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

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

DDC
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VOLUME II

Commander, Joint Task Force One

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~~JOINT TASK FORCE ONE~~

~~REPORT ON~~

~~OPERATION CROSSROADS~~

BOMB TESTS ABLE AND BAKER

CONDUCTED AT

BIKINI ATOLL, MARSHALL ISLANDS

JULY 1946 AND 25 JULY 1946.

VII - SPECIAL REPORTS,

SECTION (I) - SALVAGE REPORT VOLUME II,

SECTION ONE - ABLE DAY

1947

PART I

1. This report is a special report submitted to cover the period Able minus one through Able Plus Two Days. The general mission of the Task Unit was in accordance with CTU 1.2.7 Op. Order D-46 (Enclosure (A) to this report). The specific employment of the Task Unit for this period is contained herein, and, listed, by ships, in Appendix I hereto.

2. On Able minus one day at 0930 the signal was received that 1 July would be Able day. At this time the ships of Task Unit 1.2.7 were engaged in laying special moorings in the lee of Enyu Island for boat pool boats and for LCT's that would not be evacuated; in making final preparations for Able day; and in briefing personnel for expected operations. On receipt of the signal that 1 July would be Able day preparations were immediately begun for evacuation of this Unit, Including recovery of personnel engaged in operations away from their ships. By 1330 Task Unit 1.2.7, less vessels with special assignments, (2 LCT's moored at Enyu and the COUCAL, CHICKASAW and ATA 180 which evacuated later according to plan) was clear of the lagoon and proceeding to area Mercury in accordance with the plan. The Unit remained in area Mercury throughout the remainder of Able minus one day.

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3. On Able day prior to How hour Task Unit 1.2.7 was maneuvered to facilitate a reentry and was located about [illegible] miles distant at Mike hour. After reentry was made conditions warranted anchoring certain vessels of the Unit in a predetermined anchorage pending radiological clearance of the sectors in which they were to operate. Other vessels of the unit proceeded with boarding and firefighting as specifically ordered in accordance with plan. At about 1800 all ships of the Unit were anchored in previously assigned special berthing area. At a conference on board the Mount McKinley (CJTF-1, DSM and CTU 1.2.7) plans were made for beaching of certain target vessels which inspection had revealed required special attention.

4. On Able plus one day Task Unit 1.2.7 was underway as previously directed, proceeding to WHARTON to pick up boarding teams, and thence to boarding operations as areas of the target array were declared safe to enter. During Able day inspections it was determined that certain of the target vessels required beaching or towing from the target array to prevent sinking or possible further damage to near by target vessels. This was accomplished in accordance with plans made the previous evening. All fires aboard target vessels had been extinguished and all vessels boarded prior to 1800, at which time vessels of this Unit remaining underway were anchored for the night. At the evening Conference aboard the RECLAIMER plans were made to reboard, on Able plus two days, certain target vessels in the center of the array which were radiologically unsafe to inspect on Able plus one, and to further inspect the seriously damaged ships to determine if there were signs of flooding, or other serious damage, which was not apparent from the cursory examination made necessary by the radiological conditions of these vessels.

5. On Able day plus two target ships which had been radiologically unsafe for a thorough inspection were reboarded. The ARDC-13, which had taken on a list to port

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and settled slightly by the Vessels of the Unit not emp making preparations for lay mooring target ships.

6. At 1900 Commander Task Unit 1.2.7 shifted his flag to the Palmyra.

PART II

1. At 0900 Able minus one Task Unit 1.2.7 less GYPSY and MENDER, was present at Bikini Atoll, Marshall Islands. The two LCT'S with "A" frames (LCT 1184 and 1420) were shifted to an anchorage close to the beach in the lee of ENYU Island where they remained over Able day. Lieutenant Hann and Ch. Carp. Weston of staff of CTU 1.2.7 with a party of four men from the PALMYRA were engaged in laying special boat pool moorings at the request of CTU 1.8.3 off Ion Island. Lt. Minor of staff of CTU 1.2.7 with the U.S.S. SURCOCK and ONEOTA was engaged in laying special moorings for small boats and LCT's off Enyu Island, also at the request of CTU 1.8.3. These moorings were for securing boats over Able day for which no means of evacuation had been provided. The U.S.S. CONSERVER was engaged in evacuating personnel of the LCT 1114 on request of CTG 1.2. Other ships of the Unit were at anchor making final preparations for Able day.

2. At about 0930 on receipt of signal that 1 July would be Able day preparations were made to evacuate Task Unit 1.2.7 from the lagoon in accordance with Annex How to CJTF-1 Op. Plan 1-46 and CTU 1.2.7 Op. Order D-46 (See Enclosure (A) to this report). Ships designated in Appendix X to Annex X received special boarding teams and fire fighting officers.

3. At 1130 Commander Task Unit 1.2.7 shifted his flag to the U.S.S. RECLAIMER (ARS-42), Administration remaining in the PALMYRA. The U.S.S. COUCAL reported to

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the U.S.S. KENNETH WHITING to embark special party and then to evacuate lagoon independently prior to 1700. The ATA-180 and CHICKASAW (to evacuate with the FALL RIVER) reported to Commander Task Group 1.2 for orders and were to rejoin Task Unit 1.2.7 in area Mercury on Able day.

4. At 1300 PALMYRA was directed to proceed to Enyu Island to pick up Lt. Harmon and the Crews of the LCT's, Lt's Minor, Hann, and Chief Carpenter Weston, their working parties and boats. After embarking above personnel PALMYRA was to rejoin the formation off Enyu. The signal was made to the Task Unit to get underway and proceed out of the lagoon in accordance with CTU 1.2.7 Op. Order D-46.

5. At 1335 the Task Unit less the COUCAL, ATA-180, and CHICKASAW was standing out of lagoon in formation and proceeding to area Mercury on base course 055 at 8 knots standard speed. A despatch to that effect was sent to CJTF-1. At 1500 the U.S.S. PALMYRA rejoined the formation, having taken on board all personnel of this force who had been engaged in last minute work off Ion and Enyu Islands.

6. At 1700 commenced maneuvering the formation to stay within area Mercury. The ships of the unit being disposed in two columns at 600 yard interval and distance.

7. At 1813 the ATA-192 was directed to leave the formation and proceed to area Mack to stand by and assist the A.M. Sumner as necessary. At 1945 the COUCAL joined the formation. At 0310 the ATA-192 rejoined the formation. At 0815 the CHICKASAW and ATA-180 joined the formation having been released from special assignment by Commander Task Group 1.2.

8. The formation was maneuvered so as to arrive at the Southwest corner of Area Mercury at 0800. From this time until How hour the Unit remained in this area and maneuvered to be heading East at How and Mike Hours. At How hour plus 30 minutes the formation was turned so as to be heading toward the reentry area when the signal to re-enter was given.

9. At 1000 received orders for waves 3 and 4 (to which Task Unit 1.2.7 was assigned) to proceed to area Stanley. Changed interval and distance to 300 yards. Changed speed to 11 knots until 1135 at which time reduced speed of formation to 7 knots, CTU 1.2.7 in RECLAIMER proceeding ahead toward entrance to act as visual signal relay ship between CTG 1.2 in FALL RIVER and ships of Task Unit 1.2.7. Blue Area (Geiger Sweet) was reported outside lagoon from a line drawn from southern end of Enyu Island Eastward. Task Unit 1.2.7 ordered to remain in reentry area Able until ordered to proceed.

10. After receipt of situation summary at 1130 and from observation of target array from the RECLAIMER it was apparent that the most pressing problem, after areas and ships concerned were declared radiologically safe to work, would be, first the beaching of certain ships damaged to the extent that they were in danger of sinking, and secondly the extinguishing of fires on board target ships. To be prepared for any eventualities, the ATA-185 was ordered to be ready to cut ships from the target array; the CHICKASAW was to prepare to tow the YO-160 to a spare mooring southward of the array; and the PALMYRA was to prepare a boat with cutting equipment to be used in cutting anchor chains and mooring cables as deemed necessary.

11. From the radiological reports received it was apparent that areas of the target array to the windward of the point of detonation were becoming radiologically safe much faster than areas to leeward of this point. With this in mind, and in view of the fact that areas to windward were being cleared, radiologically, rather slowly, ships assigned to work in sectors to leeward were ordered to anchor in berths of the special mooring area (off Enyu Island) previously designated and shown on special mooring chart issued to ships of Task Unit 1.2.7 and to await clearance of their sectors.

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12. The RECLAIMER, with Commander Task Unit 1.2.7 on board, entered the lagoon at 1230 and proceed to circle the target array to the eastward of "blue" area until such time as further areas were cleared. Throughout the remainder of Able day, as further areas were declared radiologically safe, the RECLAIMER moved in closer for inspection, a more complete evaluation of damage to target vessels, and requirements to be expected of vessels of this unit.

13. In the early reentry period certain ships of the Unit were ordered into reportedly clear areas to place boarding teams aboard targets or to fight fires, sometime after which these areas were reported radiologically unsafe. It was necessary to withdraw the ships concerned into safe areas and have them inspected for radiological activity before giving them further assignments. In each case radiological safety Monitors after inspection cleared the ships and equipment. At one time radiological reports were so spotted that all ships of the unit were withdrawn and standing by and it appeared that no further progress toward boarding or fighting fires would be made unless special action were taken. After consultation between the Director of Ships Material, Dr. Hempleman (the Senior Safety Monitor), and the Commander Task Unit 1.2.7 it was decided that the Unit Flagship (RECLAIMER) having a number of Monitors aboard could Safely Probe the target area and such was ordered. A short exploratory route was chosen through the center of the array to the Eastward of the NEVADA. This run indicated the area to be within a reasonable tolerance, so a repeat run was made this time stopping to extinguish fires on the NEVADA, SARATOGA and PENNSYLVANIA. Another more Comprehensive route was chosen and a run made. This process was repeated until by dark a cursory examination had been made of all important targets thereby enabling the proper planning of the following days operations.

14. During this inspection it was determined that certain of the target vessels were damaged to the extent that special action would be necessary as follows:

(a) U.S.S. SKATE - severly damaged, no apparent fire, in danger of sinking. To be beached on Enyu Island Beaching Area when radiologically safe to work.

(b) U.S.S. INDEPENDENCE - severly damaged, burning aft, danger of explosion, danger of sinking. To be towed to special mooring well clear of target array when radiologically safe

(c) Ex - Jap Cruiser SAKAWA - badly damaged, burning aft, in danger of sinking. To be towed to beaching area as soon as declared radiologically safe.

(d) YO-160 to be cut out and towed clear of the array to permit better access for operating ships in the area.

(e) Numerous other vessels on which fires were to be extinguished as vessels were declared in radiologically clear area. Small explosions were noted on some vessels apparently from ready service ammunition or from special ammunition stowed on deck for the tests.

15. Vessels of Task Unit 1.2.7 entered the lagoon at 1300 and commenced operating in previously assigned sectors as shown in chronological order below.

1305 - Blue area (Geiger Sweet) given which cleared 2 ships for team 9 (ONECTA) and 5 ships for team 7, (ETLAH).

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1307 - ONEIDA (Team 9) ordered to place boarding team on GENEVA and NIAGARA, ATA-192 ordered fight fire on NIAGARA without boarding.

1308 - SHAKAMAXON (Team 8) ordered place boarding team on CONYNGHAM.

1314 - Explosion amidships on PENNSYLVANIA.

1317 - ETLAH (Team 7) ordered place boarding team on LCI's 549, 329, 327; LCT's 1112 and 1113, LST 545.

1319 - Second explosion noted amidships PENNSYLVANIA.

1320 - Fire on Butte (previously reported as small) seemed to be increasing.

1326 - PALMYRA ordered to send boat to transfer boarding team from ACHOMAWI to RECLAIMER.

1328 - All of sector 8 declared clear (SHAKAMAXON Team 8).

1332 - Smoldering fire noted on SARATOGA on flight deck.

1335 - ATA-192 commenced fighting fire on NIAGARA.

1340 - Fire on PENNSYLVANIA dying out.

1341 - Ordered COUCAL to eastward of array.

1345 - Boarding team left ACHOMAWI for RECLAIMER.

1345 - LAMSON sighted by RECLAIMER lying on side and sinking.

1348 - ATR-40 ordered fight fire on SARATOGA Not to board.

1349 - ETLAH alongside LCI 549, boarding team aboard.

1350 - All ships this unit directed not to place boarding teams on board any ship until specifically ordered by CTU 1.2.7.

1355 - ETLAH clears LCI 549 Geiger Sweet, proceeding LCI 329.

1358 - ATA-192 reports fire out on NIAGARA.

1405 - SHAKAMAXON (Team 8) ordered place team on CONYNGHAM.

1409 - ATR-40 alongside SARATOGA fighting fire.

1412 - ATA-192 ordered fight fire on BLADEN and BRACKEN. (Fire reported by ONEOTA).

1414 - ETLAH ordered place team on any target ship her sector except DENTUDA, SEARAVEN and LST 52. To keep North and East that line.

1416 - CURRENT (Team 3) and ATR 87 ordered to PENNSYLVANIA to fight fire. CURRENT to place team on board when fire sufficiently subdued. ATR 87 not to board.

1417 - ETLAH reports boarding team off LCI 329, proceeding LCI 327. LCI 329 reported Geiger Sweet.

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1420 - ATA-192 alongside BLADEN fighting fire.

1421 - SHAKAMAXON (Team 8) alongside CONYNGHAM boarding team aboard.

1421 - CLAMP (Team 2) ordered place team on CATRON.

1425 - Fire on INDEPENDENCE noted burning more fiercely.

1426 - CHICKASAW, ACHOMAWI, and ATA-185 ordered stand clear to eastward of center array.

1427 - All ships sector 9 reported clear (by RadSafe patrol) except Parche and Mayrant.

1430 - RECLAIMER noted smoldering fire amidship on NEW YORK.

1430 - GENEVA reported Geiger Sweet by ONEOTA.

1432 - ATR-40 reports fire extinguished on SARATOGA.

1433 - ATA-192 reports fire on BLADEN out. Proceeding to BRACKEN.

1435 - ATR-40 directed stand clear East of array.

1435 - ATA-192 cooling down BRACKEN port side.

1435 - U.S.S. NEVADA noted smoldering amidships.

1436 - Fire noted on fantail of PENSACOLA by RECLAIMER.

1436 - ETLAH alongside LCI 327 - Boarding team aboard.

1436 - ATR-87 reported alongside PENNSYLVANIA fighting fire.

1437 - 1444 - Six explosions noted aft on INDEPENDENCE, fire on board.

1439 - ETLAH reported small fire on LCI 332.

1442 - All ships Sector 9 clear except Parche and Mayrant.

1442 - ONEOTA (Team 9) ordered place boarding team on APA's.

1444 - ONEOTA reported alongside NIAGARA.

1444 - ATA-192 ordered withdraw to Eastward of BRACKEN.

1445 - PENNSYLVANIA reported Geiger Sour, ATR-87 and CURRENT ordered to withdraw.

1445 - CONYNGHAM reported Geiger Sweet by SHAKAMAXON.

1446 - CLAMP reported alongside CATRON.

1447 - CLAMP ordered withdraw from CATRON.

1449 - ETLAH reported fire on LST-661.

1450 - Fire noted on FALLON (RECLAIMER).

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1450 - CURRENT ordered stand by to Eastward of SARATOGA.

1453 - SHAKAMAXON ordered to withdraw Eastward after finishing CONYNGHAM.

1453 - ETLAH reported clearing LCI 327.

1454 - CURRENT and ATA-192 reported withdrawn to Eastward of Center array.

1456 - CLAMP withdrawn from CATRON. Boarding team aboard.

1459 - CLAMP ordered to seaward of SARATOGA.

1501 - ETLAH ordered to approach LCT 874 Geiger Sour.

1503 - ETLAH (Team 7) reports boarding team on board LST 133.

1504 - SHAKAMAXON (Team 8) ordered place boarding team on board SARATOGA using caution because of previous fire.

1508 - CLAMP ordered take boarding team off CATRON.

1518 - CLAMP reported leaving alongside CATRON.

1518 - ONEOTA (Team 9) reported boarding team aboard.

1522 - CURRENT ordered join ATR 40 and 87 to have CURRENT Geiger man check fire fighting equipment.

1523 - Radiological teams in boats B14 and 3 reported PENNSYLVANIA Geiger Sweet.

1524 - ONEOTA (Team 9) reports NIAGARA Geiger Sweet.

1527 - ETLAH (Team 7) reported boarding team on board and proceeding LST 661.

1528 - ONEOTA (Team 9) ordered place boarding team on BLADEN then FILLMORE.

1528 - RECLAIMER ordered alongside PENNSYLVANIA. Goes alongside.

1529 - ETLAH (Team 7) reports LST 133 Geiger Sweet.

1530 - SHAKAMAXON (Team 8) reports placing boarding team on SARATOGA.

1531 - SHAKAMAXON (Team 8) reports SARATOGA clear for boarding.

1531 - CLAMP reported CATRON Geiger Sour.

1533 - ETLAH reported pyrotechnics on board LST 661 exploding - Proceeding to TUNA.

1535 - ONEOTA reports BRACKEN not clear - Proceeding to BLADEN.

- ETLAH reports fire on LST 661 - Proceeding Tuna.

1539 - ETLAH ordered check water around TUNA carefully before boarding.

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SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
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1542 - ETLAH reported TUNA not boarded.

- ONEOTA reported small fire on after deck house of BRACKEN.

- SUNCOOK ordered proceed east of array and have monitor check ATA 192 fire fighting equipment.

- RECLAIMER fighting fire on PENNSYLVANIA.

- DSM in WHARTON directed all ships keep clear LST 661 army ammunition on board.

- ATR 87 reported fire fighting equipment Geiger Sweet.

- ETLAH ordered keep at least 1100 yards clear of LST-661.

1545 - ETLAH reported LST 661, TUNA and LCT 874 Geiger Sour.

- ETLAH reported LCI 327 Geiger Sweet.

1552 - ETLAH placing team on PILOTFISH.

1554 - Requested report on ATR 40 firefighting equipment.

1555 - RECLAIMER cleared from alongside PENNSYLVANIA - fire appears out.

1556 - CJTF 1 directed transfer SAKAWA to berth for badly damaged ships as soon as safe and practicable.

- SAKAWA still in Geiger Sour area. Burning aft. (Observed by RECLAIMER while passing to port.)

1557 - Requested Radiological report of ATA 192 firefighting equipment from SUNCOCK.

1558 - CURRENT reported ATR 40 and 87 fire-fighting equipment Geiger sweet.

- SUNCOCK reported underway for ATA 192.

- All teams directed check water with Geiger man continuously.

1602 - CURRENT directed place boarding team on PENNSYLVANIA and extinguish small smoldering fire.

1608 - ETLAH reports boarding team aboard clearing PILOTFISH proceeding LCT 1113 - PILOTFISH reported Geiger Sweet.

1611 - RECLAIMER proceeding survey water vicinity CATRON and FALLON.

1615 - Reported to CJTF-1 that prospects of getting SAKAWA out of array today very poor due to Geiger clear reports very slow coming in.

1616 - ONEOTA directed to place team on Mayrant when finished with present assignment.

1618 - ETLAH reported boarding team on board LCT 1113.

1619 - ATA 192 reported Monitors were inspecting Equipment.

- MAYRANT, CORTLAND, GASCONADE, and BUTTE reported Geiger Sweet by RadSafe patrols.

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1624 - ETLAH reports proceeding LCT 1112.

1625 - RECLAIMER alongside, port side, NEW YORK fighting fire amidships.

1628 - ONEDTA reports boarding team on board proceeding FILLMORE.

1629 - ATA-192 reported firefighting equipment Geiger Sweet.

- RECLAIMER clear NEW YORK - Fire appears out.

- CLAMP directed place boarding team on NEW YORK.

1630 - RECLAIMER proceeding to inspect BRISCOE, FALLON and SKIPJACK.

1630 - ONEDTA reported BLADEN Geiger Sweet.

1630 - ONEDTA reported BLADEN Geiger Sweet. CURRENT reported boarding party on board.

1634 - ATR 87 directed proceed to CORTLAND to fight fire.

1635 - ETLAH reported alongside LCT 1112.

1636 - SUNCOCK proceeding GASCONADE.

- ATR 87 reports proceeding CORTLAND.

1639 - ONEDTA reported alongside FILLMORE.

1640 - COUCAL reports boarding team aboard CONYNGHAM.

1643 - SUNCOCK directed place team on GASCONADE or BUTTE.

- ATR 87 fighting fire on CORTLAND.

- ETLAH reports LCT 1112 Geiger Sweet.

1645 - ETLAH proceeding LCT 1078.

1646 - PALMYRA (Lt. Minor) requested move LCT 1420 100 yards off shore to prevent beaching.

1648 - CLAMP reported alongside NEW YORK.

1660 - ETLAH reports boarding team aboard LCT 1078.

1656 - ETLAH reports LCT 1078 Geiger Sweet. Proceeding LST 220.

1657 - SHAKAMAXON was asked Geiger condition SARATOGA.

- SUNCOCK reports boarding GASCONADE.

1658 - ATR 87 reports alongside CORTLAND.

1702 - ETLAH reported LST 661 afire below decks.

- COUCAL requests permission boarding team (Dr. Penny) board CONYNGHAM and to circle FALLON (APA 81).

- RECLAIMER passed close aboard PENSACOLA and SAKAWA, both have small fires burning on fantail.

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1705 - COUCAL directed board CONYNGHAM but not to circle APA 81 (FALLON).

" - SHAKAMAXON reported SARATOGA Geiger Sour frame 90 aft.

1706 - CURRENT reports PENNSYLVANIA Geiger Sweet.

1713 - CURRENT reports smoldering fire on PENNSYLVANIA, extinguished.

1715 - ETLAH reports LST 220 smoking fore and aft. proceeding to LST 545.

" - ONEOTA reported FILLMORE Geiger Sweet.

" - RECLAIMER circling NEVADA.

" - SHAKAMAXON reports SARATOGA completed.

1716 - ONEOTA reports boarding team on board.

1720 - ETLAH reports boarding team aboard LST 545.

1723 - SHAKAMAXON reports parts of SARATOGA Geiger Sour under flight deck to water line, port side fram 90 to fantail. Recommend no team until 2 July.

1730 - CLAMP reports ready service ammunition on NEW YORK overheated.

1732 - CURRENT requests permission to board APOGON and SKIPJACK.

1733 - ATR 87 reports fires out on CORTLAND.

1737 - All ships Task Unit 1.2.7 reminded not to use evaporators while in lagoon.

" - RECLAIMER alongside NEVADA fighting fire.

1741 - SUNCOCK reports GASCONADE Geiger Sweet.

1744 - CLAMP reports ready to leave NEW YORK.

1745 - ATR 87 reports fire on BUTTE - Requests permission to extinguish.

1749 - ETLAH reports LST 545 Geiger Sweet.

.. Boarding team clear LST 545 proceeding to LST 220.

1750 - CLAMP directed to take no action regarding overheated ammunition if fire is out.

- ONEOTA reports alongside MAYRANT.

- CLAMP reports NEW YORK geiger Sweet.

1753 - ONEOTA reports MAYRANT Geiger Sweet.

- RECLAIMER proceeding inspect, DAWSON, BARROW, BUTTE, GASCONADE, and CORTLAND, thence to PRINZ EUGEN.

1756 - ETLAH reports proceeding LST 220 still smoking fore and aft - LST 220 not boarded.

- ONEOTA reports boarding team on board.

1758 - COUCAL reported boarding team returned from CONYNGHAM.

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DATA CLEARANCE NOT REQUIRED
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1807 - ATR 40 reported small fire in FALLON - Request permission extinguish.

1808 - COUCAL granted permission board other ships designated by Dr. Penny if regarded essential.

1809 - COUCAL directed proceed and board NEW YORK and PENNSYLVANIA.

1810 - SUNCOCK requested fire fighting ship fight fire in BUTTE.

1811 - SUNCOCK reported boarding team now on CORTLAND.

1813 - ATR 40 told FALLON not clear, do not fight fire. Proceed to anchorage.

1817 - SUNCOCK reports CORTLAND Geiger Sweet but dangerous due to several fires in vicinity ammunition.

1818 - COUCAL reports proceeding PENNSYLVANIA.

1820 - RECLAIMER completed inspection Prinz Eugen proceeding anchorage.

1832 - All boarding teams directed remain on board Salvage ships for night.

1841 - ETLAH reported LCI 329 Geiger Sweet.

1847 - CLAIP reports NEW YORK Geiger Sweet.

1900 - Ships of Task Unit 1.2.7 anchored.

2012 - CTU 1.2.7 requested have ships come by Wharton to pick up instrumentation teams and Senior members who had been there for conference. (Senior Members of Boarding Teams)

OPERATIONS ABLE PLUS ONE DAY

16. On Able Day it was determined that the U.S.S. SKATE and SAKANA should be beached and the INDEPENDENCE and YO 160 should be towed clear of the target array as soon as radiologically safe. To accomplish this the CHICKASAW, ATA 180 and ATR 87, under the direction of Lt. Hann, were assigned to tow the INDEPENDENCE to a special mooring West of the array. The ACHOMAWI and ATA 185, under the direction of Lt. Brown, were assigned to beach the SAKANA in the beaching area off Enyu Island. The ATA 192 under the direction of Lt. Comdr. Potts, was assigned to tow the YO 160 to a special anchorage clear of the array. Lt. (jg) Griffin with WIDGEON and 2 LCM's from PALMYRA took SKATE from target array and beached her in area to northward Enyu. SKATE beached lightly and anchored for and aft to prevent broaching. SKATE Geiger Sour and Lt. Griffin and party subjected to a full days dosage radioactivity. Placed in hands of Medical personnel on HAVEN for double check. Ordered to be kept clear of radioactivity for about ten days. Other vessels of the Unit were instructed to proceed with boarding as ships in their sectors were cleared radiologically.

17. Activities of vessels of this Unit follows:

0700 - All vessels this Unit be prepared get underway.

0720 - AN's and ARS's to come to WHARTON as soon as possible to pick up Monitors.

0724 - ETLAH proceeding to TUNA.

0739 - ETLAH reports boarding team on board TUNA.

0750 - ONEOTA reports ready to proceed BRACKEN or PARCHE when area cleared.

0751 - ETLAH report boarding team aboard proceeding DENTUDA.

RESTRICTED DATA
VII - (I) - 80 - A
ATOMIC [illegible]
SPECIFIC RESTRICTED [illegible] CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

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ATOMIC ENERGY ACT OF 1946
RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS
CJTF - One
Operational Report - CROSSROADS - PART VII - Special Reports
Section (I) - Salvage
Section One - Able Day

- -

0755 - To ONEOTA all ships your sector clear for boarding, place teams aboard.

0800 - ETLAH reports TUNA Geiger Sweet.

- SUNCOCK told LCT 705, CORTLAND, BUTTE and BARROW clear for boarding. Directed not to go northeast of BARROW.

- PRESERVER directed to get underway and place teams on board LCT 816 and 818. Do not go West of LCT's.

0801 - ONEOTA proceeding to BRACKEN.

0803 - CLAMP requests permission proceed and place boarding team aboard. Directed to go to CATRON.

0804 - ETLAH told all ships in Sector clear - place boarding teams aboard as desired.

0805 - SUNCOCK reports boarding BUTTE.

- SHAKAMAXON told all ships Sector clear - place boarding teams aboard as desired.

- CLAMP told all ships Sector clear except NAGATO - place teams aboard as desired.

- DELIVER requested permission to board CARTERET if ships his Sector not clear. Permission was not granted.

0807 - ETLAH reported boarding team aboard DENTUDA.

0811 - PRESERVER reports boarding team on LCT 818.

0819 - ETLAH proceeding SEA RAVEN.

0820 - CLAMP alongside CATRON.

0825 - ONEOTA alongside BRACKEN.

0826 - ACHOMAWI asked if he had Monitor on board. Urgent he get started on SAKAWA - Received answer at 0844 the Monitor now on board and proceeding SAKAWA.

0829 - ETLAH boarding SEA RAVEN.

0830 - PRESERVER boarding LCT 816.

0831 - DELIVER ordered inspect landing craft beached in Bikini.

- WIDGEON reports monitor aboard proceeding to SKATE.

- ETLAH reports SEA RAVEN Geiger Sweet.

0839 - ETLAH reports proceeding LST 661.

0840 - PRESERVER report boarding team aboard NEVADA.

0841 - ARKANSAS noted burning aft and amidships on bridge.

0842 - SAKAWA settling by the stern, burning aft. Not radiologically safe aft.

0844 - ACHOMAWI proceeding SAKAWA monitor on board.

- PRESERVER reports LCT 816 and 818 Geiger Sweet.

0845 - YO 160 noted still smoldering. Reported Geiger Sour.

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ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTED AREA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION GUIDANCE

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

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0847 - PRESERVER reported small fire on Starboard Quarter CARTERET.

0859 - CLAMP reports leaving CATRON, inspection complete, reports CATRON Geiger Sweet.

" - ATA 192 ordered direct Lt. Comdr. Potts in boat with cutting crew to commence cutting second chain of SAKAWA.

0852 - ETLAH reports boarding team aboard LST 661.

" - CURRENT reports boarding team aboard FALLON.

0855 - CLAMP proceeding alongside BRISCOE - Smoke from #2 hatch, frame 115.

0859 - DAKOTA reports BRACKEN Geiger Sweet.

0902 - DELIVER reports boarding teams inspecting small craft on beach at Bikini.

0903 - WIDGEON reports alongside SKATE.

" - ACHOMAWI told port side of SAKAWA now clear - proceed with your operations.

0905 - WIDGEON reports SKATE unsafe to board.

0907 - SUNCOCK reports BUTTE Geiger Sweet.

- PRESERVER request permission to board BRULE and YOG 83.

0912 - PRESERVER told YOG 83 clear, BRULE on danger line, proceed with caution.

- -

0915 - SAKAWA and SKATE reported sour.

0917 - ACHOMAWI reports SAKAWA very sour - leaving port side and will approach to Starboard.

0920 - YO 160 cut free of mooring.

0920 - CLAMP reports fire extinguished on BRISCOE.

0921 - ETLAH reports boarding team on board, proceeding LST 220.

- ACHOMAWI told port bow of SAKAWA clear - go alongside - Lt. Comdr. Potts will assist in cutting chain.

0922 - PRESERVER reports boarding teams on YOG 83.

0925 - ATA 180 reports monitor aboard and proceeding INDEPENDENCE.

0926 - CURRENT reports FALLON Geiger Sweet, and fire extinguished - directed proceed Salt Lake City.

0930 - ACHOMAWI told chain underfoot SAKAWA cut. Stern SAKAWA hot. Swing ship to windward so stern wire will part or can be cut.

0931 - ETLAH reports LST 661 Geiger Sweet.

0932 - ONEOTA reports alongside PARCHE.

0935 - SHAKAMAXON reports SARATOGA Geiger Sweet.

- ONEOTA reports PARCHE Geiger Sweet.

0938 - ETLAH reports boarding team aboard

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

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RESTRICTED

0941 - SHAKAMAXON reports SARATOGA completed. Proceeding MUSTIN.

0944 - CURRENT reported boarding team aboard SALT LAKE CITY.

0945 - ATA 180 requests information whether INDEPENDENCE cleared for 18 hours work.

0946 - WIDGEON reports SKATE in tow proceeding beaching area Enyu Island.

0948 - CLAMP reports BRISCOE Geiger Sweet. Proceeding CARTERET.

0950 - PRESERVER reports YOG 83 Geiger Sweet. Proceeding BRULE.

0958 - ATA 180 reports fire on NAGATO forward of No. 3 turret.

0959 - ATR 87 reports smoke on INDEPENDENCE.

" - ONEOTA directed return boarding team to WHARTON and proceed to anchorage.

1000 - ETLAH reports LST 220 Geiger Sweet.

1001 - ATA 180 proceed with operation towing INDEPENDENCE. Keep advised by monitor. Crew wear gloves.

1003 - SHAKAMAXON reports boarding team aboard MUSTIN.

1005 - ETLAH reports proceeding LST 52.

1006 - PRESERVER reports boarding team on BRULE.

1010- CLAMP reports alongside CARTERET.

1011 - ETLAH reports boarding team aboard LST 60.

1012 - ATR 87 ordered cut stern wire INDEPENDENCE.

1014 - ATA 192 reports fire on YO 160 extinguished.

1015 - DELIVER instructed that all ships sector clear - Place boarding teams aboard as desired.

" - PRESERVER instructed all ships sector clear except PENSACOLA.

1016 - SUNCOCK instructed all ships sector clear. Place teams aboard as desired. Team 5 will board STACK.

- CONSERVER informed RHIND clear for boarding. When completed instructed all ships sector clear for boarding. Place teams aboard when desired.

1017 - CLAMP reports fire aboard DAWSON.

1018 - ATR 87 ordered to DAWSON to Extinguish fire.

1021 - Tech. Dir. requested heavy instruments hanging from INDEPENDENCE bow be recovered prior towing.

1025 - CLAMP reports fire in CARTERET extinguished.

- RECLAIMER off SAKAWA noted that SAKAWA was listing heavily to port and settling by the stern, indicating longitudinal flooding of the after portion of ship. After part of ship .

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

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- not radiologically safe to place salvage party aboard to commence pumping operations.

1027 - ATR 87 reports fighting fire on DAWSON.

- CHICKASAW ordered to recover two heavy cases from bow of INDEPENDENCE.

1038 - ACHOMAWI reports SAKAWA in tow but sinking.

1039 - SAKAWA sank stern first, rolling to port. ACHOMAWI clear no casualties.

1041 - ONEOTA reports MUSTIN completed, proceeding MUGFORD.

1042 - PRESERVER reports BRULE Geiger Sweet.

1043 - ETLAH reports LST 52 Geiger Sweet.

1045 - CURRENT reports SALT LAKE CITY Geiger Sweet.

1046 - PRESERVER reports proceeding LCM 1.

1048 - ATA 180 reports ready to tow INDEPENDENCE - waiting for CHICKASAW to remove instruments.

1050 - CONSERVER reports boarding team on board RHIND.

1061 - SUNCOCK reports GASCONADE Geiger Sweet.

- ACHOMAWI to return to anchorage.

1055 - CLAMP reports CARTERET completed - Proceeding to BANNER.

1056 - ATA 185 reports standing by vicinity ARKANSAS.

1057 - ETLAH reports boarding team aboard LCT 874.

1058 - CLAMP reports CARTERET Geiger Sweet.

1100 - DELIVER reports all landing craft on beach Geiger Sweet.

1107 - CONSERVER reports boarding team on board HUGHES.

1108 - ETLAH reports LCT 874 Geiger Sweet.

1109 - ATA 185 directed recover instrument - port bow INDEPENDENCE.

1110 - ATA 192 underway with YO 160 in tow.

1111 - ONEOTA reports boarding teams on board MUGFORD.

- CLAMP reports alongside BANNER.

1112 - ETLAH reports proceeding LCI 332.

1114 - ATA 192 reports underway proceeding spare mooring buoy.

- DELIVER reports proceeding to CRITTENDEN.

1120 - CONSERVER reports inspection completed on RHIND and proceeding to STACK.

1125 - ETLAH reports boarding tea aboard LCI 332.

1126 - CURRENT reports boarding team aboard APOGON.

- ATR 40 reports YO 160 safe within 3 feet for 3 hours.

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

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DEPARTMENT OF DEFENSE DIRECTIVE 5200.9 EXEMPTION SAFEGUARDS

1126 - CONSERVER reports RHIND Geiger Sweet.

1129 - SHAKAMAXON reports completed MUSTIN and all ships his sector.

1130 - CONSERVER reports boarding team on STACK.

1132 - SHAKAMAXON reports HUGFORD Geiger Sweet, all ships in sector, completed.

1134 - CURRENT reports APOGON Geiger Sweet.

1139 - ETLAH reports LCI 332 Geiger Sweet. All ships in sector completed.

1140 - SHAKAMAXON Directed proceed anchorage.

- CLAMP reports BANNER Geiger Sweet.

- SUNCOCK reports WAINWRIGHT Geiger Sweet.

1144 - CONSERVER reports STACK Geiger Sweet. - Requests orders.

1145 - ETLAH ordered return radiological team to WHARTON.

1147 - DELIVER reports boarding team on board CRITTENDEN.

1148 - ATR 87 reports small fire on DAWSON.

1149 - PRESERVER reports HUGHES Geiger Sweet. - proceeding to NEVADA.

1150 - ACHOMAWI reports proceeding to assigned anchorage.

1152 - CLAMP reports BANNER completed.

1154 - SUNCOCK reports CORTLAND Geiger Sweet.

1155 - CURRANT reports boarding team on board SKIPJACK.

1156 - CURRANT reports SKIPJACK Geiger Sweet.

1159 - MIDGEON reported anchored off beaching area with SKATE awaiting high water.

1206 - SUNCOOK reports WILSON Geiger Sweet.

1212 - SUNCOOK ordered place team on DAWSON.

1214 - PRESERVER reports boarding team on NEVADA.

1218 - CLAMP reports alongside RALPH TALBOT.

1222 - ATA 83 and ATA 180 directed to take LIBERATOR to spare buoy.

1230 - ETLAH reports boarding team on SARATOGA.

1233 - ATA 192 reports YO 160 moored to buoy.

1234 - PRESERVER ordered check small fire on NEVADA.

1242 - ACHOMAWI reported anchored in assigned berth.

1250 - CONSERVER told place team aboard Prinz Eugen.

1256 - PRESERVER reports NEVADA unsafe for boarding.

1300 - CONSERVER reports boarding team and fire fighting team on board DAWSON.

1308 - DELIVER reports boarding team aboard ARDC - 13.

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

1310 - ATA 185 directed to proceed to anchorage.

1315 - CHICKASAW reports ATA 180 had steering casualty and lost tow (INDEPENDENCE) - CHICKASAW recovering.

1316 - PRESERVER reports all ships his sector reported clear have been boarded.

1322 - CONSERVER reported fire extinguished and inspection of DAWSON completed.

1324 - PRESERVER ordered to return to anchorage.

1328 - CLAMP reports proceeding to NAGATO.

- ATA 192 directed proceed anchorage.

1329 - CONSERVER reports fire on DAWSON out, proceeding Prinz Eugen.

1341 - ETLAH directed proceed to anchorage.

1349 - DELIVER directed proceed to PENSACOLA on completion ARDC 13.

1352 - CLAMP reports fire port side bow of NAGATO.

1400 - CURRENT told CHICKASAW is to tow INDEPENDENCE.

- CURRENT to keep INDEPENDENCE clear of other ships.

1401 - ATA 190 reports steering casualty repaired.

1406 - SUNCOCK directed proceed anchorage.

1410 - CONSERVER reports boarding team on Prinz Eugen.

1414 - DELIVER reports proceeding PENSACOLA.

1416 - CLAMP reports starboard quarter NAGATO radiologically safe.

1418 - CURRENT directed accompany CHICKASAW and INDEPENDENCE to new moorings assisting as necessary.

1419 - ATR 40 directed proceed to anchorage.

1427 - ATA 180 directed to assist on INDEPENDENCE.

- DELIVER reports ARDC 13 Geiger Sour.

1429 - SUNCOCK directed proceed to anchorage.

1430 - ATF 83 underway with INDEPENDENCE.

1443 - CLAMP directed extinguish fire on NAGATO.

1444 - ATR 87 directed proceed anchorage.

1447 - DELIVER reports boarding team on board PENSACOLA.

1455 - CURRENT reports INDEPENDENCE may be boarded onforecastle or flight deck.

1456 - CONSERVER reports Prinz Eugen complete. Prinz Eugen Geiger Sweet.

1459 - CONSERVER directed proceed ARKANSAS for Boarding.

1501 - CURRENT directed proceed to WHARTON, thence to accompany CHICKASAW until INDEPENDENCE is safely moored.

1508 - CLAMP reports numerous small fires on NAGATO.

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ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AND CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

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ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS - CASE CLEARANCE NOT REQUIRED
SECTION 104 b MILITARY CLASSIFICATION CATEGORY

1527 - CLAMP reports inspection NAGATO complete proceeding NEVADA.

1532 - CONSERVER, CLAMP and DELIVER directed proceed anchorage on completion present assignment.

" - DELIVER reports boarding team on ARKANSAS.

1537 - CLAMP reports fire #4 turret NEVADA.

1540 - CLAMP directed Extinguish fire on NEVADA.

1551 - ONEIDA reports FILLMORE Geiger Sweet.

1558 - ATR 87 reports anchored.

1603 - CLAMP reports fire on NEVADA extinguished.

1620 - RECLAIMER inspecting SKATE.

1627 - CURRENT reports standing by INDEPENDENCE.

1630 - RECLAIMER proceeding to INDEPENDENCE.

- DELIVER reports proceeding anchorage.

1644 - CONSERVER reports 3 fires extinguished on ARKANSAS, inspection completed, proceeding to anchorage.

1649 - CLAMP reports inspection completed NEVADA proceeding anchorage.

1650 - MIDGEON reports SKATE beached and anchored fore and aft.

1652 - CLAMP reports inspection completed on 11 vessels assigned plus NEVADA.

1712 - WIDGEON reported anchored.

1714 - CHICKASAW and CURRENT ordered to anchor vicinity INDEPENDENCE overnight.

1715 - ATA 180 directed to proceed to anchorage on completion present task.

1720 - ATA 180 reports fire on INDEPENDENCE.

1730 - RECLAIMER extinguished fire on INDEPENDENCE.

1800 - CURRENT anchored near INDEPENDENCE.

1803 - Reported to CJTF - 1 INDEPENDENCE moored - Fires extinguished.

ABLE DAY PLUS TWO

18. The plan for Operations on Able day plus two included further inspection of seriously damaged target vessels and recovery of instruments by instrumentation party. While enroute to the INDEPENDENCE, Commander Task Unit 1.2.7 and Director of Ship Material noted that the ARDC-13 appeared to be settling at the stern and listing to port. After discharging DSM and his party at the INDEPENDENCE the RECLAIMER with the Deputy CTU 1.2.7 aboard returned to the ARDC-13 for a more careful inspection of damage. As a result of this inspection it was deemed advisable to place the ARDC-13 in more shallow water, a decision in which DSM concurred. Under the supervision of the Deputy Commander the ACHOMAWI, ATA 180 and ATA 192 were assigned to accomplish this operation. The PRESERVER was instructed to report to Dr. Arons for the recovery of certain instruments. The remainder of the vessels of Task Unit 1.2.7 were engaged in overhauling equipment in preparations for laying the moorings and for the actual mooring of the target vessels for test Baker.

19. A chronological account of the days operations follows:

0800 - RECLAIMER underway for WHARTON to [redacted] DSM.

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SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

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RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

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0823 - PRESERVER directed report to KENNETH WHITING where report to Dr. Arons for recovery of instruments.

0840 - RECLAIMER discharged DSM and CTU 1.2.7 to CURRENT at INDEPENDENCE for inspection of latter.

0854 - CHICKASAW directed remain in vicinity INDEPENDENCE.

0915 - ACHOMAWI, ATA 180, and ATA 192 directed report to ARDC 13 for beaching that vessel. Deputy CTU 1.2.7 and Lt. Brown in charge.

0940 - RECLAIMER alongside ARDC 13 to determine its radiological conditions prior to commencing work of towing and beaching.

1030 - RECLAIMER alongside NEVADA for monitoring, DSM party, inspection and photographing of damage.

1300 - RECLAIMER alongside ARKANSAS for inspection, monitoring and photographing.

1332 - PRESERVER reported having recovered 7 instruments.

1325 - Fire reported aboard NAGATO, PRESERVER ordered inspect and fight fire if located. PRESERVER unable locate fire proceeded with previous assignment.

1400 - RECLAIMER standing by vicinity of SKATE while DSM party inspected damage.

1450 - ARDC 13 beached lightly in area off Enyu and anchored fore and aft to prevent beaching.

1500 - RECLAIMER alongside YO 160 for inspection. YO 160 still very Geiger Sour - underway immediately.

1600 - RECLAIMER alongside CRITTENDEN for inspection, photographing and monitoring. CRITTENDEN still Geiger Sour but safe to work on for a short period.

1730 - RECLAIMER anchored in special berth off Enyu Island.

1900 - Commander Task Unit 1.2.7 shifted his flag to the U.S.S. PALMYRA.

PART III

1. To prepare the ships assigned to this Unit for the varied tasks which an operation such as this might present, the assignment of special fire fighting equipment, salvage and diving equipment, and additional personnel, was deemed essential.

2. The extreme maneuverability of the ARS type vessel, in spite of its rather large size for use as an "Alongside" tug, proved invaluable for maneuvering in the restricted waters within the array. The ATF and ATA type vessels, while designed for employment as sea going tugs with more or less unrestricted maneuverability, were proved capable of performing limited alongside work and, with addition of special firefighting equipment, capable of alongside firefighting. The ATR type vessel was designed for this purpose (firefighting) and proved itself invaluable. The large volume of water available from the four strategically located fire monitors, their ability to tow alongside or astern, and their comparatively small size made them an extremely versatile vessel.

3. The performance of these vessels combined in a unit was very good. The one material casualty (a steering casualty in [illegible]) was quickly repaired and the

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RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
THIS MATERIAL CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE ACT, 50 U.S.C. 31 AND 32, AS AMENDED. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

ship continued to carry out her assigned tasks.

PART IV

1. The performance of personnel during Able Day Operations was excellent. Commanding Officers showed a marked sense of initiative and a high degree of seamanship in handling their ships in the restricted waters of the array and in going alongside target vessels for boarding, firefighting and recovery of special instruments. That enlisted personnel were alert and executed orders smartly and efficiently, was evidenced by the ease with which ships were placed and held alongside vessels and in smartness with which special equipment (firefighting, diving, salvage etc.) was brought into use.

PART V

1. As in all military operations, long range planning by experienced personnel is an absolute necessity. This point was evident to the Task Unit Commander from the inception and a nucleus of highly experienced officers was gotten together at an early date to assemble personnel, equipment, material and consumable supplies, in sufficient quantities to make the Task Unit self-sufficient as far as possible while in the operating area. A pool of salvage mechanics was made up to be carried in the Flagship to be used in "on the spot" assignments to augment crews of Salvage and Firefighting ships. It has been shown by tasks assigned to the ships on this operation, which closely paralled salvage operations, that peace time allowances of personnel for ARS's, ATF's and associated craft are woefully short of the numbers required to successfully carry out the missions for which the ships were designed. Commanding Officers of all the ships have been impressed with the need for carrying consumable supplies in sufficient quantities to enable them to operate witho % dependence on the General Supply System for a period of a least sixty (60) days. These supplies to include those small articles of equipment that are needed in large numbers as the situation in a salvage tasks develops, e.g., shackles, wire clips, small sizes manila rope, etc. Dependence for these items, on any source other than their own ships while on a salvage assignment, has been shown to be a faulty planning.

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2. Conclusions: - That ARS's, properly manned and outfitted, can be given almost any assignment, from towing to the salvage and beaching of any damaged ship, that may arise. That ARS's can be teamed with ATF's, ATA's, ATR's, ARS(D)'s and work successfully and easily. That a combination of types as listed above can be extremely easily handled tactically and that the ships operate very well together in close order formations. That the extreme versatility of the above types is well worth knowing, bearing always in mind that ATA's and ATR's are far too light for long distance heavy towing (large drydocks, etc.) That a combination of types, ARS, or ATF should ordinarly be utilized when heavy salvage work may be accompanied by large fires, these make excellent teams to cope with such a situation.

The Flagship chosen for this operation was the PALMYRA (ARC(T)-3) which was designed and built to serve as a floating salvage base carrying assorted salvage equipment beyond that carried by individual salvage vessels and housing a pool of salvage officers and men. Though far from being an ideal Flagship from the point of view of appearance, comfort, office space, dignity, etc., it has served the purpose to perfection. Hardly any item of equipment or material needed was not available or capable of being improvised by the ARS(T)-3 and no project or task arose to which an officer and men especially and well qualified in that particular type of work could be assigned from the pool. The proposition that a well managed pool of material and personnel is most effective and efficient was again proved. It is considered that the PALMYRA (ARS(T)-3) contributed, indirectly, immeasurably to the success of the entire operation.

3. Recommendations: - That a study be made by the Salvage Section of the Bureau of Ships to recommend revision of personnel allowances of ARS's so that they may be efficiently operated. That a quota of officers and men be assigned periodically to the USNTS (Salvage) to be taught subjects pertinent to salvage work which will insure the Navy a large group of qualified, competent Salvage officers and salvage divers and mechanics. That a salvage task organization be made a permanent assignment with headquarters in the Office of Chief of Naval Operations

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and a branch at Bayonne, New Jersey (NTS Salvage) from which assignments of ships and personnel may be made as the needs arise. That a system of semi-annual drills and exercises be set up as requirements for all Salvage Ships (similar to gunnery exercises for combatant ships) so that ships and personnel will be kept constantly proficient in their tasks and abreast of new developments. That ARS's be assigned to points where salvage depots are located to strategically cover the necessary areas for salvage protection. That these ships be rotated frequently enough (nine months) to provide familiarity with all localities, and to preclude loss of identity which may occur should they be assigned for long periods at outlying stations where they may be given only towing assignments to meet the every day needs of that particular base.

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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 (I) - SALVAGE REPORT

SECTION TWO - BAKER DAY

PART I

1. This report is a special report submitted to cover the period BAKER Day minus One through BAKER Day plus Nine. The general mission of the Task Unit was in accordance with CTU 1.2.7 OpOrder F-46 (Enclosure (A) to this report as amplified by D&M Staff Memorandum #8 relative appendix X to annex X to CJTF-1 OpPlan 1-46). The specific employment of ships of the Task Unit for this period is contained herein.

2. On BAKER Day minus One at 0835, the signal was received that 25 July would be BAKER Day. At this time the ships of Task Unit 1.2.7 were engaged in various assignments in preparation for Baker Day, including submerging submarines, handling spare anchors to be used as weights in submerging submarines, towing LCT's 1184 and 1420 to Rongelap, mooring LSM-60 in position, furnishing mooring crews, and in making preparations for sea. On receipt of the signal that 25 July would be BAKER Day, final preparations were begun for evacuation of the Unit from Bikini lagoon, including recovery of personnel engaged away from their ships. By 1500 Task Unit 1.2.7, less ships assigned special details (COUCAL, WIDGEON, CONSERVER, ETLAH, and ATA-185), was clear of the lagoon and proceeding to Area Mercury in accordance with plan. The Unit remained in Area Mercury for remainder of BAKER Day minus One.

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3. On BAKER Day Task Unit 1.2.7 was maneuvered so as to arrive in Area Caterpillar prior to How Hour. After the detonation at Mike Hour (0835L) the Unit was maneuvered to remain near reentry Area until directed to reenter. After reentry was ordered, and CTU 1.2.7 special anchorage had been declared radiologically safe, certain vessels were ordered to anchor. Others were directed to proceed as ordered by CTU 1.2.7. The RECLAIMER (with CTU 1.2.7 and Director of Ship Material (JTF-1) on board) was ordered to proceed to target array to inspect certain target ships. As a result of this inspection it was determined target vessels near the outer edge of the array could be boarded. Boarding teams were ordered placed on board these ships. Inspection by the RECLAIMER showed other target ships to be in danger of sinking (SARATOGA, HUGHES, and FALLON). Due to intense radioactivity none of these could be approached to remove for beaching.

4. Following BAKER Day ships of Task Unit 1.2.7 were employed as required by developments on ships in target array. This included beaching the HUGHES and FALLON; in resurfacing 3 target submarines and beaching or anchoring them in shallow water; in washing down ships with high pressure monitors and with foam to determine if this would wash off radioactive particles; in boarding target ships as they become radiologically safe; and in placing special instrumentation teams on board certain ships in the array.

PART II

1. At 0850, local time, on BAKER Day minus One (24 July) Task Unit 1.2.7 was present at Bikini Atoll, Marshall Islands. Ships of the Unit were engaged as follows:

(a) ATA-185 towing LCT 1184 and 1420 to Rongelap where they were to remain until recalled to Bikini sometime after BAKER Day. (Lt.(jg) HARMON of Staff

of CTU 1.2.7 on board LCT 1420 in Charge). The ATA-185 to rejoin the Unit in Area Mercury on completion of tow.

(b) COUCAL and WIDGEON submerging submarines in target array. To evacuate on BAKER Day in company with FALL RIVER and then rendezvous with Task Unit in Reentry Area.

(c) CONSERVER and ETLAH handling spare anchors to be used for submerging submarines if required. To evacuate on BAKER Day in company with FALL RIVER and then rendezvous with Task Unit in Reentry Area.

(d) ATA-180 mooring LSM-60 in target array.

(e) RECLAIMER, PRESERVER, DELIVER, SUNCOCK, ONEOTA, SHAKAMAXON, and PALMYRA making preparations for sea after working throughout the night assisting in submerging submarines.

(f) Other ships of the Unit were at anchor, ready for sea, engaged in making final preparations for BAKER Day (CU ENT, CLAMP, GYPSY,, MENDER, ACHOMAWI, ATA-192, ATR- and ATR-87).

(g) Lieut. MINOR and Ensign SAPEGA of CTU 1.2.7 Staff with LCM, LCPR and 10-hand mooring party were assisting in mooring the LSM-60.

2. By 1100 Task Unit 1.2.7 (less ships assigned special tasks and who were to evacuate on the morning of BAKER Day) was ready to evacuate the lagoon. All personnel with boats and equipment engaged away from their ships were on board. Boarding teams and monitors assigned to ships had reported aboard, except ATA-185 (enroute Rongelap towing LCT'S) and ATR-40 who was instructed that monitor would board on reentry after BAKER DAY. At 1300 Commander Task Unit 1.2.7 shifted his flag to the RECLAIMER, Administration

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

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

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remaining in PALMYRA. At 1300 the signal was made to get underway, from column as directed in CTU 1.2.7 OpOrder F-46 at 300 yards distance and interval. Standard speed to be 8 knots.

3. By 1500 Task Unit 1.2.7, less specially assigned ships (COUCAL, WIDGEON, CONSERVER, ETLAH, AND ATA-185) was clear of the lagoon and proceeding to Area Mercury on base course 135, at standard speed. After arrival in Area Mercury the Unit was maneuvered to remain therein until ordered to the reentry area. To facilitate 180 degree course changes, with the Unit disposed in two columns at 300 yard interval and distance, a special Sopus signal had been promulgated to the Unit for trial on WILLIAM Day evacuation.

4. At How Hour (0835 L) Task Unit 1.2.7 was being maneuvered to remain in Area Mercury at the 12 mile circle near area Caterpillar and the reentry area. Ships remaining in the lagoon overnight (COUCAL, WIDGEON, CONSERVER, and ETLAH) and the ATA-185 had joined the formation and were in their assigned positions for reentry.

5. At 1023 the Commander Task Unit 1.2.7 reported to CTG 1.2 (information to CJTF-1) that Task Unit 1.2.7 was lying to in Area Caterpillar and Reentry Area. At 1051 CTG 1.2 ordered CTU 1.2.7 to follow FALL RIVER into lagoon. This was passed to the Unit with instructions to be prepared to anchor in special berths when signaled. As the first "blue line" received did not clear special anchorage area it was necessary for the Unit to lie to until a further inspection could be made by Radiological Safety Patrols and a report made. This later report was received at 1129 and ships of the Unit were either anchored or assigned to special tasks (boarding, inspecting, etc.).

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6. Reports received between 1000 and 1200 indicated that four ships were sunk (LSM-60, LCT-1114, YO-160, and ARKANSAS) and that damage had occurred to the SARATOGA (listing to starboard and down by the stern), NEW YORK (down by the stern), FALLON (a definite list to starboard) and the HUGHES (settling with a slight list to port). At 1200 Commander Joint Task Force ONE inquired of DSM in RECLAIMER if the SARATOGA could be cast loose and towed from the target array without boarding. On receipt of the affirmative reply to this the CHICKASAW was directed to make preparations for taking SARATOGA in tow; the PALMYRA was directed to have two boats made ready with cutting equipment (one in charge of Lt. Comdr. POTTS, the other in charge of Lieut. MINOR of Staff CTU 1.2.7), and to report to RECLAIMER (CTU 1.2.7) for instructions; the ATA-180 and ATA-192 to stand by to assist as required. Due to the very high radioactivity of the water near the center of the array and salvage ships were not permitted to enter this area, and at 1555 the SARATOGA sank stern first, her bow and mast disappearing [illegible].

7. At 1220 CTU 1.2.7 received orders from CJTF-1 to proceed into the lagoon remaining behind lagoon patrols and outside blue line. At 1230, on request of DSM, permission was granted for the RECLAIMER to cross the Blue Line and proceed toward the Red Line keeping advised by Dr. HEMPLEMAN (on board RECLAIMER) of tolerance and as to safety. This action facilitated a more rapid evaluation of conditions (radiologically) within the array than would otherwise be possible. As a result of this inspection of the array, and the progress of the RadSafe patrols (blue and red areas determined and plotted) it was determined that only ships on the outer edge of the array would be safe to board. Other target ships near the center of the array being extremely radioactive and unsafe to approach.

8. The following gives in chronological order the assignments, activities, and results obtained by ships of Task Unit 1.2.7 on BAKER Day:

DECLASSIFIED
VII - (I) - 6 - B DATA
AUTHORITY
BY SPECIFIC REFERENCE [illegible] LEGAL IS NOT REQUIRED
DOD MILITARY CLASSIFICATION SUPERSEDED

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946

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1126 - COUCAL directed proceed KENNETH WHITING, to lay to southward to embark special instrumentation team.

1127 - ETLAH reported anchored in vicinity of KENNETH WHITING to lay to southward to embark special instrumentation team.

1129 - ONEOTA directed proceed vicinity KENNETH WHITING to lay to southward to embark special instrumentation team.

1138 - PRESERVER told NIAGARA clear for boarding. Directed to operate independently and place boarding team on board.

1140 - CLAMP told BLADEN clear for boarding. Instructed to place boarding team on board.

1141 - CURRENT told GENEVA clear for boarding. Instructed to place boarding team on board.

1144 - ONEOTA reported instrumentation party on board.

1145 - SUNCOCK told CORTLAND clear for boarding. Instructed to place boarding team on board.

1145 - RECLAIMER proceeding to ships reported in clear area.

1145 - SUNCOCK asked if instrumentation party from KENNETH WHITING aboard.

1154 - PRESERVER, CLAMP, CURRENT, and SHAKAMAXON directed to stay south of line through FILLMORE and CORTLAND and not to cross that line without further orders.

1155 - RECLAIMER circling FILLMORE.

1156 - ETLAH reported instrumentation party on board. Requested instructions.

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1201 - ETLAH directed to stand by. When PRESERVER, CLAMP, or CURRENT had cleared the side of targets proceed place party aboard NIAGARA, GENEVA, and BLADEN. Directed not to go north of FILLMORE.

1203 - COUCAL reported boarding team on board.

1205 - CJTF-1 asked DSM (in RECLAIMER) if SARATOGA could be out from array and towed to beaching area without placing men on board.

1210 - CTU 1.2.7 answered CJTF-1 request (above) affirmative.

1210 - CHICKASAW directed to be ready to tow SARATOGA to beach when ordered. No men to board. Get large pelican hook ready for hooking (CHICKASAW had been previously directed (on 14 July) to obtain pelican hook to fit carrier chain from INDEPENDENCE).

1210 - CURRENT reported boarding team on GENEVA.

1210- PRESERVER reported boarding team on NIAGARA.

1215 - CLAMP reported boarding team on BLADEN.

1218 - PALMYRA directed make up two cutting details in LCPR's, have them ready and standing by for orders. Lieut. Comdr. POTTS in charge of one, Lieut. MINOR in charge of second.

1220 - ATA-180 and ATA-192 directed to be prepared to assist CHICKASAW beach SARATOGA.

CURRENT reported GENEVA Geiger Sweet.

- CURRENT reported boarding party returned. Clear from alongside GENEVA and awaiting further instructions.

VII (I) 7 B
RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTION - NO CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION GUIDANCE

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

RESTRICTED

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1223 - PRESERVER reporting boarding team now off NIAGARA and standing by for orders.

1225 - CHICKASAW, ATA-180, ATA-192 directed come to vicinity RECLAIMER immediately.

1230 - DSM (Adm. SOLBERG) requested RECLAIMER cross blue line and proceed toward red line in accordance authority carried by Dr. HEMPLEMAN.

1230 - SHAKAMAXON told FILLMORE and LCI-329 clear for boarding team. Directed place boarding team on board.

1230 - CLAMP reported BLADEN Geiger readings .0002 per 28 hours.

1239 - PRESERVER told LCT 1115 clear for boarding, directed place boarding team on board.

1240 - COUCAL requested permission to move from present position to area near APA-87 (NIAGARA) in order to near APA-64 when latter cleared.

1241 - ETLAH reported alongside NIAGARA, special team on board.

1242 - CLAMP reported proceeding to LCI-549.

1242 - ACHOMAWI, ATA-180 and ATA-192 directed lie to near BLADEN until called forward.

1245 - COUCAL granted permission proceed to anchorage near NIAGARA.

1245 - RECLAIMER passing BRACKEN to port. No readings obtained.

1245 - SUNCOCK reported boarding team on board CORTLAND.

1255 - RECLAIMER stood into Geiger Sour area midway between

BRISCOE and CATRON. Backed out immediately.

1300 - RECLAIMER stopped lying to on blue line between BRACKEN and FILLMORE.

1300 - COUCAL requested permission to move to area between CATRON and BRISCOE.

1305 - COUCAL directed not to move.

1306 - PRESERVER reported boarding team on board LCT-1115.

1307 - CLAMP reported boarding team on board LCI-549.

1308 - PRESERVER reported LCT-1115 Geiger Sweet.

1309 - CLAMP reported inspection completed on LCI-549, standing by for instructions.

1309 - SUNCOCK reported CORTLAND Geiger Sweet.

1310 - PRESERVER reported boarding team back on board.

1310 - CLAMP reported LCI-549 Geiger Sweet.

1311 - PALMYRA directed hold cutting boats at ship.

1313 - PALMYRA reported one cutting boat had departed, other being held.

1315 - COUCAL directed place boarding team aboard FILLMORE, to keep lookout and keep clear of SHAKAMAXON also ordered to board FILLMORE.

1316 - RECLAIMER proceeding to stop PALMYRA boat standing toward target array.

1319 - COUCAL reported not necessary to board FILLMORE, that they were standing by to board BRACKEN or BRISCO when cleared.

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

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED - CLEARANCE NOT REQUIRED
FOR MILITARY APPLICATION SAFEGUARDS

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1320 - ACHOMAWI reported laying to near BLADEN.

1320 - RECLAIMER stopped about 1500 yards east of BLADEN. Directed PALMYRA boat with cutting party to return to PALMYRA.

1331 - COUCAL directed to proceed to anchorage and await instructions unless team desired board FILLMORE

1332 - ETLAH reported instrumentation team aboard from NIAGARA, requested instructions.

1332 - COUCAL reported BRACKEN and BRISCOE extremely important for instrumentation group. Only one guage on FILLMORE.

1337 - ETLAH directed place team on GENEVA and BLADEN. When finished return to anchorage.

1338 - CLAMP, PRESERVER, CURRENT directed to proceed to special anchorage.

1340 - RECLAIMER ordered proceed to vicinity of LCI(L)-329 on line between LCI-329 and BLADEN for inspection of target ships.

1345 - RECLAIMER stopped near LCI(L)-329.

1350 - ETLAH reported leaving GENEVA proceeding BLADEN.

1357 - RECLAIMER proceeding to vicinity LCI-327.

1400 - CLAMP reported anchored in special anchorage.

1401 - CONSERVER directed get underway proceed towards BUTTE, now clear for boarding.

1402 - CONSERVER directed place team on board BUTTE.

1404 - SUNCOCK told CARTERET clear for boarding, directed to place boarding team on board.

1405 - CLAMP told LCT-1013 clear for boarding, directed to proceed and place boarding team on board.

1406 - CURRENT told LCT-705 clear for boarding, directed proceed and place boarding team on board.

1408 - CJTF-1 told DSM in RECLAIMER permission granted for RECLAIMER to proceed with operation, under advice of Dr. HERPLEMAN, towards SARATOGA. To avoid PENNSYLVANIA as radioactivity on board was sharp with high intensity.

1410 - RECLAIMER left vicinity LCI-332 very radioactive.

1416 - CLAMP reported proceeding to LCT-1013.

1417 - RECLAIMER passed LCI-327, proceeded on inspection of target array.

1420 - SUNCOCK reported water around CARTERET Geiger Sour, awaiting instructions.

1421 - SHAKAMAXON reported FILLMORE Geiger Sweet

1422 - SHAKAMAXON reported boarding team back on board, proceeding LCI-329.

1432 - ETLAH reported completed all ships assigned, proceeding special anchorage.

1440 - CLAMP, CURRENT, and CONSERVER directed to check water very carefully when approaching targets. If Geiger Sour to retire to South and East.

1440 - CJTF-1 told DSM in RECLAIMER permission granted to proceed with great caution to area off HUGHES, to report readings and accumulated dosage for special monitors to RadSafe.

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

1444 - CONSERVER reported BUTTE Geiger Sour, not boarded, water Geiger Sweet, Requested orders.

1446 - RECLAIMER circled eastward of center of target array, passing between FILLMORE and BRACKEN. Passed through Red Area.

1446 - CONSERVER directed stand clear to the southeastward of the array and await further orders.

1450 - CLAMP reported boarding team on board LCT-1013.

1450 - RECLAIMER passed between BLADEN and FILLMORE.

1450 - COUCAL reported anchored in special anchorage.

1457 - SHAKAMAXON reported alongside FILLMORE, boarding team on board.

1458 - CURRENT reported boarding party on board LCT-705.

1459 - ETLAH reported special instrumentation team boarding completed.

1502 - CLAMP reported inspection completed on LCT-1013.

1502 - CURRENT reported LCT-705 Geiger Sour.

1503 - CLAMP reported LCT-1013 Geiger Sour.

1506 - SHAKAMAXON reported alongside LCI-329. Boarding team placed on board.

1508 - CURRENT reported boarding team returned aboard, standing by for further orders.

1514 - ATR-40 directed take monitor on board from HAVEN

1518 - SHAKAMAXON reported boarding team back aboard.

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1520 - RECLAIMER proceeded Area INDEPENDENCE, Passed between INDEPENDENCE and PARCHE.

1528 - SHAKAMAXON reported LCI-329 Geiger Sour.

1528 - RECLAIMER passed close aboard INDEPENDENCE, very high radiocativity from ship and water.

1530 - RECLAIMER stopped lying to in vicinity of PARCHE. Unable to approach SARATOGA due to radioactive condition of water.

1555 - Stern of SARATOGA underwater.

1610 - Bow and superstructure of SARATOGA disappeared below surface.

1615 - SHAKAMAXON reported boarding parties completed assigned vessels, requested instructions.

1620 - CONSERVER, CLAMP, and CURRENT directed to proceed to special anchorage.

1621 - SUNCOCK directed to proceed to special anchorage.

1622 - Task Unit 1.2.7 directed have monitors check engine-rooms and water intakes.

1625 - RECLAIMER proceeded toward area of submerged submarines.

1628 - SHAKAMAXON directed proceed to special anchorage.

1638 - RECLAIMER backed from area of TUNA (submerged). Water very radioactive.

1647 - CLAMP reported anchored.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS - CLEARANCE FOR REQUIRED
NON MILITARY CLASSIFICATION SATISFIABLE

CJTF - ONE
Operational Report - CROSSROADS - PART VII - Special Reports
Section (I) - Salvage
Report - Baker Day

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1645 - SUCUCAL reported engine room and water intake monitored, results negative.

1650 - RECLAIMER proceeded to skirt center of array to eastward, proceeded to position vicinity of LCI-327.

1658 - SUNCOCK reported anchored in Special Anchorage.

1711 - CURRENT reported Geiger check showed port intake and oil cooler Geiger Sour.

1712 - CURRENT reported anchored in special anchorage.

1715 - CURRENT directed make another check at 1730 and report.

1720 - RECLAIMER passed close aboard port side of NEW YORK very sour.

1721 - RECLAIMER proceeded to vicinity LCI-327.

1725 - SHAKAMAXON reported cooling water intakes slightly sour, idling engines to clear.

1817 - RECLAIMER skirted center array to eastward, proceeded to vicinity of submerged submarines.

1830 - RECLAIMER circled through submerged submarine area.

1835 - RECLAIMER proceeded to special anchorage.

2000 - DSM in WHARTON told TU 1.2.7 boats would be sent for initial boarding teams as soon as possible.

2130 - Initial boarding teams returned to WHARTON, monitors remained aboard ships.

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All ships in Unit at anchor in special anchorage for the night.

9. During the sweeps through the target array on board the RECLAIMER on BAKER Day, it was noted that the radioactivity of the water varied greatly in intensity and as to location. Also, all target ships, except those on the extreme edge of the array, proved to be highly radioactive. This was determined by having the RECLAIMER pass a target ship close aboard, the monitors taking readings as the ship was passed. On plotting the "blue" and "red" lines received from RadSafe patrols the following morning these findings were substantiated.

10. On the basis of the above, it was deemed advisable not to order ships into the array to attempt boarding until further investigation of water and target ship conditions had been made.

11. Reports were received that the HUGHES was in danger of sinking and that the FALLON was listing more heavily to starboard. Also a report was received that one of the submerged submarines (believed to be TUNA) was sighted in its normal submerged position.

12. To determine the practicability of removing the HUGHES and FALLON from the target array, the RECLAIMER, with CTU 1.2.7 and Director of Ship Material aboard, was directed to get underway at 1430 to conduct further sweeps through the target array. Dr. HEMILEMAN on board to act as radiological safety adviser during the sweeps. Also it was contemplated that an inspection would be made of the submerged submarine area to determine if possible the condition of the submarines. Captain SHARP was notified of this and asked if he would be present for this inspection. Prior to getting underway he reported aboard the RECLAIMER. Also on board was Captain ROBINSON, Chief of Staff for CTG 1.2

RESTRICTED DATA
AEC - 1946
SPECIFIC RESTRICTIONS - CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION CATEGORIES

13. A chronological account of operations of ships of TU 1.2.7 on BAKER Day plus One follows:

0742 - CURRENT was directed to have monitor check machinery and give CTU 1.2.7 the readings.

0804 - CURRENT reported all machinery Geiger Sweet.

1426 - RECLAIMER with DSM, CTU 1.2.7, Captain SHARP and Captain ROBINSON aboard, underway for target array.

1446 - RECLAIMER passed between BLADEN and FILLMORE then changed course so as to pass FILLMORE, BRACKEN, CATRON, and BRISCOE to starboard and BASCONADE to port.

1450 - RECLAIMER passed GASCONADE close aboard to port, 20 minutes tolerance from GASCONADE.

1455 - PRESERVER directed remain at anchor until further orders.

1500 - RECLAIMER maneuvered to place stern at HUGHES anchor chain. Bow of HUGHES registered 1½ hours tolerance.

1505 - RECLAIMER secured line on HUGHES.

1510 - Both anchor chains of HUGHES out.

1512 - RECLAIMER underway took strain on tow wire.

1514 - One and one-half inch wire to HUGHES parted.

1520 - RECLAIMER passed main tow wire (1 5/8") to HUGHES.

1521 - RECLAIMER underway with HUGHES in tow for beaching area off Enyu Island.

1530 - DELIVER, CURRENT, PALMYRA, ATR-87, COUCAL, ATR-40 and ACHOMAWI directed to get underway and stand clear until RECLAIMER had passed through anchorage area with HUGHES.

1531 - Reported to CTG 1.2 and CJTF-1 HUGHES in tow headed for beaching Area Enyu.

1546 - DELIVER asked if water safe for use in evaporators. Told affirmative in anchorage area.

1600 - PRESERVER directed proceed to vicinity of SKATE and PARCHE to make Radiological survey around five submerged submarines.

1630 - CJTF-1 informed all ships Bikini operation evaporators at anchor authorized until otherwise directed.

1715 - PRESERVER directed proceed toward FALLON taking direct route to MUSTIN, to proceed with great caution from vicinity MUSTIN and SALT LAKE CITY westward to FALLON. If Geiger situation permitted to cut anchor chain, take FALLON in tow to beaching area Enyu.

1720 - ATA-192 directed get underway and stand by RECLAIMER.

1743 - HUGHES grounded in beaching Area Enyu.

1745 - ATA-192 told PRESERVER is coming down with FALLON in tow, stand by to render assistance.

1805 - PRESERVER was asked what readings obtained from the FALLON, also if Captain BELL thought FALLON would remain afloat during the night.

1806 - PRESERVER reported the readings at the FALLON 4.0 R, and that Captain BELL thought the FALLON would remain afloat throughout the night.

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

1806 - RECLAIMER left beaching area proceeded toward submarine area.

1809 - PRESERVER was asked how far he had progressed in taking the FALLON in tow.

1810 - PRESERVER reported pelican hook on and preparing to cut chain.

1820 - PALMYRA requested permission to anchor - was directed to anchor in present position and not in assigned berth.

1822 - RECLAIMER made a sweep in vicinity of submerged submarines inspecting buoys to determine if possible number of air hoses still on surface.

1828 - Reported to CJTF-1 that HUGHES had been beached.

1830 - PRESERVER reported they were hooked up to FALLON but were not able to cut chain without exceeding tolerance radioactivity. Was directed to leave FALLON immediately.

1831 - CURRENT, DELIVER, PALMYRA, ATR-87, COUCAL, ATR-40 and ACHOMAWI directed to anchor in vicinity of other ships, leaving way to beaching area clear.

1836 - ATA-192 directed to proceed to anchorage.

1846 - PRESERVER directed proceed to regular anchorage off Enyu.

1850 - RECLAIMER and PRESERVER returned to special anchorage off Enyu.

2209 - COUCAL directed to be prepared to blow tanks on submarines commencing morning of 27th.

(BAKER DAY PLUS TWO)

14. From the readings obtained of the radioactivity of the water in the vicinity of the submerged submarines, it was deemed possible for the submarine rescue vessels to commence operations to raise the submarines. Because the submerged submarines could not be inspected for damage (flooding), it was essential that they be raised at the earliest possible date to prevent complete flooding through slow leakage. To accomplish this the COUCAL and WIDGEON were assigned to raise the TUNA and DENTUDA, respectively. From the number of buoys left floating it was indicated that these submarines were still in their submerged positions, and that prompt action would prevent their sinking to the bottom thus creating a much larger task incident to their salvage.

15. The FALLON remained afloat and required towing from the array to the beaching area. The PRESERVER and ATR-40 were designated to accomplish this. The RECLAIMER, with CTU 1.2.7 and DSM on board, was ordered to continue inspection sweeps through the target array to determine the radioactivity of target vessels and water in that area. The CLAMP was directed to embark special instrumentation team for boarding NIAGARA and GENEVA. Other ships of the Unit were to remain at anchor in a stand by status.

16. A chronological account of operation of ships of Task Unit 1.2.7 follows:

0700 - PRESERVER directed follow RECLAIMER to vicinity FALLON. Prepare to take FALLON in tow.

0807 - CLAMP directed to get underway, proceed to KENNETH WHITING to embark instrumentation team. To then board NIAGARA and GENEVA.

0812 - COUCAL directed to get underway, proceed to FALL RIVER to embark Captain SHARP. To then proceed vicinity WHARTON to embark Commander GAASTERLAND. Thence to vicinity of TUNA and to operate under

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

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED
UNAUTHORIZED RESTRICTED DATA CLEARANCE NOT AVAILABLE
USE MILITARY CLASSIFICATION ONLY

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instructions Captain SHARP in connection resurfacing TUNA.

0815 - RECLAIMER underway proceeded to target array.

0840 - RECLAIMER passed LCI-332 to starboard.

0842 - Directed PRESERVER remain in clear water until called forward to FALLON.

0844 - RECLAIMER passed SALT LAKE CITY abeam to starboard, readings indicated two hour tolerance at about 30 feet.

0855 - RECLAIMER circled FALLON to determine amount of radioactivity. Stopped with RECLAIMER stern at FALLON's bow. Reading shows 1 hour tolerance.

0903 - RECLAIMER proceeded to area of submerged submarines.

0920 - CONSERVER directed to get underway to place boarding team on BRACKEN.

0924 - RECLAIMER sighted TUNA in submerged position apparently undamaged.

0935 - RECLAIMER passed PENNSYLVANIA abeam to starboard. Readings obtained indicated 30 minute tolerance at about 40 feet.

0940 - RECLAIMER passed BRACKEN close aboard to starboard, obtaining a reading of 30 minutes tolerance.

0942 - CLARP reported instrumentation team reported aboard.

0946 - RECLAIMER circled CATRON - one hour tolerance from about 30 feet.

0955 - CTG 1.2 informed CTU 1.2.7 that red and black obstruction buoy was adrift and instructed that a ship of this unit retrieve and replant in proper position.

0959 - RECLAIMER proceeded to vicinity of HAVEN.

1000 - CLAMP reported proceeding to NIAGARA.

1006 - CONSERVER reported boarding team on BRACKEN.

1012 - PALMYRA directed to have Lieut. MCCLOSKEY take an LCM, pick up obstruction buoy, and replant on 4½ fathom shoal off North end ENYU.

1014 - PRESERVER directed to make all preparations in advance so as to reduce time alongside FALLON, and in any case, to remain alongside less than one hour. Directed to take FALLON in tow for beaching area.

1022 - CONSERVER reported boarding team back aboard. BRACKEN Geiger Sour. Withdrawing from BRACKEN.

1023 - CLAMP reported instrumentation team desired aboard BRACKEN after completion NIAGARA.

1035 - RECLAIMER anchored near HAVEN.

1050 - CLAMP granted permission to board BLADEN and FILLMORE with caution after completing NIAGARA and GENEVA.

1054 - ATR-40 washed down HUGHES using high pressure hose. Later used foam. Results undetermined.

1125 - CONSERVER directed to proceed to CARTERET and to report conditions on arrival. On completion of CARTERET go to CORTLAND to recover any instruments hanging from stern. Instruments to be delivered ..

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

Captain UEHLINGER on KENNETH WHITING.

1129 - CONSERVER directed to recover instrument hanging at frame 170 port side CARTERET. To be delivered to Captain UEHLINGER.

1150 - PRESERVER reported FALLON in tow standing out of target array.

1152 - CLAMP reported leaving NIAGARA, proceeding GENEVA.

1153 - RECLAIMER underway enroute beaching area.

1200 - RECLAIMER lying to off beaching area Enyu Island.

1201 - COUCAL reported TUNA surfaced at 1135.

1208 - CLAMP reported leaving GENEVA proceeding to BLADEN.

1216 - CLAMP reported instrumentation team on board BLADEN.

1218 - ATR-40 directed to get underway to assist PRESERVER in beaching FALLON.

1218 - ACHOMAWI ordered get clear of its berth until FALLON beached.

1221 - COUCAL reported TUNA secured on the surface. Suggested WIDGEON surface DENTUDA.

1225 - CONSERVER reported instruments removed from CARTERET, Geiger Sour, team unable to board. Now enroute CORTLAND.

1227 - PRESERVER directed beach FALLON on heading 085 to 090 between stern of HUGHES and line about 070 through southern spring buoy.

1230 - WIDGEON directed to get underway and proceed vicinity DENTUDA for surfacing. Captain SHARP to board to supervise.

1255 - CONSERVER reported instruments recovered from CORTLAND.

1305 - PRESERVER suggested anchor FALLON with one fathom under keel. Informed intended beach FALLON near HUGHES.

1316 - Informed CTG 1.2 FALLON in tow for beaching area.

1318 - COUCAL directed stand clear of berth until FALLON beached.

1320 - CLAMP reported instrumentation team back on board - proceeding FILLMORE.

1332 - CLAMP reported alongside FILLMORE and instrumentation team on board.

1336 - PALMYRA directed send LCM to beaching area to assist in beaching FALLON.

1346 - CLAMP reported instrumentation group completed on FILLMORE. Desires board BRACKEN if possible. Will return group to KENNETH WHITING unless BRACKEN cleared.

1408 - FALLON grounded headed about 120.

1431 - CURRENT reported boarding team returned from LCI-327, standing clear awaiting instructions.

1435 - DELIVER reported LCT-818 moored to buoy 15, standing clear awaiting orders.

1436 - Reported CTG 1.2 and CJTF-1 that FALLON was beached.

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

CJTF - ONE
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- -

1448 - CONSERVER reported as many animals as possible removed from CATRON during tolerance. Proceeding FILLMORE.

1450 - DELIVER directed proceed to anchorage.

1450 - ATR-87 reported ready to get underway.

1450 - PALMYRA directed to have an LCM with Lt. Comdr. POTTS plant anchors for FALLON.

1535 - WIDGEON reported DENTUDA surfaced at 1533.

1540 - RECLAIMER underway for further inspection of target array.

1608 - RECLAIMER passed close aboard PENNSYLVANIA, 25 minute tolerance.

1610 - RECLAIMER passed GASCONADE. No reading recorded.

1612 - WIDGEON reported DENTUDA secured on surface. WIDGEON returning to anchorage.

1616 - RECLAIMER passed close aboard stern of NEW YORK.

1620 - RECLAIMER proceeded to NAGATO.

1630 - RECLAIMER passed NAGATO and NEVADA. NAGATO listing to starboard and settling by stern. Buoy from LCT-1114 noted on deck starboard side amidship. About 1 hour tolerance recorded from about 50 feet.

1638 - RECLAIMER proceeded to submarine area.

1648 - RECLAIMER inspected surfaced TUNA.

1655 - RECLAIMER circled INDEPENDENCE, port side very radio-

active, starboard side showed no reading at about 70 feet.

1709 - CJTF-1 requested further information regarding submarines

1709 - RECLAIMER circled RALPH TALBOT, no readings obtained. Then went to anchorage.

1727 - Advised CJTF-1 of condition of surfaced submarines.

1733 - RECLAIMER anchored.

1900 - Dr. HEMPLEMAN on the CHICKASAW reported Geiger readings obtained from HUGHES before and after washing ship down with foam. Readings approximately same before and after foaming, with some indications that thorough foaming, followed by high pressure washing, would remove some radioactive particles thus assisting in clearing the ship radioactivity.

1907 - PRESERVER reported Geiger readings on fantail upon anchoring.

1926 - The deputy DSM in WHARTON reported condition of surfaced submarines to CJTF-1. This report indicated DENTUDA might be damaged forward and might require additional blowing.

1940 - DSM in WHARTON informed that teams One and Five would not be required on 28th. Teams Three and Four to be on board CURRENT and DELIVER at 0830.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTION (XII) - CLEARANCE OF PERSONNEL
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT
SPECIFIC RESTRICTED DATA CLEARANCE FOR FOREIGNER
USE MILITARY CLASSIFICATION SAFEGUARDS
RESTRICTED

- -

1955 - DSM in RECLAIMER requested additional Geiger men report to WIDGEON 0800 Sunday for work connection raising submarines.

2220 - CURRENT and DELIVER directed to be prepared for various assignments after 0800 on 28 July. To report when boarding teams are on board.

2305 - Requested information from CTG 1.2 as to which ASR desired for resurfacing submarines on 28 July. Proposed issuing orders after receipt reports from RadSafe Patrols.

2315 - CTG 1.2 informed CTU 1.2.7 desired COUCAL for forenoon and WIDGEON for afternoon, and that proposed plan for assignments was satisfactory

All ships at anchor in special anchorage for night.

BAKER DAY PLUS THREE

17. The results obtained in decreasing the Geiger readings from target ships by washing them down with high pressure water, or foam and water, were not conclusive but did indicate a reduction in radioactivity more rapid than normal decay. Working on the assumption that this washing down would remove an appreciable amount of radioactive deposits on the target ships, plans were made for the assignment of certain ships of the Task Unit to perform this task, using both high pressure streams and foam later washed off with high pressure water.

18. From the latest information available it was indicated the DENTUDA would require further blowing and possible beaching. To accomplish this and to continue operations in surfacing other submarines, the COUCAL and WIDGEON were directed to report to Captain SHARP and proceed as ordered by him.

13. Other ships of the Unit were ordered to place boarding teams, inspection parties, instrumentation teams, etc., on board target ships, or to remain at anchor in a stand by status.

A chronological account of the operations of ships of the Unit follows:

0745 - DSM in WHARTON informed CTU 1.2.7 that DENTUDA was down by the bow and would require additional blowing.

0800 - CURRENT reported initial boarding team #3 and Geiger monitor on board.

0821 - RECLAIMER underway, proceeded to target array.

0824 - DELIVER reported initial boarding team #4 on board.

0829 - COUCAL directed get underway, proceed FALL RIVER embark Captain SHARP, thence to WHARTON where embark Commander GAASTERLAND. Then to proceed with caution to submarine area to work under direction Captain SHARP.

0835 - RECLAIMER entered target array enroute submarine area.

0837 - WIDGEON directed to be prepared for work on resurfacing submarines this afternoon.

0845 - RECLAIMER passed TUNA and DENTUDA. TUNA shows signs of flooding, starboard list, DENTUDA down by the bow.

0852 - RECLAIMER passed PENNSYLVANIA to starboard. No readings recorded.

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

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

RESTRICTED

CJTF - ONE
Operational Report - CROSSROADS - PART VII - Special Reports
Section (I) - Salvage
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- -

0900 - RECLAIMER passed between BRISCOE and GASCONADE - Water Geiger Sweet no readings recorded from ship.

0903 - RECLAIMER passed NEW YORK, down slightly by the stern.

0923 - RECLAIMER passed PENSACOLA to port; 2 degree list, down by the stern.

0926 - GYPSY directed prepare heavy wire slings, proceed to array near DENTUDA, and be prepared to lift on DENTUDA's bow.

0937 - RECLAIMER passed LST-133 and LCT-816 to port. No apparent damage to either.

0940 - RECLAIMER passed SALT LAKE CITY, down by the stern, listing to starboard.

0945 - RECLAIMER passed NAGATO to starboard, down by the stern, 8 degree starboard list. The steady increase in list and settling by stern indicates progressive flooding. Very high radioactivity, cannot be boarded for pumping or towing.

0946 - COUCAL told DENTUDA was down by the bow so entire foredeck is underwater, suggest COUCAL proceed to DENTUDA.

0950 - RECLAIMER passed NEVADA to starboard, no apparent damage; no readings taken.

0950 - ETLAH directed to get underway and accompany COUCAL to submarine area to recover anchors on submarines.

0954 - COUCAL reported able to find only two buoys from PILOTFISH.

1000 - RECLAIMER alongside LCT-1114, capsized adrift, and in sinking condition.

1000 - GYPSY reported Lieut. BROWN of Staff of CTU 1.2.7 aboard and proceeding to DENTUDA.

1000 - COUCAL directed ETLAH to remove anchors from TUNA, stern anchors first.

1002 - RECLAIMER passed close aboard LST-545, no apparent damage.

1012 - ETLAH directed to take anchors recovered from TUNA to wet storage off Ion Island.

1017 - RECLAIMER passed LST-220 to starboard.

1017 - ETLAH reported Capt. SHARP ordered wires cut and to slip anchors. To recover anchors will require divers.

1019 - ETLAH directed not to slip any anchor until further orders from us.

1030 - RECLAIMER passed LST-52 thence to ARDC-13 and LCT-818.

1050 - RECLAIMER proceeded to submarine area.

1101 - ETLAH asked if they had removed any anchors from TUNA. ETLAH reported all anchors had been removed, all had to be burned off.

1110 - CURRENT directed to get underway and proceed to board with caution LST-545 and LST-220 in order named.

1110 - DSM (Admiral SOLBERG) and CTU 1.2.7 boarded COUCAL from RECLAIMER.

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

RESTRICTED DATA
SPECIFIC RESTRICTIONS
RESTRICTED

1142 - CTU 1.2.7 in COUCAL directed that the DENTUDA was to be beached astern of HUGHES. One ATA or ATR tow her in. Weights to be removed in shallow water.

1146 - ATA-192 directed proceed to DENTUDA, take in tow and proceed to beaching area.

1150 - ATA-180 directed to get underway and stand by to assist in beaching DENTUDA.

1154 - PALMYRA directed to have two LCM's ready to assist in beaching DENTUDA.

1155 - DSM (Admiral SOLBERG) and CTU 1.2.7 returned aboard RECLAIMER.

1210 - ETLAH directed to pick up spring buoy, take to Ion Island and make a mooring for submarines.

1219 - RECLAIMER passed NEW YORK, no change in readings. Proceeded beaching area.

1220 - CONSERVER directed to proceed to BURLESON where embark animal rescue party. When aboard proceed to BRACKEN where attempt to rescue animals.

1229 - DELIVER directed to take LCT-818 in tow and moor to buoy 15 in vicinity berth 229.

1236 - CURRENT reported boarding team returned aboard - proceeding LST-220.

1240 - ETLAH reported spring buoy in wet storage in sinking condition. Also that there was a Mark II buoy in good condition available. Directed to use Mark II buoy.

1245 - CHICKASAW directed to take TUNA in tow to buoy in lee of Rokar Island. To buoy her anchors when cutting her out.

1250 - CURRENT reported boarding team on board LST-220.

1256 - CURRENT reported boarding team on board LST-545.

1257 - RECLAIMER anchored near beaching area.

1305 - CURRENT reported boarding team returned aboard from LST-220, awaiting instructions.

1310 - CURRENT directed proceed to LCI-329 place boarding team on board.

1320 - CJTF-1 asked CTU 1.2.7 designate one ship to take party from APPALACHIAN through target array at 1445.

1330 - CURRENT reported boarding team on board LCI-329.

1339 - PRESERVER directed to get underway to be in vicinity APPALACHIAN at 1440 prepared to embark party of 40 for tour through target array.

1331 - DELIVER reported has LCT-818 in tow proceeding buoy 15.

1336 - CJTF-1 informed PRESERVER designated to take party from APPALACHIAN through array.

1340 - CJTF-1 directed all ships to be prepared to shift berths to avoid contaminated water flowing into anchorage.

1348 - CURRENT reported boarding team back aboard from LCI-329.

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

SPECIFIC RESTRICTED ... CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS
RESTRICTED

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1355 - CURRENT directed to proceed place boarding team aboard LCI-327 after monitoring water in vicinity LCI-327 and LCI-329.

1357 - CONSERVER reported all animals removed from BRACKEN. Requested orders.

1410 - CONSERVER directed proceed CATRON place team on NIAGARA, GENEVA, BLADEN, and FILLMORE as directed by Captain SLAVEN.

1417 - ATA-192 reported underway with DENTUDA for beaching area.

1416 - CHICKASAW reported underway with TUNA in tow.

1422 - CURRENT reported completed monitoring water; placed boarding team on LCI-327.

1430 - DELIVER completed mooring LCT-818.

1450 - CURRENT directed wash down LCI-327 with high pressure fire hose. Report Geiger readings of LCI-327 on completion.

1458 - ETLAH reported buoy in place. ETLAH directed proceed to anchorage.

1502 - DELIVER reported standing clear of LCT-818, boarding team back aboard, awaiting orders.

1509 - CURRENT reported hoses inadequate, requested permission to use monitors.

1520 - ATR-87 reported all foam possible had been washed off HUGHES.

1520 - CJTF-1 directed all ships in area previously designated shift berths to clear area.

1535 - CONSERVER reported all instruments removed from FILLMORE. Proceeding BLADEN.

1540 - ATA-132 and ATA-180 placed DENTUDA in beaching area.

1544 - CURRENT reported having completed washing down LCI-327. Granted permission to board and check present condition.

1557 - ATA-180 reported DENTUDA beached.

1558 - CURRENT reported boarding team on board LCI-327.

1601 - CURRENT reported boarding team back aboard from LCI-327, awaiting instructions. Directed to proceed to new anchorage.

1611 - CONSERVER reported all instruments removed from BLADEN, proceeding to GENEVA.

1614 - CCUCAL directed to send party to DENTUDA to vent tanks so that DENTUDA will rest evenly on the beach.

1628 - GYPSY reported second anchor will soon be up. Will be near submarines to expedite discharging anchors.

1630 - RECLAIMER proceeded to target array.

1636 - CONSERVER directed proceed to berth on completion present assignment.

1637 - RECLAIMER passed astern of BRISCOE proceeding through center of array to NAGATO.

1641 - CONSERVER reported instruments off GENEVA, returning to berth.

1643 - CHICKASAW reported TUNA secured to buoy.

RESTRICTED DATA
AEC - 1946
CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED

1652 - RECLAIMER passed close aboard NAGATO, main deck awash, listing to starboard and down by the stern.

1655 - RECLAIMER proceeding through target array passing NEVADA, TRIPPE, STACK, INDEPENDENCE, and submarine area, thence to anchorage.

1656 - DELIVER reported completed washing down LCT-818; awaiting instructions.

1704 - CURRENT reported anchored.

1705 - CONSERVER reported animals, equipment, and team from BURLESON unloaded, proceeding to anchorage.

1716 - GYPSY reported mooring equipment for bow and stern of submarine had been furnished. Proceeding to anchorage.

1718 - ATA-180 reported DENTUDA anchored fore and aft. Proceeding to anchorage.

1732 - CHICKASAW reported in assigned berth.

1744 - CONSERVER reported in assigned berth.

1816 - COUCAL was asked if they had vented forward tanks on DENTUDA.

1817 - CTU 1.2.7 reported to CJTF-1 that DENTUDA beached off Enyu Island and anchored fore and aft.

1820 - DELIVER inquired if water this area safe for evaporation. Answered affirmative.

1824 - ATR-87 reported completed washing down HUGHES. Proceeding to anchorage.

1837 - COUCAL reported DENTUDA grounded port side under conning tower, #1 main ballast tank flooded.

1847 - GYPSEY reported anchored in assigned berth.

2150 - CHICKASAW reported reduction in radioactivity on HUGHES by foaming and washing operations as follows: bow - 67 percent; starboard beam - 26 percent; stern - 56 percent; port beam - 45 percent.

BAKER DAY PLUS FOUR

20. During an inspection of the ships in the target array by the DSM and CTU 1.2.7 (in the RECLAIMER) the evening of BAKER Day plus Three, it was determined that all remaining ballast tanks of the TUNA should be blown. The WIDGEON was assigned to this operation under the direction of Capt. SHARP. Prior to going to TUNA, the WIDGEON was directed to proceed to the DENTUDA beached on Enyu Island and open all ballast tanks except after group. The ACHOMAWI was ordered to take the SKATE in tow and moor her to special buoy planted off Ion Island. The COUCAL was designated to continue resurfacing submerged submarines as instructed by Capt. SHARP. The ETLAH was ordered to proceed to the vicinity of LCT's 874, 1078, 1112, and 1113 to obtain fathometer records, and on completion to recover five submerged pressure units as instructed by Dr. VINE. The ATA-192 was ordered to embark Dr. LAMSON then proceed to target array to obtain readings on foil blast gauges under the direction of Dr. LAMSON. The ATA-185 was ordered to the KENNETH WHITING to pick up Dr. HENDERSON, then to proceed to vicinity of NAGATO and other target ships to recover instruments as directed by Dr. HENDERSON. The AN-85 was directed to embark Dr. ARONS then proceed as directed by him in recovery of vertical gauge stations for delivery to the KENNETH WHITING.

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

ATOMIC ENERGY ACT 1954
RESTRICTED DATA
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

21. The Gieger readings from ships that had been washed down with high pressure streams and foam indicated that further efforts along this line were warranted. The WIDGEON was directed to wash down TUNA after blowing her ballast tanks. Also, the PRESERVER and CHICKASAW were directed to proceed to beaching area Enyu Island where they were to wash down HUGHES, DENTUDA and FALLON.

22. It was noted on previous days operation that personnel boarding radioactive ships, in many cases, had to destroy shoes or clothing because of radioactive particles becoming so deeply embedded therein that they could not be removed. To avoid as much as possible the destruction of otherwise serviceable shoes and clothing CTG 1.8 was requested to furnish CTU 1.2.7 with about two hundred pairs of canvas covers similar to overshoes to be worn over regular shoes. These could be worn on board the radioactive ships then either discarded, if conditions warranted, or thoroughly scrubbed and re-used. Work clothing (greens) were similarly issued to personnel coming in contact with radioactive material.

23. A chronological account of the activities of ships of Task Unit 1.2.7 follows:

0008 - DSM and CTU 1.2.7 informed CJTF-1 and CTG 1.2 that it was planned on mooring SKATE and PARCHE to buoys being planted in lee of Ion Island. Also submerged submarines as raised. This to expedite decontamination.

0755 - PALMYRA (Comdr. BURNS) directed have boat take series of soundings around FALLON and around DENTUDA

0808 - DELIVER directed to put boarding team on LCT-818 to take Geiger readings. Then wash down LCT-818 with high pressure hose and reboard for comparative

readings. On completion proceed CONYNGHAM and place boarding team on board.

0808 - ATA-185 reported Dr. HENDERSON and party on board, proceeding vicinity NAGATO.

0808 - ETLAH reported boarding team plus Dr. VINE and party on board.

0808 - ACHOMAWI reported proceeding on duty assigned.

0809 - CURRENT reported boarding team (No. 3) and Geiger monitor on board.

0815 - CURRENT directed place boarding team on LCI-327, then wash down LCT-327, then wash down LCI-327, and reboard for comparative readings. On completion proceed to WAINWRIGHT and place boarding team on board.

0815 - ETLAH directed to place boarding teams on board LCT's 1113, 1112, 1078, and 874. Obtain readings and report.

0818 - DELIVER reported initial boarding team and Geiger monitor on board proceeding LCT-818.

0830 - ATA-122 reported heat exchanger Geiger readings below tolerance.

0852 - PRESERVER directed proceed vicinity FALLON for purpose taking Geiger readings. Lt. Comdr. GREY of Staff of CTU 1.2.7 will have further instructions.

0854 - RECLAIMER (DSM and CTU 1.2.7 on board) underway for vicinity of target array.

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

0855 - ETLAH reported alongside LCT-1113.

0900 - ETLAH reported boarding team on board, proceeding to LCT-1112.

0916 - ETLAH reported alongside LCT-1112.

0920 - RECLAIMER alongside PENNSYLVANIA.

0925 - CURRENT reported boarding team back on board from LCI-327. Now washing down.

0928 - RECLAIMER proceeded over SARATOGA, mast observed breaking water (low tide)

0930 - ETLAH reported boarding team back aboard, proceeding LCT-1078.

0935 - PALMYRA (Lt. MacCLOSKEY) directed place obstruction buoys in area SARATOGA to mark mast and after end of island.

0936 - ETLAH reported alongside LCT-1078.

0939 - RECLAIMER alongside GASCONADE, one-half hour tolerance.

0943 - RECLAIMER alongside CATRON, no readings taken.

