Late in the evening of June 22 all preparations for Queen Day had been accomplished and the evacuation was running smoothly. At 2224L June 22, after closely considering weather forecasts, Queen Day was cancelled for June 23. TG 1.1, FULTON (AS-11), COASTERS HARBOR (AG-74), SAN MARCOS (LSD-25), COUCAL (ASR-8), and the PGM-24 were ordered to return to port at dawn June 23. During that day preparations were again made and instruments reset for an expected June 24 Queen Day. Between 1500L and 1600L, the SAN MARCOS (LSD-25), PGM-24, COASTERS HARBOR (AG-74), WHARTON (AP-7), FULTON (AS-11), COUCAL (ASR-8), HAVEN (AH-12), BURLESON (APA-67), and the AVERY ISLAND (AG-76) cleared the lagoon entrance. Again the final ten ships were left in the lagoon and at dawn of June 24 Queen Day was becoming a reality.

5. At 0410L June 24 the first motion for evacuation of last minute personnel was made when the KENNETH WHITING (AV-14) sent one LCPL to evacuate Bikini. At 0452L TG 1.3 had embarked all of her last minute personnel from target ships and PGM-23 had on board all personnel from AMEN Island. All personnel from Enyu were aboard the KENNETH WHITING (AV-14) at 0500L followed by Bikini personnel at 0505L. All last minute personnel were now aboard and all ships were underway by 0530 with the MOUNT MCKINLEY (AGC-7) clearing the entrance at 0620. The MOALE (DD-693) proceeded ahead of the MOUNT MCKINLEY (AGC-7) as the final evacuees steamed to their assigned areas leaving a ghost fleet completely evacuated of personnel. Close observation showed that no ships flew all available bunting, the sign that someone had been left behind.

6. As Able Day approached few changes had taken place. All ships had reentered the lagoon following Queen Day. The MAYRANT (DD-402) had replaced the FLUSSER (DD-368) in the target array. The APPALACHIAN (AGC-1), BLUE RIDGE (AGC-2), and the PANAMINT (AGC-13) were not present to be accounted for. All LCI's except the LCT-1461 had been shifted to the lee of Enyu Island for safer mooring. The YF-733 was at Kwajalein, having been towed there by the CHOWANOC (ATF-100) when evacuated for Queen Day. The

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

ENOREE (AO-69) departed Bikini to Kwajalein on June 29, not to return until after Able Day.

7. On Able minus one day, June 30, at 0900 Vice Admiral Blandy announced that July 1 was to be Able Day and again the mass evacuation began. The destroyers with the exception of the MOALE (DD-693), again HECV, got underway and were clear of the entrance at 1300. TG 1.2, except CHICKASAW (ATA-83), ATF-180, COUCAL (ASR-8), and the FALL RIVER (CA-131) was underway and standing out at 1330. The PGM-24 had evacuated personnel from Erik and Prayer Islands at 1410L. She transferred them to the FALL RIVER (CA-131) and cleared the entrance by 1600. Throughout the afternoon various units of TG 1.8 got underway and cleared the lagoon. The PGM's were clear by 1600 and proceeded to area Franklin. The SIOUX (ATF-75), MUNSEE (ATF-107) and WENATCHEE (ATF-118) took in tow the ARD-29, APL-42 and APL-20, respectively, and proceeded to Kwajalein. The CHOWANOC (ATF-100), towing YO-130, and all other craft of TG 1.8 were clear of the lagoon by 1800, proceeding to area Packard. COUCAL (ASR-8), TU 1.2.7, cleared the lagoon at 1800L. All other units cleared throughout the afternoon at approximately the same time as on Queen Day. Left in the lagoon were the identical ten last minute evacuation ships that had been left on Q-1 day.