0946 - WIDGEON reported forward tanks DENTUDA completely vented. Believes stern dangerously close to HUGHES. Suggest additional anchor from stern.

0947 - ETLAH reported boarding team back aboard, proceeding to LCT-874.

0950 - CHICKASAW directed proceed vicinity HUGHES. Monitor to take readings.

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0950 - RECLAIMER alongside BRISCOE, one-half hour tolerance.

1000 - ETLAH reported alongside LCT-874.

1000 - ETLAH reported boarding team back on board. Proceeding to pick up instruments.

1000 - RECLAIMER passed alongside SALT LAKE CITY. No change in list or trim one hour tolerance on ship, 8 hours tolerance in water.

1010 - CURRENT reported boarding team on board proceeding WAINWRIGHT.

1010 - CURRENT reported completed washing down LCT-327 and reaching Geiger readings.

1012 - DELIVER reported leaving LCT-818 proceeding to CONYNGHAM.

1015 - RECLAIMER passed NAGATO to starboard, NAGATO has taken on more list and is down 9 feet forward, 6 feet aft. Tolerance one to one and one-half hours.

1017 - PALMYRA to direct Lieut. BROWN of Staff of CTU 1.2.7 to have LCM prepared and at high tide (about 1500) to swing stern of DENTUDA clear of HUGHES. WIDGEON to be on hand to blow all midship and stern tanks.

1020 - Task Unit cautioned to exercise care when operating in target area in vicinity SARATOGA.

1020 - RECLAIMER passed NEVADA, no change in list or trim.

1020 - CHICKASAW reported monitors inspecting FALLON and HUGHES.

1026 - ATA-185 reported Geiger readings on ball crusher gauge stations too high to permit work. Proceeding another area to pick up other instruments.

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

SPECIFIC RESTRICTED ... CONTAINED ... AFFECTING
USE MILITARY CLASSIFICATION CATEGORIES

1029 - ACHOMAWI underway from target array with SKATE in tow.

1031 - ATA-185 reported information obtained from foil gauges on NEW YORK. Expect recover from one more ship before tolerance reached.

1032 - RECLAIMER passed close aboard BRULE, no change in condition, one-half hour tolerance.

1039 - RECLAIMER passed close aboard PENSACOLA, one-half hour tolerance.

1040 - COUCAL surfaced SEARAVEN, condition apparently good.

1043 - CURRENT reported boarding team on board WAINWRIGHT.

1045 - DELIVER reported alongside CONYNGHAM, boarding team on board.

1047 - ATA-185 reported tolerance dose received, returning instruments to KENNETH WHITING. Directed to proceed to anchorage.

1053 - CURRENT reported boarding team on board awaiting further instructions.

1100 - RECLAIMER alongside NEW YORK, Dr. HEMPLEMAN boarded obtained reading showing 20 minutes tolerance on deck.

1105 - ATR-40 directed proceed to NEW YORK and wash down completely using high pressure streams.

1105 - DELIVER reported boarding team aboard from CONYNGHAM, awaiting further orders.

1110 - CONSERVER directed to proceed BURLESON at 1300 to pick up animal retrieving party, then proceed to CATRON and GASCONADE to remove animals.

1115 - MENDER directed to contact DELIVER to obtain information as to location anchors in wet anchorage off Ion Island. Recover anchor and fit the buoy with necessary chain and wire to make mooring for submarine, Lieut. HANN of Staff of CTU 1.2.7 will board with instructions.

1120 - GYPSEY directed obtain location from ETLAH and ACHOMAWI of submarine anchors that were adrift and recover same. Use extreme caution in recovery, having monitor check constantly.

1124 - DELIVER granted permission to proceed to vicinity HAVEN to pick up instruments.

1125 - DELIVER directed to board LCT-1013 and LCT-705 after obtaining new Geiger instruments.

1125 - PALMYRA (Comdr. BURNS) directed to have Lt. HANN of Staff of CTU 1.2.7 report to MENDER with instructions on planting submarine mooring buoy.

1126 - CURRENT directed to check PB2Y's on completion present assignment.

1130 - ACHOMAWI reported the only buoy in lee of Ion Island is one that TUNA is moored to except far north boundary beaching area buoy.

1135 - ACHOMAWI directed to moor SKATE with salvage anchor and heavy wire, using Dan buoy to mark location of anchor and to buoy retrieving wire.

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

1137 - DSR left RECLAIMER to board NIAGARA with boarding party.

1212 - ATR-40 commenced washing down NEW YORK.

1234 - DSR and boarding party returned to RECLAIMER.

1234 - CURRENT reported boarding team returned from PB2y's, requested instructions.

1241 - ACHONAWI reported buoy off Ion Island does not afford swinging room for SKATE.

1247 - CURRENT directed to proceed to MUGFORD and board if necessary.

1258 - ACHONAWI directed to disregard buoy, to plant anchor and moor SKATE to that.

1309 - DELIVER directed to proceed to CONYNGHAM after completion LCT-705 and 1013. To wash down with high pressure streams and take readings in same place as before.

1310 - CURRENT reported boarding team on board MUGFORD.

1311 - DELIVER reported inspection completed LCT-1013 proceeding LCT-705.

1314 - ATR-40 directed continue washing down NEW YORK until about 1600.

1324 - CURRENT reported boarding team back aboard, awaiting further instructions.

1326 - ATR-40 reported that ship will have exceeded tolerance as recommended by monitor. Will continue until 1600 unless otherwise ordered. Directed to discontinue at 1415 then proceed to anchorage.

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1327 - WIDGEON reported all ballast tanks on TUNA completely vented. Deck valves secured. Washed down 1300. Proceeding area DENTUDA.

1345 - CURRENT directed proceed to CARTERET and place boarding team aboard.

1349 - DELIVER reported alongside LCT-705, boarding team on board.

1351 - DELIVER reported completed inspection LCT-705, proceeding CONYNGHAM.

1400 - DELIVER recommended removing camera and black box from top of gun mount prior to washing down. Directed to proceed with removal.

1401 - CONSERVER reported all instruments and animals removed from CATRON. Proceeding to GASCONADE.

1408 - DSC and CTU 1.2.7 advised CTG 1.2 prefer leave DENTUDA in present position until completion decontamination.

1410 - ETLAH reported completion operations with Dr. VINE and party. Requested instructions. Directed proceed to assigned berth.

1411 - CURRENT reported boarding team aboard CARTERET.

1412 - ATA-192 reported anchored in assigned berth. Operations completed.

1412 - DELIVER reported no assistance required in removing instruments.

1425 - CURRENT reported boarding team aboard, awaiting further instructions.

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

1428 - DELIVER directed take black boxes from CONYNGHAM to AVERY ISLAND, gauges to KENNETH WHITING.

1429 - CONSERVER reported GASCONADE too hot. Withdrawing. Requests orders.

1430 - RECLAIMER underway, proceeded to beaching area Enyu Island.

1431 - CURRENT directed to go to MUGFORD on completion CARTERET. Remove black boxes and other instruments which may be damaged by water. Then wash down MUGFORD with high pressure hoses. On completion deliver black boxes to AVERY ISLAND, other instruments to KENNETH WHITING.

1439 - CONSERVER directed proceed to BRISCOE and board if safe.

1445 - RECLAIMER lying to off beaching area Enyu Island.

1452 - ATR-87 directed proceed to vicinity HUGHES, wash down HUGHES and DENTUDA using high pressure streams.

1500 - CONSERVER reported boarding team on board BRISCOE.

1503 - GYPSY reported having anchor chain buoyed off by ATF-148. Requests disposition.

1504 - CURRENT directed to wash down MUGFORD using care not to hit instruments. Not to board after washing.

1509 - ETLAH reported anchored in regular berth.

1511 - CONSERVER reported all animals and part of equipment removed from BRISCOE. Requests orders.

1516 - WIDGEON advised DENTUDA position now good. Vent and flood all tanks. Plant stern anchor out on starboard quarter and secure.

1517 - ATR-87 reported proceeding HUGHES and DENTUDA.

1526 - GYPSY directed pick up anchors and chain and drop in shallow water in lee of Ion Island with buoy and recovery wire.

1531 - CONSERVER reported NIAGARA underway unable to board. Placing animal party and animals on board BURLESON.

1533 - DELIVER reported alongside CONYNGHAM. Completed washing down. Boarding team making another inspection.

1545 - GYPSY reported proceeding to area off Ion Island to discharge anchor and chain. Second anchor is in that area, shall we recover. Given affirmative.

1546 - DELIVER reported inspection completed CONYNGHAM. Standing clear awaiting orders.

1554 - DELIVER directed to anchorage. Boarding team may return to WHARTON but to be on board by 0800 30 July.

1605 - RECLAIMER proceeded to area in lee of Ion Island to inspect mooring SKATE and TUNA.

1607 - CONSERVER reports animals and party disembarked, returning to anchorage.

1620 - RECLAIMER proceeded to target array.

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

1622 - CURRENT reported completed washing down MUGFORD. Awaiting instructions.

1634 - RECLAIMER alongside NEW YORK. Dr. HEMPLEMAN on board for Geiger readings.

1635 - GYPSY reported last anchor and chain discharged. End of chain buoyed with buoy marked ATF-148.

1639 - RECLAIMER cleared from alongside NEW YORK.

1640 - DELIVER requested disposition of hot boxes from CONYNGHAM.

1645 - ATR-40 directed to inform Admiral BLANDY and party FALLON too dangerous to board.

1647 - DELIVER directed to take hot boxes to AVERY ISLAND then proceed to anchorage.

1648 - RECLAIMER passed SALT LAKE CITY. No change in condition.

1650 - ATR-87 reported washing down HUGHES and DENTUDA.

1651 - RECLAIMER passed NAGATO. Main deck awash on starboard side. List increasing and continuing to settle. No change in tolerance.

1653 - RECLAIMER passed NEVADA, no change in condition.

1715 - RECLAIMER passed PENSACOLA, no change in list.

1718 - CURRENT reported anchored in assigned berth.

1720 - RECLAIMER proceeded to anchorage, anchored at 1739.

1733 - CTU 1.2.7 requested permission from CJTF-1 to send

ATA-185 to Rongelap to tow LCT-1184 and 1420 to BIKINI.

1746 - DELIVER reported anchored in assigned berth.

1805 - Permission granted by CJTF-1 to send ATA-185 to Rongelap.

1809 - ATR-87 reported proceeding to anchorage.

1815 - PRESERVER reported operation completed, requested orders for CHICKASAW, ATR-87, and PRESERVER to return to anchorage.

1816 - PRESERVER, CHICKASAW, and ATR-87 directed to anchor.

1817 - GYPSY recovered buoy. Requests instructions.

1825 - GYPSY directed to anchor.

1835 - ACHOMAWI reported SKATE moored with 150 feet 1 5/8 inch wire.

1840 - MENDER reported assignment completed, proceeding to anchorage.

1918 - CHICKASAW reported anchored in assigned berth.

2136 - CTU 1.2.7 reported to CJTF-1 that SARATOGA mast and island buoyed with improvised obstruction buoys.

BAKER DAY PLUS FIVE

24. The Technical Director on KENNETH WHITING requested the services of the following ships of CTU 1.2.7 to continue operations engaged on the previous day:

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

(a) ONEOTA to continue recovery vertical station under the direction of Dr. HENDERSON.

(b) ATA-185 to continue recovery of instruments under the direction of Dr. VINE.

(c) ETLAH to continue recovery of instruments under the direction of Dr. VINE.

The above assignments were approved.

25. In addition, the following assignments were made to other ships in the Unit:

(a) ATR-40 to proceed to NEW YORK to give four hour wash with high pressure streams.

(b) DELIVER to proceed to CONYNGHAM to wash down and then take readings.

(c) CLAMP to proceed to PALMYRA, embark Lt. Comdr. POTTS of Staff of CTU 1.2.7, then to KENNETH WHITING to embark representative of Technical Director, thence to center of array to search for four instrument tanks.

(d) CONSERVER to proceed to BURLESON to embark animal recovery team and proceed GASCONADE to remove animals.

(e) PRESERVER to proceed to GASCONADE to wash down, on completion proceed to DENTUDA to lay new stern anchor.

(f) ATA-192 to proceed to LCT-816 tow to beaching area for beaching by LCM.

(g) WIDGEON to proceed to DENTUDA and wash down with high pressure streams.

(h) ACHOMAWI to proceed to WHARTON to embark boarding team then proceed to TUNA and SKATE and wash down with high pressure steams, taking readings before and after.

(j) ATR-87 to proceed to PENSACOLA and give four hour wash down with high pressure steams.

(k) CHICKASAW directed to proceed RONGELAP to tow LCT-1184 and 1420 to Bikini. To depart about 0900.

(l) ATA-180 to proceed to KENNETH WHITING where embark Dr. MOORE, thence to NEVADA, PENSACOLA, and four APA's to recover peak pressure gauges.

(m) GYPSY to proceed to SEARAVEN to recover anchors.

(n) RECLAIMER acting as flagship for CTU 1.2.7 for making inspections of target array.

(o) Other vessels to remain at anchor in a stand by status.

26. A chronological account of TU 1.2.7 ships for BAKER Day plus Five as follows:

0758 - ETLAH reported boarding team and Dr. VINE on board, underway on assigned duty.

0809 - ATA-192 reported underway to take LCT-816 in tow as assigned.

0814 - ATR-87 reported proceeding to PENSACOLA.

0844 - TU 1.2.7 directed to proceed to special anchorage in lee of Enyu Island.

0850 - GYPSY reported SEARAVEN too hot to work. Requested instructions.

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

SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

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0857 - ACHOMAWI reported boarding team on board, proceeding submarine berth.

0859 - DELIVER reported sighting two marker buoys in vicinity berth 216A. Requested to recover after completing CONYNGHAM.

0859 - ATR-87 reported washing down PENSACOLA.

0900 - GYPSY directed wash down SEARAVEN thoroughly with high pressure hose, then take readings and try to board.

0911 - ATA-192 reported LCT-816 in tow proceeding beaching area.

0912 - ATR-87 reported Geiger counter reads off scale, requested larger Geiger counter.

0916 - ACHOMAWI reported commenced washing down SKATE. Will follow up on experimental sections with fresh water and lye and another section with Diesel fuel.

0954 - DELIVER directed to continue washing down CONYNGHAM for three hours.

1014 - ATR-87 reported having received word from CJTF-1 not to put any more water on decks of PENSACOLA.

1017 - COUCAL reported underway for surfacing operation on SKIPJACK.

1023 - CLAMP reported returning to KENNETH WHITING as instruments are too hot to recover.

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1037 - GYPSY reported having been washing down SEARAVEN, No change in reading. Additional instruments being obtained from HAVEN.

1040 - RECLAIMER with CTU 1.2.7 and DSM on board underway for beaching area.

1040 - DELIVER reported washing down CONYNGHAM for over one hour, inspection team completed inspection, no appreciable change in readings. Awaiting orders.

1045 - SHAKAMAXON reported Lt. HANN on board proceeding as directed.

1058 - ATA-192 directed to be prepared by about 1500 to cover HUGHES with liquid foam using Chrysler fire pump. Lt. Comdr. GRAY of Staff of CTU 1.2.7 will board with instructions.

1100 - RECLAIMER lying to in vicinity beaching area.

1112 - CLAMP reported instrumentation group disembarked, proceeding toward anchorage.

1114 - CURRENT reported completed washing down MUGFORD, boarding team aboard.

1115 - CJTF-1, CTG 1.2 and party boarded RECLAIMER.

1116 - ATA-180 reported having recovered instruments from NEVADA, PENSACOLA, Monitors report crew has had limited exposure to radioactivity for one day. Proceeding to KENNETH WHITING to deliver instruments, then to anchorage, unless otherwise directed.

1118 - PRESERVER came alongside RECLAIMER to deliver gauge readings.

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

1121 - PRESERVER underway from alongside RECLAIMER.

1122 - WIDGEON reported DENTUDA washed down 2½ hours, time limit set by monitor. Will fuel from tanker 1300 today.

1125 - CURRENT reported boarding team back on board from MUGFORD. Proceeding to wash down WAINWRIGHT.

1130 - Lt. LAESSLE of Staff of CTU 1.2.7 came alongside RECLAIMER in LCM and reported LCT-816 was beached and had stern anchor out.

1135 - Lt. LAESSLE in LCM left ship proceeding to assist in mooring DENTUDA.

1152 - CJTF-1, CTG 1.2 and party left RECLAIMER.

1200 - RECLAIMER anchored off beaching area, Enyu Island.

1209 - GYPSY reported SEARAVEN 2.5 R per 24 hours. Monitor advises GYPSY should leave vicinity.

1230 - Lt. MIHALOWSKI of Staff of CTU 1.2.7 directed to replace Lt. LAESSLE in assisting mooring of DENTUDA. To commence about 1300.

1239 - ATR-40 reported completed washing down. Will wait one-half hour until dry then take another set of readings.

1302 - COUCAL informed GASCONADE extremely hot. Directed not to board. Proceed to test PILOTFISH.

1309 - CLAMP directed to get underway, proceed and cover entire surface of CONYNGHAM with foam. Then proceed to anchorage.

1312 - DELIVER directed get underway, proceed to MUGFORD and cover entire ship with foam, then return to anchorage.

1316 - CURRENT reported boarding party returned from WAINWRIGHT, standing by dor further instructions.

1318 - ATA-185 reported completed assignment with Dr. HENDERSON. Ship and personnel had reached one day's tolerance radioactivity.

1325 - ATR-87 reported completed washing down PENSACOLA.

1326 - CLAMP reported Lt. Comdr. HILTON of CTU 1.2.7 Staff aboard proceeding to CONYNGHAM.

1330 - ACHOMAWI reported leaving SKATE. Now alongside TUNA.

1338 - DELIVER reported completed over 3 hours washing down. Inspection party completed. Departed CONYNGHAM, proceeding MUGFORD.

1340 - ATR-87 requested permission proceed to anchorage. Was directed to proceed to anchorage in lee of Enyu Island.

1345 - PALMYRA directed to have Lt. BROWN of CTU 1.2.7 Staff make preparations to board CURRENT with dynamite and equipment to sink LCT-1114.

1347 - DELIVER asked if black boxes on #2 gun mount on MUGFORD should be removed before applying foam.

1350 - CURRENT directed proceed vicinity PALMYRA where embark Lt. BROWN with dynamite, then proceed to sink LCT-1114. On completion return to Enyu anchorage.

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

CJTF - ONE
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1355 - CURRENT was asked what instruments were removed from MUGFORD before washing down.

1359 - ETLAH reported assignment with Dr. VINE completed.

1408 - CURRENT reported no instruments removed prior washing down. One black box removed from vicinity #2 turret after washing down.

1409 - CONSERVER reported all animals and instruments removed from GASCONADE. Requested orders.

1417 - DELIVER directed remove black box before foaming MUGFORD.

1418 - SUNCOCK directed shift berth to lee of Enyu Island.

1420 - CONSERVER directed prepare six inch pumps for possible use tomorrow.

1550 - WIDGEON reported completed fueling proceeding anchorage.

1558 - COUCAL reported tested after hoses. One leaks at submarine. Others will not take air. Disconnecting and will then proceed to berth.

1607 - RECLAIMER passed SEARAVEN, PARCHE, INDEPENDENCE, and PENSACOLA. Moored alongside PENSACOLA to place boarding team on board at stern. Could not board due to radioactivity. Six minutes tolerance.

1620 - RECLAIMER continued tour of target array.

1713 - RECLAIMER returned to PENSACOLA, attempted place boarding team on bow. Eight minute tolerance.

1714 - ONEOTA reported five stations recovered today. Requested permission remain at anchor astern of

KENNETH WHITING for transferring instruments.

1715 - ACHOMAWI reported completed assignment, anchored in assigned berth.

1725 - ACHOMAWI reported readings on TUNA before washing down. No appreciable changes after washing down.

1752 - PRESERVER reported having planted anchor, put beach gear on DENTUDA and took 20 ton pull, but had to discontinue operations due to crew reaching daily tolerance.

1427 - RECLAIMER underway for WHARTON to pick up Admiral PARSONS thence to target array.

1441 - DIXIE reported having completed 50 pairs canvas overshoes.

1450 - COUCAL reported unsuccessful on SKIPJACK. Proceeding PILOTFISH.

1459 - DELIVER reported having reached radiological tolerance for one day. MUGFORD 90% covered. Proceeded to anchorage in lee Enyu.

1506 - CLAMP reported CONYNGHAM covered with foam.

1514 - CLAMP reported MUGFORD covered with foam.

1518 - GYPSY reported Geiger readings vicinity SEARAVEN. Requested instructions.

1529 - GYPSY directed return to anchorage.

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

SPECIFIC RESTRICTED DATA CLEARANCE AND REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

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1531 - ATR-87 requested permission to use evaporators. Permission was granted.

1533 - ETLAH reported anchored in assigned berth.

1535 - RECLAIMER cleared from alongside NEW YORK, boarding team back on board. Proceeded through target array past SARATOGA and PENNSYLVANIA.

1543 - DELIVER reported anchored in assigned berth.

1547 - CLAMP reported completed MUGFORD.

1808 - CTG 1.2 informed DSM and CTU 1.2.7 desires to use WIDGEON on DENTUDA tomorrow.

1810 - RECLAIMER proceeded to anchorage after sweeps through target array.

1815 - SHAKAMAXON reported completed assignments, returning to anchorage.

1830 - ATA-180 reported Geiger check of machinery. Being flushed and a continuous check made.

1902 - CLAMP requested information if evaporators can be used.

1938 - CLAMP told to avoid using evaporators.

2337 - ATR-40 reported unable to distill enough fresh water to keep up with consumption.

2341 - CURRENT requested permission send monitor to HAVEN to obtain new instruments.

BAKER DAY PLUS SIX

27. Operations continued on washing down target ships with foam and with high pressure streams. The submarine rescue vessels continued working on submarines. The specific assignment of ships of the Unit were as follows:

(a) ONEOTA to continue recovery of vertical stations for Technical Director.

(b) ATA-180 to continue recovery of peak pressure gauges under direction of Dr. MOORE.

(c) PRESERVER to recover beach gear, then proceed to CONYNGHAM, CARTERET, LCT-705 and 1013 to wash down with foamite.

(d) ATR-40 to proceed to NEW YORK and wash down with foamite.

(e) ATR-87 to proceed to PENSACOLA and wash down with foamite.

(f) CURRENT to proceed to MUGFORD and BUTTE washing down with high pressure streams.

(g) DELIVER to proceed to PENNSYLVANIA, and wash down entire ship with water, followed by foamite.

(h) CONSERVER proceed to BRISCOE and BRACKEN and wash down, take Geiger readings, and then apply foam.

(i) PALMYRA to check fire fighting facilities of GYPSY and MENDER and make a report.

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

(j) ACHOMAWI to continue decontamination on TUNA and SKATE.

(k) WIDGEON proceed to vicinity DENTUDA to blow torpedo rooms.

(l) Other vessels remain in stand by status subject to call.

A chronological account of the activities of these ships follows:

0100 - TU 1.2.7 directed not to run evaporators in present anchorage.

0131 - SHAKAMAXON ordered to go alongside OTTAWA for removal of anchors and chain.

0135 - All ships told safe to use evaporators but must send daily samples to HAVEN.

0722 - ATR-40 reported only 700 gallons of feed water on hand. Directed proceed to PALMYRA where receive one thousand gallons.

0745 - CURRENT reported proceeding vicinity HAVEN to service instruments and then to AVERY ISLAND to deliver black box before commencing day's assignment.

0806 - RECLAIMER underway for inspection of target array.

0822 - ATR-87 reported proceeding to PENSACOLA.

0835 - SUNCOCK directed to go alongside OTTAWA to assist in loading anchors and chains.

0850 - ACHOMAWI reported alongside SKATE.

0855 - TU 1.2.7 informed water may be distilled but send samples to HAVEN daily.

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0910 - ONEOTA reported one more day required complete present assignment. Requested forty-eight hour availability alongside CEBU.

0910 - CTU 1.2.7 and DSM left RECLAIMER for WHARTON.

0939 - ONEOTA reported Captain HUNSINGER ordered remove monitor. WIDGEON (Commander GAASTERLAND) suggested hauling HUGHES to port to prevent damage to DENTUDA.

0958 - CURRENT reported LCT- 1114 sunk at 2124 the 30th in fifty-four feet of water.

1000 - WIDGEON directed to move HUGHES, asked if assistance needed.

1006 - WIDGEON requested LCM to plant anchor for moving stern of HUGHES.

1012 - PALMYRA directed to send LCM with heavy anchor and wire to haul stern of HUGHES clear of DENTUDA. Lieut. MINOR of CTU 1.2.7 Staff to be in charge.

1036 - CLAMP directed to proceed to SALT LAKE CITY and wash down with high pressure hoses for three hours.

1044 - ATA-180 reported removal of instruments from five APA's. Deck force subjected to full day's tolerance radioactivity. Proceeding to KENNETH WHITING to deliver instruments, thence to anchorage.

1050 - CONSERVER reported BRISCOE and BRACKEN washed down.

1102 - CTU 1.2.7 returned aboard RECLAIMER.

1102 - WIDGEON reported blowing forward torpedo and battery rooms. No water in either.

1109 - RECLAIMER anchored near WHARTON.

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

1113 - ATR-87 reported assignment completed. Requested permission to anchor and investigate engine trouble.

1120 - CTU 1.2.7 reported to RadSafe that removal of monitor without prior notice from AN-85 made it impossible to operate that ship.

1135 - WIDGEON directed discontinue operations hauling HUGHES stern around.

1137 - COUCAL directed proceed vicinity SEARAVEN blow ballast tanks as instructed Captain SHARP.

1146 - CLAMP reported monitor advises not safe to reamin in vicinity SALT LAKE CITY for more than one hour.

1154 - CLAMP asked for readings and distances from which taken.

1215 - CLAMP reported hauling out to windward to wash down own ship. Requested instructions.

1216 - CLAMP directed proceed to anchorage.

1220 - ACHOMAWI reported underway from SKATE proceeding TUNA.

1300 - RadSafe reported monitors not removed from ONEOTA by that section.

1308 - ATA-180 requested permission to take on dry stores if schedule permits.

1310 - DELIVER reported completed washing down PENNSYLVANIA. Now preparing to cover with foam.

1311 - ATA-180 reported engine failure. Ships force effecting repairs.

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1316 - CURRENT reported MUGFORD washed down and inspected. Party returned aboard. Proceeding BUTTE.

1317 - DSM returned aboard RECLAIMER.

1331 - WIDGEON directed proceed wash HUGHES and DENTUDA thoroughly.

1345 - RECLAIMER underway for further inspection of target ships.

1400 - RECLAIMER standing by BOTTINEAU.

1406 - COUCAL directed proceed as soon as practicable vicinity HAVEN where embark monitors and equipment for deep probe of submarine area.

1409 - RECLAIMER proceeded vicinity HAVEN.

1420 - COUCAL reported SEARAVEN ballast tanks dry, salvage hoses removed, anchors ready for removal when convenient.

1420 - PRESERVER reported completed assignment. Requested permission to go alongside PALMYRA to renew foam supply.

1425 - RECLAIMER passed close aboard SALT LAKE CITY.

1425 - DELIVER reported anchored in assigned berth.

1426 - ONEOTA directed discontinue operations for today because of monitor being removed.

1430 - PRESERVER directed go alongside PALMYRA to replenish foam supply.

1439 - ACHOMAWI reported about thirty per cent paint removed from target. Suggest Dr. HEMPLEMAN board ACHOMAWI.

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

AEC - 1946
RESTRICTED PACIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

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1445 - RECLAIMER embarked party from HAVEN for inspection of CONYNGHAM.

1450 - RECLAIMER proceeded CONYNGHAM.

1450 - CONSERVER directed proceed SALT LAKE CITY, place monitor on board to make Geiger readings. Then to replenish foam supply and return to previous assignment.

1456 - CONSERVER reported BRISCOE foamed. Enroute SALT LAKE CITY.

1459 - ATR-87 requested permission obtain fresh water.

1500 - ATR-87 directed obtain fresh water making own arrangements.

1502 - RECLAIMER alongside CONYNGHAM placing boarding teams and monitors on board.

1521 - CONSERVER reported boarding team on board SALT LAKE CITY completed. Proceeding BRACKEN.

1539 - RECLAIMER underway from alongside CONYNGHAM, boarding teams and monitors on board. Proceeded to WAINWRIGHT.

1550 - ATR-40 reported NEW YORK thoroughly foamed down using 430 cans of foam. Am returning to anchorage.

1550 - RECLAIMER alongside WAINWRIGHT. Boarding team and monitor placed on board.

1555 - DIXIE reported to CTU 1.2.7 that seventy pairs canvas overshoes completed. PALMYRA sent for these and distributed them.

1612 - RECLAIMER underway from alongside WAINWRIGHT,

boarding teams and monitors back aboard, proceeded to MUGFORD.

1616 - CURRENT reported completed washing down BUTTE, boarding team aboard BUTTE.

1630 - RECLAIMER alongside MUGFORD. Boarding team and monitors placed aboard.

1630 - CURRENT reported boarding team returned from BUTTE, awaiting further instructions. Have black box recovered from MUGFORD for delivery to CUMBERLAND SOUND.

1634 - RECLAIMER underway from alongside MUGFORD, boarding team aboard, proceeded on inspection of target array.

1649 - CURRENT directed to deliver black box to CUMBERLAND SOUND. Return members boarding team to WHARTON then proceed to anchorage.

1652 - CONSERVER reported BRISCOE and BRACKEN ninety per cent covered with foam. SALT LAKE CITY inspected enroute to anchorage to check foam.

1700 - RECLAIMER anchored vicinity WHARTON to discharge boarding teams, etc.

1710 - ATR-87 granted two days at anchor availability to effect repairs by ship's force.

1732 - CHICKASAW reported departing Rongelap with LCT's in tow.

1750 - CURRENT reported anchored in assigned berth.

1755 - CLAMP granted permission to go alongside SYLVANIA to pick up freight.

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

RESTRICTED DATA
ATOMIC ENERGY ACT 1954
RESTRICTED DATA
USE MILITARY CLASSIFICATION CATEGORIES

1925 - ATR-40 directed obtain two hundred cans foam from PALMYRA.

1836 - SUNCOCK reported completed taking on water.

1855 - ACHOMAWI reported operation completed, anchored in assigned berth.

1919 - ATR-40 reported main engine condensers, main deck aft and fire pumps far above tolerance. Will run pumps all night in attempt to clear.

2240 - Technical Director requested ATA-180 for forenoon, 1 August, to recover last of pressure gauges.

BAKER DAY PLUS SEVEN

29. Ships of Task Unit 1.2.7 were given the following assignments for BAKER Day plus Seven:

(a) CONSERVER to proceed vicinity WHARTON where embark Dr. HEMPLEMAN and DSM representative. Then proceed to vicinity SALT LAKE CITY and carry out instructions senior member boarding teams relative to placing inspection teams aboard ships. To be prepared to render assistance in pumping, or furnishing portable pumps.

(b) ACHOMAWI to proceed to SKATE to wash down using same method as on TUNA. Boarding team to board

ACHOMAWI that vicinity. On completion SKATE wash down SEARAVEN followed by PARCHE.

(c) ONEOTA to continue recovery of vertical stations as requested by Technical Director. On completion to arrange direct with CTU 1.8.11 for for tender availability for repairs to auxiliary generator.

(d) CLAMP to proceed to WHARTON where embark boarding team, thence to PENSACOLA where wash down using high pressure streams. Upon completion place boarding team on PRINZ EUGEN then CARTERET.

(e) GYPSY to go to SEARAVEN recover extra anchors and place them in wet storage in accordance verbal instructions.

(f) CURRENT to proceed to WHARTON where embark boarding party, thence proceed to BRISCOE and BRACKEN to wash foamite off.

(g) DELIVER to proceed to WHARTON to embark boarding team, then to PENNSYLVANIA to complete application of foam. On completion place boarding team on PENNSYLVANIA then NEVADA.

(h) ATA-185 to proceed to KENNETH WHITING where Technical Director representative, Dr. MOORE, will board, then proceed to recover peak pressure gauges as directed by him. Deliver gauges to KENNETH WHITING.

(i) PRESERVER to proceed to CARTERET to wash down with high pressure streams. Also, to test 6" submersible pumps being prepared to install on PENSACOLA on short notice.

(j) ATA-192 to proceed to MAYRANT then TRIPPE for thorough washing with high pressure hoses.

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

(k) SHAKAMAXON to continue planting submarine moorings in lee of Enyu Island.

(l) ATA-180, ATR-40, and ATR-87 granted forty-eight hours ship force availability.

(m) ETLAH, SUNCOCK, and MENDER remain at anchor in stand by status.

(n) RECLAIMER to remain at anchor near WHARTON in order that CTU 1.2.7 can attend conference on MT. McKINLEY.

30. A chronological account of the activities of ships of this unit in carrying out above assignments follows:

0750 - ATA-192 reported proceeding to carry out assigned duties.

0757 - ATA-85 reported proceeding to carry out assigned duties.

0809 - DELIVER reported boarding team on board.

0810 - DELIVER reported proceeding to PENNSYLVANIA.

0831 - DELIVER reported completed covering PENNSYLVANIA with foam, proceeding to NEW YORK.

0835 - CLAMP reported monitor ordered them away from PENSACOLA, requested instructions.

0838 - CURRENT reported initial boarding team and Geiger monitor on board.

0850 - CTG 1.8 directed SIOUX and MUNSEE to report to CTU 1.2.7 for temporary duty in connection with decontamination of target vessels.

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0857 - CHICKASAW arrived in Bikini with LCT-1184 and 1420 in tow. LCT-1184 and 1420 proceed to PALMYRA and went alongside for stores, etc.

0905 - ACHOMAWI reported alongside SKATE, commenced washing down.

0906 - CLAMP reported boarding party on board.

0918 - CLAMP reported commenced washing down PENSACOLA.

0930 - PALMYRA (CTU 1.2.7 Admin.) requested to have Comdr. BURNS and Lt. Comdr. GRAY sent to ACHOMAWI to observe methods used in washing down SKATE.

0955 - CLAMP reported Geiger readings around PENSACOLA, proceeding to PRINZ EUGEN with boarding team.

0956 - CLAMP directed place boarding team on board PRINZ EUGEN.

1007 - CLAMP reported proceeding to WAINWRIGHT, apparently has fire on deck.

1013 - GYPSY reported having recovered two bow anchors, not yet started on stern anchors.

1014 - CLAMP reported smoke on WAINWRIGHT coming from handy billy on deck.

1016 - ATA -192 reported completed assignment on MAYRANT, proceeding to TRIPPE.

1025 - DELIVER reported inspection NEW YORK completed, boarding team on board proceeding to NEVADA.

RESTRICTED DATA
AEC - 1946
CLEARANCE NOT REQUIRED
SPECIFIC RESTRICTIONS
USE MILITARY CLASSIFICATION SAFEGUARDS

SPECIFIC RESTRICTED DATA CONTAINED HEREIN
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

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1030 - ATA-185 reported duty completed, ship has reached daily tolerance of radioactivity, returning to anchorage.

1032 - GYPSY reported bow cleared, one anchor lost, proceeding to wet storage with one anchor and will return for stern anchors.

1036 - PRESERVER reported completed washing down CARTERET.

1050 - DELIVER reported inspection made on NEVADA very Geiger sour, boarding team back aboard, standing clear.

1058 - CLAMP reported boarding team back on board, leaving CARTERET.

1124 - CLAMP reported returning to PENSACOLA to wash down as long as monitor permits.

1132 - GYPSY reported placing 10 ton bow anchor from SEARAVEN in 25 feet of water north of Ion Island buoyed with spherical buoy.

1134 - CLAMP reported washing down PENSACOLA.

1135 - DELIVER reported proceeding to PALMYRA for foam.

1145 - COUCAL directed to get underway and stand by HAVEN to embark monitors and equipment for making deep probe.

1158 - CURRENT reported completed washing down BRISCOE, boarding team placed aboard.

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[illegible] - ATA-192 reported completed assignment. Returning to anchorage.

1107 - CLAMP reported lying to off PENSACOLA awaiting orders.

1116 - SUPPENT reported boarding team back on board, proceeding to BRACKEN.

1223 - CLAMP directed report amount washing accomplished on PENSACOLA, proceed to WHARTON for disembarking boarding teams, thence to anchorage.

1230 - CLAMP reported PENSACOLA completely washed down once, from midships forward once, total one hour washing.

1234 - ACHOMAWI reported proceeding to STACK.

1242 - DELIVER reported anchored in berth Easy awaiting orders.

1311 - CLAMP reported monitors sending Geiger counters to HAVEN for checking. To be returned by 1400 today.

1312 - GYPSY reported stern anchors on SEARAVEN fouled, expect to have them cleared by 1400.

1330 - CTU 1.2.7 (Administration) reported to CTU 1.2.7 that MUNSEE and SIOUX had reported into Unit for temporary duty.

1335 - DIXIE reported she has 84 pairs canvas overshoes completed.

1343 - DELIVER directed to go alongside RECLAIMER about 1500 for supply of foam.

1440 - COUCAL directed proceed to submarine area, locate SKIPJACK and commence planting necessary moorings for resurfacing submarine.

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AT [illegible] CLEARANCE NOT REQUIRED
SPECIFIC RESTRICTIONS
USN MILITARY CLASSIFICATION SAFEGUARDS

1505 - SIOUX directed to get underway proceed to WILSON where embark monitors, then wash WILSON thoroughly using high pressure streams. On completion return to anchorage.

1540 - CONSERVER reported SALT LAKE CITY engine-room pumped down. Now listing 3½ degrees. Up by stern 7 inches. After engine-room and fire-room rigged for continued pumping.

1545 - GYPSY reported SEARAVEN clear.

1615 - CURRENT reported completed washing down BRACKEN, boarding team placed aboard.

1620 - ONEOTA reported recovered three vertical stations today, probably nine more to pick up, one of which fouled and two on bottom. Radioactivity of instruments has slowed up operations. Estimate total radiation received .1 R.

1622 - CURRENT reported boarding team back aboard from BRACKEN. Operations completed, waiting for instructions.

1640 - CURRENT directed proceed to anchorage.

1655 - ACHOMAWI requested anchorage near WHARTON for tonight.

1704 - ACHOMAWI given affirmative on anchorage.

1714 - DELIVER reported anchored.

1735 - COUCAL reported operations completed, will anchor in berth and rig mooring for diving on SKIPJACK. If not ready before sundown will plant mooring at daybreak.

BAKER DAY PLUS EIGHT

30. On BAKER Day plus Eight ships of Task Unit 1.2.7 were engaged in continuing decontamination of target ships by various methods; in raising submarines; pumping flooded target ships, and other tasks as requested by various activities. In accomplishing the above, ships of the Unit were given assignments as follows:

(a) RECLAIMER acting as flagship for DSM and CTU 1.2.7 for inspection trips through target array and beaching area. To pick up Commanding Officer of PENSACOLA for boarding, inspection and pumping operation.

(b) DELIVER to proceed to the vicinity of the WHARTON to pick up boarding team, then proceed to PRINZ EUGEN for washing down with high pressure streams, thence to NEVADA for similar task. Place boarding teams aboard if radiological tolerance permits.

(c) CLAMP to pick up boarding team near WHARTON then to proceed to CATRON to apply heavy coat of foam followed by thorough washing with high pressure hoses. On completion proceed to LCT-1113 for similar operation.

(d) CURRENT to pick up instrumentation and initial boarding team. Proceed to BRISCOE for inspections and placing of instrumentation team aboard if tolerance permits. Then to proceed to LCT-705 to apply foam followed by washing and boarding by boarding party. Then proceed to LCT-1013 for similar operation.

(e) ATF-107 Commanding Officer to report to RECLAIMER for conference at 0800; on completion of conference proceed to RALPH TALBOT where wash down thoroughly using high pressure hoses.

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

(f) ATF-75 Commanding Officer to report to RECLAIMER for conference at 0800. On completion of conference proceed to GASCONADE and thoroughly wash down using high pressure hoses.

(g) CONSERVER to proceed to SALT LAKE CITY to continue decontamination and pumping as required.

(h) ATA-180 undergoing 48 hour availability.

(i) ATR-87 undergoing 48 hour availability.

(j) ONEOTA - Tender availability to overhaul auxiliary generator.

(k) ACHOMAWI to proceed to STACK, on completion proceed to SEARAVEN and wash thoroughly using high pressure streams.

(l) WIDGEON proceed to AJAX for availability.

(m) COUCAL laying four point moor for working on SKIPJACK.

(n) Lieut. BROWN of Staff of CTU 1.2.7 conducting blasting operations incident to removal of coral heads from beaching area Enyu Island.

(o) Other ships of the Unit remain at anchor available as requirements develop.

31. Activities of ships of Task Unit 1.2.7 in chronological order follows:

0715 - ATA-180 reported repairs to main engine completed.

0756 - CTU 1.2.7 (Administration) directed to commence blasting operation off Enyu Island. Lieut. BROWN of Staff of CTU 1.2.7 in charge.

0822 - DELIVER reported boarding team on board proceeding to PRINZ EUGEN.

0833 - WIDGEON ordered to go alongside AJAX for five days availability to rebrick boilers.

0835 - COUCAL reported moored over SKIPJACK. Ready to start diving as soon as radiological conditions permit.

0845 - Task Unit 1.2.7 informed blasting would be conducted off Enyu Island. Ships shift berth as deemed advisable by Commanding Officers.

0934 - CURRENT reported boarding team on board BRISCOE.

1003 - CTG 1.2 informed that salvage officer from Staff of CTU 1.2.7 assigned to investigate the condition of LST-125. Will advise on completion.

1055 - CURRENT reported boarding team back on board from BRISCOE. Proceeded to LCT-705.

1100 - COUCAL reported submarine SKIPJACK on bottom on even keel. Deck of submarine covered with coral.

1109 - CLAMP reported boarding team on CATRON.

1113 - CLAMP reported boarding team back on board.

1125 - CLAMP Reported CATRON Geiger sour.

1129 - CTG 1.8 recommends replacing ATF-75 and ATF-107 with ATF-100 and ATF-118 rather than transferring equipment and personnel.

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SPECIFIC RESTRICTED DATA CLEARANCE REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

1152 - CLAMP reported completed four hour washdown of PRINZ EUGEN. Now alongside placing boarding team on board.

1206 - CURRENT reported completed washing down and inspecting LCT-705. CLAMP has applied foam to LCT-1013. Request Instructions.

1226 - CLAMP directed transfer 60 feet 4 inch hose for use with Chrysler pumps to RECLAIMER.

1233 - CURRENT directed to return to anchorage on completion of LCT-705 and after disembarking boarding team.

1236 - CLAMP directed complete application foam to LCT-1113, then return to LCT-1013 and wash thoroughly then proceed to LCT-1113 and wash thorougly. Place boarding team aboard in each case after washing.

1237 - DELIVER reported inspection completed on PRINZ EUGEN, boarding team returned aboard, returning to NEVADA.

1244 - CLAMP reported unable to locate LCT-1113. Requested permission to proceed to RECLAIMER for transferring suction hose. Advises Chrysler pumps will be inoperative after transferring hose.

1303 - ONEOTA requested availability alongside tender for approximately three days to repair both auxiliary generators. Directed to make arrangements direct with tender and advise.

1340 - ATR-40 reported upon shifting berth will tow ATR-87; requested permission to remain alongside after anchoring. Permission granted.

1346 - DELIVER reported days' tolerance of radioactivity received, gave NEVADA two hour wash down, proceeding anchorage unless otherwise directed.

- -

1409 - Lt. MIHALOWSKI reported that ATF-118 assigned by CTG 1.8 to beach LST-125 was making good progress. Above report made to CTG 1.2.

1430 - Comdr. BURNS and Lt. Comdr. GRAY directed to indoctrinate ATF-100 and 118 in methods used in washing down target ships.

1449 - CLAMP reported boarding team now on board LCT-1113.

1458 - CLAMP reported boarding team back on board. LCT-1113 Geiger sour. Proceeding to LCT-1013.

1503 - CURRENT reported anchored.

1519 - CLAMP reported washing down LCT-1013.

1520 - DELIVER reported anchored in assigned berth.

1607 - ACHOMAWI reported completed washing down STACK, proceeding to anchorage.

1632 - COUCAL reported having time to make one more inspection dive prior sundown. Request information whether she should return to assigned berth. Directed remain in moor over SKIPJACK.

1645 - CLAMP reported boarding team aboard LCT-1013, Geirger sour. Proceeded to WHARTON to disembark boarding team thence to anchorage.

1700 - CONSERVER reported SALT LAKE CITY forward fireroom dry, forward engine-room water level 15 inches below floor plates, list 2 degrees. Ship has own pumps operating, consider salvage operation completed. Recommend checking ship tomorrow morning. CONSERVER at assigned anchorage.

1930 - COUCAL reported SKIPJACK inspected from bow aft to salvage air connection on 2 G and 5 H main

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USE MILITARY CLASSIFICATION CATEGORIES

ballast tanks with exception port side of conning tower. Ship listing 3 to 5 degrees. One quarter inch fine coral silt on deck forward, little aft. Salvage air connections to number 2 A, 2 G, and 2 H main ballast tanks air good condition, hose leading over side, one hose severed. No structural damage found.

2025 - COMCAL directed not to conduct any diving operations tomorrow until Captain SHARP boards.

BAKER DAY PLUS NINE

32. On BAKER Day plus Nine (3August) work continued to progress satisfactorily. Decontamination of ships, recovery of instruments, inspection of submerged submarines and boarding of target vessels was still being greatly curtailed by the high radioactivity of instruments, target ships, and the lagoon bottom itself. Ships of Task Unit 1.2.7 continued operations on assigned tasks as outlined below:

(a) ETLAH directed to arrive vicinity center of target array for recovery of instrument tanks as requested by Technical Director and under the direction of Lt. Comdr. POTTS of Staff of CTU 1.2.7.

(b) SUNCOCK to proceed to FULTON where embark Mr. HOLDER and instrumentation team, then proceed and recover instrument string and 2000 feet of cable laid by CURRENT before BAKER Day.

(c) ACHOMAWI directed to proceed to WHARTON to embark boarding team 6, then proceed to STACK to wash for two hours using high pressure streams.

(d) CURRENT directed proceed to vicinity of KENNETH WHITING where embark instrumentation team, then proceed vicinity WHARTON to embark boarding team, thence to BRACKEN for boarding by both

teams. On completion proceed to RHIND and wash thoroughly with high pressure streams, then place teams aboard.

(e) CLAMP directed to proceed to WHARTON where embark boarding team, proceed to BUTTE and place team on board. On completion wash RALPH TALBOT thoroughly with high pressure streams, placing boarding team on board on completion.

(f) PRESERVER directed to NEW YORK where wash down thoroughly using high pressure streams. To report Geiger readings from about 50 feet before and after washing.

(g) ATA-180 directed proceed to target GASCONADE where wash down thoroughly with high pressure streams. On completion of washing take Geiger readings about 50 feet from each side.

(h) ATA-192 directed proceed to MAYRANT where wash down thoroughly using high pressure streams. After completion take Geiger readings 50 feet from each side.

(i) DELIVER directed proceed to PENNSYLVANIA where wash down thoroughly using high pressure streams. After completion take Geiger readings from 50 feet on each side.

(j) SHAKAMAXON directed to proceed to vicinity WHARTON to embark boarding team 8, thence proceed to GASCONADE and place boarding team on board after ATA-180 has completed washing down.

(k) WIDGEON granted five days availability alongside AJAX.

(l) ONEOTA granted three day availability alongside FULTON.

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(m) ATR-87 granted ships force upkeep period ending 2000 this date.

(n) CCUCAL to continue submarine salvage operations.

(o) MENDER and CONSERVER granted two days availability for ships upkeep, liberty and recreation.

(p) Lieut. BROWN of Staff of CTU 1.2.7 to continue blasting operations in lee of Enyu Island (removing coral heads from beaching area).

(q) Salvage operations on HUGHES under the direction of Deputy CTU 1.2.7 to continue. Due to the limited time a salvage team could work on board, two teams were organized, one under the direction of Lieut. LAESSLE, the other under the direction of Lieut. MIHALOWSKI, both of Staff of CTU 1.2.7. Working in relays compartments were pumped, inspected, tested, and then flooded down to prevent motion of the HUGHES. A preliminary report indicated that any of the flooded compartments could be kept empty by using a three inch, gasoline driven pump.

(r) CTG 1.8 directed ATF-100 and 118 to report to CTU 1.2.7 as reliefs for ATF-75 and 107. To report prior 0700 this date.

33. The chronological activities of the ships of the Unit were as follows:

0720 - WENATCHEE reported working on LST-125 at CB landing and would be unable to report at 0600 as directed.

0725 - CHOWANOC reported she has not been relieved of present duties with scientific party at Yoru Island. Unable to report at 0800 as directed.

0812 - CLAMP reported boarding team on board.

0820 - CURRENT directed to wash BRACKEN thoroughly for one hour before placing teams on board.

0834 - ATR-87 requested additional twelve hours availability due to leaking stuffing box on high pressure piston. Availability granted.

0843 - CTU 1.2.7 advised CTU 1.2.7 (Admin.) that six pontoon floats and a three by twelve foot barge were located at Amen Island. Comdr. BURNS to investigate for practicability for use as mixing and storage container for decontamination mixture to be applied to target vessels.

0905 - CLAMP reported Geiger team has inspected BUTTE, Geiger sour. Proceeded to wash down RALPH TALBOT.

0914 - CURRENT reported senior and two other members of boarding team called aboard HAVEN and lying to near HAVEN waiting for them to reboard prior to commencing day's operation.

0915 - ATA-192 reported alongside MAYRANT washing down.

0942 - CLAMP reported boarding team on board RALPH TALBOT

1000 - CURRENT reported boarding team on board, proceeding to BRACKEN.

1005 - CLAMP reported boarding team inspected RALPH TALBOT before washing down, Geiger sour. Now washing down.

1012 - GYPSY directed contact CHICKASAW and ETLAH to obtain information as to location of anchors from TUNA they were directed to cut and buoy. To obtain information

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from ATA-192 as to location of DENTUDA anchor she was directed to cut and buoy. When necessary information is obtained proceed to array and recover anchors and chain.

1020 - DELIVER reported Geiger monitors departed from WHARTON can take six hours tolerance. Will wash down PENNSYLVANIA for four hours unless otherwise directed.

1022 - CLAMP reported will proceed to BUTTE at 1100 after washing down RALPH TALBOT. Will place boarding team on board BUTTE to make interior inspection.

1057 - ATA-192 reported completed assignment on MAYRANT. Returning to anchorage unless otherwise directed.

1058 - CLAMP reported washed down RALPH TALBOT for one hour. Proceeded to BUTTE.

1118 - ACHOMAWI reported boarding team aboard; washed down STACK from 0840 until 1100. Completed operation, proceeded to anchorage.

1133 - PRESERVER reported completed washing down NEW YORK.

1155- CURRENT reported having completed washing down BRACKEN, boarding team now on BRACKEN.

1159 - DELIVER reported completed thorough washing down of PENNSYLVANIA. Requested permission to proceed vicinity ROLETTE and LST-1440 to pick up freight and to WHARTON for dry provisions.

1204 - CLAMP reported completed inspection of BUTTE. Have reached tolerance for day. Requested instructions.

1215 - SHAKAMAXON reported assignment completed, boarding team back aboard WHARTON, proceeding to anchorage.

1220 - CURRENT reported completed survey of BRACKEN, proceeding to wash down RHIND.

1246 - CLAMP directed proceed to anchorage after disembarking boarding teams at WHARTON.

1256 - CLAMP reported boarding team has returned to WHARTON.

1457 - CHOWANOC reported to CTU 1.2.7 for duty.

1534 - CURRENT reported completed washing RHIND, boarding team placed on board.

1535 - ETLAH reported instrument buoy operation completed, proceeding to anchorage.

1537 - CURRENT reported boarding team back on board from RHIND. Standing by for further instructions.

1545 - CURRENT directed proceed to anchorage after disembarking boarding team at WHARTON.

1700 - WIDGEON availability extended until boiler repairs complete about 12 August.

1728 - DELIVER reported anchored in assigned berth.

2325 - COUCAL directed to start diving operations when ready tomorrow morning.

34. In addition to the numerous and varied tasks ships of the Unit were called upon to perform in accordance with the operation plan and subsequent operation orders and annexes, a greater number and variety of tasks arose which

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required "on the spot" assignments. In a great measure these were tasks under the cognizance of other groups and units of the force for which no provision had been made and, as a final resort, this unit was called upon to furnish ships, personnel, and services to enable the various projects to be completed. These tasks were as follows:

(a) CJTF-1 requested one ship preferably twin screw and relatively fast to take party from APPALACHIAN through target array at 1445 the 28th. PRESERVER was designated.

(b) Technical Director on the KENNETH WHITING requested services of divers when safe to recover linear and log time axis and other instruments on ARKANSAS and SARATOGA. Also will possibly require services of divers for recovery vertical stations and retrieving pressure gauges. Technical Director was informed that his request for services of divers would be included in diving schedule when situation permitted and other diving requirements were known.

(c) As requested by Technical Director, the following ships were made available on 28 July as indicated:

(1) ATA-192 to embark Dr. LAMSON to make tour of target array for purpose of reading foil pressure gauges.

(2) The ONEOTA to embark Dr. ARONS and recover instruments as directed by him.

(3) The ATA-185 to embark Dr. HENDERSON proceed to target ships as directed for instrument recovery.

(4) The ETLAH to embark Drs. LYON and VINE proceed as directed to take soundings and recover instruments.

(d) Technical Director requested services vessel to lift four large tanks planted by this unit for Technical Director.

(e) CTG 1.2 directed ship of this unit be assigned to recover and replant obstruction buoy in proper position. The PALMYRA was directed to have Lieut. McCLOSKEY recover and replant this buoy using an LCM with A-frame.

(f) Technical Director requested ATA-180 for forenoon 1 August.

(g) SUNCOCK and ONEOTA assigned to unload chain and anchors from OTTAWA to be used for Test CHARLIE.

(h) Technical Director requested services of divers for:

(1) Recover nine vertical stations.

(2) Recover pressure time recorders on ARKANSAS, SARATOGA, and PILOTFISH.

(3) Recover two Hydrophones.

(4) Recover diaphragm gauge and five gallon cans attached to raft on NAGATO.

(5) Recover radiation intensity films on ARKANSAS, NAGATO, SARATOGA, APOGON, and PILOTFISH.

(6) Recover bottom pressure recorders near center and possibly Gammameters attached to cable at center.

(7) Recover pressure gauges on APA-64 and 65.

(8) Possible recovery of four-ton instrument tanks near center.

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SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
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PART III

Ships of the Task Unit 1.2.7 were called upon to perform, incident to BAKER Day and its test, all the types of duties for which they were fitted with the exception of Major Salvage or Fire Fighting tasks which did not develop.

During the preparatory period for BAKER Day the Task Unit Commander obtained and had distributed to all ships large and medium sized pelican hooks to be fitted to the end of the towing hawser to permit tugs and salvage ships to hook on to target vessel's anchor chains so that personnel of towing ships would not be unduly exposed while cutting out sinking target vessels.

In each case of a target vessel towed from the array, the hookup was made quickly, the anchor chain cut below the tow and the towing vessel moved to a safe distance to commence towing within the allowed time for exposure.

Subsequent developments made it necessary to put all fire fighting facilities to use in the decontamination of target vessels. A number of methods of spraying and washing down the ships were attempted and finally a solution was arrived at which met the approval of both the Director Ship Material and this Task Unit Commander. This solution involved the placing of two quonset cells on the decks of ten ships of this unit and mixing a paint removing substance in these cells. This substance was sprayed on target vessels by means of portable P-500 fire pumps and later washed off using high pressure streams through fire monitors. Ships of this unit worked long and well at this task.

The removal of special instruments and animals from target vessels was accomplished by this task unit using priority lists furnished by the Technical Director. At times this particular job required that crews and ships be

exposed to the maximum allowed time as determined by Geiger Monitors. The ships assigned to carry initial boarding teams serviced these teams completely for the length of time they were aboard.

The beaching of one APA, one destroyer, and one submarine was accomplished expeditiously and without untoward incident. The submarine has been subsequently removed and had suffered no damage from the beaching.

The removal, by explosives, of additional coral heads in the lee of Enyu Island was started to enlarge the beaching area to be prepared for eventualities. This project has gone forward extremely satisfactorily and the beaching area is now more than double its original extent.

The PALMYRA, in its capacity as administrative flag, took care of all personnel transfers, including a redistribution of ratings among ships of the unit and the distribution of key ratings and others received from various outside sources.

In addition, the PALMYRA furnished working details to augment crews of the lifting ships, boats to undertake small salvage tasks, paid all ships crews, issued small stores and ship's store stock to ships of the unit and in several cases furnished feed water to ships of the unit propelled by steam. The pool of salvage officers and salvage divers and mechanics have been sent to points where the pressure was greatest and when each task was completed have returned to the PALMYRA , been refurnished, and again reassigned.

A supply of green work clothing was assembled at Pearl Harbor and distributed by the PALMYRA Supply Officer (additional duty as S.O. for TU 1.2.7) to all ships of the unit and when these clothes were worn out or required disposal as a result of too much radioactivity a further supply was obtained and made available to ships of the unit.

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VI. IV

Personnel performance has been uniformly excellent [illegible].

Where, at the outset, there were a few cases where ships and crews were new to each other and performed in a [illegible] manner, the constant heavy, hard work that [illegible] the lot of this unit has borne fruit in the shape of splendidly handled ships that are manned by men rapidly [illegible] seasoned and fine seamen.

While no major salvage of fire fighting tasks arose, [illegible] numerous instances of work alongside target [illegible] which required the type of ship handling that [illegible] encountered on a large salvage task.

Fire Fighting personnel performed all assigned tasks exceptionally well. They most ably demonstrated their versatility and capabilities when given the task of [illegible] boarding the target vessels. It was these personnel [illegible] under the direction of the task unit commander and the [illegible] Ship Material, that reduced the radioactivity [illegible] target ships to the point where reboarding could [illegible] in sooner than would normally have been the case.

[illegible] tasks were all well done. The towing tasks [illegible] were extremely well and capably handled.

[illegible] beaching of target ships was very well done.

[illegible] handling of communications throughout has been [illegible] ably handled done in the face of insufficient and new [illegible] a great amount of traffic, both operational [illegible] live.

Diving personnel, both officers and men, have performed their tasks expxditiously and very capably.

It is the belief of this Task Unit Commander that the performance of the personnel of this unit has been all that could be expected and in keeping with the best traditions of the Naval Service.

PART V

1. Lessons learned from the BAKER Day Operation have been numerous. For each type of ship in this unit some new capability has been uncovered, and the ship worked at full capacity doing the required task.

Ideas on teaming of ships to accomplish tasks, that have been held for some time, were put to the test and found to be thoroughly practical. The successful operation of pairing an ARS with an ATR to furnish large volumes of water for fire fighting; the pairing of an ATA with an ATF to do heavy towing that required the spotting of large ships exactly in predetermined positions; the use of the smaller tugs on the quarters of ships requiring beaching were all worked out to a very satisfactory conclusion.

Teams of underwater demolition men were made up from among the pool of divers and mechanics, and channels blasted, coral heads removed, and several ships sunk by the proper use of the right kind of explosive.

Experienced Salvage and Diving Officers took teams of divers down to inspect wrecks and obtained from them comprehensive descriptions of conditions encountered.

A great deal of rigging, both above and underwater was done and a vast amount of experience gained thereby.

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2. Conclusions: That there is no substitute for good solid seamanship and that constant training in this phase of Navy life is an essential.

That the equipment furnished salvage ships is adequate for almost any task they may encounter, but that frequent drills in the use of all items of this equipment must be held.

That all types of ships similar to these assigned this unit should be required to constantly drill at handling heavy rigging, laying beach gear, hooking up tows rapidly and under all conditions, in general; to train men to be seamen in the fullest sense.

RECOMMENDATIONS

That a system of drills in a training program be set up for ARS's and all tug types which will require that all equipment be utilized under as nearly actual conditions as is practicable.

That all deck officers assigned ARS's and tugs (including C.O.'s) be sent to a course of instruction at the Navy Training School (Salvage) Bayonne, N.Y., for training in salvage work. It is believed that the Navy should not lose the start it has in training officers and men in the salvage of ships both off shore and in stranding.

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 (J) - ARMY GROUND EQUIPMENT

1. From the moment that tests of the effect of the atomic bomb upon an array of naval vessels began to be considered by the Joint Chiefs of Staff, it was obvious that they might reasonably be expected to provide opportunity for concurrent tests of U. S. Army equipment and materiel. The use of the bomb against Hiroshima and Nagasaki had demonstrated its general effectiveness against land targets, but obviously had not provided data regarding the damage which it would do to U. S. Army equipment presently in use. Such data were urgently required if engineering specifications were to be set up for the design of new equipment capable of maximum resistence to the forces generated by the atomic bomb and if tactical doctrines were to be evolved to meet the new overall situation.

2. The Navy was aware of the opportunity for a joint effort in the tests, and informal discussions of the matter between representatives of the two Services were promptly initiated at a high level. On 2 January 1946, Vice Admiral W. H. P. BLANDY conferred with Brig. Gen. W. A. BORDEN, then Chief of the New Developments Division, War Department Special Staff and his Deputy, Colonel Gervais W. TRICHEL, concerning the form which Army participation in the effort might take. At that time the tests had not yet been formally approved by the Joint Chiefs of Staff, though tentative plans for them were receiving careful and detailed study. Admiral BLANDY stated that a joint Army-Navy test was proposed and that he intended to ask for a Senior Army Air Forces Officer to be Deputy Commander for Air. General BRODEN suggested, and Admiral BLANDY agreed, that it would be desirable to have a senior Army Ground Forces Officer

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RESTRICTED MILITARY CLASSIFICATION CATEGORIES

as a staff adviser. The Admiral added that he desired the greatest possible cooperation of the Army Technical Services in the technical phases of the operation and in the proposed test of Army equipment.

3. The matter of a Ground Forces adviser was discussed with Lieut. Gen. John E. Hull, Assistant Chief of Staff, Operations Division and with Major Gen. R. W. Hasbrouk, Chief of Staff, Army Ground Forces. Major Gen. Anthony C. McAuliffe was suggested by Army Ground Forces. Arrangements were made with General Hull by which the New Developments Division was to coordinate Army participation in the tests, keeping interested Army agencies informed of the status of the project. At the same time a method for the selection of key personnel to be employed in the Army's part of the tests was agreed upon.

4. Three days later, 5 January, Colonel Trichel discussed Army participation in the test of the atomic bomb with Rear Admiral Parsons, Assistant Chief of Naval Operations (Special Weapons) and went over the subject of Army equipment to be tested with Brig. Gen. H. Hewett, Deputy Chief of Staff, Development, Army Ground Forces.

5. Colonel Trichel conferred with Admiral Parsons, 10 January, regarding representatives from the Technical Services of the Army. Admiral Parsons was not ready at that time to give details of the requirements for Army participation in the tests. The New Developments Division was informed next day that the President had signed the directive on the atomic bomb test prepared by the Joint Chiefs of Staff. Cablegrams were sent by the War Department to the interested agencies informing them that Vice Admiral Blandy had been assigned to command Joint Task Force ONE which would carry out the tests to be designated by the unclassified code word, CROSSROADS, and that he had been authorized to deal directly with them. The probable date and location of the tests were also announced.

6. General McAuliffe reported to Headquarters Army Ground Forces for temporary duty in connection with the

bomb tests on 14 January and then, accompanied by Colonel Trichel, reported to Admiral Blandy.

7. Colonel Trichel met with Admiral Parsons, 21 January, to discuss representation of the Army Technical Services in the tests. It was agreed that the Army Technical Services should have representatives on the staff of Rear Admiral T. A. Solberg, Director of Ship Material, who was charged with preparation of target ships, and that these officers were to have the same relative position as representatives of the Navy Technical Bureaus. The following day Colonel Trichel made arrangements with the Army Service Forces for selection of representatives from the Technical Services. A War Department Directive covering the matter was prepared and coordinated with the General Staff.

8. On 25 January, he conferred with representatives of the Technical Services on preparations for participation in Operation CROSSROADS. At the close of this conference a group of staff representatives was designated to function under the Director of Ship Material, Rear Admiral T. A. Solberg. It was composed of the following officers:

Colonel H. H. Pohl, CE
Colonel J. H. Weber, ORD
Lt. Colonel F. W. Browning, TC
Lt. Colonel S. B. Lucy, QMC
Major O. O. Kenworthy, CWS

9. The duties of the Technical Staff Group as a planning unit were to select the items to be included in the test, to coordinate with all interested agencies in order to insure complete coverage, yet avoid duplication, to select target ships on which to expose items, to draw up personnel requirements, and to propose operational procedures.

10. At two later conferences on the same date, the group was briefed by the Director of Ship Material, Rear Admiral Solberg and his staff, and its members were given

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an appreciation of the technical aspects of the proposed test with special reference to the range of effects to be expected.

11. As senior officer, Colonel H. H. Pohl, CE, coordinated activities related to the participation of the Technical Services until the designation of Colonel J. D. Frederick as Commanding Officer, Army Ground Group. He was relieved as representative of the Corps of Engineers, 2 March by Lt. Col. Sherwood B. Smith.

12. Colonel John D. Frederick, Inf., assumed his duties as Commander, Task Group 1.4, 25 January 1946, but the planning group was not absorbed in the headquarters of the Army Ground Group until 11 February, when office space was assigned in Room 2019, Navy Building T-4. From this time forward, the organization developed in the manner shown in detail in Annex N to Operation Plan, Com Joint Task For One. This complete plan was approved in rough draft by Vice Admiral Blandy about 4 March and was first published in mimiographed form 18 March 1946, and in printed form with very minor changes and corrections somewhat later.

ORGANIZATION

13. The Army Ground Group consisted of a Headquarters and six operating units. The latter represented the following services: Quartermaster Corps, Corps of Engineers, Ordnance Department, Signal Corps, Chemical Warfare Service, and Army Air Forces. Each unit was given a code designation, but this was done arbitrarily rather than according to the seniority of the service which a unit represented, the Quartermaster Unit, for example, being Task Unit 1.4.5 and the Engineer Unit, Task Unit 1.4.1.

14. The Headquarters was composed of Command, Technical and Administrative Sections. The functions of the Command and Administrative Sections were the normal ones implied by their respective designations. The Technical Section was

composed of representatives of the six services enumerated above. Its members planned, correlated and supervised all test procedures, were responsible for the preparation of reports covering the test items of their respective services, and assisted the Commanding Officer of the Army Ground Group in the preparation of reports of the tests accompanied by appropriate recommendations.

15. On 22 March 1946, the Commanding Officer, Army Ground Group, Colonel John D. Frederick, Inf, acting under authority of Letter Order AG 471.6 (15 March) issued Special Orders No. 1 activating the provisional Headquarters Detachment, Army Ground Group, Joint Task Force One, as of that date, with the following duty assignments;

J.D. Frederick	**Col**	**Inf**	**Commanding Officer**
J.H. Weber	Col	OD	Executive Officer
M.S. Goldman	Lt Col	AC	S-3
R.N. Huse	Capt	AGD	S-1
C.H. Wollenberg	Capt	Sig C	S-4

16. Each operating unit was under the command of the appropriate technical staff officer in the Headquarters and was composed of a group of inspection teams. Each of these teams was assigned to a target ship for Test Able and was responsible for loading, securing, maintaining and inspecting test items assigned to that ship, and for preparing them for shipment or for other disposal after the test. A certain amount of reorganization of test teams between Tests Able and Baker was necessary to meet the special conditions of Army participation in the second test, but the duties of individual teams in regard to test items under their cognizance remained essentially unchanged.

17. Throughout the operation the officer in charge of each inspection team was responsible for continued training of his personnel, for the submission of inspection sheets after each test, for assisting in the preparation of a correlated technical report, and for the general administrative

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duties connected with the functioning of his team. The senior Army Ground Group officer on each target ship was responsible for over-all supervision and coordination of the activities of all Army Ground Group personnel on that ship.

PERSONNEL

18. Despite some difficulties encountered because of the rapid release of officers from active duty and the discharge of experienced enlisted men, efforts to secure personnel of wide technical experience and recognized ability were successful. Individuals eligible for release or discharge prior to 1 September 1946 were in compliance with a general directive of Joint Task Force One, required to sign a waiver. When postponement of the tests was announced by the President, 23 March, new waivers covering longer periods were signed by both officers and enlisted men. A few individuals filling key positions, who declined to extend the period covered by the original waiver, were released at once others, whose services could be dispensed with, if absolutely necessary, before completion of the operation, were retained. Officers and civilians, with but few exceptions, were obtained from the continental United States. Enlisted personnel was obtained from both the continental United States and the Hawaiian Department.

19. Inspection teams assisted in the loading of test items on the target ships to which they were assigned, at West Coast Navy Yards, and in securing them in position for the voyage and tests. They moved to the target area on these ships. Officers of the Headquarters Staff visited the Navy Yards, made detailed inspections of personnel and test items and conferred with representatives of the various agencies of the Army and Navy interested in the procurement of and handling of the test items. The Commanding Officer, Army Ground Group visited the West Coast and carried out an inspection of elements of the Army Ground Group there during the first week of April.

20. Colonel Lewis P. Jordan, Quartermaster Officer and Senior member of the Technical Staff, supervised Army Ground Group activities on the West Coast from 10 to 27 March when he left by air for Pearl Harbor and established an advanced Headquarters for the Group in the Headquarters CINCPAC on 28 March, coordinating the activities of the several technical services and establishing a general liaison with the various agencies of the Navy concerned with the work of loading and securing Army test items on target ships. He also procured clothing and other supplies required for personnel of Task Group 1.4 during the operation at Bikini and took action to meet shortages in test items and personnel. On 26 April he left Hickam Field for Bikini where he made a general topographical reconnaissance of the area and examined Navy facilities available to Task Group 1.4, returning to Pearl Harbor 2 May.

21. Personnel of Headquarters, Task Group 1.4 moved from Washington to the West Coast by echelons during the second half of April. The Headquarters was deactivated 30 April when its remaining enlisted personnel were assigned space on the Navy's Special Train serving for Oakland, California, that evening. Colonel J.H. Weber, Executive Officer, who directed activities in Washington after Colonel Frederick's departure, and Lt Col M.S. Goldman, S-3, left for Oakland the next day by air. The transfer was completed on 2 May when the Commanding Officer and his Executive boarded the USS WHARTON. Except for those officers who had already proceeded to Pearl Harbor by air and who boarded the WHARTON after its arrival there, 12 May, all personnel of the Headquarters sailed from Oakland in that ship, 6 May 1946.

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TEST ITEMS

22. Each officer representing one of the technical services in the Technical Staff of Task Group 1.4 was responsible for selection of test items representative of the engineering requirements of his service. In discharging this responsibility, he was free to make his own decisions in regard to items of equipment, material and supplies to be exposed, subject to the single limitation that the selection must be consistent with over-all requirements established by the Army Ground Forces. To insure adequate coverage without duplication, close liaison was maintained among all the individuals and services concerned, including the appropriate agencies of the Navy.

23. Each officer of the Technical Staff was also responsible for determining the conditions of test for items under his supervision and obtained assignment of space for them on target ships from the Director of Ship Material. He issued shipping orders in such fashion as to permit timely arrival of test items at the Navy yards where they were to be loaded. In conjunction with the Director of Ship Material, he prepared deck layouts of all items to be exposed. He likewise established appropriate procedure for loading and maintenance of the test items under his supervision and for preparing them for the test. Finally, he was required to prepare a plan for dispostion of the items after the test, both those to be disposed of at Bikini and those to be sent to laboratories for further analysis.

INSPECTIONS

24. Inspections to be carried out by the several units of Task Group 1.4 were planned to:

(1) Determine in detail the physical conditions of all test items both before and after tests.
(2) Establish the operating condition of test items both before and after test.

(3) Establish, insofar as possible, the nature, extent and cause of changes to test items as a result of test.
(4) Obtain data necessary to relate test damage to other known types of damage.
(5) Select test items to be returned to the continent for laboratory analysis in accordance with procedures laid down in Reboarding and Inspection Plan, Annex X, Operation Plan Com Joint Task For One.

25. In order to carry out the inspections as planned, each technical service assigned to the ship's crew of each target ship on which it exposed test items, an inspection team composed of qualified officer and enlisted technicians. These teams were to reboard ship after the test in accordance with the procedures laid down in Reboarding Inspection Plan, Annex X. The enlisted technicians were to inspect items related to their respective specialties, in accordance with prearranged and rehearsed procedures. The data derived from these inspections was to be recorded on test inspection forms.

26. Each commander of an inspection team had the duty of supervising his enlisted technicians' activities and of preparing a general report on all items under his cognizance. This report (complete or in successive installments), he was to forward to the technical staff officer of his service in group headquarters.

27. In addition to the inspection teams, each technical service assigned among the target ships a small number of officer specialists to assess the test damage and to recommend the shipment of certain of the items to appropriate laboratories for further study and analysis.

REPORTS

28. Responsibility for the preparation of the various technical, operational and daily reports to be submitted by the Commanding Officer, Task Group 1.4 to the Commander,

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Joint Task Force One, was assigned to the Operations Officer, Lt. Col. MARCUS S. GOLDMAN, AC. He was also charged with the coordination of the report writing activities of the several units of the task group, to the end that as much uniformity of style as differences in subject matter permitted might be attained, and that the individual reports might lend themselves more easily to incorporation in or attachment to the larger group reports.

29. Each Officer of the Technical Staff was assigned responsibility for the preparation of the reports of [illegible] unit. These unit reports were to be based upon the assessment of damage made by the officer specialists, supported by inspection forms made out to cover each individual test item and turned in to Group Headquarters by the commanders of inspection teams.

OAKLAND TO PEARL HARBOR

30. The period between arrival aboard and the sailing of the USS [illegible]TON, 6 May 1946, was devoted by personnel of the Headquarters to the arrangement of office space, establishment of files, installation of a field telephone system connecting it with the staterooms of the Commanding Officer and Executive Officer, check on supplies and equipment and requisition of what was needed to fill shortages. Attention was also given to provision for messenger service, preparation of duty rosters for both officers and enlisted men, and briefing on individual duties.

31. During the voyage much time was given to conferences and to the development in detail of procedures to be established for activity in the target area both before and after the test. The attention of the Commanding Officer and of his officers was largely devoted to coordinating the routine activities of the Army Ground Group with those of the ship and of the Navy Staff aboard, to training of personnel for duties during the operation, and to the establishment of policies and routine procedures governing inspection of test items on target ships during the period of delay at Pearl Harbor.

32. The WHARTON docked at Pearl Harbor at 10:30 hours, 12 May 1946. Col. LEWIS P. JORDAN, Chief of the Quartermaster Unit and Commanding Officer of the Advanced Headquarters, Army Ground Group, accompanied by Lt. Col. SHERWOOD B. SMITH, CE, Lt. Col. H.N. DAUBERT, OD, Major RAY J. DAVIES, QMC, Capt. HENRY C. ADAMS, CWS, Capt. AUSTIN HALEY, OD, Capt. JOHN J. ELKO, QMC, and Capt. W.G. NOVAK, OD, came aboard the USS WHARTON as soon as the gangplank was lowered and reported to Col. FREDERICK. At the staff meeting which immediately followed, Col. FREDERICK briefly outlined the activities which would occupy the Army Ground Group during the stay at Pearl Harbor. A roster of duty officers for the period at Pearl Harbor was given out and a later meeting of all Army Ground Group personnel, officers, civilians and enlisted men, was scheduled.

33. At this meeting of Army Ground Group personnel, which took place in the Submarine Base Theatre at 1ØØØ hours, 14 May 46, Col. FREDERICK introduced Rear Admiral T. A. SOLBERG, USN, Director of Ship Material who briefly outlined the purpose and nature of Operation CROSSROADS as a whole. Col. FREDERICK also introduced the members of his staff, spoke of the role of the Army Ground Group in Operation CROSSROADS and emphasized the importance of security and individual responsibility for its maintenance. He announced the appointment of Col. L. P. JORDAN as S-4, Headquarters, Army Ground Group, vice Capt. C. H. WOLLENBERG, who was, however, to serve as assistant, and the appointment of Capt. H. C. ADAMS to serve as Recreation Officer in addition to his other duties. Col. FREDERICK also outlined the recreation program for the period at Pearl Harbor, particularly emphasizing the arrangements being made with the assistance of Major GILVARY P. GRANT, OD, to provide tours of the Island of Oahu and other special recreational opportunities for enlisted men.

34. During the period between arrival at Pearl Harbor, 12 May 46, and departure therefrom, 22 May 46, Col. FREDERICK and his Executive Officer, Col. JOHN H. WEBER, made visits to various ships carrying test items under their cognizance. Visits were made to various Army installations in or near Honolulu for purposes of liaison. On 16 May 46, Lt. Col.

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S. F. RUSSELL and Capt. A. HALEY conducted officers of the Oahu Ordnance Depot on a tour of the USS NEVADA to inspect Army equipment.

35. The Administrative Officer, Capt, RALPH N. HUSE, coordinated with J-1 and J-2 aboard the USS MT McKINLEY in order to work out a SOP for issuance of orders and of Joint Task Force One Identification Cards. A number of readjustments of personnel on target ships, made necessary by losses through release of men from the service, were effected at Pearl Harbor. Technical Sergeant James S. Arrigona, of S-3, conducted informal classes in order better to acquaint enlisted personnel of Headquarters, Army Ground Group with the annexes to the Operation Plan of Joint Task Force One having most direct relation to their duties.

36. During the entire period dealt with here, the efficiency of Army Ground Group operations was greatly facilitated by the intelligent and willing cooperation provided by the personnel of Headquarters, COMSERPAC, AFMIDPAC, and all Army Service installations on the Island of Oahu. These agencies furnished transportation on shore and much needed last minute supplies, secured, on a number of occasions, quarters and messing facilities for enlisted men and in a variety of other ways aided the officers of the Technical Staff in carrying out their missions.

37. Before leaving for Bikini, the Commanding Officer, Army Ground Group, Colonel J.D. FREDERICK, accompanied by Major General W.E. KEPNER, Deputy Task Force Commander for Aviation, Rear Admiral W. S. PARSONS, Deputy Task Force Commander for Technical Direction, and Rear Admiral SOLBERG, Director of Ship Material, made an inspection of Army Air Forces equipment aboard the USS NEW YORK, NEVADA, ARKANSAS and INDEPENDENCE, 18 May 1946.

PEARL HARBOR TO BIKINI

38. Headquarters of the Army Ground Group departed from Pearl Harbor aboard the USS WHARTON at 0820, 22 May 1946, and arrived at Bikini 1336, 29 May 1946. In addition

to the officers who had made the trip from San Francisco in the CHARTON, there were four officers who had traveled from the Mainland to Oahu by other means and who came aboard at Pearl Harbor. Colonel LEWIS P. JORDAN, QMC, Captain JOHN J. ELKO, QMC, Fuel and Lubricants Officer of the Quartermaster Unit, Lt. Col. SHERWOOD B. SMITH, CE, Technical Representative of the Corps of Engineers and Captain ADAMS, CWS, Technical Representative of the Chemical Warfare Service.

39. During the voyage from Pearl Harbor to Bikini, the Commanding Officer, Army Ground Group had frequent informal conferences with the appropriate members of Admiral BLEBERG'S Staff regarding the coordination of Army Ground Group activities at Bikini with those of the various agencies operating under the Director of Ship Material. He also established a schedule for his own visits and those of members of his staff to target vessels after the arrival at Bikini and set up methods of procedure for these preliminary inspections. Members of the Technical Staff were engaged during the period of the voyage in the review of activities carried on at Pearl Harbor and in planning for operations in connection with Test Able at Bikini; in bringing the personnel lists of the respective services up to date; in planning both the schedule and the technical phases of their preliminary visits of inspection to target vessels after arrival at Bikini; and in handling necessary correspondence with various agencies of their services. The administrative and operational personnel of Headquarters was engaged during this period in bringing all personnel records up to date; in the writing of the historical records called for by various directives of the Commander, Joint Task Force One and the Director of Ship Material; in the planning of methods of procedure for the maintenance of security during the tests; and in the development of a routine for the handling of the initial reports of inspection teams and for the preparation of the overall technical and historical records to be based upon them. In addition to these activities, considerable time and thought was devoted to the consideration of ways and means

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to provide adequate recreational facilities for enlisted men during the stay at Bikini. This included not only planning for enlisted personnel of Headquarters but preparation for immediate issue after arrival at Bikini of additional recreational equipment for the use of personnel of target vessels, which had been taken aboard the WHARTON at Pearl Harbor.

ARRIVAL AT BIKINI AND ACTIVITY IMMEDIATELY THEREAFTER

40. Immediately after the arrival of the USS WHARTON in the lagoon of Bikini Atoll at about 1330, 29 May 1946, Colonel Frederick, Commanding Officer, Army Ground Group, announced schedules for Army Ground Group inspection visits to target ships for the remainder of the week and for Monday of the next, and issued instructions regarding routine procedures with regard to departures from the WHARTON, messing during inspection trips, arrangements for photography, etc.

41. Early next morning, 30 May, Colonel Frederick began a round of inspections of Army test items on target vessels and on the island of Bikini, which was continued through-out the remainder of the week. Trips were made in boat, P7-8; and Col Frederick made a personal check on the status of Army Ground Group preparation for the test on the following vessels: ARKANSAS, NEVADA, PENSACOLA, INDEPENDENCE, FALLON, CARTERET, PENNSYLVANIA, SARATOGA, NIAGARA, BLADEN, and ARDC-13. The visits were in the order here given. Col Frederick was accompanied by his Executive Officer, Colonel J.H. Weber, and by the members of his staff most directly interested in the test items on the vessels inspected. Preparations for the test were found to be in different states of completeness depending upon the time of the arrival of the different vessels at Bikini and upon similar factors, but in all cases they were as far advanced as could have been expected. In several instances it was believed that better results could be obtained if items were to be exposed in other locations on the weather decks than had been assigned, and exploratory conversations were begun with the hope of securing a reallocation of space.

42. In compliance with a directive of the DSM, routine procedure was immediately set up for requesting allocation of small boats from the boat pool of the WHARTON for transportation of personnel of TG 1.4 to and from target ships. The first request was submitted to the DSM Target Inspection Officer by S-3 on 29 May for 30 May. Daily staff meetings following dinner were initiated for the purpose of coordinating requests for boats, checking on daily reports and informal discussions of progress in preparation for the tests. At these, Colonel J.H. Weber, Executive Officer presided.

43. On 30 May and 1 June, Capt R.N. Huse, S-1, visited the USS FALLON, CARTERET, INDEPENDENCE, NEVADA, ARKANSAS, PENSACOLA, ARDC-13, DAWSON, BUTTE, GILLIAM and GASCONADE, making a check of personnel records. He also arranged for the execution of J-2 clearance forms and of the pledges regarding security and patents. He likewise verified and corrected the Task Group 1.4 rosters on the various vessels and collected service records for return to the WHARTON. He also made a check of recreational equipment, in which he was assisted by Capt Adams who later arranged for the issue of such additional equipment as was required. Upon a report from Capt Huse on needs of personnel assigned to target ships, Col Jordan, S-4, issued clothing and equipment to meet shortages.

44. Each of the officers of the Technical Staff of the Army Ground Group thoroughly inspected the personnel and test items of his service and for that purpose made individual visits to ships to which they were assigned, in addition to the visits made in Col Frederick's company. These officers also held a number of conferences with the officers of their respective services, aboard the WHARTON and aboard various target ships, at which the progress of preparation for the tests and the technical problems related thereto were discussed in detail and appropriate decisions taken and directives issued.

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45. The various inspections carried out by the Commanding Officer, Army Ground Group and the members of his staff established the fact that as of 1 June 1946, the health and morale of the command were excellent and preparations for the test of Army items on Able Day as far advanced as schedules for the arrival of target vessels at Bikini permitted. The one serious delay in the carrying out of the operational plan of the Army Ground Group was that occasioned by the fact that because of dysentery aboard, the NEW YORK had been diverted to Kwajalein and on 1 June 1946 no definite information was yet available as to when it might be expected to take up its position in the target array.

CONTINUATION OF PREPARATION FOR TEST ABLE

46. During the week of 2-8 June, the Commanding Officer, Task Group 1.4, continued his round of inspection among the target ships. He visited the USS DAWSON, BUTTE and GASCONADE, 4 June, inspecting Engineer teams and test items on the first two ships and the Signal Corps team and items on the GASCONADE. Colonel Frederick was accompanied on these inspections by his Executive Officer, Colonel John H. Weber, OD, and by Lt. Colonel S. B. Smith, Engineer Officer of his Technical Staff.

47. On 6 June, Colonel Frederick escorted Major Gen. Anthony C. McAuliffe, Army Ground Forces adviser to the Commander Joint Task Force ONE, on visits to the USS ARKANSAS, INDEPENDENCE, PENSACOLA, and NEVADA. General McAuliffe inspected Army personnel and test items on the four ships and talked with both officers and enlisted men of the inspection teams. Later he expressed his pleasure at the many evidences of cordial and enthusiastic cooperation among Army and Navy personnel of all ranks in preparing for the tests, which he had remarked on these visits.

48. Colonel Frederick, accompanied by his Executive Officer, Colonel John H. Weber, and Lt. Colonel S. B. Smith, Engineer Officer of his Technical Staff, inspected teams and test items of Task Unit 1.4.1 (Engineer) on the USS DAWSON

and BUTTE and the inspection team and test items of Task Unit 1.4.2 (Signal) on the USS GASCONADE.

49. The work of coordinating administrative activities of the various elements of Task Group 1.4 continued without interruption. By the afternoon of 8 June, Captain R. N. Huse, S-1, had boarded twenty-five ships, all but one of those of Joint Task Force ONE at Bikini carrying Army Ground Group personnel and had compiled a ship by ship roster broken down according to arm and service. Troops aboard the USS WHARTON, AVERY ISLAND, CORTLAND, BLADEN, NIAGARA and LST's 52 and 661 had been paid by 8 June.

50. During this same period, 2-8 June, each officer of the Technical Staff had made visits of inspection to all ships carrying test items of his service, in addition to those on which they had accompanied Major Gen. McAuliffe and Colonel Frederick. On all ships the preparations for Test Able were found to have progressed in a manner which seemed to assure their completion before the rehearsal on Queen Day.

51. New allocation of space was made for display of test items of Task Unit 1.4.5 (Quartermaster) on four APA's, the USS CARTERET, CORTLAND, FALLON and NIAGARA to insure better exposure and requests had been submitted for installation of pallets on the weather decks of target ships for the exposure of Ordnance ammunition, smaller items of Ordnance materiel, and Quartermaster items.

52. As of 8 June, Officers of the Technical Staff had also prepared and submitted to J-43 estimates of transportation requirements for the return of selected test items to appropriate laboratories in Hawaii and the Continental United States for analysis after the test.

53. In an effort to establish and maintain radio communication among the Headquarters, Task Group 1.4, and all target ships having personnel of the Group aboard, an initial test of the use of six SCR 536 ("handie talkie") on a frequency of 5500 K.C., which was authorized by the Communications

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Officer of the USS WHARTON, was made during the period 10 through 13 June. The range of the SCR 536 proved unsatisfactory. On 13 June the 46 m.c. frequency was assigned Task Group 1.4 by the Commander Joint Task Force ONE. Action was initiated 14 June to obtain thirty SCR 300's to activate a complete Task Group 1.4 net. Pending establishment of units, arrangements were made with Captain G. H. Bell, USN, DNM Target Inspection Officer, to utilize the Fleet (29.7 m.c.) net daily during the periods 0730-0800, 1[illegible]-1[illegible] and 1730-1800. By 15 June, nine SCR 300's had been obtained and the balance requested out of MidPac. With the receipt of the balance of the sets, which were delivered by air freight, the complete net was in use by 22 June 1946.

54. During the preparation of Army displays for Test Able, particularly between 8 and 15 June, a number of changes were made in the assignment of personnel in order to make the most effective possible use of the special technical skill of individuals. The work of testing equipment, replacing defective and damaged parts, and putting all in sound operational order was carried out according to schedule. Because of the decision to drop a standard bomb of some type on Queen Day, plans were formulated and carried out for the protection of certain Army items on the decks of target vessels and for the stowing of others below decks, in order to avoid damage during the rehearsal, since it was desired to expose all items to the atomic bomb in sound operational condition.

55. On 13 June, Major Gen. Anthony C. McAuliffe, Army Ground Forces Adviser to the Commander Joint Task Force ONE, decorated Colonel John D. Frederick, Commanding Officer, Army Ground Group, with the Bronze Star Medal awarded for "heroic achievement in connection with military operations against the enemy in the Southwest Pacific area, on 29 January 1945." Officers of all units and enlisted men of Headquarters, Task Group 1.4 were mustered on the half deck of the USS WHARTON at 1600 for the ceremony. Senior officers of the Navy aboard the WHARTON voluntarily attended the muster.

56. Upon the arrival of the USS NEW YORK at Bikini, 15 June, it was possible to return to the original plan for exposing test items of Task Unit 1.4.6 on her weather decks, and the alternative plans which had been studied during the period of uncertainty regarding her presence in the target array were dropped.

57. In compliance with the various directives providing for the preparation of matter for the press and its release through J-21 at Bikini, Lt. Col. M. S. Goldman, AC, was appointed Press Officer for the Army Ground Group by Special Order #17, Headquarters, Task Group 1.4, under date of 6 June 1946. Since Lt. Col. Goldman had previously acted in this capacity on verbal orders from the Commanding Officer, this involved no change in the method of liaison between Headquarters, Task Group 1.4 and J-21.

58. The photographing of Army test items exposed on the weather decks of target ships was completed during the week of 15-22 June, except for a very few display lots which were photographed after re-entry of the lagoon following the Queen Day rehearsal. Color photographs were taken of the test rack of fuels and lubricants exposed to weathering on the deck of the USS ROCKWALL, a non-target ship, as a control measure, by Task Unit 1.4.5.

59. Among the special activities of the last days of preparation for Test Able was the assembly of two rafts of bridging by the Engineer Detachment of Task Unit 1.4.1 on the beach immediately northwest of the seaplance ramp on Bikini Island. The work was begun 17 June and completed the next day despite the steepness of the beach, the presence of coral heads and a fairly heavy ground swell, handicaps not encountered in rivers and which considerable effort was required to overcome. Some of the mooring lines were broken by a squall during the night of 18-19 June, but the rafts themselves were not damaged. On 19 June they were towed out and tied up, one astern the USS BUTTE and one astern LST-661.

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60. Immediately before the Queen Day rehearsal, the staffs of the technical units of Task Group 1.4 reconsidered the matter of participation in Test Baker. In most instances it was believed that Test Able would provide the data sought by the technical services and that participation in Test Baker should either be considerably curtailed or entirely omitted. Recommendations in this sense were forwarded to the chiefs of several of the services. Except for Task Unit 1.4.4 (Chemical) and Task Unit 1.4.6 (Air), the units did, however, participate in Test Baker in compliance with directives issued after Test Able.

REHEARSAL OF QUEEN DAY AND FINAL PREPARATIONS FOR TEST ABLE

61. The evacuation of personnel of the Army Ground Group from Bikini for the rehearsal of Queen Day and their return were carried out according to schedule and without incident. The subsequent inspections of displays of test items revealed that only minor damage had resulted from the bomb burst and that none of it was of a sort to interfere with the operation of equipment or to reduce the value of the test on Able Day.

62. After the return of personnel of the Task Force to the lagoon on completion of the rehearsal, test lots which had been stowed below decks were returned to display position where they were maintained in operational condition until the evacuation for Test Able, 30 June.

63. The few test items which had not been photographed before the evacuation for the rehearsal were all photographed before the second evacuation. The raft of bridging which had been moored astern of the USS BUTTE was moved to a position astern of the USS ARKANSAS and tied up there. A very few other last minute changes, including very minor ones in assignments of personnel, were made in preparations between reentry from the rehearsal and evacuation for Test Able.

64. Dr. Milton Burton and Dr. John C. Bocher, civilian experts assisting TU 1.4.5 in the exposure of fuels and lubricants items, arrived at Bikini by air, 22 June, and held a series of conferences with Capt. C.S. Piggott, USNR, Scientific Advisor to the Bureau of Ordnance Technical Group, Col. L.P. Jordan, Quartermaster Officer of the Technical Staff and Col. Jordan's special assistant for fuels and lubricants, Capt. J.J. Elko, QMC. In these conferences, decisions were taken regarding the exposure of test racks and other matters of a similar sort.

65. During the last week before Test Able, officers and enlisted specialists of the inspection teams were given final briefing on inspection procedures and on reporting results of inspections. Inspection instructions, shipping tags, etc. were distributed, and the machinery for handling inspection forms and shipping tags in Group Headquarters was set up according to plan.

66. Colonel J.D. Frederick, Commanding Officer, Army Ground Group, accompanied the members of the President's Evaluation Commission on their visits of inspection to the USS NEVADA, INDEPENDENCE, and NAGATO on the morning of 29 June. Col. J.H. Weber, Col. Frederick's Executive Officer, Col. L.P. Jordan, QMC Officer, Lt. Col. S.F. Musselman, Ordnance Officer, and Maj. E.K. Walters, Air Officer of his Technical Staff, and Dr. C.K. Green, Civilian Expert of the Signal Corps were present aboard the NEVADA and INDEPENDENCE to assist Col. Frederick in explaining the test items displayed by their respective Technical Services. In the afternoon, Col. Frederick gave a short exposition of the Army Ground Group's participation in Operation CROSSROADS for the information of the Army observers when they boarded the USS NEVADA. Later he and members of his staff accompanied the Observers on a tour of the NEVADA, INDEPENDENCE and NAGATO.

67. During the morning of 30 June, Col. Frederick accompanied the Secretary of the Navy on his visit of inspection aboard the USS NEVADA and USS INDEPENDENCE and

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explained the arrangement of Army test items. In the afternoon, prior to the evacuation of the lagoon, he accompanied the Evaluation Board of the Joint Chiefs of Staff on visits of inspection to the USS NEVADA, INDEPENDENCE, and PRINZ EUGEN and explained various features of the displays of Army equipment on those vessels.

TEST ABLE

68. The Commanding Officer, Army Ground Group, and all members of his staff were evacuated from the lagoon of Bikini Atoll aboard the USS WHARTON on the afternoon of 30 June. They witnessed from the decks of the WHARTON the phenomena attending the drop of the Atomic bomb at 0900, 1 July, and returned to Bikini Lagoon in the afternoon. Personnel of the inspection teams were evacuated from target ships as scheduled, witnessed the bomb drop from the ships on which they were evacuated, and returned to the lagoon ready to reboard the target ships according to plan as soon as radiological clearance was announced.

69. At 0830, 2 July, Col. Frederick held a staff conference in the Conference Room of the WHARTON in which he instructed all officers of the Technical Staff to hold themselves in readiness to go aboard target ships as soon as radiological clearance had been announced and transportation provided. He also gave detailed instructions regarding measures to be taken to prevent loss of test items after reboarding of target ships and to insure the accuracy and completeness of reports.

70. In order to coordinate more closely with the Navy in initial boarding activities and to provide the two Army officers concerned with valuable professional experience, Capt. Vance Matthews of TU 1.4.1 was detailed to accompany Comdr. J.D. Burns, Senior Fire Protection Officer, in his fire-fighting activities and First Lieut. T.A. Mort, Bomb Disposal Officer, TU 1.4.3, was designated a member of Joint Task Force ONE Initial Boarding Party No. 7, with which he boarded, among other ships, four LST's upon which Army ammunition was displayed.

71. During the afternoon of 2 July, Col. Frederick and his Executive Officer, Col. J.H. Weber, inspected Army test items in the USS SARATOGA, NEW YORK, PENNSYLVANIA, and YOG-83. On 3 July, Col. Frederick accompanied the President's Evaluation Commission and the Evaluation Board of the Joint Chiefs of Staff on visits of inspection to the USS ARKANSAS, NEVADA, PENSACOLA, and CRITTENDEN, and Col. Weber accompanied Maj. Gen. Anthony McAuliffe, Army Ground Forces Advisor to the Commander Joint Task Force ONE and Representative Albert J. Engel of Michigan on a visit of inspection to the USS SARATOGA and PENNSYLVANIA in the morning and to the YOG-83 and LST-52 in the afternoon. On the morning of 4 July, Colonel Frederick accompanied the Evaluation Board of the Joint Chiefs of Staff to the USS INDEPENDENCE, ARKANSAS, PENSACOLA, and NEVADA. The INDEPENDENCE was inspected from alongside, but the other ships were boarded and inspected below decks. In the afternoon, Col. Frederick attended Admiral Blandy's press conference aboard the USS MT McKINLEY. Col. Weber accompanied Maj. Gen. McAuliffe and Representative Engel on visits of inspection to the USS NEVADA and PENSACOLA during the morning of 4 July and in the afternoon conducted Representative Engel on an inspection of the USS ARKANSAS and PRINZ EUGEN. Col. Frederick devoted the entire day of 5 July to conducting Representative Engel and Representative Dean M. Gillespie of Colorado on visits of inspection to the USS NEW YORK, INDEPENDENCE, DAWSON, SALT LAKE CITY and BURLESON.

72. Inspection teams of the AGG returned to their respective ships with Reboarding Teams A and B of the ship's crews and immediately commenced the work of inspecting AGG test items. Members of the Technical Staff, TG 1.4, began their visits of inspection to target ships and continued them throughout the week. By 1700, 5 July 46, each officer of the Technical Staff had visited all target ships on which items under his cognizance had been displayed in Test Able. The Signal Corps Officer of the Technical Staff had also inspected the Signal Corps installations on the island of Bikini. At this time the work of inspection had been completed on the USS CATRON and on Bikini Island.

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On other ships it ranged from 10% complete on the USS ARKANSAS and NEVADA to 75% complete on the USS FALLON and GASCONADE.

73. After completing the first visual inspection of test items, the officers of the Technical Staff concentrated upon the work of obtaining satisfactory photographs and of preparing selected specimens for shipment to laboratories in the continental United States and in Hawaii for analysis. First Lieutenant T.A. Mort, Bomb Disposal Officer of the Ordnance Unit, who had accompanied Initial Boarding Team No. 7 aboard all target ships displaying Army ammunition, disposed of a few items which were considered dangerous immediately after his first inspection and then prepared plans for the disposal of all other explosives which had not been selected for shipment to the United States for test and/or analysis.

74. Progress in photographing Army items after Test Able was slowed by lack of sufficient transportation for officers of the Technical Staff and their photographers. Despite this handicap, however, photography of all AAF items, all CWS items and all QMC Fuels and Lubricants items had been completed before 1200, 6 July, and decided progress had been made in photographing test items of the other categories. It is estimated that photographing of Army Ordnance items was 99% complete at that time.

75. The work of crating and packing selected items for shipment to appropriate laboratories for analysis was begun on each target ship as soon as test items had been inspected and photographed and was pushed as rapidly as conditions permitted. As a result of conferences between Col. Frederick and Maj. Walters of TG 1.4 and Capt. T.C. Lonquist, USN, BuAer, arrangements were made to send approximately one half of the airplane instruments exposed by BuAer in Test Able to Wright Field for study by technicians of the AAF. Capt. Lonquist and Maj. Walters also agreed to exchange copies of their preliminary and final reports for the use of their respective services.

76. The preliminary technical report for use by the Technical Historian, Joint Task Force ONE, due the fifth day following reentry after Test Able, was prepared and submitted 6 July 1946.

INTERIM EVALUATION OF TEST ABLE AND PREPARATION FOR TEST BAKER

77. During the week of 6-13 July, Task Group 1.4 was engaged in the following major tasks: (1) completion of inspections to determine the damage to Army test items resulting from exposure in Test Able; (2) compilation and preliminary analysis of data relating to damage to Army test items in preparation for the "A" plus twenty report; (3) preparation of selected test items for shipment to Hawaii and the continental United States for further study and laboratory analysis of damage; (4) release of certain personnel for early return to permanent stations; (5) reorganization of the test units, after the release of such personnel in preparation for Test Baker; (6) study of the logistic problems involved in Army participation for Test Baker and the initiation of activity in preparation for that test.

78. As of 17ØØ, 6 July, the inspection of Army test items had been completed only at the Signal Corps installation on Bikini Island and on the USS CATRON, LST-545 and LCT-874. On other ships it ranged from twenty percent on the USS NEVADA up to ninety percent on LST's 220 and 661. By 17ØØ, 12 July, however, the inspections had been completed on all ships and personnel had already begun to concentrate their efforts upon their other tasks. All photography of test items, whether required for the inspections here or as an aid to further study and laboratory analysis, had also been completed.

79. The crating and boxing of test items selected for further study and laboratory analysis and their tagging for shipment to Hawaii and the continental United States progressed in satisfactory fashion throughout the week.

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On 9 July, Lt. Col. F.W. Browning, Liaison Officer of the Transportation Corps, was appointed Transportation Officer of the Army Ground Group with the duty of coordinating with J-4 all matters related to the shipment of Army test items. As of 1200, 13 July, all such Army test items had been packed and tagged. A few were already on their way. Others had been loaded in the USS CHILTON and ST CROIX, and the remainder were ready for loading. A number of samples of QMC subsistence items to be analyzed aboard the USS BURLESON were delivered to Comdr. R.N. Lee, USNR, aboard that ship the evening of 6 July.

80. Twenty-five officers and one hundred and twenty-four enlisted men of the Army Ground Group, whose services were not required for participation in Test Baker, were ordered to return either to their permanent stations or to Hawaii for further temporary duty there. Capt. J. Borsellino and three enlisted men of the CWS Unit departed by air on 9 July, for Hawaii to rejoin the 42nd CWS Laboratory Company there. They accompanied a shipment of gas shells exposed in Test Able as guard and security detachment. The three team commanders of the Air Unit departed by air for Wright Field, Ohio, 13 July. Most of the other personnel, to be returned to permanent stations, both officers and enlisted, were aboard the USS CHILTON. Dr. Milton Burton of Notre Dame University, consultant to the QMC Unit for fuels and lubricants, left 9 July, by air for the United States to prepare his report.

81. The decision to detonate the atomic bomb at some distance underwater in Test Baker necessitated some change in the planning of TG 1.4. As has already been indicated, representatives of the Technical Services had suggested omission or considerable curtailment of Army participation in the underwater test, and several had forwarded recommendations in that sense to their respective chiefs. In the light of these conditions, the Commander of Task Group 1.5 on 25 June 1946 addressed a memorandum to the Commander Joint Task Force ONE, recommending that participation of the Army Ground Group in Test Baker be limited to exposure of "a small number of special items, such as electronic equipment and ponton bridging", and to certain other items

which could not be removed from their secured positions without much labor and considerable interference with essential activities and which, therefore, would remain for the second test. On 7 July 1946, he was informed that by a decision of higher authority his command was to expose items of Army equipment, materiel and supplies in landing craft. In order to carry out this decision, he determined to display Army test items in such fashion as to approximate as nearly as possible with the resources at hand the conditions which would obtain in the first stage of an amphibious landing.

82. Colonel Frederick presided at a meeting of his staff, 9 July, in which the general problems presented by the decision in favor of participation in the underwater test were discussed. Colonel J.H. Weber, Executive Officer, explained the plan for exposure of Army materiel, equipment and supplies on the beach of Bikini Island, in beached craft and in craft in the outer edge of the target array, under conditions approximating those which would obtain during an amphibious landing.

83. The plan for Test Baker did not include participation by TU 1.4.4 (Chemical) and TU 1.4.6 (Air). All personnel of the two units were therefore released by TG 1.4 with the exception of the Unit Commanders, Maj. E.K. Walters, AC, who was to remain until after Test Baker in the status of an observer, and Capt. H.C. Adams, CWS, who, though relieved of command functions, continued to assist S-3 and was assigned the duty of preparing tentative plans for deck layout of test items and of preparing manifests to cover the items involved.

84. On 9 July, Colonel Weber and Lt. Col. Browning visited the USS PALMYRA where they discussed with Capt. Manseau, USN, Commander TU 1.2.7, plans for transfer of test items from target or other ships to the craft in which they were exposed in Test Baker. The following day, Lt. Col. Browning accompanied Capt. F.W. Slaven, USN, Test Coordinating and Planning Officer, Joint Task Force ONE, to the ASR(T)-3 for a further conference on the same

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subject. Transfer of the test items began 11 July, and despite heavy ground swells, good progress was made in removing Army equipment from target ships by means of the LST-545 and the ARS-39. It was discharged at the LST landing on Bikini Island, and put under guard twenty-four hours a day to prevent loss or damage.

85. Landing craft assigned to TG 1.4 for Test Baker were inspected by Lt. Col. Browning who found that although two LCM's would need to be replaced from the reserve craft available, all the other craft were serviceable.

86. Since inspection teams were not assigned to individual target ships for Test Baker as they had been for Test Able, considerable reorganization of the four technical units participating in the second test was both possible and desirable. By it, progressive release of personnel from duty at Bikini was facilitated. For example, personnel remaining in four of the teams of TU 1.4.3 (Ordnance) was used to form two new teams, numbered 10 and 11 and commanded by Maj. J.A. Ulrich and Maj. E.R. Cherry, and to contribute a limited number of officers and enlisted men for assignment to duty in a special guard detachment commanded by Maj. G.P. Grant. The Guard Detachment set up camp on Bikini Island, 14 July. Ordnance Inspection Team #10 moved to the island the next day, to be followed by Team #11, 16 July.

87. The transfer of Army test items to landing craft and to Bikini Island continued throughout the week of 13-20 July despite difficulties occassioned by heavy swells and lack of mechanical facilities for handling the heavier pieces such as guns and vehicles. At the time of the evacuation of the lagoon on William Day, 18 July, preparations for Test Baker were complete on the USS GASCONADE, on the LCM-5 and at the Signal Corps installation on Bikini Island; it amounted to ninety percent on the USS NEVADA, SARATOGA, PRINZ EUGEN, the LCT's 812 and 1113 and the LCM-2. Although preparations were less advanced on other ships and landing craft and at some of the shore installations, it was believed that all would be completed by 1700, 23 July.

88. Quartermaster test lots, including fuels and lubricants items, were transferred from the USS ROCKWALL to the LCT-1115 on 15 July and unloaded from the LCT-1115 at Bikini Island, 16 July. Three general QMC lots were put aboard the LST-125 and three general QMC lots and three fuels and lubricants lots, together with two additional test lots of invasion pipe and two test lots of coal, were assembled on Bikini Island to be displayed in supply points there. A collapsible one thousand gallon tank was removed from the USS CORTLAND and landed on the Island, 17 July, for installation as part of the fuels and lubricants display there in Test Baker.

89. Lt. Col. Smith, Engineer Officer of the Technical Staff, supervised the unloading of Engineer equipment from the USS ROCKINGHAM to the LCT-1115 and from the LCT-1115 to the Engineer dump on Bikini Island and LST-125, 14 July. On 16 and 17 July, Engineer test items were loaded for display in LCM-5 and 2, and the items displayed on the LST-125 lashed in place. Considerable difficulty was encountered in loading the heavier items because the crane on the pier at the Sea Bee landing could not lift them and could not raise and lower the boom. The searchlight unit in the trailer could not be handled as a whole, so it was necessary to lift searchlight and trailer separately.

90. By 16 July, twenty-four items of Army Ordnance materiel to be displayed in Test Baker had been removed from target ships. Two craft anchored in the stream had been loaded with the items designated for them and the remaining nineteen items had been landed on the beach of Bikini Island. Vehicles and artillery to be displayed on LCT-312 and LST-125 were moved aboard and secured in place 17 July. These test items together with those previously loaded on LST-545 and LCT-1113 were lubricated and covered as protection against weathering.

91. The Signal Corps installation on Bikini Island was in a state of readiness for Test Baker by 15 July. Spare Signal equipment on the USS ROCKBRIDGE was installed on target ships for the test. On 16 July, Civilian Consultants

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with the assistance of 1st Lt. J.B. Legerski installed shock gauges on the USS AVERY ISLAND in preparation for the test. Repairs had been completed and special tests were being run, as of 20 July, on the SCR 584 Radar and the SCR 399 Radio on the USS PRINZ EUGEN. On Bikini Island 1st Lt. E.S. Maury and T/Sgt. Reid were engaged in modifying Navy Sono-Radio-Buoy equipment and in maintaining radio guard on the welfare net and the Electronics Net three times daily.

92. All personnel of the Army Ground Group, except those assigned to the USS ARKANSAS, were evacuated from Bikini during the rehearsal of William Day minus one, (13 July), and returned in the reentry of William Day, (19 July). Movement from target ships and encampments on Bikini Island to transports for the evacuation proceeded according to schedule and was reported in detail by ship over the Army radio net to the Commanding Officer, Army Ground Group.

TEST BAKER

93. The work of preparation of displays of Army test items on Bikini Island and in landing craft beached on the island or anchored off shore was completed before inspections made by Maj. Gen. McAuliffe and Col. Frederick on 23 July. The displays were arranged in such fashion as to approximate as nearly as possible conditions which would obtain during a landing operation. A total of twenty-four major pieces was displayed by the Ordnance Unit on the beach, on beached LCT's and LST's and on LCT's and LST's anchored near shore in the target array. Fifteen pieces of heavy Ordnance materiel were displayed in storage condition on four of the larger target ships, the battleships USS NEVADA, USS ARKANSAS, and the USS PENNSYLVANIA and the carrier, USS SARATOGA. The equipment was displayed on these ships only because no means had been provided for its removal to the beach or for its shipment to the United States.

94. Engineer items to be exposed in the test were in display position by 1500, 21 July with the exception of the raft of bridging which was towed to the ARDC-13 and made fast to the port after butt, 22 July. On the morning of 23 July, Lt. Col. S.B. Smith, Commander of the Engineer Unit, was informed that the LCM-2 had sunk with an Engineer display aboard. It was decided that neither salvage nor a change of plan for Test Baker was justified.

95. Quartermaster displays, including those of Fuels and Lubricants, both on Bikini Island and on landing craft were completed and photographed according to schedule. They were inspected by the Commander of the Quartermaster Unit, Col. L.P. Jordan and his Special Assistant for Fuels and Lubricants, Capt. J.J. Elko, on 23 July, after which the two officers accompanied Col. Frederick on his visit of inspection.

96. Capt. C.H. Wollenberg, Signal Officer of the Technical Staff and Commander of the Signal Unit, assisted by officers and civilian consultants of his staff, completed the photographing of Signal Corps displays on the USS NEVADA, USS SARATOGA, USS ARKANSAS, and USS PRINZ EUGEN and of Navy Sonobuoy equipment on the LCT-874 and at the Electronics Building on Bikini Island. The Sonobuoy equipment was installed by Lt. E.S. Maury and Sgt. A. Reid of the Signal Unit.

97. All personnel of the Army Ground Group were evacuated from Bikini Atoll and the ships in the lagoon, according to schedule, on Baker minus one (24 July). Movement from target ships and from encampments on Bikini Island was reported in detail over the Army radio net to the Commanding Officer. The phenomena accompanying the underwater detonation of the atomic bomb were viewed by Colonel Frederick, his staff and enlisted personnel of Headquarters, Army Ground Group, from the USS WHARTON at 0835, 25 July 1946. Officers and men of the several inspection teams and civilian consultants of the Army Ground Group watched them from the various transports on which they had been

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evacuated from Bikini.

PRELIMINARY EVALUATION OF TEST BAKER AND COMPLETION OF ACTIVITIES AT BIKINI

98. Although the USS WHARTON returned to Bikini Atoll in the afternoon of 25 July, it was impossible to begin inspection of Army test items immediately, since the waters of the lagoon were still dangerously radioactive and clearance for reentry had not yet been issued. Personnel of Headquarters, TG 1.4 therefore devoted themselves to work on the interim report on Test Able, which was submitted 27 July and to various matters related to the writing of the final reports after return to the United States. Requests for transportation of personnel and records were prepared and submitted to J-4.

99. Because of the persistence of radioactivity in the areas in which Army test items were displayed, it was not until 30 July that any inspection was possible. On the afternoon of that day, Colonel J.H. Weber, Executive Officer, Army Ground Group, accompanied by Colonel L.P. Jordan, Quartermaster Officer of the Technical Staff and Commander Quartermaster Unit, Lt. Col. S.B. Smith, Engineer Officer of the Technical Staff and Commander, Engineer Unit, Lt. Col. S.F. Mussleman, Ordnance Officer of the Technical Staff and Commander, Ordnance Unit and Capt. J.J. Elko, Col. Jordan's Special Assistant for Fuels and Lubricants, made a preliminary reconnaissance and inspection. Even then, safety restrictions prevented their close approach to the beach or to target craft. Their observation was therefore limited, no detailed inspection of displays being possible.

100. The Commanding Officer of the Army Ground Group, Colonel John D. Frederick, made his initial inspection of Army test items after their exposure in Test Baker, in a visit to shore installations on Bikini Island, the afternoon of 31 July. On the same occasion he also inspected the test displays in beached and moored landing craft.

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101. After these two preliminary inspections, the work of assessing the results of Test Baker was pushed as rapidly as conditions permitted and, whenever and wherever possible, preparations were made for the subsequent disposal of test items. Meanwhile, preparation of reports of the results of Test Baker was begun by all units, effort being made to turn in data on the results of inspections as early as possible. Attention was also given to planning for later activity in Hawaii and in Washington, so that the over-all mission of the Army Ground Group can be completed as soon as possible and its members released for other assignments or for return to civilian life.

102. All Engineer test items exposed in Test Baker were inspected by the Engineer Officer of the Technical Staff and Commander Engineer Unit (TU 1.1.1), Lt. Col. S.B. Smith on 31 July. On that occasion the raft of bridging tied astern of the ARDC-13 was photographed. After inspection of the water distillation unit, tractor and odograph, Lt. Col. Smith, at the urgent request of Commander J. D. Burky, Commanding the 53rd Construction Battalion, turned the tractor over to him on memorandum receipt, for use in work on the island. It had been photographed immediately after inspection. On 2 August, Lt. Col. Smith, Captain L. F. Sammusson and a working party of six enlisted men, accompanied by Lt. G. E. Pickering, USN, as radiological monitor, worked on the rafts of bridging tied astern of the ARDC-13 and the LST-661. The next day, Lt. Col. Smith, 2nd Lt. E. R. Andrews and a working party of eight enlisted men, accompanied by a radiological monitor, again worked on the raft astern of the ARDC-13. After further efforts to decontaminate the rafts, it was decided in consultation between Lt. Col. Smith and Colonel S. L. Warren, MC, that data to be obtained from further study of the bridging would not justify the radiological hazards involved. Both rafts were therefore sunk 9 August, Lt. Col. Smith having been designated to witness the sinking and render a report.

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103. On 1 August, test items exposed on Bikini Island in Tests Able and Baker by the Signal Unit (TU 1.4.2) were, after inspection, closed, locked and generally made ready for loading aboard ship for transportation to the Signal Depot, Oahu, T. H. or to the Signal Corps Engineering Laboratories, Ft. Monmouth, New Jersey. In the course of the week, excess Signal Corps equipment aboard the USS WHARTON was packed in preparation for return to the Signal Depot on Oahu. A shipping manifest was issued directing the return of 160,000 pounds of excess Signal equipment not required for Test Baker. This equipment was to be returned on the USS ROCKBRIDGE. The transfer to the same ship of 48,000 pounds of target items awaiting shipment from Bikini was also authorized.

104. Although it was not possible to begin inspection of items exposed in Test Baker by the Ordnance Unit (TU 1.4.3) until 31 July, when the Ordnance Officer of the Technical Staff and Commander of the Unit, Lt. Col. S. F. Musselman, together with other officers of the Army Ground Group, accompanied Captain Huntsinger, USN, and Initial Boarding Team #9 in a general inspection of target landing craft in the lagoon or beached on Bikini Island, the work of inspection was completed by 1200, 3 August. The fact that Ordnance Inspection Teams #10 and #11 were able to return to their encampments on Bikini Island on 31 July, facilitated the progress of the inspections. Preparations were immediately made for shipment of all Army Ordnance test items to the Hawaiian Ordnance Depot, T. H.

105. Although Colonel L. P. Jordan, Quartermaster Officer of the Technical Staff, and his Special Assistant for fuels and lubricants, Captain J. J. Elko had participated in Colonel Weber's preliminary reconnaissance and inspection, the afternoon of 30 July, close and detailed inspection of Quartermaster items exposed in Test Baker did not begin until the next day when Col. Jordan accompanied Captain Huntsinger, USN, and Initial Boarding Team #9 in visits to landing craft in the lagoon and beached on Bikini Island. He visited the various craft in the following

order: ARDC-13, LCT 874, LCT 1078, LCT 1112, and LCT 1113 in the lagoon, and LCT 1237 beached on Bikini. After this, Col. Jordan, accompanied by Lt. Cols. F. W. Browning, S. B. Smith, and S. F. Musselman, and by a radiological monitor, went to inspect Army Ground Group installations on the island. This same day, Col. Jordan's Test Planning Officer, Major R. J. Davies, with Captain G. L. Bell and a working party of nine enlisted men landed on Bikini Island, but were not able to begin work until after the arrival of Captain Elko and two radiological monitors, Lts. (jg) Eustis and Romaine, USN. The packing of test items on the island which were to be returned to the United States had also been completed, red tags had been attached to them, and they were ready to be picked up by the Navy for shipment. Since there was no Target Coordination Officer on the island, all "B" tags were submitted to the Army Office on the USS WHARTON for action. Some Fuels and Lubricants which were being returned to stock at the 51st QM Base Depot, Oahu, T.H., were tagged with white tags. On 2 August, Captain Elko arranged with J-43 for shipment of test items on the USS ROCKWALL, but the arrangements were cancelled later in the same day because the sailing of the ROCKWALL had been indefinitely delayed.

106. As of 1700, 3 August, inspection of the effects on Army test items of the detonation of the atomic bomb in Test Baker had been completed except on the USS NEVADA, the USS PENNSYLVANIA, and the USS GASCONADE, a visit of inspection having been made to the USS PRINZ EUGEN by civilian engineers of Task Unit 1.4.2 during the afternoon of that day. On 6 August, Captain C. H. Wollenberg, Signal Officer of the Technical Staff, Task Group 1.4, and Commander Task Unit 1.4.2 and Dr. G. K. Green, accompanied by a party of scientific consultants from the Signal Corps Engineering Laboratories, who were stationed on the USS AVERY ISLAND, boarded the USS GASCONADE and made a complete inspection of all damage sustained in Test Baker by items under the cognizance of Task Unit 1.4.2 exposed on that vessel. On 10 August, Major J. A. Ulrich and Major E. K. Cherry and six enlisted men of Task Unit 1.4.3 (Ordnance)

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boarded the USS PENNSYLVANIA and made a complete inspection of Army Ordnance test items that remained aboard during Test Baker. As of 1700, 10 August 1946, inspection of Army items exposed in Test Baker had been completed on all ships except the USS NEVADA. The persistence of radioactivity on the NEVADA was still sufficient to prevent the carrying out of detailed inspections aboard her.

107. On 7 August all Army test items on Bikini Island were loaded on landing craft for transfer to ships which were to transport them to Hawaii and the continental United States. Lt. Col. F. W. browning, Transportation Officer, Task Group 1.4, coordinated with the Navy agencies concerned in the transfer and was present on the island to exercise general supervision over the working parties of the several units of the task group. On 8 August he supervised the transfer of the test items from the landing craft to the USS ARTEMIS, ROCKWALL and ROCKINGHAM.

108. Redeployment of personnel of Task Group 1.4, which had begun immediately after Test Able and continued during the period between the two tests, proceeded at a much more rapid pace after Test Baker. On 4 August, Lt. Col. S. F. Musselman, Ordnance Officer of the Technical Staff and Commander, Task Unit 1.4.3, with six officers of Task Unit 1.4.3, and Captain H. C. Adams, Chemical Officer of the Technical Staff and Commander Task Unit 1.4.4, left Bikini for the United States in the USS SAIDOR. On 6 August, Captain R. N. Huse, S-1, completed arrangements with J-1 for the transportation to Hawaii and the continental United States of all personnel of Task Group 1.4 still remaining at Bikini for whom transportation had not previously been provided. Plans were formulated to have fifteen officers and sixty-seven enlisted men return on the USS KENNETH WHITING, six enlisted men on the USS AVERY ISLAND and four officers and ten enlisted men on the USS HAVEN. A certain number of others, both officers and enlisted men, were to go by air lift at such dates as priorities permitted. These plans were almost immediately modified because of the decision to keep the HAVEN at Bikini for an indefinite period and because of other circumstances. In the end, the number sent by air was considerably increased.

109. Colonel John D. Frederick, Commanding Officer, Task Group 1.4 (Army Ground Group) and Colonel Lewis P. Jordan, Quartermaster Officer of the Technical Staff and Commander, Task Unit 1.4.5 departed Bikini for Hawaii by air the afternoon of 9 August. Col. Frederick departed from Hawaii for the United States, 10 August, but Col. Jordan remained until 14 August in order to coordinate work of reporting on analysis of quartermaster test items in various Army laboratories in Hawaii.

110. The movement continued by echelon and was completed by 14 August except for three officers and eleven enlisted men aboard the USS ARTEMIS, PRINZ EUGEN, ROCKBRIDGE and ROCKINGHAM. Most of the remaining officer personnel of Headquarters accompanied the Executive Officer, Colonel John H. Weber, by air, 11 August, while the enlisted personnel, after transfer from the USS WHARTON to the USS KENNETH WHITING on the tenth, sailed on the fourteenth.

111. Colonel Weber reported at the Navy Building, Washington, D. C., 13 August, and on the following day opened the Headquarters offices of Task Group 1.4 in Rooms 2615 and 2616, T-3 Navy Building. A stenographer was loaned by the New Development Division, War Department Special Staff to help with paper work until the arrival of enlisted personnel in Washington. As other officers of the task group arrived in Washington, they reported to Colonel Weber and took up the work of evaluating test results and writing reports where it had been interrupted by departure from Bikini. By 3 September the enlisted personnel, who had come in the USS KENNETH WHITING, had reported for duty in Washington and work on the final drafts of the various reports due 1 October was well under way.

112. A few days later Room 2615 was exchanged for Room 2610, and Room 2608 was secured for use as a private office by Colonel Frederick. The space thus provided Task Group 1.4 was more extensive and better arranged than any which it had previously been allocated in the course of the operation. It considerably facilitated work on the reports.

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113. As individual officers and enlisted men of Task Group 1.4 completed their duties in connection with Operation CROSSROADS, they were released for return to their permanent stations, for relief from active duty or for discharge. As of 25 September, the work on final drafts of the various reports was so far advanced, that deactivation of the Army Ground Group (TG 1.4) on or about 1 October in accordance with the original plans of the Commanding Officer seemed definitely assured.

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 (K) - Public Information

DIGEST OF MORE IMPORTANT CONCLUSIONS AND RECOMMENDATIONS

The following is a brief digest of the principal conclusions and recommendations resulting from the experiences of Crossroads Tests Able and Baker, and which would be applicable to similar tests such as Test Charlie.

CONCLUSIONS: That the over-all result of the wide press coverage of Tests Able and Baker was beneficial (1) in placing the atomic bomb in proper perspective before the public, (2) dispelling any possible thought that the tests were planned or conducted in any manner other than for the impartial development of the Armed Forces along worthwhile, forward-looking and intelligent lines, and, (3) in presenting to the American public, as well as to the Armed Forces, the importance of the United States maintaining pre-eminence in the understanding, development and use of scientific discoveries in their relation to the national security.

RECOMMENDATIONS

Telecommunications

1. Establish transmission stations at the scene far enough in advance to permit adequate testing and time to overcome transmission and receiving difficulties.

2. Do not install high-powered voice broadcast transmitters on the same ship from which Press RATT and radio-photo originate.

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3. Establish radio-photo circuits, including receivers for each circuit, from all designated origination points to San Francisco.

4. Provide rapid telecommunications exclusively for press between all press filing points in the forward area.

5. Provide separate telecommunications facilities for each medium and let each have priority but not exclusive use of the facilities provided for it.

6. Announce early in the operation how the "press versus radio" dispute is to be decided and state there will be no further changes not recommended by the two media jointly

Accreditation

7. Limit correspondents to a small hard-working group (about 25) of professional writers drawn from top news-dissemination agencies.

8. Set a deadline for selections. Make no late changes. It is better to have vacancies than poorly-filled billets.

9. Fly the small group to the scene. Avoid spending long periods on shipboard away from all news sources.

Radio Broadcasting

10. Require the networks to book time on a basis of "the first so many minutes" after the news event rather than exact times.

Pictorial

11. Eliminate dual responsibility for pictorial matters between PubInfo and Non-Technical Photography.

12. Continue pool procedure and require each pool to have one appointed spokesman in the field.

13. Pick points for pictorial coverage carefully.

14. Assign fewer civilian photographers.

15. Provide close liaison between pictorial and radio-photo communications personnel; utilize all opportunities for test transmission of radiophotos.

BASIC OBJECTIVES AND POLICIES

1. Objectives. Operation Crossroads was conducted at a significant period in world history. The atomic bombs at Hiroshima and Nagasaki had, in the public mind, signalled the end of World War II. Measures for the national control of atomic energy were being debated in the United States Congress, and measures for the international control of atomic energy were being discussed in the Security Council of the United Nations. The Armed Forces of the United States were demobilizing rapidly. A proposed merger of the Army and Navy into a single department, and the over-all size and composition of the Armed Forces were being publicly discussed in Congress and by the press and radio of the country. With this background, it was important that the public not have any serious misconceptions concerning the purposes or conduct of Operation Crossroads, nor the broad capabilities of the atomic bomb when used primarily against naval targets. The basic public information objectives of Operation Crossroads were, therefore:

(a) To clarify publicly the origins and purposes of the tests.

(b) To control speculation on Crossroads by high Army and Navy officials so that public opinion would not be moulded by their possibly biased views.

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(c) To bring the story of Crossroads to the public through an enlightened group of impartial observers (both American and foreign), and through comprehensive coverage by civilian press, radio and pictorial representatives, furnishing the observers and press attending the tests with all practicable factual information (consistent with security) to enable them better to evaluate the results.

(d) To publicize promptly and widely the principal findings of the Joint Chiefs of Staff's Evaluation Board and the President's Evaluation Commission, emphasizing the facts that these boards were of a joint and impartial nature and had been extended all facilities to make a clear unbiased study of the tests.

2. Responsibility of Publicity Control. Joint Chiefs of Staff Memorandum #SM5332, dated 22 March 1946, vested in Commander Joint Task Force One the control of all publicity concerning Crossroads and directed him to insure that all such publicity emphasize the "true scope, importance, joint nature, and impartiality of these tests." (See Appendix I, Items 8, 9, and 10 for this directive and the implementation thereof).

3. Security. Basic plans were formulated on the decision that there would be no censorship or review of press or radio copy on Crossroads. Security would be obtained by limiting the times and places to which press correspondents had access. Pictorial security was treated in a different manner. Civilian pictorial representatives were permitted to go almost anywhere in the operation at any time; all film was processed at specified laboratories and reviewed for security before public release.

ORGANIZATION AND DEVELOPMENT

4. General plans for the Public Information coverage

of Operation Crossroads are set forth in CJTF-1 Op plan 1-46, Annex "O", and the five appendices thereto. (Appendix I, Item 2).

5. The basic staff organization provided for Public Information as J-21, a sub-section of the J-2 (Intelligence) Section of the staff. In January, 1946 Lt. Col. J. F. Moynahan, AUS, and Comdr. L. V. Julihn, USN, were assigned to J-21 and carried on the initial Public Information work. In February, Captain Fitzhugh Lee, USN, reported as Public Information Officer (J-21) with Colonel William Westlake, AAF, as Deputy Public Information Officer. The four principal sections of the staff were headed, two by Navy officers and two by Army officers. Similarly, Army and Navy officers were distributed impartially throughout the Public Information Staff. Staff organization diagrams are contained in Annex "O". (Appendix I, Item 2).

6. Field Organization. The majority of the Public Information Staff was assigned to the press headquarters ship USS APPALACHIAN in which most of the correspondents were quartered. To cover several other primary sources of news, a field organization was provided. A Press Officer was assigned to Admiral Blandy's Flagship, the USS MOUNT MCKINLEY, the most important news source and from which news breaks were teletyped to the APPALACHIAN and to other filing points. A Public Information Officer and staff was assigned to Kwajalein, headquarters for air operations. A small J-21 staff unit was left in Washington to handle Public Information matters in the Rear Echelon. A Press and Orientation Officer was assigned to the observer ship USS PANAMINT, and another to the observer ship USS BLUE RIDGE. The Public Information Officers of the 12th Naval District and of Commander in Chief, Pacific Fleet were given temporary additional duty on the Public Information Staff of Crossroads to facilitate administrative matters at San Francisco and Pearl Harbor.

7. Civilian Participation. In order to avoid any possible criticism that the Army and Navy were attempting

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to influence the press coverage of Crossroads, it was decided that the principal civilian publicity media should be consulted in all important phases of Crossroads Public Information. Early in February, a group of the leading media representatives in Washington, D. C. were called together and asked to form a Civilian Press Committee with whom the Crossroads Staff could cooperate in drawing up general plans and in selecting press representatives to cover Crossroads. (For composition of this committee, see Appendix I, Item 3).

8. Similarly, a Civilian Press Committee later was formed on board the press headquarters ship (USS APPALACHIAN) to serve with the Crossroads Public Information Staff as a "Joint Steering Committee" in formulating and developing basic policies for Crossroads Public Information coverage. Formation and active utilization of these two committees, one in Washington and one on board the APPALACHIAN, proved of great value in maintaining efficient administration and harmonious relations with the civilian media representatives. (For composition of Joint Steering Committee, see Appendix I, Items 3 and 13).

9. A brief chronology of Public Information events is attached to this report as Appendix II. It lists all important public information events, press conferences, movements of press, etc. A more complete chronological digest is contained in the file of weekly Public Information Section Reports (Appendix I, Item 28).

PRESS AND MAGAZINES

10. Selection of newspaper and magazine representatives to cover Crossroads was made with the cooperation of the Washington Civilian Press Committee. The broad intent was to provide wide geographic coverage, to permit representation by a large number of independent magazines and dailies, and to recognize the pooled coverage of such newspaper chains as the Scripps-Howard, Hearst, and Cowles Newspapers, and such magazine groups as the McGraw-Hill and

Chilton Publications. (For press and magazine representatives finally selected, see Appendix I, Items 24 and 25).

11. All contacts were made with the publications themselves and not with individuals. The press as a whole exerted strong pressure to have many more press representatives attend Test Able than the number which finally covered the tests. However, as the time for departure from the United States drew near, a great many magazines and newspapers dropped out for various reasons, thus permitting the next one on the list to send a representative. By the time of departure, many worthwhile publications had dropped out and representatives were taken from relatively unimportant newspapers and magazines. (See Paragraph 48 for amplification and recommendations).

12. Foreign Press Representation. The Joint Chiefs of Staff decided that representatives of the foreign press would be included in the press representation at Crossroads. This decision was concurred in by the President and the Secretaries of State, War and Navy. One press representative each was invited from the nations represented on the Atomic Energy Commission of the United Nations Security Council. Two additional representatives were allowed to Great Britain in recognition of the special assistance of that country in developing the atomic bomb.

13. Invitations to the foreign press were transmitted by the State Department to the foreign offices of the eleven governments concerned; three did not send representatives to cover Test Able, five did not cover Test Baker. The list of foreign press representatives covering Crossroads is contained in the complete list of correspondents. (Appendix I, Items 24 and 26).

14. There was considerable public criticism of the alleged inadequate representation of the foreign press in Crossroads. It did not appear to have serious consequences.

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15. Difficulty was experienced in determining the foreign press filing priority privileges and other aspects of press coverage which are highly competitive. This might have been obviated if the original invitations to the foreign governments had specified the exact status of their press representatives, i.e., whether or not they were to be considered as "guest observers", as representatives of individual newspapers, or as "news services" for their countries. The decision was made to treat them generally as news services, which gave them privileges not enjoyed by individual papers in the United States.

16. Filing Priorities. The Joint Steering Committee studied the problem of filing priorities and appointed a special sub-committee of civilian and service personnel to make recommendations. The report of the sub-committee was accepted unanimously by the Joint Steering Committee. This plan provided for dividing Able Day into a series of time zones, priority in filing in their assigned zone. Thus their copy would not be delayed by the filings of those whose deadlines were past or many hours distant. A three-hour time lag for transmission was allowed in assigning correspondents to the various time zones. A detailed description of the filing priorities system is given in the A-Day Action Bill. (Appendix I, Item 16). A similar plan was used on Baker Day. (Appendix I, Item 19). Both plans worked very successfully.

RADIO BROADCASTING

17. Selection of Representatives. The general plan for selecting representatives for radio broadcasting followed that for press and magazines.

18. Originally, the radio broadcasting networks indicated that they desired to send technicians as well as commentators to attend Crossroads. In view of the facts that (1) a great deal of Armed Forces equipment (such as standard Signal Corps and Navy Transmitters) was involved;

(2) that every technician who came in a simulated officer status meant one less member of the working press (due to limited berthing facilities), and (3) that there would be no simultaneous transmissions of separate competitive programs, it was deemed advisable to decline the request of the networks to send their own technicians.

19. An agreement, outlining the policies and terms for radio participation in Crossroads, was drawn up and approved by the news heads of the four United States networks and by Mr. Fox Case, the radio broadcasting representative of the Washington Civilian Press Committee. (Appendix I, Item 6). The networks also indicated, but not in writing to Crossroads, that within the scope of their contractual obligations they would release all "pool" broadcasts, particularly those describing the actual detonations, to non-network-affiliated stations throughout the country. Based on this, a letter was sent by Crossroads to the individual station applicants for accreditation. (Appendix I, Item 7). With the plans thus clearly outlined in advance, a total of 14 accredited radio correspondents were nominated to attend Test Able of Crossroads. Of these, 12 were network men, and two represented local stations exclusively. One of the latter did not broadcast at all, either live or recorded, from Bikini, but did file, via the teletype circuits, copy to his station.

20. It is noteworthy that not one large independently owned station in the United States, whether network-affiliated or not, sent a strictly radio representative to Crossroads.

21. Three newspaper correspondents originally were accredited as "stringers" for large local stations (one from Texas, one from Oklahoma, and one from Louisiana), and all three sent more or less regular broadcasts or recordings back to those stations. In addition, as the operation proceeded, many "invitational broadcasts" were made by other newspaper and magazine correspondents to the various networks.

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22. Voice broadcasting equipment (audio) of the best quality obtainable was installed aboard the USS MOUNT MCKINLEY, the USS APPALACHIAN, and the USS PANAMINT. The United States News Transmission Vessel SPINDLE EYE (A U.S. Army Press Communications Ship) also, as part of her original installation, had the finest audio equipment available at the time she was fitted out. Air-conditioned studios were constructed in all four ships; the starboard side of Radio I on the APPALACHIAN; in the War Command Room on the MT. MCKINLEY and PANAMINT. Standard Navy transmitters were used on all but the SPINDLE EYE.

23. Time booking on the transmitters was controlled by the purchase of time on the west coast commercial receiving stations, subject to confirmation by Crossroads. Despite the multiple transmitters, when the Crossroads ships were in company, only one actual program at a time was confirmed from Bikini; i.e., even on a different frequency. This rule was followed due to the fact that no two frequencies proved equally good (in practice, it was found that rarely was more than one frequency usable at a given time), and the multiple transmission allowed the receiving stations to choose the best.

PICTORIAL

24. The pictorial aspects of Crossroads were broadly divided into:

(a) Still pictures.
(b) Motion pictures.
(c) Television.
(d) Artists.

25. A still picture pool was formed consisting of Life Magazine, Acme News Pictures, Associated Press Photos, and International News Photos. Several other independent photographers wished to join this pool but it was not considered feasible to have them do so. The stipulation was

made, however, over the objection of the still picture interests, that where parallel service and civilian coverage was not provided, any pictures taken by Crossroads accredited civilian still photographers would be available to any media requesting them. There were eight photographers in this pool for Test Able and six for Test Baker. (Life Magazine withdrew their photographers (but not from the pool) after Test Able).

26. A motion picture pool was formed of the six principal newsreel interests (Fox Movietone News, Paramount News, Universal News, MGM News of the Day, Pathe and March of Time). One member from each covered Test Able. Only two pool members covered Test Baker--Fox and Pathe.

27. Television. Because of commercial rivalry, the television interests were prevented by the newsreel interests from joining the newsreel pool. Six television interests formed a pool and sent one man as a pool representative to obtain film for subsequent televising in the United States. The participants in the pool were the National Broadcasting Company, the Columbia Broadcasting System, the American Broadcasting Company, Philco,-Dumont, and the affiliation of Balaban and Katz-Paramount Company.

28. The United States Government was a member of each of the three pictorial pools, providing approximately 33 service photographers for public information purposes (Army 6, Navy 18, Marines 7, and Coast Guard 2).

29. All photographic coverage, including that for Public Information, was centralized operationally under the J-22 (Non-Technical Photography) Section of the staff with operational headquarters in the USS SAIDOR.

30. Civilian pictorial representatives were assigned their Able and Baker Day posts by the director of Non-Technical Photography (J-22) upon recommendation from PubInfo and, usually, in cooperation with a representative from the pool concerned.

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31. Radio-photos were transmitted from the USS MOUNT MCKINLEY and the USS APPALACHIAN at Bikini during both tests, and from the USNTV SPINDLE EYE (See Par. 22) at Kwajalein during Test Able. During Test Baker, radio-photo from Kwajalein was transmitted from the shore base. The radio-photo installations worked very successfully; that provided a wide picture coverage in the world press at times when news interest in Crossroads was greatest and when it could not possibly have been provided in any other way.

32. Two official staff artists were accredited to Crossroads: Captain Charles Bittinger, USNR, and Major Milton Marx, AC. Mr. Arthur Beaumont, well-known marine artist, was permitted to attend the tests. Gunnery Sergeant Grant Powers, USMC, and a well-known artist in civilian life, attended the tests as a member of the Public Information Staff and produced many newsworthy wash drawings and pen-and-ink sketches. The products of all of these artists become the property of the U.S. Government and are to be divided between the War and Navy Departments at the conclusion of Crossroads in accordance with primary interest in the subject matter.

ORIENTATION

33. Over-all orientation of press and radio was accomplished as indicated below.

34. A Press Packet containing a large amount of reference material was furnished to each correspondent and observer accredited to Crossroads. Included in the Press Packet was an introductory letter to the press from Vice Admiral Blandy and one from the Public Information Officer, plus an Index of Contents of the Packet. (Appendix I, Items 20, 21, and 22).

35. Press releases were issued periodically as the occasion warranted. The total content of all the press releases gave, for Public Information purposes a complete

factual picture of Crossroads. Crossroads Press Release Nos. 37 (Statement by Admiral Blandy on Purposes of Atomic Bomb Tests), No. 46 (Full Story of Atomic Bomb Tests will be Told to Public), and 61 (Arrangements for Observation of Second Atomic Bomb Test) were particularly important as policy-making releases. The complete file of the 63 Crossroads press releases is available in the Crossroads Historical File (Appendix I, Item 30 is the index of these press releases).

36. Press conferences were held whenever opportunity permitted with members of the Staff and Crossroads organization who could be made available and who were of value to the press because of specialized knowledge. (Appendix I, Item 31 is a list of all press conferences).

37. A special "Off-the-Record Press Conference" was held in Washington, D.C. on 26 April 1946. All of the press then designated to cover Crossroads, plus a number of influential persons in press, radio, and pictorial media, were invited to attend this conference. It consisted of a full presentation of Operation Crossroads by Vice Admiral Blandy and the principal members of his staff. The minutes of this conference were subsequently edited to remove classified material and were issued to all members of the press and to all observers attending Crossroads. (Appendix I, Item 11).

38. A number of documentary films were shown to the press and observers while they were in the Pacific. These movies were chosen impartially from all sources, both Army and Navy, and supplied valuable background material. These movies were widely commended by the press on board the APPALACHIAN and many were shown several times by special request. (For list of documentary films shown, see Appendix I, Item 23). Newsreels of the Able Test were rushed to the Pacific and shown before the second test (Baker) took place. These also proved valuable.

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39. A series of orientation lectures were delivered to the press on the APPALACHIAN in the periods just before Tests Able and Baker. These lectures were designed to furnish as complete a picture as possible on the over-all activities of Crossroads. (For list, see Appendix I, Item 15). An Orientation and Press Officer was provided on each of the two observer ships (PANAMINT and BLUE RIDGE) for the purpose of duplicating, insofar as practicable the orientation lectures, showing of films, etc., on those ships. In addition, excellent briefings on air operations were provided by Commanders Task Groups 1.5 and 1.6 and their staffs at Kwajalein to all press and observers just prior to each test.

TELECOMMUNICATIONS

40. Technical aspects of press and radio telecommunications are not discussed in the Public Information Section of the report but may be found in the Communications Section (Part VII (B)).

41. Following this page are three statistical tables on press wordage filed, radio broadcasts transmitted, and radio pictures transmitted, for each of Tests Able and Baker, and the totals for the two tests. Briefly summarized, these table show that for both tests there were:

(a) Approximately 2,417,500 words (in five languages) filed by radio teletype to newspapers and magazines:

(b) 615 commercial radio broadcasts transmitted; and

(c) 401 photographs transmitted by radio-photo.

Table I

ESTIMATED PRESS WORDAGE TRANSMITTED BY RADIOTELETYPE FROM CROSSROADS.

	USS MT MC KINLEY	USS APPALACHIAN	USS PARAMINT	KWAJALEIN	B-29	TOTAL
Test Able (10 May to 5 July)	60,730	1,536,400	36,510	135,580	3,000	1,732,710
Able Day (1 July 1946, ELD)	14,070	258,400	6,485	26,000	3,000	298,470
Test Baker (6 July to 31 July)	69,850	512,800	14,319	102,130	3,000	664,840
Baker Day (25 July, 1946 ELD)	17,000	107,450	2,075	14,000	3,000	138,450

TOTAL FOR ABLE AND BAKER DAYS ONLY- - - - - - - 436,920

GRAND TOTAL, TESTS ABLE & BAKER- - - - - - - 2,417,550

NOTES:

1. Because by arrangement between CROSSROADS and CNO (OP-20-B) all Press wordage via Radioteletype from CROSSROADS was abstracted at Radio San Francisco (MPG-COM12), no exact information as to total radioteletype wordage is available at this time. The above figures are the best considered estimate obtainable, and the probability is that the actual wordage filed was in excess of the figures shown. (No record was, or could be, kept of the wordage mailed by correspondents.)

2. Press wordage filed from the USS PARAMINT and the B-29 PLANE "The Voice" is included in the totals for the USS APPALACHIAN, as all transmissions from those points were relayed via the APPALACHIAN. Figures shown for these points, therefore, are for information only, and are not duplicated in totals.

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3. Press radioteletype transmissions from the B-29 PLANE on ABLE and BAKER days (3000 words each day) is, so far as is known, the first such successful transmission of press via radioteletype from a plane in flight. These transmissions were received aboard the USS APPALACHIAN (under way at the time) and automatically relayed to San Francisco. On Able Day, while all transmissions from the Plane were received satisfactorily aboard the USS APPALACHIAN, two "takes" were not received in San Francisco. On Baker Day, the first "take" from the B-29 was received perfectly in San Francisco 4 minutes after being filed aboard the Plane, and all 3000 words on Baker Day went through to San Francisco without incident. Press Radio teletype and Voice Broadcasting, both direct to the USS APPALACHIAN and relayed to San Francisco automatically, were transmitted simultaneously from the plane, and each had its own duplex circuit.

Table II
COMMERCIAL RADIO BROADCAST TRANSMISSIONS FROM CROSSROADS

	USS MT MC KINLEY	USS APPALACHIAN	USS PANAMINT	SPINDLETOP KWAJALEIN	B-29	TOTAL	TOTAL
Test Able (10 May to 5 July, 1946, Inc)							
Live Pgms	39	43	9	30	3		112
Recorded Pgms	65	83	9	23	0		171
Two-Ways	71	54	2	49	0		174
	175	180	20	102	3		457
Able Day (1 July 1946, (ELD)							
Live Pgms	11	11	1	12	3	34	
Recorded Pgms	3	12	1	12	0	27	
Two-Ways	2	1	1	12	0	15	
	16	24	3	36	3	76	

	USS MT MCKINLEY	USS APPALACHIAN	USS PANAMINT	SPINDLEYE KWAJALEIN	B-29	TOTAL
Test Baker (6 July to 31 July 1946, ELD)						
Live Pgms	32	3	0	0	4	35
Recorded Pgms	40	13	1	0	2	53
Two-Ways	69	1	0	0	0	70
	141	17	1	0	6	158
Baker Day (25 July 1946, ELD)						
Live Pgms	13	2	0	0	4	15
Recorded Pgms	13	6	1	0	2	19
Two-Ways	9	0	0	0	0	9
	35	8	1	0	6	43

TOTAL FOR ABLE AND BAKER DAYS ONLY- - - - - - - - - 119

GRAND TOTAL, TESTS ABLE AND BAKER - - - - - - - - - - - - 615

NOTES:

1. These figures are exact according to the various origination point logs. No notation is made herein of the lengths of the various transmissions. If information regarding specific programs, and their length, is desired, it may be found in CJTF-1 (J213 section) files.

2. All originations on the USS PANAMINT and the B-29 PLANE "The Voice" were relayed by the USS APPALACHIAN and the USS MT MCKINLEY. Their totals are included (but not duplicated) in the totals of these two ships. Figures shown are for information only. (See note 2 of Table I).

3. Recorded programs means those recorded at San Francisco for later use in the United States. Not all of these recorded programs were broadcast as some were primarily for news releases by the various recipients.

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4. There were no regular broadcasting representatives at any CROSSROADS origination point other than the MOUNT MCKINLEY after 5 July, 1946. The MT MCKINLEY had a total of four, one representing each network. Various newspapermen, acting as "stringers", were used on the USS APPALACHIAN between Baker minus Two and Baker plus Four.

5. Average ratings of all transmissions from Bikini was between 3 and 3-plus. Able Day pool broadcast rating was "3"; Baker day pool broadcast rating was "4-minus".

Table III

PHOTOGRAPHS TRANSMITTED VIA RADIOPHOTO TO SAN FRANCISCO FROM CROSSROADS

	USS MT MCKINLEY	USS APPALACHIAN	SPINDLETOP KWAJALLIN	TOTAL	TOTAL
Test Able (10 May to 5 July, Inc)	105	61	50		216
Able Day (1 July 1946, ELD)	18	10	16	44	
Test Baker (5 July to 31 July, Inc)	72	108	5		185
Baker Day (25 July, 1946, ELD)	20	16	4	40	

TOTAL FOR ABLE AND BAKER DAYS ONLY - - - - 84

GRAND TOTAL FOR TESTS ABLE & BAKER - - - - - 401

NOTES:

1. These figures do not show total transmissions; several pictures had to be transmitted several times in order to obtain a satisfactory print in San Francisco. The end result, i.e., a printable picture, was all that mattered, and is shown in the figures above.

2. Average quality rating for all above pictures was "Good".

3. First Able Day picture received in San Francisco one hour twenty minutes after bomb detonation; first Baker picture received in San Francisco one hour and two minutes after bomb detonation.*

4. There were no radiophoto transmissions from any other CROSSROADS points or ships.

5. For Test Able all radiophoto transmissions from Kwajalein were from U. S. Army News Transmission Vessel SPINDLETOP; for Test Baker these transmissions were from the same equipment set up ashore.

* First pictures delivered to press Able Day at plus 2 hrs., 25 min.

First pictures delivered to press Baker Day at plus 1 hr., 44 min.

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42. A section of the staff was set up to cover all administrative matters and to look after the problems of transportation, billeting, and messing of the correspondents.

43. Precedence in berthing accommodations and other non-professional privileges was established by the age of the correspondents, the oldest being assigned the most desirable accommodations. This method, while having some disadvantages, appears to be the least susceptible to adverse criticism.

CONCLUSIONS AND RECOMMENDATIONS

44. General Results of Press Coverage. The fact that a large number of correspondents representing the United States and eight foreign countries reported Operation Crossroads through the press, radio and pictorial media of the world, had the following results:

(a) The atomic bomb was taken out of the realm of the fantastic and incomprehensible in the public mind and placed approximately in its proper light as another and very powerful weapon. Without the wide public knowledge afforded by these tests and this press coverage, it seems probable that public misinterpretation of the capabilities of atomic energy and the atomic bomb may have handicapped appreciably the intelligent development of the Armed Forces of the United States and adversely influenced progress in international relations.

(b) The Armed Forces of the U. S. Government avoided the possibility of public mistrust of all future actions in dealing with the atomic bomb as a weapon. If the public had not received a fairly clear idea of the force and nature of the atomic bomb, requests for military and naval appropriations in the future might well have been suspect in the public mind.

(c) The Armed Forces gained credit for a well and impartially executed operation of great complexity and magnitude. Press opinion appeared to be almost unanimous in general approval of the high level of efficiency attained by Joint Task Force One in conducting the tests.

(d) The Able Day bomb was, unfortunately, credited initially in the minds of a large portion of the American public with being a comparative dud. This occurred for two principal reasons. First, the fact that a large majority of the newsmen (for safety reasons) viewed the test from about 20 miles away and that the atomic cloud was obscured from them by a large mass of cumulus clouds, led many of them to underestimate in their initial reports the true strength of the bomb. (The initial reports make the headlines). Second, a radio broadcaster shortly after How hour sent a service message to his network in the United States stating that it was reliably reported that the bomb had gone off three seconds too soon. He deduced from this that it may have been as much as a mile and a half too high when it exploded. This message was picked up by the three wire services and disseminated throughout the world. Another radio announcer said approximately the same thing over the air in a broadcast. These resulted in banner headlines in the newspapers, and wide comment over the radio, with consequent initial impressions in the public mind which were difficult, even impossible, to dispel subsequently. However, the higher level of objective reporting in the Baker Test, plus the excellent pictorial coverage of both tests, probably resulted in over-all conclusions by the public which were fairly accurate and sound; as much so, at least, as can be expected on tests of such a technical nature.

(e) The general public had the opportunity to be well-informed on all significant and many insignificant phases of Crossroads. The Navy Press Digest summarizing Crossroads shortly before the first test said: "Tons of ink, columns of space, and hundreds of mats were employed by editors during the week to give the public a complete

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and exhaustive account of every phase of this dramatic and historic experiment. Detailed accounts written by on-the-scene correspondents, reports of scientific opinion on the operation, gleaned by Washington, New York, and Boston reporters; and elaborate diagrams, numerous Navy photographs, etc. covered this subject with a thoroughness seldom accorded any event. Statements that it would be the most-photographed and best-reported news event in history seem little exagerated. The reading public was kept informed of the attitude of reporters assigned to the experiment, the personality of the meteorologist in charge, the plans for the Medical Section, who's who among audience and cast, the possibility of untoward consequences, and were given a detailed account of the dress rehearsal. The time table for the 24 hours preceding the explosion was printed in detail in many metropolitan papers. Stories of the "A-Bomb Ark" with its goats and rats appeared. Pictures of notables leaving by plane for the scene, diagrams of the expected cloud effects, charts showing the disposition of the target ships, and pictures of the "bullseye" USS NEVADA in its new brilliant orange paint coat appeared in all papers."

45. Security. The general aspects of security are covered in Part VII (D) of the over-all Report on Crossroads. From the point of view of Public Information alone, the following general conclusions can be made:

(a) The establishment of security criteria governing the release of photography, including radiophotos from the forward area and still and newsreel photography from Washington, was imperfectly appreciated prior to Test Able. This seriously hampered the release of photography for that test, and increased the complexity of the task imposed on the admittedly cumbersome Composite Security Review Panel. As a result of this experience, as soon as possible after the execution of Test Baker, the Joint Task Force Commander, assisted by the Deputy Commander for Technical Direction, the Director of Ship Material, the AC/S J-2 and the Director

of Photography, selected a number of photographs which he approved for release as meeting security requirements. By the use of these criteria, all concerned with the release of photography were greatly assisted and deadlines for Test Baker were successfully met. A similar procedure is desirable in future tests, especially if a Composite Security Review Panel is again created.

(b) The system of issuing appropriate identification cards seemed too cumbersome and too slow. Members of the press and distinguished observers who were nominated late had little difficulty in getting "cleared" but often did not receive proper identification papers until after they had been in the Marshalls area for a considerable period. This applied particularly in the case of photographers.

(c) It was originally intended that civilian press photographers would have access to all events and scenes except those involving the bomb itself, security being gained by photographic censorship. Many officers in the lower echelons in the Task Force were not sufficiently aware of this with the result that there was considerably more local restriction placed on the movements and activities of press photographers than was necessary.

46. Number of Correspondents Covering the Tests.

Press interest in the first test was intensified by the novelty of the bomb, by the wide implications of its power, and by great world interest in the international uses of atomic energy both in war and peace. All these made Test Able especially "newsworthy" and resulted in great pressure being brought to bear to accredit very large numbers of correspondents. However, it is unquestionably a fact that in Test Able, the presence of large numbers of press and the presence of several not qualified either personally or professionally to cover the tests undoubtedly handicapped to an appreciable extent the proper coverage and interpretation of these important and historic tests to the public of the world. (It is worth noting that press interest showed a marked drop after Test Able and that there

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were billets which could not be filled in the short period available.

47. The total number of correspondents attending was limited by the availability of billets. Original plans called for facilities for 200. Actually, 165 correspondents covered Test Able and 75 covered Test Baker. The group covering Test Able proved too large for the following reasons:

(a) Necessity for having news sources come to the press instead of the press going to the news sources. With a small group, the latter procedure would have been possible and much more satisfactory.

(b) Large numbers resulted in crowding of berthing, messing, and transportation facilities and an undesirable "regimentation" of the press.

(c) Inability to give personal attention in orientation and indoctrination. The press as a whole was less "well-educated" on the operation than would have been possible with a smaller group.

(d) Overcrowding of the transmission facilities at the key times. Good reportage of a professional hard-working few is handicapped in transmission by the less important reportage of less qualified writers.

However, especially for Test Able, it was necessary to accredit this large number of correspondents with the foreknowledge that it would handicap best coverage. To have done otherwise might have impaired public confidence in the tests and have exposed the government to the accusation that the press coverage was being limited so that the full story might be better "controlled" from the Armed Forces' point of view.

Recommendation: If circumstances permit, the correspondents (less the photographers) should

be limited to a small (not more than 25) hard-working group of professional writers drawn from the wire services, top syndicates, radio networks, and outstanding independent newspapers and magazines who specialize in broad national and international news coverage.

48. Selection of Correspondents. The procedure of selecting correspondents for Tests Able and Baker on recommendations of a Civilian Press (representing all media) Committee was basically sound. However, as nominees continued to drop out, the continuous extension of the deadline for new nominations up to the last days before departure from Washington undid much of the good work of the initial selections. The publications accredited prior to the initial 11 March deadline nominated, almost without exception, professional, able writers. But, when several publications decided at the last minute not to cover the first tests, publications of lesser stature were accredited. As a result, several individuals, poorly qualified as objective reporters, were nominated and accredited at the last minute with insufficient time to check their qualifications. Since all contacts were made with publications and not with individuals, Crossroads Public Information could not very properly question the nominations of recognized publications already accepted to cover Crossroads. Hence there was no way to screen some of these late arrivals and prevent their nearly useless presence at Bikini. This situation will always exist in choosing press representatives to cover government activities, but with more time and a smaller group, a certain amount of indirect screening can be accomplished.

Recommendation: For future operations of this type, set a deadline for selections and stick to it. Make no late changes unless the personalities are well known and/or can be thoroughly checked. It is better to have vacancies than poorly filled billets.

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49. Flagship vs. Press Ship. In Tests Able and Baker the largest single group of correspondents was in the APPALACHIAN, designated as Press Headquarters. There were other smaller groups on the flagship (MT. MCKINLEY), the PANAMINT (civilian and foreign observers) and at Kwajalein (to cover air operations). Although every effort was made to avoid it, minor friction developed between these various groups due principally to the highly competitive nature of the news profession coupled with the fact that all groups could not be given equal and simultaneous access to all the news and the means of rapidly transmitting news. Similar problems existed throughout the recent war, and are to a large extent insoluble.

50. In operations such as Crossroads, the main and only authoritative source of news is the flagship of the Task Force Commander. Therefore, from the exclusive point of view of public information and the press, all the correspondents should have the privilege of basing on the flagship. Unless the press delegation can be very small, this has obvious difficulties from the point of view of security, berthing and messing, and other factors. If it is not done, however, it is very desirable to have an exclusive press communication channel between the flagship and all points where correspondents are stationed. (See also recommendations of Paragraph 69).

> Recommendation: If the total number of correspondents can be made small enough, and if other considerations permit, place the principal press delegation on the flagship; otherwise, insure excellent and exclusive press communications between press and flagship.

51. Transportation. In Test Able almost all the correspondents were transported to Bikini by ship, holding orientation conferences en route. This was necessary because:

(a) Air transport was insufficient.

(b) Many of the correspondents were completely ignorant of all aspects of Crossroads and there was no equally satisfactory way to provide for proper orientation. This method, although necessary for Test Able, had several disadvantages.

Recommendations: In future operations of this nature, (unless there is a running story en route to the scene), select a smaller group, fly that group to the nearest landing field to the operation (such as, in the case of Crossroads, Kwajalein), and board ships there. They should arrive at least a week previous to the expected date of the event. Such orientation as may be necessary then could be given intensively. It should be remembered, if it is decided to restrict future press representation to a small, highly skilled group, that such men's time is valuable to their offices. They should not be required to be present before their usefulness to the operation starts nor after the news value of the event ends for them.

52. Filing Priorities. Correspondents who dealt with filing priority systems in various war theatres indicated strong approval of the priority filing system used for Tests Able and Baker. This system is described in the A-Day Action Bill (Appendix I, Item 16). The system is predicated on the available Press Radioteletype circuits functioning throughout the time period of the system. (Atmospherics caused no missed deadlines on Able Day, but did cause a few to be missed on Baker Day, due to a one hour radio "blackout") The only delay, other than atmospherics, in transmitting copy which caused a correspondent to miss his deadline on either test was occasioned by garbled messages which had to be re-run. When the fault for the garble

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lies with the original transmitting point, it is proper that that point should re-run the copy. However, on Baker Day, considerable time was lost re-running copy from the USS APPALACHIAN which had been properly received in Hawaii and garbled in the re-transmission from there to San Francisco. Thus, APPALACHIAN circuits (which at the time of the re-run, were direct to San Francisco) were unnecessarily tied up with re-runs while copy with upcoming deadlines was held up.

Recommendations: Require relay stations to re-run copy they have transmitted improperly, whatever the cause. A filing Priorities Officer should be designated and should be kept informed at all times of delays affecting new copy caused by re-runs of old copy. The Priorities Officer should be authorized to hold up re-runs which already have missed their deadlines in favor of fresh copy with an upcoming deadline.

53. Radio Broadcasting. The fourteen radio correspondents covering Test Able were distributed among all originating points. For Test Baker, there were only four (one representing each network), all on the flagship. The radio group was not unwieldy, and no difficulty was encountered in giving them as satisfactory service as the circuit conditions would permit. It may be assumed, for future operations of this nature, that the number of origination points, in multiples of four (one for each network at each point) with a tendency toward the networks using only one man, as a "pool" correspondent, at the points with lesser news interest. Network coverage more directly satisfies the radio industry than does wire service the newspaper industry. However, any planning of facilities for future operations must take into account the probability of "stringer" coverage; i.e., more actual transmissions than would be anticipated from the purely radio accredited correspondents.

54. Apportioning of time (Filing Priorities). Reception of all Crossroads radio programs in the United

States was confined to commercial stations (RCAC and Press Wireless), for which the time buyers were charged according to fixed tariffs. For this reason, all "programs" were "booked" by the network or station in the United States, such booking being subject to confirmation by Crossroads. Only one program at a time was permitted from Bikini; it was considered more important to get one transmission through with a good signal than to try more than one at the almost certain cost of neither being usable. This system has its flaws, of course, in that competitive networks did considerable jockeying in attempts to gain favored time positions; but the difficulties encountered were minor and were adjusted without friction. However, Paragraph 2(g) of the PubInfo agreement with the radio industry (Appendix I, Item 6) was an attempt to prevent "block booking" of time for the purpose of preventing another network from getting a program. This paragraph is workable when the main event is set at a time known to all well in advance; it did not work at Bikini because the exact times of the detonations of Tests Able and Baker were subject to last-minute changes. In the case of Test Able, the time was changed.

> Recommendation: In future operations which may involve the same sliding time factor, require the networks to book on a basis of "the first so many minutes" after the event, in order of priority of booking, rather than at exact times.

55. The pictorial coverage of Crossroads probably served to convey a more accurate picture of the operation, the bomb, and its effects on naval targets than did all the written and spoken material furnished through press and radio. Pictorial coverage suffered somewhat, nevertheless, from the poor functioning of the Composite Panel in Washington and from a basically poor organization in which responsibility for PubInfo Photography was divided between J-21 (PubInfo) and J-22 (Non-Technical Photography). This organization appeared to be satisfactory in theory but worked poorly in practice.

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56. Civilian, Service Public Information, and Service Documentary and Non-Technical Photography all present different problems. A civilian organization prefers to feature the photographs and/or footage made by its own cameraman (even though pool) rather than the work of an anonymous service photographer. In Crossroads this was borne out both in the Marshalls and at the PhotoScience Laboratory at Anacostia, for civilians at all times preferred to use their own material and resorted to government pictures only when their own did not provide the desired news value. The original Crossroads plan called for using the civilian still and newsreel photographers to supplement service coverage. This did not work out, as the civilian photographers "shot" only material they thought their individual companies would use. This was particularly true in still photography where civilian cameramen refused to take pictures they deemed "un-newsworthy."

> Recommendations: Place all civilian and service public information photography under the exclusive control of Public Information, making PubInfo responsible for orders, billeting, transportation and assignment of their photographers and the transport of unprocessed PubInfo film. Eliminate dual responsibility between PubInfo and Non-Technical Photography at all possible points. (Both J-21 and J-22 concur in these recommendations).

57. Pool procedure, in general, worked satisfactorily. Of the three pools, the most effective was the newsreel organization, due principally to the effective control exercised by one appointed representative speaking for all the newsreel men in all matters involving Joint Task Force One.

> Recommendation: Continue pool procedure and require that each type (still, newsreel and television) each have one appointed spokesman in the field.

58. Number of Photographers. With pool operations, fewer photographers could achieve results equal to those obtained; one still, one newsreel, and one television photographer (three in all) should be sufficient for each PubInfo point of coverage. Service photographers can provide the supplemental coverage from other, less newsworthy, points. If careful attention is given to the location of the points prior to the discussion of the number of civilian cameramen to be sent on an operation, the civilian companies will probably be agreeable to this suggestion. (It was the government in Crossroads who asked for greater civilian representation). All pool assignment points should be made with consideration for the necessity for quick pickup, processing, and transmission of photographs.

Recommendations:

(a) Pick points for pictorial coverage carefully;

(b) Assign fewer civilian photographers;

(c) Assign pool men to flagship as soon as it departs for the scene of action.

59. The Radio-Photo picture is to other pictures as the wire service is to the individual paper, or the network to the individual radio station. They worked very successfully in Crossroads. Because time is of the essence in radiophotos, every effort must be made at all laboratory points to give radio-photo pictures priority in processing and release.

60. Special types of prints are required for radio-photo transmission. The Able and Baker Day radio-photo transmissions evidenced that, for that distance and at that time, flat non-contrasting type prints afforded the best reception. This is a problem which must be worked out jointly by the pictorial and communications personnel. The pictorial section, through its control of the processing

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laboratories, must insure that the radiophoto technicians are given the exact type of print that will transmit and be received best. To obtain good results, it is necessary that there be a great many test picture transmissions.

61. To provide maximum service to the users of radiophotos, there should be as many receiving stations in the United States as there are transmitting stations at the operation so that pictures from all points may be transmitted, and received, simultaneously. It was not the case in Crossroads. This is particularly true when all pictures are being pooled.

Recommendations:

(a) Provide close liaison between pictorial and communications personnel and all possible opportunities for test transmissions of radio-photos.

(b) Provide a receiver in the United States for every transmitter in the forward area.

62. Photography in Crossroads was handicapped by inadequate small boat transportation in the forward area, and by inadequate facilities for rushing film to the United States. Experience has demonstrated that unless careful planning provides adequate transportation facilities under the direct supervision of PubInfo personnel, the opportunities for obtaining photographs and their delivery to the consumer will not be satisfactory.

63. Telecommunications constitute one of the most important single aspects of satisfactory Public Information coverage; if they are not good, nothing is good.

64. Facilities. A large and expensive effort was put forth by the United States Government to provide the press, radio broadcasting, and pictorial (radio-photo) news media

with adequate telecommunications from Crossroads. While equipment was reasonably well obtainable, the lack of trained personnel, due to the demobilization program then in effect in the Armed Forces, had a serious adverse effect on this phase of the operation. The various communications activities of both the Army and the Navy were canvassed to procure the best possible personnel to install, maintain, and operate all the equipment. In the field of high-fidelity voice broadcasting, the various networks originally indicated their desire to have their own engineers handle the technical aspects of operation. It was considered advisable to decline this for reasons already given. (See Paragraph 17). However, of the small group of Army and Navy qualified broadcast radio engineers assigned to Crossroads, all were formerly in civilian radio broadcasting, and all were strongly recommended by the various network engineering departments. In spite of this latter point, the United States networks felt free to criticize publicly the few aspects of Crossroads communications which did not provide instant and comparable service to land installations within the continental limits of the United States. (The official Crossroads comment on these criticisms may be found as Items 17 and 19, Appendix I). The radio broadcasting audio equipment was the best available (mostly RCA manufacture); radio-photo equipment was Acme; while the teletypes, and transmitters, were standard Army and Navy equipment.

65. Results. In general, it may be said that, until Able Day, satisfactory spoken (voice radio), written (Press RATT) and pictorial (radio-photo) service was had from the Press ship except during the local daylight morning hours, with the nadir of the 24-hour transmission period being around 2100 to 2300 GMT. Fortunately, on Able Day, atmospherics at that period (and throughout the day) were overcome by the Press RATT, and later, radio-photo. Voice facilities on Able Day were not successful at that period but improved later in the day. The voice facilities were not powerful enough to reach the United States west coast directly and the functioning of relays planned to be

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utilized, both at Oahu and Guam, was not entirely satisfactory. On Baker Day, all three media transmission services functioned excellently, and it is worth noting that the same voice personnel and equipment at Bikini that were used for Able Day were used for Baker Day. To a large degree, the improvement in radio broadcast reception on the mainland was due to the greatly improved functioning of the Press RATT and radio-photo circuits.

66. From Kwajalein, all three types of transmission were, in the main, satisfactory. Kwajalein press originated ashore at the Joint Communication Center for both Able and Baker Days. Voice broadcasting and radio-photo originated from the U. S. Army USNTV (United States News Transmission Vessel) SPINDLE EYE, for Test Able. There was no voice broadcasting from Kwajalein on Baker Day, and radio-photo, for Test Baker, was transmitted, like the press, from JCC Kwajalein.

67. Disputes Between Press and Radio. As did the Army and Navy during the war, Crossroads found itself in the middle in the long-existing battle between Voice Broadcasting and Press, with the wire services being the aggressive spokesmen for the latter. The wire services contended that, on all important news (such as the first story on the bomb detonations) a neutral voice should make the first report, via the voice circuit, to both the radio industry and the wire services in the United States. The radio interests strongly opposed this view. Without discussing the merits of the argument, it is to be noted that no apparent attempt to settle the problem between themselves had been made by the two media. Instead, the government agency involved (in this case, Crossroads) has always been made both the battleground, and (because of the necessity of reaching a decision) the arbiter. The result always has been, that the arbiter is publicly criticized by either one or both of the disputants. During Crossroads each media had priority, but not exclusivity, on its own circuits. The fact that while press can be voiced, but voice cannot be transmitted by

radioteletype, was not germane, for there were many times during Crossroads that the voice circuits could and would have been used to voice press had the press so requested. Because of special wire service pressure and at the direction of SecNav, on Able and Baker Days, Admiral Blandy acted as the neutral voice and officially announced the bomb had detonated; and the pool burst broadcast on both days was made available, officially and by a neutral unidentified voice in the introduction to the program, to all media including the wire services. This was not a satisfactory solution; it is unlikely that the government can find one.

68. During Crossroads a new problem arose which, while indicated during the last days of the Pacific War, did not at that time reach any proportions. Two correspondents--one newspapers, one radio--filed regularly to newspapers. One, the radio correspondent, used his position as a radio correspondent to file his story to the paper by voicing it to his network, which later transcribed it and reforwarded it to the ultimate addressee. This was done, on the correspondent's own admission, to take advantage of the faster transmission--a phase of the large press vs. radio dispute discussed in Paragraph 67. The other, the newspaper correspondent, through arrangement with a broadcasting network, voiced one story to his paper--a story which the network specifically stated was not for broadcast use--via this network. So long as the principle of separate circuits for each media continues, it would appear that the practice referred to above allows discriminatory preference to those who, either through use of their position as a radio broadcasting correspondent, or through arrangements with a network, voice their press. Those who have no such favored position may, understandably, protest this procedure.

69. An apparently simple solution, the establishment of "voice-press" circuits, is not really simple. Demand for this type of service comes almost exclusively from the wire services, and then only for those special occasions, such as the wartime "communiques", or the "top" news story. They do not wish it for normal copy transmission. Therefore,

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such a "voice-press" circuit would be highly inefficient, for it would mean the establishment of additional voice circuits, entailing frequencies, additional transmitters, receivers, and personnel which could be used, comparatively speaking, only rarely. The simultaneous operation of two voice circuits will, moreover, considerably reduce the chances for either to go through well and dependably. For these reasons, it is felt that the practice observed in Crossroads, and by Commander in Chief, Pacific Fleet during the Pacific War--separate circuits for each media, with each having priority, but not exclusivity on its own circuit--be continued.

Recommendations: For telecommunications in future peacetime operations comparable in size and location to Crossroads, and which is to be covered by the various press media:

(a) Establish transmission points at the scene far enough in advance to permit the communications personnel to conduct sufficient testing to locate and overcome transmission and receiving difficulties;

(b) Do not install and operate voice broadcast transmitters of sufficiently high power to span distances incurred in the Pacific on the same ship from which Press RATT and radio-photo originate;

(c) Establish separate radio-photo circuits, including receivers for each circuit, from all designated origination points to San Francisco;

(d) Provide rapid telecommunications exclusively for the press (PubInfo) between all press filing points of an operation. In Crossroads this was provided for in the plans but did not work out in practice.

(It was possible to send a press story of several thousand words length to the United States and receive in return a comment on it within a very few hours. In contrast, brief servicing messages between press groups in the forward area became involved in operational traffic and in the over-all communications systems of the ships and stations. (This frequently resulted in as much as 48 hours delay in traffic which probably appeared trivial in content to various Communications Watch Officers and other personnel who handled it, but which was of great importance in the over-all Public Information coverage).

(e) Provide separate telecommunications for each medium and let each have priority but not exclusive use of the facilities provided for it.

(f) Announce early in the operation how the press vs. radio dispute is to be decided and state there will be no further changes not recommended by the two media jointly.

70. Administration presented no unusual or difficult problems. A great many individual correspondents (and, in some instances, their sponsors) desired to take advantage of their trip to the Pacific to visit and cover many places and activities not under the jurisdiction of Crossroads. In many cases, such coverage was undoubtedly advantageous to the Army and Navy and to the U. S. Government; in such cases, such trips were facilitated as much as practicable but were often hampered by administrative difficulties in orders, travel, clearance, responsibility, etc. In several instances, the requests were based on individual whims and were either impracticable or unjustifiable.

Recommendations: Establish clearly the status of correspondents desiring to cover outside activities and make it known to them before departure from the United States. Set up a procedure for quick efficient handling of orders, responsibility, etc., in worthy cases, and for the early and prompt disapprovement of requests of no value to the Government.

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APPENDIX I

ITEM NO.

1. Joint ARMY-NAVY press release of 10 December announcing the Atomic Bomb Tests.

2. Public Information Annex (Oboe) to Commander Joint Task Force ONE Operation Plan 1-46 with Appendices I through V. Contains statement of the mission of the Public Information Section, charts of staff and field organization, instructions for the preparation, release, and filing of news material, general plan for the transportation of correspondents and plans for Public Information coverage of Test Baker.

3. Memorandum for Admiral Blandy dated February 1946, giving composition and membership of the Washington Press Committee.

4. Memorandum for the Press dated 1 March 1946. Subject: Applications to attend Operation CROSSROADS. The Memorandum was sent to all newspapers, press associations, syndicates, photo agencies, etc., inviting them to send press representatives to CROSSROADS.

5. Public Information estimate No. I, dated 7 March 1946. Gives estimate of public attitude toward Atomic Bomb Tests at that time.

6. Letter to Fox Case, Radio Representative on the Operation CROSSROADS Press Committee, dated 11 March 1946. This letter gives the details of the radio plan of the Public Information Section including facilities, programs, priorities, and the rules under which radio broadcasts would operate.

7. Form letter to individual radio stations applying for radio representation on Operation CROSSROADS. The letter is dated 20 March 1946.

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8. Joint Chiefs of Staff Memorandum to Commander Joint Task Force One, dated 22 March 1946. The memorandum deals with publicity regarding the tests of the effects of atomic explosives and places control of all publicity in Commander Joint Task Force One.

9. Memorandum to Joint Chiefs of Staff dated 4 April 1946. This memorandum is an implementation of the directive of 22 March 1946 concerning publicity regarding the effect of atomic explosives.

10. Memorandum to All Personnel in Joint Task Force One. The subject of this memorandum is Publicity regarding CROSSROADS. This is the Task Force Commander's implementation within the Task Force of the Joint Chiefs of Staff's directive of 22 March.

11. Minutes of "Off the Record" Press Conference held by Admiral Blandy at Washington, D. C. 26 April 1946. This conference was a complete presentation of the plans for CROSSROADS made by CJTF-1 and all principal members of his staff.

12. Dispatch dated 3 May 1946 giving policy of Joint Task Force One concerning writing for publication by CROSSROADS Public Information Personnel.

13. File of Press Memorandums 1 through 13 outlining the operation of the Press Steering Committee and its handling of Press problems aboard the Appalachian.

14. Memorandum from Public Information Officer to CJTF-1 dated 15 June 1946. This memorandum gives details of the plans for press and radio coverage of Able and Baker Tests together with a discussion of pertinent problems of press, radio, and Public Information Relationships on Operation CROSSROADS.

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15. Schedule of orientation lectures and distribution of material dated 20 June.

16. A-Day Action Bill, dated 28 June. A description of the press facilities available on the USS APPALACHIAN and their operation on Able Day. Also contains the press priority filing plan.

17. Dispatch from Public Information Officer to CJTF-1 dated 18 July. This is the official CROSSROADS comment on criticism relative to radio coverage of Test Able.

18. Dispatch to SECNAV from CJTF-1 dated 19 July regarding broadcast facilities and the use of the Spindle Eye.

19. Baker Day Action Bill, dated 24 July 1946. A description of the press facilities available on the USS APPALACHIAN and their operation on Baker Day. Also contains the press priority filing plan for that day.

20. List of material contained in the press packets given to each correspondent and civilian observer covering Operation CROSSROADS.

21. Letter of Welcome to the press contained in the press packets. This is Admiral Blandy's letter to the press.

22. Introductory Letter to the press from the Public Information Officer. This letter was contained in the press packets.

23. List of Films contained in the orientation film library.

24. List of press, radio, pictorial representatives covering Operation CROSSROADS as of 1 June 1946. Contains the names of all persons covering Test ABLE.

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25. List of press, radio and pictorial representatives covering Operation CROSSROADS as of 25 July 1946. Contains the names of all persons covering Test BAKER.

26. Memorandum on regulations governing civilian camera coverage of Operation CROSSROADS. Outlines the entire photographic plan of the Public Information Section including radio photo facilities, censorship, developing, processing, etc.

27. CROSSROADS Press Digests No. 1 through No. 6. Analyses of Public Opinion about Operation CROSSROADS through quotations from newspapers columns, newspapers, editorials, radio broadcasts, etc.

28. File of Weekly Summary of Events. These are weekly reports on Public Information. They contain a chronological history of progress of Public Information activities.

29. A file of all CROSSROADS Press releases. The cover page consists of a list of these releases by subject in chronological order.

30. A copy of the Operation CROSSROADS Report on Public Information. This report covers the period from 1 January 1946 to 31 July 1946.

31. List of all CROSSROADS Press conferences. Covers the period from 1 March 1946 through 31 July 1946.

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APPENDIX II

PUBLIC INFORMATION SECTION JOINT TASK FORCE ONE

A Chronology primarily concerned with Press on the USS APPALACHIAN.

10 December 1945		Announcement by Secretaries of War and Navy that Operation Crossroads would take place.
20 January 1946		Public Information Section began formal operation.
24 January	"	Vice Admiral W. H. P. Blandy held his first press conference.
24 January	"	Admiral Blandy testified before the McMahon Committee on the purpose of Crossroads.
20 February	"	A complete list of the ships in CROSSROADS was published.
22 February	"	The Public Information Officer, JTF 1 reported for duty.
26-27	" "	First press tour of Roswell, New Mexico, to cover training of Gen. Roger Ramey's B-29 Air Group.
27 February	"	First meeting of the Washington Operation CROSSROADS Press Committee.
1 March	"	Press conference, Admiral Blandy and his staff.
1 March	"	Invitation to send representatives to cover Operation CROSSROADS sent out to all publicity media.

5 March 1946		Meeting of Washington Press Committe to determine number of representatives to be accredited various media.
7 March	"	Publication of Public Information Estimate of the Situation. #1
11 March	"	First deadline for applications to attend CROSSROADS.
13 March	"	Press conference, Admiral Blandy and Staff.
22 March	"	Press conference, Major Gen. A. C. McAul[illegible]e, and other on Army Ground Forces parti[illegible]ation in CROSSROADS.
28 March	"	Press conference, Admiral Blandy and Staff.
8-9 April	"	Second Press tour Roswell Army Air Field, for those unable to attend first tour, demonstration AAF Drones, etc.
10 April	"	Press Conference, Admiral Blandy, Admiral Solberg, and others concerning Bureau of Ships participation in CROSSROADS.
11 April	"	Speech by Admiral Parsons before New York Republican Club.
12 April	"	Statement by the President approving Operation CROSSROADS.
17 April	"	Press conference, Admiral Blandy, General Kepner, General Powers and others concerning air phase of Operation CROSSROADS.
17 April	"	Speech by Rear Admiral F. J. Lowry, Commander, Rear Echelon, JTF-1 before Naval War College.

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23 April 1946		Press conference for Science Writers Association, Admiral Parsons, Dr. Sawyer and the technical staff.
26 April	"	"Off the Record" Press Conference, on the entire story of Operation CROSSROADS given by Admiral Blandy and all key members of his staff.
8-9 May	"	Press tour aboard Aircraft Carrier, SHANGRI-LA, off San Diego, Calif. Emphasis on Naval drone plane operations.
13 May	"	Admiral Blandy held his final press conference in Washington.
1 June	"	Publication of final list of accredited correspondents.
8 June	"	Special CROSSROADS train left Washington, D. C. for San Francisco.
12 June	"	USS APPALACHIAN, Press Headquarters ship left San Francisco for Bikini Atoll, in company with USS PANAMINT and USS BLUE RIDGE, carrying observers.
13 June	"	First meeting of the Joint Press and Staff Steering Committee, organized to clear problems of correspondents in relation to coverage of CROSSROADS.
14 June	"	Meeting of Joint Steering Committee to discuss revision of the priorities system.
17 June	"	Press conference held at sea by voice radio between correspondents on the APPALACHIAN and scientists on the PANAMINT.

18 June	1946	APPALACHIAN arrived Honolulu. Civic welcome extended to press and observers.
20 June	"	Departure from Honolulu.
21 June	"	Orientation lecture, History of the Atomic Bomb.
22 June	"	Orientation lecture, Logistics.
23 June	"	Orientation lecture, Setting the Stage for Bikini. (Queen Day)
24 June	"	Orientation Lecture, Able Day Operations.
26 June	"	Orientation Lecture, Radiological Safety and Scientific Dividends.
27 June	"	Orientation Lecture, Weather.
28 June	"	Arrived Kwajalein Atoll. Briefing on air operations by representatives, Task Group 1.5, Group 1.6. Left Kwajalein Atoll.
29 June	"	Arrived Bikini Atoll. Visit to NEVADA. Press conference with the Secretary of the Navy, Admiral Blandy and Staff.
30 June	"	Press conference with Joint Chief of Staff Evaluation Board and the President's Evaluation Commission. Left Bikini Atoll for Sector Marmon.
1 July	"	Able Day. Returned to Bikini Lagoon. Press conference with Admiral Blandy and Staff.
2 July	"	Tour of Target Array by selected correspondents, Admiral Blandy and staff in morning. Tour of entire press party thru target array in afternoon.

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3 July 1946		Press conference, weather and photo officers. Press visit to PRINZ EUGEN and PENSACOLA.
4 July	"	Press conferences, oceanographic section, radiological safety section, Navy Medical section, Admiral Blandy, JCS and President's boards, Assistant Secretary of War for Air, crew of Dave's Dream, and others. Press visit to NEVADA. Left Bikini for Kwajalein.
5 July	"	Arrival in Kwajalein. 63 correspondents left for the Mainland. Majority of others left for Honolulu, on tour of PANAMINT or to stay in Marshalls area.
6 July	"	Left Kwajalein for Pearl Harbor with 14 correspondents.
12 July	"	Arrived Pearl Harbor.
14 July	"	Left Pearl Harbor for Kwajalein with 32 correspondents aboard.
17 July	"	Orientation lecture, ship construction and underwater explosives.
18 July	"	Radio Press conference with Admiral Blandy on Mt. McKINLEY on basis of question submitted by press in advance. (William Day)
19 July	"	Orientation lecture, submarine construction and operation.
21 July	"	Arrive Kwajalein Atoll. Briefing by CTG 1.5 and CTG 1.6 on role of air in test Baker. Picked up eight new correspondents and others who had left ship for special tours. Left Kwajalein.

22 July 1946		Arrived Bikini Atoll.
23 July	"	Press tour of target group, boarding NAGATO and SARATOGA. Press Conference Admiral Blandy and Staff.
23 July	"	Four Press conferences: Radiological Safety, (Capt. Lyon and Col. Stafford Warren); Technical Aspects, (Dr. Ralph Sawyer and staff); JCS Evaluation Board and President's Commission (Dr. Compton and Senator Hatch and others) and oceanographic problems (Comdr. Revelle and staff) Selected representatives for Baker Day press plan for Kwajalein.
24 July	"	CJTF-1 announced 25 July as Baker Day.
25 July	"	Baker Day. Detonation at 0835. SARATOGA sank at 1608. Reentered lagoon, anchoring near entrance about 1800.
26 July	"	Press conference, Admiral Blandy and Staff. Selected correspondents joined CJTF-1 for tour of target array. Departed for Kwajalein.
27 July	"	Flight over target from Kwajalein. Some correspondents departed CROSSROADS: APPALACHIAN returned to Bikini.
28 July	"	Press inspection of beached Destroyer HUGHES and APA FALLON. Press conference Vice Admiral E. L. Cochrane, Chief BuShips and staff. Press and observers toured target array on USS PRESERVER (ARS-8).

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29 July	1946	Press conferences: Wave measurement (Comdr. Revelle and Mr. Holter); Instrumentation (Drs. R. A. Sawyer, Thatcher, Hartman and Penny); Evaluation Board and President's Comm. representative and final conference Admiral Blandy and Staff. APPALACHIAN departed Bikini.
30 July	"	Arrived and departed Kwajalein enroute Honolulu and San Francisco only five of original press group on board.
5 August	"	Arrived Pearl Harbor.
9 August	"	Departed Pearl Harbor enroute to San Francisco. Three members of press on board.
16 August	"	Arrived San Francisco.

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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 (L) - GENERALIZED TARGET LAYOUT TEST ABLE

1. The operation of forming the target array for TEST ABLE may properly be considered to have commenced with the laying of the buoys for the center of the layout. This work was commenced on five April and was completed by one May, all moorings having been tested with a 42,000 lb. pull between adjacent buoys.

2. Locations of ships in the target array had to be considered in planning the movement schedule of target vessels from Pearl Harbor to Bikini. Thus, large target ships on the windward side of the array had to be brought in early, in order that approaches to their anchorages from leeward would not be fouled by ships which had arrived earlier. In the case of those ships in the center of the array, where ships were to be moored bow and stern in close proximity to each other the order of arrival and entry was of even more critical importance.

3. The berthing of ships was carried out in close conformity with Appendix IV of Annex A to CTG 1.2 Operation Plan 1-46. The vanguard of the target vessels arrived on twenty-eight May. As each vessel arrived at the mouth of the lagoon she was conducted to her moorings or berth by "berthing officers" of the Staff of CTU 1.2.7, assisted as necessary by tugs. By the evening of thirty-one May the bulk of the heavy ships were in their assigned berths, and it remained only to berth the LST's and smaller craft. The only exceptions to the foregoing were the New York, which had been diverted to Kwajalein because of a serious epidemic of bacillary dysentery on board, and the Prinz Eugen, which was detained at Pearl Harbor for machinery and boiler repairs.

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These ships arrived at Bikini on fifteen and nine June, respectively, and the array was completed, except for the craft which were to be beached on Bikini Island.

4. Good weather prevailed through out the operation and no very serious difficulties were encountered. The task of anchoring ships exactly in the centers of assigned berths was rendered somewhat difficult by the paucity of navigational landmarks and beacons in the general area of the anchorage. Early arrivals experienced little difficulty in this respect, but some of the later arrivals found that the view of shore beacons established on nearby islands of the atoll was obscured by the veritable forest of masts and stacks of the ships which had arrived earlier. Subsequent to completion of the target array, a careful survey was made of the positions of ships in the array with the aid of aerial photographs of the layout. Final readjustment of positions was completed prior to Queen Day.

5. There were ninety targets moored or beached in the lagoon when the bomb exploded. They were not in battle formation but were placed in positions to give the largest amount of desired technical information with especially close concentration around the center target point. The battleship NEVADA, with its bright red hull and white deck was selected as the target center for the bomb drop. The remainder of the target array, consisting of nearly every type of vessel, three of which were foreign (a battleship and two cruisers), plus concrete barges, a concrete floating drydock and aircraft, was layed out in a great "spider-web" pattern. Some of the targets were anchored or moored more than two miles from the center of the array; others (amphibous craft) were beached at Bikini Island. In this manner it was possible to determine the varying degree of damage sustained by the ships and the physiological effects on the animals which were on board them. Here it should be remembered that the target ship decks carried a great variety

of test material not ordinarily exposed on the decks of naval vessels.

6. This test was held so that adequate data of a sort necessary for the re-design of naval vessels to minimize damage to superstructures and exposed personnel from this type of bomb (a single explosion, air burst) could be provided. Every effort was employed to utilize highly skilled personnel to obtain a maximum amount of data in an unbiased, scientific manner.

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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 (M) - GENERALIZED TARGET LAYOUT TEST BAKER

1. Whereas the first experiment was an air burst this time the bomb was detonated slightly below the surface of the water. For this purpose the LSM 60, with her elaborately rigged equipment, was selected as center of the target array. Ships used as targets in Test Able were again used in Test Baker. Because of the nature of this test the target layout had to be modified to some extent. However, the same "spider-web" pattern was used. As before, the targets were not in battle formation but were placed in positions to give the greatest amount of desired technical information. The close concentration around the center target point noted in Test Able was lacking in the array for this test.

2. The work of moving ships out of the center of the target array after Test Able and laying new buoys for the Test Baker array was commenced on five July. This work went ahead concurrently with the shifting of ships into their assigned berths for Test Baker. The operation, as such, presented no special difficulty except for some delay and interference occasioned by other work which necessarily had to be done at the same time. Such conflicting activities were:

(a) Diving operations for inspection of sunken ships underwater instrumentation, etc.

(b) Laying of special buoys for instrumentation and other purposes.

(c) Repairs to damaged ships to place them in readiness for Test Baker.

Formation of the target array was completed on fifteen July, except for minor adjustments to positions of certain vessels, which were accomplished during the two days following.

3. In Test Able the greatest damage was inflicted on superstructures; while in Test Baker the greatest damage was expected to be inflicted on ships hulls. The target layout and instrumentation for Test Baker was designed to obtain maximum information from the results of underwater shock, wave action and severe drenching.

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REPORT ON
ATOMIC BOMB TESTS ABLE AND BAKER
(OPERATION CROSSROADS)
CONDUCTED AT
BIKINI ATOLL, MARSHALL ISLANDS
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PART VII - SPECIAL REPORTS

SECTION (N) - OCEANOGRAPHY

1. SUMMARY.

The atomic blast will contaminate directly a volume of water which is small compared to the total volume of the lagoon. This small water mass will increase in size, with corresponding decrease in the concentration of contaminant, by current transport and by the processes of horizontal and vertical diffusion. The water mass contaminated internally by the blast will be spread the full length of the lagoon within about two days. Radioactive materials deposited with the plume or by convective rains following the blast will be spread more widely and will reach the edges of the lagoon sooner, but their concentration will be relatively low.

The current system is particularly important in predicting events subsequent to the blast. The description presented here is the result of a survey conducted during March and April. Further studies will be made in June to determine whether conditions have changed significantly. The system consists primarily of a wind driven surface current flowing in a WSW direction with an average speed of 0.3 knot (varying slightly with wind velocity), extending to a depth of about 40 feet where it gives way to a thicker and slower (0.1 knot) ENE bottom current. These two currents form a continuous, rotary circulation, with bottom water upwelling at the eastern end of the lagoon to join the surface flow and, surface water sinking at the western end.

Oceanic water flows into the lagoon continuously over the eastern and northern reefs. The total volume of flow is about three percent of the volume of the lagoon per day. Continuous outflow occurs through the western part of ENYU Channel. Elsewhere, channels, passes and the western reef, the current reverses with the tide. The tidal flow is strongest through the southwestern passes, but the tidal interchange is relatively ineffective in flushing the lagoon. It is estimated that only 40% of the water leaving the lagoon on the ebb tide is true lagoon water. The remainder is oceanic water that has come into the lagoon on the preceding flood tide. Not much more than 10% of the water entering on the flood tide becomes thoroughly mixed with lagoon water and carried into the general lagoon circulation.

By far the larger part of the water in the central part of the lagoon has thereafter come in over the eastern and northern reefs. As this water flows in, it is absorbed into the rotary circulation of the lagoon, thus renewing the lagoon water, while at the same time the latter is being flushed out of the southwestern passes at a rate of 3.2% per day. At this rate of flushing, any given mass of water in the lagoon will on the average be reduced to one-half its original volume in 22 days and to one-tenth its volume in two and a half months. The rate of flushing will presumably be somewhat slower than average for water in the northwestern part of the lagoon, which has a relatively closed circulation, and faster in the eastern and southern portion, which is more exposed to tidal interchange.

At the time of Test ABLE a patch of contaminated water will be formed at the surface in the target area. The contamination will move with the surface current in a WSW direction at a speed of about 0.3 knot (assuming a 10 knot easterly wind), so that its center will have moved about 7 miles from the center of the target area in the course of a day. At the same time its concentration will be reduced rapidly by vertical and horizontal diffusion.

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It is estimated that these processes will reduce the concentration to 1% of the initial value in two hours and to 0.01% in one day (not counting radioactive decay).

In Test BAKER it is likely that the radioactive products will be uniformly distributed from surface to bottom. The patch of contaminated water, originally more or less circular, will be elongated rapidly by currents flowing westward at the surface and east at the bottom. The contaminated water at the surface will be diluted by vertical mixing with underlying water at an estimated rate of 25% per hour. The reduction in the concentration of the bottom water moving eastward from the target area is expected to be about 8% per hour, the difference being due to the fact that the bottom current is three times as thick as the surface current.

Therefore part of the radioactive products will be carried away from the target area, but part will be transferred by vertical diffusion to the other current and will be carried back again. Thus a strip of contaminated water is developed, which lengthens westward with the speed of the surface current flowout with rapidly diminishing concentration, and eastward with the speed of the bottom current. The maximum concentration will remain to the eastward of the target area.

At the end of the first day the strip of contaminated water is expected to extend from BIKINI Island to a point about 7 miles WSW of the target. The concentration at the western end of the strip is expected to be about 0.01% of the initial value, taking into account vertical and horizontal diffusion but neglecting radioactive decay. At the eastern end of the lagoon the average concentration will be about 1% of the initial value, but there may be patches of unswelling bottom water with a concentration of 10% or more.

At the end of two days the strip of contaminated water will extend from BIKINI Island to the southwestern [illegible] and will be about two miles wide. The maximum

concentration in the eastern end will be less than 1% of the initial value and in the western end about 1 X 10-5%.

It is difficult to carry the analysis beyond this point, but it is certain that further dilution will take place at a much slower rate, and it will probably require a week or two to reduce the maximum concentration to 0.1% of its original value.

If the winds were only 5 knots instead of 10, three or four days would be required to establish the condition described. If they were 20 knots, it would require about a day and a half. It is not possible to predict accurately what would happen in the case of flat calm or wind direction other than easterly since neither has been observed. It is certain, however, that the above predictions would have to be modified. It is probable that with several days of calm weather, the internal circulation of the lagoon would be destroyed and that radioactive products would be spread only by tidal currents and a very slow horizontal diffusion. With southerly winds, on the other hand, it is possible that the lagoon circulation would be accelerated by increased inflow through ENYU Channel.

After the second day contaminated water will begin to leave the lagoon by a series of ebb tide pulses through the southwestern passes. The amount leaving the lagoon will be very small at first and will increase during the first week or so to a maximum of about 3% of the total contaminant in a days time. Thereafter the rate of loss will be about 3% of the remaining contaminant per day.

2. GENERAL DESCRIPTION OF THE AREA.

2.1 Morphometry

BIKINI Atoll (see enclosed chart), centered at 11°35'N, 165°22'E, is roughly oval in shape, 23 miles long on the eastwest axis, 13 miles north and south.

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Measurements of the chart show that the total area of the lagoon is 641 km^2 (192 mi^2). About 40% of the lagoon has a depth of 25 to 30 fm. Bottom areas above and below these depths are progressively smaller except for the zone between 0 and 5 fm. which covers 8% of the lagoon area, twice that of the next deeper zone. The isolated coral heads, neglected in the measurements, would slightly increase the area of the shallowest zone.

The total volume of the lagoon below lowest low water is estimated to be 28 km^3. Of this volume, about 72% lies below the general still depth of 7 fm. in ENYU Channel. Only about 4% of the water lies below the 30 fm. bottom of the deepest still, ENIRIKKU PASS.

One-third of the circumference of the atoll is composed of islands. They constitute the only portion of the rim over which flow of water is completely prevented. Between the island are long strectches of shallow reef which together make up about half the circumferences of the atoll. They are exposed at lower low tides, and at high tides are covered by up to five feet of water. There are eight passes or channels, which constitute about 2% of the circumference of the atoll, all on the south and southwestern side. The largest one, ENYU Channel, amounts to three-fourths of the total width of the passes and two-thirds of the cross-sectional area. Its sill depth is about 3 to 10 fm., and the underlying reef is visible from the surface throughout its length. In the deeper southwestern passes the remains of the reef are visible at the edges, shelving steeply toward the center of the channels, which cut deeply into the reef.

Table 1 summarizes the measurements of the periphery of the atoll and includes an estimate of the cross-sectional area of water in the passes and over the reefs.

Table 1. Measurements of the periphery of the atoll

	Periphery	Cross-section
Islands	33 km.	- - -
Reefs	47	.05 km^2
Passes	20	.30
Total	100	.35

2.2 Oceanography and meteorology

2.21 The current system of the region

BIKINI Atoll lies in the North Equatorial Current, a westerly drift of water largely wind-driven by the NE Trades. The surface water flow is about half a knot. The velocity decreases with depth, but slight flow can be detected at depths of 200 fm. or more. The southerly flow can be detected at depths of 200 fm. or more. The southerly limit of the current is believed to lie between 6° and 9°N at this longitude, but the available data are meager. It seems likely that the seasonal shift of the trades and the North Equatorial Current is never large enough to place BIKINI in the Doldrum Belt; however, it is mentioned in passing that if this should happen, the conclusions in this report about the current system inside and outside the lagoon would be invalid for the period in question.

The simple picture of a westerly current is modified and complicated by the presence of the atoll. Only the upper few feet of water can flow unimpeded into the lagoon. The remainder splits and passes around the obstruction, giving rise to eddies and to variations in the direction of flow which extend some distance around the atoll. These currents will be described in more detail in a subsequent report.

The temperature of the surface water is about 80° to 82°F. There is a virtually mixed layer of water in the upper 300 to 400 feet, in which the decrease in temperature with depth is at most 2°. Thus the water that enters the

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lagoon is relatively homogeneous. From the surface to the depth of the deepest sill, no observations has been obtained of a variation of as much as 1°.