8. On July 1 the final last minute evacuation of personnel and ships was commenced. At 0414, TG 1.2 reported that she had embarked all target ship's personnel. At 0512, PGM-23 had all personnel from Kuro, Namu and Amen Islands aboard and was underway. At 0524 KENNETH WHITING (AV-14) had all personnel from Bikini and Enyu on board and was underway. As on Queen Day, the MOUNT MCKINLEY (AGC-7), last ship to leave the lagoon, was clear of the entrance at 0630 and the last ten ships plus the MOALE (DD-693) were proceeding to assigned areas. Observation again showed that no ship flew the all bunting signal and evacuation was complete to the man.

TEST BAKER

1. The evacuation on William Day, the day of the full dress rehearsal for the second Atom Bomb Test, on 19 July 1946, with the exception of a few minor vessels that remained in the lagoon for security reasons, was the same as for Baker Day, the day of the actual test.

2. The general plan was to:

(a) Evacuate the bulk of the task force from Bikini by Baker minus one day to Rongelap Atoll. Rongelap had been chosen instead of Kwajalein which had been used for Test Able due to the fact that it was over one hundred miles closer to Bikini and served as an adequate anchorage in every respect.

(b) Evacuate the remainder in the early morning of Baker Day, ships to be underway with all personnel on board as soon as practicable after daylight and clear of the lagoon entrance by How minus two hours.

3. For clarity it should be noted here that "Test Baker" was the designation for the second Atom Bomb test and "Baker Day" for the day the test was held. How hour was the designation for the intended time of detonation of the bomb and Mike hour for the actual time of detonation. All times used are Love (Zone - 11) which was the local time at Bikini Atoll.

4. On 24 July messages were despatched from the Flagship stating that Baker Day was to be 25 July and How Hour 0835, thus setting in motion the evacuation for Test Baker.

5. It was anticipated that re-entry to Bikini lagoon would not be safe for several days after Baker Day so in order to alleviate the burden of a sustained period at sea, vessels of the service group (with a few exceptions) were evacuated to Rongelap Atoll where they could remain at anchor until necessary for them to be called back to Bikini. Part of this evacuation was accomplished prior to 23 July. QUARTZ (ATA-130) and YF-[illegible] being towed to Rongelap on William Day remained until after Baker Day, MUNSEE (ATF-107) and [illegible] towing ships for the above

MILITARY CLASSIFICATION SAFEGUARDS

two vessels, returned to Bikini. CHIKASKIA (AO-54) departing on 21 July for Kwajalein where she loaded fuel and then departed for Rongelap, and the LCI-1091 departing Bikini for Kwajalein on 22 July and for Rongelap on 24 July.

6. On 23 July eight non-target LCT's escorted by ATA-187, CHOWANOC (ATF-100) towing YF-990, SIOUX (ATF-75) towing ARD-29, and ATA-185 towing LCT's 1184 and 1420, departed Bikini for Rongelap. The LCI-1067 departed Bikini for Kwajalein where she remained until 24 July and then sailed to Rongelap. CHOWANOC (ATF-100) returned to Bikini on Baker minus one day; SIOUX (ATF-75) and ATA-187 returned to Area Packard; and ATA-185 returned to Area Mercury.

7. On Baker minus one day TOMBIGBEE (AOG-11), YOG-70, YO-199 and YO-132 escorted by MUNSEE (ATF-107) departed Bikini for Rongelap, LST-861 departed for Kwajalein, JAMES M. GILLIS (AGS-13) departed for Wotho and the remainder of the service group minus PGM-23, departed for Area Packard, having cleared the lagoon by 1655. All vessels of the technical group except KENNETH WHITING (AV-14), ALBEMARLE (AV-5), CUMBERLAND SOUND (AV-17), BEGOR (APD-127) and LSM-60 cleared the lagoon by 1745 and proceeded to their assigned stations. The Target Vessel Group commenced evacuating the bulk of the target ship's crews to the Transport Group Vessels as early as was practicable and completed prior to 1700 on Baker minus one, leaving on board only such personnel as were required for last-minute operation, instrumentation and adjustments. Non-target vessels of this group were clear of the atoll by 1531 except FALL RIVER (CA-131), ETLAH (AN-79), CONSERVER (ARS-39) WIDGEON (ASR-1) and COUCAL (ASR-8).