A tide station was operated inside the lagoon off BIKINI Island at latitude 11°37'N, longitude 165°31'E, and another on the seaward side of the sand spit north of the island. The observed times of high and low water agreed with the predicted tides for BIKINI (USCGS) within the limits of accuracy of the equipment. The observed tidal range averaged 87% of the predicted range. Lowest low water corresponded to a reading of 1.19 feet on the tide staff. The station is believed to be representative of conditions over the entire lagoon for the following reasons:

(a) The size of the channels permits easy communication with the ocean.

(b) No appreciable tidal lag has been found between observations inside and outside the reef.

(c) Winds are steady and storm tides unlikely.

The large Pacific tidal wave that caused extensive damage in ALASKA and HAWAII on 2 April was recorded at BIKINI at 1530 as a single wave raising the water level one and a half feet above normal for a period of twenty minutes. It was preceded and followed by twelve hours of unusually high seiches, many of them exceeding one foot, with periods of 13 to 15 minutes.

Small lagoon seiches of periods somewhat longer than one hour and heights up to 0.2 foot have been recorded frequently. They are of no importance in evaluating the circulation of the lagoon.

According to HO Misc. 11275, the waves generated inside the lagoon should be 1.8 feet high at the anchorage area, 2.5 feet in the middle of the lagoon, and 3.8 feet at the western end with an 18 knot wind. With a 10 knot

wind they should be respectively 1 foot, 1.5 feet, and 2 feet. The periods should be between 2 and 3 seconds. These values agree with observations.

The trade winds give rise to large breakers on the exposed eastern and northwestern reefs. With an 18 knot wind, the breakers were found to be about 10 feet high. If the winds decrease during the summer, these waves will become smaller and should be about 4 feet high with a 12 knot wind.

A swell recording unit has been in operation inside the lagoon near BIKINI Island, which has shown the existence of swell about a foot high and with a period of 9 seconds. Although generally too small to be noticeable from large ships at anchor, it breaks sharply against shore on the lagoon side of the reef. It is believed that this swell is not related to the waves generated by the trade wind, since the period differs and since the bottom drops off too steeply off BIKINI for the waves to be refracted inside. They are believed to have come through the channel from the south and to have been generated in the southern hemisphere. During July and August, the winter season in the southern hemisphere, they may be as high as five feet in the target area.

2.23 Meteorology

Table 2 is a summary of meteorological observations obtained during the present investigation, and Figures 1 and 2 show daily wind averages and the diurnal variation in wind speed. It is by no means certain that the observed diurnal variation is typical, for the May observations showed practically none.

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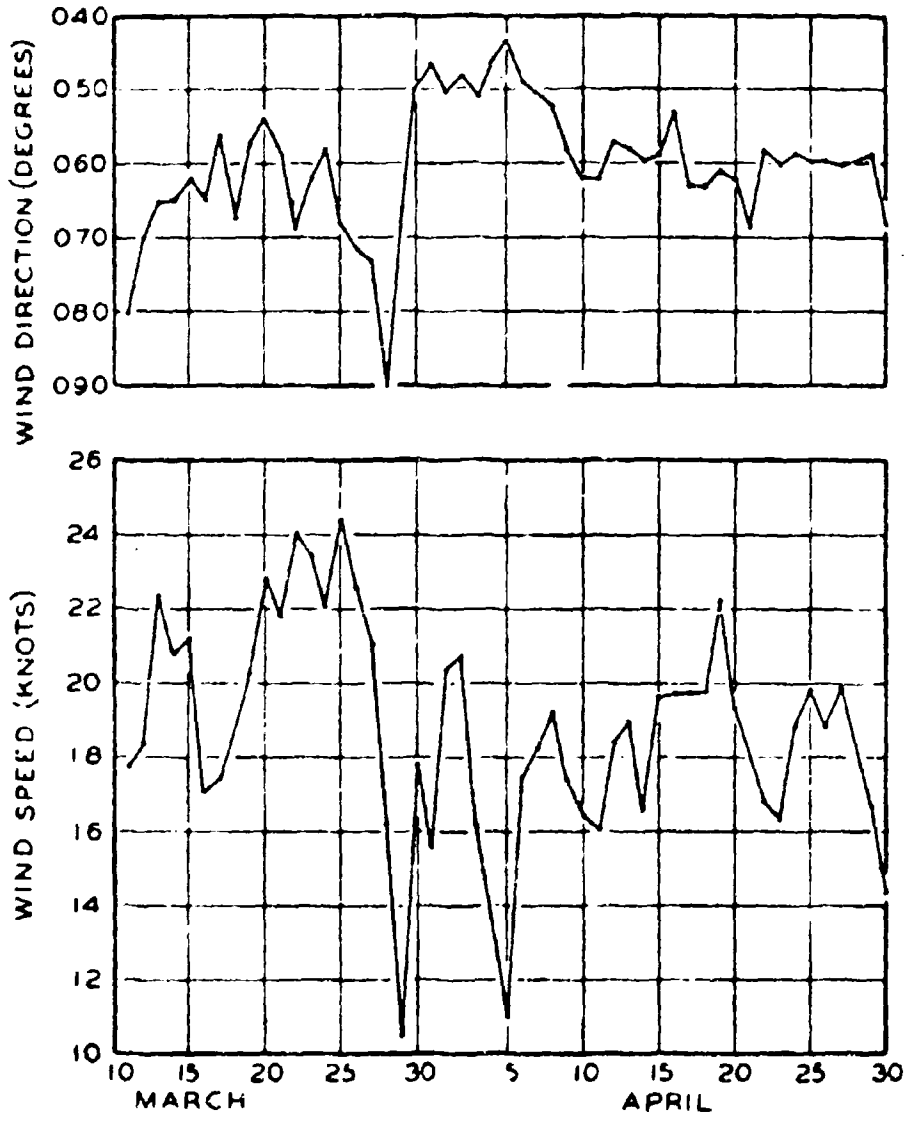


FIGURE 1
AVERAGE WIND SPEED AND DIRECTION

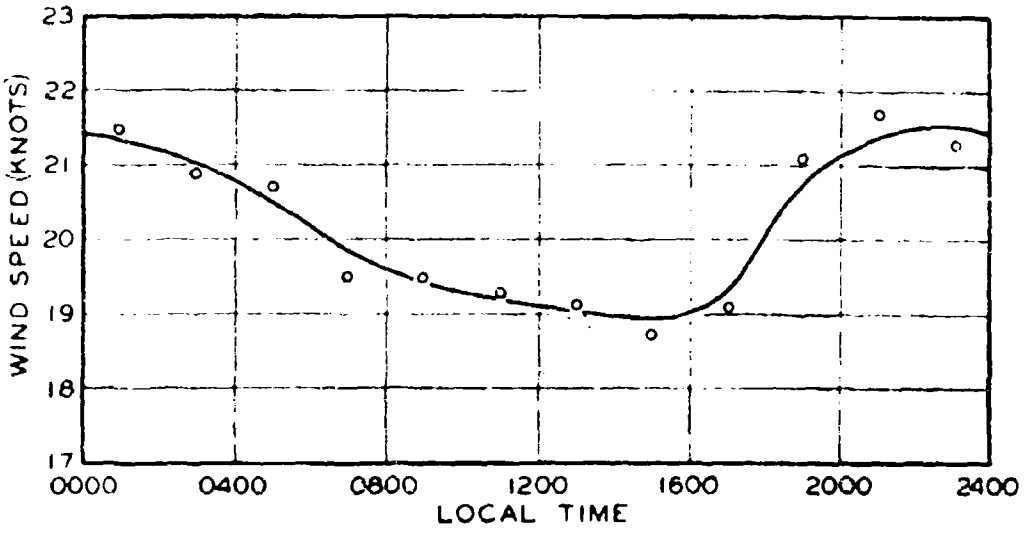


FIGURE 2
DIURNAL CYCLE OF WIND SPEED

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Table 2. Weather observations from BIKINI.

	Mean air temperature	Amount clouds	Primary wind direction	Wind speed
March	82.6	6.8	ENE	20
April	81.7	6.4	ENE	18

The wind observations are subject to a certain amount of error, first because the velocity was measured with an anemometer 90 feet above the water so that the recorded winds were stronger than surface values would be, second because readings were made during only 10 minutes of each hour. The measurements are sufficiently accurate, however, to serve the purpose of correlation with oceanographic phenomena.

5. OCEANOGRAPHY OF THE LAGOON

5.1 Currents

Three methods were used to measure currents; (a) current meters, by which the velocity was determined at various depths from surface to bottom and the direction to a depth of about 100 feet, the limit of visibility; (b) current poles, which determined the average drift of the upper fifteen feet of water over periods of from eight hours to a day and a half; (c) dye marker, which was used primarily in the channels and over the reefs, where others methods were impracticable.

Figure 3 shows the general drift of the surface water of the lagoon as determined by current pole observations. Data obtained by all three methods are presented in Figures 4 to 7.

The circulation of the lagoon as determined by the current measurements is as follows:

(d) Over the eastern and northern reefs, continuous inflow results from the fact that outside currents and wave action maintain a gradient in water level between the outer reefs and the lagoon amounting to about 1.5 feet.

(b) Continuous outflow occurs through the western part of KAYU Channel. The volume of this flow is a little more than half the inflow over the reefs.

(c) Elsewhere on the periphery of the lagoon the direction of flow changes with the tide. The ebb is stronger than the flood through the southwestern passes.

(d) The dominant features of water movement inside the lagoon are a wind-driven surface current flowing in a generally WSW direction and a return current along the bottom.

(e) The surface current extends to a depth of 40 feet or more. Its velocity varies with the wind as shown in Figure 8. Throughout the entire lagoon the current is influenced to some extent by the tide, decreasing on the flood and increasing on the ebb and with a more pronounced southerly component on the ebb. Near the southwestern passes the flood tide is strong enough to reverse the surface current.

(f) Part of the surface current leaves the lagoon through the passes and channels with each ebb tide; however, the outflow accounts for only 30% of the total transport into the western end of the lagoon. The remainder sinks and returns as an ENE bottom current, carrying with it some outside water that has come into the lagoon on the flood tide. The bottom current is thicker

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than the surface current but slower and more compressed laterally (occupying about the central one-half to two-thirds of the area of the lagoon). Its mass transport is probably between 70% and 90% that of the surface current. Like the latter, it is affected by the tide, the speed decreasing on the ebb and the direction changing near the passes.

(g) From BIKINI Island westward there is a current which runs at mid-depths just inside the northern reefs and more or less parallel to them. It increases in size and thickness as it progresses westward. The salinity of the water in this current (see section 3.21) indicates that it is reef water of fairly recent origin. Its final disposition in the western end of the lagoon has not been studied, but presumably some small part is lost over the western reefs or through the westernmost passes, while the remainder joins the bottom current.

(h) Summarizing these observations: The lagoon derives its water by continuous inflow over the northern and eastern reefs and by tidal interchange along the rest of the periphery, of which the southwestern passes are the most important. The lagoon has an active internal circulation which consists primarily of a westerly wind-driven surface current and a return flow along the bottom.

The current measurements presented in this section are the framework that will be used in fulfilling the practical requirements of the report, namely the determination of the path of contamination in the lagoon and the rate of flushing. However, before preparing the final estimate it is necessary to examine the variations in temperature and salinity in the lagoon, which add to the general knowledge of lagoon circulation and serve as an independent check on the quantitative results.

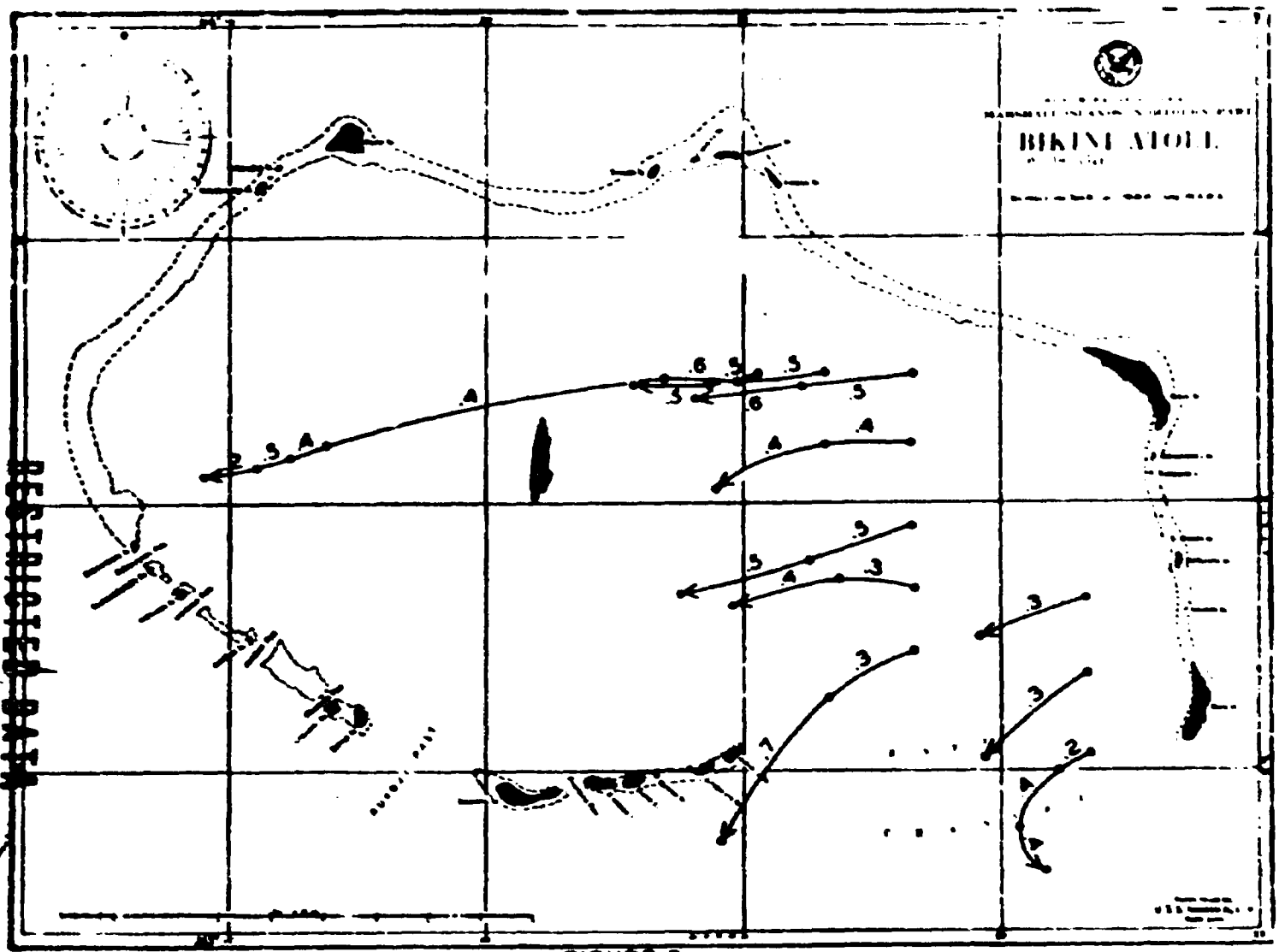


FIGURE 3

CURRENT POLE DRIFT - DIRECTION AND SPEED (KNOTS)

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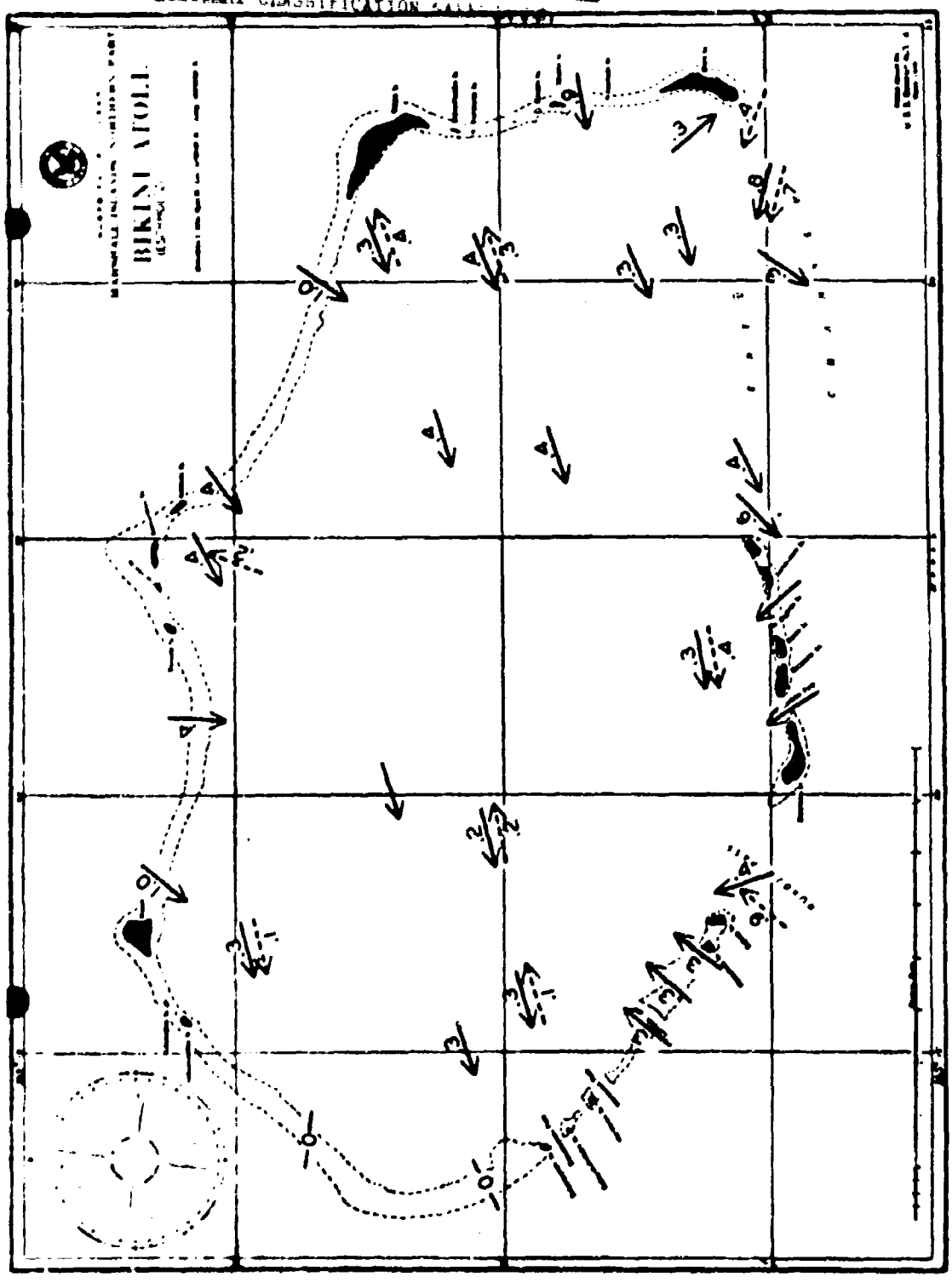
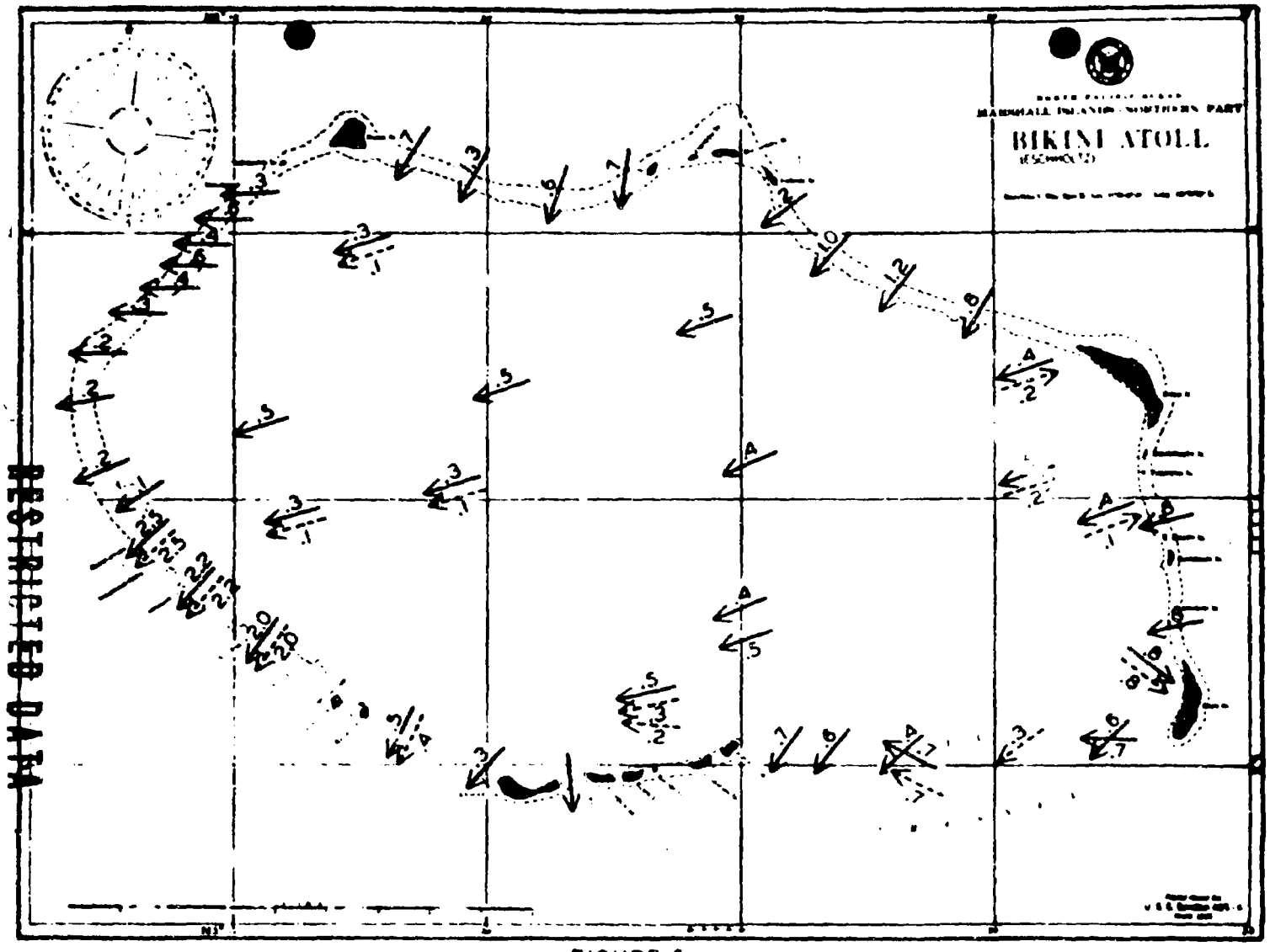


FIGURE 4
CURRENT VELOCITY (KNOTS)-HIGH TIDE - AT SURFACE (⟶) AND AT BOTTOM (- - - ⟶)



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FIGURE 5

CURRENT VELOCITY (KNOTS)- **EBB TIDE** - AT SURFACE (⟶) AND AT BOTTOM (---⟶)

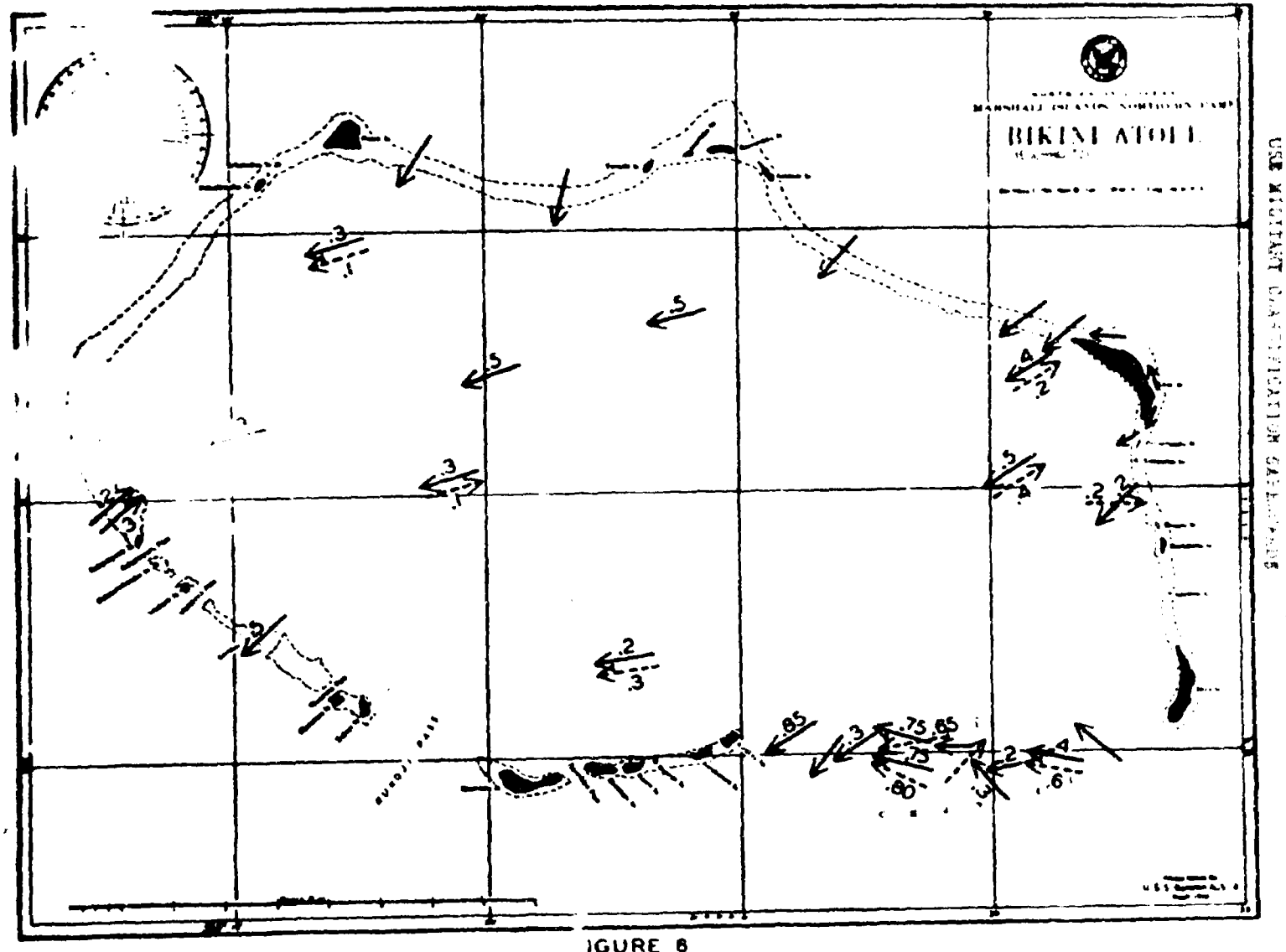


FIGURE 8

CURRENT VELOCITY KNOTS - LOW TIDE - AT SURFACE (⟶) AND AT BOTTOM (- - - ⟶)

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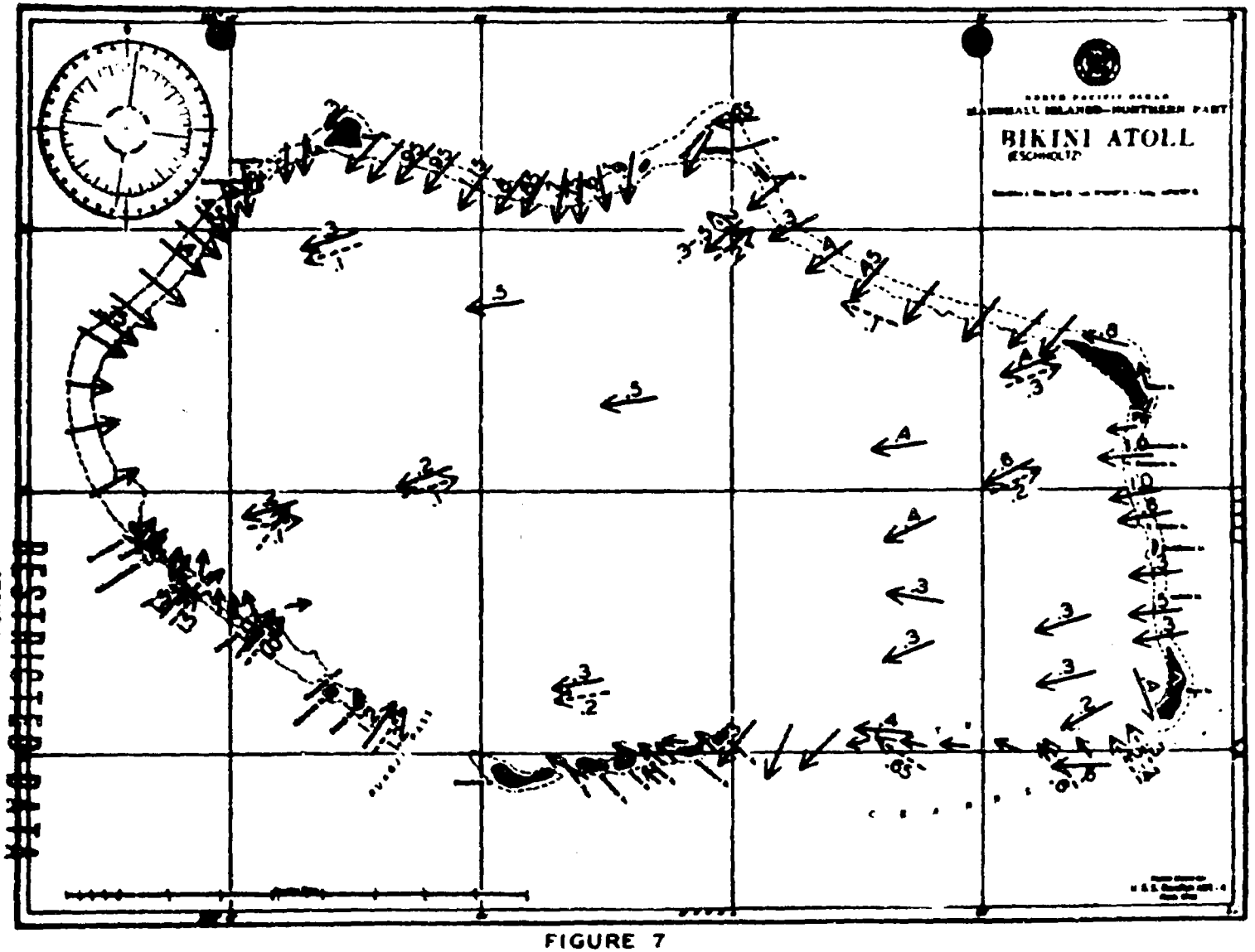


FIGURE 7

CURRENT VELOCITY KNOTS - FLOOD TIDE - AT SURFACE (——>) AND AT BOTTOM (---->)

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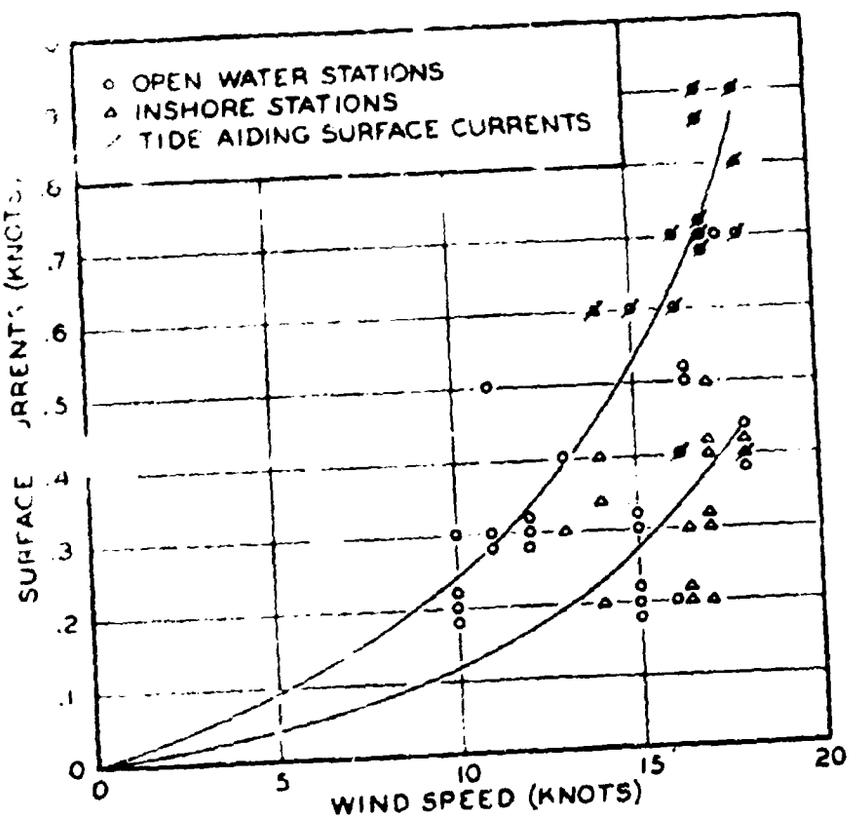


FIGURE 8
EFFECT OF WIND ON CURRENT SPEED

5.2 Measurements of temperature and chemical constituents.

5.21 Horizontal variations in temperature and chemical constituents.

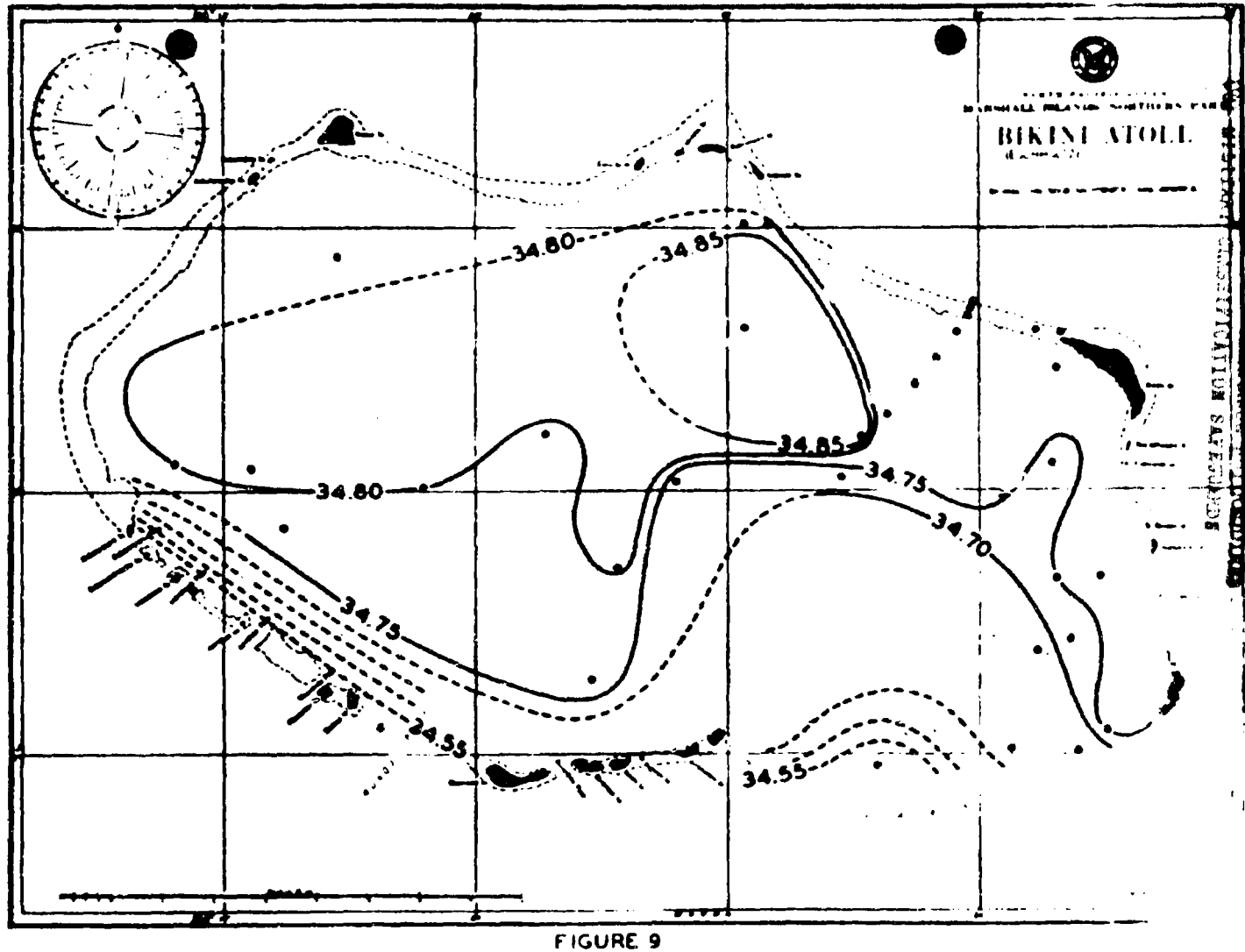
Since the waters of BIKINI lagoon are derived from the relatively homogeneous surface layer of the surrounding ocean and are subject to continual interchange with it, it is not to be expected that a high degree of variability would occur in the lagoon. However, the small variations that have been observed are useful in analyzing the general system of circulation.

Variability can arise in three ways:

(a) In the surface water of the surrounding ocean there are slight north-south gradients in temperature and salinity, the temperature increasing southward and the salinity decreasing. Thus the water entering the lagoon from the north is about 0.1°C colder and 0.3°/oo more saline than that which enters the southern passes.

(b) Superimposed on this basic difference is a reef effect. During the short period of its passage over the reef, the water is subjected to an intensification of the surface processes of heating, cooling, and evaporation which in deeper water would be distributed downward by vertical mixing. The salinity of the water coming over the reef is constantly increased by evaporation. Assuming what appears to be a reasonable value for evaporation of 0.5 cm. per day, the salinity will be increased 0.01 to 0.03°/oo, depending on the width of the reef and the strength of the current. The greatest flow over the reefs is on the northern side of the lagoon. Therefore the effect of the reefs is to make the

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FIGURE 9

SURFACE SALINITY (‰) - FLOOD TIDE

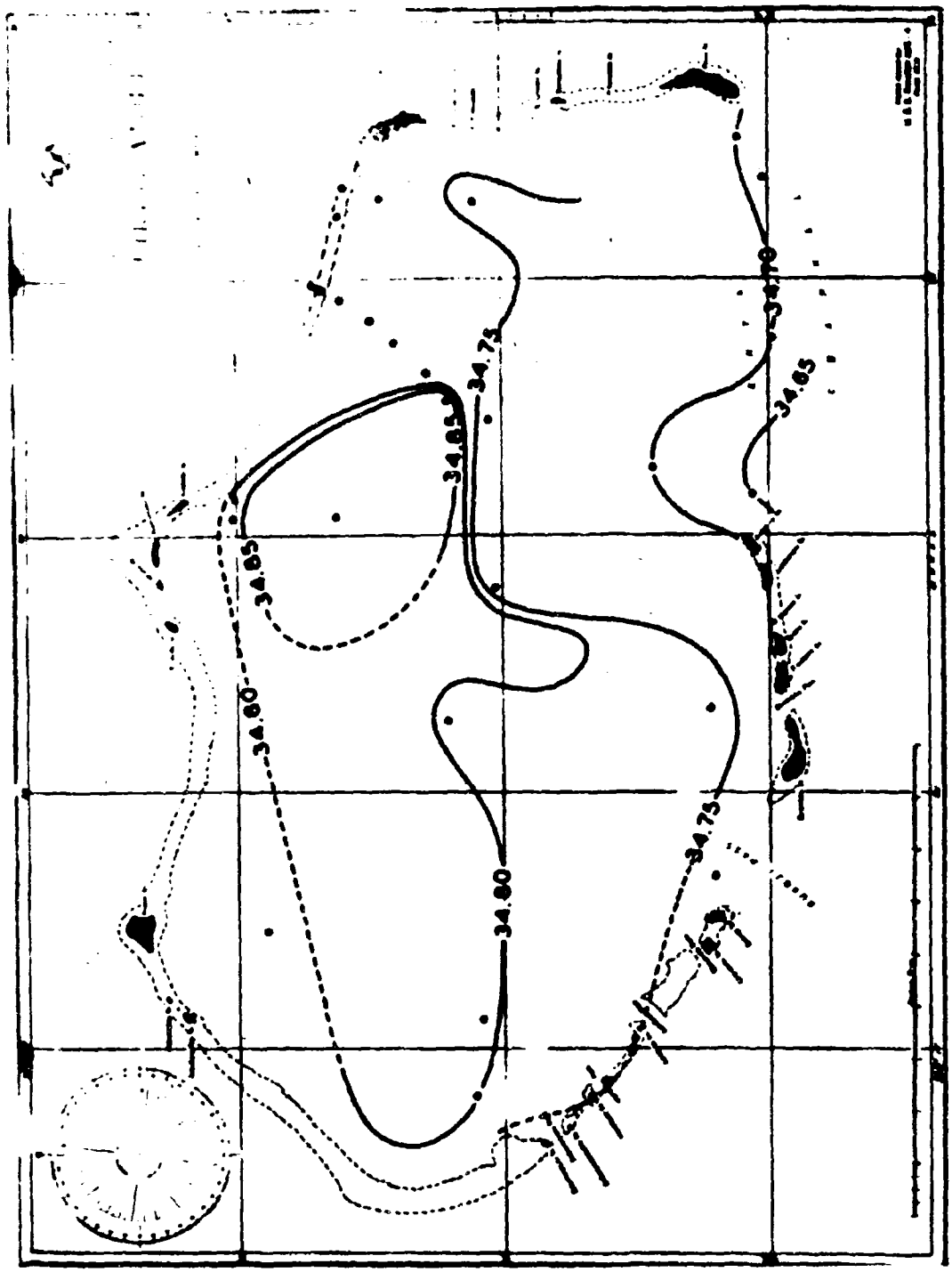


FIGURE 10
SURFACE SALINITY (‰) - EBB TIDE

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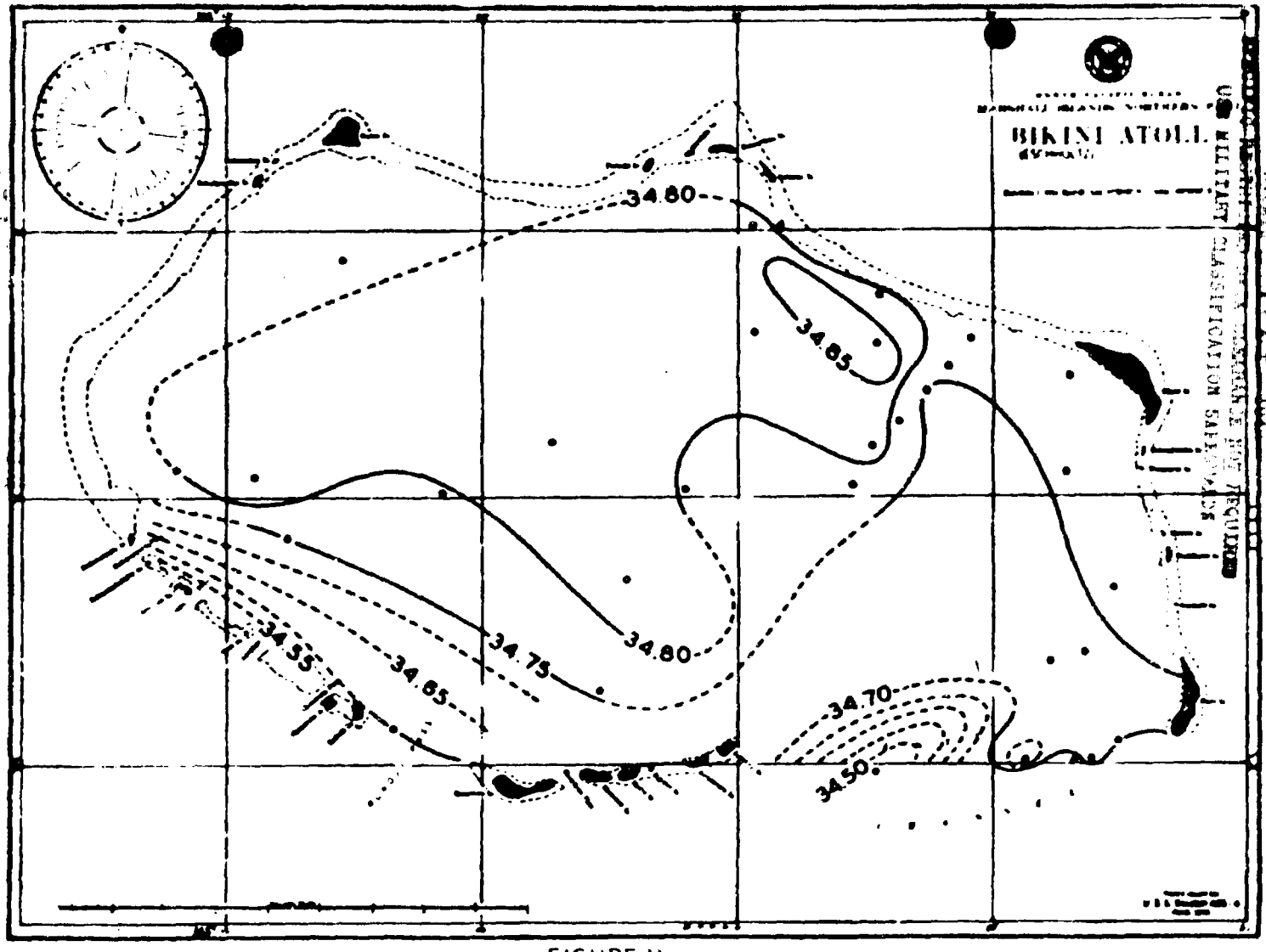


FIGURE II
BOTTOM SALINITY (‰) - FLOOD TIDE

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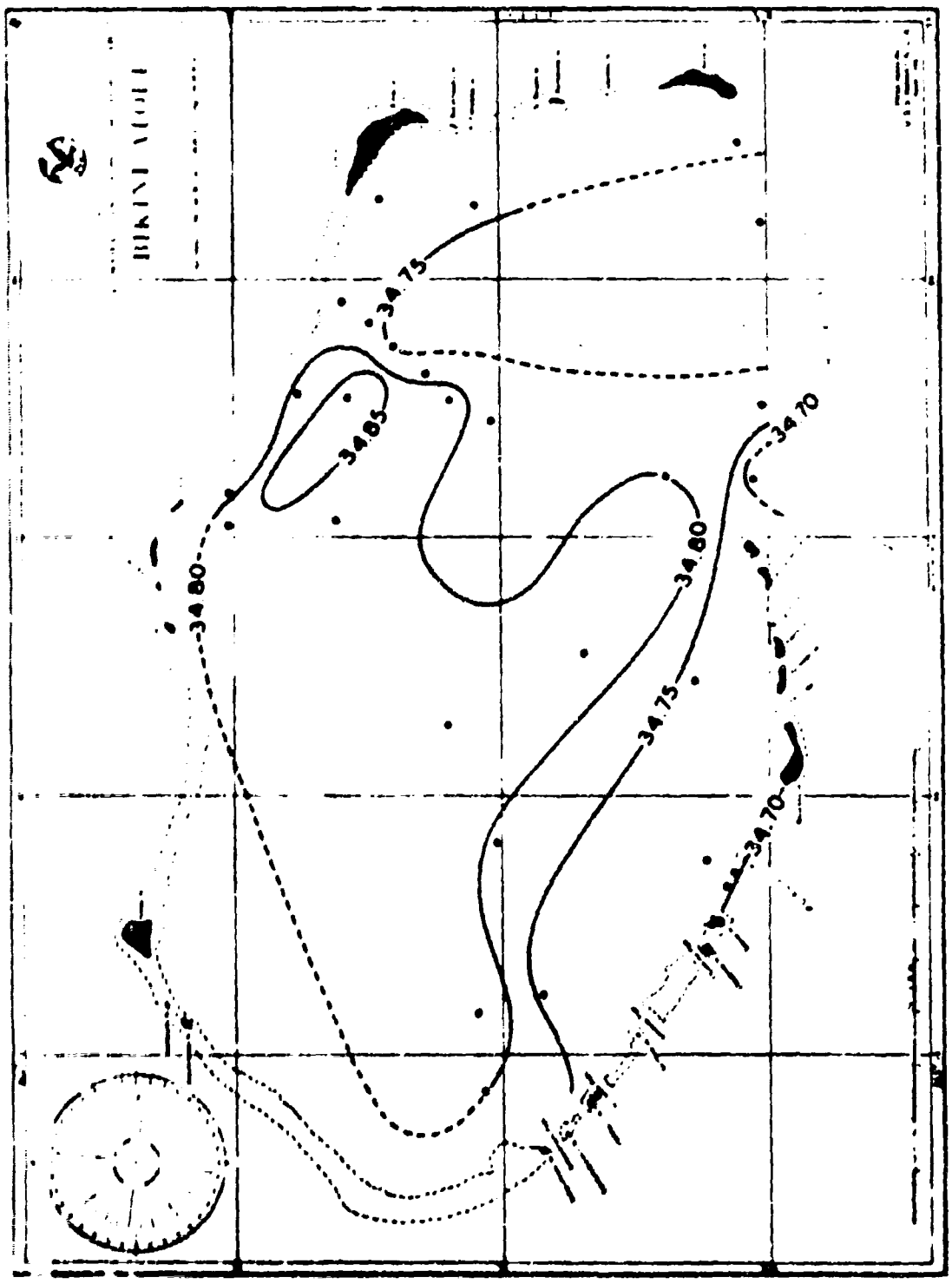


FIGURE 12
BOTTOM SALINITY (‰) - EBB TIDE

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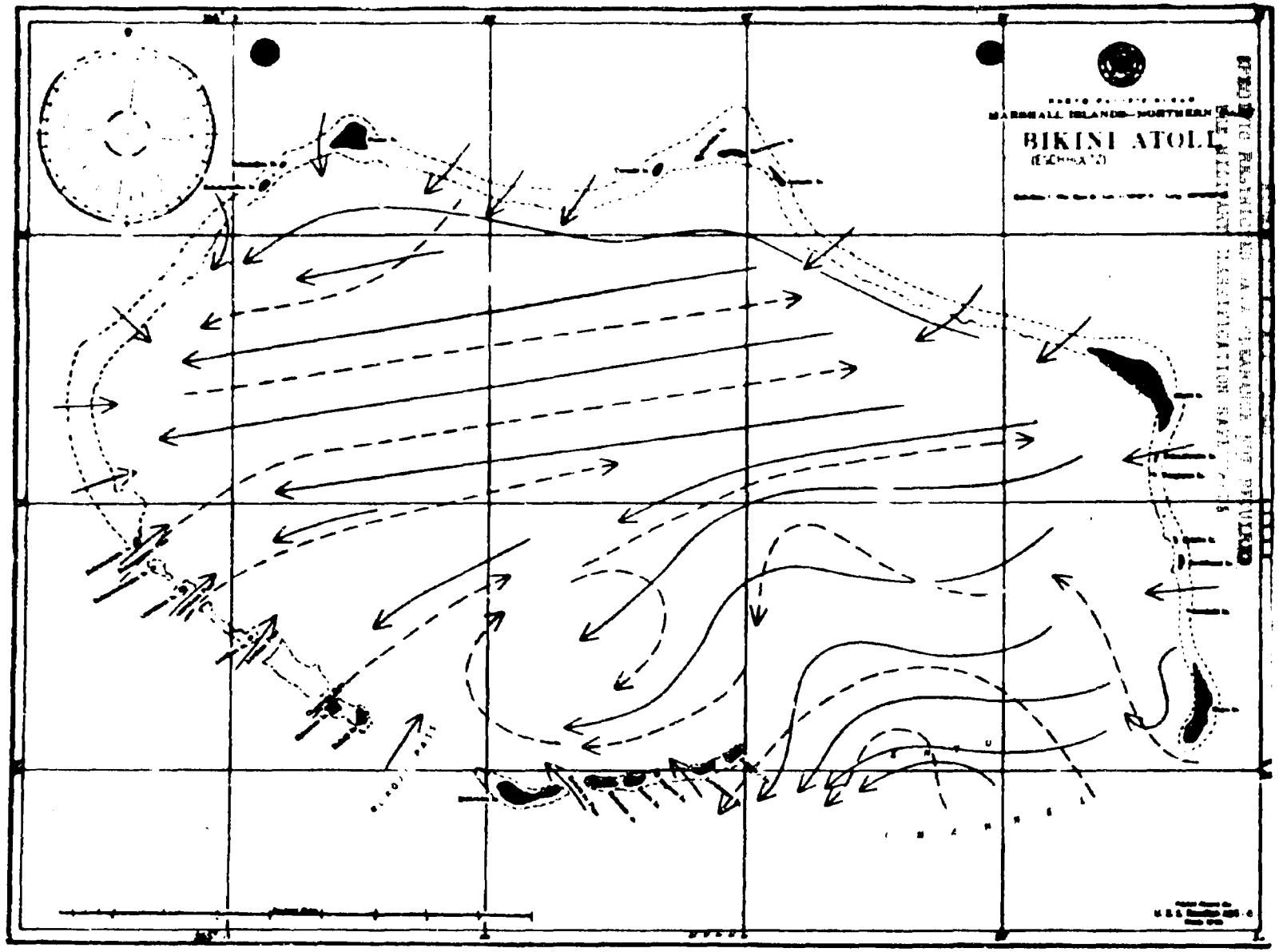


FIGURE 13
SCHEMATIC REPRESENTATION OF FLOOD TIDE CURRENTS
AT SURFACE & INTERMEDIATE DEPTH (⟶) AND AT BOTTOM (- - ⟶)

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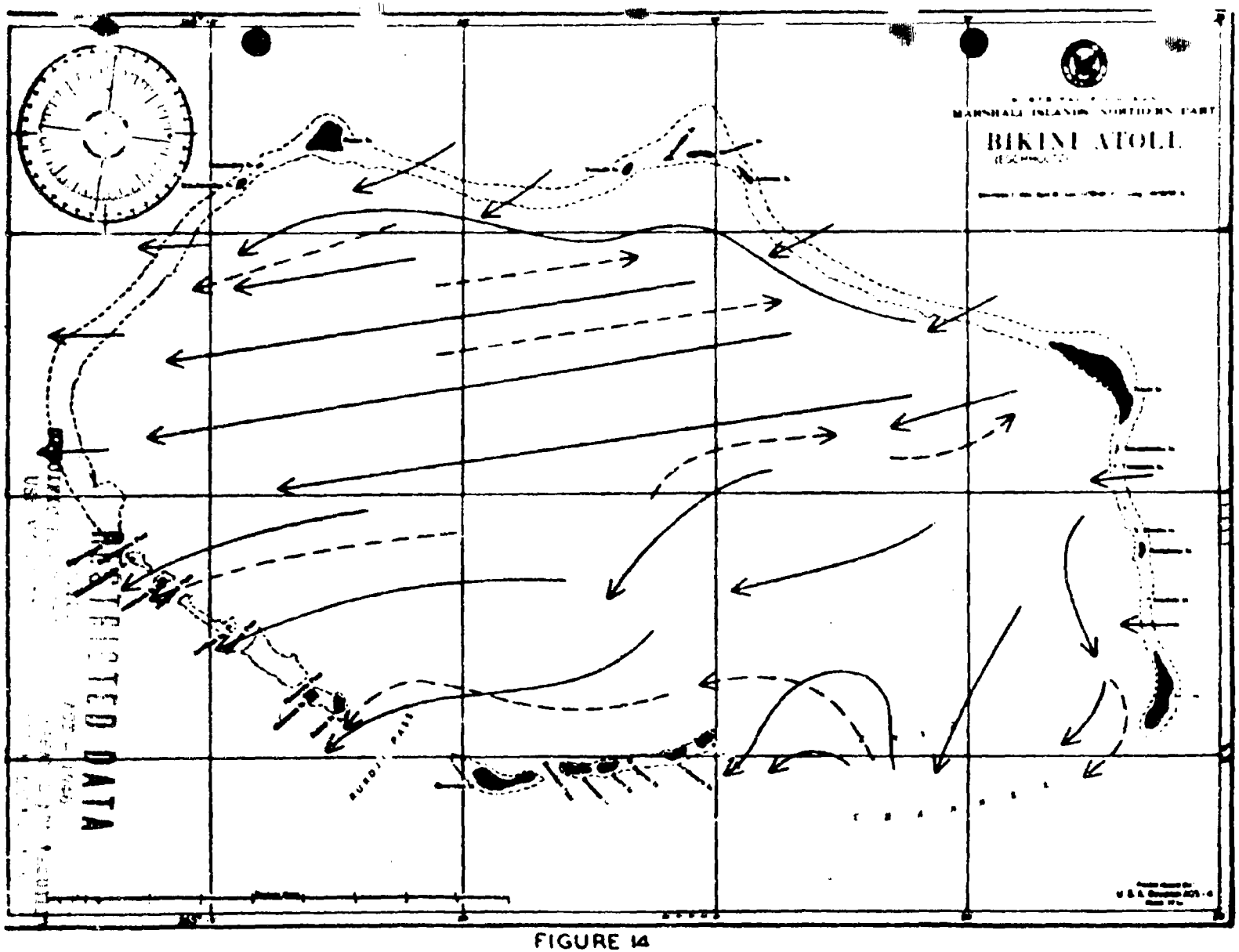


FIGURE 14
SCHEMATIC REPRESENTATION OF **EBB TIDE** CURRENTS
AT SURFACE OR INTERMEDIATE DEPTH (⟶) AND AT BOTTOM(- - ➔)

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north-south gradient in salinity slightly stronger in the lagoon than it is in the oceanic water outside. The effect of the reefs on temperature appears to be important only locally. The water is heated one to two degrees as it comes over the reef during the day and is cooled at night. The temperature is therefore more variable than it is elsewhere in the lagoon, but the net effect on lagoon temperature appears to be negligible. Because of the effect of surf, and possibly by the photosynthesis of reef algae during the daytime, the oxygen content of the water is higher near the reef than in the main body of the lagoon. These variations are used in a later section to analyze diffusion rates.

(c) What has been said of surface exchanges over the reef applies to a lesser extent to the lagoon as a whole. In the open ocean, the effects of surface heating and evaporation are readily distributed through a mixed layer 300 to 400 feet deep. In the lagoon, with an average depth of 175 feet, these effects are more pronounced. It is estimated that evaporation will increase the salinity of the lagoon an average amount of 0.01°/oo in three days.

The distribution of salinity in the lagoon, shown in Figures 9 to 12, is initially dependent on these three factors but is modified by the existing current pattern. In general, the evidence gained from examination of the salinities corroborates the current data previously shown. The current observations and the additional evidence derived from study of the salinities are combined to produce the current patterns shown in Figures 13 and 14, which although somewhat idealized appear to be logical.

The direction of the currents in the north and north-western part of the lagoon indicated that it is an area of relatively closed circulation. The high salinity

of the area is additional evidence. The presence of water with a salinity about 0.1°/oo higher than any incoming water is indicative that some of it remains in the same general area a minimum time of 30 days.

The opposite extreme is the water near the south-western passes, where horizontal salinity gradients of 0.10°/oo per mile indicate rapid mixing with water from outside. Collections made here at different phases of the tide show that the isohalines drift one to two miles during a tidal cycle.

The presence of a tongue of high salinity water extending from the central part of the lagoon toward ENYU Channel is indicative of a complicated current pattern in this part of the lagoon. It is of little practical significance and therefore has not been studied in detail, but there is little doubt that one or more eddies exist between the saline central water and the fresher water to the south.

The salinities in the southeastern part of the lagoon adjacent to ENYU Channel are of some help in clarifying the rather obscure results of the current measurements. The latter show that there is continuous outflow from this area through the western third of ENYU Channel and from the south-western passes by way of a narrow band of current just inside the southern reefs. Obvious sources of flow into the area are the eastern part of ENYU Channel, the eastern reefs, and the main body of lagoon water to the north and west. The salinity distribution indicates that of these possible sources, ENYU Channel is the most important. The expansion and contraction of the 34.75 isohaline proves the existence of tidal interchange. The curvature of all the isohalines demonstrates the presence of an eddy centered somewhere near the middle of the reef in ENYU Channel, such that water flows in through the eastern part of the channel and outward on the western side.

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Study of temperature distribution has added nothing to the general picture of current patterns. Diurnal temperature variations are of a large enough magnitude so that a particular mass cannot retain identifiable temperature character long. Therefore the observations can be used only for studying rapid mixing processes between water masses of pronounced characteristics, such as inflow near the reefs.

3.22 Vertical variations in temperature and chemical constituents.

Vertical variations arise in two ways: (a) by horizontal movements of water masses having different characteristics, and (b) by diurnal changes.

One of the best examples of the first type is found near the reefs where the incoming water is warmer during the daytime than the lagoon water proper. The reef water therefore overlies the lagoon water initially, producing temperature differences between surface and bottom that may be as much as 1°F but more typically are a few tenths of a degree. This is illustrated in Figure 15, a temperature profile obtained by a series of bathythermograph lowerings along a line extending westward from BIKI.I Island. Similar variations have been noted in salinity, phosphate, and oxygen. Differences in oxygen are particularly marked, since the reef water is highly oxygenated by surf effects.

Figures 16 and 17 show diurnal variations in temperature and chemical constituents at two stations. Variations at the surface are only slightly greater than in deep water, which is largely due to rapid vertical diffusion of the products of surface heat exchange. The amount of diffusion is of course dependent on wind velocity. Figure 18 shows the maximum observed difference between surface and bottom temperature plotted against wind velocity. The curve is extrapolated to zero velocity on the assumptions that (a) the total heat increment is about 300 g. cal. per cm^2 per day and (b) the vertical temperature curve is proportional to a normal curve for total energy absorption in moderately clear water.

3.2 Interchange between lagoon and oceanic water.

The current measurements described in section 3.1 were used to estimate the volume of water moving into or out of the lagoon at any given time. A certain amount of error is unavoidable in this estimate, but there are two ways to check the general validity of the results: (a) During a complete tidal cycle the total inflow must equal the total outflow. (b) During any shorter period of time the difference between inflow and outflow must equal the change in the volume of the lagoon as determined by the change in water level.

Application of current measurements to the problem was carried out as follows:

(a) The cross-sectional area of current in each channel and pass was determined by measurement of the chart. Cross-sectional areas along the reefs were estimated by measuring the length of the reef and assuming the approximately correct depths at high and low tide of 130 and 30 cm. respectively, and an average depth of 80 cm. during ebb and flood.

(b) The average velocity of flow was determined across each reef, channel, and pass at high tide, ebb, low tide, and flood.

(c) The volume of flow was obtained by multiplying velocities and cross-sectional areas. Two correction factors were introduced for flow in the passes. The measurements were made in the middle of the passes where flow is at a maximum. By oceanographic theory the average flow in the pass at any given moment should be about three-fourths of the maximum flow, and the figures are corrected accordingly. In the second place, the rate of flow in the passes is not constant throughout ebb or flood. The

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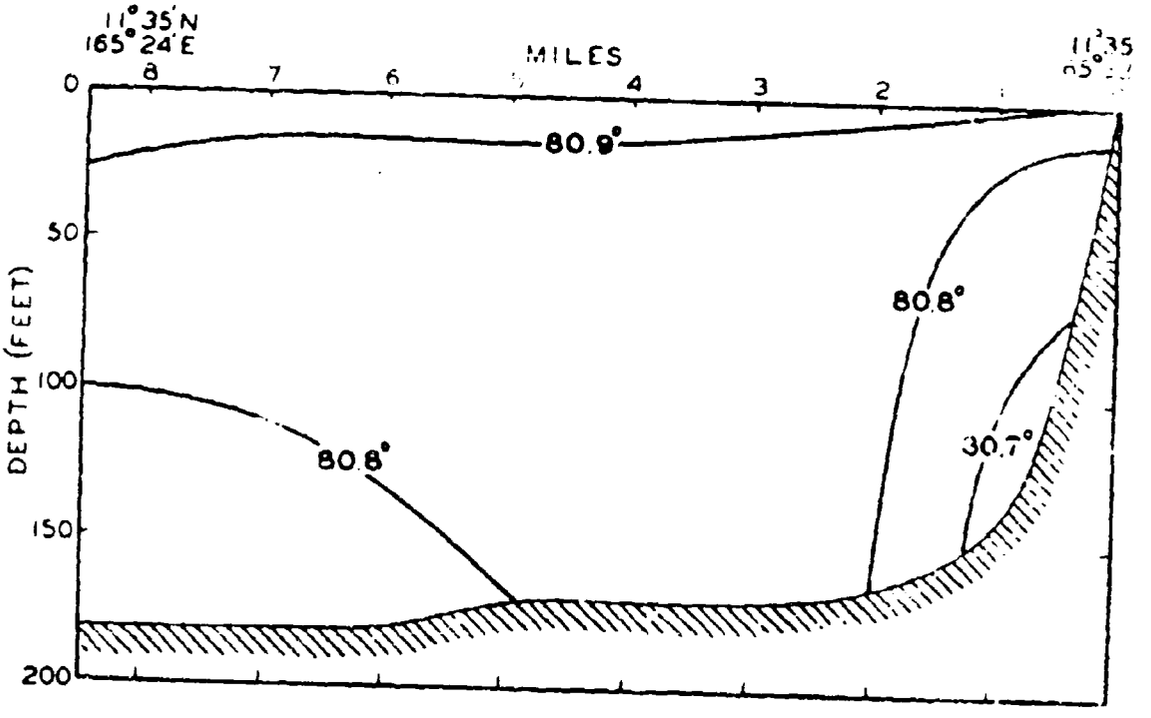


FIGURE 15

VERTICAL TEMPERATURE SECTION OFF EASTERN REEF (°F)

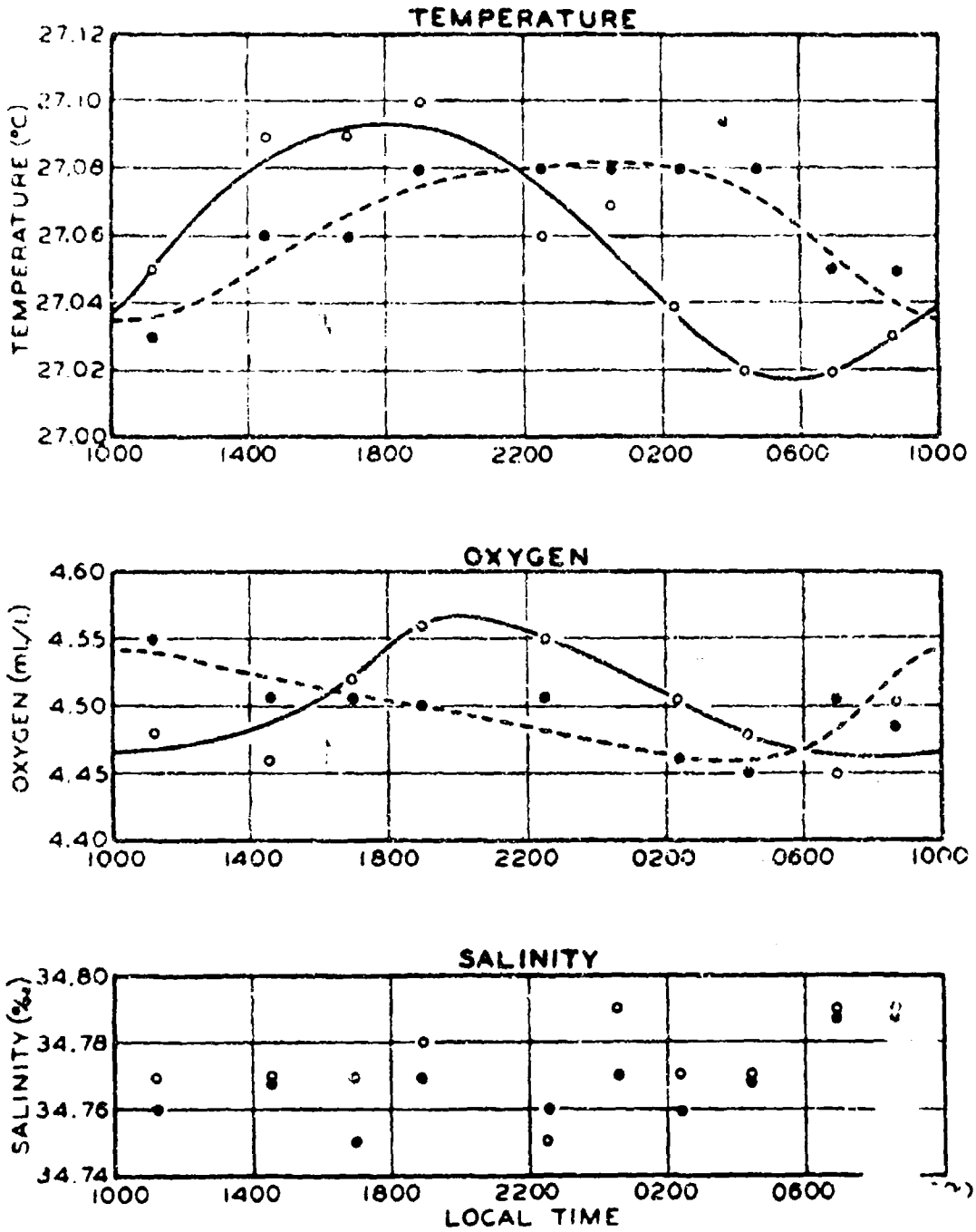


FIGURE 16
DIURNAL CYCLES OF TEMPERATURE, OXYGEN, AND SALINITY
IN EAST-CENTRAL LAGOON AT SURFACE (o—o) AND AT BOTTOM(•---•)

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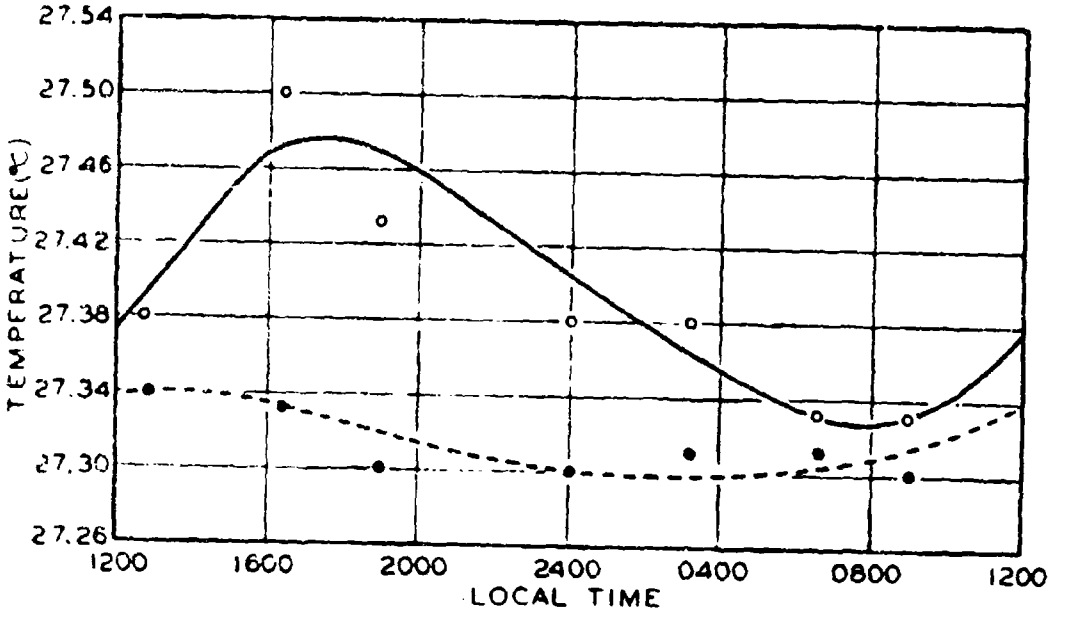


FIGURE 17
DIURNAL CYCLE OF TEMPERATUKE IN WEST-CENTRAL LAGOON
AT SURFACE (o——) AND AT BOTTOM(•- - -)

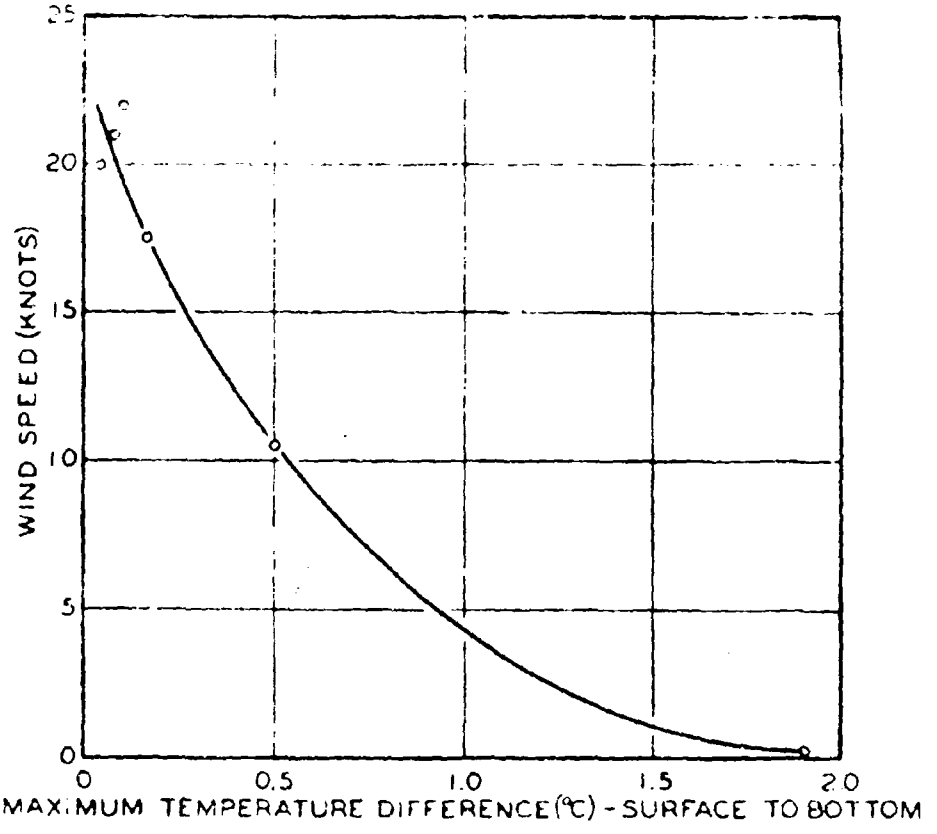


FIGURE 18
EFFECT OF WIND ON DIURNAL TEMPERATURE GRADIENTS

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change in velocity with time is roughly a sine curve, and the average rate of flow can be approximated by multiply the flow at mid-ebb and mid-flow by the factor $2/\pi$. Table 3 shows the results of the calculations.

Table 3. Calculated flow into and out of the lagoon.

(d) The net exchange of water is determined from the duration of each stage of the tide and the volume of flow during that time, as shown in Table 4.

* Positive values inflow, negative values outflow.

** Rukoji is a narrow, deep pass with shallow reefs on each side. The type of flow is difference in the pass from that over the reefs, and they are therefore listed separately.

Table 4. Net transport ($\times 10^{14} cm^3$)

Tide Stage	High	Ebb	Low	Flood
Duration (hours)	0.5	5.8	0.5	5.2
Reefs	0.21	1.75	0.03	1.72
	-0.01	-0.28		
Channels	-0.12	-2.15	-0.12	2.56
				-0.71
Passes	-0.11	-6.97	-0.15	4.29
Sum	-0.03	-7.65	-0.24	7.86

Net inflow 7.86
Net outflow 7.92

Table 3. Calculated flow into and out of * agoon..

Reefs	Length cm x 10⁵	Length cm x 10³	Velocity cm/sec.* Tide stage H	E	L	F	Volume (cm³ x 10⁹/sec) Tide Stage H	E	L	F
Boby-Namu	0.5		20	10	10	25	0.13	0.04	0.02	0.10
Namu-Yuro	8.4		40	40	30	45	4.35	2.70	0.75	3.02
Amen-Elkini	9.8		40	50	25	40	5.10	3.95	0.74	3.14
Elkini-Enyu	5.4		30	40	30	35	2.10	1.73	0.32	1.30
Boby-West	8.5		0	-15	0	35	0.00	-1.02	0.00	1.35
West-Yuro	7.3		-5	-5	5	5	-0.41	-0.25	0.09	0.25
						Sum	11.27	7.15	1.92	9.17
Channels										
Bukoji	3.5	0.97	-5	-15	-5	45	-1.5	-4.5	-1.5	13.7
Enyu	15.7	1.22	-8.5	-8.0	-8.5	-8.0	-4.8	-5.8	-4.8	-3.8
						Sum	-6.3	-10.3	-6.3	9.9
Passes										
All P.	2.0	2.34	-10	-100	-15	53	-5.9	-51.0	-8.9	21.4
Bukoji	2.3	3.66	-5	-25	-5	55	-1.1	-5.5	-1.1	11.0
Emilikku	0.7	5.50	-5	-25	-5	35	-1.1	-5.5	-1.1	7.7
						Sum	-8.1	-32.7	-11.1	40.1
Corrected sum - Namu reef (c)							-8.1	-27.4	-8.7	32.9

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During a mean tide of 100 cm., the value used in all calculations, the change in the volume of the lagoon is $6.4 \times 10^{14} cm^3$, or 2.3% of its total volume. This value is about 20% lower than the estimate obtained in Table 5. The difference, however, is not large enough to affect the essential validity of the results.

The tables show that although the net transport is outward at high, ebb, and low tides, some water is brought in over the northern and eastern reefs. Moreover, some water is lost through ENYU Channel at flood tide. The total transport of water across the periphery of the lagoon is therefore larger than the net tidal transport. A budget of total transport can be obtained by calculating the sum of all positive values and the sum of all negative values as shown in Table 5.

Table 5. Total transport ($x10^{14} cm^3$)

	Inflow	Outflow
Reefs	0.21	-0.01
	1.75	-0.29
	0.03	
	1.72	
Channels	2.56	-0.12
		-2.15
		-0.12
		-0.71
Passes	4.29	-0.11
		-6.97
		-0.15
Sum	10.56	-10.62

The total transport into and out of the lagoon is therefore estimated to be about $10.6 \times 10^{14} cm^3$ per 12 hours, or 3.8% of the total lagoon volume. The reservation is made, however, that these values may be asmuch as 20% too high.

A final check on the validity of the data, particularly with respect to the relative proportion of water that comes in over the reefs as compared with that derived from the channels, can be obtained by calculating the salt budget. It has been observed that water entering the lagoon over the reefs has a salinity of about 34.80°/oo, along the southern passes and channels it is about 34.50°/oo, and the average salinity of water flowing out during the ebb is 34.63°/oo. Combining these observations with estimated volumes of flow, the results are as shown in Table 6. The error is about 1%.

Table 6. Salt budget.

		Estimated total volume of water	Salinity	Total transfer of salt
Inflow	Reefs	3.71×10^{14}	34.80	12.9×10^{11} g
	Channels, passes	6.85	34.50	23.6
	Total	10.56		36.5
Outflow		-10.62	34.63	-36.8

Thus the total transport into and out of the lagoon is established with a fair degree of accuracy. There remains only the question of the dispersal of water inside the lagoon. Taking the figures from Table 6, the water coming in over the reef with a salinity of 34.80°/oo constitutes 35% of the total inflow, while 65% is channel water with a salinity of 34.50°/oo. If these proportions were mixed completely, the resultant salinity of the lagoon would be about 34.61°/oo. The difference is too large to be accounted for by evaporation. The most logical explanation of the apparent discrepancy is that rapid and relatively complete mixing occurs only in the immediate vicinity of the passes and channels, and part of the water entering this area on the flood tide is lost on the ebb without becoming incorporated in the main mass of central lagoon water. Again utilizing observed salinity values for purposes of

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calculation, the water in the passes on the ebb tide, with an average salinity of 34.63°/oo, has a percentage composition of 43% central lagoon water (salinity 34.80) and 57% ocean water (34.50) which has been in the lagoon only a short time. The results of this estimate are summarized as follows:

(a) It is assumed that the total inflow and outflow are equal and have a value of $10.6 \times 10^{14} cm^3$ per 12 hours.

(b) 57% of the total outflow or $6.0 \times 10^{14} cm^3$ is of recent oceanic origin by way of the southern passes and channels. It has been in the lagoon only during one or a few tidal cycles and has not had time to become thoroughly mixed with the water in the central part of the lagoon. The remaining 43% or $4.6 \times 10^{14} cm^3$ is lagoon water.

(c) The total inflow can be allocated as follows:

(1) 35% or $3.71 \times 10^{14} cm^3$ per 12 hours comes in over the northern reefs and joins the main mass of lagoon water.

(2) 65% or $6.85 \times 10^{14} cm^3$ comes in through the southern passes and channels, of which 6.0 is transient according to (b) above, and the remaining 0.85 is transported into the central part of the lagoon.

(d) Therefore of the total interchange of $10.6 \times 10^{14} cm^3$ per 12 hours, $4.6 \times 10^{14} cm^3$, or 1.6% of the total volume of the lagoon, perform a slow flushing of the lagoon as a whole, while the remainder rapidly flushes a small area in the south and southwestern part of the lagoon.

The estimates of total inflow and outflow, based on a mean tide of 100 cm., are adequate for determining the average rate of flushing over a considerable period of time. During shorter periods the rate will vary from about 50% of the calculated values (neap tide) to 160% (spring tide). Still larger variations are obtained in the relative amounts of water passing over different parts of the periphery of the lagoon.

3.4 Vertical diffusion

In section 3.22 it was shown that vertical mixing is effective in maintaining a relatively uniform temperature in the lagoon. Diurnal heating in the absence of wind would increase the temperature about 2°C at the surface during the day. The increase at the bottom would be less than 0.01°. Actually, however, the surface increase was never more than about 0.2°. The rest of the heat was transferred downward by vertical diffusion and the temperature change at lower levels was correspondingly increased. The rate of vertical transfer is readily determined for any particular temperature distribution: the constant in the equation, known in oceanographic literature as the coefficient of eddy diffusivity and designated by the symbol A_v, can then be used to determine the rate of transfer of any property of the water with any assumed initial distribution. This method is essential in determining the rate of dilution of contaminated water after the blasts.

There are two inherent difficulties in applying these methods in BIKINI lagoon. First, the observed differences are small, so that the errors of measurement in any particular set of observations may be as much as 40% of the total difference. Second, it was not possible to sample the same body of water at successive intervals, which introduces random oceanographic variations.

The errors are to a considerable extent eliminated by smoothing the curves and by using several independent methods of computation. These methods were:

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(a) The relationship between wind velocity and surface current gives values of eddy viscosity, which in uniform water should be numerically equal to A_v.

(b) The diffusion coefficient was computed from the diurnal temperature variations perviously described.

(c) At noon, and especially during low tide, the water flowing in over the eastern and northern reefs is appreciably warmed during its passage, its salinity is raised, and it becomes rich in oxygen. The mixing of this characteristic water from a "line source" with the rest of the water in the lagoon provides another method of computing vertical diffusion which is of particular interest because of its analogy with the surface contamination expected in Test ABLE.

Method (a) and method (b) for the eastern station gave valuable uses of A_v around 200 to 250 cm^2 per second. Method (b) for the western station gave values much higher than are reasonable, indicating that processes other than vertical diffusion were active. The result is believed to be due to sinking of surface water, which effectively brings the surface temperature fluctuations to greater depths by other means then turbulence. The sinking is the result of the gradual slowing down of water which is being driven against the western reefs, and seems to be distributed over a large part of the western lagoon.

Method (c) leads to somewhat smaller values of eddy diffusivity near the reefs. This may be partly due to upwelling, partly to the fact that the "line source" is located near the surface, where the scale of turbulence must be suppressed by the existing boundary. However, theoretical considerations indicate that A_v will increase to a value of about 250 at a depth of 2.5 m. and probably changes little if any from that depth down to very near the bottom.

These figures will be used in the section that follows to determine the rate of dilution of radioactive products by vertical diffusion.

4. DECONTAMINATION ESTIMATE

The factors exclusive of radioactive decay that must be considered in calculating the rate of decontamination after the blasts are horizontal and vertical diffusion and current direction and velocity. Since all these factors are considerably affected by weather, it is impossible to make a precise prediction that will fit all cases. But barring a radical change such as reversal of wind direction, the results should be of the right order of magnitude. The present section is based on the assumption of a 10 knot ENE wind at the time of the tests. A further section will attempt to describe what would be likely to happen with certain other wind conditions.

Assume that the explosion produces a volume of uniformly contaminated water with a radius of about 400 m. As horizontal diffusion begins to operate, the size of the patch of contaminated water will increase, a gradient in concentration will develop from the center of the patch toward its periphery, and the concentration in the center will decrease gradually. An oceanographic theory developed by G. F. McEWEN predicts that the effect of diffusion will be as shown in Table 7.

Table 7. Reduction of contamination by horizontal diffusion (% of initial concentration, radioactive decay not included)

Time in hours	Distance in meters from the center		
	0	800	1600
0	100	0	0
4	99	0	0
12	67	2.7	0.03
24	35	6.8	0.7
48	11	5.3	1.7

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Further dilution will take place by vertical diffusion, and this effect can be determined from the measurements described in the previous section. At the time of test ABLE, the contamination will be largely confined to the immediate surface layer. Assuming for purposes of calculation that at the end of three minutes the radioactive products will have become uniformly distributed through the upper 2.5 m., then further dilution of this surface layer is expected to take place according to the figures in Table 8.

The patch of contaminated water will be carried WSW from the target area at a rate of about 0.3 knot. The contaminated water that is diffused down into the bottom layer will be carried back toward the target area. This removal of contaminated water by the counter current is

Figure 8. Reduction of surface contamination by vertical diffusion in test ABLE (% of concentration 3 minutes after blast)

Time	Concentration
3 min.	100
15	32
30	22
1 hour	15
2	11
4	7.5

important in maintaining a high and relatively uniform rate of reduction of concentration in the surface layer, a reduction that is estimated to continue at a rate of about 25% to 30% per hour after the first four hours.

In Test BAKER it is assumed that the contamination is initially distributed in a cylinder of 400 m. radius extending from the surface to the bottom. The part of the cylinder in the surface current, namely the upper one-fourth, will move in a WSW direction at a speed of 0.3 knot. The lower three-fourths will move ENE with the bottom current at 0.1 knot.

As the patch of contaminated surface water moves away from the target area, vertical mixing with uncontaminated water underneath will reduce the surface concentration about 25% per hour. The material lost from the surface layer will be carried back toward the target area by the counter current. Reduction of concentration will also occur in the patch of contaminated bottom water moving eastward from the the target area, but the rate of reduction will be only about one-third as high, or 8% per hour, because of the greater thickness of the bottom layer. From this figure, the amount of contaminant moving into the surface layer at any time is readily determined.

Since a part of the radioactive material diffuses out of the patches of contaminated water and into the opposite current moving back past the target area, the net result of the current system and vertical diffusion will be to produce a long, narrow strip of contaminated water passing through the target area along a WSW-ENE axis. The strip will be gradually broadened by horizontal diffusion, but this effect is of relatively minor importance. Table 9 shows the estimated reduction in concentration of contaminant by horizontal and vertical diffusion.

At the end of the first day the eastern end of the strip of contaminated water is expected to reach BIKINI Island. The analysis cannot be carried beyond this point with any degree of accuracy since both the mathematical theory and the oceanographic factors involved are very complex. Considerable upwelling of bottom water occurs near BIKINI Island. Since this water will have a higher concentration of radioactive material than the surface water, the area between the target and BIKINI is more likely to be dangerous than any other part of the lagoon.

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Table 9. Calculated maximum concentration of radioactive materials in the surface water after Test BAKER (% of initial concentration, radioactive decay not included)

Time in hours	0	1	2	4	12	24	48
Downwind from target:							
Distance travelled miles	0	0.3	0.6	1.2	3.6	7.2	14.4
Horizontal diffusion	100	100	100	99	67	33	11
Vertical diffusion	100	75	56	32	3.2	0.1	10-4
Combined effect	100	75	56	32	2.2	.03	10-5
Upwind from target:							
Distance travelled miles	0	0.1	0.2	0.4	1.2	2.4	-
Horizontal diffusion	100	100	100	99	67	33	-
Vertical diffusion	100	14	13	11	6	2	-
Combined effect	100	14	13	11	4	0.7	-

The maximum concentration in this area probably will not be more than 13.6% of the initial value. This figure is based on vertical diffusion alone, since horizontal diffusion is expected to be much reduced in the bottom layer. There is considerable likelihood that upwelling will occur over a broad enough area to dilute the contaminant considerably; however, it is better to be conservative and consider that there may be patches of water with 10% of the original concentration of contaminant.

At the end of two days most of the bottom water at the eastern end of the lagoon will have upwelled to the surface and will have been diluted by vertical diffusion as it moves westward with the surface current. The rate of diffusion will be decreased, since it will be mixing with bottom water that is already slightly contaminated. However, rough estimates indicate that none of the water in the target area will contain as much as 1% of the original concentration of contaminant, although higher concentrations may persist near the reef for another day.

The other end of the strip will have reached the southwestern passes at the end of the second day, and henceforth a small amount of radioactive material will be discharged from the lagoon at each ebb tide.

The nature of the diffusion process is such that the rates will decline rapidly after the first two days except insofar as random variations in current direction carry patches of contaminated water into uncontaminated areas, leading to rapid dilution. If the radioactive material were spread uniformly through the southern half of the lagoon, the concentration would be reduced to 0.1% of the initial value, but it seems unlikely that this could occur in less than one to two weeks. It is clear that the natural processes of current flow and vertical diffusion act together to maintain a gradient in concentration with the greatest amount in or near the target area, and the gradient will be destroyed only very slowly by horizontal diffusion and random variations in currents.

After the first few weeks, further dilution will take place only by tidal interchange. Since the major path of contaminated water lies south of the area of most complete stagnation, it is expected that the radioactive materials will be removed at least as rapidly as the average lagoon flushing rate of about 3% per day. This will require two and a half months to reduce the concentration by a factor of 10.

An unpredictable but probably small quantity of radioactive material will become attached to bottom sediments and sinking organic matter, from which it will be liberated gradually over a long period of time and will be a minor source of contamination, particularly in the eastern part of the lagoon where upwelling of bottom water is most pronounced. It is not expected to be of any practical significance at the surface but might be hazardous to diving operations.

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5. EFFECT OF WEATHER ON LAGOON CIRCULATION AND DECONTAMINATION.

The quantitative estimate of the decontamination rate presented in the previous section required certain basic assumptions about the weather, particularly as regards wind direction and speed. These factors are of the greatest importance in determining the circulation of the lagoon in general and the dissipation of radioactive products in particular. The calculation was based on what appeared likely to be the prevailing conditions at the time of the blast, namely an ENE wind with a speed of about 10 knots. Different conditions would require modification of the predictions, and over a limited range of variations the modifications can be made accurately. The effect on the lagoon of winds between 10 and 20 knots is well known. The curves can be extrapolated to 5 knots with no great error. These are simply questions as to rates of diffusion and water transport.

The curves previously shown in Figure 8 are a fair indication of the effect of wind on current transport. With winds of 5 knots, the rate of flow of the surface current would be reduced to 0.1 to 0.2 knot, and it would require three or four days for the contamination to spread the full length of the lagoon. Horizontal and vertical diffusion would also be reduced. The eastwest gradient in radioactive products would be less pronounced. Upwelling of bottom water in the eastern end of the lagoon would be likely to produce patches of water with high concentrations of contaminant for three days or more.

With a 20 knot wind on the other hand, the rate of flow would be increased to 0.5 knot, and the contaminant would spread across the lagoon in about one and a half days, but the eastwest gradient would be stronger and more persistent.

Since the available weather data indicate a decrease in wind velocity during the summer and a shift in the average direction toward the east or southeast, it is

barely possible that the test might come at a time when these changes are extreme, namely no wind or a southerly wind. There has been no opportunity to determine what would happen in such cases. Any predictions are largely speculatory, but a few general comments can be made.

It is believed to require twelve to twenty-four hours for a wind driven current to be generated or for it to cease when the wind stops. Therefore in a prolonged period of calm weather the rotary circulation of the lagoon would soon be destroyed. There would remain only the slow movements generated by tidal interchange. Vertical and horizontal diffusion would be greatly reduced. It seems likely therefore that a large concentration of contaminant would remain in the target area and the latter would be unsafe for reentry until wind currents were again generated.

A southerly or southeasterly wind would change the direction of the lagoon circulation but otherwise would not change the previous description of the spread of radioactive products. It seems possible although by no means certain that the rate of flushing of the lagoon would be drastically altered if southerly winds persisted long enough to alter the direction of the oceanic current outside. The most likely guess is that water would then flow in constantly along the full length of ENYU Channel at a rate of about 10% of the lagoon volume per day and would be flushed out by tidal interchange across the northern and western reefs and through the southwestern passes. This would rapidly clear the target area and triple the observed rate of flushing.

Veering winds during or after the tests would alter the direction of flow of the currents so that the path of contaminated water would no longer be a straight line across the lagoon and back. This would increase the horizontal spread of radioactive materials, and the rate of vertical diffusion would be maintained at the initial high level for a longer period of time. The net result probably would be that the rate of dilution during the first few hours or the first day would not be greatly altered but that subsequent dilution would be greatly accelerated.

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6. APPENDIX ON OCEANOGRAPHIC METHODS.

6.1 Current measurements.

Measurements of surface currents were obtained by the current pole method. The poles were 12 to 16 feet long. Some of them were four inches square; others were made of smaller strips of wood with aluminum fins inserted to increase the cross-sectional area. They were weighted so as to hang vertically with about one foot exposed above the surface of the water. A light aluminum staff was rigged to the upper end of each pole, bearing some device to aid in sighting the pole. Various methods used at one time or another or in combination were pennants, life jacket dye marker (bags of fluorescein, which left a trail of green dye in the water), lights, and radar reflectors. Three or four poles were used simultaneously. They were set out one to two miles apart, and their position was determined every few hours by coming alongside and taking bearings on beacons or other landmarks. At night, and at considerable distances from land, radar ranges were used for obtaining fixes.

Along the reefs and in the channels, the currents were studied by dropping dye bombs from an airplane and photographing the dye patches at frequent intervals over a period of 15 to 30 minutes. It was largely the surface currents that were measured by this method, but packages of dye lashed to the bombs left a trail in the water as the bombs sank, permitting some conclusions as to subsurface currents. The dye bomb method proved to be particularly useful on the reefs and in any circumstance in which a high degree of variability required a large number of nearly simultaneous observations.

Vertical profiles of current velocity were obtained with a Von Arx current meter. It consisted of a propellor mounted in a tube oriented to the current by means of a vane on one end. Each turn of the propellor induced a small electrical potential that was used to determine the number

of revolutions, from which the current velocity was computed. The current direction was determined by observation of the vane through a water glass. The current was measured at depth intervals of 5 to 20 feet from the surface to bottom. The direction could be determined to a depth of about 150 feet, the limit of visibility in the lagoon waters. An underwater floodlight was used for night stations. It was necessary to exercise considerable care in the current meter work since swinging of the ship at anchor introduced an error. Dye marker and the cable angle were used to determine the times when valid measurements could be made.

6.2 Measurement of temperature and chemical constituents.

The distribution of temperature and chemical constituents has provided information on diffusion rates, lateral mixing, and currents. Reversing thermometers and Nansen bottles were used to measure the temperature and collect a water sample at any desired depth. The Nansen bottle is a tubular instrument with a valve at each end. The bottle is lowered with the valves open so that the water passes freely through the bottle. A "messenger" sent down the wire trips a mechanism which releases the upper end of the bottle so that it turns upside down, closing the valves and entrapping a water sample. The thermometer mounted on the side of the Nansen bottle is designed so that turning it upside down it breaks the thread of mercury, and the thermometer records the temperature at the time of reversal.

The salinity of the water samples was determined by the Knudsen method based on a chloride titration with silver nitrate. The Winkler method was used for oxygen analyses, and the Atkins-Deniges method for phosphate.

6.3 Tides and swell.

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Tides were measured by two standard tide gauges. One was located in shoal water in the eastern part of the lagoon near BIKINI Island, the other on the outer reef. Portable 24-hour gauges were also used occasionally in various places. Swell was computed from an instrument which measured short period pressure fluctuations on the bottom in shoal water.

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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 (O) - AEROLOGICAL REPORT

(All times are Zone minus Eleven (Love)
unless otherwise indicated)

PART I - STATEMENT OF MISSION

The mission of the Aerological Unit was: (1) To prepare operational weather forecasts and advices. (2) To prepare recommendations for the COMMANDER JOINT TASK FORCE ONE in all matters pertaining to the collection and dissemination of weather data necessary for forecasting the meteorological conditions affecting the operation.

Specifically the duties and responsibilities of the Staff Aerological Unit were:

A. The preparation of operational weather forecasts and advices.

B. The preparation of immediate advices to the COMMANDER JOINT TASK FORCE ONE of the indications of storms, typhoons or other violent or dangerous atmospheric conditions and the dissemination of this information to other TASK FORCE SHIPS and to shore stations.

C. The preparation of weather studies important to operational planning.

D. The coordination of Aerological activities within the TASK FORCE.

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E. The arrangements for routine reception of weather reports and the augmentation of the weather network with reports from ships of the TASK FORCE where necessary and practicable.

F. The compilation of historical aerological data and the documentation of all aerological data collected for future references and study.

PART II - PLANNING

A. Weather Studies.

1. Source of Climatological Data.

During the preparation of the operational plans for the tests a comprehensive study of weather conditions in the BIKINI ATOLL AREA was made. This involved a compilation of all known climate data for this region. Surface weather records for the SOUTHERN MARSHALLS were available, but these data did not entirely answer the questions proposed by the sensitive meteorological requirements of TESTS ABLE and BAKER. A knowledge of the expectancies of cloud amount, distribution and character to heights of thirty thousand feet, as well as the altitudinal distribution of the wind direction and speed to stratospheric levels was necessary. The most desirable type of weather records available were observations taken at ENIWETOK, which was adjudged to have sufficiently similar climate to BIKINI to allow meteorological inferences which would not be misleading. Unfortunately, these weather records contained winds to the desired altitude for one year only, 1945, although the surface reports were for a period of about three years. Despite this serious statistical limitation careful consideration of the records and interpolation of the relatively abundant surface data available from the SOUTHERN MARSHALLS resulted in the preparation of satisfactory weather studies.

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2. Expectancies of Suitable Weather.

a. Cloud Conditions: The firing of TEST ABLE and BAKER were utterly dependent upon suitable cloud conditions. If there were too much cloud, the bomb could not be dropped, photography would be obscured, and measurements vital to successful scientific analyses would be lost.

With the alteration of the schedule of the first test from 15 May to 1 July, the influence of the weather on the operation was considered to be critical. The principal reason for this was the slow migration northward of the equatorial front, a zone of convergent winds accompanied by extensive cloud systems and abundant rains. The average position of this belt of heavy cloudiness usually reached BIKINI in August. This meant the expectancies of suitable weather for the test at BIKINI were greatly diminished.

In conjunction with the Air Operations Sub-Section the following cloud criteria were established for bombing:

	Low Clouds	Middle Clouds	High Clouds
Favorable	$<.3$	$<.3$	$<.5$
Questionable	.3 to .5	.3 to .5	.5 to .7
Unfavorable	$>.5$	$>.5$	$>.7$

These criteria as established for high clouds were later abandoned as experience in the BIKINI AREA revealed that the cirrus cloud level was usually above 30,000 feet, and therefore could be neglected.

Based on cloud reports only from ENIWETOK during 1945 the number of operational days for high level bombing were:

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	JULY	AUGUST
Favorable	7	8
Questionable	8	12
Unfavorable	16	11

b. Upper Wind Conditions: The emphasis on the need for accurate wind data to high levels was brought out mainly from a radiological safety point of view. Upper wind data were combined in various statistical studies to show the maximum expected dispersion at all levels of the anticipated radioactive cloud and the percentage frequency that wind from an all easterly direction would be expected. In July the latter amounted to 25% and in August to 50%. Also it was pointed out that the normal trade winds (easterlies) only extended to variable heights of 20 to 35,000 feet when a marked reversal of easterly winds took place. Above the trade winds, the anti-trades (westerlies) were normally present and these extended to the base of the stratosphere, near 55,000 feet, where another reversal of the winds occurred with the stratospheric winds generally blowing in an easterly direction.

From these studies the operational and radiological safety groups were able to draw conclusions as to the normal expectant fall-out of the radioactive material and to make plans for the placement of various operational ships and aircraft units. Also plans were made to provide flexibility in the positions so that they could be shifted to meet actual upper wind conditions.

c. Combinations of Suitable Cloud and Upper Wind Conditions: The critical dependency on weather occasioned by the six weeks postponement of the test was indicated by the number of "ideal" operational days being diminished to 3 to 4 per month in July and August when a coincidence of

favorable cloud and wind days were considered. (An ideal day is defined as a day when visual bombing conditions exist and the winds aloft are easterly at all levels to 60,000 feet.

Operating experience proved that an ideal day was not an absolute necessity but that various upper wind combinations were satisfactory. The winds acceptable had to be decided in each specific case by a study of the radiological hazards presented to ships, aircraft and neighboring inhabited islands.

B. Forecast Considerations.

Accurate weather forecasts for a period of 24 to 36 hours were determined to be vital to the efficient accomplishment of the operation. If reliable weather forecasting could not be provided the only remaining procedure would be to prepare to explode the bomb each day. Because of the elaborate timing preparations necessary for the instrumentation program this was considered impracticable. If the operation was once set in motion it would have to be called off prior to midnight of the same day in order to avoid losing a day in resetting and checking instruments. The practice of preparing for a shot each day could only be continued for a maximum of four or five days before crews were exhausted and instrument settings required complete rechecking. Also drone aircraft with limited fuel supply would be lost to the operation if they encountered unsuitable cloud conditions over the target for any appreciable time after their arrival.

Upper wind forecasts had to be prepared at least 24 hours in advance in order to place ships and aircraft in sectors where they would be free from the fall-out of radioactive particles. If the forecasts were radically wrong the aircraft operation sectors could be changed without too

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much difficulty, but the change in ships' positions might be of such magnitude as to make it physically impossible of accomplishment. Any unexpected shift in winds would present a serious radioactive hazard to ships already placed according to previous wind predictions.

After the explosion upper wind observations were essential in order to keep track of the radioactive cloud drift.

C. Preparation of Aerological Op-Plan.

An aerological plan (Annex T to Commander Joint Task Force ONE Operation Plan No. 1-46) was drawn up outlining the sources and amount of aerological data existing and the methods by which these data could be collected, analyzed and interpreted. A complete weather study covering the period of the operation was included as part of this plan.

A typhoon plan (Annex V to Commander Joint Task Force ONE Operation Plan No. 1-46) was drawn up outlining procedures to be followed in event the Task Force was endangered by a typhoon.

D. Provisions for a Weather Central.

Because of the physical impossibility of establishing an Aerological Unit in the MT. McKINLEY large enough to do the entire task of collecting and analysing the necessary number of meteorological charts it was planned to establish a task force weather central on KWAJALEIN. This weather central was to be directly under control of COMMANDER JOINT TASK FORCE ONE and would have sufficient personnel attached to make complete surface and upper air analyses and to provide weather briefing and debriefing service to all Task Force land-based aircraft.

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Had a ship been available capable of maintaining an aerological unit the SIZE of the proposed weather central it would have been an advantage to establish this central in the BIKINI area. Such an arrangement would have resulted in the saving of much communication time and closer personal coordination between the Staff Aerological Unit and the Weather Central.

E. Provisions for Shipboard Units.

In order to provide weather service for ship-based aircraft and TASK GROUP COMMANDERS AFLOAT and to provide the necessary aerological units for making upper air and surface observations, plans were made to place adequate aerological units in TASK FORCE ships. The ships selected for these tasks were those which ordinarily carry aerological units, therefore the problem became one of augmenting these units as necessary. As weather reports were desired from BIKINI as soon as possible special steps were taken in order that a continuous reporting of weather commenced with the arrival of the first task force ship in the BIKINI AREA.

F. Provisions for Weather Reconnaissance.

Since it was not possible to establish a network of weather stations of the density which the accuracy of the forecasts would require, steps were taken to obtain aerological data in the areas lacking in weather observations by the use of weather reconnaissance aircraft.

To implement this plan three B-29 weather reconnaissance planes were requested and obtained from the Army Air Forces. At the same time requests were sent to CincPac and Com MARIANAS for use of Navy typhoon reconnaissance aircraft, which were based in the MARSHALL ISLANDS and at GUAM.

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The B-29's were placed under the operational control of COMMANDER TASK GROUP 1.5. Channels were established so that the number of planes and routes flown daily by the B-29's were those specified by the CROSSROADS WEATHER CENTRAL. As the PB4Y-2's, the typhoon aircraft of the Navy, were under the operational control of Commander MARIANAS, plans were made to have at least one flight daily and to obtain an extra flight if deemed desirable by CJTF-1. Five days before ABLE and BAKER days the operational control of Navy aircraft would be temporarily given to ComCom KWAJALEIN so that closer coordination would be obtained between the Army and Navy aircraft during critical periods.

O. Coordination.

A survey was made of the existing Army and Navy weather facilities after which conferences were arranged with the various interested Commands. A great deal of difficulty was anticipated in getting the required number of weather stations manned because of current demobilization and the disestablishment of military stations.

A conference was called at the Headquarters of CinCPac, at which there were Communication and Aerological representatives from CinCPac, Com MARIANAS, the 43rd Weather Wing, the 7th AACS Wing and CJTF-1. At this conference the representative of CJTF-1 outlined the proposed Aerological Plan for the CROSSROADS OPERATION and explained why special weather reports were needed for the operation, particularly from the standpoint of an upper air network. It was agreed that to obtain sufficient data in the MARSHALL ISLAND AREA, exclusive of that provided by weather reconnaissance planes, the following land and ship reports were necessary:

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	REPORTS DAILY		
	3-Hourly Surface	4 RAWINS	2 ROABS
WAKE			
ENIWETOK	Same	Same	Same
TARAWA	Same	Same	Same
MAJURO	Same	4 PIBALS	Same
KWAJALEIN	Same	4 RAWINS	Same
MARCUS	Same	Same	None
WX SHIP (12-45N, 180-00	Same	1 PIBAL, 1 RAWIN	1 RAOB
WX SHIP (12-00N, 153-4		Same	Same

CinCPac, the [illegible]g Officer 43rd Weather Wing and AACS were [illegible]ted to supplement existing facilities in order to provide the above reports on a regular and reliable basis and to provide adequate weather communications.

The above special reports were in addition to the regular network of weather stations which covered the area from Siberia and China to a point midway between Honolulu and the continental west coast and from the Aleutians to the Equator. No decrease in this network could be accepted and these reports were used in preparing the overall Pacific Analysis, a necessary step in the preparation of forecasts for Bikini.

The status of equipment and personnel for all the stations was discussed. Definite commitments were made by a representative of each of the services to furnish equipment and personnel for which they were responsible. Immediate steps were taken to obtain the necessary personnel and equipment and to arrange for their movement into place so that all stations could be fully operative by 15 April 1946. (Because of difficulties in obtaining personnel and establishing adequate communications the network did not become fully operative until about 1 June 1946.)

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A survey was made of the adequacy of all weather communications which might be involved in CROSSROADS. It was found that the weather communications network was entirely unsatisfactory and that very few weather reports were being received from the MARSHALL ISLAND AREA. Also the Aerological Unit on KWAJALEIN was seriously handicapped by its inability to receive adequate weather information. The problems of communications, where considered inadequate were brought to the attention of the responsible Commander. Commitments were received to furnish satisfactory communications within the limits of available technical and operation communications personnel. No difficulty was anticipated with shortage of equipment.

Arrangements were made for the reservation on KWAJALEIN of the necessary office space for the CROSSROADS WEATHER CENTRAL and for the installation of a complete landine weather teletype circuit from the weather central office to the island communication centers. This latter was deemed necessary in order that the weather information would not be hindered by having to use a line shared by other traffic.

When all necessary planning and the Aerological Plan, (CJTF-1 Op-Plan 1-46, Annex "T") had been completed, a STAFF AEROLOGICAL OFFICER was ordered to CinCPac, Com MARIANAS and to Com KWAJALEIN in order to advise these Commanders of final Aerological requirements. At the same time first hand information was obtained as to the progress of the placement of personnel and equipment and the status of weather communications.

PART III - ORGANIZATION

A. The Staff Aerological Unit.

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Within the task force the component aerological units were organized so that the responsibility of furnishing weather forecasts or advices for task force operations was vested in the STAFF AEROLOGICAL UNIT. Information disseminated by other units were an interpretation or elaboration of these official forecasts or advices.

The STAFF AEROLOGICAL UNIT was located in the TASK FORCE FLAG SHIP (U.S.S. MT. McKINLEY) and was a subsection (J-34) under the ASSISTANT CHIEF OF STAFF FOR OPERATIONS (J-3).

The unit was composed of a Senior AAF Weather Officer, a Senior Navy Aerological Officer, one Lieutenant (Navy) Aerological Officer, six enlisted Aerographers' Mates and three enlisted radiomen.

The assignment of a Senior Aerological Officer from both the Army Air Force and the Navy was deemed essential because of the major participation of each of these services in the Operation. In this way provision was made for presenting weather information in the most usable form for each service and the possibility of overlooking weather implications peculiar to each of the services was avoided. At the same time this arrangement, together with the CROSSROADS WEATHER CENTRAL, provided a responsible forecast team capable of analysing the necessary amount of data on a 24 hour continuous basis.

B. The CROSSROADS Weather Central.

The WEATHER CENTRAL was for all practical purposes an integral part of the STAFF AEROLOGICAL UNIT and was established primarily to assist in the collection and analysis of the necessary amount

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of weather data required for reliable forecasts. It was organized under the administration of COMMANDER TASK GROUP 1.5 and was located at KWAJALEIN. In this location the WEATHER CENTRAL, in addition to furnishing information required by the STAFF AEROLOGICAL UNIT, was able to provide briefing and debriefing service for land based aircraft, control the operation of weather reconnaissance planes and monitor the local collection and dissemination of weather reports by the AACS and JCC at KWAJALEIN. For stations such as EBEYE and ENIWETOK where TASK FORCE planes were based, weather information was supplied directly from the WEATHER CENTRAL and a WEATHER CENTRAL OFFICER was provided for briefing when required.

The WEATHER CENTRAL consisted of a SENIOR ARMY AIR FORCE WEATHER OFFICER as Officer-in-Charge with 15 AAF Weather Officers and 5 AAF Enlisted Observers. (The unusual ratio of officers to enlisted men resulted because sufficient enlisted personnel could not be obtained.) One Lieutenant (Navy) Aerological Officer was attached in order to assist in the preparation of weather analyses and to advise the Officer in Charge of Naval procedure and requirements.

C. Weather Reconnaissance Units.

Army B-29 weather reconnaissance aircraft were under the operational control of COMMANDER TASK GROUP 1.5. An AAF Weather Officer was assigned as a regular member of each plane crew.

Navy PB4Y-2 weather reconnaissance aircraft were under the operational control of Com MARIANAS until ABLE minus 5 and BAKER minus 5 when control was temporarily given to AtCom KWAJALEIN. To these aircraft Navy Aerological Officers were assigned.

D. Task Force Shipboard Aerological Units.

Complete Aerological Units were embarked in ships as follows:

SHANGRI LA ---------- (Flag CTG 1.6)	1 Lt. Aerological Officer 5 Aerographers' Mates
SAIDOR ----------	1 Lt.(jg) Aerological Officer 3 Aerographers' Mates
CUMBERLAND SOUND ------ (Later transferred FALL RIVER)	1 Lt.(jg) Aerological Officer 5 Aerographers' Mates
ALBEMARLE ---------- (Flagship CTG 1.1)	1 Lt.(jg) Aerological Officer 3 Aerographers' Mates

These units provided briefing for TASK GROUP COMMANDERS and aircraft when necessary. Their main functions were, however, to supply upper air data and surface weather observations. All upper winds from shipboard units were taken by means of RADAR whenever possible. In a few cases where RADARS were out of commission or unusuable because of light winds, visual soundings were substituted.

After arriving at BIKINI the entire unit on the CUMBERLAND SOUND was transferred to the FALL RIVER because the RADAR on the CUMBERLAND SOUND was unsuitable for RADAR wind soundings.

One man Aerological Units were located on the ORCA, BOWDITCH, KENNETH WHITING, BLUE RIDGE, APPALACHIAN and FALL RIVER. (The FALL RIVER UNIT was later supplemented by the entire unit from the CUMBERLAND SOUND). These units were used to obtain surface weather reports especially when any of the ships were absent from the BIKINI AREA. The FALL RIVER UNIT in addition provided weather

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briefing for CTG 1.2. When the Aerographers' Mate in the ORCA and the KENNETH WHITING were no longer needed in these ships, they were transferred to the STAFF AEROLOGICAL UNIT where their services were urgently required. The units in the BLUE RIDGE and APPALACHIAN accomplished in addition, the task of providing weather interpretations for distinguished visitors and the press.

E. Weather Communications.

Units afloat received all weather reports by copying the FLEET WEATHER CENTRALS regular broadcasts from GUAM and HONOLULU. All the necessary weather data could not have been obtained in time without the assistance of these two weather centrals who collected and edited the individual weather reports and broadcast them as one bulletin. In order that the STAFF AEROLOGICAL UNIT might receive as quickly as possible information from the vicinity of the MARSHALL ISLANDS, the weather collective and weather reconnaissance reports, collected at KWAJALEIN, were sent to JCC for immediate transmission to the MT. McKINLEY. Transmission to the MT. McKINLEY was via the administrative radio-teletype channels with standby CW channels.

Communication with weather reconnaissance planes was via air-ground tactical frequency with both Army B-29's and Navy PB4Y-2's using the same frequency. By this method the handling of weather reconnaissance reports was expedited.

For TASK FORCE SHIPS making weather reports, a special frequency was allocated for communication with JCC KWAJALEIN. Weather reports from TASK FORCE SHIPS were sent to CJTF-1 and JCC KWAJALEIN.

A radio-teletype conference circuit, later

replaced by a voice circuit, was set up between the MT. McKINLEY and the JCC KWAJALEIN for use of the STAFF AEROLOGICAL UNIT and the WEATHER CENTRAL. Regular scheduled conferences were held at 0500 and 1730 daily. Special conferences were called at any time required.

Because of the importance of weather in this operation all weather information within the TASK FORCE was handled as operational priority

PART IV - WEATHER OPERATIONS

A. Forecast Requirements.

Because of the precise operational weather requirements for the tests an attempt was made to forecast the exact amount and altitude of all expected clouds together with the hitherto unattempted task of forecasting upper winds to 60,000 feet. This required the continuous preparation and analyses of complete upper air charts, as well as the surface maps. The services of the CROSSROADS WEATHER CENTRAL were used to the fullest extent in the preparation and analyses of all upper air information.

It was realized that it was a difficult job to meet the above requirements mainly because of the lack at the present time of exact forecasting techniques for tropical areas. At the current stage of TROPICAL METEOROLOGY there exist a number of theories, none of which can be completely proved or disproved, because of the lack of sufficient data for study and research.

It was essential that a forecast training program be initiated as quickly as possible. Training

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was carried out by preparing a complete operational forecast daily together with a complete verification. The information required was given in as much detail as possible. After the verification for each forecast a review of the synoptic considerations, used in making the forecast, was made. If the forecast was a miss an intensive restudy was made of the situation in an attempt to gain experience in order to avoid the same mistakes again

b. Routine.

The formulation of a final official weather forecast for operations on the following day required the coordinated efforts of both the STAFF AEROLOGICAL UNIT and the CROSSROADS WEATHER CENTRAL.

Based upon the analyses of the 1200Z weather maps preliminary, independent weather forecasts for the following day were prepared. These forecasts were prepared prior to 0500. At the 0500 voice radio conference between the two units the two forecasts were compared and the complete synoptic situation and its implications were discussed. The WEATHER CENTRAL contributed necessary details of the upper air analyses together with information obtained from the debriefing of weather reconnaissance plane pilots. The STAFF AEROLOGICAL UNIT supplied essential cloud data and trends obtained from local indications in the BIKINI AREA.

Upon the completion of these discussions the final forecast was arrived at. If the original preliminary forecasts agreed no problem was involved; but if they were at variance, each point of the discussion was weighted to see if any implications might have been overlooked by either of the UNITS. In every case the final decision

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of the forecasts was made by the STAFF AEROLOGICAL UNIT.

The elements of the completed forecast included the amount in tenths of low, middle and high clouds; the altitude of the base and top of the low clouds and the altitude of the other cloud layers; precipitation if expected; the wind direction and velocity for 5,000 increments from the surface to 60,000 feet; height of the tropopause; visibility; temperature, and relative humidity.

In this manner the combined talents of a forecast team were used to the fullest extent and the possibility of overlooking some important synoptic consideration was reduced to a minimum. In addition it permitted the main component parts of the Aerological organization to participate in the preparation of the prediction thus eliminating any possible controversy or misunderstanding in the information promulgated by each unit. Such controversy or misunderstanding could easily result in a lack of confidence in the forecasts.

It was essential that all the TASK GROUP COMMANDERS have precisely the same coordinated forecast that was presented to TASK FORCE COMMANDER.

As soon as the official forecast was completed an operational priority dispatch describing expected cloud and upper wind conditions for the following day was sent to all TASK GROUP COMMANDERS.

Each day a 24 hour forecast of expected weather conditions in the BIKINI AREA was also prepared and sent to all ships present.

At 0830 daily the weather prediction for the

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next day was presented in detail to the TASK FORCE COMMANDER and his operational staff at a formal weather briefing. On the basis of expected weather conditions a decision was made by CJTF-1 as to whether or not the next day was suitable for operations.

A second weather conference with the CROSSROADS WEATHER CENTRAL was held at 1730. At this time the reports of the aircraft weather reconnaissance observers were discussed as well as any development not anticipated at the early morning conference. The weather prediction issued for the next day, in the light of any new information, was evaluated. If found necessary, modifications to the forecast were made at this time. Plans for the following days weather reconnaissance flights were discussed and the sectors to be covered and required number of aircraft decided.

At 2200 daily, another weather briefing for the TASK FORCE COMMANDER was held. The operational decision made by CJTF-1 at the 0830 conference was either substantiated or altered on the basis of new or later Aerological advices.

weather reconnaissance flights were made daily. The B-29 aircraft covered the area in general to the eastward and the PB4Y-2's to the westward. At least one B-29 and one PB4Y-2 were used daily. Under unusual conditions of weather or just previous to planned operational days, the number of flights were increased as necessary. As a matter of routine one weather reconnaissance plane arrived in the BIKINI AREA at 0500 daily and contacted the MT. McKINLEY by voice radio. In this manner the STAFF AEROLOGICAL UNIT could obtain current weather information in the surrounding area of BIKINI. The aircraft also made an upper air sounding over BIKINI. On each weather flight, complete

reports using CAW-C code were made half hourly. These reports were collected and analysed at the CROSSROADS WEATHER CENTRAL and at the same time passed to the MT. McKINLEY for use of the STAFF AEROLOGICAL UNIT. When reports were urgently required by the STAFF AEROLOGICAL UNIT they were intercepted directly by the MT. McKINLEY.

When the weather reconnaissance planes landed at KWAJALEIN the Aerological Officers of the plane crew were interviewed by the WEATHER CENTRAL and a flight summary for each flight was prepared and forwarded to the MT. McKINLEY. On ABLE DAY three weather reconnaissance planes passed over the BIKINI AREA. The first plane arrived about 0130 and contacted the ship by voice radio. An upper air sounding was made and this data plus a complete weather report was passed to the MT. McKINLEY. The plane then proceeded eastward on its assigned flight. Planes arrived also at 0330 and 0530 and each repeated the above procedure. On BAKER DAY the above routine was altered by having all three planes arrive in the area at 0330. After an upper area sounding had been made and reported these planes were stationed at 1500, 8,000 and 15,000 feet at a position approximately 40 mile upwind from the target. In these positions the planes were in a position to make reports of the movements of clouds into the Target Area. After the bomb was fired they proceeded on their assigned flight.

Both of the above procedures proved to be very satisfactory but the one used on BAKER DAY was preferable.

The information obtained from these aircraft was indispensable in the preparation of weather

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forecasts. If one or more of these aircraft could have prepared analyses and weather forecasts while in flight in addition to the observations they would have been even more valuable to the operation.

Upon the arrival of the BOWDITCH at BIKINI early in March that ship made 6 hourly surface weather reports daily plus a daily PIBAL to the FLEET WEATHER CENTRAL GUAM. This duty was assumed by the CUMBERLAND SOUND upon her arrival at BIKINI the latter part of April. The number of surface reports were increased to hourly between 0600 and 1500 and three hourly the remainder of the day. When the CUMBERLAND SOUND UNIT was transferred to the FALL RIVER in early June these duties were assigned the FALL RIVER. RADAR upper wind soundings were taken in the BIKINI AREA by the SHANGRI LA, SAIDOR and FALL RIVER every six hours so that soundings were obtained daily at 0000, 0300, 0430, 0600, 0900, 1030, 1200, 1500, 1630, 1800, 2100 and 2330 ZEBRA. On rehearsal days the number of RAWINS taken by the FALL RIVER were increased to every three hours. In this manner, with all three ships reporting, a sounding was obtained every hour and a half during critical periods.

On mornings of squally and unsettled weather the ships RADARS were used to great advantage in spotting and computing the movements of showers into the target area. In this manner it was often possible on practice days to take advantage of clear areas between the scattered rain showers.

C. Problems.

1. Deficiency in Surface Weather Code.

Because of a serious deficiency in the internationally accepted surface weather reporting code,

detailed cloud observations and analyses were made for the BIKINI AREA and forwarded to the CROSSROADS WEATHER CENTRAL. This information supplemented the synoptic weather data collected by KWAJALEIN and was of great assistance in the preparation of the predicted cloud conditions for the next day.

It is worthwhile to elaborate on this point because this deficiency in the surface weather reporting code was a seriously handicap in preparing the forecasts for photography and visual bombarding of the target which required an accurate foreknowledge of the distribution, amount and heights of clouds. The basic code only permits the documentation of the amount of total sky covered by cloud irrespective of height. This is not sufficient to furnish necessary information on the cloud pattern; the amount, height and direction of movement of the low, middle and high clouds should be observed and reported independently of each other whenever possible.

2. Delays in Weather Transmissions.

The forecasting value of weather reports rapidly decays with time. When a new observation is made the last report becomes mainly of historic interest and its transmission precedence should be treated accordingly. Considerable indoctrination of communication personnel was necessary before the efficient handling and transmission of weather reports was accomplished.

3. Errors in Reports.

A very appreciable percentage of errors frequently rendered entire weather observations useless, if not occasionally misleading. This was attributed

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both to inexperienced weather personnel who improperly coded their observations and to transmission errors.

4. Difficulties in Copying Radio Weather Intercepts.

The radio weather broadcasts from GUAM and HONOLULU were copied in order to obtain weather data necessary for the analyses of the weather map. In general this information was adequate and the analyses for the North Pacific were an important aid in the preparation of forecasts for the MARSHALLS. However, the interference caused by the great number of radio circuits on the MT. McKINLEY prevented good radio reception of these weather broadcasts. Added to local radio interference were communication difficulties due to failure of radio transmitters at GUAM and PEARL. This often resulted in the loss of considerable data necessary for the completion of the overall Pacific weather maps. This loss was not consistent and the deficiency was usually corrected on the following six hourly maps.

5. Lack of Data from Weather Ships.

The important reporting stations, weather ships BIRD DOG 3 (latitude 12° 45' N and longitude 180° 00' W) and BIRD DOG 4 (latitude 12° 00' N and longitude 153° 40' E) were unable to maintain continuous operation resulting in omissions of weather data. Every effort was made by Com MARIANAS to keep these weather ships on station, but their operations were handicapped by the lack of experienced personnel and overhaul facilities. No observations from these ships were available during the critical period in the preparation of predictions for ABLE DAY. The observations from BIRD DOG 3 would have been especially helpful as soundings at its site usually gave the

characteristics of the surface air mass that would invade BIKINI within 36 to 48 hours. Loss of information from the BIRD DOG SHIPS was rectified by weather reconnaissance planes but a limitation was imposed on the area of search by having to use part of the planes maximum range in covering this additional area.

6. Deficiency in Radiosonde Reports.

Radiosonde reports were not available from the target area. This was anticipated in the original plan. The Navy type radiosonde transmitter operates on a frequency of 72.2 megacycles, the same band allocated for TBS transmission. An effort was made to alter the design of these upper air transmitters but there was not sufficient time to make the necessary instrumental modifications and to manufacture an adequate number of instruments for use. It was not possible to use Army type radiosonde equipment which operates on a frequency of 400 megacycles because the bulky antennas precluded a satisfactory installation on ships. Upper air data from the target area was obtained from daily ascents by the weather reconnaissance aircraft. These planes furnished accurate information on upper air pressures, temperatures and humidities to altitude of 20,000 feet, and occasionally higher.

Of the radiosonde stations in the augmented weather network planned for CROSSROADS, instrumental difficulties prevented the station at MAJURO and BIRD DOG 3 and 4 from making regular and routine upper air observations, TARAWA, KWAJALEIN, ENIWETOK and WAKE functioned smoothly. The SHANGRI LA operated very satisfactorily because she was stationed at ROI away from the target area where communications congestion was acute.

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7. Difficulties in Taking Wind Observations.

The land based network of stations, TARAWA, MARCUS, KWAJALEIN, ENIWETOK and WAKE using Army equipment, type 658, made very satisfactory upper wind measurements. At BIKINI, the measurements of upper winds was assigned to certain key ships. These ships demonstrated completely the practicability of making wind observations to high levels using their radar equipment. The FALL RIVER, SAIDOR, SHANGRI LA and occasionally the MT. McKINLEY made highly successful upper wind radar measurements.

One difficulty was encountered with the shipboard SP search radar equipment as elevation angles could not be measured beyond 30 degrees which in turn prevented soundings when light winds prevailed. Another difficulty was the frequent bursting of balloons below 30,000 feet. Either the balloons had significantly deteriorated in tropical weather or were initially of an inferior quality.

Some difficulty was experienced by conflicting weather and operational demands upon ships radars. This was solved by assigning radar winds as the primary mission for radars located on designated ships.

8. Responsibility for Computing Ballastic Winds.

In March an AAF weather officer was sent to ALBUQUERQUE for the purpose of instructing the civilian radar operating personnel of the 584 radar tracking installation in the technique of making upper wind observations and the computation of ballistic winds. Although operating plans provided for the furnishing of these data to the bombardier by aerological personnel, this respon-

sibility was assigned to the 584 radar installation personnel upon the arrival of that unit in the BIKINI AREA. These personnel were unfamiliar with the variability and accuracy to which winds aloft measurements could be made. For this reason, the limitations in their ballistic compilations were not appreciated. Further, in levels where measured data was lacking the services of aerological personnel were required to make satisfactory interpolations.

9. Lack of Lateral Diffusion and Fall Out Data.

Intimately associated with the problem of forecasting winds to stratospheric heights for the radiological safety unit was the question and prediction of the rates of lateral dispersion or diffusion and subsequent areas of fall-out of radio active matter within the cloud resulting from the explosion. Because of meager or no information was available on this subject, Aerology was unable to answer the numerous questions which were raised by the Radiological Safety Group regarding areas which might possibly be contaminated by radioactive particles.

D. Weather Forecasts for Test and Rehearsal Days.

1. Queen Day Forecast.

On the 22nd of June an atmospheric wave associated with the intertropical front was well defined by the complex of aircraft weather reconnaissance observation, upper air and surface data obtained from TARAWA, MAJURO and KWAJALEIN. This wave, traveling from the east to the west at approximately 15 knots, was attended by an extensive multilayer cloud pattern and variable rain showers. On the basis of this analysis the weather for QUEEN DAY,

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planned for the 23rd was issued as follows:

TO ALL TASK GROUP COMMANDERS:

WEATHER FORECAST BIKINI FOR 23 JUNE 0800 TO 1600 LOVE X 5 TENTHS CUMULUS CLOUDS AT 1500 TOPS 8000 FEET X 5 TENTHS MIDDLE CLOUDS AT 10000 FEET X OVERCAST HIGH CLOUDS ABOVE BOMBING LEVEL X TOTAL CLOUD COVER BELOW BOMBING LEVEL 7 TO 8 TENTHS X SCATTERED SHOWERS X WINDS ALOFT EASTERLY SHIFTING TO SOUTHEASTERLY AT 40000 FEET AND SOUTH AT 50000 X WIND VELOCITY 15 TO 20 KNOTS REDUCED TO 10 KNOTS IN LEVELS BETWEEN 20000 AND 35000 FEET X

This forecast was presented in detail to the TASK FORCE COMMANDER and his staff at the 0830 weather conference on 22 June. It was immediately recognized that the predicted large amount of total cloud cover below the bomber, if verified, would be entirely unsuitable operationally. However, in spite of predicted dismal cloud conditions, QUEEN DAY was tentatively set for the 23rd with the reservation that the operation may be cancelled at the 2200 weather conference, provided an analysis of later weather reports continued to point to poor cloud conditions for the 23rd. Weather was not the entire factor in this decision. With the full anticipation of having to cancel the mission for the 23rd before mid-night, it was desired to test all operations in the event such an exigency arose on ABLE minus ONE. It was intended to determine whether all Units could be made ready without the loss of a day if the mission, after being called on, was cancelled before mid-night. At the 2200 conference there was no change in the weather prediction, and the TASK FORCE COMMANDER cancelled the QUEEN DAY operation for the 23rd.

The westward moving equatorial disturbance

affected the BIKINI AREA as predicted on the 23rd but the multilayer cloud pattern was somewhat less than predicted. Never-the-less the cloud conditions were such that an uninterrupted visual bomb run could not be obtained and further, instrument flying conditions between KWAJALEIN and BIKINI, and ENIWETOK and BIKINI would have prevented drone aircraft operations. The weather summary for actual conditions in the BIKINI AREA for the 23rd was issued as follows:

> WEATHER SUMMARY BIKINI AREA FOR 23 JUNE 0800 TO 1200 LOCAL X 2 TO 5 TENTHS CUMULUS AT 1500 TOPS 5000 X 3 TO 5 TENTHS MIDDLE CLOUDS AT 13000 FEET X CIRRUS ABOVE BOMBING LEVEL X AVERAGE TOTAL CLOUDINESS BELOW BOMBER 7 TENTHS WITH SOME TEMPORARY CLEARING FOR SHORT PERIOD AROUND MID FORENOON X WINDS ALOFT SHIFTED FROM EASTERLY TO WESTERLY AT ABOUT 25000 FEET X

With the passage to westward of the equatorial disturbance, the cloud conditions for BIKINI on the 24th were expected to be greatly improved. At 0830 of the 23rd the following forecast was issued to all TASK GROUP COMMANDERS and was presented to the TASK FORCE COMMANDER:

> WEATHER FORECAST BIKINI AREA FOR 24 JUNE 0800 TO 1600 LOCAL X 5 TENTHS HIGH CLOUDS ABOVE BOMBING ALTITUDE X 3 TO 4 TENTHS CUMULUS AT 1500 FEET TOPS 3000 FEET X WIND ALOFT EASTERLY SHIFTING TO WESTERLY AT 30000 FEET X WIND VELOCITY AT ALL LEVELS 15 TO 18 KNOTS X

On the basis of the weather prediction, the TASK FORCE COMMANDER scheduled the QUEEN DAY operation for the 24th. It was recognized that the forecast wind directions would not have been operationally suitable from the RADIOLOGICALLY

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hazards standpoint but since a further postponement was not desirable, a fictitious altitudinal wind distribution was furnished for the rehearsal. At the 2200 conference no change in the weather prediction for the 24th was indicated, and the QUEEN DAY operation for the 24th was confirmed.

The actual weather conditions in the target area for the 24th were summarized as follows in a dispatch to all TASK GROUP COMMANDERS:

WEATHER SUMMARY FOR BIKINI AREA 24 JUNE 0800 TO 1200 LOVE X AVERAGE 2 TENTHS CUMULUS CLOUDS X 2 TENTHS MIDDLE CLOUDS DECREASING TO ZERO BY 1100 LOCAL X SCATTERED HIGH CLOUDS X AVERAGE TOTAL CLOUDINESS BELOW BOMBING LEVEL 2 TO 3 TENTHS X WINDS ALOFT LIGHT EASTERLY SHIFTING TO STRONG WESTERLY ABOVE 20000 FEET X

2. Able Day Forecast.

The weather map for 1200Z 29 June (2300L 29 June) indicated a widespread high pressure cell whose center was located about 600 miles north northeast of MIDWAY. This anticycle was drifting slowly east northeastward toward the GULF OF ALASKA resulting in a significant weakening of the surface pressure gradients in the MARSHALLS. An extensive low pressure system was located 250 miles west of GUAM. This low, although not reaching the intensity of a typhoon or severe storm was causing overcast skies and showers as far west as the PHILLIPPINES and east to the region of TRUK. The low pressure area was not expected to deepen or show much movement in the next 48 hours.

On the 29th a west to east traveling upper air low pressure trough passed the BIKINI AREA resulting in the development of a wedge of high pressure at

altitudes above 20,000 feet. The passage of the upper air trough which was traced rather accurately thru ENIWETOK and BIKINI, intensified and produced severe thunderstorms on the 30th in an area 400 to 500 miles directly to the east of BIKINI. The development of the upper air wedge subsequent to the passage of the trough caused the anti-trades to blow from the northwest at altitudes above 20,000 feet. From soundings made by weather reconnaissance aircraft, there was also noted a drying out of the air at levels above 6,000 which was associated with a general subsidence and invasion of drier air due to the upper air high pressure development. This factor eliminated the likelihood of a layer of middle clouds in the BIKINI AREA.

The equatorial front in the region of the MARSHALLS was situated just south of JALUIT and north of KUSAIE and PONAPE. The front was not expected to influence the weather conditions at KWAJALEIN or BIKINI for the next 36 hours.

With the above basic facts the following forecast for the BIKINI AREA for 1 July 1946 was prepared and presented to the TASK FORCE COMMANDER at 0830 30 June:

2 TO 3 TENTHS CUMULUS CLOUDS WITH BASES 1500 FEET TOP AT 5000 FEET X NO MIDDLE CLOUDS, ABOUT 6 TENTHS HIGH CIRRUS CLOUDS AT ALTITUDES ABOVE 30000 FEET X TOTAL CLOUD BELOW BOMBER AT TARGET TIME 2 TO 3 TENTHS X WINDS ALOFT EXPECTED TO BE EASTERLY 10 TO 15 KNOTS UP TO 15000 FEET, VARIABLE 2 TO 8 KNOTS BETWEEN 15 AND 25000 FEET, AND NORTHWESTERLY 25 TO 35 KNOTS ABOVE 25000 FEET X

On the basis of this information the TASK FORCE

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COMMANDER scheduled the ABLE DAY operation for 1 July, bomb drop at 0830.

During the day 30 JUNE, the weather reconnaissance aircraft soundings showed significant increases of moisture at levels below 5,000 FEET in the BIKINI AREA but this factor was expected to influence only the nocturnal convective cloud condition. The cloudiness would tend to be at a maximum near dawn and then rapidly dissipate during the early forenoon. At the 2200 30 June conference there was no change in the weather prediction given at the 0830 conference.

Between the hours 0100 and 0600 1 July weather reconnaissance aircraft made continuous cloud observations and upper air soundings in the BIKINI AREA. 7 to 8 tenths cumulus with showery conditions were reported in the immediate vicinity of the lagoon. The cumulus clouds were occasionally swollen to 12,000 feet accompanied by not infrequent lightning discharges. This nocturnal convective cloud condition was not unanticipated although the intensity of the convection during these early hours was significantly greater. At 0500 another weather briefing was held at which time the forecast of 2 to 3 tenths of cloud at target time was reiterated. It was pointed out that the nocturnal cloudiness would tend to be a maximum at dawn and from that time on the cloudiness would diminish. This prediction was substantiated by the command aircraft which was checking on the weather conditions at this time as well as by the Aerological Officer aboard the weather reconnaissance aircraft flying in the immediate vicinity of BIKINI. With this added information the TASK FORCE COMMANDER cleared the bomber to takeoff from KWAJALEIN with a revised target time of 0900.

After 0700 the cloudiness continued to diminish,

with an occasional isolated light shower developing from the dissipating cumulus clouds. At 0830 the total cloudiness were estimated at 2 to 3 tenths.

The upper wind forecast verified very satisfactorily, being substantiated by rawin soundings taken from the FALL RIVER, a visual balloon run from the MT. McKINLEY 5 minutes after detonation, and by the action of the radioactive cloud itself. The latter broke in three portions, the lower part extending to 15,000 feet began drifting to the WNW in accordance with the moderate ESE winds, the middle section 15,000 to 25,000 feet diffusing slowly in all directions in accordance with the light variable winds, and the upper portion 25,000 to 35,000 feet flowing southward with the northerly winds.

3. William Day Forecast.

The weather map at 1200Z 17 July showed that a severe typhoon which had formed in the vicinity of GUAM and moved across the northern tip of LUZON into the South CHINA SEA would no longer affect the weather in the MARSHALL ISLAND AREA. The mid-Pacific or sub-tropical high was of moderate intensity, elongated in an east-west direction across the central Pacific but separated by a weak trough between MIDWAY and the HAWAIIAN ISLANDS. It was believed that the western portion of this high cell was intensifying. The equatorial front was in the vicinity of BIKINI and light shifting winds and scattered shower activity prevailed. To the east of BIKINI weather reconnaissance flights had observed conditions considerably better than those at BIKINI. On the basis of these flight reports and the expected movement of the equatorial front to the south, it was anticipated that improving conditions and favorable operation weather

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would prevail for William Day. The following forecast was sent to Task Group Commanders:

WEATHER FORECAST BIKINI AREA 19 JULY 0800 TO 1600 LOVE X 3 TO 4 TENTHS CUMULUS BASE 1500 TOP NEAR 6 GRAND OCCASIONALLY SWELLING TO 10 GRAND X FEW PATCHY MIDDLE AND HIGH CLOUD X TOTAL CLOUD BELOW 20 GRAND 3 TO 4 TENTHS X WINDS ALOFT MAINLY EASTERLY 10 TO 15 KNOTS ALL LEVELS X

This forecast for favorable weather was presented verbally in detail at the 0830 weather conference on 18 July and WILLIAM DAY was set for the next day the 19th.

At the evening conference at 2200 it was maintained that the front should remain in a southerly position because of the increased easterly flow in the BIKINI AREA and that satisfactory weather would prevail. The forecast as issued in the morning was not changed.

A heavy shower had occurred between 1800 and 2000 on the 18th and distant lightning was visible throughout the night. Early on the morning of the 19th the radar showed extensive severe weather to the south of BIKINI and in a broad belt extending east-west about 70 to 100 miles south of BIKINI.

The weather reconnaissance aircraft over the BIKINI AREA between 0400 and 0500 reported undesirable flying weather between KWAJALEIN and BIKINI, but indicated that the belt of bad weather would probably remain to the south of BIKINI and that favorable conditions existed to the eastward, upwind from BIKINI. This aircraft observation was very soon afterward verified by the Command Aircraft, Burma Zero. At 0700, rain showers were visible to the east and south and shortly thereafter it became very apparent that the equatorial

front was moving northward into the target area. Radar observations showed that the weather to the eastward was deteriorating very rapidly. It appeared that a northward bulge in the equatorial front was approaching from the east and causing the winds to converge ahead of it. Convective clouds of all types rapidly developed and showers occurred throughout the target area. Drone aircraft could not operate and certain other aircraft were either restricted in their operations or could operate not at all.

Actual cloud conditions over the target were showers, 7 to 8 tenths cumulus bases 1,500 tops variable to 18,000 feet. Broken middle and high clouds. Total cloud cover over target below 20,000 feet 8 tenths.

The forecast for WILLIAM DAY did not verify because of the unexpected movement of the equatorial front into the BIKINI AREA.

4. Baker Day Forecast.

In the weather conference on the morning of the 23rd it was pointed out that a typhoon was developing in the MARIANAS AREA and that a general synoptic situation was occurring which was similar to the one which produced favorable weather for the ABLE DAY operation. Widespread subsidence was expected to the eastward of the typhoon area and the equatorial front was expected to stay south of BIKINI. This optimism was somewhat premature because a surge of the easterlies from the southern Hemisphere produced an atmospheric wave on the equatorial front which brought the front actively northward into the BIKINI AREA during the night. Thunderstorms and heavy showers persisted throughout the night and

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early forenoon of the 24th in the BIKINI AREA and in all surrounding quadrants. This deterioration of local weather prior to the morning weather conference on the 24th caused the Aerological Unit much apprehension with regard to the weather for the 25th, but there appeared no positive reason to relinguish the original favorable indications of clearing weather. It was forecasted that the wave on the equatorial front would move to the northwestward of BIKINI, and that drier air would invade the area. For these reasons the following forecast was sent to all TASK GROUP COMMANDERS:

> WEATHER FORECAST BIKINI AREA FOR 25 JULY 0800 TO 1600 LOCAL X 3 TO 4 TENTHS CUMULUS BASE 1500 TOPS MAINLY 3 TO 8 GRAND BUT ISOLATED TOPS DEVELOPING TO 15 GRAND X LITTLE OR NO MIDDLE CLOUD X 3 TO 4 TENTHS HIGH CLOUD NEAR 32 GRAND X TOTAL CLOUD BELOW 20 GRAND 3 TO 4 TENTHS X WINDS ALOFT EASTERLY 15 TO 25 KNOTS ALL LEVELS X

This forecast in detail together with the reasoning behind it were given at the 0830 morning Staff conference. It was stated that favorable weather was forecasted for BAKER DAY, but with a low degree of confidence. It was further stated that the weather reports and particularly the winds and aircraft reconnaissance reports received during the day would be a good indication as to whether or not small amounts of clouds would prevail. The operation was called on and ships ordered into position with the reservation that a postponement might be made after the evening conference if the favorable forecast did not hold.

The aircraft reconnaissance reports showed that the frontal wave had definitely passed BIKINI and that although conditions to the eastward were

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showery and unsettled there was improvement in conditions to the southeast. In addition, cumulonimbus clouds in the BIKINI AREA were being sheared off above 20,000 feet by the northerly subsiding flow. By late afternoon there was a noticeable decrease in convective activity as the result of this subsidence.

A chart was prepared showing the position of the equatorial front relative to BIKINI and the most significant weather reported in the reconnaissance flights. With the aid of the diagram it was pointed out at the 2200 conference that the frontal wave would move northwesterly and the front stay north of BIKINI. Good weather would prevail. The forecast height of the low cloud was reduced to no higher than 6,000 feet. It was stated that in view of this later information the forecast was now given with good confidence. It was on this basis that the COMMANDER JTF-1 decided to keep the schedule decided upon in the morning.

At the time of the evening conference distant lightning was visible to the north of BIKINI in the direction of the front, but a radar observation showed that this shower activity, about 30 miles north, was the only weather present within a hundred miles radius except a small shower area just to the west and five very small and widely scattered shower areas to the southeast. As the surface winds were southeasterly it was reasoned that one of these small showers was likely to pass over the MT. McKINLEY, but thereafter conditions would improve. This was a correct prediction as a slight shower did occur.

Weather reconnaissance beginning about 0300 showed that conditions were favorable for the operation. The RAOB from the SHANGRI LA and an aircraft sounding showed an isothermal layer between 7,000 and 8,000 feet with relatively dry

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air above, which was preventing clouds from developing to any extent. Three reconnaissance aircraft, orbiting in the area at 1500, 8,000 and 15,000 feet from 0500 to near the time of the burst, continued to report favorable conditions.

Surface and upper winds were also favorable. Light southeasterly winds in the lower layers shifted gradually through east to moderately strong northeasterlies above 35,000 feet. It was necessary to change only slightly the originally chosen 090° T sector axis. The steadiness of the winds indicated that there would be no radiological danger for surface ships.

During the critical time for photography and flight operations only 2 to 3 tenths of small cumulus, no middle cloud and only a few thin cirrus over 30,000 feet existed in the target area. The original favorable forecast presented at the morning conference on the 24th was verified.

SUMMARY OF FORECASTS

A complete operational forecast was presented at the daily briefing conference beginning 1 June 1946 and lasting until after BAKER DAY on 25 July 1946. Verification of these forecasts gave 80% accuracy during June and 70% during July. These figures cannot be compared with other weather forecasts verification scores because of the much more exacting requirements for the CROSSROADS OPERATION. The usual forecast does not attempt to present the expected cloud conditions in such detail.

The drop in accuracy for July is attributed to the fact that the equatorial front moved closer to the BIKINI AREA in July thus making the forecasting of cloud conditions a more difficult

problem. In general it was possible to forecast the level of the wind shift within a few thousands of feet. The direction the upper level wind would take could not always be determined except during anticipated passages of upper high pressure wedges or low pressure troughs. Much more research and practice is needed in this phase of weather forecasting and it is believed that the answer lies in an extensive network of upper air stations together with the preparation of complete upper air maps to high levels. Throughout all test and rehearsal days planned operations had to be cancelled in only one instance because of unpredicted weather.

PART V - METEOROLOGICAL EFFECTS RESULTING FROM THE EXPLOSIONS.

A. Test Able.

Much speculation relating to significant changes in atmospheric conditions resulting from atomic explosions has been voiced and promulgated. This section is included mainly to clarify these views.

1. Thunderstorms.

In the New Mexico test, a thunderstorm preceded the explosion, without considering the sequence of events this observation not infrequently has been distorted to imply a genetic relationship. Some references also have been made to rainstorms associated or resulting from the Japanese explosions, but these are in main speculatory inferences without substantial meteorological basis. In Japan it is conceivable that the reported showers may have been a result of convection caused by the widespread fires which sustain convection for a long period of time

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after the explosion. This phenomenon has been noted over large forest fires and over burning European cities.

Prior to test ABLE a prevailing expectation among non-meteorologists was that the atomic burst would result in the development of a thunderstorm with attendent rainfall and lightning discharges. It was upon this belief that an extensive spherics documentation program was established. No spheric activity was recorded. The belief that a thunderstorm would result was largely based on the reasoning that large amounts of moisture in tropical air masses plus the large quantities of water expected to be evaporated from the water surface would be extremely conducive to thunderstorm formation. The atomic bomb is unable to produce a thunderstorm because the mechanism which produces showers and thunderstorms is entirely unrelated to the trigger action of a sudden impact of energy in the atmosphere, even though it be tremendous. Sustained convection or mechanical lifting for at least several hours over relatively large areas together with a proper vertical moisture distribution is essential for the production of shower and thunderstorm activity.

2. Nuclei For Condensation.

References have also been made to the high atmospheric concentration of ionized particles resulting from the atomic burst serving as nuclei for condensation and thus also being conducive to the formation of rainfall. On ABLE DAY many small light rain showers developing from cumulus clouds extending from 2,000 to 6,000 feet occurred throughout the Northern MARSHALLS. In the path of travel of the radioactive cloud, measurements were recorded of radioactive rain. The amount of radioactivity was so small that it was only of academic

interest and was the result of radioactive particles above the tops of the clouds falling into the rain clouds or of particles being in the area where the cloud formed and thence falling out in the rain. Nevertheless the fact that rain showers occurred may falsely suggest some validity in the hypothesis that large numbers of ions in the air caused by radioactive emanations may result in rainfall. This has no basis in fact. The very abundant hygroscopic salt nuclei in the atmosphere over ocean areas form an adequate source of nuclei will have no effect upon formation of clouds. The showers that occurred were anticipated and were directly attributed to the widespread thermal instability in the rather moist equatorial air mass prevailing over the MARSHALLS on ABLE DAY.

An inspection of ships records in the BIKINI AREA and pictures taken over the lagoon revealed that the only detectable changes which took place in the wind or atmospheric structure were the momentary effects of the blast and heat wave and the violent changes which took place in a rather limited area in the vicinity of the explosion. The cloud pattern over BIKINI lagoon was undisturbed except for the doughnut shaped cloud which formed around the explosion.

There are now two very adequately documented cases on record of atomic air bursts being unable to cause rainfall, the NEW MEXICO test, and the BIKINI Test ABLE. In both cases the thermodynamic and moisture structure of the atmosphere were properly staged for rainfall production. In both cases rainfall failed to occur because adequate mechanism for the release of the available moisture was lacking.

3. Cloud Chamber Effect.

The explosion was accompanied by the formation

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of a dome shaped cloud which a few seconds later took the form of a doughnut as the top of the dome dissipated. This doughnut cloud extended from the surface to approximately 1,000 feet. The cloud effect can be attributed to the rarefaction in the wake of the blast wave and resultant adiabatic cooling. The temperature and dewpoint conditions at the time of the burst required only 4 to 5° C of cooling to cause 100% relative humidity in these lowest levels. This would require a pressure change of about 40 to 50 millibars or 4 or 5×10^4 dynes/cm^2. Microbaragraphs located in various islands in the BIKINI Atoll indicated blast pressure effects of approximately 15 to 25 millibars. At Kwajalein the blast wave recorded a pressure change effect of approximately .08 millibars 23 minutes after the burst.

4. Atomic Cloud.

The intense heat developed by the explosion created large convective currents similar to those observed in the development of cumulonimbus clouds, but rising more rapidly. In about 10 minutes the cloud reached a height of approximately 35,000 feet after which further convective activity from the surface ceased. In passing upward thru the freezing level at 19,000 feet characteristic false cirrus of a scarf cloud formed and gave the appearance of cascading downward. Within 2 or 3 minutes the false cirrus was enveloped by the rising warmer convective and turbulent currents and became indistinguishable. The identity of the atomic cloud was maintained for about 50 minutes after which the prevailing winds dispersed the cloud into 3 main masses, the lowest portion (surface to 15,000 feet) moving to the west northwest, the middle portion (15,000 feet to 25,000 feet) diffusing in all directions with light variable winds, and the top portion (25,000 to 35,000 feet) moving to the south southwest. When the cloud was no longer

visible its trajectory was computed from observed wind soundings and was shown ultimately to have taken a path at all levels to the northwest, recurving in a large arc to flow to the northeast and pass over the vicinity of WAKE in 48 to 72 hours after the burst time.

B. Test BAKER.

In attempting to predict the character of the underwater detonation, it was believed that either a ball of fire together with tremendous amounts of liquid water and supersaturated water vapor would be ejected from the lagoon resulting in a rain of spray and the formation of a convective cloud; or, that there would be no ball of fire but rather, a complex explosive ejection of liquid water into a plume of spray.

If the first occurred a significant portion of the radioactivity could be expected to be suspended in a cloud and carried downwind resulting in an appreciable decrease of the radioactive concentration in the lagoon. If the second occurred, practically all of the radioactivity would precipitate with the spray in the immediate vicinity of the detonation point creating a serious radiological hazard for many days after the explosion.

If only water was forced into the air it was concluded that no cloud would form. This was based on the premise that it is impossible to form any significant cloud by the simple injection of water into the air. To produce a cloud an adiabatic cooling such as caused by convective currents ascending to lower pressures is required.

In test BAKER a vigorous ball of fire with the attendant liquid water and vapor was vigorously ejected. Within seconds a tremendous cloud chamber

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effect was observed. A column of water and spray was observed to have a width of approximately 2,100 feet, topped by a water vapor cloud that rose to 8,000 to 9,000 feet within 3 minutes. The cloud subsequently settled down until its top was about 7,500 feet under the influence of an isothermal lapse rate in the atmosphere which was present near this level. A rain of water spray continued to occur for 15 or 20 minutes but it is believed the source of moisture for the rain came entirely from the ejected water from the lagoon.

SUMMARY OF METEOROLOGICAL INFLUENCES.

There were no significant meteorological influences resulting from test ABLE and BAKER other than purely local cloud effects in the prevailing air mass at the time of detonation. It may be concluded that a local rainstorm can not be started by an air burst no matter how favorable conditions may be for the formation of rain, also that the forces exerted on the atmosphere by the atomic explosion will not appreciably effect the surrounding wind, temperature or pressure pattern except momentarily and in the very immediate vicinity of the burst.

PART VI - COMMENTS AND RECOMMENDATIONS

A. Further Development of Aircraft Weather Reconnaissance.

Army and Navy weather reconnaissance aircraft were indispensable to the successful accomplishment of the aerological mission. The effective network of weather reports provided by these aircraft would have been impossible to duplicate by ship or land stations. In addition they were able to make more detailed reports of cloud conditions than are possible from surface stations. They were able to report the character of layers of clouds, the

exact altitudes of tops and bases and make measurements of temperature and moisture distribution aloft. For tropical forecasting, data on detailed cloud patterns are of invaluable aid to the weather forecaster because from this information the vertical therodynamic structure of the air masses can be deduced.

The value of the weather reconnaissance reports were significantly increased by the addition of a trained aerological officer as a regular member of the crew. This officer was able to make very accurate weather observations and being cognizant of the problems confronting the forecaster could be constantly on the alert to detect significant weather conditions or changes.

The modification of the aircraft to allow the installation of special aerological instruments contributed greatly to the value of the weather reports.

The mobility of the aircraft permitted the collection of weather reports equivalent to a dense network of weather stations in the operational area as quickly as the airplanes could be moved and arrangements made for ground and communication facilities.

The use of weather aircraft also permitted a flexibility in the collection of weather reports such that information could be immediately obtained in any suspected direction of approaching bad weather.

It is recommended: 1. That as the result of experience gained in the CROSSROADS OPERATION in the use of aircraft reconnaissance that sufficient aircraft weather reconnaissance squadrons be trained and maintained so that these units will be

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immediately available for any future tests or operations requiring precise and reliable weather forecasting service in an area where sufficient ship or shore weather stations do not exist.
2. That a detachment or squadron of weather reconnaissance planes be fitted out with sufficient equipment and a complement of aerological personnel to enable them to prepare weather analyses and forecasts while in flight. Such a plane should carry a minimum of one aerological officer, two aerographers mates as regular flight crew members and have sufficient communications and space to permit the collection and analyses of complete weather broadcasts.

B. Operational Need for a Weather Service.

The weather forecast and advices for the CROSSROADS OPERATION were the result of the combined coordinated efforts of all Task Force aerological units. In order to provide sufficient data it was necessary that area commanders increase the services from the existing network of weather stations. Units had to be provided in the task force to augment existing stations as required for reliable weather forecasts. To handle the volume of work required a weather central was established at KWAJALEIN to assist in analyses. Without these arrangements the preparation of forecasts for the operation with the attained degree of reliability would have been impossible. It can therefore be seen that a special weather service was required for the successful completion of the CROSSROADS aerological mission. The addition of a single Aerological Officer or unit to the staff would not have been a satisfactory solution.

It is recommended: 1. For future operations, which are sensitive to weather conditions, that

provisions be made for weather facilities commensurate with the amount, type and reliability of the weather forecasts and advices required. Sufficient personnel have to be provided to supply the necessary weather data and to carry on complete and continuous analyses over a prolonged period of time. With regard to this recommendation it is considered that the personnel outlined in Part III Para. (A) through (D) were the absolute minimum for an operation of this magnitude. Had the personnel been available the CROSSROADS weather central could have exchanged one officer for two observers and operated as efficiently with 10 qualified weather officers and 15 enlisted observers.

2. That the major weather centrals now established be continued and that additional centrals be established in all future operating areas. On the basis of experience a major weather central can efficiently and effectively handle all weather information for an area of approximately 2,000 mile radius from the central. It should be borne in mind that as weather requirements progress to higher altitudes additional personnel will be required to collect and analyze the additional essential data.

3. That a mobile weather central be maintained to be immediately available for movement to operating areas where tests or operations similar to CROSSROADS are to be held. Such a ship should have a minimum complement equivalent to a major fleet weather central. Sufficient office and laboratory space should be provided to carry on the functions of a major weather central. Communication facilities must be capable of collecting and disseminating large amounts of weather data. It is considered that a AGC would be suitable for this purpose. A high speed CV would be ideal as it would give the added advantage of being able to carry the necessary weather reconnaissance planes

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and to accompany any high speed Task Force.

C. Necessity for Upper Wind Measurements to High Altitudes.

To safeguard personnel from radiological hazards, the measurement of upper winds to stratospheric levels was an absolute necessity. In addition data for winds to these high levels were required for the preparation of studies to aid in operational planning.

As the use of atomic weapons, rockets and guided missiles increases and the atomic bomb itself becomes more powerful, wind data will be required to higher and higher levels, (Although not a part of this test, the problem of rockets and guided missiles is added here because of the effect of winds on their trajectories).

Experience in these tests have proved the practicability of consistently measuring winds to high altitudes in a suitable network of ship and shore stations. Although the equipment used in these tests was satisfactory it is believed that instrumentation must be continually developed if the required wind altitude demanded in future operations is to be attained.

It is recommended that:

1. Land based RAWIN equipment be improved and developed to permit reliable wind measurements to heights in excess of 100,000 feet (100000 feet is used in all the following recommendations as only the initial goal. As development progresses this altitude will materially increase).

2. That ship board equipment be developed to measure reliably winds to altitudes in excess of

100,000 feet. If practical, a radar especially designed for aerological use should be designed and installed in ships carrying complete aerological units. (To be of maximum utility this radar should also be capable of observing weather.)

3. That a program be initiated to obtain RAWIN soundings from as many ships and land stations as practicable.

4. That all available upper wind data be collected and placed on punch cards or in some other suitable statistical form where they are immediately available for weather studies in connection with atomic bomb, rocket and guided missiles operations.

5. That every effort be made to obtain upper air information from all areas of the world.

6. That research be initiated into methods of extrapolating and forecasting of upper winds in areas where specific data is lacking. That the result of these studies be converted to simple practical rules so that they may be readily used by Aerological and Ordnance operating personnel.

7. That an upper wind sounding balloon or some other device be developed in order to permit tracking and computation of upper winds to altitudes in excess of 100,000 feet.

8. That the effects of upper winds at levels from 20,000 to 60,000 feet on cloud amount and rainfall in the equatorial regions be further investigated. This study should correlate the activity of the equatorial front and the formation and movement of tropical storms with winds at these high levels.

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D. Assignment of the Responsibility of Ballistic Wind Computation.

The high degree of accuracy required for bombing in test ABLE made it imperative that corrections for ballistic winds be used. The delegation of the responsibility of furnishing these ballistic wind corrections should have been assigned to qualified weather personnel because a complete understanding of the variability and limitation in accuracy of winds aloft measurements was necessary before proper calculations could be made. In the future predictions of the ballistic winds over areas lacking in upper air observations will be frequently required. This further emphasizes the need for properly trained and experienced meteorologists in all ballistic problems.

It is recommended that:

1. The responsibility for furnishing ballistic information be assigned to aerological personnel.

2. That steps be taken as required in order to acquaint weather personnel with available information concerning the use and computation of ballistic winds used in connection with aircraft bombing.

3. That ballistic wind and density tables be extended initially to 100,000 feet altitudes with provisions for further expansion as necessary, and that they be compiled in forms as necessary for use with all types of airborne projectiles or missiles.

E. Research on Lateral Diffusion and Fall-Out in the Atmosphere.

The radioactive contamination in the air produced by the atomic explosion flowed with the wind

currents and at the same time dispersed both laterally and vertically. The solid particles falling through the layers of variable air currents no doubt reached the surface at remote distances from the point or origin. To aid in estimating the location of areas of radioactive contamination, quantitative information on the rates of lateral dispersion and fall-out would have been of great assistance to the radiological safety group. Only meager information of this type is now available. It is recommended that research projects be instigated to obtain quantitative information on the rates of turbulent diffusion and fall-out throughout the tropopause. The need for information on this subject becomes increasingly significant when the implications of offensive and defensive strategy of atomic weapons are considered.

F. Improvement of Surface Weather Code.

For forecasting weather in the CROSSROADS OPERATION there existed a serious deficiency in the internationally accepted weather reporting code. This code was wholly inadequate for the information regarding cloud conditions which was deemed essential for tropical weather forecasting. The code only permitted reporting the amount, height of the lowest cloud present and the amount of the total sky covered by cloud irrespective of height. It is recommended that a weather code be provided for surface observers to include independent observations of the amount, height and movement of the low, middle and high clouds whenever these conditions can be observed.

G. PREPARATION OF FUTURE WEATHER STUDIES.

For operational planning purposes a weather study was included in the Aerological Annex to the Task Force Operation Plan 1-46. Because of the

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new requirements presented by the atomic bomb, this study contained special arrangements and presentation of weather elements not heretofore included in such a summary. The weather study proved adequate and satisfactory in so far as the weather elements included. The amount of data available for preparation of the summary was somewhat inadequate in many cases particularly in the higher levels.

It is recommended that all personnel responsible for the preparation of weather studies for military operations give careful consideration to CJTF-1 Aerological Plan (Annex T to CJTF-1 Op.Plan 1-46) so that future studies will contain all necessary information required by newly developed weapons. Every effort must be made to present weather information in a form suitable for atomic bomb, rockets or guided missiles operation.

II. SHIPBOARD AEROLOGICAL UNIT COMPLEMENT.

The original complement of aerographers mates attached to the staff aerological unit proved inadequate and additional personnel has to be obtained on a temporary duty basis. The radiomen placed under the supervision of the aerological unit were of great assistance and the copying of weather schedules were most satisfactorily done in the aerological office. By this means the type of information could be quickly varied and controlled under the immediate supervision of an aerological officer. It was an advantage to train the radiomen in weather copying as the bulletins consist primarily of numbers.

It is recommended that all aerological units afloat, which must furnish daily forecasting service, have an absolute minimum complement of:

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1 qualified aerological officer.
6 aerographers mates (One C Aer.M included in this figure)
4 radiomen

This unit can prepare surface analyses, prepare forecasts and make surface and upper winds observations. If upper air analyses must be prepared on board or observations taken other than routine, additional personnel will be required.

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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 (P) - AIR SEA RESCUE

PART I - PLANNING

1. Pacific Ocean Area ASR Doctrine.

Basic doctrine for Air Sea Rescue in the Pacific Ocean Areas is contained in CinCPOA Standard Operating Procedure, SOP-3A. To the maximum practicable extent, CJTF-1 used the provisions of this letter as a basis for all ASR arrangements, instructions, and doctrine within JTF-1.

2. Special Considerations.

The special conditions surrounding the CROSSROADS Operation necessitated some modifications to the Pacific doctrine for ASR responsibilities as contained in SOP-3A. Some of the considerations involved were:

(a) The principal danger within a considerable radius of BIKINI Atoll i.e., radiological contamination of airspaces, following an atomic bomb detonation, could be predicted and evaluated by experts available only to CJTF-1.

(b) Most of the air and surface units available in the BIKINI Atoll (i.e. MARSHALLS) Area were under the operational control of CJTF-1.

(c) CJTF-1 operated directly under the Joint Chiefs of Staff, not under CinCPOA; this complicated the matter of delegating responsibility over areas assigned to CinCPOA.

(d) It was desirable for security reasons that CJTF-1 have authority to control all aircraft permitted to operate within one hundred fifty nautical miles (i.e. radar range) of BIKINI Atoll before, during and after the atomic tests.

(e) Air Traffic congestion over the Target Array following ABLE and BAKER Days made "Positive Control" necessary for safety reasons.

(f) Military air routes to the Far East were vital to the support of occupation forces farther west, hence it was important that the atomic bomb tests interrupt traffic over these routes for the shortest practicable time.

(g) As a result of demobilization, communication circuits throughout the Pacific could not be relied upon for the fast, accurate transmission of ASR, air traffic control, and air safety orders.

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3. Basic Authority

After discussion with interested commanders and agencies the following directives were issued:

(a) By the Commanding General, Army Air Forces:

NUMBER WCL 35331

PACUSA ADMIN MANILA PI PASS TO CG 7TH AF HICKAM FLD HAWAII, CG 8TH AF OKINAWA CG 13TH AF MANILA, CG 20TH AF GUAM FOR INFOR AND PACUSA TOKYO PASS TO CG 5TH AF TOKYO SIGNED WARCOS

IT IS REQUESTED THAT YOU ISSUE INSTRUCTIONS TO PROHIBIT ALL AIRCRAFT UNDER YOUR CONTROL FROM OPERATING WITHIN A RADIUS OF 500 NAUTICAL MILES OF BIKINI ATOLL, UNLESS DIRECTLY PARTICIPATING IN OPERATION CROSSROADS OR UNLESS OTHERWISE CLEARED BY COMMANDER JOINT TASK FORCE 1 DURING THE PERIOD 25 JUNE TO 30 AUGUST 1946. CLEARANCE FOR FLIGHTS REQUIRED IN THIS AREA DURING PERIOD LISTED WILL BE REQUESTED FROM THE NEAREST OVERSEAS AIRWAYS TRAFFIC CONTROL CENTER. DETAILED INSTRUCTIONS WILL BE ISSUED BY JOINT TASK FORCE 1 FOR PLANNING PURPOSES. THIS PLAN IMPOSES MINIMUM RESTRICTIONS.

ORIGINATOR CG AAF
APR 46 DTG 222159Z

(b) By the Commander in Chief Pacific Ocean Areas:

ALPAC 163

BEGINNING 24 JUNE 1946 AND UNTIL THIS ALPAC IS CANCELLED NAVAL AIRCRAFT EXCEPT THOSE ASSIGNED CROSSROADS WILL REMAIN CLEAR OF THE AREA WITHIN 150 NAUTICAL MILES OF

BIKINI ATOLL UNLESS CLEARED BY CJTF-1 PRIOR TO ENTRY X PARA X UPON RECEIPT OF NOTIFICATION FROM COM JTF-1 OPERATIONS OF ALL NAVAL AIRCRAFT NOT ASSIGNED CROSSROADS WILL BE SUSPENDED TWELVE HOURS PRIOR TO EACH ATOMIC BOMB TEST WITHIN 500 NAUTICAL MILES TO BIKINI ATOLL X THESE OPERATIONS MAY BE RESUMED WHEN ADVISED BY CJTF-1 X IT IS DESIRED THAT CJTF-1 NOTIFY THE FOLLOWING DIRECTLY BY OP DISPATCH WHEN THE TESTS WILL OCCUR AND WHEN FLYING MAY BE RESUMED WITH SAFETY:

COM MARIANAS X COMHAWSEAFRON X ISCOM JOHNSTON X ISCOM WAKE X ATOLL COMMANDER KWAJALEIN X AND COMNATSPAC X IT HAS BEEN AGREED THAT CJTF-1 WILL ASSUME AIR SEA RESCUE RESPONSIBILITIES WITHIN 150 NAUTICAL MILES OF BIKINI ATOLL FROM 25 JUNE 1946 UNTIL THIS ALPAC IS CANCELLED X

The authority granted by these directives proved adequate to enable CJTF-1 to establish a special CROSSROADS Air Sea Rescue organization within the BIKINI Area and, at the same time, to cover the remaining special considerations outlined in paragraph 2 above.

4. Air Sea Rescue Annex.

The ASR instructions for the CROSSROADS Operation were contained in the Air Sea Rescue Annex (Annex Y to CJTF-1 Op-Plan No. 1-46. In its original version this annex was predicated upon assumptions slightly different from the specific terms of authority finally granted. The Annex was later amended so that its provisions fell within scope of the directives quoted in paragraph 3 above.

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It will be noted that the five hundred nautical miles radius from BIKINI Atoll (prescribed in both basic directives) includes WAKE Island. Thus, when air traffic was interrupted over the primary military air routes to the West (i.e., the PEARL-KWAJALEIN-GUAM and the PEARL-MAJURO-SAIPAN Airways). At the conclusion of Test ABLE, CinCPOA proposed that this alternate airway be left open for Test BAKER. CJTF-1, in reply, recommended that the safety radius specified in ALPAC 153 be reduced from five hundred to four hundred nautical miles. CinCPOA, on 13 July, 1946, issued ALPAC 201 which so modified ALPAC 153.

5. Details of ASR Arrangements.

The following ASR arrangements obtained during the periods noted:

(a) Period 10 March to 24 June 1946: The provisions of SOP-3A applied to all areas in the MARSHALLS Area during this period. Commander MARIANAS held ASR responsibility within the area (which includes BIKINI Atoll). For this reason VH-4 and VPB-32 (later VP-32), in addition to their duty in connection with CROSSROADS, reported to Commander MARIANAS for temporary additional duty as part of the Area Air Sea Rescue Organization.

(b) Period 25 June to ABLE minus One Day (30 June 1946): The provisions of ALPAC 153 became effective on 25 June 1946, and CJTF-1 assumed ASR responsibility for the area within one hundred fifty nautical miles of BIKINI Atoll. Only aircraft under CJTF-1 could operate with safety and for limited periods within radiologically contaminated portions of this area after detonation; thus CJTF-1,

in effect, temporarily assumed ASR responsibility within the five hundred mile radius. Since ALPAC 153 and WARCOS WCL 35331 prohibited navy and army aircraft from flying within this area unless directly connected with CROSSROADS, or otherwise cleared by CJTF-1, authority for positive control of aircraft within this area thus stemmed from these directives. At this time CROSSROADS requirements mounted rapidly and VP-32 was withdrawn from temporary additional duty under Commander MARIANAS and thereafter operated under CJTF-1. Since Commander MARIANAS retained ASR responsibility in all areas outside one hundred fifty nautical miles from BIKINI Atoll, VH-4 was continued in its temporary additional duty assignment to assist.

(c) 1 July (ABLE DAY) to 24 July 1946 (Baker minus One Day):

Twelve hours before the first scheduled detonation time (0900L) for Test ABLE the remaining provisions of ALPAC 153 and WARCOS WCL 35331 were invoked by operational priority dispatches (known as "Crossroads Air Notices") sent to each group of activities concerned. This action stopped all air traffic within a radius of five hundred nautical miles of BIKINI Atoll thus interrupting travel over the PEARL-KWAJALEIN-GUAM, the PEARL-MAJURO-SAIPAN and MIDWAY-WAKE-GUAM airways. Fortunately, the radiologically dangerous cloud dissipated rapidly and by 1615L ABLE Day it was possible to send operational priority dispatches

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to the interested agencies which declared the area within five hundred nautical miles of BIKINI Atoll to be radiologically safe and thus permitted resumption of air traffic on all the air routes noted. CinCPOA, on 13 July, issued ALPAC 201 which modified ALPAC 153 as noted above.

(d) 26 July (BAKER Day) to 27 July 1946 (BAKER plus Two Day): Twelve hours before the scheduled detonation time (0835L) for Test BAKER the provisions of ALPAC 153 (as modified by ALPAC 201) and WARCOS WCL 35331 (similarly interpreted) were again invoked. This action stopped all air traffic within a radius of four hundred nautical miles of BIKINI Atoll. It permitted continuation of air traffic over the MIDWAY-WAKE-GUAM airway, and after some rerouting, over the PEARL-MAJURO-SAIPAN airway. The PEARL-KWAJALEIN-GUAM airway traffic was interrupted. Although somewhat unexpected, the area of radiological contamination in Test BAKER persisted somewhat longer and spread to a greater radius than in Test ABLE. As soon as the limits of the contaminated area had been definitely established a CROSSROADS AIR NOTICE was sent pronouncing the area within four hundred nautical miles of BIKINI Atoll between true bearings zero three zero and two nine zero degrees to be radiologically safe for air operations. The remaining was said to be unsafe. Receipt of this notice permitted opening the PEARL-KWAJALEIN-GUAM airway and resumption of normal routing the PEARL-MAJURO-SAIPAN airway.

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Further long range radiological reconnaissance on BAKER plus one day showed it possible to pronounce all areas radiologically safe and at 0045L BAKER plus TWO day, this was done.

(e) 27 July (BAKER plus TWO Day) to 30 August 1946: ALPAC 153 was cancelled by ALPAC 215 on 6 August 1946, the ASR responsibility within a radius of one hundred fifty nautical miles of BIKINI Atoll reverted to Commander MARIANAS in accordance with the provisions of SOP-3A.

PART II - TRAINING

1. CJTF-1 Staff.

The senior members of the air staff, CJTF-1, were familiar with the provisions, techniques, and procedures currently in use within Pacific Ocean Area. Some had had recent combat and administrative experience in the application of these arrangements. Training for the staff, therefor, was limited to training in internal procedures within the Force Flagship and perfecting coordination with surface operations.

2. Air Units JTF-1.

All air units received training in Air Sea Rescue and survival techniques, procedures and methods, while undergoing their initial group training. They received additional instruction immediately prior to departure for overseas flight and still further instructions while in the operating area.

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PART III - CONDUCT OF THE OPERATIONS

1. Operational Organization.

(a) Central Control: Upon assuming ASR responsibility within a radius of one hundred fifty nautical miles of BIKINI Atoll a central plot of all ASR facilities known to be within operating distance was established in the Combat Information Center in U.S.S. MOUNT McKINLEY (AGC-7), which normally remained at anchor in BIKINI Lagoon. Here a radar track on all aircraft operating within radar range was maintained. Aircraft were required to report to CJTF-1 via voice radio upon entering and leaving the area. At times, for safety reasons, it was necessary to invoke strict "Positive Control", assign aircraft specific flight levels, and limit their time at certain altitudes. U.S.S. ORCA (AVP-49) assisted in local air traffic control to the limit of her communication facilities. Other vessels, notably Carriers and AGC's, were employed as relief radar and communications guard ships. An aviator attached to the air staff of CJTF-1 (J-32), familiar with ASR procedure and techniques, supervised the activities of CIC. On ABLE and BAKER Days a special section of Air Plot in U.S.S. MOUNT McKINLEY (AGC-7) was devoted exclusively to ASR plots and coordination.

(b) Operating Bases and Units: ASR Bases were located and units disposed as follows:

(1) EBEYE - 5 PBM-5H Seaplanes of VH-4 were based at EBEYE. One seaplane was kept as ASR Ready Duty Seaplane during daylight hours. The services provided by VH-4 were augmented by those of VPB-116 (later VP-116), equipped with a 4 PB4Y aircraft specially fitted for ASR, and 2 B-17 Dumboes (with droppable boats) attached to Rescue Squadron 4, AAF. These units operated under CTG 94.4.14 (AtComKWAJALEIN).

(2) BIKINI - 1 PBM 5H Seaplane (from VH-4) was kept as ASR Ready Duty Seaplane at BIKINI constantly during daylight, commencing with the beginning of heavy air operations. U.S.S. ORCA (AVP-49), at BIKINI, was prepared for emergency ASR duty. In addition the destroyer assigned to duty as Harbor Entrance Control Vessel, BIKINI, was available on short notice for ASR missions.

(3) ENIWETOK - 2 B-17 Dumboes (with droppable boats) were kept in readiness for ASR purposes, during daylight. At times these units were supplemented by aircraft of VPB-116 which based at ENIWETOK intermittently.

(4) Vessels - Aircraft carriers assigned JTF-1, while underway, kept one TBM on deck (Condition 11), during daylight, for ASR missions. U.S.S. SAIDOR (CVE-117), in addition, kept one HOS-1 helicopter in Condition 11.

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(5) ROI - The TBM assigned U.S.S. SHANGRI LA (CV-38) was kept shore based at ROI to provide quick rescue facilities for Navy Drone Air Unit. Assisted by the plane guard destroyers this plane was available on short notice for ASR missions.

2. ASR Arrangements for ABLE and BAKER Days.

(a) Certain modifications to the routine ASR arrangements were necessary on ABLE and BAKER Days, and for the days immediately following, to care for the special circumstances which existed. These circumstances were:

(1) Evacuation of BIKINI Atoll by all non-target vessels.

(2) Large number of airborne aircraft in, and enroute to, the BIKINI Area.

(3) The special radiological dangers attending atomic bomb detonations.

(b) These conditions were met on the test days as follows:

(1) ABLE Day: The ASR Ready Duty Seaplane at BIKINI was replaced by three airborne Dumboes from TU 1.6.33 (VH-4). These Dumboes took stations as follows: thirty miles Northwest of the Target Array; thirty miles Northeast of the Target Array and over WOTHO Atoll.

Altitudes were assigned so as to keep these aircraft visible on the radar scopes in U.S.S. MOUNT McKINLEY (AGC-7). These aircraft were on station when the air pattern began to form over the target array. A B-17 took station between BIKINI and ENIWETOK until the aircraft of TU 1.5.6 (Army Drone Unit) had passed on their return to ENIWETOK. Two B-17 Dumboes (with droppable boats) were kept airborne fifty nautical miles from ENIWETOK in a direction toward BIKINI, North and South of the track of TU 1.5.3, during the same period. Remaining ASR aircraft in the area (VPB-116 and B-17 Dumboes at KWAJALEIN) were on short notice under CTU 94.4.14 (AtCom KWAJALEIN). All ASR aircraft carried radiological safety monitors on all flights. The usual standby TBM's were kept in readiness in U.S.S. SHANGRI LA (CV-38) and U.S.S. SAIDOR (CVE-117). ASR aircraft were returned to base progressively as the air groups completed their tasks. ASR control remained at all times in U.S.S. MOUNT McKINLEY (AGC-7). On ABLE plus ONE Day the radiological condition of the waters in the lagoon permitted resumption of the BIKINI ASR Ready Duty Seaplane.

(2) BAKER Day: The ASR arrangements for BAKER Day were essentially the same as for ABLE Day except that it was found desirable to provide relief on station at 1300L for two of the three PBM Dumboes. Had a rescue become necessary in the late afternoon a more useful

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fuel supply would have been available for the ASR aircraft. ASR aircraft carried radiological monitors on all flights. Air activity over the Target Array continued on an intense but gradually diminishing level after BAKER Day. To provide emergency services, one PBM Dumbo was kept airborne East of BIKINI at all times during daylight until BAKER plus Eight Day. On BAKER plus Ten Day it was possible to restore the ASR Ready Duty plane at BIKINI.

(c) Communications.

(1) All stations guarded the normal ASR nets, 500 Kcs voice, 140.58 mcs voice, plus 7945 Kcs and 3310 Kcs during incidents.

(2) Supplemental communications were conducted over:

(a) Radar telling net, 2160 Kcs voice.
(b) RIO net (4495, 8990 Kcs).
(c) Tower frequencies (6970 Kcs, and 116.10 mcs).

These circuits proved generally satisfactory although there were times when the RIO circuit to TU 1.5.3 (at ENIWETOK) was interrupted by atmospherics for periods as long as 12 hours, despite the frequencies used.

(3) Radio Calls: Aircraft on ASR mission used regular "XRAY" calls at all times except that, on ABLE and BAKER Days for missions under CJTF-1 they used "problem" calls.

3. Incidents.

No incidents resulting in full-scale ASR operations occurred while CJTF-1 held ASR responsibility. Several forced landings or crashes in the immediate vicinity of JTF-1 surface forces, involving limited local ASR missions, did occur. These are reviewed briefly herein.

(a) 3 June 1946: (The bulk of JTF-1 surface forces, including U.S.S. SAIDOR (CVE-117) was anchored in BIKINI Lagoon). HOS-1 helicopter BuNo. 76513, Commander WOOD, USNR, Pilot, and Captain MILLER, USN, passenger, while on a local flight over the target array, experienced a forced landing due to failure of the main rotor mechanism. The aircraft descended rapidly and landed in the water off the starboard bow of U.S.S. SAIDOR. Both pilot and passenger escaped with superficial bruises and were picked up by nearby small boats. The helicopter sank almost immediately in approximately 30 fathoms of water. It was salvaged on the following day and taken aboard U.S.S. SAIDOR for examination.

(b) 7 July 1946: (U.S.S. SAIDOR accompanied by plane guard destroyer was underway in the area South and East of BIKINI conducting air operations for photographic purposes. The bulk of JTF-1 was at anchor in BIKINI Lagoon). F6F-5P BuNo. V80148, pilot Ens. John GRENTZER, USNR, returned from a low altitude sonne strip photographic flight over vessels of the Target Array. Turning in to a final approach for a landing aboard, Ens. GRENTZER lost flying speed and dove into the water

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on the port quarter of U.S.S. SAIDOR. The plane sank almost immediately, carrying the pilot down with it. In a few instants the pilot succeeded in freeing himself and rose to the surface where he was picked up by one of the plane guard destroyers. He was found to have experienced only minor injuries.

(c) 9 July 1946 (NX-2 Dat.): (U.S.S. SHANGRI LA plus two guard destroyers was at anchor off ROI Island. The Navy Drone Air Unit and Navy Field Recovery Unit were temporarily based ashore at ROI). While conducting local drone control training operations from NAS ROI Island, F6F-3K Drone aircraft BuNO. 41436, Lieut. William H. WILLIAMS, USN, pilot, turned over control of the aircraft to the Navy Field Recovery Unit (TU 1.6.14) on the ground. The aircraft was then upwind of the field and at an altitude of almost 1,000 feet. Turning into the final approach a few instants later at about 600 feet, the port wing dropped radically, the plane lost flying speed, and dove to the left. It was observed to recover partially then fall off again in a progressive stall and dove into the water bursting into flames as it hit. It disappeared almost instantly. A TBM examined the area five minutes later and reported only an oil slick with small pieces of debris. Plane guard destroyers (TU 1.6.12) from ROI searched the area for three hours without finding any trace of the pilot. The search was then abandoned. No other forces participated.

PART IV - COMMENTS

1. General.

The Air Sea Rescue arrangements employed in the CROSSROADS Operation were somewhat complex. The complexities arose partially from a unique command relationship (CJTF-1 operated directly under the Joint Chiefs of Staff, rather than under CinCPOA); partly from the presence of both Army and Navy forces in the operation; but primarily from the special problems of safety and security attending the detonation of atomic bombs. Despite these complexities, it is considered that the plan adopted was satisfactory in all respects.

2. Shifts of ASR Responsibility.

Because of the intricacy of the shifts of responsibility some slight apprehension arose that uncertainty might devel p during the shift periods. No such uncertainty was apparent, although there is no positive evidence that it did not exist in the minds of certain commanders for short periods.

3. Bird Dog Stations.

Except for short periods at infrequent intervals, vessels to occupy the Bird Dog Stations East and West of KWAJALEIN were not available within the Pacific Fleet because of personnel shortages. The absence of these vessels reduced the safety along the air routes (on which flying increased as a result of the operations of JTF-1), and placed an added burden on the JTF-1 weather reconnaissance units which had to include the stations in their patrols.

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4. Runway Patrols.

The heavy air traffic at KWAJALEIN and, to a lesser extent, at ENIWETOK and ROI Islands, made runway patrols extremely desirable. Suitable vessels for this service could not be made available. AtCom KWAJALEIN provided miscellaneous make-shift vessels to the limit of his abilities. JTF-1 was combed for suitable vessels which could be made available without success. Fortunately no "post take-off" accidents occurred.

5. AVR at BIKINI.

The original ASR Plan did not provide for an AVR at BIKINI. One was made available by Commander MARIANAS, reconditioned and manned by JTF-1 personnel and proved invaluable for sea-drone patrol, stand-by control tower, and miscellaneous sea-plane tending duties at BIKINI. It measurably reinforced the ASR facilities in the BIKINI Area.

6. Communications.

Communications, both within and without the Task Force, were constantly a source of concern to CJTF-1. Difficulty was experienced in communicating by radio with KWAJALEIN and ENIWETOK. During certain periods it was impossible to reach GUAM or PEARL. Eventually these difficulties were very much reduced, but had ASR incidents occurred rescue efforts might have been handicapped by them. Interruptions were caused by power-plant failures ashore, inexperienced personnel, unsatisfactory frequencies and circuit conditions.

7. Command Channels.

CJTF-1 exercised control over air traffic near BIKINI through the normal area commanders. Crossroads Air Notices containing warnings were sent by OP dispatch to various interested command agencies,

Army and Navy. Despite the urgency of these warnings, it was necessary to address each of them to a total of about ten to twelve commanders. It appears that such an address is unnecessarily clumsy. It should be possible to control traffic by direct representations to local traffic control agencies which would then relay appropriate information to their respective commanders.

PART V - RECOMMENDATIONS

The following recommendations with respect to ASR arrangements are made in the event future atomic bomb tests at sea are planned:

1. General.

That an ASR Plan generally similar to that used for Tests ABLE and BAKER be employed.

2. Additional Facilities Required.

(a) That an AVR be added to the facilities available in the BIKINI Area.

(b) That vessels for runway patrol be provided at KWAJALEIN and ENIWETOK (DEs or PCEs) if similar numbers of VH bombers and large transport airplanes operate from these bases.

(c) That efforts be made to obtain suitable vessels to man continuously during the operations the Bird Dog stations East and West of KWAJALEIN.

3. Radius of ASR Responsibility for CJTF-1.

That the prospective maximum radius of dangerous radiological contamination from each prospective atomic bomb detonation be studied carefully in the light

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of the best available knowledge in order to reduce to the minimum consistent with safety the area within which "non-test" air traffic must be interrupted.

4. Command Channels.

That a system be devised to permit reduction in the multiple addressees presently necessary on safety and danger notices and thus simplify and speed up the warning procedures.

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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 (Q) - OBSERVERS (NON-PARTICIPATING)

PART I - BRIEF SUMMARY

1. This report is submitted in accordance with instructions contained in Annex BB of the Operations Plan. It covers the period from 1 February 1946 to 1 September 1946, and outlines the Observers' Group's participation in Operation CROSSROADS. The mission of the Observers' Group was:

(a) Provide for the maintenance of security of all phases of the Operation in accordance with the Security Plan.

(b) Insure that observers receive the maximum amount of information and the best possible conditions for observation that are consistent with security and safety.

(c) Provide for the maximum possible comfort of the observers.

This mission was accomplished and dispatch from the foreign non-participating observers (See appendix A) indicates that they were completely satisfied with their treatment throughout the operation. Also letters of appreciation are affixed to the "Panamint Parade" "See Appendix I-2) from the non-participating observers. Attention is invited to the superior cooperation which was exhibited by all sections of Joint Task Force One with which the Observers' Group had any dealings. Without their splendid assistance during the entire period covered by this report it would have been extremely difficult to accomplish our assigned mission.

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PART II - CHRONOLOGY ACCOUNT OF THE OPERATION

2. The history of the Non-participating Observers' Section begins with the decision of the Joint Chiefs of Staff to include non-participating observers in the plan for the atomic bomb tests. (See Para. 6, J.C.S. 1552/7, dated 14 January 1946, classified Top Secret). A total of 240 non-participating observers was authorized which included representatives from the following groups:

Number	Group	Remarks
60	Members of Congress	Includes members of Congress appointed to the President's Evaluation Commission
78	U. S. Army	Includes ground force and air force officers, as well as Army officers on the Joint Chiefs of Staff Evaluation Board.
38	U. S. Navy	Includes one marine officer and two Coast Guard officers, as well as Navy officers on the Joint Chiefs of Staff Evaluation Board.
30	U. S. Scientists	Includes members appointed by President's Evaluation Commission and to the Joint Chiefs of Staff Evaluation Board.
34	Foreign Representatives	Each nation represented on the United Nations Atomic Energy Commission was invited to send two representatives. Great Britain was authorized to send eight additional non-participating observers and Canada four additional.

3. The Commander, Joint Task Force ONE, placed the Observers' Group (J-23) under the jurisdiction of the J-2 Division. (See J-2 Staff Organization Chart, attached as Appendix B). Colonel Horace B. Smith was detailed by the War Department to assist Colonel T. J. Betts, Assistant Chief of Staff, J-2, by assuming full charge of the non-participating observers.

4. Colonel Smith reported for duty on 1 February 1946 and immediately began assembling a group of Army and Navy officers and enlisted men for duty in his section. During the course of Operation CROSSROADS, the following personnel were assigned to the Observers' Group:

Rank	Name	Reported for Duty	Duty Assignment
Col.	H.B. Smith	1 Feb 46	Officer in charge.
Capt.	Stanhope C.Ring	18 Jun 46	Orientation Officer assigned to USS Panamint.
Capt.	J. L. Callan	1 Jun 46	Responsible for Foreign Representatives (USS Panamint).
Lt.Col.	James H. Batte	1 Feb 46	Responsible for Army non-participating observers (USS Blue Ridge)
Lt.Col.	Edwin F. Black	1 Apr 46	Responsible for U.S. scientific non-participating observers (USS Panamint).

VII - (Q) RESTRICTED DATA
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Operational Report - CROSSROADS - PART VII - Special Reports
Section (Q) - Observers
(Non-Participating)

Rank	Name	Reported for Duty	Duty Assignment
Cmdr.	Kelso Daly	5 Feb 46	Responsible for Navy non-participating observers (USS Blue Ridge).
Major	Roderic D. O'Connor	15 Feb 46	Responsible for air transportation.
Major	Peter J. O'Carroll, Jr.	18 Jun 46	Air Aide.
Major	D. L. Jones	13 Jul 46	Air Aide.
Capt.	Augustin J. Rapisardi	18 Jun 46	Air Aide.
Capt.	Franklin W. Littleton, Jr.	18 Jun 46	Air Aide.
Capt.	Francis J. Briscoe	18 Jun 46	Air Aide.
Capt.	A. W. Gullion	13 Jul 46	Air Aide.
Lt.	A. J. McCormick	25 Mar 46	Assistant to Capt. Callan.
1st Lt	Arthur H. Beckteft	18 Jun 46	Air Aide.
1st Lt	Kirkwood C. Myers	12 May 46	Air Aide.
1st Lt	Winston P. Anderson	12 May 46	Air Aide.
1st Lt	William C. Miller	18 Jun 46	Air Aide.
1st Lt	George N. Hale, Jr.	5 Jun 46	Assistant to Major O'Connor.

Rank	Name	Reported for Duty	Duty Assignment
M/Sgt	Charles R. Ten Eyck	20 Feb 46	Stenographer (USS Panamint).
T/Sgt	Ervin A. Kowalski	1 May 46	Stenographer (USS Blue Ridge).
Tec 3	Leonard E. Bauer	5 Mar 46	Stenographer (USS Blue Ridge).
Pvt	Ramiro Leon	6 May 46	Stenographer (USS Panamint).

A. Preliminary Planning.

5. The next step was to prepare the invitations to the various non-participating observer groups and have them approved by the appropriate Joint Task Force ONE authorities prior to their being issued. Copies of the final letters of invitation are included in Appendix C.

6. The choice of individual non-participating observers by name was made as follows:

Group	Method of Selection
Congressional 1. Senate	By President, Pro Tempore, of the United States Senate.
2. House of Representatives	By the Speaker of the House of Representatives.
United Nations Representatives	By their respective governments.
Army	By War Department.
Navy	By Navy Department.
Civilian Scientists	By National Academy of Sciences.

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All non-participating observers agreed to place themselves under the orders of Commander, Joint Task Force ONE, from the time they reported until their assignment was formally terminated.

7. It was decided that the most interesting way for the non-participating observers to spend the time during the interval between Test Able and Test Baker would be for them to make a cruise of some of the central Pacific islands. Accordingly, a letter outlining a proposed itinerary was prepared and submitted to the Chief of Naval Operations for approval. (Copy of this letter is attached as Appendix D). This itinerary included visits to the islands of Majuro, Ponape, Truk, and Guam.

8. During the latter part of March, Annex Z entitled "Non-participating Observers Plan" was prepared and submitted to the Commander, Joint Task Force ONE, for inclusion in Operation Plan No. 1-46. A copy of this Annex is included as Appendix E.

B. Advance Preparation Including Movement to the Objective.

9. The non-participating observers section prepared an information booklet (see Appendix F) which contained all of the information which it was expected that the non-participating observers would need in preparing themselves for the journey to Bikini.

10. All non-participating observers were required to sign appropriate security pledges in accordance with the instructions contained on pages 20 through 22 of the information booklet. Copies of these security forms are attached as Appendix G.

11. With the assistance of J-4 Section, arrangements were made to secure a special train to transport the non-participating observers from Washington, D. C. to Oakland, California, where the Navy Auxiliary General

Communication Ships, Panamint, Blue Ridge, and Appalachian were waiting to begin the trip to Bikini. The special train left Washington, D. C. at 2030 8 June 1946 and arrived at Pier 4, Oakland, California, at 0900 12 June 1946. Appendix H contains list of passengers on this special train. All non-participating observers immediately boarded their respective ships in accordance with the following arrangements:

Ship	Category of Passengers
USS Panamint	United Nations representatives, civilian scientists, Congressional Representatives, special Press representatives.
USS Blue Ridge	Army and Navy.
USS Appalachian	Press.

12. It should be noted that the J-21 Section under the command of Captain Fitzhugh Lee, USN, had complete responsibility for all press representation for Operation CROSSROADS. For further details on this phase of the operation, see the special report prepared by Public Information Section (J-21) of J-2 Division, Joint Task Force ONE.

13. At this point in our report, for the sake of clarity, we will consider the activities of the non-participating observers on board the USS Panamint and those on board the USS Blue Ridge separately. Appendix I deals with the USS Panamint and Appendix J deals with the USS Blue Ridge.

14. Appendices I-3, I-4, I-5, and I-6 are biographical passenger lists for the USS Panamint which were published at various stages during the Operation. Appendix I-2 contains a copy of the "Panamint Parade" which gives a very complete and accurate account of all

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activities which took place on the USS Panamint during the entire voyage. This volume was prepared by passengers and members of the Observers' Group staff on board the USS Panamint in accordance with special authority received from Vice Admiral Blandy. (See Appendix I-1). This entire volume was published on board the USS Panamint by members of the ship's complement.

15. Appendix J contains a "Record of Events" which includes detailed information concerning the voyage of the USS Blue Ridge and of the personnel who travelled as non-participating observers on board that ship.

16. The two AGC's, the USS Panamint and USS Blue Ridge, were organized into Transport Group, 1.3.3, under the command of Captain W. B. Ammon, Captain of the USS Panamint. The Transport Group arrived at Honolulu on 18 June 1946 at 1600 for a stopover of 48 hours during which time the passengers of both ships, together with the passengers on board the USS Appalachian, were entertained by members of the Hawaiian Entertainment Committee. The Transport Group sailed from Honolulu on 20 July 1946, at 1600.

17. On arrival at Kwajalein 0715 28 June 1946, additional passengers who had flown here from the United States, joined the non-participating observers group (see passengers lists included in Appendices I and J).

18. Transport Group, 1.3.3, arrived at Bikini Atoll 0930 29 June 1946, entered the lagoon and sailed completely around the target array. On that afternoon the non-participating observers boarded and inspected the USS Nevada, the Japanese battleship Nagato, and the USS Independence. At 1700 on 30 June 1946, the Transport Group sailed out to sea to take up its station for Test Able. At 0901 on 1 July 1946 the Test Able atomic bomb was exploded. The non-participating observers watched the explosion from the decks of their respective ships, approximately 20.4 statute miles from the point of detonation.

19. At 1600 the same day, the ships of the Transport Group re-entered the lagoon and dropped anchor in their respective berths where they were given an opportunity to inspect the damage caused by the bomb's explosion. The observers cruised the entire target area in small boats and were permitted to board the USS Nevada, USS Arkansas, and the German cruiser, the Prinz Eugen.

20. The USS Panamint and the USS Blue Ridge left Bikini Atoll at 1700 5 July 1946, and arrived at Kwajalein 1000 the next day. Non-participating observers who were scheduled to return to the United States left the ships there. At 1500 6 July 1946, the Transport Group began the Pacific cruise which had been planned to occupy the interim period between Test Able and Test Baker.

21. From 6 July until 23 July, at which time the Transport Group returned to Kwajalein, the USS Panamint and USS Blue Ridge made a Pacific cruise in accordance with the previously approved plan (see paragraph 7 above.) Appendix I-7 contains complete details as to the dates, times, and places visited on this cruise.

22. At Kwajalein the Transport Group picked up additional passengers who had been ordered to Bikini to witness Test Baker. The Transport Group sailed at 1145 24 July 1946 and took up station outside the Bikini lagoon at approximately 0600 on 25 July.

23. At 0835 on 25 July 1946 the Test Baker atomic bomb was exploded. Non-participating observers watched the explosion from the decks of their respective ships which were in position approximately 11 statute miles from the point of detonation. At 2200 hours the same day, the Transport Group entered the Bikini lagoon and dropped anchor just inside of Enyu channel in their assigned berths where they remained until 27 July. During this time, radioactivity

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prevented the non-participating observers from entering the target array and from boarding any target vessels. However, arrangements were made for them to examine the destroyer Hughes from small boats at very close range. This destroyer had been beached to prevent it from sinking.

24. On the 27th of July, Admiral Blandy and members of his staff came aboard the USS Panamint for a conference with the non-participating observers on that ship. This conference was very well received by all passengers and a transcript of the talks given by Admiral Blandy and the members of his staff is included as Appendix K.

C. Final Phase Including the Return to Washington, D. C.

25. Leaving Bikini lagoon on 27 July at 1820, the USS Panamint returned to Kwajalein on the initial stage of her return voyage to the United States. The USS Blue Ridge remained behind for one day to pick up 68 officer separatees for transportation to the United States. On arrival at Kwajalein, arrangements were made to have all non-participating observers on board the USS Panamint flown over the target array in the Bikini lagoon in two C-54's. This aerial inspection was completed by 1600 the same day.