8. The Transport Group carrying the crews of the target vessels cleared the lagoon for Area Marmon by 1735 leaving behind two ships, GEORGE CLYMER (APA-27) and ROCKBRIDGE (APA-228) to embark the last-minute personnel on Baker Day. APPALACHIAN (AGC-1), the only press ship present at Bikini, departed at daylight 24 July to Area Marmon to be joined there by the BLUE RIDGE (AGC-2) and PANAMINT (AGC-13), who arrived from Kwajalein the morning of Baker Day.

UNCLASSIFIED

REPRODUCED FROM
BEST AVAILABLE COPY

9. SAIDOR (CVE-117) and plane guards FURSE (DD-882) and N.K. PERRY (DD-883) were clear of the Lagoon by 0950, and the ORCA (AVP-49) at 1706 which left no ships of the Navy Air Group in the lagoon after Baker minus one. SHANGRI LA (CV-38) with her plane guards C.P. CECIL (DD-835) and TURNER (DD-834) had returned to Roi after the William Day rehearsal where they remained until 1700 Baker minus one except for TURNER (DD-834) who made a trip to Bikini and return between 21 and 24 July for fuel and provisions. At 1700 Baker minus one they departed for their Test Baker operating area at Point Tare.

10. All ships of the Surface Patrol cleared the lagoon by 1300 Baker minus one. A.M. SUMNER (DD-692) took up station off the entrance as HECV, where she remained until MOUNT MCKINLEY (AGC-7) cleared the lagoon on Baker Day morning, at which time she proceeded Area Mack. The others proceeded to their assigned stations.

11. At sunset Baker minus one day the only ships remaining in the lagoon were the target vessels plus fourteen other vessels, thirteen of whom were to clear the lagoon in the last phase of the evacuation the morning of Baker Day. The fourteenth, the Bomb Carrying LSM-60 was doomed to remain behind at the center of the target array.

12. On Baker Day GEORGE CLYMER (APA-27) and ROCKBRIDGE (APA-228) were underway at 0518 and clear of the lagoon by 0552 with their assigned last-minute personnel embarked.

13. The ALBEMARLE (AV-5) with last minute personnel of the laboratory Unit embarked got underway at 0513 and was clear of the lagoon by 0545. KENNETH WHITING (AV-14) had taken aboard assigned personnel by 0510 and was clear of the lagoon by 0550. After anchoring the drone boats in lee of Enyu Island, BEGOR (APD-127) cleared the harbor entrance at 0600 and proceeded to Area Franklin. COUCAL (ASR-8), WIDGEON (ASR-1), CONSERVER (ARS-39) and ETLAH(AN-79) completed transferring last-minute personnel from the target vessels to transports by 0535 and cleared the lagoon

ATOMIC ENERGY ACT - 1946

UNCLASSIFIED

REPRODUCED FROM
BEST AVAILABLE COPY

by 0621. PGM-23, who had evacuated Yoru and Namu Islands personnel the previous day completed evacuation of Amen Island at 0512, transferred them to CUMBERLAND SOUND (AV-17) and cleared the lagoon at 0611. A picket boat evacuated the Los Alamos Party from the LSM-60 and proceeded to a mooring buoy near the lagoon entrance where it moored and transferred personnel, including the picket boat's crew tc boats from MOUNT MCKINLEY (AGC-7) and CUMBERLAND SOUND (AV-17). MOUNT MCKINLEY (AGC-7) and CUMBERLAND SOUND(AV-17) cleared the lagoon by 0658, after recovery of the above mentioned boats and personnel, and proceeded to Area Chevrolet and Chrysler respectively; thus completing Bikini evacuation for Test Baker.

14. One incident marred the otherwise clocklike precision of the evacuation but which also proved the worth of the elaborate safety precautions which had been promulgated. One small group of last-minute personnel on the target vessel GASCONADE (APA-85), somehow overlooked, filled the yardarms with bunting which was immediately spotted and recognized as a signal that personnel were still on board. CONSERVER (ARS-39) was dispatched to take them off, and did so in sufficient time to prevent delaying the operation.