26. In accordance with instructions received in a dispatch from Admiral Blandy (see Appendix L) the USS Panamint sailed from Kwajalein for Honolulu at approximately 1715 29 July 1946. The ship docked in Honolulu at 1000 4 August 1946 for a 48 hour layover prior to continuing on to the United States. Certain passengers who had made arrangements to return to the United States via commercial aircraft left the ship at Honolulu. The non-participating observers and members of the Observers' Group staff on the USS Panamint gave a dinner party in the Submariners' Club at the Royal Hawaiian Hotel in order to return the hospitality which had been shown them by the local residents on their way through Honolulu to attend Test Able.

27. The USS Panamint sailed from Honolulu at 0930 6 August 1946 and arrived in San Francisco at 1300 12 August 1946. Arrangements had been made by the Joint Task Force One Logistics Representative there to secure accommodations for the entire party at the Hotel Whitcomb. A press conference and cocktail party had also been scheduled for the day at their arrival in San Francisco. The Joint Task Force One Logistics Representative already had made reservations for all the non-participating observers on the airlines and railroads so that they could return to their homes as rapidly as possible.

28. Arrangements were made for the non-participating observers to visit the 168 inch cyclotron which is under construction at the University of California in Berkeley on 13 August 1946. Following this, the observers were invited to a luncheon at the Faculty Club where they were personally welcomed by Dr. Oppenheimer.

29. Those non-participating observers who desired to return to New York or Washington, D. C. by train left San Francisco on the 14th and 15th of August using reservations which had previously been secured for them by the Joint Task Force One Logistics Representative in San Francisco. They arrived at their destinations the mornings of August 17th and 18th.

30. Since the return of the Observers Group to Washington, D. C., all efforts have been concentrated on the task of assembling and sending out to the U. S. scientific and the foreign non-participating observers such photographs and motion picture films as are made available by the Naval Photographic Science Laboratory at Anacostia, D. C. This task is of primary importance particularly from the public relations point of view, as these pictures are invaluable to the observers who are called upon to give lectures by their respective governments or business organizations.

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PART III - SPECIAL COMMENTS AND INFORMATION

31. Considerable difficulty was encountered in maintaining proper security when the foreign observers had an opportunity to come in contact with technical participating personnel. In such cases, (for example, when the foreign observers boarded the USS Nevada, the USS Independence and the Japanese battleship Nagato. See paragraphs 18 and 19 above.) the foreign observers, most of whom spoke English quite fluently and who were attired in civilian clothes without any visible mark of identification, took advantage of the situation and asked a good many technical questions. The participating personnel, busy with their work and not having been particularly alerted to this type of a security hazard, usually answered these questions quite frankly thus unconsciously revealing classified information to unauthorized foreign personnel.

32. The necessity of providing accommodations for the foreign observers on the same ship as the U. S. scientific non-participating observers forced the latter group to undergo the more stringent security restrictions which ordinarily would only have been applicable to the foreign observers. Unquestionably this was unfair to the American scientists particularly as the great majority of them had been engaged in highly classified work for the Government during the war. Furthermore, all of them had been required to sign the special security forms (see Appendix G), prior to leaving the United States.

PART IV - PERSONNEL PERFORMANCE

33. A list of all personnel assigned to the Observers' Group, together with the dates they reported and their duty assignment, is given in Paragraph 4, above. The personnel performance of all members of the Observers' Group has been superior throughout the operation.

PART V - LESSONS LEARNED, CONCLUSIONS AND RECOMMENDATIONS

A. Lessons Learned.

34. The main lesson learned during Operation Crossroads was the importance of providing the non-participating observers with the maximum amount of printed information and photographs concerning the tests. Without exception, the observers kept elaborate records of their experiences throughout the operation. To supplement their own observations, they were extremely anxious to obtain all possible official information which had been released. As so many of the official releases contained technical items of a rather complicated nature, it became necessary to reproduce them in a mimeograph or photo-lith form so that each observer could have a copy. Likewise, the importance of assembling sets of still photographs as well as motion picture films as soon as possible after the tests for distribution to the observers cannot be overemphasized. (See paragraph 30, above.)

B. Conclusions

35. With regard to the advisability of inviting non-participating observers on future atomic bomb trials, the following conclusions are based upon experience obtained during Tests Able and Baker:

(a) Aside from a possible stimulation of their processes insofar as matters pertaining to atomic weapons are concerned, the Army and Navy non-participating observers gained nothing by being physically present during the tests which they could not have learned just as well by studying the final classified reports of the operation and by seeing classified motion pictures of the atomic explosions.

(b) Practically all of the U. S. scientific non-participating observers had ample qualifications for employment as participating scientists. It is believed that much more beneficial and lasting results would have been obtained if they had witnessed the

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tests as technical advisors or technical assistants in their respective fields than as relatively isolated non-participating observers. Since their current employers had been willing to release them for an indefinite period to watch the tests, it seems reasonable to suppose that these employers would just as readily have made them available for a temporary assignment as members of Joint Task Force One.

(c) The foreign observers were in general highly trained scientific, military, naval, or ordnance technical experts. Yet it is not believed that their presence as non-participating observers enabled them to acquire any more information than they would have had they made thorough studies of all press releases, pictures, and motion pictures pertaining to the tests. Therefore, from the point of view of the foreign governments, these technical personnel could have been much more usefully employed in their own countries. And from the American standpoint of promoting good will and honesty in international relations, it is believed more effective results would have been obtained if, instead of the foreign non-participating observers, additional foreign press representatives had been invited.

(d) Congressional representation is of primary importance at any service enterprise of the magnitude of Operation Crossroads. It is unfortunate that more members of Congress could not have witnessed this outstanding example of perfect integration of the Army, Navy and Air Force.

C. Recommendations.

36. Based upon the conclusions outlined above, the following recommendations are made concerning the attendance of non-participating observers at future atomic bomb tests:

(a) There should be no Army or Navy non-participating observers at subsequent tests. Those officers whose attendance at the operation is considered vital by the War or Navy Departments should be assigned to Joint Task Force One in a participating capacity.

(b) There should be no U. S. scientific non-participating observers in future tests. Instead, invitations should be extended through the National Academy of Science to the various strategic industrial concerns and to engineering and medical societies to designate a limited number of qualified scientists to serve with Joint Task Force One as technical advisors or technical assistants in their respective professional fields.

(c) There should be no foreign non-participating observers at subsequent tests. However, the number of foreign press representatives allotted to each invited nation should be increased to compensate for this reduction in the total number of foreign witnesses. For example, if the allotment were to remain the same as for Tests Able and Baker, foreign non-participating observers would be eliminated, but each nation would be invited to send three press representatives instead of one.

(d) Every effort should be made to encourage and facilitate Congressional attendance at future atomic bomb tests.

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Operational Report - CROSSROADS - PART VII - Special Reports
Section (Q) - Observers
(Non-Participating)

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C O N T E N T S O F A P P E N D I C E S

Appendix A	Copy of Dispatch for Admiral Blandy from United Nation Observers expressing their appreciation for being present at CROSSROADS.
Appendix B	Joint Task Force One Staff Organization Chart of J-2.
Appendix C-1	Copy of letter to War Department requesting names of Army non-participating observers.
Appendix C-2	Copy of letter to Navy Department requesting names of Navy non-participating observers.
Appendix C-3	Copy of letter to President, Pro Tempore, of the United States Senate requesting invitations be issued to United States Senators to attend CROSSROADS as non-participating observers.
Appendix C-4	Copy of letter to Speaker, House of Representatives, requesting invitations be issued to members of the House of Representatives to attend CROSSROADS as non-participating observers.
Appendix C-5	Copy of letter sent by State Department inviting foreign non-participating observers.
Appendix C-6	Copy of letter to Dr. Frank B. Jewett, National Academy of Sciences, Washington, D. C. requesting names of scientific observers.

Appendix C-7	Copy of individual letter of invitation sent to each scientific observer.
Appendix D	Copy of letter signed by Admiral Blandy, and approved by Admiral Nimitz, authorizing the "between tests" cruise.
Appendix E	Copy of Annex Z entitled "Non-Participating Observers Plan", to Operation Plan No. 1-46.
Appendix F	Copy of information booklet "Operation Crossroads".
Appendix G-1	Copy of Security Form S-1 "Pledge".
Appendix G-2	Copy of Security Form S-2 "Agreement".
Appendix G-3	Copy of Security Form S-5 "Memorandum Patent Agreement".
Appendix G-4	Copy of Security Form S-6, Patent Agreement for Military Personnel only.
Appendix G-5	Copy of Personal History Data Form for J-2 Clearance.
Appendix H	Copy of list of passengers leaving Washington, D. C. on Special Train 8 June 1946 2230.
Appendix I-1	Copy of dispatch from Admiral Blandy authorizing publication of Panamint Parade.
Appendix I-2	Copy of Panamint Parade.
Appendix I-3	Copy of Panamint passenger list of 16 June 1946.
Appendix I-4	Copy of Panamint passenger list of 28 June 1946.

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Appendix I-5	Copy of Panamint Passenger list containing names of all persons witnessing both Tests Able and Baker.
Appendix I-6	Copy of Panamint passenger list of 24 June 1946.
Appendix I-7	Copy of cruise itinerary showing dates and times of departure and arrival and miles covered between various points.
Appendix J	Copy of Record of events occuring on board the USS Blue Ridge.
Appendix K	Copy of transcript of proceedings of conference held by Admiral Blandy and staff on USS Panamint on 27 July 1946.
Appendix L	Copy of dispatch ordering the USS Panamint to return to the United States.

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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 (R) - DRONE BOAT OPERATIONS

(All times are Zone minus Eleven (Love))

PART I - BRIEF SUMMARY

This report summarizes the activities from 1 April, 1946 to 1 August, 1946.

The use of drone boats, controlled by TBMs, to obtain water samples from the immediate vicinity of the Atomic Bomb detonation was decided upon at a conference held by Rear Admiral Parsons in Washington, D.C. on 5 April, 1946.

Construction of eight drone LCVP's was completed at U.S. Naval Shipyard, Terminal Island during the period 16 April to 16 May, 1946. By 4 May six TBM's of T.G. 1.6 had been fitted out as control planes at NAS, San Diego, and control from the air was demonstrated at Terminal Island by 8 May. The U.S.S. BEGOR (APD-127), was fitted out with drone control equipment at the shipyard, Terminal Island, by 18 May 1946.

On 15 May 1946, six drone boats were lifted in the EPPING FORREST (LSD-4) to Bikini, arriving 2 June 1946. The U.S.S. BEGOR (APD-127) carrying the other two drones, departed San Diego 21 May in company with SHANGRI-LA and escorts and arrived at Bikini 5 June 1946.

The period 6 June through 10 June was taken

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up in routine work on the electronic equipment in the drones and in BEGOR (APD-127), and participation in the Air Rehearsal on 10 June 1946.

On 15 June conducted a rehearsal of the drone boat operation with SAIDOR and BEGOR underway. On 20 June participated in scheduled Air Rehearsal, and on 24 June the QUEEN Day rehearsal. On 1 July participated in test ABLE. On 14 July a Task Force Air Rehearsal was held, and this unit participated carrying out a sampling operation. On 19 July operated with the entire Task Force in the WILLIAM Day rehearsal. Test BAKER operations for this unit extended from 25 July through 29 July.

PART II - CHRONOLOGICAL ACCOUNT OF THE OPERATION CONCEPTION.

About the middle of March, LOS ALAMOS scientists decided the analysis of a sample of water from the immediate vicinity of the Atomic Bomb blast was essential if the tests were to be properly evaluated. Proposed was a lead encased boat controlled by a man who would guide the craft into the desired position, open petcocks to collect the sample of contaminated water, then guide the boat out to an area where the water samples would be safely transferred to a ship. The feasibility of the idea was questioned and the plan abondoned.

The next plan proposed called for the use of a Helicopter, the water sample to be collected in a container lowered over the side. BuAir refused to permit the use of a Helicopter for this purpose, stating the Helicopter had not yet reached the stage of development where it would be deemed safe.

The President's early April postponement of the Atomic Bomb test allowed time for a more suitable

plan to be formulated and for its subsequent development.

At the 5 April conference held by the Deputy for Technical Direction, drone boats of the type used by Naval Combat Demolition Units in Southern France were proposed. The suggestion was accepted and plans immediately laid for obtaining and equipping the craft with Naval Shipyard Pearl Harbor designated as the conversion point.

As the result of a conference held on 8 April 1946 by the Deputy Task Force Commander for Technical Direction with BuShips and Air Operation representatives, the conversion point for the drone boats was shifted from Pearl Harbor, T.H., to Terminal Island, and San Pedro was designated as the area for initial training of the drone boat unit. This was desirable in order to expedite conversion of boats, to insure coordination with LOS ALAMOS activities, and to integrate with the air components which were initially located in SAN DIEGO. The drone boats were to be obtained and equipped by BuShips with Captain Logan McKEE, U.S.N. in direct charge of this phase.

On 12 April 1946 the Drone Boat Unit was designated Task Unit 1.1.3 and its composition was established as one APD, an Underwater Demolition Team, 6 Drone Boats with a two boat reserve and, when assigned, control TBM's from Task Group 1.6 and normally based on U.S.S. SHANGRI-LA.

On 16 April BuShips personnel who had been ordered to the Drone Boat Project and headed by Commander C. BUSENKELL, USNR, arrived at Terminal Island and conferred with Shipyard representatives to initiate work on the drones. The purpose of this conference was to acquaint Terminal and LOS ALAMOS representatives with the nature of Navy plans

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for equipping the LCVP's, and to make preliminary plans for doing the work. Outlined were the contemplated LCVP functions and features:

Start and Stop Engine
Anchor Release
Speed Control
Steering
Water Sampling
Geiger Counter and Associated Transmitter
Plywood Covering for Sea Protection
Distinctive Coloring
Radar Beacon
Rudder and Propellar Guards

By tri-weekly summaries submitted each Monday, Wednesday, and Friday, CJTF-1 was kept informed on all phases of the drone boat project at Terminal Island. Similar summaries were originated in Washington by CJTF-1.

By 20 April 1946 satisfactory tests for remote steering were run on eight drone units on a beach hook-up and actual preliminary installation work started on the LCVP test model. Eighty-five per cent of the PEARL HARBOR drone equipment had arrived but urgently needed apparatus had not been included in the shipment. When the need became critical, a set for testing control transmitters and receivers was obtained from NAS MOJAVE.

It was decided to test the drone equipped LCVP's from a picket boat outfitted with control equipment. Such a boat was obtained from the SAN PEDRO Boat Pool and assigned to the drone boat project. Installation work began immediately.

By 23 April 1946 work was progressing satisfactorily on the first LCVP drone. It was anticipated that the 4 May delivery date of the

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first drone would be met without the radar beacon, water sampler, smoke bomb release, anchor release, and extra battery power unless the equipment was received within a few days. Schedule permitted all boats to be tested in actual operation prior to shipment to Bikini. At this date the first boat was 40% complete and the others ranged from 30% to 10%.

ADVANCE PREPARATIONS AND TRAINING.

On about 18 April the U.S.S. BEGOR (APD-127) was ordered to report to CJTF-1 as part of Task Unit 1.1.3 and about the same time Underwater Demolition Team "EASY" (whose name was changed to Underwater Demolition Team "Three") was also ordered to report to CJTF-1 and assigned to the BEGOR for duties with Task Unit 1.1.3.

On 23 April, Commander R. R. BRADLEY, Jr., USN, who had been ordered as Commander Task Unit 1.1.3, reported to CJTF-1 in Washington and was informed of the nature and duties of the Task Unit. There he conferred with CTU 1.1, with Bu-Ships, and all other activities of JTF-1 interested in any way with drone boat unit and the program of conversion. Lt. Comdr. Walter COOPER, USNR, Commanding Officer of Underwater Demolition Team "EASY", was also on hand in Washington and attended these conferences.

On 24 April Commander BUSENKELL and Terminal Island personnel went to SAN DIEGO to confer on the TBM prototype and inspect APD-127. Initial plans called for installation of four control transmitters with amplifiers in the forward clipping room with control boxes to be installed on the bridge.

On 29 May Commander BRADLEY conferred with CTU 1.6,

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in SHANGRI-LA at SAN DIEGO, concerning operational features and conversion of the control TBM's which were being converted at NAS, SAN DIEGO. It was determined at that time that the first TBM could be ready by 4 May and available for training purposes at SAN PEDRO, with the other five ready by 8 May.

On 30 April Commander BRADLEY arrived at Terminal Island to coordinate production of the drones, conversion of the APD to drone control ship, and training. The BEGOR arrived on the same date, with UDT "THREE" embarked.

Installation work on the APD was started immediately. Operating crews from the UDT were assigned to boats and the training program was started on the following day. Crews of boats not yet complete worked along with the shipyard employees to familiarize themselves with the drone installations and expedite completions of the LCVP's. Arrangements were made to have one TBM at SAN PEDRO daily and a training program was set up. The UDT officers functioned as drone control officers, and at least two were in the TBM for the training period each afternoon. Prevailing fogs precluded morning flights. As they became available, at least one drone and sometimes two were sent out with the picket boat, and either control from the air, or conning from the air with control from the picket boat was rehearsed daily.

Conferences were held at Terminal Island on 1 and 2 May with Rear Admiral PARSONS, Captain ENGLEMAN, Drs., BRADBURY, WEISNER, FINK, Commanders BRADLEY, DAUFFMAN, BUSENKELL, and others concerning operational phases, equipment performance, and personnel. It was agreed by all concerned that it was desirable to eliminate electronic control from the airplanes, using them

as a conning station with radio voice communication to the APD which in turn would perform all radio control functions. Control from the air was to be a secondary method.

On 7 May the first water sampler arrived at Terminal Island from the U.S. Naval Torpedo Station, Arlington, Virginia, was installed the same day and the first complete LCVP drone was completed that night, with radar beacon, coder, water sampler, smoke grenades, and anchor release. On that day a distance check was made with the picket boat as control station, TBM as conning station. Full control was maintained at a range of twenty miles.

On 13 May a successful demonstration for representatives of the press was staged using two crewless drones and the picket boat. The demonstration included start engines, release anchors, right and left rudder, throttle changes, stop engines, use of water sampler and smoke pots. Radar beacons were installed but not demonstrated since there was no radar in the picket boat.

At 1300 15 May six LCVP drones and the picket boat were loaded aboard the U.S.S. EPPING FORREST (LSD-4), Lieutenant DOWEKY with one officer and twenty-three enlisted men of the UDT were embarked as a maintenance and operating crew for the boats. At 1600 the EPPING FORREST left Terminal Island for BIKINI.

On 17 May installation of the electronic gear in BEGOR was completed, as well as alteration of her boat skids to take the two drones she was to lift. The electronic equipment installed is as follows:

One SG Radar (replacing the regular SU Radar).

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AS TO CLEARANCE NOT REQUIRED
SEE MILITARY CLASSIFICATION SAFEGUARDS

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

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Four ARW Transmitters with associated antennas and control boxes for remote control of the drones.

Four AN/ARC-1 Transmitter-receivers for drone control broadcasts and communications with the TRM's.

Four RAO Receivers for monitoring the geiger counter broadcasts from the drones.

MOVEMENT TO THE OBJECTIVE.

On 18 May BEGOR proceeded to SAN DIEGO.

On 21 May BEGOR departed SAN DIEGO for PEARL HARBOR in company with SHANGRI LA, SUMNER, MOALE, and HUNTINGTON.

On 27 May BEGOR arrived at PEARL HARBOR. While there, a test was made to determine the reliability of the drones' engine starting after being left unattended for an appreciable period of time. After being warmed up, a drone was shut down for a period of six hours. It was then started without difficulty. The same drone was then left overnight, and started again by remote control in the morning. The same satisfactory results were observed.

On 29 May BEGOR departed PEARL HARBOR for BIKINI in company with SHANGRI LA, SUMNER, MOALE, HUNTINGTON, TURNER, and PERRY.

On 2 June, EPPING FORREST arrived in BIKINI. Unloading of the drones was accomplished during the afternoon, but not without damage to electronic gear and hulls. A twenty-five knot wind was blowing and consequent rolling of the LSD caused large waves within the flooded well which caused the difficulty. The drones were moored to buoys near the GUNSTON HALL (LSD-5).

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OPERATIONS AT BIKINI

On 5 June BEGOR arrived at BIKINI. During the period 6 to 9 June a working schedule was set up and checking and repairing of the drones was begun. An inshore anchorage was obtained for the BEGOR to provide mooring for the drones astern in fairly quiet water. Laboratory space and facilities were obtained in U.S.S. COASTERS HARBOR (AG-74) for electronic work, and dock space obtained for work on the drones. Preparations were made for participation in the air rehearsal scheduled for 10 June. It was hoped that a full rehearsal of ABLE DAY operations could be accomplished. However, satisfactory performance of four drones could not be accomplished by nightfall of 9 June. These drones would work satisfactorily under local electronic control within the drone, but not remotely from the controls in the BEGOR, as it was necessary to modify the procedure for the 10 June rehearsal.

On 10 June, two drones were anchored in the lee of ENYU ISLAND in accordance with the Op-Plan. On board were safety crews and a control officer. BEGOR was underway in the same vicinity. Each drone had an SCR 610 for communications with the BEGOR. At MIKE Hour the TBM's took off from SHANGRI LA, and by MIKE plus 18 minutes were in position to windward of ENYU, and the conning officers in the planes were in communications with the control officer in BEGOR. The plan was for conning officers in the planes to give orders to the control officers in BEGOR, as laid down in the Op-Plan. These orders were then to be further relayed via 610 to the drones where the proper control function would then be applied by local control. Under this arrangement both drones were gotten underway and guided into the target area where each then took water samples; they were then guided out of the area and back to the lee of

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SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

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ENYU. For purposes of training the conning officers in the air, each of the four conned a drone into the center of the target area and out again.

A time schedule of the first two runs follows:

H plus 21 - Factory 1 Underway - conned by BUCKO 1.

H plus 26 - Factory 3 Underway - conned by BUCKO 3.

H plus 43 - Factory 1 commenced taking water sample at a position within 150 yards of center of target area.

H plus 51 - Factory 1 headed out having completed sampling.

H plus 60 - Factory 3 commenced sampling within 100 yards of center of target area.

H plus 66 - Factory 3 proceeding out.

H plus 78 - Factory 1 arrived at point 2000 yards North of ENYU, at which time BUCKO 2 took over and commenced second run for that drone.

H plus 83 - Factory 3 arrived at a point roughly midway between ENYU ISLAND and target center, at which time BUCKO 4 took over and commenced second run for that drone.

11 - 14 June:

Work on the drones during this period accomplished in preparation for a full scale operation of this unit on 15 June; on the evening of 14 June four drones were believed ready in all respects and in perfect condition electronically with exception of radar beacons. These had not yet been

aligned with the SG Radar on board BEGOR. Control gear in BEGOR was similarly ready. Four conning officers of UDT-3 went on board SAIDOR at 1900 in anticipation of her getting underway the next morning.

15 June.

0600 - SAIDOR underway. Received report that at preliminary electronic check of the drones before leaving pontoon dock, Factory One failed to answer signals correctly and would have to be eliminated from the exercise.

0745 - BEGOR underway for Area FRANKLIN.

0815 - Three drones, Factory Two, Factory Three, and Factory Four proceeding toward ENYU. Prior to arriving at the ENYU anchorage, Factory Four sustained a burned out vacuum and had to be eliminated from the exercise.

0930 - Factory Two and Factory Three anchored in position in the lee of ENYU ISLAND ready for the exercise, safety personnel on board.

0940 - BEGOR on station in Area FRANKLIN.

1000 - MIKE Hour - Four TBM's took off from SAIDOR with conning officers. BEGOR moving into Area CHALMERS, proceeding toward BIKINI.

1007 - Established voice radio contact with all planes from BEGOR.

1009 - Engine started in Factory 2 by remote control - conning officer in BUCKO 1 giving orders.

1012 - Anchor slipped on Factory 2 by remote control; Factory 2 proceeding toward target area.

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

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1019 - Attempted to start engine in Factory 3 by remote control. Engine would not start due to electronic failure of the starting channel. Engine was then started locally, after which all functions operated satisfactorily by remote control.

1025 - Released anchor, Factory 3, by remote control. Conning officer in BUCKO giving orders. Factory 3 proceeding toward target area. Progress of both drone boats toward the target was relayed by conning officers in the air to BEGOR; positions were designated either by grid position, or by bearing and distance from various target ships.

1056 - Fired yellow smoke pot in Factory 2 by remote control. Operation successful.

1100 - Factory 2 passing starboard bow of NEVADA - commenced taking water sample. Factory 2 maneuvering in area between NEVADA, NAGATO, and INDEPENDENCE.

1107 - Sampling completed. Factory 2 evacuating target area.

1117 - Fired yellow smoke pot in Factory 3.

1126 - With Factory 3 100 yards on port bow of NAGATO - commenced taking water samples. Maneuvered within NAGATO - INDEPENDENCE - NEVADA (as a triangle) while sampling.

1133 - Water sampling completed, Factory 3 commenced evacuating target area.

When each drone was well clear of target area, conn was shifted to the standby plane, and a second run was made. Conning Officer in BUCKO TWO maneuvered Factory 2 on its second run, and the

conning officer in BUCKO FOUR maneuvered Factory 3.

After leaving Area FRANKLIN at MIKE Hour, BEGOR proceeded through Area CHALMERS to a point within 1,000 yards of the reef, and approximately midway between BIKINI and ENYU, where she remained throughout the rest of the exercise.

Upon completion of the second runs, the planes were released to return to SAIDOR, and BEGOR returned to her anchorage.

16, 17, 18, 19 June.

Anticipated Air Rehearsal on 18 June. Weather conditions necessitated postponement each day until 20 June. Made daily preparations for operation of drone boats during the rehearsal.

20 June.

Air Rehearsal.

0700 - BEGOR underway for Area CHALMERS. Factory 3 proceeding to ENYU anchorage.

0810 - Factory 3 anchored in lee of ENYU, ready for operation, safety crew on board.

NOTE: Only one drone used in order to minimize electronics damage and to permit maintenance, repair and testing of the other drones.

0820 - BEGOR arrived in Area CHALMERS. It was not considered necessary to go all the way to FRANKLIN.

0830 - MIKE Hour.

0851 - TBM conning planes, BUCKO 1 and BUCKO 3 on station and ready to conn.

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USE MILITARY [illegible] SAFEGUARDS

0904 - Factory 3 underway under remote control. Conning Officer in BUCKO 1 conning. BEGOR standing toward the Atoll from Area CHALLENGE.

0951 - Factory 3 nearing bow buoy of NAGATO. Safety crew took manual control to avoid collision with the buoy.

1000 - Conning Officer in plane again conning.

1000 - Factory 3 taking water samples in Area between NAGATO, NEVADA, INDEPENDENCE.

1005 - Factory 3 heading out of target area.

When clear of target area, conning was shifted to conning officer in BUCKO 3 who made a similar run into the target area. BUCKO 2 and BUCKO 4 were in the area observing the entire operation. At end of operation, planes returned to SAIDOR, BEGOR returned to anchorage.

21 June.

Began preparations for QUEEN DAY operation. At 1400 sent two drones with crews to SAN MARCOS (LSD-25) for hoisting on board for evacuation.

22 June.

0800 - Commenced complete check out of six drones.

0930 - Transferred four conning officers to SAIDOR from Underwater Demolition Team 3.

1000 - Hoisted Factory 5 and Factory 6 on board BEGOR for QUEEN DAY operation.

1300 - BEGOR underway shifting berths to lee of ENYU. Factories 1, 2, 3, 4 underway for same area.

1400 - Factories 1, 2, 3, 4, anchored in lee of ENYU, 500 yards from beach and 500 yards apart. BEGOR anchored 2000 yards off shore.

23 June.

Complete recheck of all electronic installation in drone boats, anticipating QUEEN rehearsal on 24 June. All features of the drones were operated remotely from controls in BEGOR.

24 June - QUEEN DAY.

0000 - Party left BEGOR for Factories 1, 2, 3, 4, still anchored in lee of ENYU, to carry out final routines.

0400 - Routine check out of drones completed, party returned to BEGOR.

0530 - Picket Boat underway with Safety crews on board. BEGOR underway.

0550 - BEGOR and Picket Boat clear of lagoon. BEGOR proceeding to Area FRANKLIN. Picket Boat remaining just off lagoon entrance.

0700 - BEGOR lying to in Area FRANKLIN.

0715 - 0720 - Personnel in Picket Boat noted Factory 2 and Factory 3 adrift. Both drones were drifting to windward and were clear of all obstructions, so no action was taken at that time. Since BEGOR was out of range for communication with Picket Boat, C.T.U. 1.1.3 was unaware of the condition of Factory 2 and Factory 3.

0914 - MIKE Hour. BEGOR proceeding into Area CHALMERS. Picket Boat proceeding to drones to put safety crews on board.

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ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS CLEARANCE NOT REQUIRED
USE MILITARY CHANNELS

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ATOMIC ENERGY ACT - 1946
RESTRICTED DATA PERMITTED - NO CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

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0936 - In radio communication with BUCKO 3.

0940 - CTU 1.1.3 directed by CJTF-1 to proceed to a point off shore BIKINI to conduct drone boat operations. BEGOR proceeding toward BIKINI.

0942 - In radio contact with BUCKO 1 who reported on station and ready to commence operations.

0944 - Started engine of Factory 1 by remote control from BEGOR, conning officer in BUCKO 1 giving conning orders.

0944 - Released anchor, Factory 1.

0946 - Factory 1 heading out of anchorage toward target area.

0951 - Attempted to start engine, Factory 3.

NOTE: It was still unknown to control personnel in BEGOR that Factory 2 and Factory 3 were not in place. After several attempts to start Factory 3 without favorable report from conning officer in plane, decision was made to try Factory 4.

0957 - Started engine Factory 4.

1001 - Released anchor, Factory 4.

1003 - Factory 4 proceeding out of anchorage toward target area. The program of Factory 1 and Factory 4 was relayed by the conning officer in BUCKO 1 and BUCKO 3 over their voice circuits to BEGOR.

1021 - Commenced taking water samples with Factory 1 in area between NAGATO, NEVADA, INDEPENDENCE.

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1029 - Sampling completed, Factory 1 standing out of target area.

1030 - BEGOR proceeding toward entrance of lagoon to meet Factory 1 in lee of ENYU.

1048 - BEGOR standing into lagoon followed by MOALE to recover water samples from drones.

1051 - Commenced taking samples, Factory 4, within, NEVADA, NAGATO, INDEPENDENCE area.

1057 - Sampling completed Factory 4 standing out of target area.

1106 - Commenced visual control of Factory 1 from BEGOR.

1135 - Factory 1 alongside MOALE transferring water samples.

Factory 1 was first brought close to BEGOR, and was washed down with wash deck hose (simulated). A boat was lowered and Factory 1 was boarded by safety officer, coxswain, and radio chemists. Factory 1 was then taken alongside MOALE by manual control for transfer of water samples. Meanwhile, Factory 4 arrived and the same procedure was followed.

1210 - MOALE standing out of lagoon, proceeding to KWAJALEIN.

25 and 26 June.

Routine maintenance and repair. Made alterations in control function of one drone in attempt to prevent it from responding to spurious signals (on QUEEN DAY the anchor releases of two drones were keyed by signals of unknown origin). This alteration made it necessary to key the drone

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USE MILITARY CLASSIFICATION SAFEGUARDS

selection function simultaneously with the desired function (right rudder, start engine, etc.) in order to get a response.

27 June.

BEGOR underway at 1230 to make reliability and distance test of new alterations. It was found that at a distance of eight miles the drone began to respond erratically to control signals, and that it failed to respond completely at about eighteen miles. The reliability was decreased to such an extent that the alteration was deemed not worth while.

28 and 29 June.

Further preparations for test ABLE. Two drones hoisted on board U.S.S. SAN MARCOS for evacuation during test ABLE.

TEST ABLE

30 June (ABLE minus ONE).

0900 - Complete mechanical and electronic check of six drones.

1000 - Hoisted two drones on board BEGOR.

1100 - Four conning officers were transferred to U.S.S. SAIDOR from Underwater Demolition Team 3.

1400 - BEGOR shifted berth to lee of ENYU. Drones boats Factory 1, Factory 2, Factory 3, Factory 4 proceeded to lee of ENYU where they were anchored for test ABLE. Security watch maintained on all drones.

1 July (ABLE DAY).

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0030 - Boarding party left BEGOR and proceeded to the anchored drone boats to conduct final tests and inspection.

0400 - Tests completed, boarding party returned to BEGOR.

0545 - BEGOR underway and standing out.

0715 - BEGOR on station in Area FRANKLIN.

0900 - MIKE Hour - BEGOR proceeding into Area CHALMERS.

0915 - BUCKO 1, BUCKO 2, BUCKO 3, BUCKO 4, with conning officers and safety monitors on board, took off from U.S.S. SAIDOR. BUCKO 1 and BUCKO 3 proceeding to station 5 miles to windward of ENYU. BUCKO 2 and BUCKO 4 orbiting over SAIDOR.

0931 - Made initial voice contact with BUCKO 1 who reported leak in hydraulic line which required him to return to base. BUCKO 2 ordered to proceed to ENYU in place of BUCKO 1.

0933 - Made voice contact with BUCKO 3 on station who reported Factory 1, Factory 3, and Factory 4 anchored in position, Factory 2 adrift about 2000 yards from the anchorage and drifting downwind.

0934 - CTU 1.1.3 ordered by CJTF-1 to proceed to a point off shore BIKINI to conduct drone boat operations. BEGOR proceeding.

0938 - Conning officer in BUCKO 3 was ordered to commence operation with Factory 3.

0938 - Attempted to start Factory 3 under instructions from conning officer in BUCKO 3. After several attempts the conning officer reported no evidence of the boat starting, and shift to

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

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Factory 4 was ordered by CTU 1.1.3.

0944 - Started Factory 4. Immediate response noted, and anchor was released.

0946 - Factory 4 headed toward target, conning officer in BUCKO 3 giving instructions.

0947 - BUCKO 2 arrived on station and reported to CTU 1.1.3.

0949 - Conning officer in BUCKO 2 was directed to locate Factory 2 which was adrift. It was intended to send that drone into the target area.

0950 - BUCKO 2 reported himself in a contaminated area. Conning was delayed while the plane proceeded into safe air. High counter readings persisted each time the plane tried to get in conning position. As a result the plane stayed out of conning distance for about ten minutes. BUCKO 3, who was already operating, reported safe air at all times.

1002 - With BUCKO 2 finally in safe air, attempted to start Factory 2 (which was adrift). No response. CTU 1.1.3 directed to shift to Factory 1.

1007 - Started engine, Factory 1. Immediate response was noted, and the anchor was released.

1015 - Factory 1 clear of anchorage headed for target with conning officer in BUCKO 2 giving conning orders.

1017 - For several minutes prior to this time, the communication power voltage in BUCKO 3 had been dropping, and the conning officer realized that soon he would lose contact by voice entirely.

Factory 4 was then in clear area abeam CONYNGHAM. Just before losing contact, the conning officer ordered left full rudder. There was not sufficient voltage left for him to hear the acknowledgement, but he saw the drone respond. Factory 4 began a tight circle. The control officer in BEGOR reported loss of communication to CTU 1.1.3, who directed him to call BUCKO 4 from his orbit over SAIDOR to come in and take over conning of Factory 4. By this time BEGOR was about 3/4 mile outside the reef, and from there it could be seen that Factory 4 was circling in a safe position. Her speed was decreased, awaiting arrival of BUCKO 4.

1030 - BUCKO 4 arrived on station and reported ready to conn Factory 4.

1031 - Factory 4 again proceeding toward target.

1045 - Factory 4 at target center. Geiger counter readings so far obtained had been low and unsatisfactory to the Radio Chemist. Factory 4 was then maneuvered about in search of more radioactive areas.

1055 - Factory 1 arrived at target center and similar maneuvering was done with that drone, trying to obtain higher counter readings.

1101 - Factory 4 took two water samples - position 50 yards on starboard quarters of NEVADA .

1123 - Factory 4 taking four samples - 100 yards on starboard beam of TALBOT.

1134 - Factory 4 took 2 samples - position 50 yards astern of SKATE.

1136 - Factory 4 evacuating target area. BEGOR

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USE MILITARY CLASSIFICATION SAFEGUARDS

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proceeding toward lagoon entrance.

1137 - Factory 1 taking 2 water samples - position 200 yards astern of and between NEVADA and INDEPENDENCE -

1140 - Factory 1 took 2 water samples - position 200 yards astern of SKATE -

1143 - Factory 1 took 3 samples - 300 yards astern of SKATE -

1148 - Factory 1 took 3 samples - 300 yards astern of SKATE -

1149 - Factory 1 evacuating target area.

NOTE: The above positions are given with reference to the normal position of the SKATE. All samples were taken on order from the Radio Chemist.

1210 - BEGOR anchored in lee of ENYU with MOALE anchored 300 yards astern.

1215 - Took visual control of Factory 4 and directed BUCKO 4 to orbit until arrival of BUCKO 2.

1216 - Brought Factory 4 close aboard BEGOR and washed it down with wash deck hose. Safety officer then went on board and declared it safe for boat crew to take over. One Radio Chemist boarded Factory 4 which then proceeded to MOALE.

1230 - Transfer of water samples from Factory 4 to MOALE completed.

1235 - Took sight control of Factory 1. Directed BUCKO 2 to join BUCKO 4 and return to SAIDOR.

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1240 - Brought Factory 1 close aboard BEGOR for washing down and testing by safety officer, after which crew went on board and proceeded to MOALE.

1255 - Transfer of water samples to MOALE completed. MOALE proceeding to KWAJALEIN.

1300 - BEGOR ships boat with safety officer sent to retrieve Factory 2 still drifting and now close to target area.

1330 - BEGOR underway for normal anchorage.

1630 - BEGOR anchored, drones moored astern.

2 - 8 July.

Daily repair, maintenance, and check out of the drone boats and their installations including that in the BEGOR.

9 - 13 July.

Routine maintenance and repair work continued on drones and control equipment in BEGOR. Daily radio communication checks between BEGOR and control planes on Flight Deck of SAIDOR. Same with radiological safety section in MOUNT MCKINLEY on 12 and 13 July. On the afternoon of 10 July conducted distance check with all eight drone boats at ENYU anchorage, conning from Picket Boat and controlling from BEGOR who was anchored in normal berth. Participation in air rehearsal on 14 July.

14 July (Air Rehearsal).

0715 - Drone Boats and Picket Boat underway for ENYU anchorage.

0730 - BEGOR underway.

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

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0830 - BEGOR on station - one mile off the reef between BIKINI and ENYU.

0850 - MIKE Hour - Conning planes - BUCKO 1, BUCKO 2, BUCKO 3. BUCKO 4 took off from SAIDOR.

0916 - In radio contact with BUCKO 3 who reported on station and ready to conn.

0919 - In contact with BUCKO 1. - on station.

0919 - Started Factory 6 - conning officer in BUCKO 3 giving conning instructions.

0923 - Factory 6 standing out of anchorage proceeding toward target area. Instructed conning officer to simulate radiological reconnaissance following route CAMEL

0933 - Started Factory 5 - conning officer in BUCKO 1 giving conning instructions.

0937 - Factory 5 standing out of anchorage proceeding toward target area. Instructed conning officer to simulate radiological reconnaissance following route PHILLIP MORRIS.

0940 - Instructed conning officers in both planes to keep drone boats clear of target center within 500 yard circle, and to vary radiological reconnaissance routes accordingly.

1039 - Factory 6 taking water samples within target area.

1041 - Factory 5 taking water samples within target area.

1115 -Factory 5 and 6 evacuating target area.

1130 - BEGOR in lee of ENYU. The remaining

four drones were started and their anchors slipped in succession - a short test of each one was then conducted.

1150 - Secured operations; released planes to return to SAIPAN; returned to anchorage.

15 - 17 July.

Routine maintenance, repair, check out of drone boats and associated equipment in BEGOR. Preparations for WILLIAM Day. Daily communications checks on all pertinent circuits between conning vessels, BEGOR, MOUNT MCKINLEY.

16 July (WILLIAM minus ONE)

0800 - Commenced pre WILLIAM Day check of all equipment. All electronic drone features in boats - control features in BEGOR - communications equipment in BEGOR - tested and repaired when necessary - LOS ALAMOS technicians tested and realingned geiger counter transmitters.

1100 - Hoisted two drone boats on board BEGOR.

1300 - Six drone boats underway for anchorage in lee of ENYU.

1400 - BEGOR underway for lee of ENYU.

1500 - BEGOR anchored. Six drone boats anchored.

1530 - Commenced final alignment check of radar beacons on the drones. SG radar in BEGOR.

19 July (WILLIAM DAY).

0000 - Technical party left BEGOR for drone boats to carry out final routine with all electronic

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features of the boats.

0430 - Final routine completed, technical party returned to ship.

0515 - Safety crews placed on board each of the six drones.

0545 - BEGOR underway for Area FRANKLIN.

0700 - BEGOR on station in Area FRANKLIN.

0905 - HOW Hour - BEGOR proceeding to Area CATERPILLAR.

1000 - Received cancellation of air activities. Drone boat conning planes to be launched by SAIDOR when favorable weather conditions permit. BEGOR lying to off the reef between BIKINI and ENYU.

1116 - Established radio contact with conning planes, BUCKO 1 and BUCKO 3, on station and ready for the water sampling operations.

1118 - Started engine, Factory 3, by remote control.

1119 - Released anchor. Factory 3 standing out of anchorage toward target area - conning officer in BUCKO 3 giving conning instructions.

1125 - Started engine, Factory 1, by remote control.

1126 - Released anchor. Factory 1 standing out of anchorage toward target area - conning officer in BUCKO 1 giving conning instructions.

1211 - Factory 3, near target center, taking water samples.

1215 - Factory 1, near target center, taking water samples.

1225 - Water sampling completed, Factory 3 and Factory 1 proceeding out of target area. BEGOR proceeding south toward lagoon entrance.

1240 - BEGOR entering lagoon. Only one drone boat noted heading toward lee of ENYU.

1245 - Conning officer in BUCKO 3 reported having lost sight of Factory 3.

1258 - BEGOR anchored in lee of ENYU. Took over visual control of Factory 1 from plane. Controlling and conning from bridge of BEGOR.

1300 - Factory 3 sighted by BUCKO 3 in vicinity of PRINZ EUGEN. Commenced conning Factory 3 toward ENYU.

1305 - Ceiling 800 feet. Ordered BUCKO 3 to abandon Factory 3 for reasons of air safety. BUCKO 1 and BUCKO 3 released to return to SAIDOR. Factory 3 returning under control of safety crew.

1315 - Factory 1 alongside BEGOR. Similated washing down and testing for radioactivity.

1330 - Factory 1 alongside SUMNER simulating transfer of water samples.

1330 - Conducted remote control test run of Factories 2, 4, 7, 8 which were still anchored. Each was gotten underway successfully and tested out satisfactorily except Factory 7, which began responding erratically after getting underway.

1400 - Drones and BEGOR underway for BIKINI anchorage.

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SPECIFIC RESTRICTED DATA CLEARANCE EQUIREMENT
USE MILITARY CLASSIFICATION SAFEGUARDS

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SPECIFIC RESTRICTIONS AS CONTAINED IN SAIDOR REQUIRED
RESTRICTED MILITARY CLASSIFICATION SAFEGUARDS

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20 - 30 July.

Daily maintenance, repair and check out of all electronic mechanical equipment.

24 July (BAKER DAY minus ONE).

0715 - Drone boats and auxiliaries fueled, and extra fuel taken aboard each boat.

0830 - Five conning officers reported aboard SAIDOR.

1200 - Drone boats underway for ENYU ISLAND.

1330 - BEGOR underway for ENYU ISLAND.

1400 - BEGOR anchored in lee of ENYU.

1700 - Drone boats anchored in position, checking completed, and secured. Watch posted. Picket Boat reported to Rear Admiral PARSONS at LSM-60.

BAKER DAY

25 July.

0000 - Electronics party left BEGOR for anchored drones to conduct final checks and last minute preparations.

0500 - Check out of all boats completed, electronics party returned to BEGOR.

0530 - BEGOR underway for Area FRANKLIN.

0835 - MIKE Hour - BEGOR moving into Area CATERPILLAR.

0846 - Four TBM conning planes took off from SAIDOR.

0857 - Conning planes report on stations.

0910 - Factory ONE started engine, released anchor and underway by remote control for target area. Conning officer in BUCKO 1 giving conning instructions.

0922 - Factory THREE under remote control headed for target area. Conning officer in BUCKO 3 giving conning instructions.

	FACTORY ONE Sample	Grid	Reading
0947 -	1	2201 S	NO
0948 -	2	2201 R	
0949 -	3	2201 R	READINGS
0950 -	4	2201 R	
0951 -	5	2201 P	
0952 -	6	2201 Q	RECEIVED
0953 -	7	2201 W	
0955 -	8	2201 X	
0955 -	9	2201 X	
0957 -	10	2201 Y	

	FACTORY THREE Sample	Grid	Reading
1011 -	1	2201 N	NO
1012 -	2	2201 N	
1013 -	3	2201 Q	
1014 -	4	2201 C	READINGS
1015 -	5	2201 P	
1016 -	6	2201 X	
1017 -	7	2201 K	
1021 -	8	2201 R	
1022 -	9	2201 R	RECEIVED
1022 -	10	2201 S	

1000 - Factory ONE clear of target center.

1025 - Factory THREE clear of target center. BEGOR proceeding toward lagoon entrance.

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USE MILITARY CLASSIFICATION SAFEGUARDS

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USE MILITARY CLASSIFICATION SAFEGUARDS

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1100 - BEGOR anchored in lee of ENYU.

1115 - Factory ONE alongside BEGOR for washing off radioactive spray.

1200 - Factories ONE and THREE monitored by boarding party who found them highly radioactive; samples left in drones. Drones remotely sent to ENYU anchorages by drone crews.

1430 - Factories ONE and THREE taken to ALBEMARLE where water samples were transferred.

25 July (Afternoon Run).

1522 - Three conning planes on station.

1543 - Factory SIX underway on Radiological Safety Route CHESTERFIELD. Conning officer in BUCKO 6 giving conning instructions.

1550 - Factory SEVEN underway on Radiological Safety Route PHILLIP MORRIS. Conning Officer in BUCKO 5 conning.

FACTORY SIX

	Sample	Grid	Reading
1613 -		2300 G	
1621 -	1	2101 T	
1622 -	2	2101 N	
1624 -		2101 N	
1629 -	3	2001 J	
1630 -	4	2001 D	
1632 -	5	2001 C	
1634 -	6	2001 A	
1637 -	7	1901 B	
1638 -	8	1902 U	
1640 -	9	1802 I	
1642 -	10	1803 R	
1652 -		1805 M	

FACTORY SEVEN

	Sample	Grid	Reading
1648 -	1	2101 H	
1650 -	2	2101 N	NO
1650 -	3	2101 N	
1651 -	4	2101 O	READING
1652 -	5	2101 P	
1654 -	6	2201 Q	RECEIVED
1655 -	7	2201 W	
1657 -	8	2200 D	
1657 -	9	2200 D	
1658 -	10	2200 E	

1715 - Factory SEVEN cleared target array.

1720 - Factory SIX clear of target array.

1750 - Water samples transferred from Factory 7 by boarding party and monitors to ALBEMARLE.

1805 - Water samples transferred from Factory 6 by boarding party and monitors to ALBEMARLE.

1815 - ALBEMARLE underway to Kwajalein with water samples.

26 July.

0800 - Factories ONE and THREE checked out for run.

0815 - Two conning planes reported on station.

0820 - Factory THREE underway following Radiological Safety Route CHESTERFIELD. Conning officer in BUCKO ONE conning.

0902 - Factory ONE underway following Radiological Safety Route LUCKY STRIKE. Conning officer in BUCKO TWO conning.

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USE MILITARY CLASSIFICATION SAFEGUARDS

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ATOMIC ENERGY ACT - 1946
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USE MILITARY CLASSIFICATION GAVELGUARDS

FACTORY THREE

	Sample	Grid	Reading
0902 -	1	2101 N	NO
0903 -	2	2101 M	
0904 -	3	2101 M	READING
0906 -	4	2001 T	
0907 -	5	2001 R	
0912 -	6	2001 G	RECEIVED
0919 -	7	2002 F	
0924 -	8	2003 M	
0938 -	9	2006 W	
1002 -	10	2504 M	

FACTORY ONE

	Sample	Grid	Reading
1001 -	1	2202 Y	NO
1003 -	2	2201 N	
1005 -	3	2201 M	READING
1006 -	4	2201 L	
1007 -	5	2201 K	RECEIVED
1009 -	6	2101 O	
1010 -	7	2101 T	
1012 -	8	2101 Y	
1014 -	9	2101 X	
1016 -	10	2101 W	

1041 - Factory THREE boarded and the samples removed by the Safety Monitors.

1055 - Factory ONE boarded and the samples removed by the Safety Monitors.

1300 - Water samples taken from BEGOR to HAVEN.

1400 - Factories ONE and SEVEN out for the afternoon run. Two conning planes reported on station.

1420 - Factory ONE underway following Radio-

- -

logical Safety Route CHESTERFIELD. Conning officer in BUCKO 5 conning.

1431 - Factory SEVEN underway following Radiological Route LUCKY STRIKE. Conning officer in BUCKO 6 conning.

FACTORY ONE

	Sample	Grid	Reading
1445 -	1	2399 D	
1454 -	2	2201 U	NO
1505 -	3	2001 U	
1513 -	4	1903 S	
1520 -	5	2005 L	READING
1531 -	6	2205 C	
1536 -	7	2405 P	
1543 -	8	2504 Y	RECEIVED
1550 -	9	2501 Y	
1557 -	10	2500 O	

FACTORY SEVEN

	Sample	Grid	Reading
1456 -	1	2600 Q	NO
1504 -	2	2502 Y	
1508 -	3	2503 D	
1517 -	4	2302 C	
1521 -	5	2201 E	READING
1525 -	6	2101 S	
1532 -	7	2000 R	
1535 -	8	2000 P	
1538 -	9	1999 C	RECEIVED
1544 -	10	2098 S	

1544 - Factory SEVEN leaving the target area for the BEGOR.

1557 - Factory ONE leaving the target area for the BEGOR.

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1604 - Factory SEVEN alongside BEGOR being monitored and having water samples removed.

1607 - Factory ONE alongside BEGOR being monitored and having water samples removed.

1630 - Operation completed. Water samples sent to RADSAFE on HAVEN.

27 July (BAKER plus TWO).

0800 - Factory FIVE checked out for target run. (Only one drone required). Two conning planes reported on station.

0850 - Factory FIVE underway on Radiological Safety Route CHESTERFIELD. Conning officer in BUCKO 1 conning.

FACTORY FIVE

	Sample	Grid	Reading
0917 -	1	2300 S	0
0923 -	2	2201 Q	0
0925 -	3	2201 P	0
0932 -	4	2001 S	0
0948 -	5	2102 G	0
1011 -	6	2203 L	0
1016 -	7	2303 N	0
1021 -	8	2403 R	0
1026 -	9	2402 P	0
1033 -	10	2502 W	0

1035 - Factory FIVE clear of the target array.

1049 - Factory FIVE alongside BEGOR.

1050 - Boarding party and monitor removing water samples.

1058 - Operations secured. Water samples sent to RADSAFE on HAVEN.

28 July.

1500 - CJTF-1 notified CTU 1.1.3 that no further drone operations were necessary.

29 July.

No operations.

30 July.

1000 - BEGOR underway for BIKINI. Drone Boats following.

1030 - BEGOR anchored.

1300 - Four drones hoisted aboard U.S.S. SAINT CROIX for transportation to San Diego, California.

31 July.

0800 - Remaining four drones underway for SAINT CROIX to be hoisted.

1 August.

1300 - Picket boat and certain boat personnel sent to SAINT CROIX for transportation to San Diego with the drone boats.

PART III - SPECIAL COMMENT AND INFORMATION

GENERAL.

1. During the entire operation, the chief concern has been in keeping the drone equipment in operating condition. The nature of this equipment is such that daily operation and complete check out of each remote control feature is necessary. Failures in the radio equipment were

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ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS ON DISSEMINATION SAFEGUARDS
USE MILITARY CLASSIFICATION

constantly occuring, and repair or replacement of parts was necessary in each case. Such abnormal numbers of failures was undoubtedly due to the fact that the equipment was designed and manufactured for use in aircraft during the middle of the war, was intended to serve for a maximum of fifty hours only, and to be expendable. It was in open air storage for about a year at Maui, disassembled and stored at Pearl Harbor for about a year, and after installation in these boats was subjected to constant use at Bikini from 5 June until conclusion of Test BAKER.

2. Weather and humidity conditions at Bikini played a major role in the difficulties mentioned in 1 above. Fungus and vertigree attacked the radio parts, and almost daily frequency shift accompanied the temperature and humidity changes. To help overcome this situation, a laboratory bench alignment of transmitters and receivers was carried out weekly, and in addition, immediately before each major rehearsal and operation.

3. On three occasions, spurious radio signals from undetermined sources interfered with drone boat operations. The remote anchor release channel appeared to be the most susceptible, and the anchor release was tripped twice on one drone and once on another while anchored unattended in readiness for remote operation. This undesireable situation was remedied by using the boat generator as the power source for the anchor release motor, instead of battery power as originally intended. With this arrangement, the boat engine must be running before the anchor release motor can be started, hence any spurious signal which should cause the anchor release relay to close would have no effect since no power would be on the anchor release motor. After making this alteration, no difficulties from

spurious signals were experienced.

4. It was considered necessary to have two drone boats ready for every one that it was desired to send on a mission. Hence for Test ABLE, four drones were anchored and ready in the lee of ENYU to insure two getting into and out of the target area. This number of anchored drones was increased to six for Test BAKER. In each test, two boats were carried in the BEGOR ready for launching. These were principally stand-bys in case the anchored drones did not withstand the explosion.

5. The TBM3E aircraft proved very satisfactory as a conning station. It provides ample room for pilot, conning officer, and radiological monitor. It has greater maneuverability than a larger plane, and offers maximum visibility from the center cockpit (conning officers station).

6. Depth perception at low altitudes and low angles of elevation becomes a problem when drone boats are maneuvering in congested areas. Conning at altitudes above 2500 feet was considerably easier, for the conning plane is at an altitude of 4000 feet and a slant range of four (4) miles.

7. The distance and position of the control transmitters (BEGOR) from the receiver (in the drone) is of little or no consequence. Successful control was carried out in this operation from a distance of sixteen miles, and at times when an island and several large ships were interposed between transmitter and receiver. It is believed that equally successful results would have been obtained at thirty miles or more.

TEST ABLE

1. Factory 1 and Factory 4 operated perfectly

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under control, and were successfully sent into and out of the target area.

2. Seven water samples were obtained by Factory 1, and ten by Factory 4.

3. Much interference was experienced on the geiger counter frequencies, making them difficult to monitor. CW was received almost continuously on both circuits (3885 kc and 4950 kc), and voice broke in occasionally.

4. Communications with all conning planes was excellent except for the loss of power in BUCKO 3. After alnding a short circuit was found in the generator.

5. The total time elapsed from MIKE Hour until water samples were on board MOALE was 3 hours 55 minutes.

6. All four conning planes were needed and untilized on ABLE DAY. Communications failed in BUCKO ONE immediately after take-off, and his job was carried out by BUCKO TWO. The same thing occurred in BUCKO THREE after commencing the run with Factory 4, and BUCKO FOUR took over and completed the operations.

TEST BAKER

1. Factory 1 and Factory 3 responded perfectly to all signals sent in getting underway and making the initial run on the morning of BAKER DAY. BEGOR was in Area CHALMERS - The boats were anchored in lee of ENYU.

2. For the afternoon run, Factory 6 and Factory 7 were checked out and started on their run from the BEGOR which by that time was anchored in lee of ENYU. Subsequent runs were similarly started.

3. Forty water samples of five gallons each were collected on BKAER DAY and transferred to ALBEMARLE for delivery to KWAJALEIN.

4. Report from the LOS ALAMOS Radio Chemist at KWAJALEIN indicated that twenty three of the water samples were useable for his purpose, and that the amount was more than adequate.

5. Geiger counters functioned properly BAKER DAY in Factory 6 only, which made the afternoon run.

6. On BAKER afternoon, Factory 6 and Factory 7 followed Radiological reconnaissance route CHESTERFIELD and PHILLIP MORRIS respectively.

7. On BAKER plus ONE radiological reconnaissance was conducted and water samples were taken by each of two drone boats in the morning and two drone boats in the afternoon (These boats followed routes CHESTERFIELD and LUCKY STRIKE). Twenty-four water samples were delivered to RADSAFE on HAVEN.

8. On BAKER Plus TWO, one drone boat made a radiological reconnaissance following route CHESTERFIELD, and collected ten water samples which were delivered to RADSAFE on HAVEN. During this run the geiger counter functioned properly. However, the activity encountered was all below the sensitivity of the instrument.

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9. Communications with the planes was excellent. At no time was it necessary to make use of the stand-by plane which was in the air. On the morning of BKAER plus TWO, the stand-by plane had a communication failure shortly after the take-off and had to land. It was replaced by another stand-by. The primary plane had no difficulty.

10. Communications with RADSAFE were satisfactory.

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PART IV - PERSONNEL PERFORMANCE

Throughout all preliminary preparations and during tests ABLE and BAKER, the performance of the personnel attached to this unit has been excellent. The electronics staff has been untiring in their efforts toward getting the drone boats in efficient working condition and keeping them so.

The Underwater Demolition Team 3 officers and men have maintained the mechanical and hull condition of the drones at a high standard, and controlled the drones successfully in both test ABLE and test BAKER. The teams' conning officers and the pilots in the planes showed keen judgement and iniative in making the air phase successful.

The personnel of the U.S.S. BEGOR rendered valuable assistance in the maintenance of the boats, and the communication and control equipment installed on board. Her operations and rader tracking of the drones was highly satisfactory.

PART V - LESSONS LEARNED, CONCLUSIONS, RECOMMENDATIONS.

1. This operation has proved conclusively

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that conning of drone boats from aircraft rather than direct control is entirely practicable and satisfactory, and that the very small time lost in transmitting conning instructions is more than made up for in reliability.

2. The possibility although remote, of the conning officer "losing" his own drone does exist. It happened only once during the eleven times that operations with two drones were held at BIKINI. The remedy for this situation lies in allowing ample time for the first one to obtain about 1000 yards distance before sending the second one in.

3. The possibility of one conning plane handling two drones is doubtful. With one drone in a congested area, the conning officer is fully occupied.

4. The personnel problem, particularly with respect to electronics, was a serious handicap during the present operation. Most of the personnel that were made available were assigned too late for proper training, and the constant work necessary on the automatic gyro control and relay equipment put too heavy a load on the few who had been trained.

It is recommended that for future drone boat operations, maintenance personnel be assigned in sufficient numbers and early enough to inaugurate a training program which will make them of value. This should include a minimum of two technicians per drone, plus an equal number of laboratory personnel. Such personnel should come from general service and not from aviation activities.

5. The primary mission of obtaining water samples in the contaminated area was successfully carried out.

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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 (S) - COMBAT INFORMATION CENTER

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1. Organization Chart of CIC's.

2. Preliminary Planning in Washington.

   a. Study of capabilities of CIC in relation to demands of Operation Crossroads.

   b. Requirements established.

   c. Problems encountered during the planning stages.

3. CIC Operation Plan.

   a. Appendix VI, Annex F to CJTF-1 Op-Plan 1-46.

4. CIC Training Program.

   a. Preliminary training.

   b. Training in the forward area.

      (1) Watch Quarter and Station Bill.

      (2) Shipboard training enroute to the forward area.

      (3) Shipboard training in the forward area.

      (4) Task Force training in the forward area.

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(5) Training with the Army Air Group.

(6) Training with the Navy Air Group.

(7) Full scale air Rehearsals.

(8) QUEEN Day, JTF-1 Rehearsal for ABLE Day.

5. Establishment of an Air Control Center in the U.S.S. MOUNT McKINLEY.

   a. CJTF - 1 assumed responsibility for Air Sea Rescue in the Bikini Atoll Objective Area.

6. ABLE Day Operation.

   a. Execution.

   b. Problems.

   c. Conclusions.

   d. Recommendations.

   e. Tabs.

7. Preparation for Test BAKER.

   a. Revision of CIC Operation Plan, Addendum to Appendix VI, Annex F.

8. Training for Test BAKER.

   a. Unit training.

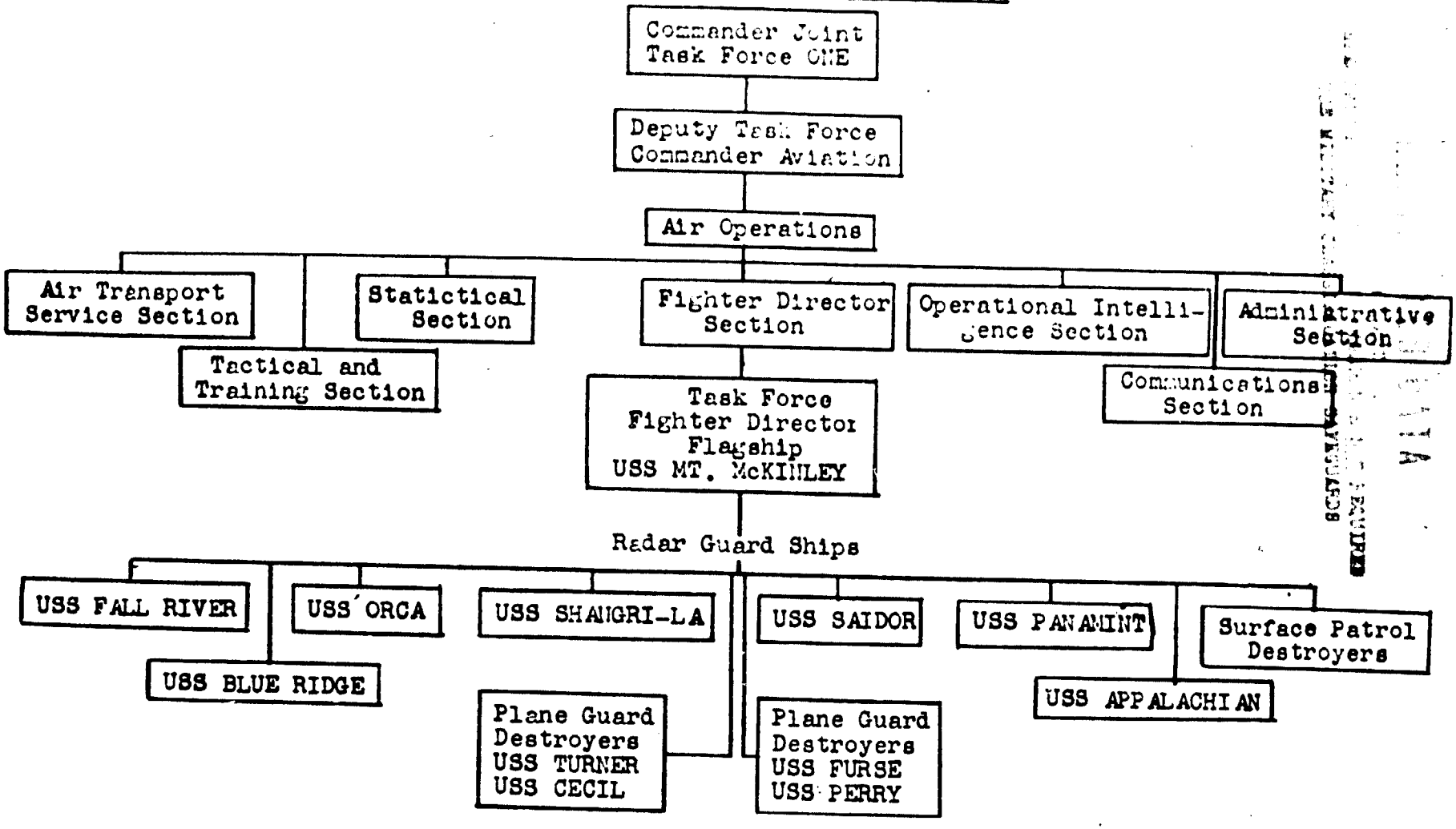
   b Full Scale Air Rehearsal.

   c. WILLIAM Day, JTF-1 Rehearsal for BAKER Day.

9. BAKER Day Operation.
   a. Execution.
   b. Problems.
   c. Conclusions.
   d. Recommendations.
   e. Tabs.
10. Post BAKER Day Operations.
11. Conclusions of Operation CROSSROADS.
12. Recommendations.

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FUNCTIONAL CHART FOR AIR OPERATIONS



1. ORGANIZATION CHART OF CIC's.

2. Preliminary Planning in Washington relating to CIC.

a. A conference was called during the first week in February 1946 to establish the capabilities of the CIC's of the Task Force as to:

(1) The number of separate flights of aircraft that could be continuosly tracked and positively identified.

(2) The best methods of obtaining positive indentification.

A decision was reached that twenty-five (25) separate flights of aircraft would be the maximum number that could be continuosly tracked and positively identified. This figure was based on the following factors:

(1) The number and types of radar aboard the flagship.

(2) The number of ships available as radar guard ships and their number and types of radar.

(3) The numbers, rates and experience of CIC personnel (CIC Officers and Radarmen) aboard the flagship.

(4) The numbers, rates, and experience of CIC personnel aboard the radar guard ships.

(5) The detailed controlled flight patterns prescribed for each flight of aircraft in the Air Plan. (The Air Plan prescribed times of take-off, routes to stations, altitudes, time on station, flight patterns, and in most cases courses and speeds to be flown while on station, time off station, and routes back to bases.

b. Preliminary requirements established for CIC. The following Operational functions were established as requirements for the flagship CIC:

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(1) To continuously track twenty-five (25) separate flights of aircraft and plot same on the Main Display Board.

(2) To positively identify the twenty-five (25) tracked flights of aircraft.

(3) To exercise direct and positive control over all aircraft in the air.

(4) To guard and maintain radio discipline on the following radio air control frequencies:

(a) Task Force Air Guard Channel (140.58 mcs).

(b) Task Group 1.5 Common (135.72 mcs).

(c) Task Group 1.6 Common (124.02 mcs).

(d) Task Force Secondary (116.10 mcs).

(e) Air Sea Rescue Primary (4475 kcs).

(f) Radar Telling Net (2160 kcs).

(g) Reporting In and Out Net (8495 kcs).

(h) Army Drone Air Unit (149.22 mcs).

(i) Navy Drone Air Unit (129.78 mcs).

(5) To maintain full and complete radar coverage.

(6) To maintain IFF guard duty.

(7) To be prepared to "home" any lost aircraft.

(8) To be responsible for exercising Air Sea Rescue. (Be prepared to effect Air Sea Rescue.)

(9) To act as an Air Control Center.

(10) To be able to identify and vector any aircraft clear of the radiological danger areas.

(11) To be prepared to move aircraft on station and to assign new altitudes so that aircraft can better perform their assigned missions.

(12) To keep the Command aircraft informed of the situation as it changed or developed.

(13) To inform the bomb carrying aircraft when the Bikini Lagoon was clear and ready for the live bomb run.

(14) To be responsible for obtaining Ballistic Winds for the bomb carrying aircraft.

(15) To inform the command aircraft when all planes were on station.

(16) To transmit time checks at specified intervals to insure the withdrawal of aircraft at scheduled times.

(17) To keep all aircraft informed of all changes in the radiological danger areas.

(18) To be responsible that all aircraft pilots were instructed to put on goggles prior to the atomic bomb detonation.

(19) To be responsible for the carrying out of all directives pertaining to radar silence.

(20) To carry out all directives and responsibilities of CJTF-1 Op-Plan 1-46.

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SPECIFIC RESTRICTIONS ON CLEARANCE AND REQUIRED
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(21) To prepare and submit a CIC report upon the completion of Operation Crossroads.

c. Problems: The problems encountered in carrying out the requirements set up for CIC were the following:

(1) During the planning stage of the Operation the requirements of the air units changed continuously, necessitating changes in the Air Plan which resulted in changes to the CIC plan. Changes were continual up to and including ABLE Day.

(2) Test requirements dictated the necessity of moving a large number of aircraft in to 7 NM from the cloud and circling in a counter-clockwise direction. This would confuse the radar picture, creating a merging of radar indications and a loss of aircraft identity. The identity of all flights would have to be re-established when they departed from this orbit.

(3) The use of Code III IFF as a means of identification could not be used effectively as all Army planes were to use Code 1, and all Navy planes were to use Code 2. The four Navy drones were to carry codes 3. 4, 5 and 6.

(4) Seventy (70) aircraft were eventually written into the Air Plan and scheduled to be airborne in the Bikini Area on ABLE Day This tripled the number that CIC originally assumed responsibility for and necessitated a reassignment of radar tracking duties to the Radar Guard Ships and necessitated a comprehensive CIC training program.

(5) Of the seventy (70) aircraft scheduled to be airborne on ABLE Day, thirty-five (35) were assigned to fly at fifteen thousand (15,000) feet or above. Of this thirty-five (35) aircraft, thirty (30) aircraft were assigned to

altitudes of twenty thousand (20,000) feet or above. Due to the lobeing characteristics of the air search radars (SK and SC) at close range, these aircraft were certain to be in frequent fade areas, making it practically impossible to track these aircraft by use of the SK and SC radars. Therefore SP-SM Radars would have to be assigned to these high altitude planes. The U.S.S. SHANGRI LA and the U.S.S. SAIDOR would need their SP-SM radars to track their high altitude aircraft. This left four SP's available on the four radar guard ships for high altitude tracking. It was doubtful whether CIC personnel were sufficiently trained to be able to shift targets rapidly enough to cover four assigned flights each, the number necessary to track all flights.

(6) A doubt existed as to the availability of experienced CIC personnel necessary to carry out such a detailed and comprehensive air control plan. Due to the demobilization of rated personnel, the performance of Radarmen was expected to be below the average wartime standard. It was expected that the accuracy of radar reporting and plotting would be below that normally expected.

(7) An uncertainty existed regarding the performance of radars due to inexperienced maintenance personnel.

(8) Information regarding the numbers, arrangements and types of radars and radio equipments aboard the flagship and all designated radar guard ships was incomplete, creating the possibility of inadequancies.

(9) Due to the number of aircraft involved in the Air Plan it would require rapid radar reporting

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and plotting in order to maintain a continual track of the movement of all aircraft. It was questionable whether sufficient time was available for such training in order to meet the date of the first scheduled atomic bomb test.

(10) The assigning of extensive tracking responsibilities to the radar guard ships created the possibility of overloading the Radar Telling Net.

(11) The possibility existed of overloading the air communications frequencies in the CIC of the flagship. This reverted back to a question of personnel, equipment, and training in proper radio procedures and discipline.

(12) A preliminary check of CIC personnel in the flagship, and in all radar guard ships, disclosed the fact that all ships were losing most of their CIC personnel and new crews were being assigned, the composition of which were unknown. It was difficult for designated radar guard ships to certify their readiness to carry out the electronics plan, as prescribed, during this interim period. A quick comprehensive training program would have to be initiated in all designated radar guard ships.

(13) Electronic tests by BuShips during the operation prescribed the use of only those radars essential to carry out the requirements of the Air Plan, and made certain demands upon the air search radars of one radar guard ship.

(14) The execution of early CIC training was complicated because of the dispersal of designated radar guard ships, continual changes in CIC personnel, continued changes in the Air Plan, changes in requirements for CIC's, and yard availabilities of ships.

(15) There was some difficulty of obtaining planning directives and changes which effected CIC Operations, as they were being prepared for the related annexes and appendices of CJTF-1 Oplan 1-46. Annexes of particular interest to CIC were: Air Plan, Communications Plan, Photographic Plan, Logistic Plan, and Movement Plan.

(16) Crosschecking of related plans of the Operation Order for requirements and changes as they would effect CIC was necessary.

(17) The possibility of the SK-SC radars of the designated radar guard ships being blocked out by ship clutter at close ranges, due to their prescribed stations during ABLE Day, was recognized.

(18) The possibility existed that all radars and/or radio equipments would be effected in varying degrees by the detonation of the Atomic Bomb and the resulting Atomic Cloud.

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3. CIC Operation Plan (Designated Air Control and Radar Doctrine, Appendix VI, Annex F to CJTF-1 Op-Plan 1-46).

a. With the firming of the requirements and responsibilities for CIC, the following Operation order for CIC was prepared.

Index

(1) Introduction.

(2) Control.

(3) Duties of Task Force Fighter Director Officer.

(4) Duties of Ship Fighter Director Officers.

(5) Fighter Director Ships.

(6) Radar Guards and Radar Guard Ships.

(7) Radar Silence and IFF.

(8) Radar Tracking.

(9) Radar Reporting.

(10) Communications.

(11) Lost Plane Procedure.

(12) Air-Sea Rescue.

(13) Fighter Director Vocabulary.

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(1) Introduction: CIC and Radar Doctrine stated herein is in accordance with USF 10B and PAC 70B. The following supplements these references:

(2) Control: The control of all aircraft traffic, air and surface search radars, VHF and Inter-fighter-director voice radio communications, and conditions of radar and IFF silence within the Task Force is the function of the CIC (Officer in Tactical Command) (Normally CTTF-1 except when otherwise specifically indicated) and will be exercised and controlled through the Task Force Fighter Director Officer. The Task Force Fighter Officer will be stationed in, and exercise control from the CIC (Combat Intelligence Center) of the flagship, unless otherwise directed.

(3) Duties of the Task Force Fighter Director Officer: The Task Force Fighter Director Officer will:

(a) Control all traffic in the air.

(b) Maintain radio discipline on the Task Force Air Guard channel and the inter-fighter-director radio voice communication circuits.

(c) Coordinate the homing of lost aircraft.

(d) Coordinate and control air-sea rescue.

(e) Prescribe Radar Guards and Radar Guard ships.

(f) Designate Fighter Director Ships.

(g) Assign IFF Guard duties.

(h) Be responsible for the assignment of shipboard radar coverage.

(i) Brief all CIC officers prior to the operation.

(4) Duties of the Ship Fighter Director Officers: The Ship Fighter Director Officers will:

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(a) Be responsible for carrying out all directives of the Force Fighter Director Officer and to function in accordance with prescribed CIC doctrines.

(b) Be responsible for carrying out provisions of CJTF-1 Op-Plan No. 1-46 as they apply to CIC.

(5) Fighter Director Ships: The Force Fighter Director Ship is the U.S.S. MOUNT McKINLEY. The sequence of Task Force Fighter Director relief will be:

(a) U.S.S. SHANGRI LA.

(b) U.S.S. SAIDOR.

(c) U.S.S. APPALACHIAN.

(d) U.S.S. BLUE RIDGE.

(e) U.S.S. PANAMINT.

In case of radar, radio voice communications, or other material failure in the flagship, the Task Force Fighter Director duties will be assumed by the relief ships in the order named above.

(6) Radar Guards and Radar Guard Ships: The following ships are designated radar guard ships:

(a) U.S.S. MOUNT McKINLEY.

(b) U.S.S. SHANGRI LA.

(c) U.S.S. SAIDOR.

(d) U.S.S. APPALACHIAN.

(e) U.S.S. BLUE RIDGE.

(f) U.S.S. PANAMINT.

All Radar Guard Ships will immediately report all failures of radar or communications equipment to the Task Force Fighter Director Officer over the Radar Telling Circuit. Reports will include the length of time equipment will be inoperative. A report will also be made when the equipment is back on the air. Radar Guard Ship duties are assigned as follows:

(a) U.S.S. MOUNT McKINLEY:

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at four (4) revolutions per minute (4 RPM). All targets will be reported at least once each minute. Radar operators will report from the master PPI tube using a curser with calibrated range markings.

(2) SP Radar: Assigned to track the Bomb Carrying Airplane and the two pressure drop aircraft. May be further assigned to track Helicopters when assigned by the Task Force Fighter Director Officer.

(3) SCR 720 Radar: Will be assigned zenith search when and as directed by the Task Force Fighter Director Officer.

(b) U.S.S. SHANGRI LA:

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range with a continuous three hundred sixty degree (360) sweep at four (4) revolutions per minute (4 RPM). All targets will be reported at least once each minute. Radar Operators will report from the master PPI tube using a curser with calibrated range markings.

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(2) SM Radar: Assigned to track the four (4) F6F drones, the eight (8) Primary Drone Control Sections RED, WHITE, BLUE, and YELLOW, and the four (4) Secondary Drone Control Sections RED, WHITE, BLUE, and YELLOW, when launched from the U.S.S. SHANGRI LA. The radar track of these aircraft on the Main Display Board will be labeled with Mark III IFF codes as shown.

(3) SC Radar: Maintains the IFF guard for the Task Force. Also maintains the emergency IFF guard duty. All emergency IFF will be reported immediately to the Task Force Fighter Director Officer via the Radar Telling Circuit. IFF guard is to include the keeping of a record of all planes having emergency IFF; giving position, track, and time. Only BL equipment on the U.S.S. SHANGRI LA will be operated during this operation, unless otherwise directed by the Task Force Fighter Director Officer.

(c) U.S.S. SAIDOR:

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at four (4) revolutions per minute (4 RPM). All targets will be reported at least once each minute. Radar Operators will report from the master PPI tube using a curser with calibrated range markings. The USS SAIDOR will also act as stand-by IFF guard ship and be prepared to take over this duty when directed to do so by the Task Force Fighter Director Officer.

(2) SP Radar: Assigned to track the one (1) F6F aircraft designated ROGER and the one (1) TBM Photographic aircraft designated NAN. Will also track the four (4) B-29 Radiological Reconnaissance Aircraft, two (2) sections of two (2) aircraft each, designated JIG and KING.

(d) U.S.S. APPALACHIAN:

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at four (4) revolutions per minute (4 RPM). All targets will be reported at least once each minute. Radar Operators will report from the master PPI tube using a curser with calibrated range markings.

(2) SP Radar: Assigned to track the two (2) B-17 Drone aircraft and the two (2) B-17 Drone Control Aircraft, designated HOW and LOVE.

(e) U.S.S. BLUE RIDGE:

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at four (4) revolutions per minute (4 RPM). All targets will be reported at least once each minute. Radar operators will report from the master PPI tube using a curser with calibrated range markings.

(2) SP Radar: Assigned to track the two (2) B-17 Drone aircraft and the two (2) B-17 Drone Control aircraft designated FOX and GEORGE. Also the Master Drone Control aircraft designated MIKE.

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OPORD [illegible] - CTF 58/CADS - PART VII - Special Reports
Section (S) - Combat Information Center.

(5) SCR 720 Radar: Assigned zenith search when and as directed by the Task Force Fighter Director Officer.

(f) U.S.S. PALAMINT:

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at four (4) revolutions per minute (4 RPM). All targets will be reported at least once each minute. Radar operators will report from the master PPI tube using a cursor with calibrated range markings.

(2) SP Radar: Assigned to track the four (4) F-13 aircraft, Flight ABLE, and the four F-13 airborne spares, Flight BAKER.
(Note: The U.S.S. PALAMINT will also conduct certain radar observations of the detonation of the bomb in accordance with instructions to be issued separately.)

(7) Radar Silence and IFF:

(a) Only those ships designated as Fighter Director Ships and/or Radar Guard Ships will operate their air search radars. All others will secure their air search radars, unless otherwise directed.

(b) All Fighter Director Ships and Radar Guard Ships, except those designated as IFF guard ships, will secure their BL equipment.

(e) All ships present will secure their surface search and gunnery radars as later directed.

(3) Radar Tracking:

(a) All designated Fighter Director Ships will be responsible for maintaining a continuous track of all aircraft in addition to tracking any designated aircraft as assigned in this Appendix. No instructions contained in this Appendix will be construed as relieving any Fighter Director Ship from the responsibility of maintaining a continuous track of all aircraft. To properly perform this function all air search radars will be placed at peak performance.

(b) All Fighter Director Ships will be prepared to report position of any aircraft to the Task Force Fighter Director Officer when requested. All air contacts will be identified and labeled on the Main Display Board in accordance with their assigned radio voice calls.

(c) Any ship that launches aircraft is charged with the responsibility of keeping a constant track of those aircraft and being ready to give their position to the Task Force Fighter Director Officer when requested. To insure an accurate identified track it is suggested that two (2) CIC Watch Officers maintain a running plot on the face of the PPI tubes in addition to the Main Display Board.

(d) The safety of this operation depends on knowing the exact wheresbouts of each aircraft at all times. Tracking ships will make full use of the twenty (20) mile range scale on the PPI tubes for close-in tracking.

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Carriers launching planes will commence PPI tube tracking on the twenty (20) mile range scale in order to have each plane properly identified. A shift to the seventy-five (75) mile range scale may be made when all launched aircraft are on the scope and identified.

(e) It is suggested that lookouts be fully utilized to identify close-in visual contacts.

(f) Supporting Fighter Director Ships will be prepared to assist in identifying any aircraft requested by the Task Force Fighter Officer by referencing their Main Display Board.

(9) Radar Reporting:

(a) All radar reports will be given via the Radar Telling Circuit using standard fighter direction vocabulary.

(b) All aircraft contact reports made via the Radar Telling circuit will be given as bearing and range from the Radar Reference Point designated AUTO. This Reference Point is the center of BIKINI ISLAND, BIKINI ATOLL (11° 37' 15" N - 165° 32' 50" E). Each Radar Guard Ship will so set up their CIC that quick conversion plotting can be done.

(c) All launching and landing reports will be made to the Task Force Fighter Director Officer over the Radar Telling Circuit in accordance with the Standard Deck Condition Code. Condition Jig reports will be made simultaneously with each aircraft launched.

(10) Communications:

(a) The Task Force Air Guard Channel and the Radar Telling Circuit will be carefully monitored and controlled by the Task Force

Fighter Director Officer. Proper voice procedure and strict radio discipline will be maintained and rigidly enforced by the Task Force Fighter Director Officer on these circuits. All aircraft will maintain a constant guard on the Task Force Air Guard Channel and be prepared to transmit on this channel at all times.

(b) The Fighter Director Brevity Code, as published in the Combined Communications Board Publication, CCBP-3, is to be used on the Radar Telling Circuit. No preliminary call ups or communication checks will be made after XRAY Hour minus three (3) hours. It is assumed that all communications will have been checked on this circuit prior to XRAY Hour minus three (3) hours. Voice radio transmissions on this circuit will be kept down to an absolute minimum and no unnecessary transmissions will be made.

(c) All voice radio transmissions will be made on assigned and designated channels only.

(d) All information messages should end with OUT.

(e) If routine reports, made from plane-to-base are readable they will not be relayed to the Task Force Fighter Director Officer. However, the parent carrier will be prepared to give an amplifying report if requested. The Task Force Fighter Director Officer will monitor the Task Force Air Guard Channel, TG 1.5 common, TG 1.6 common, and the Radar Telling Circuit assigned this Task Force.

(f) All Fighter Director Ships will be prepared to log any aircraft control channel and/or

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the Radar Telling Circuit when directed to do so by the Task Force Fighter Director Officer.

(g) The Fighter Director Brevity Code, CCBP-3, will also be used on the Task Force Air Guard Channel. No preliminary call ups will be made after communications have been established. This applies to base-to-plane. However, communications should be re-established before the transmission of lengthy messages. This shall not be interpreted as prohibiting the parent base from establishing satisfactory communications with their aircraft.

(h) All aircraft will report in to the Task Force Fighter Director Officer on the VHF Task Group Common channels when on assigned stations.

(i) All aircraft will use only their assigned radio voice calls at all times. No nicknames will be used.

(j) All aircraft will check their transmitter keys prior to take-off to insure that they are OFF. If trouble develops while planes are airborne each plane will immediately exercise every means available to locate the defective radio and take remedial action.

(k) All transmissions to the Task Force Fighter Director Officer requiring action, or for information, will be addressed to the Task Force Commander.

(l) All CIC's of the destroyers assigned this Task Force as Surface Patrol will monitor the Task Force Air Guard Channel and the

Radar Telling Circuit. All plane guard destroyers are designated Radar Guard Ships.

(m) After the Bomb Carrying Airplane announces that a live bomb run has begun, strict radio silence will be observed by all units other than the Bomb Carrying Airplane except in cases of emergency. The Bomb Carrying Airplane will maintain a listening watch on all channels for three (3) minutes after the announcement of the beginning of the live bomb run. The purpose of this watch is to insure receipt of a message from any unit desiring the live bomb run be cancelled.

(11) Lost Plane Procedure:

(a) Lost plane procedure will be in accordance with SOP-3A.

(b) Lost planes will usually be homed by the parent carrier. If land-based, the planes will be homed by a Fighter Director Ship designated by the Task Force Fighter Director Officer. If several planes are lost simultaneously the Task Force Fighter Director Officer will designate one Fighter Director Ship to coordinate and control the homing of all lost planes. During any period when there is a lost plane, no plane will show emergency IFF until directed to do so by the ship coordinating the lost plane procedure. This will alleviate the confusion of emergency IFF and the homing problem.

(12) Air Sea Rescue:

(a) Air-Sea rescue will be in accordance with CinCPac Standary Operating Procedure SOP-3A.

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(b) Air-sea rescue within the BIKINI ATOLL Objective Area (defined in paragraph 1 Annex Y to CJTF-1 Op-Plan No. 1-46) will be under the control of the OTC and exercised through the Task Force Fighter Director Officer.

(c) All ships will be alert for reports of downed aircraft and relay such reports to the Task Force Fighter Director Officer for action.

(d) All ships will keep a record of such downed planes, showing position and time.

(e) All Fighter Director Ships will be prepared to assist in air-sea rescue work.

(13) Fighter Director Vocabulary: Fighter Director Vocabulary is in accordance with Combined Communications Board Publications, CCBP-3. (Following is an extract of the common forms that will be used during this operation in Air Control.)

(a) Anchor: Orbit a visible orbit point.

(b) Angels: Height in thousands of feet

(c) Base: Home airfield.

(d) Close: Keep near directing ship.

(e) Fuel: Quantity of fuel remaining.

(f) Left (Port): Alter course to left.

(g) Orbit: Circle.

(h) Orbit Left (Port): Circle left.

(i) Orbit Right (Starboard): Circle right.

(j)	Request Homing:	Request course to steer for home.
(k)	Right (Sterboard):	Alter course to right.
(l)	Steer:	Set course.
(m)	Vector:	Alter course to...magnetic course indicated.
(n)	Cockerel:	IFF Mark III.
(o)	Switch Cockerel:	Switch on your IFF Mark III
(p)	Strangle Cockerel:	Switch off your IFF Mark III.
(q)	Check Cockerel:	Insure that your IFF Mark III is on the correct code.
(r)	Switch Mayday Cockerel:	Switch your IFF Mark III to the distress setting.
(s)	Cockerel is Strangled:	IFF Mark III is switched off.

4. CIC Training Program.

a. Preliminary training.

(1) Instructions were dispatched from Washington to all designated radar guard ships to conduct training exercises while in port and during the time they were waiting departure to the operating area.

(2) A complete new CIC team was ordered to the radar operator's school at Point Loma, San Diego, California, for team training and for further assignment to the U.S.S. SAIDOR.

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(3) A suggested Watch, Quarter and Station Bill for the CIC of the flagship, the U.S.S. MOUNT McKINLEY, was drawn up by the Task Force Fighter Director in Washington on 8 April and forwarded to the Officer-in-Charge of CIC in the U.S.S. MOUNT McKINLEY. Based upon this proposed set up he was instructed to commence CIC team training. The duties and responsibilities of the U.S.S. MOUNT McKINLEY were outlined and it was requested that a check be made of all CIC personnel, as to numbers and rates, to ascertain that sufficient personnel were attached to the ship to carry out the prescribed Air Control and Radar Plan, and to carry out the duties required of the Task Force Control Ship. If personnel inadequacies appeared appropriate action was requested to be taken in order to bring the complement up to the numbers and rates required.

(4) Following is a copy of the Suggested Preliminary Watch, Quarters, and Station Bill sent to the Officer-in-Charge of CIC on the U.S.S. MOUNT McKINLEY.

(a) Radar Operators.

(1) SK Radar - full operation (3 operators rotating on 20 minute shifts on QUEEN, ABLE, WILLIAM, BAKER and all full scale air rehearsal days).

(2) SP Radar - full operation (4 operators) 2 teams of 2 each rotating on 20 minute shifts on QUEEN, ABLE, WILLIAM, BAKER and all full scale air rehearsal days.

(3) 720 Radar - limited operation - 1 operator.

(b) Plotters.

(1) Main Vertical Display Board:

(a) 4 SK plotters at Vertical board, one in each quadrant. Three is the minimum number of SK plotters as the SK operator will call plots as rapidly as he can put the cursor on the targets (with accuracy). It will be necessary to call plots as close in as they can be seen, and also signals of strenght one.

(b) 1 SK plotter at the CIC face of the Vertical board.

(c) One SK plotter. Special chart to be made for the face of the DRT to cover the operating areas within radar range. At present it is not planned that the U.S.S. MOUNT McKINLEY will be under way to any degree, but if an emergency should occur and she would have to get under way, we would want to be prepared for that emergency. Suggest the U.S.S. MOUNT McKINLEY's designated operating area be made the center of the chart.

(d) One SK plotter on the horizontal intercept board to plot only the B-29 bomb carrying aircraft and the two B-29 Pressure Drop Aircraft. This plot will be kept for detailed information required by the bomb analysis group.

(c) Status Boards

(1) Aircraft status board keeper. (Will have to monitor TG 1.5 and TG 1.6 comms on split earphones. He will also have access to this information from the two CIC Watch Officers who will man these circuits.) It will be necessary

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to carry 70 planes on this status board. Your present CAP status board can be used, supplemented by your search and attack board. Suggest you check the adequacies of these boards in light of this requirement.

(2) Radio voice call board for ships, command calls, Island calls, etc., will need be set up.

(3) Operational Status Board. (Including IFF codes, wind information, cloud cover, radioactivity, Redex information, orders for immediate reference, and YE code). The YE code may be included on outer edge of Main Display Board. This status board does not need to be manned as it can be made up prior to the operation.

(4) A ship's position status board will be necessary. This also will be made up prior to the operation.

(d) Communications

(1) Internal.

(a) JS sound powered circuit. An officer evaluator in CIC will man this circuit.

(1) It will connect the following stations outside of CIC.

(a.) Visual lookout station.

(b.) Bridge.

(c.) Flag Plot.

(d.) Radiological Safety Section in Joint Operations.

(e.) Any other station required by your set-up in order to keep all attack boxes silent. Would like to have the internal communications set up so that it will not be necessary to use any attack boxes during the operation except in an emergency.

(2) Internal.

(a) The Task Force Air Guard Common Channel (140.00) will be manned by the Task Force Fighter Director. This will be the only Frequency in operation in CIC.

(b) The Task Force Air Guard Secondary Channel (116.10 mcs) will be manned by an officer, probably one from the Staff. (You need not figure this position in your complement.)

(c) The Task Group 1.5 Common Channel (135.72 mcs) will be manned by a CIC Watch Officer. This officer will be plotting on the face of the PPI tube to assist in keeping the Main Display Board up to date, correct, and accurate.

(d) The Task Group 1.6 common channel (124.02 mcs). Same as "c".

(e) The private channel between the Deputy Commander for Aviation and the Command Aircraft (137.52 mcs) will be "covered" by an enlisted man.

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(f) The Army Air Drone Unit frequency (149.28 mcs) will be "intercepted" by an enlisted man.

(_) The Navy Air Drone Unit frequency (12[illegible].70 mcs) will be "intercepted" by an enlisted man.

(m) The Radar Telling Net (2100 kcs) will be manned by an officer, stationed at the CIC face of the Main Display Board. It is suggested that the CIC officer take this circuit.

(i) The General Warning Net (3000 kcs) will be manned as follows: If it is piped into CIC an enlisted man will "cover" the frequency. If it is adjacent to CIC, the communication people will assign an operator and assume the responsibility of covering.

(j) The RIO Net (8495 kcs) will be controlled by CIC but the communication department will man this CW net with a rated radio operator.

(k) The Task Force Administrative Circuit (747 mcs) will be "covered" by an enlisted man.

(l) The Primary Air Sea Rescue frequency will be "guarded" by a rated radarman.

It is suggested that all personnel be thoroughly briefed in logging communication channels and that a set of abbreviations

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be promulgated at this time, if you have a logging system in effect at the present time.

It is also suggested that you proceed with satisfying all requirements of the Joint Air Operations space insofar as arranging a CIC display is concerned.

It is further suggested that a cushion of at least 5 enlisted men be provided for contingencies such as illness, changes to the operation plan, CIC requirements, etc. It is best if all personnel be aboard the flagship prior to your departure from the West Coast as it is doubtful if any additional personnel can be obtained after your arrival in the forward area.

b. Training in the forward area: All CIC's were instructed to continue to conduct extensive and full scale training exercises independently while en route to the forward area. Each CIC was to work out its own training program to fit their individual training needs. It was suggested that the operation be simulated by referencing the detailed flight plans in the Air Operations Order. When CJTF-1 Staff reported in the USS MOUNT McKINLEY in San Francisco on 6 May 1946, it was found that the flagship CIC was composed of the following complement:

Officers: Five CIC officers, one designated "X" and four designated "R". One had combat experience, one had limited CIC experience, and three were without any shipboard experience having just reported aboard from the Naval Radar Training School at St. Simons Island, Georgia.

Enlisted Personnel: Thirty enlisted men made up the CIC complement of which five (5) had previous

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CIC experience. All were graduates of a radar training school. These men were all recently assigned to the ship and had never worked together as a team, except during their preliminary training period. The rates of these men included:

3 Rdm 1/c
5 Rdm 3/c
5 S 1/c
17 S 2/c

Rather than attempt to train all CIC personnel to man all stations within CIC and undertake an overall training program in such a short period of time, it was thought advisable to assign each man to a station and train him to perform the duties and functions of that one station; thus making him a specialist, but insuring his efficient operation during Operation CROSSROADS.

(1) A Watch, Quarter and Station Bill was drawn up for CIC and all personnel were assigned to train and carry out their specific duties as follows:

Task Force Fighter Director Officer -- Comdr. A. Wilding Jr.

General Functions:

(a) Responsible for the control of all traffic in the air.

(b) Maintains radio discipline on assigned frequencies.

(c) Coordinates the homing of lost aircraft.

(d) Coordinates and controls (through the chain of command) air-sea rescue.

(e) Prescribes Radar Guards and Radar Guard ships.

(f) Designates Fighter Director Ships.

(g) Assigns IFF guard duties.

(h) Responsible for the assignment of shipboard radar coverage.

(i) Coordinates and controls all CIC functions.

(j) Responsible for seeing that CIC operates in conformity with prescribed CIC doctrines.

(k) Responsible for the briefing of all CIC personnel prior to the operation.

Specific Functions.

(a) Mans the Task Force Air Guard Channel (140.58 mcs).

(b) Responsible for the carrying out of all directives as contained in CJTF-1 Op-Plan 1-46.

(c) Responsible for dissemination of all pertinent information to ComJointTaskForONE, Deputy Com. JTF-1 for Air, and all other interested Flag Officers.

(d) Maintains close liaison with the Radiological Safety group.

(e) Responsible for warning all aircraft with regard to the Radiological danger areas, insofar as informed by the Radiological Safety group.

(f) Responsible for CIC training and for the efficiency of CIC operations.

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(g) Responsible for obtaining information from aircraft as directed.

(h) Responsible for maintaining data necessary to compile summary operation report.

Ships Fighter Director Officer -- Lt.Commander L. Klauder.

(a) Responsible to see that all directives of the Task Force Fighter Director Officer are carried out.

(b) Mans the Radar Telling Net (2160 kcs).

(c) Obtains information desired from designated Radar Guard Ships.

(d) Receives radar and radio reports and disseminates same to interested and cognizant stations.

(e) Plots radar reports on the CIC face of the Main Display Board, converting as necessary.

(f) Informs Aircraft Status Board keeper of all condition Jig and Love reports as obtained from the U.S.S. SHANGRI LA and the U.S.S. SAIDOR.

(g) Maintains strict radio discipline on the Radar Telling Net.

CIC Watch Officer -- RIO Circuit and Tracking -- Ens. E. Schwartz.

(a) Mans the TG 1.6 Common channel (124.02 mcs).

(b) Keeps the Task Force Fighter Director Officer informed of pertinent information from this channel.

(c) Gives Aircraft Status Board keeper a record of all TG 1.6 aircraft reporting in on station and the departure of same.

(d) Tracks and plots aircraft targets on the face of the PPI tube.

(e) Checks on radar tracking on the Main Display Board to see that all plots are tracked correctly.

(f) Makes full use of the short range scale on the PPI to aid in tracking close in aircraft targets.

(g) Has cognizance of all radio communications and is responsible for channeling all crystal controlled radios as prescribed in the Operation Plan. Is also responsible for the assignment of radio equipment in CIC to frequencies.

CIC Watch Officer — RIO Circuit and Tracking — Ens. A. Haley

(a) Mans the TG 1.5 Common Channel (135.72 mcs).

(b) Keeps the Task Force Fighter Director Officer informed of pertinent information from this channel.

(c) Gives Aircraft Status Board keeper a record of all TG 1.5 aircraft reporting in on station and the departure of same. Is responsible to see that the Aircraft Status Board keeper has full and detailed information recorded. If not he is responsible to take

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steps to obtain this information for the Aircraft Status Board keeper.

(d) Tracks and plots aircraft targets on the face of the PPI tube.

(e) Checks on radar tracking on the Main Display Board to see that all plots are tracked correctly.

(f) Makes full use of the short range scale on the PPI to aid in tracking close-in aircraft targets.

CIC Watch Officer - Filter Officer -- Ens. J. T. Kennedy.

(a) Mans the 1 JS sound powered circuit.

(b) Disseminates pertinent information from CIC to Flag Plot, including;

(1) Reports from the RIC circuit.

(2) Reports from aircraft on station.

(3) Reports of planes taking departure.

(4) Position reports on any aircraft requested.

(5) Relays orders from the Command to the Task Force Fighter Director for action.

(6) Reports lost aircraft.

(7) Reports on emergency IFF.

(g) Keeps Flag Plot fully informed of all activities within CIC and all operational developments.

(h) Receives all instructions and orders from higher echelon for action in CIC.

(i) Is fully cognizant of the overall picture in CIC and should be prepared to answer any operational inquiry.

SK Radar Operator -- Peterson, R. C., Rdm 2/c
Standby -- Van Mill, D. A., Rdm 3/c

(a) Operates the SK radar on a continuous 360 degree sweep.

(b) Mans the 24 JS circuit.

(c) Reads ranges and bearings off a calibrated range curser.

(d) Reports ranges and bearings to the Main Display Board Plotters.

(e) Will report all radar contacts within five miles and all radar contacts of strength one.

(f) Will stand by the scope when relieved in order to maintain the radar picture at all times.

(g) Will inform the radar maintenance officer at once if the SK radar does not appear to be operating at peak performance.

SK Radar Plotters -- (3) -- Rutkosky, F.J. S 2/c
Roberts, R.M. S 2/c
Tully, P. J. S 2/c

(a) Mans the 24 JS circuit.

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(b) Each plotter is responsible for an assigned 120 degrees of the Main Display Board

(c) All times will be recorded.

(d) All radar plots will be in yellow grease pencil.

(e) No transmissions will be made back to the SK radar operator over the 24 JS circuit.

(f) Plotting will be in accordance with the standard radar plotting techniques.

(g) Plots will only be erased when the tracks begin to integrate, and then the last four plots will always be left on the board.

SP Radar Operators — Ross, W. D. Rdm 2/c
Amplement, T. J. Rdm 3/c
Setser, J. Rdm 3/c
Wishart, D. C., S 2/c

(a) Mans the 21 JS circuit.

(b) Operates the SP radar as assigned in CJTF-1 Op-Plan 1-46.

(c) Reads ranges, bearings, and altitudes.

(d) Reports contacts to the Main Display Board plotter, intercept board plotter, and the plotter in Flag Plot.

(e) Will stand by the set when relieved to maintain the radar picture at all times.

(f) Will inform the radar maintenance officer at once if the set does not appear to be operating at peak performance.

(g) At estimated 30 seconds before actual bomb release will stand by to obtain and report accurate range and bearing reading at the instant of Bombardiers report, "Bomb Away."

SP Radar Plotter At Main Display Board --
White, K. H., S 2/c

(a) Mans the 21 JS circuit.

(b) Plots the bomb carrying B-29 aircraft with red grease pencil on the CIC face of the Main Display Board.

(c) Erases the radar track on the completion of each run.

(d) Records all times.

(e) Will not make any transmissions on the 21 JS Circuit to the SP radar operators.

(f) Plotting will be in accordance with the standard radar operating techniques.

Sr Radar Plotter at the Intercept Board --
Kotula, R., Rdm 2/c.

(a) Mans the 21 JS circuit.

(b) Prepares paper with polar coordinates and range markings.

(c) Plots the B-29 bomb carrying aircraft with pencil.

(d) Changes plotting paper at the end of each bombing run. Marks each paper with the number of bombing runs.

(e) Will not make any transmissions over the 21 JS circuit to the SP radar operators.

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(f) Plotting will be in accordance with the standard radar plotting techniques.

(g) Prepares all plots for photography.

SP Radar Plotter in Flag Plot -- Regonini, A.A., S 2/c

(a) Mans the 21 JS circuit.

(b) Plots the bomb carrying B-29 aircraft on the face of the aircraft plotting board.

(c) Erases the radar track on the completion of each run.

(d) Records all times.

(e) Will not make any transmissions over the 21 JS circuit to the SP radar operators.

(f) Plotting will be in accordance with the standard radar plotting techniques.

Radiological Safety Plotter in CIC -- Kimmel, H. U., Rdm 3/c

(a) Mans the 51 JS sound powered circuit.

(b) Plots the radiological danger areas on the face of the Main Display Board with white grease pencil.

(c) Plots the radiological danger areas on the Altitude Board.

(d) Makes changes in these areas as changes develop and are reported.

(e) Gives position reports of Radiological Reconnaissance aircraft to the Joint Air Operations Room.

(f) Keeps a record of time when each danger area is reported in CIC.

Radiological Reconnaissance Aircraft Plotter -- Cunningham, J., S 2/c

(a) Mans the 51 JS circuit.

(b) Plots the position of each radiological reconnaissance aircraft on the display board in Joint Air Operations.

(c) Transmits to CIC the extent of the areas determined to be radiological hazards.

Plotting Supervisor -- Seyb, R. R. Rdm 1/c

(a) Takes station between CIC and the radar control room.

(b) Supervises the plots on the Main Display Board to see that tracks reject the radar picture on the scopes.

(c) Makes any corrections to the Main Display Board plots.

(d) Makes corrections on the Main Display Board as suggested by the scope plotting CIC officers.

(e) Supervises Radar operators.

(f) Stands by to fill any position in an emergency.

SG Radar Operator -- Doll, H.W. Rdm 2/c

(a) Operates the SC radar.

(b) Mans the 22 JS circuit.

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(c) Reports ranges and bearings of surface targets as requested.

SG Radar Talker -- Rolling, A.F. S 2/c

(a) Takes station on the Navigation Bridge.

(b) Mans the 22 JS circuit.

(c) Obtains range and bearings as requested.

Aircraft Status Board Keeper -- Albonico, J.F. Rdm 1/

(a) Mans the TG 1.5 and TG 1.6 common VHF channels with split headphones.

(b) Records all information from the RIO circuit.

(c) Records all aircraft reporting in and out times on the aircraft RIO circuit.

(d) Received written double check from CIC Watch Officers on the aircraft RIO circuits.

(e) Records any changes in aircraft altitudes.

(f) Notes and records radio failures in any plane.

DRT Plotter -- Hendershot, J. R. S 2/c

(a) Makes overlay map of Bikini Area for the DRT.

(b) Prepares map and plots for photography.

(c) Plots all reference points and orbit points.

(d) Plots all incidents of interest including emergency IFF, downed planes reports, etc.

(e) Be prepared to give range and bearing to any base.

(f) Plots radiological danger areas as they are reported.

Visual Lookout -- Gates, R. Rdm 1/c

(a) Mans the 25 JS circuit.
(b) Be able to identify all planes sighted visually, by type and markings.

(c) Report position and identity of all planes sighted to CIC.

(d) Informs photography of the bombardier's reports of minutes before actual bomb release so that all movie cameras may be started at second of bomb release.

(e) Reports position and course of opening aircraft sighted visually.

(f) Informs CIC of the instant of bomb detonaton.

25 JS Talker in CIC -- Berry, R. G. Rdm 2/c

(a) Mans the 25 JS circuit.

(b) Transmits bombardier's time signals to visual lookout.

(c) Identifies radar tracks on Main Display Board by visual lookout's reports.

(d) Keeps visual lookout informed as to planes and their approximate position that may be sighted visually.

(e) Keeps ship's head on the CIC face of the Main Display Board.

RIC Circuit (8495) -- Rated Radio Operator

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(a) Manned by a rated radio operator qualified to keep up with CW traffic on this circuit.

(b) Gives all incoming routine messages to the Aircraft Status Board Keeper by means of the RIO messenger.

(c) Acts as the net control station.

(d) Records time of receipt on all messages.

(e) Be prepared to transmit any message as directed.

(f) Routes any urgent messages direct to the Task Force Fighter Director Officer.

(g) Knows the operational command calls.

RIO Messenger -- Stecher, J. R. S 2/c

(a) Stands by the RIO CW radio operator to carry messages.

(b) Carries all traffic between the RIO radio operator and the Aircraft Status Board Keeper.

(c) May assist Aircraft Status Board Keeper by recording times of take-off.

(d) Carries urgent messages from RIO radio operator to the Task Force Fighter Director Officer.

[redacted] -- Bottola, A. J. S 2/c

(a) Standby for use as necessary.

(b) Must know the station of all personnel aboard ship and all spaces.

Recorders --

(a) Dunn, G. L. S 2/c. Records the Task Force Air Guard Channel (140.58 mcs).

(b) Clark, H. A. S 2/c. Records the TG 1.5 Common Channel (135.72 mcs).

(c) Taylor, D. B. S 2/c. Records the TG 1.6 Common Channel (124.02 mcs).

(d) Shane, D. C. S 2/c. Records the Radar Telling Net (2160 kcs).

(e) Decker, E. E. S 2/c. Records the Secondary Air-Sea Rescue Frequency (4475 kcs) and the Task Force Common Secondary Channel (116.10 mcs) on split headphones.

(f) Thompson, A. G. S 2/c. Records the Primary TBS (74.1 mcs). Note: The above recorders will keep a complete written log and will inform the Task Force Fighter Director Officer of any message of interest other than routine traffic.

Radar Maintenance Officer -- Ens. T. A. Pond

(a) Takes station in CIC and immediately accessible to the port aft X6J circuit.

(b) Stations radar technicians where possible breakdowns will occur.

(1) By the SP antenna.

(2) By the SK antenna.

(3) By the radar sets.

(c) Provides for means of communications with technicians.

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Radar Technicians

(a) Penland, C. L. CETM. Takes station in CIC and mans the port forward X6J circuit.

(b) Mileaf, H. ETM 2/c. Takes station in the forward radar room and mans the X6J circuit.

(c) Miron, J. B. ETM 2/c. Takes station on the SK radar platform and mans the X6J circuit.

(d) Augerson, W. S. ETM 3/c. Takes station at the base of the SK radar platform and mans the X6J circuit. Will also standby to repair any PPI failures on the Flag and Navigation Bridges.

(e) Robbins, C. ETM 3/c. Mans the radar supply room and the X6J circuit. Will be prepared to supply and replace radar equipment requested.

(2) Shipboard training enroute to the forward area. Commencing with sortie from San Francisco on 6 May 1946, two hours of intensive formal drill each day was programmed for all CIC personnel. In addition each man stood his regular CIC section watch (one in four) and participated in all inter-ship drill which concerned CIC. Specific training included the following:

(a) Radar Operators: Aircraft tracking, reporting aircraft targets with use of cursor, sound powered telephone techniques and procedures, familiarization with Air Plan in order to anticipate aircraft movements, and practice reading IFF codes.

(b) Plotters: Spot plotting, track plotting, writing backward legibly, sound powered telephone techniques and procedures,

plotting symbols, a knowledge of all aircraft movements in accordance with the Air Plan.

(c) Talkers: Sound Powered telephone techniques and procedures, keeping of logs, where incoming and outgoing information went and why, and which personnel were cognizant of information received.

(d) Recorders: Experience reading radio voice transmissions, recording abbreviations, how to keep radio logs, where information received should go and who would be cognizant of information received.

(e) Status Board Keepers: Experience reading radio transmissions, designation and mission of all aircraft, estimate time of take-offs, estimated time of reporting on station, estimated time of taking departure, estimated time of landing, and a knowledge of the Task Units, and task unit radio voice calls of all aircraft.

(f) Radio Guards: The assigned radio channeling of all radios, practice reading radio voice transmissions, techniques and procedures for radio voice transmissions, knowledge of the assigned functions of all aircraft, disseminating information received to cognisant personnel, keeping of radio logs, and a complete understanding of all communication assignments.

By 10 June 1946, all CIC personnel were judged to be sufficiently trained and capable of performing their assigned duties for Operation CROSSROADS.

(3) Shipboard training in the forward area. After the completion of individual training, CIC

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operated together as a team and inter-departmental training was started. Specifically CIC's operational relationships with the Air Plot, Flag Plot, Radiological Safety, Aerology, and Radio was formulated. Methods and procedures of disseminating information to and from CIC was worked out. Drills were regularly conducted with these departments to smooth out the operational functions of all concerned. These drills also developed and firmed the responsibilities of the related departments. On 14 June 1946, during the ABLE Day Staff rehearsals, CJTF-1 judged CIC to be ready to carry out all of its responsibilities within the USS MT. MCKINLEY.

(4) Task force training in the forward area. The final phase of CIC training was in relation to other CIC's of the Task Force. The major problem encountered here was that only the U.S.S. SHANGRI LA, USS SAIDOR, And Plane Guard and surface Patrol Destroyers were present in the area. The U.S.S. APPALACHIAN, U.S.S. BLUE RIDGE, and U.S.S. PANAMINT were not due until 29 June, the day before scheduled sortie for ABLE Day. A CIC meeting was called aboard the flagship for all CIC Officers of designated Radar Guard ships present in the area. At this conference the responsibilities of all CIC's were reviewed and the flow of information between CIC's was emphasized. Following this conference daily tests and drills were held between radar guard ships, emphasizing radio procedures, passing of radar information, and familiarization with each ship's assignments. By the 25th of June this phase of the training was judged satisfactory and the CIC of the U.S.S. MT. MCKINLEY was fully trained and prepared to carry out its assignments as the Task Force Fighter Director ship.

When the U.S.S. APPALACHIAN, U.S.S. PANAMINT, and U.S.S. BLUE RIDGE reported on 29 June 1946

their CIC Officers were called to the flagship for a conference. The operating instructions were clarified and all recent changes in the Operation Order, as effecting CIC, were reviewed. An attempt was made at this conference to acquaint the ships with the CIC operating procedures as developed during the task force training period.

(5) Training with the Army Air Group. During June 1946, the Army Air Group conducted daily training missions over Bikini, weather permitting. During these training missions the aircraft reported in to the CIC of the flagship and conducted their training mission in connection with CIC. CIC was fully manned during these training flights and all aircraft were tracked and plotted. Continual drills and communication checks and procedures were held. All training flights simulated ABLE Day flight patterns and communication procedures.

(6) Training with the Navy Air Group. The U.S.S. SHANGRI LA trained with the Navy drones at ROI. The U.S.S. SAIDOR sortied from Bikini and conducted Photo training missions over Bikini. These planes worked with the flagship and simulated ABLE Day Operations.

(7) Full scale air rehearsals. Full scale air rehearsals were scheduled on the 10th and 20th of June. All aircraft of Task Groups 1.5 and 1.6 participated. This provided excellent training for all CIC's. As a result o the first air rehearsal, the following problems were evident:

(a) A complete review of the communication facilities aboard the flagship was necessary. This was necessary because:

(1) VHF radio failures resulted in complete loss of all VHF communications with all aircraft.

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(2) No crystals of TG 1.5 common VHF were available for TDQ's or AN/ARC-1's.

(3) Lack of allocation of sufficient radio equipment to CIC to provide standby equipment.

(4) Lack of quick and efficient radio repair.

(5) Failure of aircraft pilots to follow and comply with the communication plan of the operation order, particularly in the proper use of radio frequencies, thus throwing a heavy load on certain frequencies.

(b) Remedial action included the following:

(1) Putting the Task Force VHF Common frequency on a TDQ transmitter, two AN/ARC 1's, one AN/ARC 5, one SCR 624, and additional receivers on two RBK's and one RCK.

(2) TG 1.5 Common frequency was crystaled in one SCR 624, one AN/ARC 5, and two AN/ARC 1's. Back up receivers were supplied by two REK's.

(3) TG 1.6 Common frequency was crystaled in one TDQ transmitter, two AN/ARC 1's and receivers were backed up with two REK's.

(4) Task Force Common Secondary frequency was crystaled in one TDQ transmitter, two AN/ARC 1's, one SCR 624, one AN/ARC 5, and the receivers backed up with two REK's.

(5) All medium frequencies were put on TBL's.

(6) A critique was held with TG 1.5 and TG 1.6 to review all of the problems evident during the execution of the air rehearsals.

(c) Since the Army Air Group was unfamiliar with the accepted Navy standard procedures and form for aircraft reporting in on station and reporting taking departure the following prescribed forms were promulgated:

(1) In order to provide essential information to the Commander, Joint Task Force ONE and to the Deputy Commander for Air, it is desired that certain information concerning the arrival of aircraft at station and their departure for base be communicated on assigned radio voice channels to the Task Force Fighter Director Officer (in U.S.S. MT. MCKINLEY). Reference CJTF-1 Op-Plan 1-46, Annex F, App. V, pg. F-V-14, para. 2 c, and Annex F, App. VI, pg. F-VI-8, para. 10 h, and Annex F, App. V, pg. F-V-14, para. 2 f.

(2) It is desired that the following phraseology be utilized for these reports. It is therefore requested that all pilots be instructed to use these and only these conventional forms.

(a) When flight is joined up, the flight leader will report in for all aircraft in his flight using the following form:

"Hello Priest, this is Eggleston 1, Flight Able on station, 4 planes, over". (Number of planes in flight always includes the reporting plane.

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(b) If aircraft are proceeding individually to station, each aircraft commander will report in when on station using the following form:

"Hello Priest, this is Toucan 2, on station, over."

(c) Any aircraft not on assigned station by designated time will report in giving his call, present altitude, and number of minutes before he expects to arrive at station. The following form will be used for this report:

"Hello Priest, this is Toucan 1, approaching station Angels eight point five, time one one, over."

(d) The form for reporting departure from the target area will be:

"Hello Priest, this is Toucan 2, taking departure, over."

(d) All designated radar guard ships were not in the area for these air rehearsals and therefore tracks on certain high altitude aircraft for which these guard ships were responsible, were meager.

(e) The SK radar performance was far below an acceptable standard. Ranges were limited and aircraft went into frequent fades and remained in the faded areas for longer periods of time than they should have, if radars were at peak performance.

(f) It was impossible to hold a meeting of all CIC Officers prior to these rehearsals as

the AGC's were enroute between San Francisco and Bikini, and the U.S.S. SHANGRI LA, with her Plane Guard Destroyers, was at Kwajalein. Only the U.S.S. SAIDOR and her two plane guard destroyers were present in the area.

(g) With all Army aircraft carrying IFF Code 1, and all Navy aircraft carrying IFF Code 2, IFF was useless as a means of identification. The four Navy drones were assigned IFF Codes 3, 4, 5 and 6. Since the U.S.S. SHANGRI LA had an intercept problem in the recovery of their drones and they relied upon the IFF identifying coding it was determined that no aircraft would have their IFF operational, except the Navy drones, thus simplifying drone identification and interception.

(h) The Army Air Group used a system of assigning aircraft calls that required that CIC receive information on these calls via the "Reporting In and Out" net prior to the time of planes reporting in on station. If there was a delay in the RIO net a confused situation resulted. It directly effected the keeping of the aircraft status boards in CIC and proper identification. This situation did occur during air rehearsals. Therefore the Army and Navy Air Groups were requested to assign permanent voice radio calls to each aircraft assigned in the operation plan. This was placed in effect and the problem was solved.

(i) The "Reporting In and Out" net which connected KWAJALEIN, ENIWETOK, ROI, U.S.S. SHANGRI LA, U.S.S. SAIDOR, U.S.S. ORCA and the U.S.S. MT. MCKINLEY was under control of the U.S.S. MT. MCKINLEY and was to

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inform the Task Force Fighter Director on the movements of all aircraft. This developed into an important net and the efficiency of the operation as a whole. Employment of this net was vague as it appeared in operation order. It was apparent that a detailed plan was essential to set up methods, procedures, and form. In order to eliminate time lag it was evident that all transmissions via this net must be brief and concise, but still convey all the information needed in CIC. The Task Force Fighter Director Officer evaluates this net and the procedures and use of this net as one of the most important features of any future joint Army and Navy Air Group Operation that employs a plan of using aircraft from widely separated bases. It should be given careful study for use in Test CHARLIE. The following directive was made an Addendum to the CIC Appendix and promulgated and placed in effect upon receipt.

(1) RIO Net and Radio Reports:

(a) CJTF-1 assumed responsibility for air-sea rescue within the Bikini Atoll Objective Area (defined in paragraph 1 Annex Y to CJTF-1 Op-Plan 1-46) on 25 June 1946. This responsibility will be maintained until such time as CJTF-1 is no longer present in the area. Therefore it is necessary that CJTF-1 be kept fully informed of the movements of all aircraft coming into this area. An Air Control Center is hereby established in the U.S.S. MT. MCKINLEY to keep CJTF-1 informed of all aircraft movements and to assist in carrying out the responsibilities of air-sea rescue.

The following is the SOP for air control and becomes effective upon receipt. This supersedes all previous instructions.

(1.) Intentions: Intentions (short title "Air intent for --- Date") shall reach CJTF-1 not later than fifteen hundred (1500) LZT the day preceding the planned mission (s). If no flights are scheduled, a negative intent will be transmitted. If any change (s) or cancellation (s) are made in the air intent after it has been transmitted to CJTF-1 the changes and/or cancellations will be transmitted to CJTF-1. ALL times in air intents will be LZT. No air intents will be transmitted to CJTF-1 on WILLIAM and BAKER days or any day on which a full scale air rehearsal is scheduled. The following information, when appropriate, will be included in the air intent in this precise form:

(a.) Purpose and mission.

(b.) Number and type of aircraft.

(c.) Radio voice calls.

(d.) ETD.

(e.) Route out.

(f.) ET withdrawal.

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(c.) Return route.

(h.) ET landing.

Examples of dispatch:

"AIR INTENT FOR 15 JULY X ABLE WEATHER CAA PHOTO X BAKER ONE BAKER 24 FOUR BAKER 29 X CHARLIE JOSHUA 1 EGGLESTON ONE TWO FOUR SIX X DOG 0430 0700 0830 0900 1000 X EASY ALL DIRECT X FOX 1145 1200 1300 1330 1400 X GEORGE ALL DIRECT X HOW 1250 1330 1430 1500 1630 X"

"AIR INTENT FOR 15 JULY X ABLE SPECIAL TRANSPORT CAA NOTPOINT CAA TRANSPORT CAA ASH X BAKER FOUR PEP 5 X CHARLIE 13X102 24X102 12X102 15X102 X DOG 0630 0900 1000 1400 X EASY TO ALTINGAE TO BIKINI X FOX 1000 1400 1600 REMAIN X GEORGE DIRECT X HOW 1200 1600 1800 X"

Air intent information copies will be furnished CTG 1.6 by CTG 1.5 and vice versa.

(2) Take Off Reports:

(a) On WILLIAM and BAKER days and all Full Scale Air Rehearsal Days:

(1.) Take offs of all aircraft of JTF-1 will be reported promptly, with operational priority precedence, direct to CJTF-1 over the "Reporting In and Out Net" (RIO). All times will be L2T. Reports will be made as follows:

(a.) Radio Voice call.

(b.) The word "OFF".

(c.) Time.

Examples:

"BURMA 0 OFF 0430".

"EGGLESTON [illegible] 6 and 8 OFF 0630 0635 0640 0645".

In addition to the RIO net reports ship based units will transmit to CJTF-1 take-off and landing reports on the Radar Telling Net (2160 kcs), using the Standard Deck Condition Code, USF 10B.

(b) On all other Days:

(1.) On all other days the take off reports will be made in the following form:

(a.) Mission destination and radio voice call of aircraft.

(b.) The word "OFF".

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(c.) Time of take-off.

Examples:

"PHOTO EGGLESTON 2 OFF 1800".

"ASR 13X102 OFF 0630".

"PHOTO 21X102 OFF 0845".

"SPECIAL TRANSPORT 14X102 OFF 1400"

Aircraft must use the same radio voice calls in reporting in to CJTF-1 in the BIKINI Area as are transmitted to CJTF-1 in the take off reports on the RIO net. All aircraft will carry calls as assigned in annex C, Appendix VI, pages one (1) through five (5).

(3) On Station Reports:

(a) On WILLIAM and BAKER days and all scheduled air rehearsal days all aircraft will report in on their assigned task group VHF common channel, except TU 1.6.3 (TG 1.5 common: 135.72 mcs; TG 1.6 common: 124.02 mcs). If reports cannot be made on the TG common channel the first alternate will be 116.10 mcs, the last alternate 140.58 mcs. All ASR planes from TU 1.6.3 will report in on 4475 kcs.

(1.) When aircraft have two or more missions to perform (as F6F5P ROGER, F6F5P QUEEN, and F-13 Photo Flights JIG and KING) they will report in on station at their first assignment, report departure at the completion of their first assignment, report in on station at their second assignment, and report departure from their second assignment. F6F5P ROGER will report in on station at his third station and report when mission completed and taking departure for base.

(b) On all other days all aircraft will report in, using their task unit calls as follows:

(1.) All aircraft from TG 1.5, TU 1.6.1 and TU 1.6.2 will report in on the Task Force Air Guard Channel (140.58 mcs). The Secondary choice will be the secondary Task Force Common (116.10 mcs).

(2.) All aircraft from TU 1.6.3 will report in to the U.S.S. ORCA on 6970 kcs. (CJTF-1 will intercept this frequency). The secondary choice will be the Task Force Air Guard Channel (140.58 mcs).

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(3.) Aircraft from the U.S.S. FALL RIVER will report in to the U.S.S. FALL RIVER on 7425 kcs, and remain under their control. The U.S.S. FALL RIVER will transmit launching and recovery reports to CJTF-1 on the Radar Telling Net (2160 kcs) using the Standard Deck Condition Code, USF 10B. The U.S.S. FALL RIVER will keep CJTF-1 informed of the status of all flights under their control using the Rader Telling Net (2160).

(4.) All other aircraft from JTF-1 will report in to CJTF-1 on the Task Force Guard Channel (140.58 mcs) when airborne in the BIKINI Atoll Objective Area.

(5.) Transient Aircraft; Any aircraft not attached to JTF-1 will report in to CJTF-1 upon approaching BIKINI ATOLL using the Task Force Air Guard Channel (140.53 mcs). He will give his radio voice call, base of departure, destination, altitude, and estimated time of departure. He will again check in when departing the area.

The secondary channel for these reports will be

116.10 mcs.
(Note: All aircraft must continually monitor 140.58 mcs, when within one hundred (100) miles of BIKINI ATOLL).

(4) Landing Reports:

(a) Landing Reports will be transmitted on the "Reporting In and Out" net similar to launching reports. TU 1.6.1 and TU 1.6.2 will also transmit landing reports to CJTF-1 via the Radar Telling Net (2160 kcs) using the Standard Deck Condition Code, USF 10B.

(1.) On WILLIAM and BAKER days and All Full Scale Air Rehearsal Days the following form will be used:

(a.) Radio voice call of the a/c.

(b.) The word "Landed".

(c.) Time (LZT).

Examples:

"Burma 0 landed 1945".

"Eggleston 1, 2, 3, 4, 6, landed 1150 1155 1200 1215 1230".

(2.) On All Other Days:

(a.) Mission designation and radio voice call of aircraft.

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(b.) The word "Landed".

(c.) Time (LZT).

Examples:
"ASR 13X102 landed 1520".
"Photo Eggleston 5 landed 1030".

(2) Reporting In and Out (RIO) Net: The RIO Net connects ROI, ENIWETOK, KWAJALEIN, USS SHANGRI LA, USS SAIDOR, USS ORCA, and the USS MOUNT McKINLEY. The net is for the purpose of transmitting aircraft movement reports to the Task Force Fighter Director in the USS MOUNT McKINLEY, and for such other purposes as CJTF-1 may specifically direct. The USS MOUNT McKINLEY is the net control station.

(a) The Station Designations and Call Signs are as follows:

Station	Call Sign
TG 1.5 at KWAJALEIN	NDJ-1
TU 1.5.6 Army Drone Unit at ENIWETOK	NDU-1
TU 1.6.13 Navy Field Recovery Unit at ROI	NDR-1
U.S.S. MOUNT McKINLEY	NTAC
U.S.S. SHANGRI LA	NTIF
U.S.S. SAIDOR	NKBK
U.S.S. ORCA	NCKH

(b) The RIO net will be operated on the following schedule and

frequencies unless otherwise directed by CJTF-1:

4862 kcs. from 1500Z to 2230Z
4540 kcs. from 2230Z to 1000Z
6495 kcs. from 1000Z to 1500Z

(c) The RIO net will be manned by all net stations on the following schedule:

(1.) On BAKER Day: From 0430L on BAKER minus One (1) until directed to secure by CJTF-1.

(2.) On WILLIAM Day and All Full Scale Air Rehearsal Days: From 0330 LZT until secured by CJTF-1.

(3.) On All Other Days: From 0500 LZT until directed to secure by CJTF-1. It is anticipated that stations not conducting air operations will be directed to secure after reporting into the net and checking for any possible traffic.

(j) CIC was also responsible for contacting all weather planes and getting weather reports for Aerology. Weather planes would usually report in at 0430 each morning and give a series of reports until 0600. A second weather plane would report in at 0800. For these weather planes it was necessary to operate radars and track these aircraft and maintain an IFF Guard.

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(b) QUEEN Day, JTF-1 rehearsal for ABLE Day. QUEEN Day, 22 June 1946, was the designated full scale rehearsal day for ABLE Day and the final rehearsal for all units of JTF-1. The execution of this rehearsal was rated excellent. Shipboard communications were excellent and all radars operated at peak performance, resulting in a complete air picture at all times. The comments on this rehearsal were:

(a) Not all designated Radar Guard ships were present to participate.

(b) Unable to maintain effective communications on the RIC net with Eniwetok, the Army Drone base, necessitating a relay through Kwajalein.

(c) Failure of three aircraft to report taking departure from the area.

(d) Two radio receiver failures in aircraft.

(e) Several instances of the wrong frequencies being used to report in on station.

(f) Where aircraft had several assigned stations and two or more functions to perform it was evident that these aircraft should report in at each station and report taking departure upon the completion of each mission.

(g) The bombardiers broadcast in the bomb carrying aircraft was excellent.

2. Establishment of an Air Control Center in U.S.S. MOUNT MCKINLEY.

a. CJTF-1 assumed responsibility for Air Sea Rescue within the Bikini Atoll Objective Area (designated as within 150 NM of Bikini Atoll) on 25 June 1946. CJTF-1 exercised this responsibility through the Task Force

Fighter Director Officer. In order to properly execute this responsibility it was necessary to have complete information regarding the movements of all aircraft within the area. To meet these requirements the following facilities were set up within the flagship.

(1) Establishment of an Air Control Center. This included:

(a) The dispatching of an air intent by all commands to CJTF-1 on the day preceeding any scheduled flight. (This included Radio Voice Calls, estimated time off, route estimated time of arrival, estimated time of departure, and estimated time of landing.)

(b) Any deletions or additions to this air intent were dispatched to CJTF-1 as soon as known.

(c) Actual take-off reports were made to CJTF-1

(d) All aircraft reported in to CJTF-1 by radio when approaching the Bikini Atoll Objective Area.

(e) All aircraft reported in to CJTF-1 by radio when taking departure from the Bikini Atoll Objective Area.

(f) Landing reports were forwarded to CJTF-1 when aircraft landed.

(g) An aircraft control status board was set up and maintained in CIC.

(h) Complete aircraft movement dispatch board was maintained in CIC.

(i) All radio voice channels were recorded.

(j) Permanent records of aircraft control status boards and radio logs were kept and filed.

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(k) Radars were operated for tracking and maintaining air emergency IFF guard duty.

With the above methods and procedures, a complete up-to-the-minute picture of the movement of all aircraft in the area was maintained.

c. ABLE Day Operations:

a. Execution.

(1) The Air Plan was perfectly executed with all aircraft flying their prescribed flight patterns. Only one aircraft aborted and it was replaced immediately.

(2) Radio performance was excellent in all aircraft and shipboard equipments.

(3) Radar guards ships, who had been present in the area and participated in CIC training exercises, functioned better than the ships that were unable to participate in the training exercises.

(4) The Radar performance in the flagship was excellent. Other AGC's reported some minor difficulties which were quickly repaired.

(5) The RIO net functioned smoothly during take-off reports but a time lag of an hour developed in reporting landing times on some aircraft.

(6) Radio Logs from radar guard ships were incomplete.

(7) Task Unit 1.5.2 (Photographic Unit) requested an accurate ships position report from each of the four AGC's at Mike Hour and each minute thereafter until Mike plus 7 minutes. These position reports in ranges and bearings, were obtained from the Radar Reference Point (Point Auto) and forwarded to TU 1.5.2. This necessitated an additional

use of the SP radars for all AGC's except the U.S.S. MOUNT McKINLEY, which was close enough to Bikini to obtain visual ranges and bearings.

(8) The tie-in between the CIC of the flagship and the U.S.S. FALL RIVER, the Aerological Ship, worked very well. The bomb carrying aircraft gave the course and speed of the wind at altitude to the flagship which relayed that information via the Radar Telling Net to the U.S.S. FALL RIVER. The U.S.S. FALL RIVER computed the Ballistic Wind, and transmitted it to the flagship who in turn transmitted it to the bomb carrying aircraft. This operation took but 33 seconds.

(9) The SK radar showed no effects or indications from the detonation of the Atomic Bomb. The SP radar showed normal cloud indications. The Atomic Cloud was tracked by the SP radar for a period of forty-five (45) minutes.

(10) Two Precipitron Aircraft reported in over Bikini at 2000 feet on ABLE Day and were vectored 65 miles on bearings 335° (T) and 350° (T) to intercept and track the Atomic Cloud. These aircraft were vectored direct to the cloud, during darkness, where they succeeded in obtaining valuable information for RadSafe.

(11) Due to the distance of the U.S.S. SHANGRI LA from her aircraft (approximately 50 miles) she requested assistance in IFF identification. Her requests for information did not obtain the information she desired. For BAKER Day tests a requirement is established for one radar guard ship to assume the IFF guard duty in the Bikini Area and to be responsible for tracking the Navy drone aircraft.

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b. Problems

(1) With radio silence lifted at Mike Hour, CIC medium frequencies, 2160 kcs, 4475 kcs, 124.02 mcs, and 8495 kcs, suffered interference from the radio broadcasting frequency. There was also some radio interference from some of the radiological safety frequencies.

(2) When relief aircraft were dispatched into the Bikini area, neither the RIO Net nor the aircraft, when reporting in on station, designated which aircraft he was relieving. This necessitated numerous unnecessary radio transmissions to obtain this information.

(3) Relief aircraft reported in to the area assumed the same radio voice call as the aircraft he was relieving, making two aircraft in the air simultaneously with the same radio voice call. This caused confusion and additional radio transmissions until a reassignment of calls was made.

(4) A few aircraft pilots ceased monitoring the Task Force Air Guard Common Channel as soon as they reported taking departure. If the Deputy Task Force Commander for Aviation requested information from these pilots after they had reported departing the area it could not be obtained until the pilot landed.

(5) Due to the high angle of elevation several aircraft flying at high altitude were lost from the radar scopes as they passed within five miles of the tracking ship.

(6) Some designated radar guard ships did not make a copy of the operation plan available to CIC personnel until the day before the operation. Such a comprehensive plan could not be assimulated and set up in CIC in such a short period of time.

(7) Most ships were operating with a bare minimum of CIC personnel which did not permit reliefs during ABLE Day. The long period of time personnel were required to operate at their respective duty stations and the heat of the area, combined with the generated heat in CIC, resulted in a physical strain being placed on all CIC personnel.

c. Conclusions.

(1) The CIC Operation Plan provided adequate radar coverage to perform the functions required of CIC for the operation.

(2) Sufficient radio frequencies were allocated to CIC and traffic was so regulated that no frequency was overburdened.

(3) Sufficient radar guard ships were designated to track and control all aircraft.

(4) Radio and Radar equipments operated satisfactorily. Only one radar in the task force reported non-operational, and that one only for a period of thirty minutes.

(5) The aerological radar plan, with designated aerological radar ships, was a satisfactory arrangement from a radar employment viewpoint. The radars remained under the control of the Task Force Fighter Director but certain specified radars were allocated to the Aerological Department to obtain Rawins at specified times and on a non-interfering bases.

(6) Atomic bombs apparently do not effect the normal use of radars or radio voice communications.

d. Recommendations:

(1) All designated radar guard ships should train and function with the flagship at every available opportunity while in the area.

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(c) Instructions contained in Addendum to Appendix VI, Annex F, pages 5, 6 and 7 should be carefully followed and rigidly enforced. The Task Force Fighter Director should meet with all Air Operations Officers and emphasize this addendum.

(d) Radars of the Flagship must be under the control of the Task Force Fighter Director and be used to give directs in order to insure the safety of all aircraft in flight.

(e) One radar guard ship in the Bikini Area be designated as an I.F.F. guard ship, and as such be responsible for tracking the Navy drone aircraft as an aid to the identification and interception of drone aircraft, and to be prepared to give position reports to the U.S.S. SHANGRI LA when requested.

(f) That a study be made of the frequency plan to eliminate [illegible] interference on CIC circuits from the radio broadcasting frequency.

(g) No [illegible] will carry the same radio voice call [illegible] the same operating day.

(7) All aircraft pilots will monitor the Task Force Air Guard Common frequency at all times while they remain within the Bikini Atoll Objective Area (150 M. from Bikini Atoll).

(i) That an Operation Plan be made available to all CIC personnel at least two weeks prior to the operation. If advanced Air Plan copies are distributed each designated Radar Guard Ship should be placed on the distribution list.

(j) New procedures for relief aircraft, regarding reporting in procedure, should be promulgated. A relief aircraft must specify whom he is relieving.

c. Enclosures:

(1) Track of Bomb Carrying Aircraft on live Bomb Run.

(2) Precipitron mission.

(3) Aircraft Status Board #1.

(4) Aircraft Status Board #2.

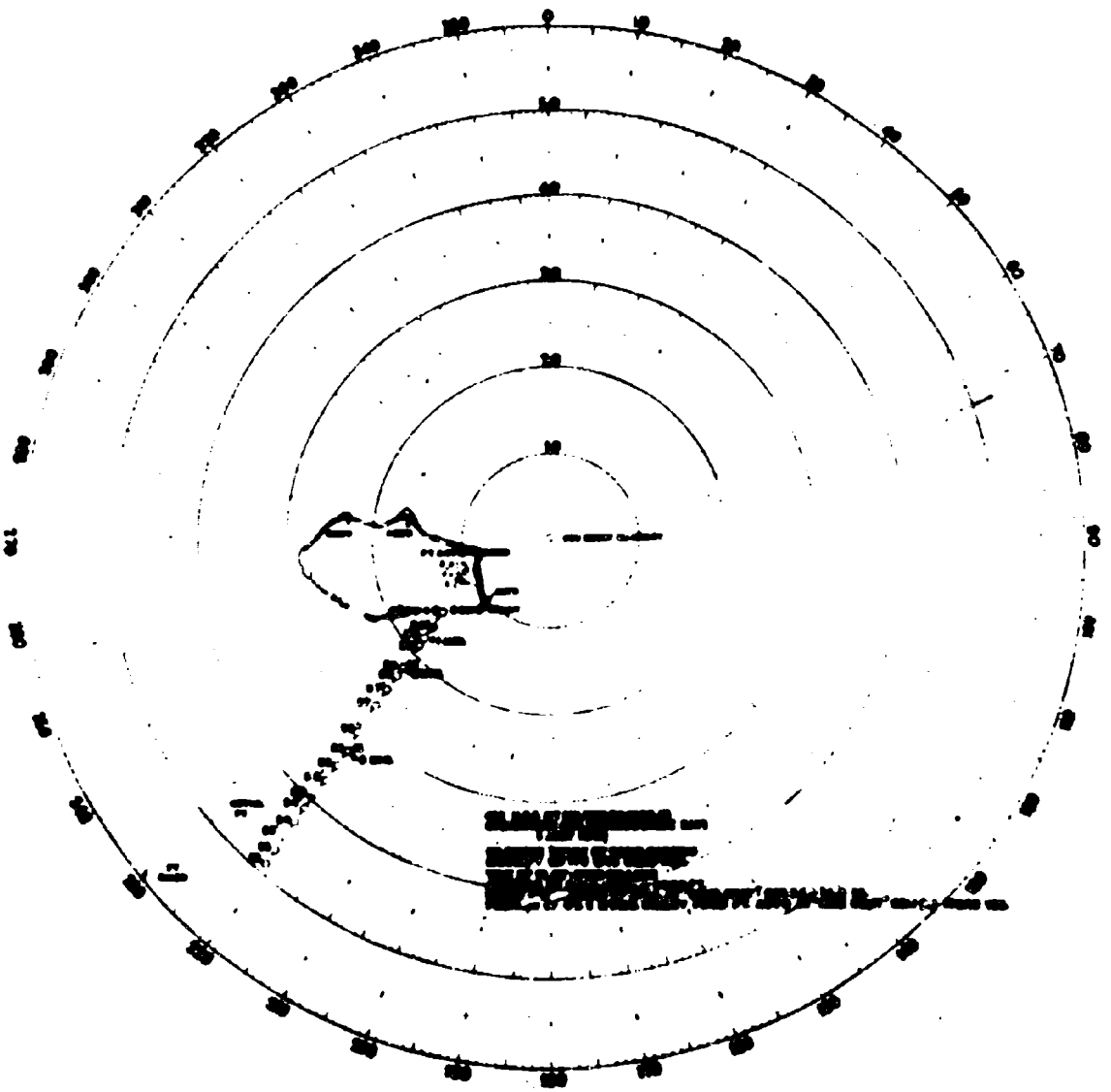
(5) Operation Status Board.

(6) Island and Ship Call Status Board.

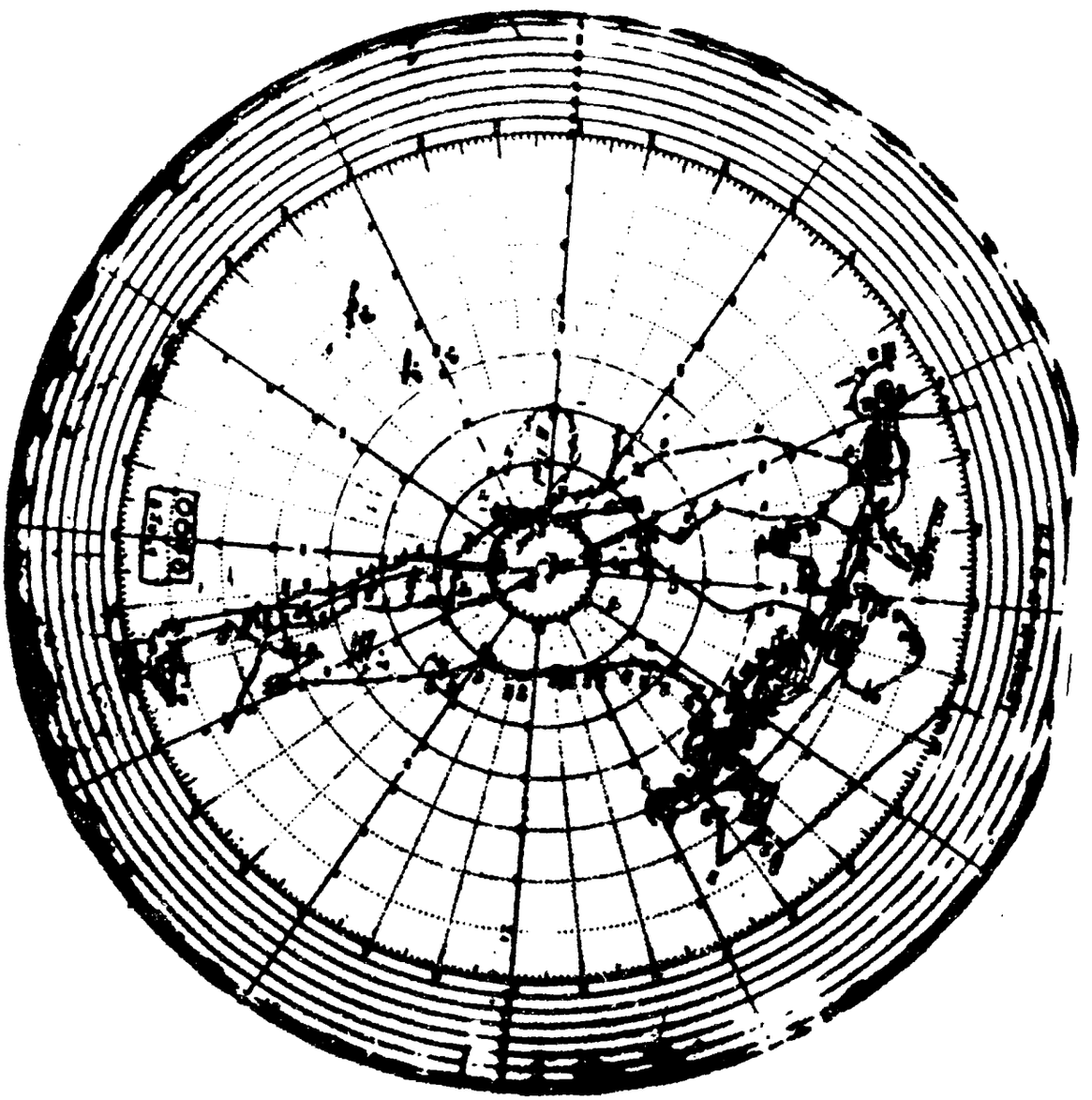
(7) Command Call Status Board.

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ENCLOSURE (1)



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

TYPE	MISSION	CALL	STATION	AG	TA	TD	TTO	TL
B-29	BOMB-CARRYING	BROADWAY 1	BAKER	B	0803	0905	0555	1018
B-29	COMMAND	BURMA 1	BIKINI	8 5	0534	0840	0423	1058
B-29	BROADCAST	ELKRIDGE 1	EASY	7	0651	0958	0537	1113
B-29	PRESS-PHOTO	FATHEAD 1	EASY	4	0648	0929	0539	1113
PBM	ASR (DUMBO 1)	POWERHOUSE 1	LOVE	3	0642	1421	0510	1555
PBM	ASR (DUMBO 2)	POWERHOUSE 2	UNCLE	3	0639	1450	0505	1555
F-13	PHOTO	EGGLESTON 1	T to S	26	0704	0929	0516	1016
F-13	PHOTO	EGGLESTON 2	T to S	26	0704	0929	0517	1018
F-13	PHOTO	EGGLESTON 3	T to S	26	0704	0929	0518	1010
F-13	PHOTO ABLE	EGGLESTON 4	T to S	26	0704	0929	0519	1430
F-13	PHOTO	EGGLESTON 5	T to S	26	0704	0929	0520	1014
F-13	PHOTO	EGGLESTON 6	T to S	26	0704	0929	0521	1505
F-13	PHOTO	EGGLESTON 7	T to S	26	0704	0929	0522	1044
F-13	PHOTO (BAKER)	EGGLESTON 8	BAKER	B	0803	0918	0525	1016
F 6 F	PHOTO (QUEEN)	SKYLIGHT 1&2	5E AUTO	10	0728	0832	0716	0849
F 6 F	PHOTO (QUEEN)	SKYLIGHT 3-4	5E AUTO	10	0728	0832	0716	0849
F 6 F	PHOTO (SUGAR)	SKYLIGHT 5	5E AUTO	3 5	0726	0812	0716	0844
F 6 F	PHOTO (ROGER)	SKYLIGHT 6	5E AUTO ABLE	8	0726	0930	0716	0947
C-54	OBSERVATION	FOLKLORE 1	EASY	7.5	0706	0932	0556	1102
C-54	OBSERVATION	FOLKLORE 2	EASY	7.5	0711	0928	0557	1057
C-54	PHOTO (PLAYBOY-1)	PLAYBOY 270 1	15 BIKINI	12	0737	0934	0630	1104
C-54	PHOTO (PLAYBOY-2)	PLAYBOY 090 2	15 BIKINI	12	0737	0934	0631	1133
PBM	ASR (DUMBO 3)	POWERHOUSE 3	WOTHO	8	0710	1005	0620	1119
B-29	RADIO RECCO-J	ANTIQUE 1	LOVE	28	0800	1413	0640	1619
B-29	RADIO RECCO-K	ANTIQUE 3	TARE	28	0800	1409	0705	1519
B-29	PRESSURE DROP	APPENDIX 1	BIKINI 270	B-1	0730	0913	0548	0955
B-29	PRESSURE DROP	APPENDIX 2	BIKINI 090	B-1	0730	0915	0546	1021
B-17	MASTER CONTROL	MARMALADE 1	5N EASY	24	0804	0940	0620	1021
B-17	CONTROL (ROSE)	MARMALADE 3	UNCLE	30	0804	0940	0532	1136
B-17	CONTROL (HOW)	MARMALADE 4	UNCLE	18	0804	0940	0829	1139
B-17	CONTROL (LOVE)	MARMALADE 5	UNCLE	13	0804	0940	0527	1132
B-17	CONTROL (FOX)	MARMALADE 2	WILLIAM	24	0804	0940	0534	1132
PBM	HOT POINT	BRIGHTEYES 3	090-15	8.5	0707	0807	0504	1043
B-17	ASR PATROL	MILKPAIL 9	270-40-100	6.5	0803	0936	0480	1238
TBM	DRONE RECOVERY	DAGGER 1	140-40	3-	0830	1000	0757	1102
TBM	DRONE RECOVERY	DAGGER 2	140-40	3-	0830	1000	0757	1150
F-13	RADIO RECCO	ANTIQUE 2	EGG 3	28	1318	1413	1136	1555
F-13	RADIO RECCO	ANTIQUE 4	EGG 5	28	1328	1406	1144	1814
F-13	NIGHT OWL	EGG 1	BIKINI	10-	1343	1824	1212	1740
F6F	PHOTO	SKYLIGHT 8	BIKINI	1-	1623	1703	1624	1716
F6F	PHOTO	SKYLIGHT 7	BIKINI	1-	1623	1703	1624	1716

1 OF 3 CIC STATUS BOARDS - "ABLE DAY" - USS MT. McKINLEY

ENCLOSURE (1)

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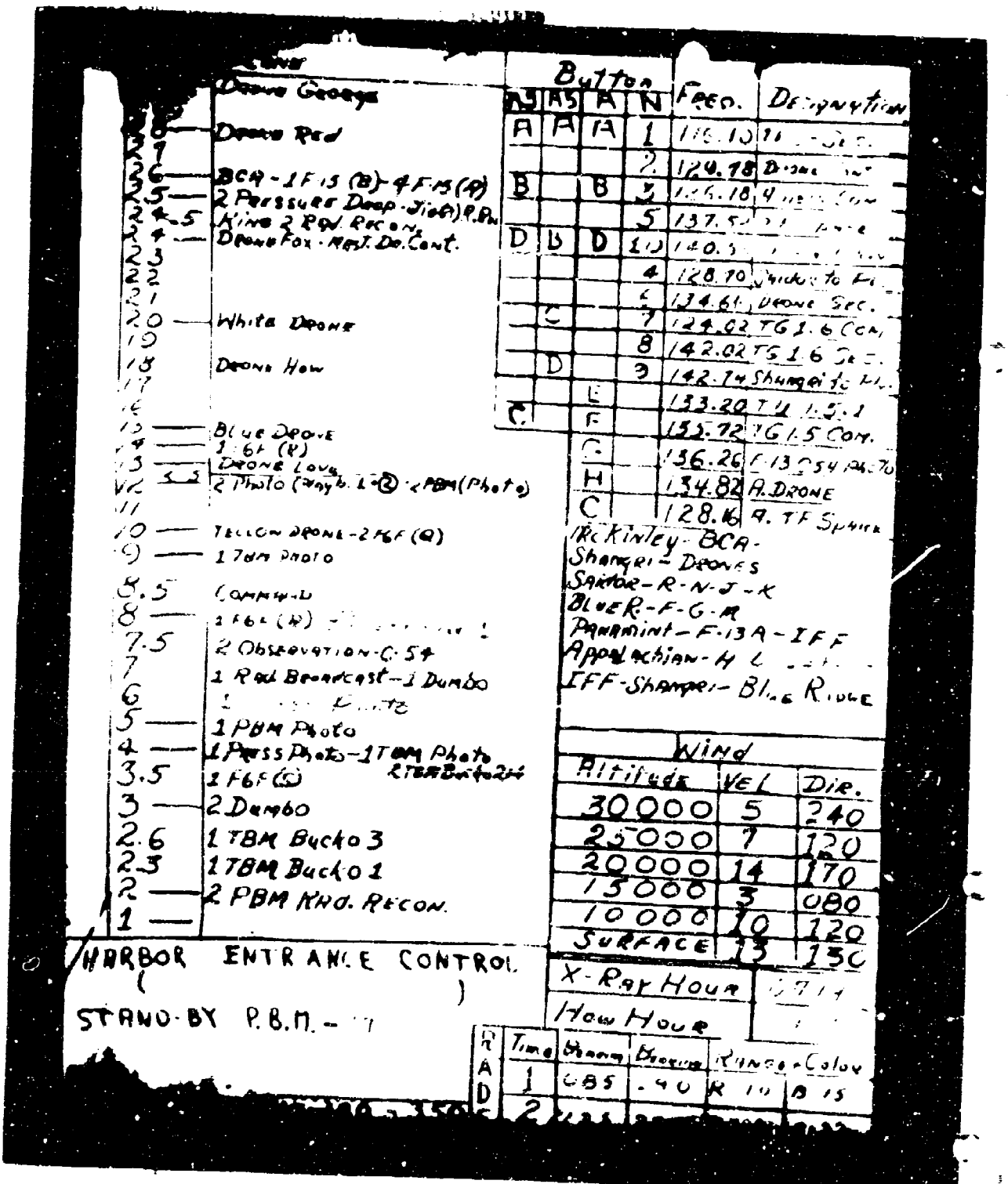
TYPE	MISSION	CALL		STA.	AG	IA	ID	IO	IL
TBM	PHOTO(MAN)	LONETREE	1	YOKE	9	0757	0855	0738	0947
TBM	PHOTO(OBOE)	LONETREE	2	SUGAR	4	0814	0908	0738	0949
PBM	PHOTO(TARE)	BRIGHTEYES	6	CHARLIE	12	0658	0918	0521	1051
PBM	PHOTO(UNCLE)	BRIGHTEYES	4	KING	12	0658	0918	0519	1105
PBM	PHOTO(WILLIAM)	BRIGHTEYES	5	DOG	5	0659	0918	0529	1112
FGF	PRI.CONT.(RED)	RED	1	VICTOR	28	0814	0858	0717	1005
FGF	PRI.CONT.(RED)		2	VICTOR	28	0814	0858	0717	1005
FGF	PRI.CONT.(YELL.)	YELLOW	1	VICTOR	10	0830	0910	0717	1005
FGF	PRI.CONT.(YELL.)		2	VICTOR	10	0830	0910	0717	1006
FGF	PRI.CONT.(WHITE)	WHITE	1	VICTOR	20	0826	1000	0717	1059
FGF	PRI.CONT.(WHITE)		2	VICTOR	20	0826	1000	0717	1005
FGF	PRI.CONT.(BLUE)	BLUE	1	VICTOR	15	0822	0910	0717	1005
FGF	PRI.CONT.(BLUE)		2	VICTOR	15	0822	0910	0717	1005
FGF	SEC.CONT.(RED)	RED	3	SUGAR	28	0825	0910	0744	1005
FGF	SEC.CONT.(RED)		4	SUGAR	28	0825	0910	0744	1005
FGF	SEC.CONT.(YELL.)	YELLOW	3	SUGAR	10	0813	1000	0744	1059
FGF	SEC.CONT.(YELL.)		4	SUGAR	10	0813	1000	0744	1059
FGF	SEC.CONT.(WHITE)	WHITE	3	SUGAR	20	0825	1000	0744	1059
FGF	SEC.CONT.(WHITE)		4	SUGAR	20	0825	1000	0744	1059
FGF	SEC.CONT.(BLUE)	BLUE	3	SUGAR	15	0828	1000	0744	1059
FGF	SEC.CONT.(BLUE)		4	SUGAR	15	0826	1000	0744	1059
PBM	RADIO.RECCO.(c)	BRIGHTEYES	1	BIKINI	2	0733	1420	0514	1608
PBM	RADIO.RECCO.(d)	BRIGHTEYES	2	BIKINI	2	0733	1420	0514	1608
TBM	BOAT CONT.(BUCKO 1)	WARPAINT	1	BIKINI	2.3	X	ABORT	0919	0945
TBM	BOAT CONT.(BUCKO 2)	WARPAINT	2	BIKINI	3	0923	0933	0919	1257
TBM	BOAT CONT.(BUCKO 3)	WARPAINT	3	BIKINI	2.6	0832	1232	0919	1107
TBM	BOAT CONT.(BUCKO 4)	WARPAINT	4	BIKINI	4	0923	1233	0919	1257

2 OF 3 CIC STATUS BOARDS-"ABLE DAY"-USS MT. McKINLEY

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ENCLOSURE (4)

RESTRICTED DATA
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SPECIFIC RESTRICTIONS AS TO CLEARANCE NOT REQUIRED
SEE MILITARY CLASSIFICATION REGULATIONS



Drone George
Drone Red
BCA - 1 F 13 (B) - 4 F 13 (A)
2 Pressure Drop - Jig (A) P.B.M.
Hine 2 RAN Recon.
Drone Fox - Mast. Dr. Cont.
White Drone
Drone How
Blue Drone
1 F6F (R)
Drone Love
2 Photo (Mayb. 1 - (2) 1 PBM (Photo)
Yellow Drone - 2 F6F (Q)
1 TBM Photo
Command
2 F6F (R)
2 Observation - C-54
1 Rad Broadcast - 1 Dumbo
1 PBM Photo
1 Press Photo - 1 TBM Photo
2 TBM Buck to 24
2 F6F (G)
2 Dumbo
1 TBM Buck to 3
1 TBM Buck to 1
2 PBM Rno. Recon.

HARBOR ENTRANCE CONTROL
(
)
STAND-BY P.B.M. -

Button				Freq.	Designation
A	A	A	1	116.10	[illegible]
			2	124.98	Drone [illegible]
B		B	3	126.18	4 [illegible] Com
			5	137.5	[illegible]
D	D	D	[illegible]	140.5	[illegible]
			4	128.70	Shuck to Fi[illegible]
			[illegible]	134.61	Drone Sec.
	C		7	124.02 TG 1.6 Com
			8	142.02 TG 1.6 Se[illegible]
	D		9	142.74 Shumgai to Ki[illegible]
		E		133.20 TU 1.5.1
C		F		132.72 TG 1.5 Com.
		G		136.26 C 13 C 54 Alt 20
		H		134.82 A. Drone
		C		128.16 A. TF Shuttle

McKinley - BCA -
Shangri - Drones
Sailor - R - N - J - K
Blue R - F - G - A
Peppermint - F-13A - IFF
Appalachian - H L [illegible]
IFF - Shangri - Blue Ridge

Wind		
Altitude	Vel	Dir.
30000	5	240
25000	7	120
20000	14	170
15000	3	080
10000	10	120
Surface	13	130

X-Ray Hour [illegible]
How Hour [illegible]

RAD	Time	Beam	Bearing	Range - Colour
A	1	085	- 40	R 10 B 15
D	2	[illegible]		

ISLAND AND SHIP CALL STATUS BOARD

ISLAND	ENCODE	SHIP	ENCODE
AT COM ENIWETOK	ICHANG	ALBERMARLE	FAR-FETCH
AT COM KWAJALEIN	HONG KONG	APPALACHIAN	BORNEO
AIRUKIIJI	ARJI	ARCADIA	OPERATOR
AIRUKIRARU	AIRY	BLUE RIDGE	PARADOX
AOMOEN	AMEN	BARTON	SHARK FIN
ARRIIKAN	ARAN	CECIL	BEAVERDAM
BIGIREN	BIREN	CUMBERLAND SOUND	BLUE POINT
BIKINI	BIKINI	FALL RIVER	DESPERADO
BOKAAETOKUTOKU	BOKU	FURSE	OBELISK
BOKOBYAADAA	BOBY	FLUSSER	TADPOLE
BOKONEJIEN	BONE	HUNTINGTON	RANCH HAND
COM MARIANAS	SHELLBACK	INGRAHAM	CREEN BEE
BOKONFUAAKU	BOKON	MOALE	SKEEZIX
BOKORORYURU	BORO	MOUNT MC KINLEY	BOB WHITE
CHIEERETE	CHERRY	ORCA	OLD AGE
ENIAIRC	ENAR	PANAMINT	COMANCHE
ENIIRIKKU	ERIK	PERRY	WORKTRAIN
ENINMAN	EMAN	SAIDOR	ANIMAL
NAMU	NAMU	SHANGRI-LA	DAGGER
IS COM KWAJALEIN	CHEFOO	SPINDLE EYE	SPINDLE EYE
OURUKAEN	ORUK	SUMNER	PACE MAKER
REERE	REER	TURNER	ABELARD
ROCHIKARAI	ROKAR	WHARTON	LOCOWEED
ROMURIKKU	ROMUK	WHITING	SOUL MATE
WORIKKU	UKU	OBRIAN	ROMEO
SOPA ENIWETOK	WEAPON		
SOPA KWAJALEIN	DICKEY		
ENYU	ENYU		
IONCHEBI	ION		
RUKOJI	RUJI		
YOMYARAN	YORAN		
YUROCHI	YURO		

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ENCLOSURE (6)

RESTRICTED DATA

ATOMIC ENERGY ACT - 1948

SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED

USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
AEC - 1946
DISCLOSURE MAY BE EXPECTED
USE MILITARY CLASSIFICATION SAFEGUARDS

COMMAND CALL STATUS BOARD

DESIG.	DECODE	ENCODE
C.J.T.F-1	V. ADM. W.H.P. BLANDY	PRIEST
J.T.F-1	JOINT TASK FORCE ONE	BETHLEHEM
C.T.G. 1.1	R. ADM. PARSONS	WETNURSE
C.T.U.1.5.1!	GEN. POWERS	BURMA Ø
	GEN. SPAATZ	FOLKLORE Ø
C.T.U. 1.5.1	COL. EDMUNSON	WAGECUT 1
C.J.T.U. 1.5.6	COL. ALNESS	WAGECUT 6
C.T.U. 1.5.2	COL. GULLEN	WAGECUT 2
C.T.U. 1.5.3	COL. ALNESS	WAGECUT 3
C.J.T.U. 1.5.7	MAJ. CRAWSON	WAGECUT 7
C.J.T.U. 1.5.8	MAJ. IRELAND	WAGECUT 8
T.U. 1.5.1	TACTICAL OPERATIONS	MILKPAIL 1
T.U. 1.5.2	PHOTO.	MILKPAIL 2
T.U. 1.5.3	INSTRUMENTATION	MILKPAIL 3
J.T.U. 1.5.6	ARMY DRONE UNIT	MILKPAIL 6
J.T.U. 1.5.7	ARMY METEOROLOGICAL	MILKPAIL 7
J.T.U. 1.5.8	ORIENTATION	MILKPAIL 8
C.J.T.G. 1.6	R. ADM. SPRAGUE	WALLET
J.T.G. 1.6	NAVY AIR GROUP	TORY
C.T.U. 1.6.31	N.A.B. EBEYE	BELGRADE Ø
T.U. 1.6.32	C.S.P. TENDER	BRIGHTEYES
C.T.U. 1.6.32	SEAPLANE TENDER BIKINI	BRIGHTEYES Ø
C.T.G. 1.7	SURFACE PATROL	VETO
T.G. 1.7	SURFACE PATROL	WHITE FLAG
	TECH. DIRECTOR J.T.F-1	BETWEEN
	DEPUTY T.F.C. FOR AVIATION	ABALONE
C.T.G. 1.5	GEN. RAMEY	WAGECUT Ø
T.G. 1.5	ARMY AIR GROUP	MILKPAIL
DEPUTY T.F.C. FOR TECH. DIRECTION		ABSORB
ASST. DEPUTY T.F.C. FOR AVIATION		BOTANY

1 OF 2 CIC WING STATUS BOARDS
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ENCL. (148 .7)

7. Preparation for BAKER Day.

a. As a result of ABLE Day Operations it was apparent, that a more detailed and amplified Air Control and Radar Doctrine Plan was needed for Test BAKER. This requirement was dictated by:

(1) The need for more detailed instructions regarding the Reporting In and Out Net.

(2) The changes in altitudes and flight patterns of aircraft for Test BAKER necessitated the reassignment of radar tracking responsibilities for the radar guard ships.

(3) The need for more and detailed reports from CIC's of designated radar guard ships.

(4) The apparent need of aircraft pilots for a detailed plan of radio channeling being employed during the operation.

(5) The Army Air Group being unfamiliar with the Fighter Direction Brevity Code it was decided to delete this code except for essential items.

(6) The inexperience of CIC personnel on certain Radar Guard Ships required a more detailed plan. This plan was designated as "Addendum to Appendix VI, Annex F.", and follows as Enclosure 8.

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ADDENDUM TO ANNEX F
AIR PLAN
APPENDIX VI

AIR CONTROL AND RADAR DOCTRINE (REVISED FOR TEST BAKER)

Note: This Appendix is an extract of Appendix VI Annex C except that where discrepencies exist this appendix governs. This appendix is effective upon receipt.

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1. Introduction
2. Control
3. Duties of Task Force Fighter Director Officer
4. Duties of Ship Fighter Director Officers
5. Fighter Director Ships.
6. Radar Guard Ships
7. Radar Guards
8. Radar Silence and IFF
9. Radar Tracking
10. Radar Reporting
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12. RIO Net and Radio Reports
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16. Fighter Director Vocabulary

1. Introduction:

CIC and Radar Doctrine stated herein in accordance with USF 20B and PAC 70B. The following supplements these references.

2. Control:

The control of all aircraft traffic, air and surface search radars, VHF and inter-fighter director voice radio communications, and conditions of radar and IFF silence within the Task Force is the function of the OTC (Officer Tactical Command, normally CJTF-1 except when otherwise specificelly indicated) and will be exercised and controlled through the Task Force Fighter Director Officer. The Task Force Fighter Director Officer will be stationed in, and exercise control from the CIC (Combat Information Center) of the flagship, unless otherwise directed.

3. Duties of the Task Force Fighter Director Officer:

The Task Force Fighter Director Officer will:

(a) Control all traffic in the air.

(b) Maintain radio discipline on the Task Force Air Guard channel and the Radar Telling Net.

(c) Coordinate the homing of lost aircraft.

(d) Coordinate and control air-sea rescue.

(e) Prescribe conditions of radar silence.

(f) Prescribe Radar Guards and Radar Guard Ships.

(g) Designate Fighter Director Ships.

(h) Assign IFF guard duties.

(i) Be responsible for the assignment of shipboard radar coverage.

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(j) Responsible for the transmitting of predicted Radex and all subsequent changes to the Radex.

(k) Informs Command Aircraft when all aircraft are on station.

(l) Transmits time check to all aircraft at Mike time plus six (6) minutes and Mike time plus thirty (30) minutes.

(m) Brief all CIC officers prior to the operation.

4. Duties of the Ship Fighter Director Officers:

The Ship Fighter Director Officers will:

(a) Be responsible for carrying out all directives of the Force Fighter Director Officer and to function in accordance with prescribed CIC doctrines.

(b) Be responsible for carrying out provisions of CJTF-1 Op-Plan No. 2-46 as they apply to CIC.

5. Fighter Director Ships:

The Force Fighter Director Ships is the U.S.S. MOUNT McKINLEY. The sequence of Task Force Fighter Director relief will be:

(a) U.S.S. APPALACHIAN

(b) U.S.S. SAIDOR

(c) U.S.S. BLUE RIDGE

(d) U.S.S. PANAMINT

(e) U.S.S. SHANGRI LA

In case of radar, radio voice communications, or other materiel failure in the flagship, the Task Force Fighter Director duties will be assumed by the relief ships in the order named above.

6. Radar Guard Ships:

The following ships are designated Radar Guard Ships:

(a) U.S.S. MOUNT McKINLEY

(b) U.S.S. SHANGRI LA

(c) U.S.S. SAIDOR

(d) U.S.S. APPALACHIAN

(e) U.S.S. BLUE RIDGE

(f) U.S.S. PANAMINT

(g) U.S.S. FALL RIVER

(h) Plane Guard destroyers of TU 1.6.1 and TU 1.6.2.

(i) Such other ships as may later be designated by CJTF-1.

All Radar Guard Ships will immediately report all failures of radar or communications equipment to the Task Force Fighter Director Officer over the Radar Telling Net (2160 Kcs). Reports will include the length of time equipment will be inoperative. A report will also be made when the equipment is back in a satisfactory operating condition.

7. Radar Guards:

The radar guard duties are assigned as follows:

(a) U.S.S. MOUNT McKINLEY

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(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at three (3) revolutions per minute (3 RPM). All targets will be reported at least once each minute. Radar operators will report from the master PPI tube using a curser with calibrated range markings.

(2) SP Radar: Assigned to track the Command Aircraft. Is further assigned to track the Army drone and drone control aircraft, designated George, at sixteen thousand (16,000) feet.

(3) SCR 720 Radar: Will be assigned Zenith search when and as directed by the Task Force Fighter Director Officer.

(b) U.S.S. SHANGRI LA

(1) SK Radar: Assigned to track the Navy primary drone control aircraft, the Navy secondary drone control aircraft, and the Navy drones.

(2) SM Radar: Assigned to track the Navy primary drone control aircraft, the Navy secondary drone control aircraft, and Navy drones.

(3) SC Radar: Maintains the IFF guard duty. Also maintains the emergency IFF guard duty. All emergency IFF will be reported immediately to the Task Force Fighter Director Officer via the Radar Telling Net (2160 Kcs). IFF guard is to include the keeping of a record of all planes showing emergency IFF:

giving position, track and times. Only BL's on designated IFF guard ships will be operated during this operation unless otherwise directed by the Task Force Fighter Director Officer.

(c) U.S.S. SAIDOR

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at three (3) revolutions per minute (3 RPM). All targets will be reported at least once each minute (when not in a fade area). Radar operators will report from the master PPI tube using a curser with calibrated range markings.

(2) SP Radar: Assigned to track the four (4) F6F 5P aircraft designated Queen, at ten thousand (10,000) feet, or below the cloud layers. Further assigned to track the one (1) F6F 5P aircraft, designated Roger, at eight thousand (8,000) feet, and its second run at fourteen thousand (14,000) feet.

(d) U.S.S. APPALACHIAN

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at three (3) revolutions per minute (3 RPM). All targets will be reported at least once each minute (when not in a fade area). Radar operators will report from the master PPI tube using a curser with calibrated range markings.

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(2) SP Radar: Assigned to track the one (1) F-13 aircraft, designated Flight Baker, at thirty thousand (30,000) feet.

(e) U.S.S. BLUE RIDGE

(1) SK Radar: Maintains the IFF guard duty. Will be prepared to transmit to the U.S.S. SHANGRI LA, via the Radar Telling Net (2160 Kcs), the ranges and bearings of IFF codes three (3), four (4), five (5), and six (6) (Navy drone IFF codes) when requested by the U.S.S. SHANGRI LA. Also maintains the emergency IFF guard duty. Will report all emergency IFF immediately to the Task Force Fighter Director Officer via the Radar Telling Net (2160 Kcs). Emergency IFF guard duty is to include the keeping of a record of all planes showing emergency IFF: giving positions, track and times. The secondary duty is to track aircraft on a non-interfering basis with the IFF guard duty.

(2) SP Radar: Assigned to track the two B-29 Pressure Drop aircraft at twenty-five thousand (25,000) feet.

(3) SCR 720 Radar: Assigned Zenith search when and as directed by the Task Force Fighter Director Officer.

(f) U.S.S. PANAMINT

(1) SK Radar: The master PPI will be set on the seventy-five (75) mile range scale with a continuous three hundred sixty (360) degree sweep at three (3)

revolutions per minute (3 RPM). All targets will be reported at least once each minute (when not in a fade area). Radar operators will report from the master PPI tube using a curser with calibrated range markings. The U.S.S. PANAMINT will also act as standby IFF guard ship and be prepared to take over this duty when directed to do so by the Task Force Fighter Director Officer.

(2) SP Radar: Assigned to track the seven (7) F-13 aircraft, designated Flight Able, at fifteen thousand (15,000) feet.

(Note: The U.S.S. PANAMINT will also be prepared to conduct certain radar observations of the detonation of the bomb if directed to do so. Instructions will be issued separately).

(g) U.S.S. FALL RIVER

(1) SK Radar: Secured.

(2) SP Radar: Assigned to the Aerology Section for the obtaining of Rawins. To be operated as directed by the aerological section of JTF-1.

(h) PLANE GUARD DESTROYERS:

Air Search radars to be used as directed by CTU 1.6.1 and CTU 1.6.2.

(i) The CPN-6 radar beacon will be operated from the U.S.S. SARATOGA during daylight

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hours commencing on Baker minus 10 days. The U.S.S. SARATOGA is close to, but not at, the center of the target array.

8. Radar Silence and IFF

(a) Only those ships designated as Fighter Director Ships and/or Radar Guard Ships will operate their air search radars. All others will secure their air search radars, unless otherwise directed.

(b) All Fighter Director Ships an/or Radar Guard Ships, except those designated as IFF Guard Ships, will secure their B6 equipment.

(c) All ships present will secure their surface search and gunnery radars in accordance with the radio silence directive.

( ) All aircraft will have their IFF operational but will not repeat not turn it on. Only Navy drone aircraft will have their IFF turned on during this operation. Pilots will use emergency IFF when needed or when requested by any designated Fighter Director Ship.

9. Radar Tracking

(a) All designated Radar Guard Ships assigned to maintain a continuous track of all aircraft will place all air search radars at peak performance.

(b) All Radar Guard Ships assigned continuous tracking will be prepared to report the position of any aircraft to the Task Force Fighter Officer when requested. All air contacts will be identified and labeled on the Main Display Board in accordance with their assigned radio voice calls.

(c) Any ship that launches aircraft is charged with the responsibility of keeping a constant track of those aircraft and being ready to give their position to the Task Force Fighter Director Officer when requested. To insure an accurate identified track it is suggested that two (2) CIC Watch Officers maintain a running plot on the face of the PPI tubes in addition to the Main Display Board.

(d) The safety of this operation depends on knowing the exact whereabouts of each aircraft at all times. Tracking ships will make full use of the twenty (20) mile range scale on the PPI tubes for close-in tracking. Carriers launching aircraft may commence PPI tube tracking on the twenty (20) mile range scale in order to have each aircraft properly identified. A shift to the seventy-five (75) mile range scale may be made when all launched aircraft are on the radar scope and identified.

(e) It is suggested that lookouts be fully utilized to identify close-in visual contacts.

(f) Radar Guardships maintaining a continuous track on all aircraft will be prepared to assist in identifying all aircraft requested the Task Force Fighter Director Officer by referencing their Main Display Boards.

10. Radar Reporting

(a) All radar reports will be given via the Radar Telling Net using standard fighter direction vocabulary.

(b) All aircraft contact reports made via the Radar Telling Net will be given as bearing

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and range from the Radar Reference Point designated AUTO. This reference point is the center of Bikini Island. Bikini Atoll (11° 37' 15" N - 165° 32' 50" E). Each Radar Guardship will so set up their CIC that quick conversion plotting can be done.

(c) All launching and landing reports will be made to the Task Force Fighter Director Officer over the Radar Telling Net in accordance with the Standard Deck Condition Code. Condition Jig reports will be made immediately after aircraft are launched.

(d) All designated Radar Guardships will guard the Radar Telling Net commencing at How time plus three (3) hours and until secured by CJTF-1.

11. COMMUNICATIONS

(a) The Task Force Air Guard Channel (140.58 mcs) and the Radar Telling Net (2160 kcs) will be carefully monitored and controlled by the Task Force Fighter Director Officer. Proper voice procedure and strict radio discipline will be maintained and rigidly enforced by the Task Force Fighter Director Officer on these circuits. All aircraft will maintain a constant guard on the Task Force Air Guard Channel at all times and will be prepared to transmit on this channel. This applies to all aircraft approaching the Bikini Atoll objective area at any time while CJTF-1 is in the area.

(b) The Fighter Direction Brevity Code, as published in the Combined Communications Board Publication, CCBP-3, is to be used

on the Radar Telling Net. No preliminary call ups will be made on this net after communications have been established. Voice radio transmissions on this net will be made.

(c) All Radar Guardships present at BIKINI on Baker minus one day will standby at 0900 LZT to check all air control communications with the flagship.

(d) All voice radio transmissions will be made on assigned and designated channels only.

(e) All information messages should end with "OUT".

(f) If routine reports made from plane-to-base are readable, they will not be relayed to the Task Force Fighter Director Officer. However, the parent carrier will be prepared to give an amplifying report if requested.

(g) The U.S.S. MT. MCKINLEY will guard and log the Task Force Air Guard Channel (140.58 mcs), TG 1.5 Common (135.72 mcs), TG 1.6 Common (124.02 mcs), the Task Force Common Secondary (116.10 mcs), Primary Air-Sea Rescue (4475 kcs), Radar Telling Net (2160 kcs), and the RIO net.

(h) The U.S.S. SHANGRI LA will log TU 1.6.14 Navy Drone frequency (129.78 mcs), the U.S.S. SHANGRI LA to planes frequency (142.74 mcs) and the Navy Drone control frequency (6515 kcs).

(i) The U.S.S. SAIDOR will log TG 1.6 Common (124.02 mcs), U.S.S. SAIDOR to planes frequency (128.70 mcs), and the Air-Sea Rescue Channel (4475 kcs).

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(j) The U.S.S. PANAMINT will log the TG 1.5 Common (140.58 mcs), and the TG 1.6 Common (124.02 mcs).

(k) The U.S.S. BLUE RIDGE will log TG 1.5 Common (135.72 mcs), and the Radar Telling Net (2160 kcs).

(l) The U.S.S. APPALACHIAN will log the Task Force Air Guard Channel (140.58 mcs), and the Radar Telling Net (2160 kcs).

(m) During WILLIAM and BAKER and all full scale rehearsal days all aircraft will report in to the Task Force Fighter Director Officer on the respective Task Group Common frequency. The second alternate will be the Task Force Air Guard Channel, (140.58 mcs). All aircraft from TU 1.6.3 will report in on 4475 kcs. All other days all planes will report in on the Task Force Air Guard Channel, except aircraft from TU 1.6.3 who will report in to the U.S.S. ORCA on 6970 kcs.

(n) All aircraft will use only their assigned radio voice calls at all times. No nicknames will be used.

(o) All aircraft will check their transmitter keys prior to take-off to insure that they are OFF. If trouble develops while planes are airborne each plane will immediately exercise every means available to locate the defective radio and take remedial action.

(p) All transmissions to the Task Force Director Officer requiring action, or for information, will be addressed to the Task Force Commander.

(q) All CIC's of the destroyers of this Task Force will guard the Radar Telling Net (2160 Kcs), and the Task Force Air Guard Channel (140.58 mcs) on Baker Day.

(r) During two (2) minutes before and two (2) minutes after scheduled times of transmission of radio voice time checks from the U.S.S. CUMBERLAND SOUND no station will transmit on the Task Force Air Guard Channel (140.58 mcs). From "Two (2) minutes before HOW Hour" transmissions until "Explosion occured" transmission no transmissions will be made on 140.58 mcs. Only in case of emergency will radio silence be broken during these times.

12. RIO NET AND RADIO REPORTS

(a) CJTF-1 assumed responsibility for air-sea rescue within the Bikini Atoll Objective Area (defined in paragraph 1 Annex I to CJTF-1 Op-Plan 1-46) on 25 June 1946. This responsibility will be maintained until such time as CJTF-1 is no longer present in the area. Therefore it is necessary that CJTF-1 be kept fully informed of the movements of all aircraft coming into this area. An Air Control Center is hereby established in the U.S.S. MT. MCKINLEY to keep CJTF-1 informed of all aircraft movements and to assist in carrying out the responsibilities of air-sea rescue.

The following is the SOP for air control and becomes effective upon receipt. This supersedes all previous instructions.

(1) INTENTIONS: Intentions (short title "Air Intent for --- Date") shall reach CJTF-1 not later than 1500 the

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day preceding the planned mission (s). If no flights are scheduled, a negative intent will be transmitted. If any change (s) or cancellation (s) are made in the air intent after it has been transmitted to CJTF-1, the changes and/or cancellations will be transmitted to CJTF-1. ALL times in air intents will be LZT. No air intents will be transmitted to CJTF-1 on WILLIAM and BAKER Days, or on any day on which a full scale air rehearsal is scheduled. The following information, when appropriate, will be included in the air intent in this precise form:

(a) Purpose and mission.

(b) Number and type of aircraft.

(c) Radio voice calls.

(d) ETD

(e) Route out.

(f) ET withdrawal.

(g) Return route.

(h) ET landing.

Examples of dispatch:

"AIR INTENT FOR 15 JULY X ABLE WEATHER CMA PHOTO X BAKER ONE BAKER 24 BAKER 29 X CHARLIE JOSHUA 1 EGGLESTON ONE TWO FOUR SIX X DOG 0430 0700 0830 0900 1000 X EASY ALL DIRECT X FOX 1145 1200 1300 1330 1400 X GEORGE ALL DIRECT X HOW 1250 1330 1430 1500 1630 X"

"AIR INTENT FOR 15 JULY X ABLE SPECIAL TRANSPORT CMA HOTPOINT CMA TRANSPORT CMA ASR X BAKER FOUR PBM5 X CHARLIE 13X102 12X102 15X102 X DOG 0630 0900 1000 1400 X EASY TO ALINGINAE TO BIKINI X FOX 1000 1400 1600 REMAIN X GEORGE DIRECT X HOW 1200 1600 1800 X".

Air intent information copies will be furnished CTG 1.6 by CTG 1.5 and vice versa.

(2) TAKE OFF REPORTS

(a) On WILLIAM and BAKER Days and all full scale air rehearsal days.

(1) Take offs of all aircraft of JTF-1 will be reported promptly, with operational priority precedence, direct to CJTF-1 over the Reporting In and Out Net (RIO). All times will be LZT. Reports will be made as follows:

(a) Radio Voice Call.

(b) The word "OFF".

(c) Time.

Examples:

"BURMA 0 OFF 0430"

"EGGLESTON 1 THRU 7 OFF 0650"

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"EGGLESTON 2 4 6 AND 8 OFF 0630 0635 0640 0645".

In addition to the RIO net reports ship based units will transmit to CJTF-1 take off and landing reports on the Radar Telling Net (2160 kcs), using the Standard Deck Condition Code, USF 10 B.

(b) On all other days.

(1) On all other days the take off reports will be made in the following form:

(a) Mission designation and radio voice call or aircraft.

(b) The word "OFF".

(c) Time of take off.

Examples:

"PHOTO EGGLESTON 2 OFF 1800".

"ASR 13X102 OFF 0630"

"PHOTO 21X102 OFF 0845"

"SPECIAL TRANSPORT 14X102 OFF 1400"

Aircraft must use the same radio voice calls in reporting in to CJTF-1 in the Bikini Area as are transmitted to CJTF-1 in the take

off reports on the RIO net. All aircraft will carry calls as assigned in Annex C, Appendix VI, pages one (1) through five (5).

(3) ON STATION REPORTS:

(a) On WILLIAM and BAKER Days and all scheduled air rehearsal days all aircraft will report in on their assigned task groups VHF common channel, except TU 1.6.3 (TG 1.5 common: 135.72 mcs);(TG 1.6 common: 124.02 mcs). If reports cannot be made on the TG common channel the first alternate will be 116.10 mcs, the last alternate 140.58 mcs. All planes from TU 1.6.3 will report in on 4475 kcs. The following phraseology will be used for "on station" reports. Pilots will be instructed to use these and only these conventional forms.

(1) When flight is joined up the flight leader will report in for all aircraft in his flight using the following form:

"Hello Priest, this is Eggleston 1, Flight Able on station 4 planes, calls Eggleston 1, 3, 5 and 7, over".

"Hello, Eggleston 1, this is Priest, Roger, Out".

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(2) If aircraft are proceeding individually to station, each aircraft commander will report in when on station using the following form:

"Hello Priest, this is Toucan 2, TBM OBOE, on station, over".

"Hello Toucan 2, this is Priest, Roger, Out".

(3) Any aircraft not on assigned stations by designated time will report in giving his call, present altitude, and the estimated number of minutes before he expects to arrive at station.

"Hello Priest, this is Toucan 1, approaching station, angels eight point five, time one one, over".

"Hello Toucan 1, this is Priest, Roger, Out".

(4) Form for reporting departure from the target area will be:

"Hello Priest, this is Toucan 2, taking departure, over".

"Hello Toucan 2, this is Priest, Roger out".

(5) When aircraft have two or more missions to perform (as F6F5P Roger, F6F5P Queen, and F-13 Photo and Flights Jig and

King) they will report in on station at their first assignment, report departure at the completion of their first assignment, report in on station at their second assignment and report departure from their second assignment. F6F5P Roger will report in on station at his third station and report when mission completed and taking departure for base.

(b) On all other days all aircraft will report in, using their task unit calls as follows:

(1) Aircraft from TG 1.6, TU 1.6.1 and TU 1.6.2 to the Task Force Air Guard Channel (140.58 mcs). The secondary choice will be the secondary Task Force Common (116.10 mcs).

(2) All aircraft from TU 1.6.3 will report in to the U.S.S. ORCA on 6970 kcs. (CJTF-1 will intercept this frequency) The secondary choice will be the Task Force Air Guard Channel (140.58 mcs).

(3) Aircraft from the U.S.S. FALL RIVER will report in to the U.S.S. FALL RIVER, on 7425 kcs, and remain under their control. The U.S.S. FALL RIVER will transmit launching and recovery reports to CJTF-1 on the Radar

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Telling Net (2160 kcs) using the Standard Deck Condition Code, USF 10 B. The U.S.S. FALL RIVER will keep CJTF-1 informed of the status of all flights under their control, using the Radar Telling Net (2160 kcs).

(4) All other aircraft from JTF-1 will report in to CJTF-1 on the Task Force Guard Channel (140.58 mcs) when airborne in the Bikini Atoll Objective Area.

(5) Transient aircraft: Any aircraft not attached to JTF-1 will report in to CJTF-1 upon approaching Bikini Atoll using the Task Force Air Guard Channel (140.58 mcs). He will give his radio voice call, base of departure, destination, altitude, and estimated time of departure. He shall again check in when departing the area. The secondary channel for these reports will be 116.10 mcs.

(Note: All aircraft must continually monitor 140.58 mcs, when within one hundred (100) miles of Bikini Atoll.)

(4) LANDING REPORTS:

(a) Landing reports will be trans-

mitted on the "Reporting In and Out" net similar to launching reports. TU 1.6.1 and TU 1.6.2 will also transmit landing reports to CJTF-1 via the Radar Telling Net (2160 kcs) using the Standard Deck Condition Code, USP 10 B.

(1) On WILLIAM and BAKER Days and all full scale air rehearsals days the following form will be used:

(a) Radio voice call of the aircraft.

(b) The word "Landed".

(c) Time (LZT).

Examples:

"Burma Ø landed 1945"

"Eggleston 1 through 7 landed 1025"

"Eggleston 1, 2, 3, 4, 6 landed 1150 1155 1200 1215 1230".

(2) On all other days:

(a) Mission designation and radio voice call of aircraft.

(b) The word "Landed"

(c) Time (LZT)

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Examples:

"ASR 13X102 landed 1520"

"Photo Eggleston 5 landed 1030"

(5) REPORTING IN AND OUT (RIO) NET: The RIO net connects ROI, ENIWETOK, KWAJALEIN, U.S.S. SHANGRI LA, U.S.S. SAIDOR, U.S.S. ORCA, and the U.S.S. MT. MCKINLEY. The net is for the purpose of transmitting aircraft movement reports to the Task Force Fighter Director in the U.S.S. MT. MCKINLEY, and for such other purposes as CJTF-1 may specifically direct. The U.S.S. MT MCKINLEY is the net control station.

(a) The station designations and call signs are as follows:

Station	Call Sign
TG 1.5 at KWAJALEIN	NDJ-1
TU 1.6.6 Army Drone Unit at ENIWETOK	NDU-1
TU 1.6.13 Navy Field Recovery Unit at ROI	NDR-1
U.S.S. MT. MCKINLEY	NTXC
U.S.S. SHANGRI LA	NTIF
U.S.S. SAIDOR	NKRX
U.S.S. ORCA	NCKH

(b) The RIO net will be operated on the following schedule and frequencies unless otherwise directed by CJTF-1

- -

2862 kcs. from 1500Z to 2230Z
4540 kcs. from 2230Z to 1000Z
8495 kcs. from 1000Z to 1500Z

(c) The RIO net will be manned by all net stations as follows:

(1) On BAKER Day: From 0430L on Baker Minus one (1) Day until directed to secure by CJTF-1.

(2) On WILLIAM Day and all full scale air rehearsals days: From 0330L until secured by CJTF-1.

(3) On all other days: From 0500L until directed to secure by CJTF-1. It is anticipated that stations not conducting air operations will be directed to secure after reporting into the net and checking for any possible traffic.

13. LOST PLANE PROCEDURE:

(a) Lost Plane procedure will be in accordance with SOP-3A.

(b) Lost planes will usually be homed by the parent carrier. If land based, the plane will be homed by a Fighter Director Ship designated by the Task Force Fighter Director Officer. If several planes are lost simultaneously the Task Force Fighter Director Officer will designate a Fighter Director Ship to coordinate and control the homing of all lost aircraft. During any period where there is a lost plane, no plane will show emergency IFF until directed to do so by the ship coordinating the lost

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plane procedure. This will alleviate the confusion of emergency IFF and the homing problem.

14. AIR SEA RESCUE

(a) Air-sea rescue will be in accordance with CinCPac Standard Operating Procedure three A (SOP 3A).

(b) Air-sea rescue within the Bikini Atoll Objective Area (defined in paragraph 1 Annex Y to CJTF-1 Op-Plan No. 1-46) will be under the control of the OTC and exercised through the Task Force Fighter Director Officer.

(c) All ships, stations, and aircraft will be alert for reports of downed aircraft and will relay such reports to the Task Force Fighter Director Officer for action.

(d) All ships will keep a record of such downed aircraft, showing position and time.

(e) All designated Fighter Director Ships will be prepared to assist in air-sea rescue work.

15. REPORTS

(a) The following copies of reports will be forwarded to the Task Force Fighter Director Officer on BAKER plus two (2) days.

(1) U.S.S. SHANGRI LA

(a) Radio log of 124.78 mcs.

(b) Radio log of 152.75 mcs.

(c) Radio log of 6315 kcs.

(2) U.S.S. SAIDOR

(a) Radio log of 124.02 mcs.

(b) Radio log of 128.70 mcs.

(c) Radio log of 4475 kcs.

(d) A copy of radar tracks of all plotted aircraft.

(3) U.S.S. PANAMINT

(a) Radio log of 135.72 mcs.

(b) Radio log of 124.02 mcs.

(c) A copy of radar tracks of all plotted aircraft.

(4) U.S.S. BLUE RIDGE

(a) Radio log of 135.72 mcs.

(b) Radio log of 2160 kcs.

(c) Radar plots of IFF code 3, 4, 5, and 6 and any emergency IFF.

(5) U.S.S. APPALACHIAN

(a) Radio log of 140.58 mcs.

(b) Radio log of 2160 kcs.

(c) A copy of radar tracks of all plotted aircraft.

16. FIGHTER DIRECTOR VOCABULARY: Fighter Director Vocabulary is in accordance with Combined Communications Board Publications, CCBP-3.

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(a) Angels -- Height in thousands of feet.

(b) Base -- Home Airfield.

(c) Orbit -- Circle

(d) Vector -- Alter course to -- magnet course indicated.

(e) Steer -- Set course.

(f) Cockerel -- IFF Mark III.

(g) Switch Cockerel -- Switch on your IFF Mark III.

(h) Strangle Cockerel -- Switch off your IFF Mark III.

(i) Check Cockerel -- Insure that your IFF Mark III is on the correct code.

(j) Switch Mayday Cockerel -- Switch your IFF Mark III to the distress setting.

(k) Cockerel is Strangled -- IFF MARK III is switched off.

8. Training for Test BAKER.

a. Unit Training.

(1) Several units required additional training due to radical changes in their operations for BAKER Day. These units would check in with the flagship and simulate their actual missions. The Army drone unit worked with CIC for timing in perfecting their flight pattern. PBM's TARE, UNCLE, WILLIAM, and HOTPOINT also trained with CIC. The radio broadcast plane checked all communications with CIC for possible

radio interference. In addition, CIC retained its regular cognizance over the daily weather aircraft.

b. Full Scale Air Rehearsal. A Full Scale Air Rehearsal was held on 14 July. As a result of this rehearsal the following items were noted:

(1) Changes in some flights of aircraft caused confusion in radio voice calls. Changes in flight missions necessitated a change in the radio voice calls.

(2) Aircraft pilots failed to guard the Task Force Air Guard Common Channel at all times while in the Bikini Atoll Objective Area.

(3) Radar tracking was difficult due to the fact that the ships remained in the Bikini Lagoon, resulting in aircraft passing overhead and above the angle of elevation of radars. This caused radar tracking ships to lose the identification of some aircraft.

c. WILLIAM Day.

This was the regular scheduled JTF-1 rehearsal for BAKER Day, held on 19 July. After the first aircraft reported in on station, weather changed and before all aircraft arrived on station, the operation was cancelled. During the early phases of this rehearsal many aircraft requested changes of altitude. There was little to judge the training mission on due to the early cancellation. However, the early indications were that this rehearsal was destined to develop into the best rehearsal of the operation.

9. BAKER Day Operation.

a. Execution. In all respects BAKER Day was the best executed air plan of the operation. Some of the out-

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CLEARANCE FOR ROUTINE

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SPECIFIC RESTRICTIONS ON USE AND CLASSIFICATION SAFEGUARDS CLEARANCE NOT REQUIRED

TYPE	MISSION	CALL	STATION	AG	TA	TD	TTO	TL
B-29	COMMAND	BURMA 1	BIKINI	16.5	0547	1048	0506	1159
B-29	COMMAND	BURMA 2	BIKINI	16.5	0625	0906	0526	1019
PBM	ASR(DUMBO 1)	POWERHOUSE 1	LOVE	3	0647	1245	0509	1409
PBM	ASR(DUMBO 2)	POWERHOUSE 2	ABLE	3	0647	1122	0513	1222
F-13	PHOTO	EGGLESTON 1	7NM from BIK.	15	0708	0858	0535	1013
F-13	PHOTO	EGGLESTON 2	7NM from BIK.	15	0708	0858	0536	1024
F-13	PHOTO	EGGLESTON 3	7NM from BIK.	15	0708	0858	0537	1012
F-13	PHOTO	EGGLESTON 4	7NM from BIK.	15	0708	0858	0539	1029
F-13	PHOTO	EGGLESTON 5	7NM from BIK.	15	0708	0858	0538	1014
F-13	PHOTO	EGGLESTON 6	7NM from BIK.	15	0708	0858	0540	1609
F-13	PHOTO	EGGLESTON 7	7NM from BIK.	15	0708	0858	0541	1459
F-13	PHOTO	EGGLESTON 8	7NM from BIK.	15	CANCELLED			
F-13	PHOTO	EGGLESTON 9	7NM from BIK.	15	CANCELLED			
F6F	PHOTO	SKYLIGHT 1	BIKINI	10	0719	0824	0707	0934
F6F	PHOTO	SKYLIGHT 2	BIKINI	10	0719	0824	0707	0934
F6F	PHOTO	SKYLIGHT 3	BIKINI	10	0719	0824	0707	0934
F6F	PHOTO	SKYLIGHT 4	BIKINI	10	0719	0824	0707	0934
F6F	PHOTO (SUGAR)	SKYLIGHT 5	BIKINI	.5	0711	0805	0707	0934
F6F	PHOTO (ROGER)	SKYLIGHT 6	BIKINI	.6	0709	0859	0707	0934
B-29	BROADCAST	ELKRIDGE 1	ABLE	7	0723	0932	0617	1036
B-29	PRESS PHOTO	FATHEAD 1	ABLE	4	0727	0906	0614	1010
C-54	OBSERVATION	FOLKLORE 1	ABLE	7.5	0714	1005	0554	1120
PBM	OBS.(EAGLE EYE)	BRIGHTEYES 8	ABLE	8	0713	0906	0542	1053
PBM	ASR(DUMBO 3)	POWERHOUSE 3	WOTHO	7	0710	0947	0617	1024
PBM	HOTPOINT	BRIGHTEYES 3	YOKE	9.5	0645	0856	0513	1053
C-54	PHOTO	PLAYBOY 1	TARE	12.5	0750	0902	0630	1022
C-54	PHOTO	PLAYBOY 2	TARE	12.5	0750	0906	0631	1027
B-17	MASTER CONT.(MIKE)	MARMALADE 1	EASY	18	0803	0852	0532	0943
B-17	CONTROL(GEORGE)	MARMALADE 3	EASY	16	0803	0852	0533	0951
B-17	CONTROL(LOVE)	MARMALADE 5	EASY	11	0803	0852	0535	1047
B-17	CONTROL(HOW)	MARMALADE 4	EASY	7	0803	0852	0534	1001
B-17	CONTROL(FOX)	MARMALADE 2	EASY	6	0803	0852	0532	1001
F-13	PHOTO.(BAKER)	EGGLESTON 10	OVERARRAY	30	0753	0858	0542	0946
B-29	PRESSURE DROP	APPENDIX 1	BIKINI	25	0732	0850	0550	0959
B-29	PRESSURE DROP	APPENDIX 2	BIKINI	25	0732	0850	0551	0950
B-17	ASR	PEABODY 2	KWAJALEIN	5			0630	1050
B-29	WEATHER	JOSHUA 1	DIR.TO BIK.	15	0300	0919	0222	1018
B-29	WEATHER	JOSHUA 2	DIR.TO BIK.	8	0300	0928	0231	1032
B-29	WEATHER	JOSHUA 4	DIR.TO BIK.	1.5	0300	0915	0058	
TBM	PHOTO.(NAN)	LONETREE 1-3	YOKE	10.5	0711	0906	0707	0934
TBM	PHOTO.(OBOE)	LONETREE 2	BIKINI	4	0742	0905	0707	0934

1 OF 3 CIC STATUS BOARDS - BAKER DAY - USS MT Mc KINLEY

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TYPE	MISSION	CALL		STATION	AG	TA	TD	TTO	TL
B-17	A S R	MILKPAIL	9	WILLIAM	6.5	0757	0913	0521	1236
P B M	PHOTO (TARE)	BRIGHTEYES	6	CHARLIE	12	0706	0911	0531	1125
P B M	PHOTO (UNCLE)	BRIGHTEYES	4	KING	12	0704	0906	0526	1039
P B M	PHOTO (WILLIAM)	BRIGHTEYES	5	DOG	3	0705	0908	0542	1046
P B M	CHARLIE 1	BRIGHTEYES	1	ABLE	4	0749	1305	0513	1453
P B M	DOG	BRIGHTEYES	2	ABLE	4	0749	1305	0513	1453
F 6 F	PRI. CONT. (RED)	RED	1	VICTOR	14	0804	0904	0726	0912
F 6 F	PRI CONT. (RED)	RED	2	VICTOR	14	0804	0904	0726	0912
F 6 F	PRI. CONT. (WHITE)	WHITE	1	VICTOR	9	0813	0904	0726	0912
F 6 F	PRI. CONT. (WHITE)	WHITE	2	VICTOR	9	0813	0904	0726	0912
F 6 F	PRI. CONT. (BLUE)	BLUE	1	VICTOR	5	0804	0904	0726	0912
F 6 F	PRI. CONT. (BLUE)	BLUE	2	VICTOR	5	0804	0904	0726	0912
F 6 F	SEC. CONT. (RED)	RED	3	SUGAR	14	0811	0858	0750	1015
F 6 F	SEC. CONT. (RED)	RED	4	SUGAR	14	0811	0858	0750	1015
F 6 F	SEC. CONT. (WHITE)	WHITE	3	SUGAR	9	0808	0858	0750	1015
F 6 F	SEC. CONT. (WHITE)	WHITE	4	SUGAR	9	0808	0858	0750	1015
F 6 F	SEC. CONT. (BLUE)	BLUE	3	SUGAR	5	0809	0904	0726	0912
F 6 F	SEC. CONT. (BLUE)	BLUE	4	SUGAR	5	0809	0904	0726	0912
B-29	RAD. RECCO (JIG)	ANTIQUE	2	N. OF CLOUD	15	0920	1502	0540	1609
B-29	RAD. RECCO (KING)	ANTIQUE	4	S. OF CLOUD	15	0920	1343	0541	1459
T B M	BOAT CONT. BUCKO1	WARPAINT	1	5 N. M. UPWIND	2.3	0857	1105	0850	1121
T B M	BOAT CONT. BUCKO3	WARPAINT	2	5 N. M. UPWIND	2.6	0857	1105	0850	1121
T B M	BOAT CONT. BUCKO2	WARPAINT	3	10 W. EASY	4-0	0857	1105	0850	1121
T B M	BOAT CONT. BUCKO4	WARPAINT	4	10 W. EASY	4-0	0857	1105	0850	1121
P B M	A S R (DUMBO 4)	POWERHOUSE	4	REL. DUMBO 1	3	1240	1615	1113	1738
P B M	A S R (DUMBO 5)	POWERHOUSE		REL. DUMBO 2		C A N C E L L E D			
P B M	CHARLIE 2	BRIGHTEYES	7	REL. CHARLIE 1	4	1254	1614	1045	1754
F-13	SONOR 1 - PHOTO	SONOR	1	5 N. M. UPWIND	5+	COMBINED WITH NIGHTOWL FLT.			
B-17	A S R	PEABODY	8	KWAJALEIN	5	X	X	0632	1055
T B M	BOAT CONT. BUCKO 5	WARPAINT	5	BIKINI	2.3	1517	1755	1508	1810
T B M	BOAT CONT. BUCKO 6	WARPAINT	6	BIKINI	2.6	1517	1755	1508	1810
B-29	NIGHTOWL	EGGLESTON	10	BIKINI	5+	1350	1800	1435	1910
T B M	A S R	DAGGER 1 and 2		SHANGRI-LA	3-	X	X	0753	1018
F-13	FLIGHT KING	EGGLESTON	3	N.W. BIKINI	4	1343	1750	1245	1902
F-13	COMM. RELAY	EGGLESTON	5	320°-50 MI.	10	1346	1700	1251	1805
C-54	PHOTO	PLAYBOY	1	BIKINI	6	1402	1635	1252	1756

1 OF 3 CIC STATUS BOARDS - "BAKER DAY" - USS MT. McKINLEY

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ENCLOSURE (12)

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USE MADE OF THIS [illegible] (A) GUARDS

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AG	PLANE	BUTTON	FREQ.	DESIGNATION
		SEC PBM A N		
30	1 F-13 (BAKER)	A A A 1	116.10	TF COM SEC
25	2 PRESSURE DROP	2	129.78	NAVY DRONE
18	B-17 MASTER DRONE CONTROL	B B 3	126.18	AMER. COM.
16.5	COMMAND	5	137.52	T.F. SPARE
16	DRONE (GEORGE)	D B D 10	140.58	T.F. COM. PRI.
15	9 F-13 (ABLE)	4	128.70	SAIDOR to PLS.
14	DRONE (RED)	6	134.64	NAVY DRONE SEC.
13	COMMAND	C 7	124.02	T.G. 1.6 COM.
12.5	PLAYBOY 1 and 2	8	142.02	T.G. 1.6 SEC.
12	PBM (TARE and UNCLE)	D 9	142.74	SHANGRILA to PLS.
11	DRONE (LOVE)	E	133.20	T.U. 1.5.1 COM.
10.5	TBM (NAN)	C F	135.72	T.G. 1.5 COM.
10	4 F6F (QUEEN)	G	136.26	F-13 and C-54 COM.
9.5	HOTPOINT	H	134.82	ARMY DRONES
9	DRONE (WHITE)	C	128.16	ARMY T.F. SPARE
8	COMM. RELAY PLANE			
7.5	2 C-54 OBSERVATION			
7	B-29 BROADCAST			
	DUMBO 3			
	DRONE (HOW)			
6.5	B-17 DUMBO			
6	DRONE (FOX)			
5	DRONE (BLUE) — NIGHTOWL			
4	PRESS PHOTO.			
	TBM (OBOE)			
	PBM (CHARLIE and DOG)			
4	BUCKO 2 and 4 — FLIGHT KING			
3	DUMBO 1, 2, 4, 5. — PBM WILLIAM			
2.6	BUCKO 3 and 6			
2.3	BUCKO 1 and 5. — BRIGHTEYES 5			
.6	F8F (ROGER)			
.5	F6F (SUGAR)			

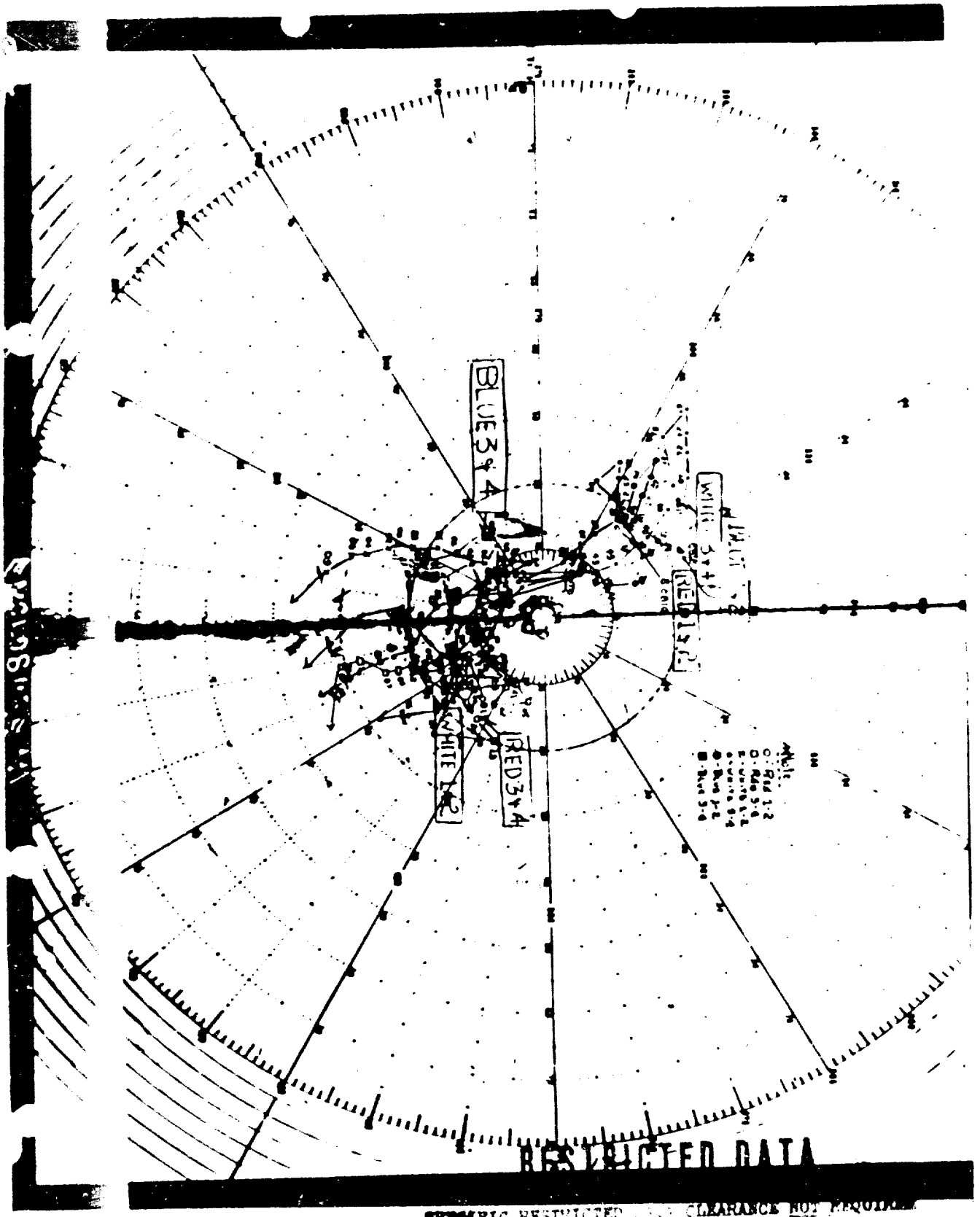
McKINLEY:	COMMAND-DRONE GEO.
SHANGRI-LA:	DRONES - IFF
SAIDOR:	R-Q-S
BLUE RIDGE:	PRESSURE - IFF
PANAMINT:	BLUE FLIGHT
APPALACHIAN:	BAKER FLIGHT

ALTITUDE	WIND VEL.	WIND DIR.
30000	19	030
25000	10	080
20000	10	090
15000	09	120
SURFACE	07	150

HOW HOUR: 0835

	TIME	BEAR	BEAR	RANGE RED	RANGE BLUE
R	0600	260	340	8	12
A	0715	220	360	9	11
	0840	260	360	9	11
D	0957	270	360	4	45
E	1030	270	360	8	50
X	1125	270	360	14	70
	1230	270	360	20	85

1 OF 3 OIC STATUS BOARDS - "BAKER DAY" - USS MT. McKINLEY
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standing points were:

(1) Radars performed at their maximum efficiency. No material failures in the force were reported. Radar ranges were outstandingly good and all guard ships reported excellent aircraft tracking.

(2) Radio reception was excellent. Good discipline was maintained and excellent radio procedures were used.

(3) All aircraft reported in on station and reported when taking departure from the Bikini Area.

(4) All aircraft flew their prescribed flight patterns and the timing of all flights was excellent.

(5) Communications were maintained with all stations on the RIO Net at all times. No time lag existed during the day.

(6) The designating of one radar guard ship in the Bikini Area as an IFF guard ship to assist the U.S.S. SHANGRI LA in drone identification justified the use of one radar. This guard ship had complete tracks on all Navy drones at all times.

(7) The SK and SC radars showed no indication on the scopes when the Atomic Bomb detonated. The SP radar picked up the atomic cloud and tracked it for thirty minutes. It appeared on the radar scope as an ordinary ionized storm cloud.

(8) Enclosures:

(9) Aircraft Status Board # 1 of BAKER Day.

(10) Aircraft Status Board # 2 of BAKER Day.

(11) Operation Status Board of BAKER Day.

(12) Navy Drone Radar Tracks.

10. Post BAKER Day Operations.

a. During the days following BAKER Day aircraft reported in to the Bikini Area to perform missions of Radiological Reconnaissance, photography, observation, Air Sea Rescue, drone boat control, tracking and radiological surveys of oil slicks, and transport duties. These aircraft checked in to the flagship and were given the altimeter setting and an altitude to fly while in the Bikini Area.

It was CIC's responsibility to alert the photographic aircraft to any happenings which would be of interest to photography. These events included:

(1) Sinkings.

(2) Beaching Operations.

(3) Towing.

(4) Fires.

(5) Ship-spraying Operations.

(6) Raising Submarines.

(7) Spreading Oil Slicks.

CIC controlled the movements of all aircraft assigned to Radiological Reconnaissance and would vector the aircraft to locations to obtain radiological readings of areas designated by the RadSafe Section. CIC controlled the movement of these aircraft but once the aircraft arrived at the designated station, their functions in that area would be directed by RadSafe.

The CIC of the flagship also resumed its duties as an Air Control Center.

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ATOMIC ENERGY ACT - 1946

b. Enclosures.

(13) Aircraft Status Board for BAKER plus 1 day and BAKER plus 2 days.

(14) Aircraft Status Board for BAKER plus 3 days, BAKER plus 4 days, and BAKER plus 5 days.

AIRCRAFT STATUS BOARD IN CIC

BAKER PLUS I DAY

TYPE	BASE	MISSION	CALL		AG	TTO	TA	TD	TL
C-47	KWAJ	OBSERVATION	G-6311		2	0917	1050	1140	1311
C-54	KWAJ.	PHOTO	PLAYBOY	2	5	0442	0545	1214	1331
F-13	KWAJ.	RADIO RECON.(JIG)	EGGLESTON	6	1.5	0512	0610	1315	1439
B-29	KWAJ.	RADIO RECON.(KING)	EGGLESTON	7	4	0750	0910	1255	1409
B-29	KWAJ.	NIGHTOWL	EGGLESTON	10	4	0616	0617	1206	1316
PBM	EBEYE	ASR (DUMBO 2)	POWERHOUSE	1	6	0630	0747	1221	1400
PBM	EBEYE	CHARLIE 1	BRIGHTEYES	1	1.5	0550	0718	1218	1356
TBM	SAIDOR	DRONE BOAT CONT.	WARPAINT	1	1.2	0742	0752	1052	1113
TBM	SAIDOR	DRONE BOAT CONT.	WARPAINT	2	2.3	0742	0752	1052	1113
TBM	SAIDOR	DRONE BOAT CONT.	WARPAINT	3	2.6	0742	0752	1052	1113
B-29	KWAJ.	OBSERVATION	BURMA	Ø	1.5	0911	1015	1055	1206
F-13	KWAJ.	RELIEF (KING)	EGGLESTON	4	2	1047	1151	1315	1422
F-13	KWAJ.	RELIEF (JIG)	EGGLESTON	5	10	1045	1151	1655	1756
F-13	KWAJ.	NIGHTOWL(RELIEF)	EGGLESTON	2	4	1044	1151	1720	1830
C-54	KWAJ.	PHOTO(RELIEF)	PLAYBOY	1	3	1055	1205	1620	1734
PBM	EBEYE	CHARLIE 2	BRIGHTEYES	7	7	1042	1220	1620	1740
PBM	EBEYE	ASR (DUMBO)	POWERHOUSE	4	6	1050	1220	1630	1740
F6F	SAIDOR	PHOTO	SKYLIGHT	1	20	1345	1421	1500	1703
F6F	SAIDOR	PHOTO	SKYLIGHT	2	10	1345	1413	1501	1703
F6F	SAIDOR	PHOTO	SKYLIGHT	3	20	1345	1410	1500	1703
TBM	SAIDOR	DRONE BOAT CONT.	WARPAINT	5	1.8	1350	1400	1628	1703
TBM	SAIDOR	DRONE BOAT CONT.	WARPAINT	6	1	1350	1400	1628	1703
TBM	SAIDOR	DRONE BOAT CONT.	WARPAINT	7	4	1350	1400	1628	1703
HOS	SAIDOR	TRANSPORT	THOROUGHBRED	1	1	1445	1450	1520	1530
HOS	SAIDOR	TRANSPORT	THOROUGHBRED	2	1	1532	1451	1535	1543
HOS	SAIDOR	TRANSPORT	THOROUGHBRED	2	1	1547	1549	1620	1623
HOS	SAIDOR	TRANSPORT	THOROUGHBRED	2	1	1635	1640	1655	1713
HOS	SAIDOR	TRANSPORT	THOROUGHBRED	1	1	1540	1545	1635	1650

BAKER PLUS 2 DAY

C-47	KWAJ.	OBSERVATION	G-6311		5	0847	1000	1045	1215
F-13	KWAJ.	NIGHTOWL	EGGLESTON	3	5	0507	0611	1222	1340
PBM	EBEYE	TRANSPORT	11X102			0535	0615	0641	0815
PBM	EBEYE	DUMBO	POWERHOUSE	1	6	0600	0725	1233	1410
C-54	KWAJ.	PHOTO.	PLAYBOY	2	.5	0707	0810	1155	1315
TBM	SAIDOR	STAND BY	WARPAINT	2		0740	0753	0830	0909
TBM	SAIDOR	DRONE BOAT CONT.	WARPAINT	1	1.2	0740	0753	1100	1113
PBM	EBEYE	CHARLIE (PHOTO)	BRIGHTEYES	7	.5	0620	0750	1310	1447
C-54	KWAJ.	OBSERVER	OVERTURE	1	1	1139	1240	1318	1437
C-54	KWAJ.	OBSERVER	OVERTURE	2	1.5	1137	1240	1318	1438
PBM	EBEYE	DUMBO(RELIEF)	POWERHOUSE	4	6	1057	1223	1614	1744
F-13	KWAJ.	NIGHTOWL(RELIEF)	EGGLESTON	1	8	1107	1215	1714	1908
F-13	KWAJ.	PHOTO.(RELIEF)	PLAYBOY	1	.7	1057	1155	1654	1806
F6F	SAIDOR	PHOTO.	SKYLIGHT	1	20	0854	0935	0955	1029
TBM	SAIDOR	RELIEF(BUCKO 2)	WARPAINT	3	1.3	0830	0840	1100	1113
F6F	SAIDOR	PHOTO.	SKYLIGHT	2	20	0854	0935	0955	1029
PBM	EBEYE	TRANSPORT	27 X102			0934	1108	1 15	1342
PBM	EBEYE	TRANSPORT	24 X102			1110	1245	1417	1608

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ENCLOSURE (13)

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ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS ... CLEARANCE ... REQUIRED
... MILITARY ... CLASSIFICATION ...

RESTRICTED DATA

ATOMIC ENERGY ACT - 1946

SPECIFIC RESTRICTION: USE MILITARY CLASSIFICATION VALUES

AIRCRAFT STATUS BOARD IN CIC

BAKER PLUS 3 DAY

TYPE	BASE	MISSION	CALL		AG	TTO	TA	TD	TL
PBM	EBEYE	ASR (DUMBO)	POWERHOUSE	1	6	0528	0700	1252	1431
PBM	EBEYE	TRANSPORT	15 X 102			0637	0800	0920	1051
F-13	KWAJ.	NIGHTOWL	EGGLESTON	1	7	0636	0753	1200	1320
C-54	KWAJ.	PHOTO	PLAYBOY	1	3	1130	1237	1547	1710
C-47	KWAJ.	OBSERVATION	OVERTURE	1	1.5	0854	1020	1100	1237
PBM	EBEYE	ASR (DUMBO)	POWERHOUSE	4		1128	1252	1615	1745
F-13	KWAJ.	NIGHTOWL (RELIEF)	EGGLESTON	3	1.5	1300	1415	1641	1758
PBM	EBEYE	TRANSPORT	22 X 102			0920	1050	1246	1414
PBM	EBEYE	TRANSPORT	29 X 102			1045	1235	1359	1547
PBM	EBEYE	CHARLIE I	BRIGHTEYES	1	7	0558	0730	1420	1547
TBM	SAIDOR	BUCKO	WARPAINT	1		0900	0910	0920	1041
TBM	SAIDOR	BUCKO	WARPAINT	2		0900	0910	0920	1041
TBM	SAIDOR	BUCKO	WARPAINT	3		0900	0910	0920	1041
TBM	SAIDOR	BUCKO	WARPAINT	4		0900	0910	0920	1041
HOS	SAIDOR	TRANSPORT	THOUGHBRED	2		1438			1452
PBM	EBEYE	TRANSPORT	28 X 102			1310	1500	1545	1731
C-54	KWAJ.	OBSERVATION	OVERTURE	1	1	1401	1510	1550	1721
C-54	KWAJ.	OBSERVATION	OVERTURE	2	1.3	1401	1510	1550	1722
			BAKER PLUS 4 DAY						
PBM	EBEYE	TRANSPORT	23 X 102			0917	1052	1200	1343
PBM	EBEYE	TRANSPORT	27 X 102			1107	1259	1419	1558
F-13	KWAJ.	PHOTO	EGGLESTON	2	6	0714	0817	1208	1331
C-54	KWAJ.	PHOTO	PLAYBOY	2	7	1101	1200	1531	1648
PBM	EBEYE	CHARLIE I	BRIGHTEYES	1		0601	0757	1447	1620
PBM	EBEYE	ASR AND CHARLIE	POWERHOUSE	1		1140	1305	1645	1810
F6F	SAIDOR	PHOTO	SKYLIGHT	1	4	0910	0920	1027	1055
F6F	SAIDOR	PHOTO	SKYLIGHT	2	4	0910	0920	1030	1055
HOS	SAIDOR	TRANSPORT	THOUGHBRED	1		0944			1035
HOS	SAIDOR	TRANSPORT	THOUGHBRED	2		0944			1035
F6F	SAIDOR	PHOTO-SONAR	SKYLIGHT	3	4	1156	1206	1425	1444
F6F	SAIDOR	PHOTO-SONAR	SKYLIGHT	4	4	1156	1206	1425	1444
			BAKER PLUS 5 DAY						
PBM	EBEYE	TRANSPORT	24 X 102			0944	1117	1222	1405
PBM	EBEYE	TRANSPORT	29 X 102			1041	1216	1346	1525
F-13	KWAJ.	NIGHTOWL	EGGLESTON	7	.7	0658	0800	1208	1328
C-54	KWAJ.	NIGHTOWL (RELIEF)	PLAYBOY	2	4	1058	1220	1527	1640
F-13	KWAJ.	PHOTO	EGGLESTON	2	3.6	1200	1320	1540	1655

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ENCLOSURE (14)

11. Conclusions of Operation CROSSROADS.

a. Radar performance was excellent after the initial air rehearsal. While the operation order directed all radars to be placed at peak performance, this directive was loosely interpreted until the first air rehearsal. With the first air rehearsal it was apparent to all CIC's that in order to satisfactorily carry out their assigned duties all radars must function at their maximum efficeincy. Few materiel failures were reported and these were quickly repaired. No radar set was off the air for a longer period than thirty minutes.

b. The radio frequency plan for CIC was excellent. All frequencies were well separated and no frequency was over-burdened with traffic. After the difficulties experienced during the first air rehearsal little maintenance trouble was experienced. Radio discipline, air to air, and air to ground, was excellent. A few aircraft experienced radio troubles, principally VHF receiver failure.

c. Internal communications as they were set up in the CIC Watch, Quarter and Station Bill were adequate and satisfactory. No materiel failures were experienced. After a training program for all hands the techniques and procedures for sound powered telephones were excellent.

d. Due to the safety requirements written into the Air Plan no emergency conditions existed during the operation. No aircraft were lost and no aircraft required "homing".

e. CIC owes its success of tracking and identifying all aircraft to the controlled flight patterns detailed in the Air Plan. The detailed Air Plan permitted CIC to track and positively identify seventy aircraft in the air simultaneously. Without such an Air Plan CIC could not have exercised positive control over seventy aircraft.

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f. For CIC to properly assume air sea rescue responsibilities an Air Control Center must be established in CIC. This Air Control Center must have information on all aircraft entering the area of responsibility. This includes all transient traffic as well as aircraft of Joint Task Force ONE. Voice radio communications must be had with all aircraft and all aircraft must report into the area and report when taking departure.

g. The RIO is an essential net to Air Control when aircraft are operating from a number of widely separated bases. This net proved invaluable to CIC.

h. The air sea rescue facilities at Bikini appeared adequate with one PBM standing by on the water at Bikini; one AVR boat on patrol duty within the lagoon, and one Destroyer on surface patrol at the entrance to the lagoon. PBM's on Air Sea rescue duty maintained guard on 4475 kcs, as their primary channel. This was a more satisfactory radio set-up than monitoring 140.58 mcs, as the primary ASR frequency.

i. No necessity existed for the flagship to monitor the Navy drone control frequency as the controlling carrier intercepted this frequency and forwarded pertinent information to the Task Force Fighter Director via the Radar Telling Net.

j. Intra-CIC coordination was excellent. There was quick efficient passing of information between CIC's by means of the Radar Telling Net. Communications were so rapid and efficient between CIC's of the radar guard ships that, as developed during wartime operations, administrative and routine dispatch traffic found its way to thisfrequency during the latter stages of the operation. In order to satisfactorily perform its primary functions CIC's must not be converted into a communciation center, unless such a

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[illegible] is established in advance, permitting CIC's to plan and organize accordingly to handle this traffic. Conditions existed during this operation whereby the Radar Telling Net was used as a two-way telephone net between two officers, tying up the net for twenty minutes.

k. Wire recordings of radio voice circuits were the primary means of recording. However it was still necessary to man each recorder as the time of transmission must still be vocally recorded after each "out" transmissions.

l The CIC complement aboard the flagship was sufficient in numbers and rates to adequately handle the duties of a task force controlling ship of an operation of this scope. The Watch, Quarter and Station Bill was satisfactory and filled all requirements. It completely covered all contingencies without overtaxing personnel or equipments. All CIC personnel performed their assigned duties in an excellent manner.

m. Two months is considered sufficient time to train CIC personnel to perform their duties in an operation such as CROSSROADS; this assumes that personnel will be trained as a "specialist" to perform only his assigned duty in CIC. To train a personnel to fill any billet in a CIC would take a considerable longer time. All designated radar guard ships should keep the radar guard ships informed and retain cognizance of the scope and progress of their training. He should be prepared to assist them in their training and designate them as controlling ships during training periods.

12. Recommendations.

a. While the Air Critiques held at Task Group 1.5 headquarters after each rehearsal and operation were indispensible it is recommended that similar critiques be held on lower levels for the discussion of routine

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and more detailed problems. While these problems were not of sufficient importance to warrant time at the large critique, they would result in a smoother execution of the operation. An example is the filing of routine air intents, use of the RIO Net, and correlation between the RIO Net and radio voice calls. These are all problems which caused concern during the operation that could have been handled at a conference at lower levels.

b. Air Control cannot effectively be exercised from a dual head. The responsibility must be centralized in one organization. With due consideration of facilities, equipment, and personnel it is recommended that complete control of aircraft in flight be vested in the CIC of the flagship. The CIC may delegate certain routine and fixed functions, if practicable. Any functions requiring command decisions should be retained in the flagship.

c. For all Joint Operations it is recommended that staff liaison be established and physically maintained with each service. The Air Staff was composed of Army and Navy personnel who materially and effectively aided each other. Had Task Group 1.5 been staffed with one Navy liaison officer and Task Group 1.6 staffed with one Army liaison officer, it is believed that many problems would have been averted or more quickly solved. It is further recommended that the Navy liaison officer be more cognizant of communications than air operations. Due to the Army being unfamiliar with the Navy type of operation plan in effect some difficulty was experienced with the communication plan which could have been quickly clarified with permanent liaison.

d. It is recommended that an additional Navy Air Operations officer be added to the Air Operations Department. The Navy's representation in the Air Operation

department included one assistant Deputy Task Force Commander for Aviation, one Air Operations Officer, and the Task Force Fighter Director Officer. This organization placed a particularly heavy load on the one Air Operations Officer who performed the duties normally assigned to two officers.

e. Insofar as practicable it is recommended that CIC critiques be held with representatives of all designated radar guard ships after each air rehearsal and operation. When ships are not present in the area it is recommended that a summary of the critique be mailed to the absent ships.

f. It is recommended that continual liaison by the Task Force Fighter Director be maintained with all radar guard ships commencing with the formulating of plans in Washington. This liaison may be in the form of progress reports and recommendations for training, forwarded by mail. It is advisable to keep all ships informed of the scope and extent of operations for planning and training purposes.

g. Operation Plans should be made available to CIC's as soon as received by the ship. Several radar guard ships did not received an Operation Plan until the day before the scheduled operation. With such a detailed air plan it was impossible for CIC's to adequately set up their CIC's to carrying out their assigned functions in this short space of time. The Operation Plan is needed in advance to formulate and carry out a CIC training program. It is further recommended that when advance copies of the Air Plan and/or Air Communication Plan are distributed that CIC's of all radar guard ships be placed on the distribution lists.

h. Because of the large numbers of inexperienced CIC personnel in the fleet today it is recommended that the Air Control and Radar Doctrine Appendix be prepared in detail and specifically cover all responsi-

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bilities and functions assigned each radar guard ship.

i. All CIC personnel should be required to familiarize themselves with all phases of the Operation Plan concerning CIC. With the limited number of CIC officers allocated to ships in the fleet enlisted men are assuming some of their former functions and should therefore be cognizant of all phases of the operation as they effect CIC. Radarmen are assuming many of the communication functions in CIC and should be familiar with the CIC communication plan, including proper techniques and procedures.

j. It is recommended that CIC's conduct continual team training exercises. When possible these training exercises should be in conjunction with the flagship, and other radar guard ships of the fleet. All CIC officers should be present during these exercises and participate. When practicable each guard ship should assume the radar guard and act as the Air Control Center for the day.

k. The requirements of the Radiological Safety Group, relating to aircraft, required close liaison between CIC and RadSafe. It is recommended that the inter-ship organization between these two activities be studied and a more positive operating liaison plan be developed. The plan should provide for better and more complete exchange of information and a statement of responsibilities regarding issuing of instructions to aircraft on radiological patrols. It is further recommended that a RadSafe Officer be designated to keep CIC informed of Redex changes, danger areas, both air and water, and all radiological developments.

l. The primary difficulty experienced in exercising control of aircraft during the operation was radio

failure in aircraft. It is therefore recommended that radio maintenance be given more attention.

m. Radio wire recorders required that the time be vocally recorded on the recording. This necessitated assigning one man to each recorder. It is suggested that fully automatic recorders be made available to designated CIC's for future operations.

n. It is recommended that permanent radio voice calls be assigned to every aircraft in the operation and no deviation be permitted. These calls should be used on the RIO Net reports and by all aircraft on the radio voice circuits. This is one of the primary means by which CIC can identify aircraft and carry out its responsibility for the safety of aircraft in flight. By assigning permanent calls for an operation the call will tell the controlling ship the type of plane, his altitude, his planned flight pattern, estimated time of departure, and his assigned station.

o. It is recommended that administrative and routine operational messages be sent over designated channels and not be transmitted over the Radar Telling Net. If CIC is to function as a Message Center they should be so informed in the Operation Plan so that planning and training can be incorporated in the CIC schedule. Routing such traffic through CIC requires proper write-up and routing and cannot be handled correctly or expeditiously without additional training of CIC personnel. It also places additional traffic on a radio net that is already handling a maximum of traffic during an Air Operation. Typical messages ordered transmitted via CIC aircraft control circuits during the operation included messages to ships to operate evaporators, to make berthing assignments, to issue operating instructions to ships, to locate whereabouts of certain VIP's, and to employ the net as a telephone connection between officers. At one time the net was tied up for fifteen minutes for such purposes.

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p. It is recommended that the frequency plan be studied with an effort made to reassign the radio broadcast frequency clear of all CIC aircraft control frequencies. The broadcast transmissions could be read on 4475 kcs, 2160 kcs, 124.02 mcs, and 135.72 mcs.

q. It is recommended that no Task Force or Task Group VHF Common frequency be assigned for which no TDQ crystals are available. During this operation no TDQ crystals were available for the Task Group 1.5 Common frequency, necessitating the use of a SCR 624 and an AN/ARC-1 on this common frequency.

r. It is recommended that Test CHARLIE employ the use of the RIO Net as specified in the Addendum to Appendix VI, Annex F. The Task Force Fighter Director evaluates this net as of primary importance in exercising Air Control and Air Sea Rescue.

s. It is recommended that CIC back up all TDQ transmitters and RCK receivers with AN/ARC 1's and RBK receivers. Each circuit should have one VHF standby and each task force primary circuits should have 3 VHF standbys.

t. It is recommended that all RCK receivers be relocated near their antennas. Radio reception on all RCK's was poor. A comparison of RCK and AN/ARC 1 reception, with present installations, proved the AN/ARC 1 two hundred percent better in readability and strength. Aircraft transmissions fading out at forty miles on the RCK could be read out to one hundred and thirty miles on the AN/ARC 1.

u. The recommended complement for a controlling CIC ship (AGC type) should include, in addition to the Task Force Fighter Director, four CIC Officers, 1 maintenance officer, 30 trained radarmen, and 3 radar technicians.

v. It is recommended that the Task Force Fighter Director maintain liaison duties with each aircraft base. He should meet with Air Operations Officers to discuss plans and problems as they develop. He should acquaint Air Operations Officers with the functions, procedures, and the requirements of the controlling CIC for a better understanding of the overall operation.

w. It is recommended that the Task Force Fighter Director organize Force CIC training problems and execute same. Training reports should be required from all participating ships. An exchange of officers should be effected where necessary to assist a CIC in setting up for the operation. It is further recommended that CIC training be initiated on all radar guard ships as soon as they have been assigned to the force. Weekly training reports should be submitted to the Task Force Fighter Director.

x. It is recommended that the Task Force Fighter Director Officer have the following qualifications:

(1) Have CIC combat experience.

(2) Have had duty as a task force or a task group fighter director officer.

(3) Has had experience in the preparation of an Operation Plan and the execution of same.

(4) Has had CIC organizing experience.

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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 VIII

PICTORIAL SUPPLEMENT

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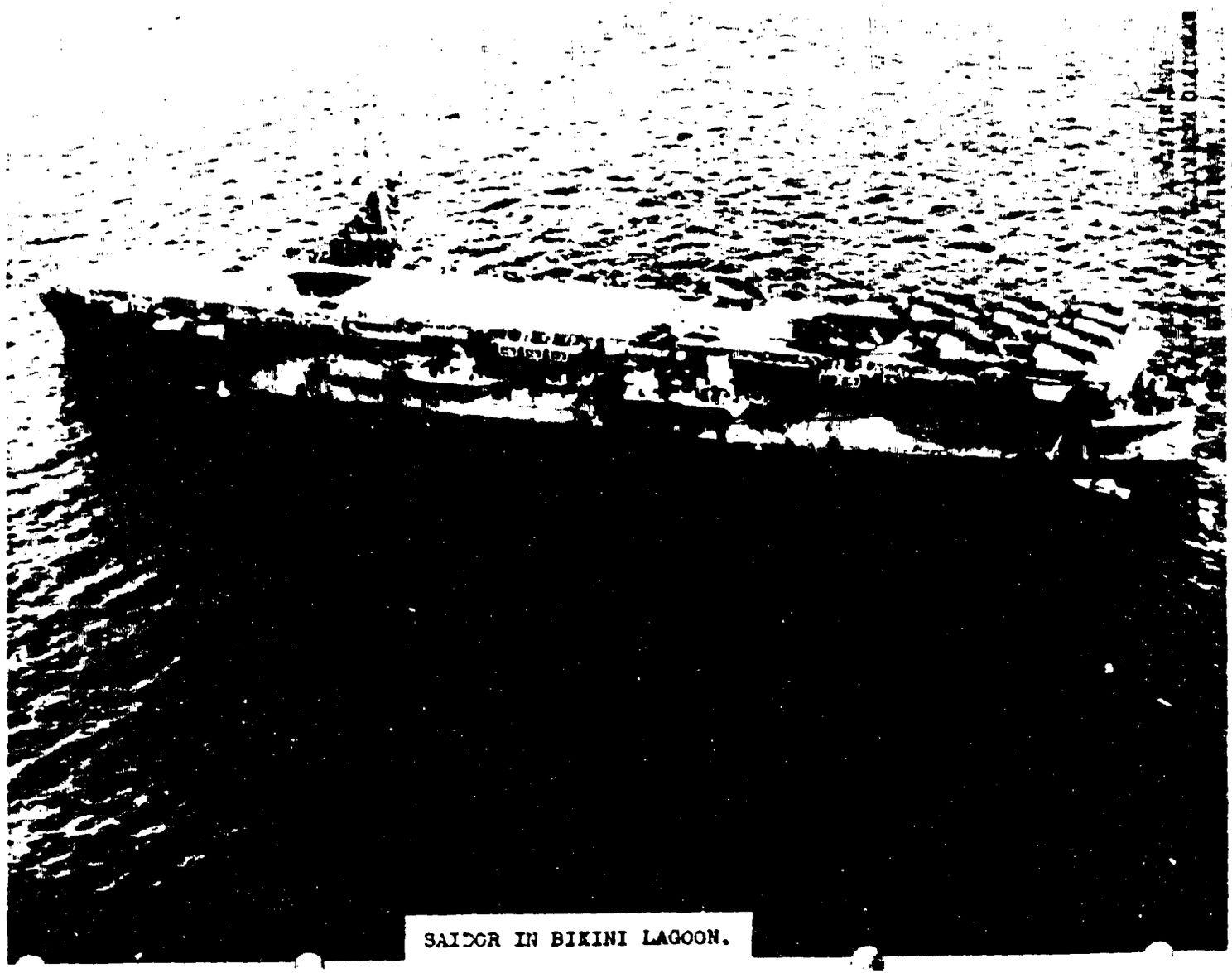
U.S.S. FALL RIVER

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SAIPOR IN BIKINI LAGOON.

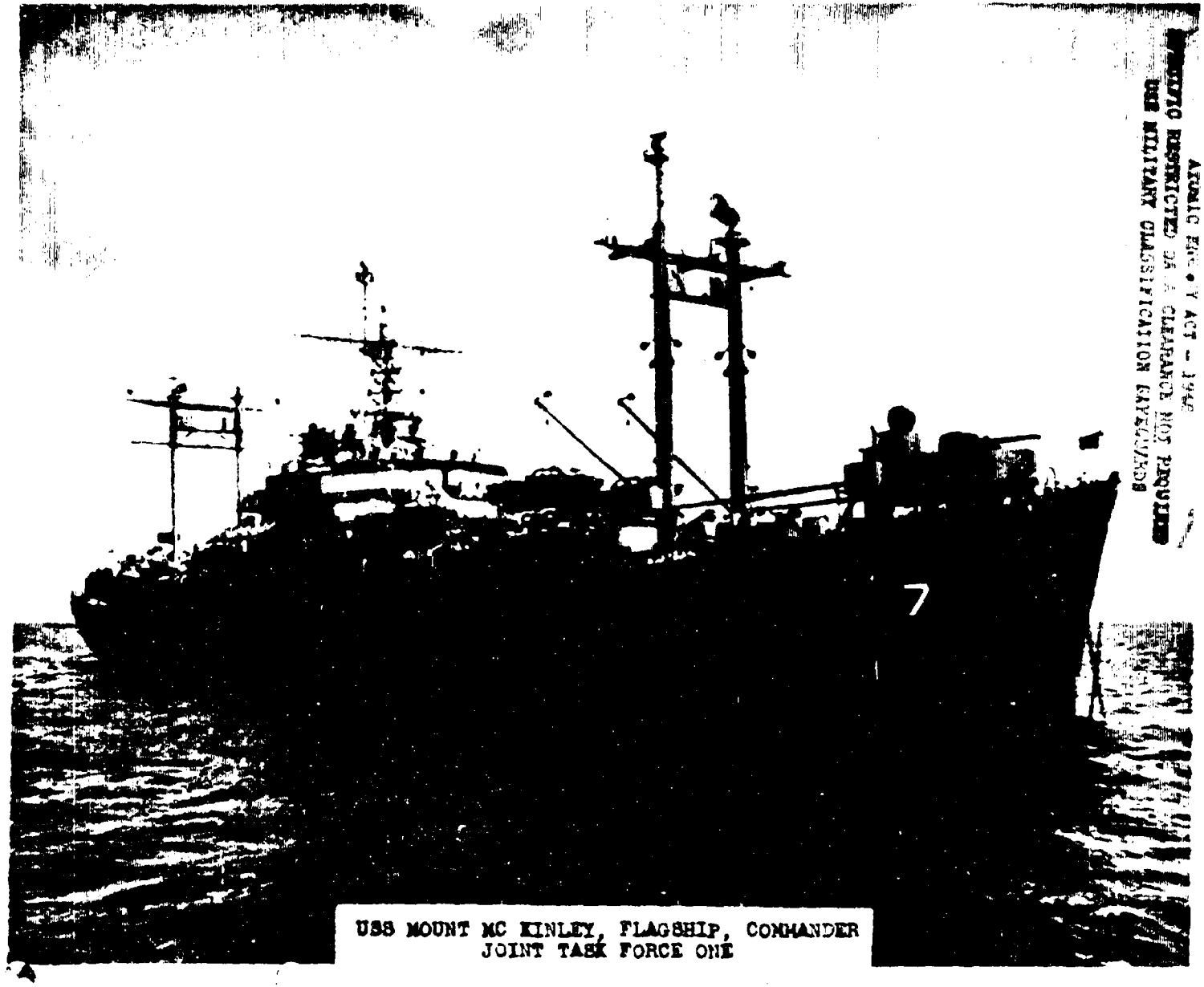
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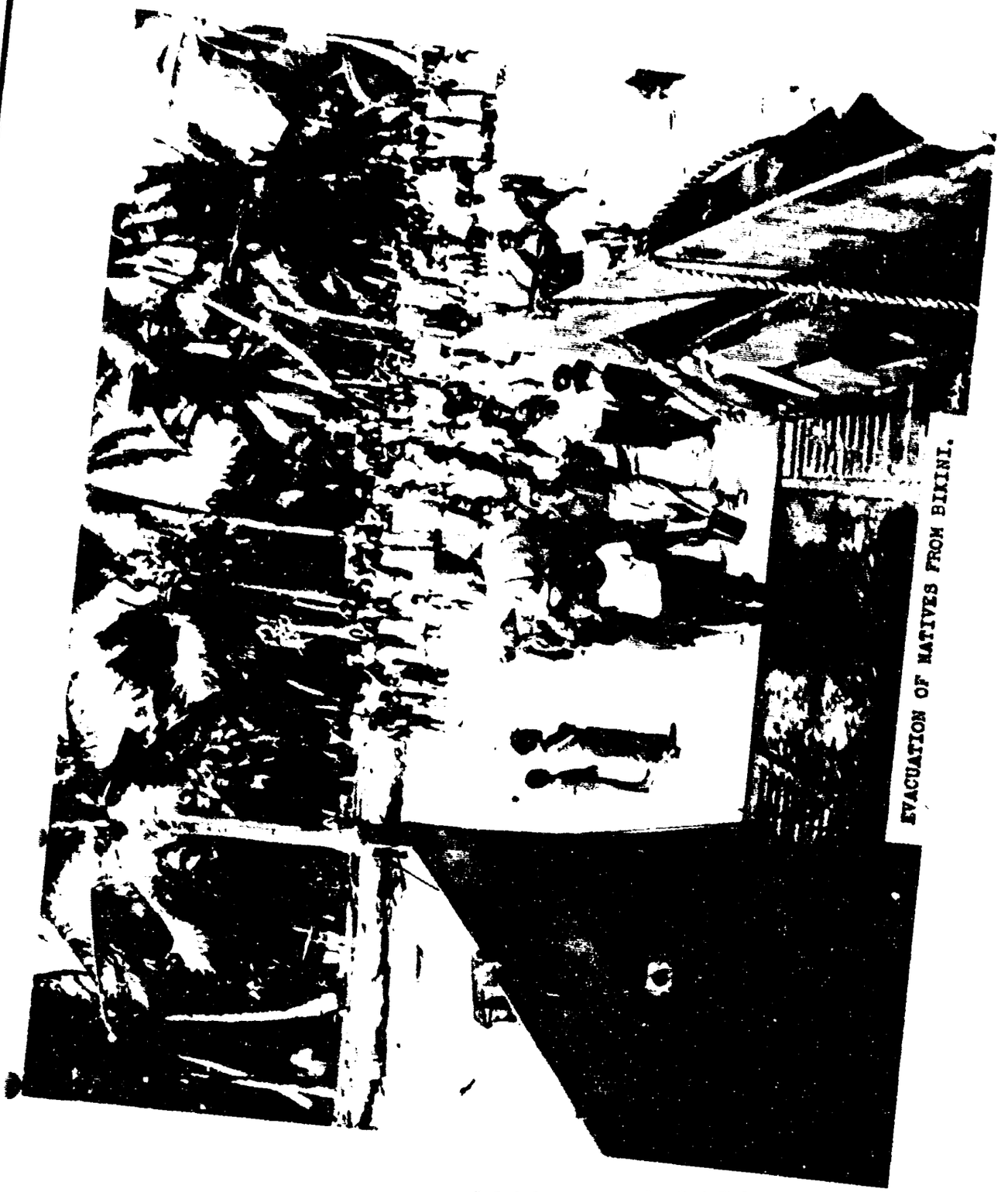
U.S.S. NEVADA

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USS MOUNT MC KINLEY, FLAGSHIP, COMMANDER
JOINT TASK FORCE ONE



EVACUATION OF NATIVES FROM BIKINI.

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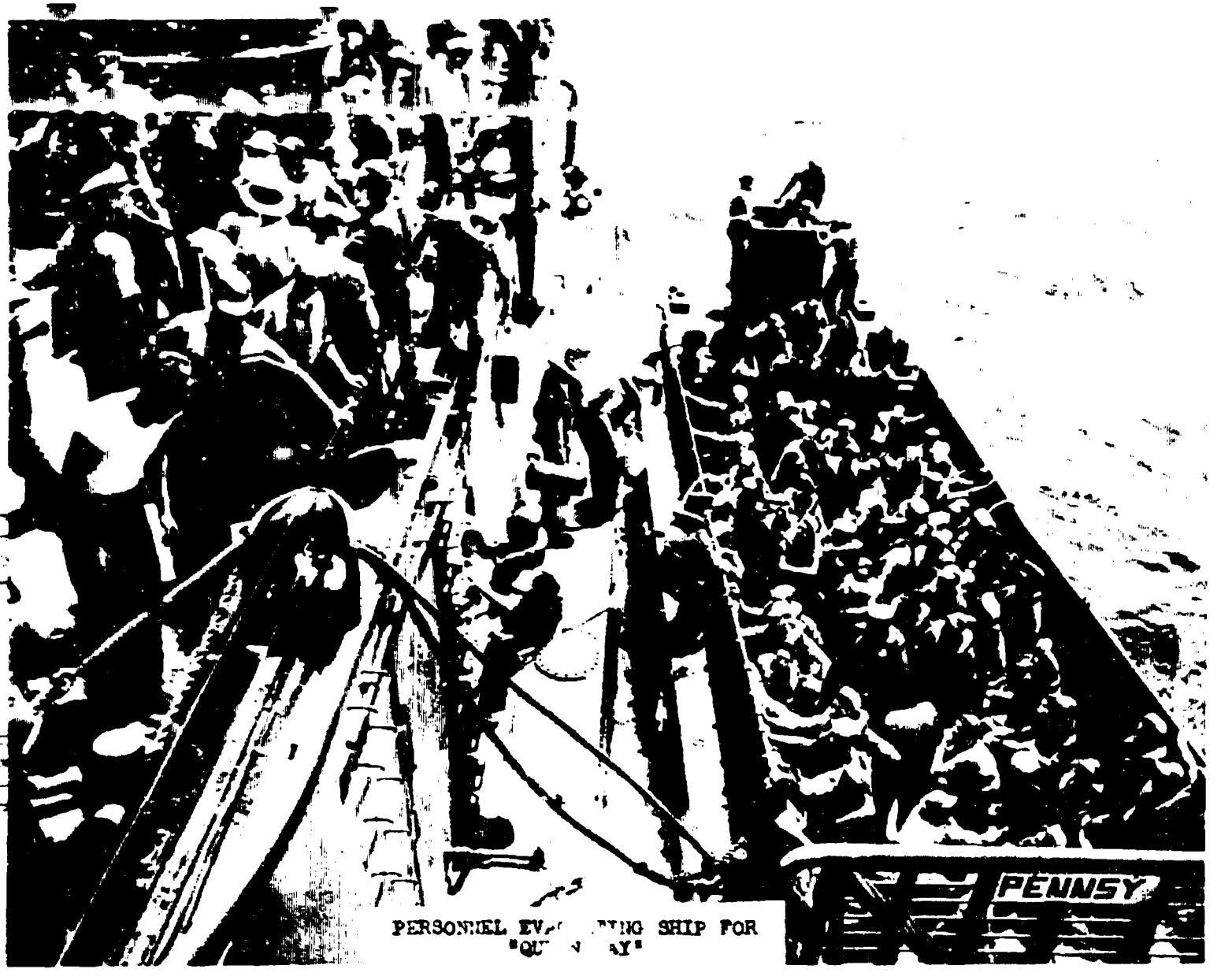
CAPTAIN AND EXECUTIVE OFFICER OF PRINZ EUGEN DECENDING GANGWAY DURING "QUEEN DAY" EVACUATION.

JAPANESE P.O.W. [illegible] PILOT
[illegible] EVACUATED BY U.S. AIRCRAFT

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USE [illegible]



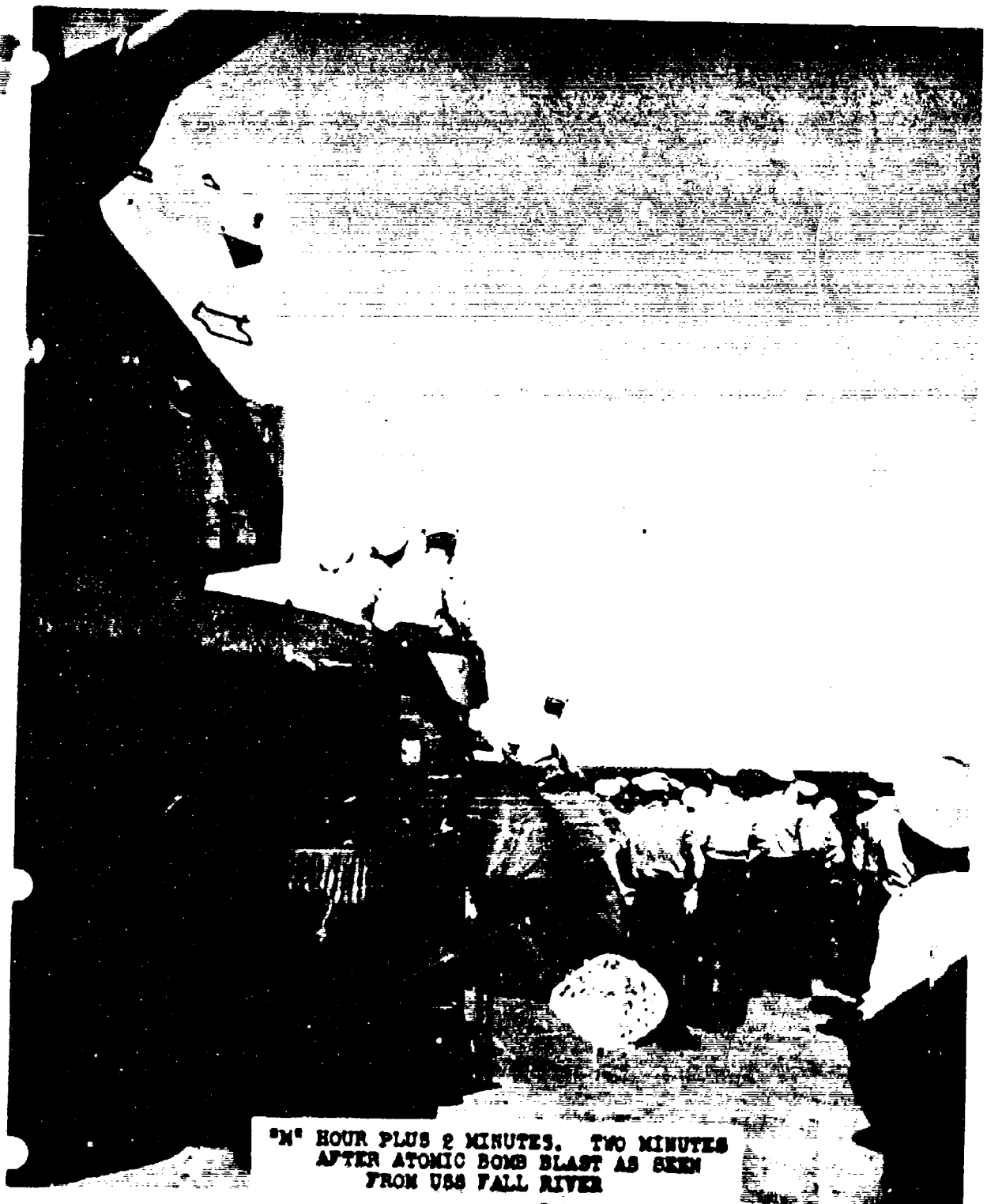
EVACUATION OF PERSONNEL FROM THE U.S.S. NEW YORK TO SHIPS OUTSIDE THE TARGET AREA.



PERSONNEL EV[illegible]ING SHIP FOR
"QU[illegible]AY"



NATIVES EVACUATED FROM BIKINI ENJOY
NEW HOMES ON RONGERIK



"M" HOUR PLUS 2 MINUTES. TWO MINUTES AFTER ATOMIC BOMB BLAST AS SEEN FROM USS FALL RIVER

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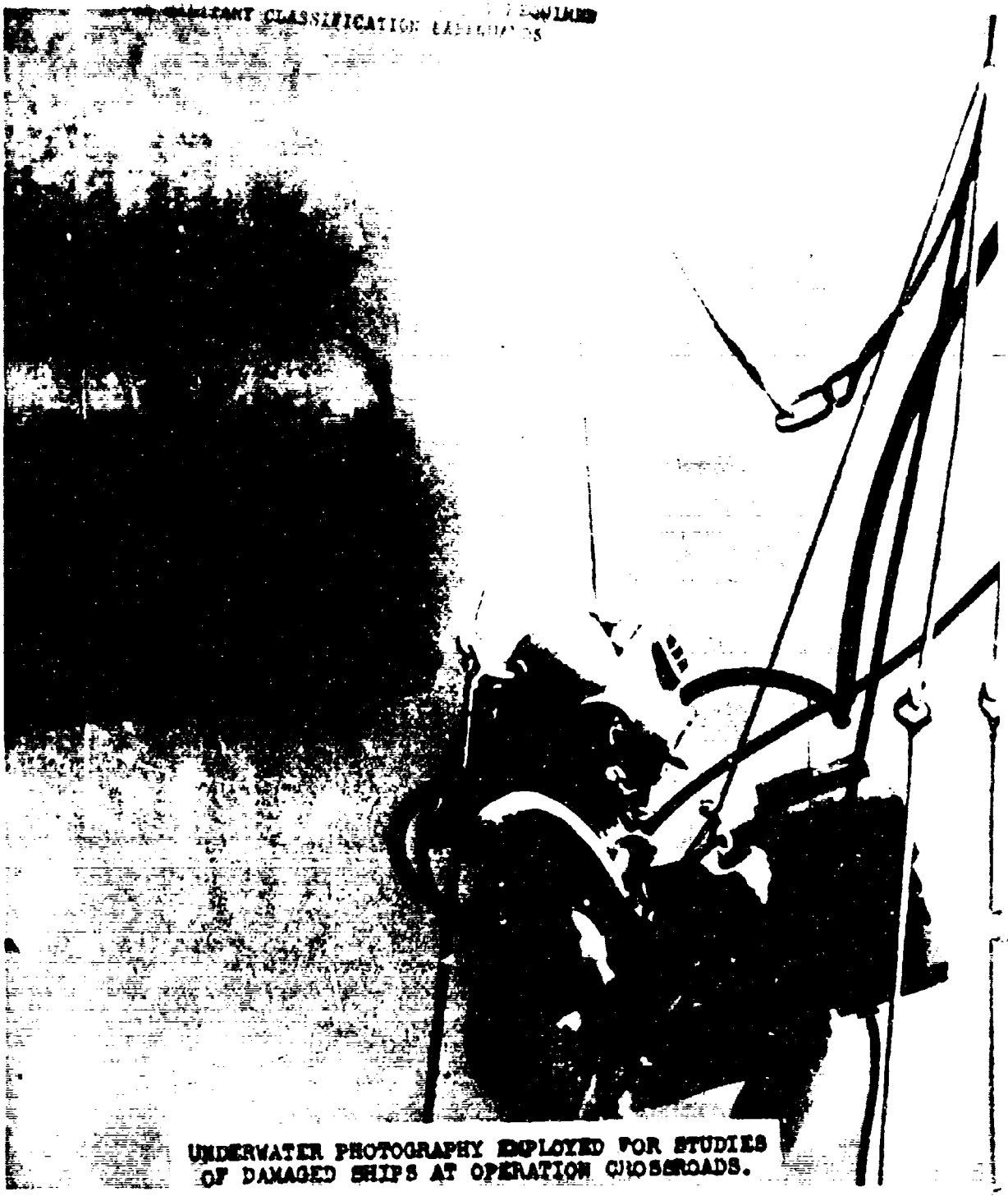
THE BURST OF ABLE BOMB



A.LE CLOUD FORMATION

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UNDERWATER PHOTOGRAPHY EMPLOYED FOR STUDIES OF DAMAGED SHIPS AT OPERATION CROSSROADS.

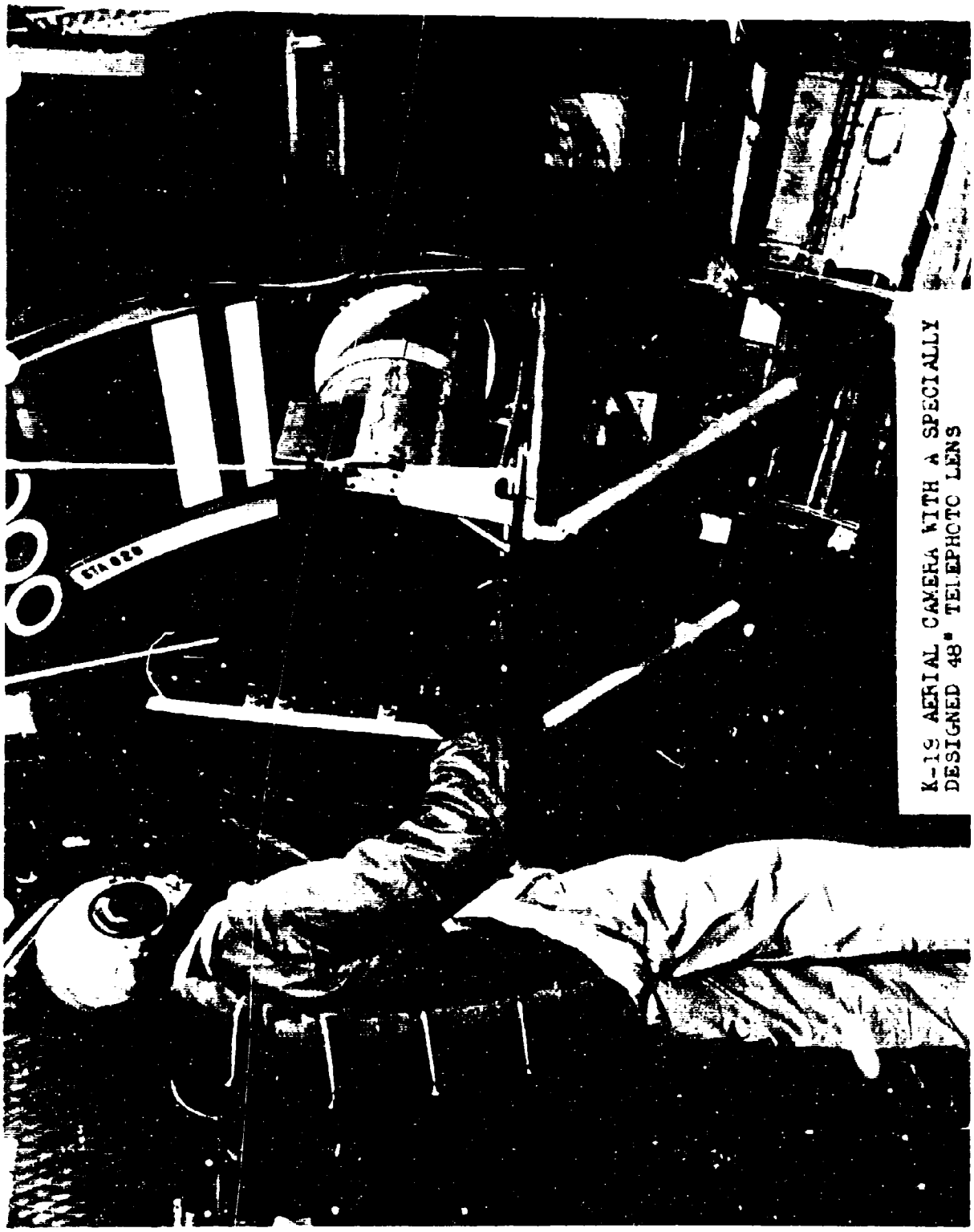


DIVER-PHOTOGRAPHER WITH UNDERWATER CAMERA

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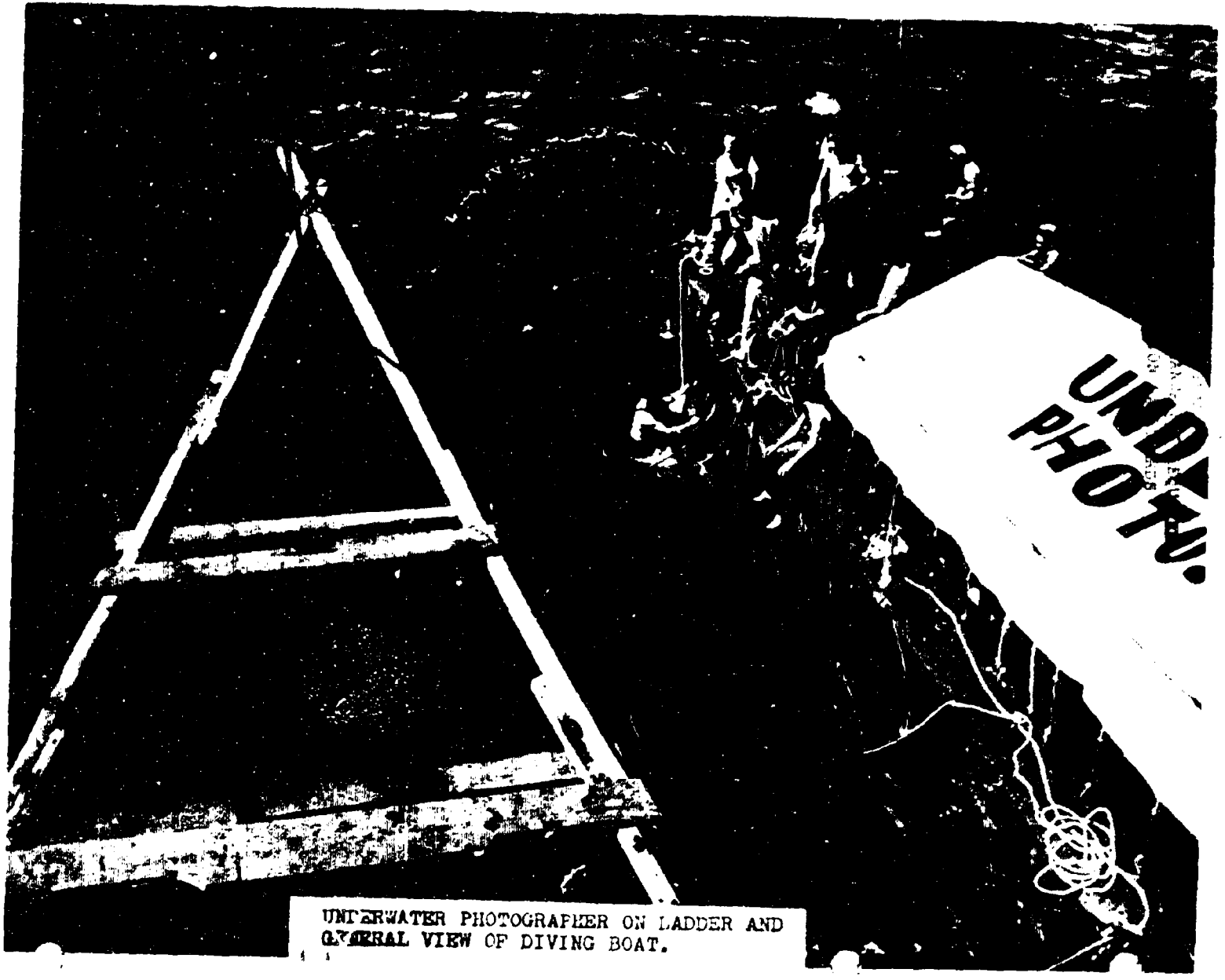


UNDER WATER PHOTOGRAPHY AT BIKINI.
DIVER-PHOTOGRAPHER ABOUT TO DESCEND.



K-19 AERIAL CAMERA WITH A SPECIALLY DESIGNED 48" TELEPHOTO LENS

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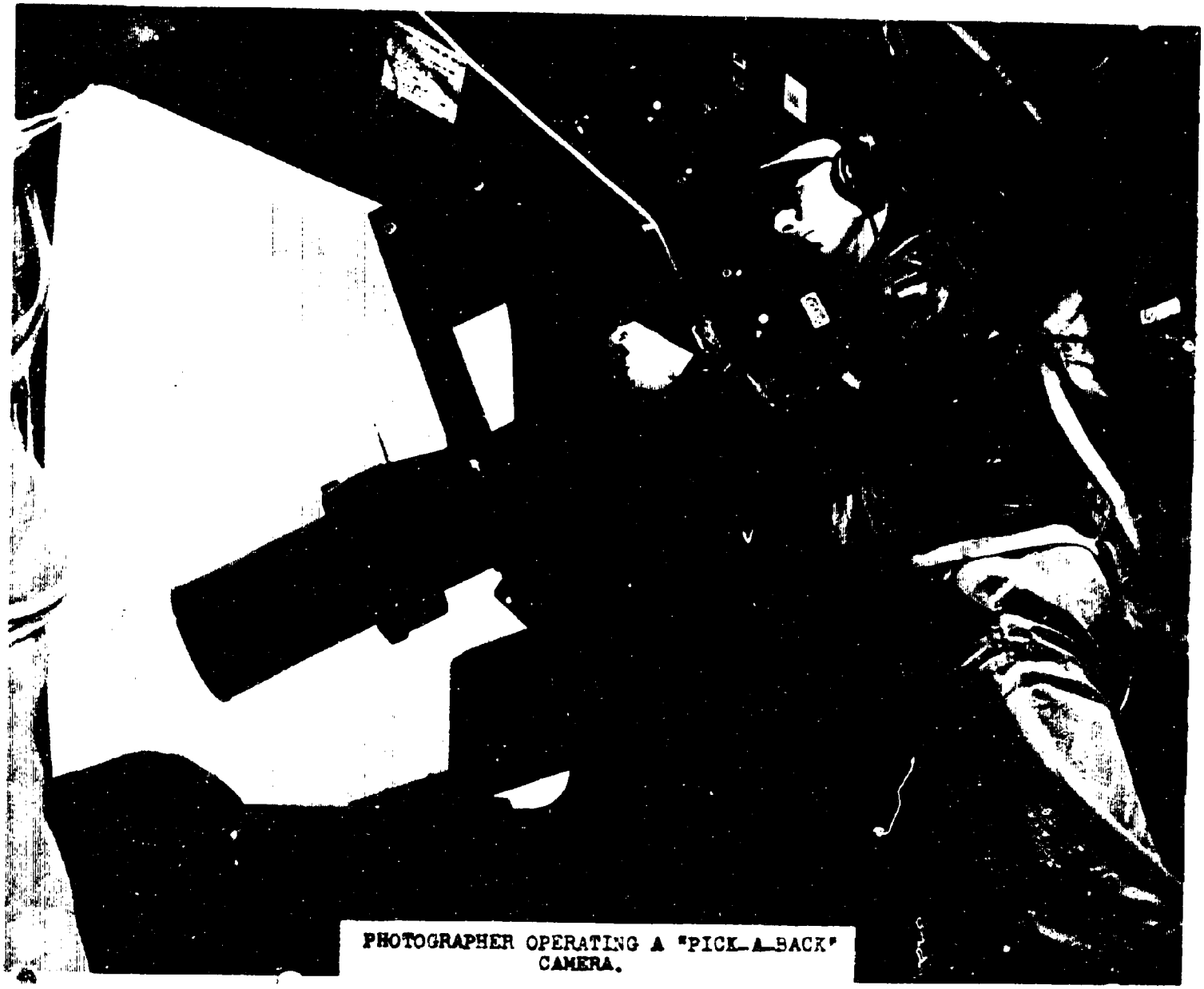


UNDERWATER PHOTOGRAPHER ON LADDER AND GENERAL VIEW OF DIVING BOAT.



ASSEMBLING LAND TOWER CAMERA STATION.

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PHOTOGRAPHER OPERATING A "PICK-A-BACK" CAMERA.

MITCHELL CAMERA MOUNTED IN TBM.

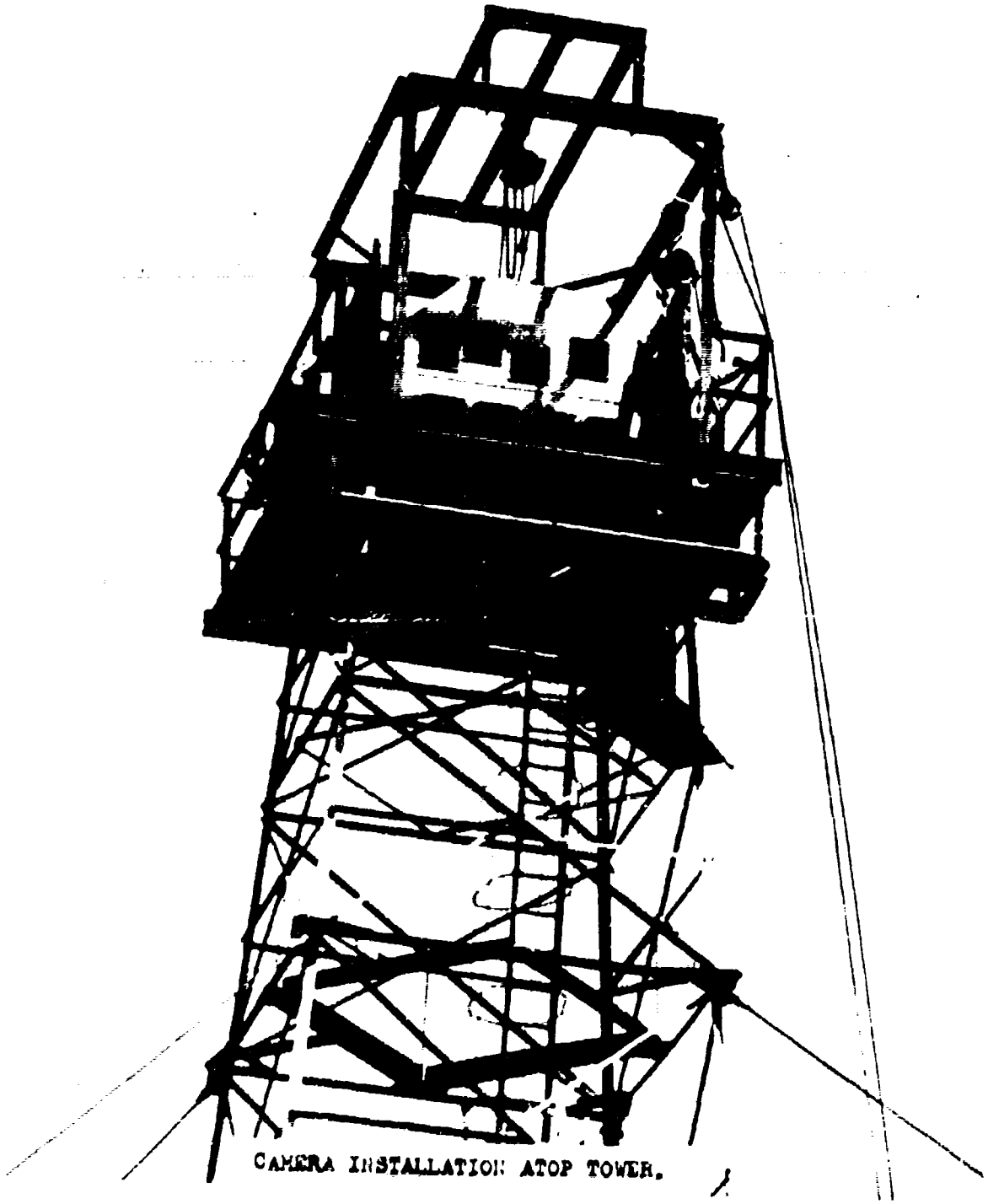
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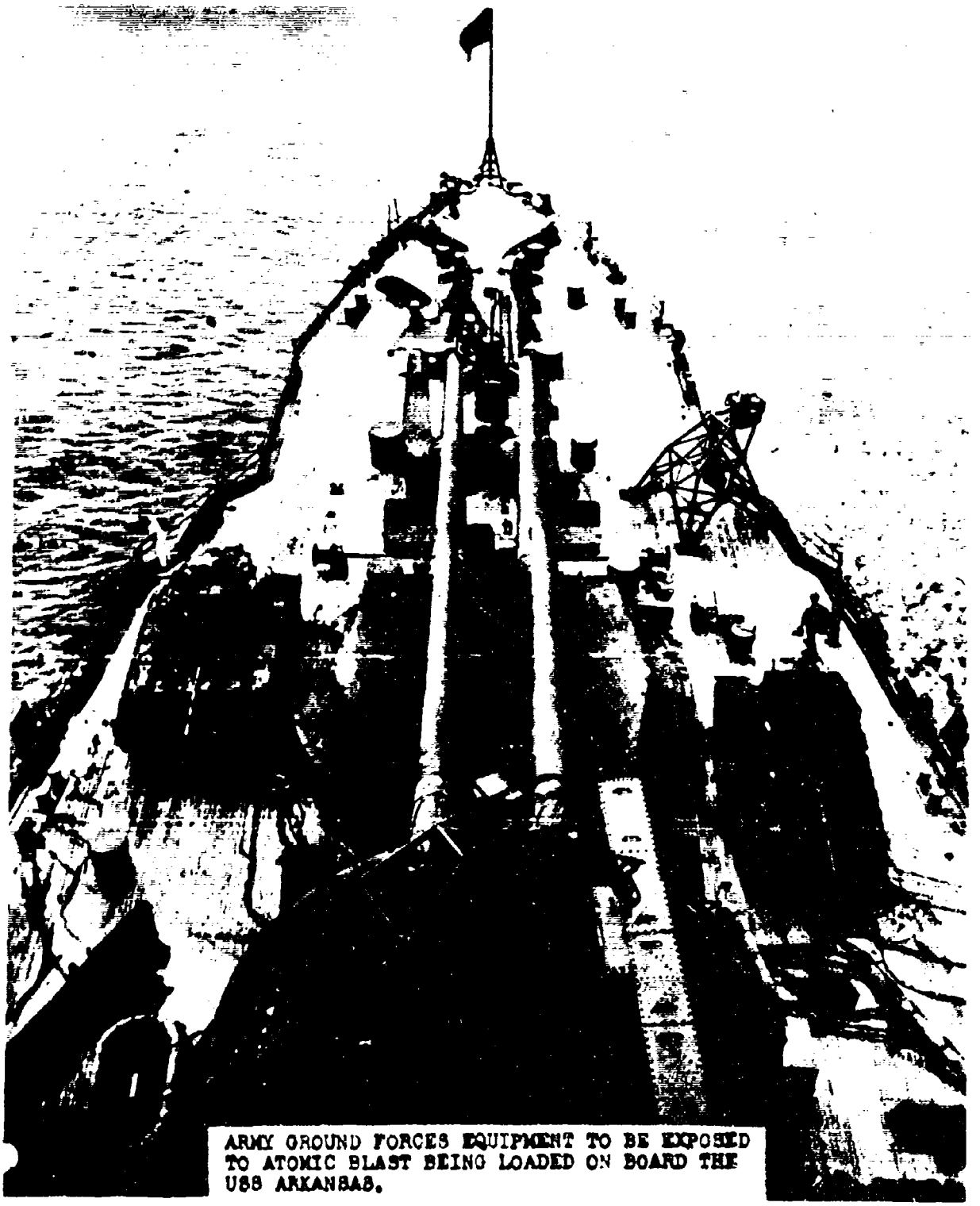
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CAMERA INSTALLATION ATOP TOWER.



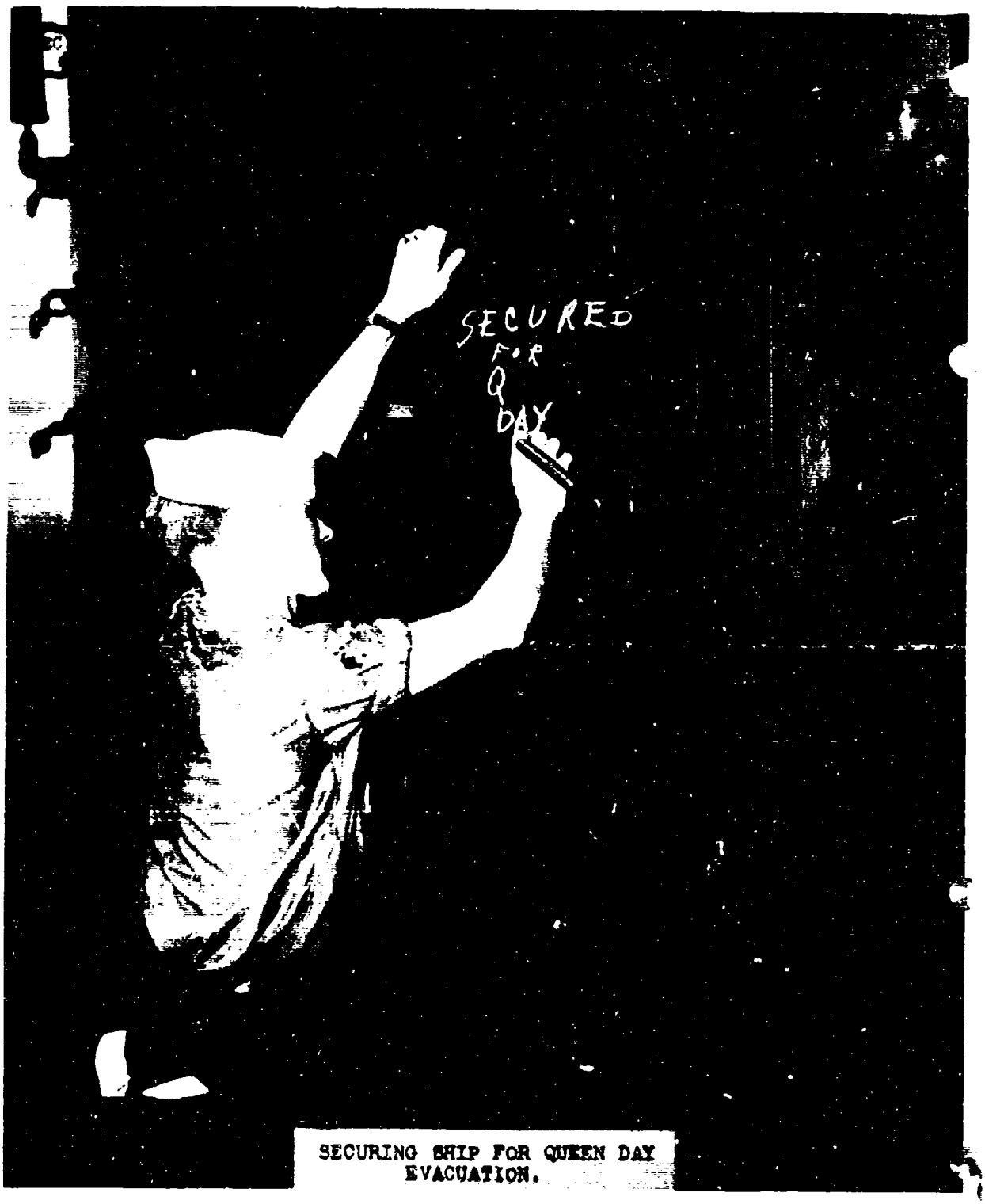
ARMY GROUND FORCES EQUIPMENT TO BE EXPOSED TO ATOMIC BLAST BEING LOADED ON BOARD THE USS ARKANSAS.

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[illegible] DISTRIBUTION SAFE / DS



SECURING SHIP FOR QUEEN DAY EVACUATION.

PAINTING ABLE DAY INSIGNIA ON BRIDGE OF USS PENNSYLVANIA.

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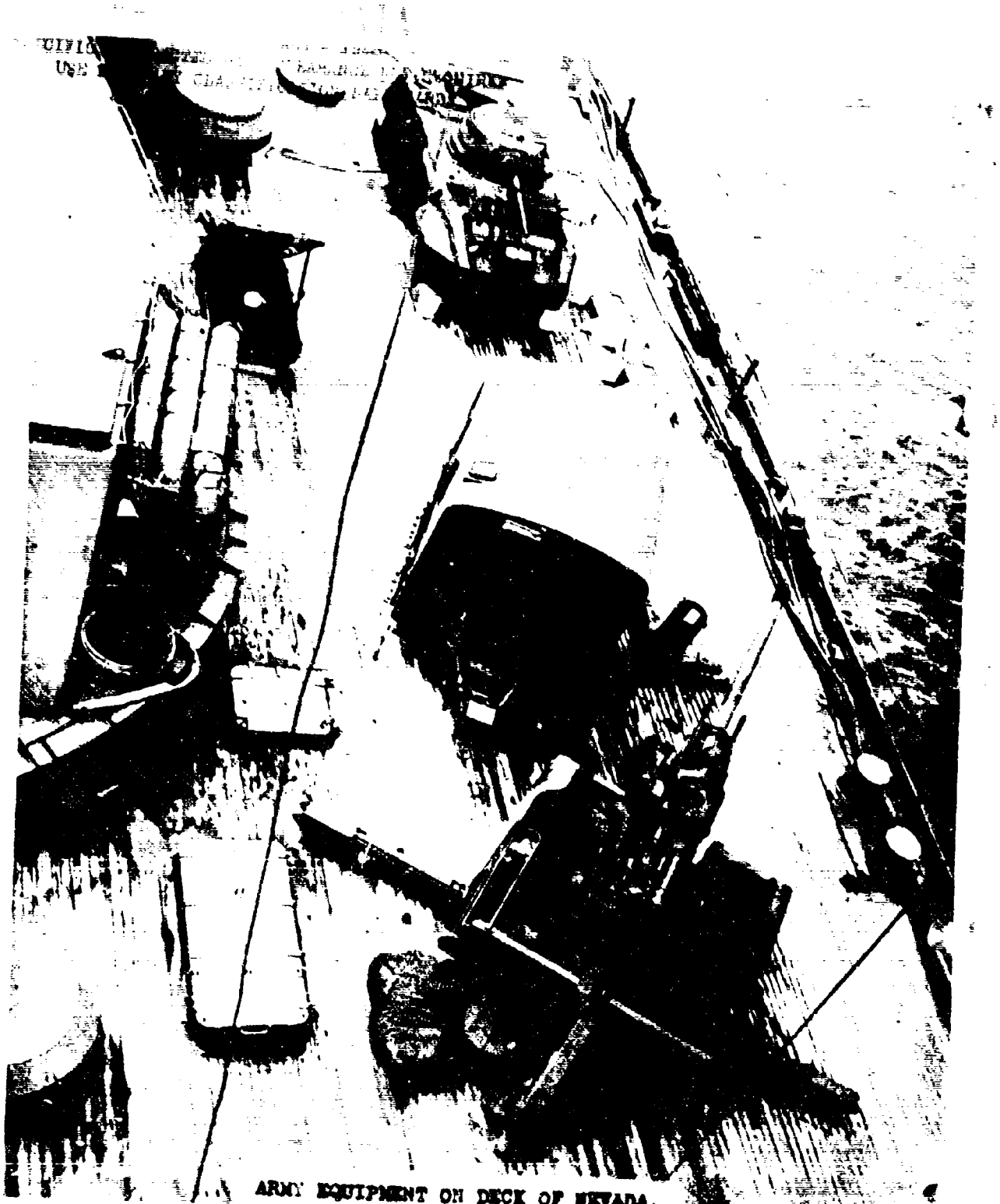
USN MILITARY CLASSIFICATION SAFEGUARDS

U.S.S. PENNSYLVANIA,
PORT BOW



ARMY EQUIPMENT ON DECK OF SHIP.

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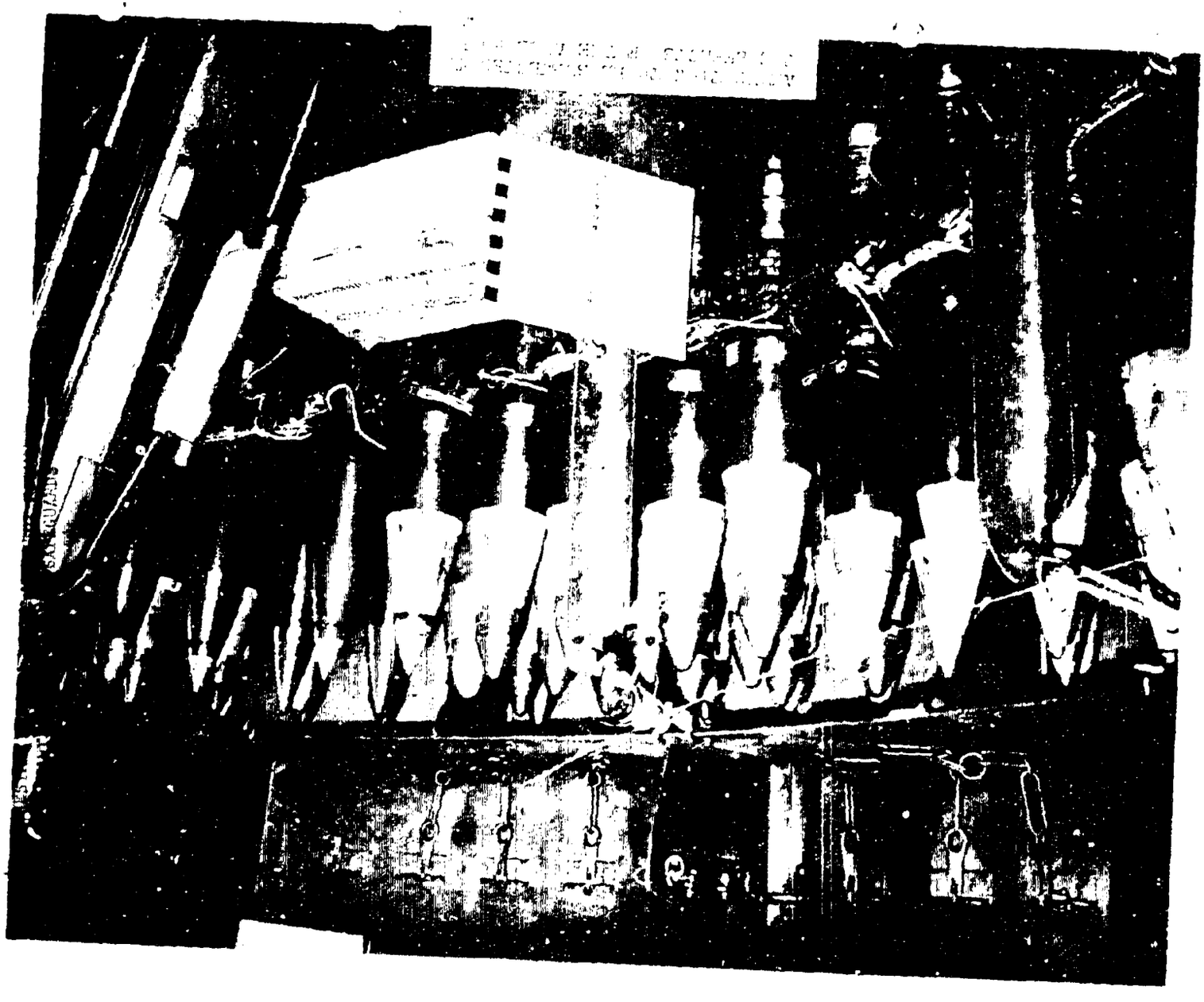


ARMY EQUIPMENT ON DECK OF NEVADA.

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BU CHD MATERIAL TO BE SUBJECTED
TO EFFECTS OF THE ABLE BOMB



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SPECIFIC RESTRICTIONS ON DISCLOSURE AND PUBLICATION

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SPECIFIC REQUIRED
USE MILITARY CLASSIFICATION DATABOOKS

ARMY EQUIPMENT TO BE SHIPPED
TO ARLE ROAD

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TELEVISION INSTALLATION.



THE PRESS CLUB AT KWAJALEIN

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MILITARY OR ATOMIC INFORMATION SAFEGUARDS



OBSERVING PARTY ABOARD THE PGM-29

PRESS INSPECTING TARGET ARRAY AFTER
TEST BAKER FROM A C-54.

RESTRICTED DATA
AEC - 1946
CLEARANCE NOT REQUIRED
SPECIFICATION SAFEGUARDS



PRESS GETS A "K" RATION LUNCH DURING FLIGHT FROM KWAJALIEN TO BIKINI.

CORRESPONDENTS VIEWING TARGET SHIPS
AFTER TEST BAKER.

AP CR-668-2

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
FOR MILITARY APPLICATION SAFEGUARDS

RESTRICTED DATA
SPECIFIC RESTRICTIONS
USE MILITARY CLASSIFICATION

CORRESPONDENTS VIEWING DAMAGE TO TARGET VESSE

CR 54 - 2759

PRESIDENT'S EVALUATION COMMISSION LOOKING OVER DAMAGED SHIPS, 2 JULY 1946.

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



DISSECTING FISH IN LABORATORY
ON USS HAVEN.



MARINE LIFE TO BE EXAMINED FOR RADIOACTIVITY.

RESTRICTED DATA

ATOMIC ENERGY ACT - 1946

SPECIAL [illegible] DATA CLEARANCE NOT REQUIRED

USE MILITARY CLASSIFICATION SAFEGUARDS



TESTING LIVE BIRD FOR RADIOACTIVITY.



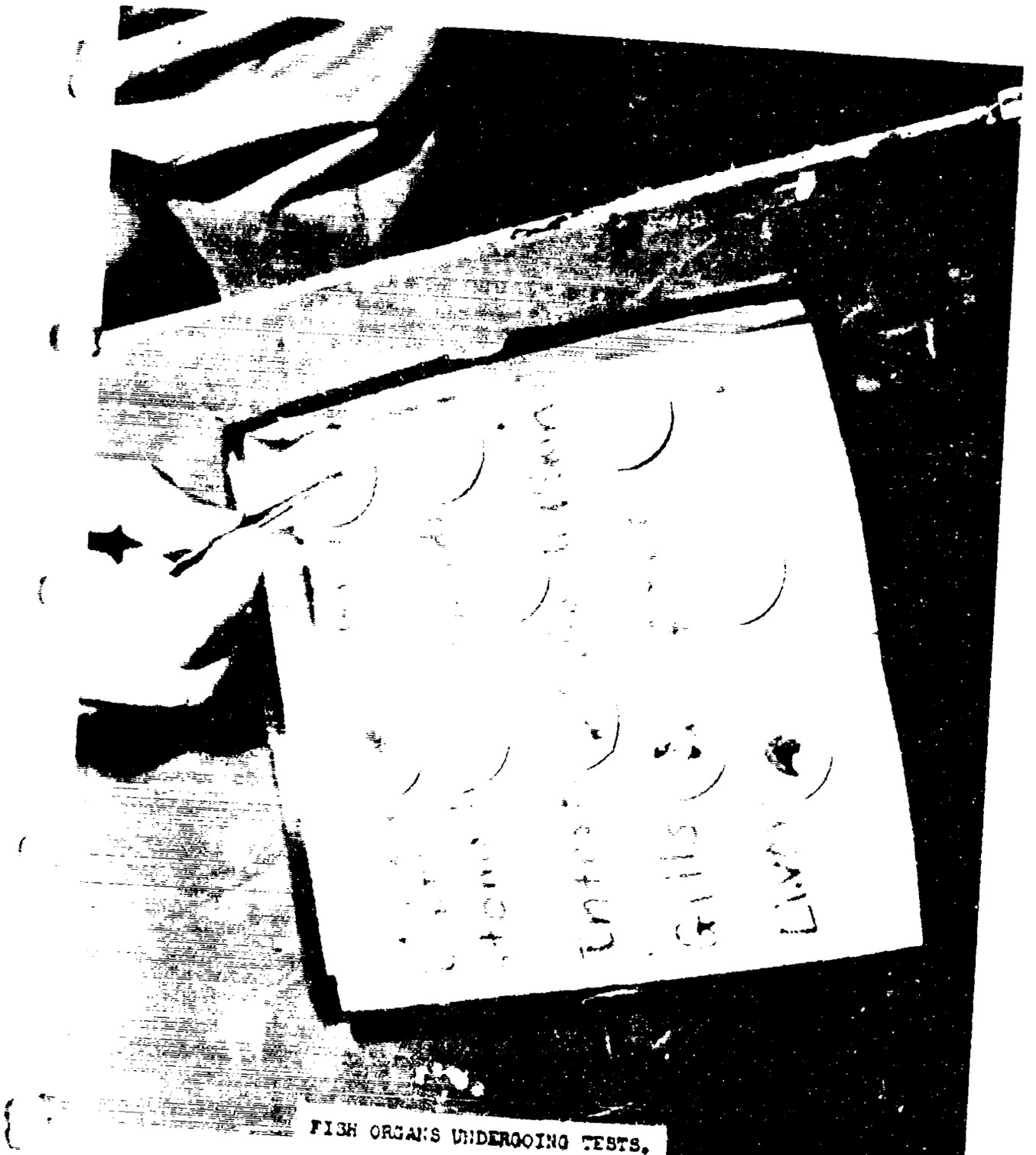
TESTING WATER TO DETERMINE DECAY CURVE.

RESTRICTED DATA
ACT - 1946
SPECIFIC CLEARANCE MAY REQUIRE
USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA



GEIGER COUNTER STOCK ROOM ON USS RAVEN.



FISH ORGANS UNDERGOING TESTS.

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

SPECIFIC RESTRICTED DATA CONTAINED AND REQUIRES
USE MILITARY CLASSIFICATION SAFEGUARDS

RADIO-ECOLOGY FISH SURVEY GROUP DEVISED
FOR FISH THAT HAVE BEEN POISONED.

AA CR 72

THE WARNING DOME THE GUIDES OF THE USS PENNSYLVANIA BEFORE INSPECTION PARTY BOARDS HER AFTER THE ABLE BOMB TEST.

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

PRESERVING SPECIMENS OF FISH



AA CR7E 27052

CATALOGING FISH ABOARD USS HAVEN.

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
CLEARANCE NOT REQUIRED
USS MIDWAY SECURITY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA



CHECKING PERSONNEL FOR RADIOACTIVITY.



ADMIRAL BLANDY AND PARTY INSPECT
ANIMAL LABORATORY ON BOARD
THE USS BURLESON

RESTRICTED DATA

ATOMIC ENERGY ACT - 1946

SPECIAL [illegible] CLEARANCE NOT REQUIRED

USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
SPECIFIC RESTRICTIONS AS TO DISSEMINATION APPLICABLE
USE MILITARY CLASSIFICATION CATEGORIES

GOATS BEING SHEARED PRIOR TO TEST ABLE.

AB CR [illegible] 2415

ATEL-URINE ANALYSIS ON USS HAVEN

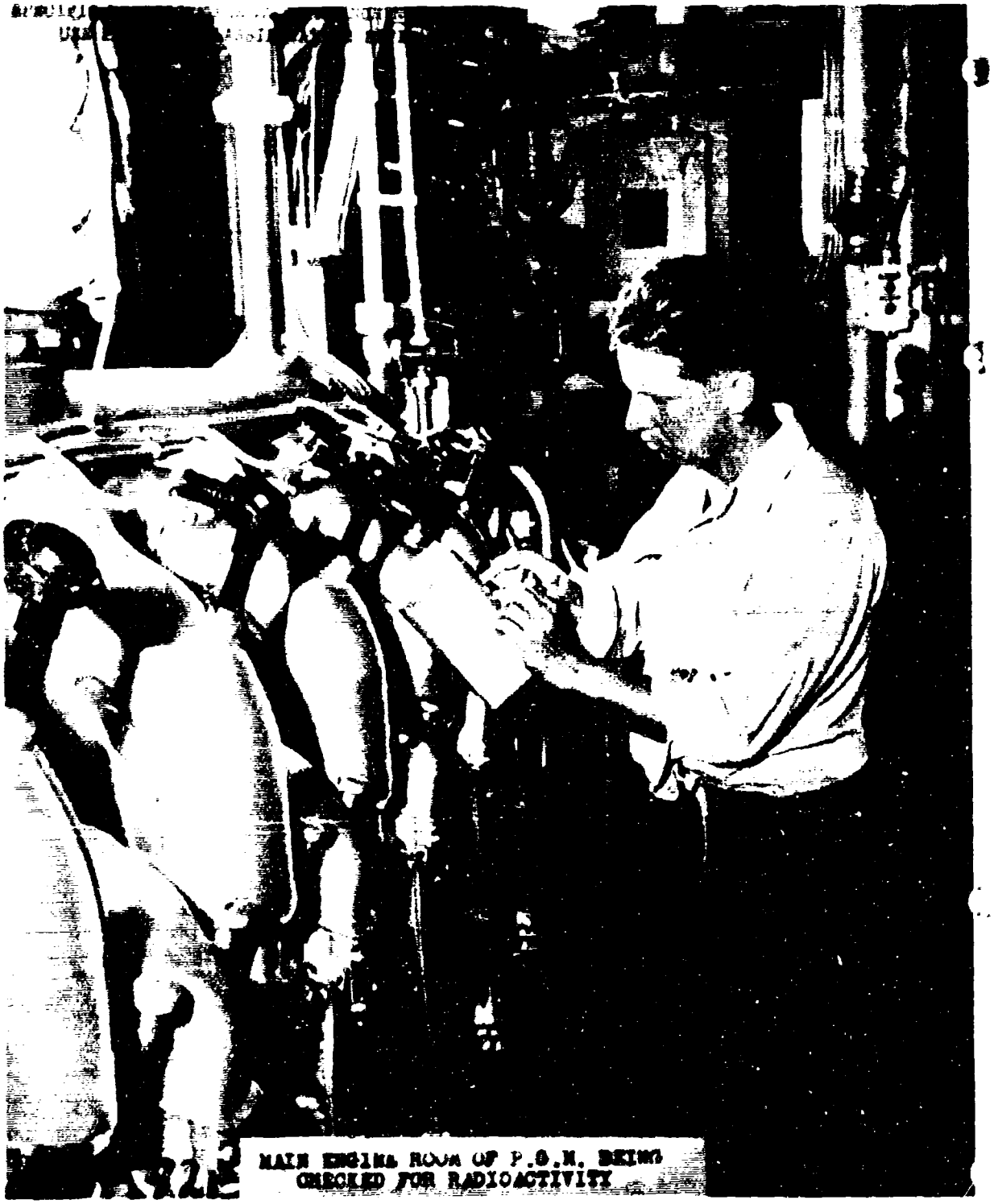
RESTRICTED DATA

ATOMIC ENERGY ACT - 1946

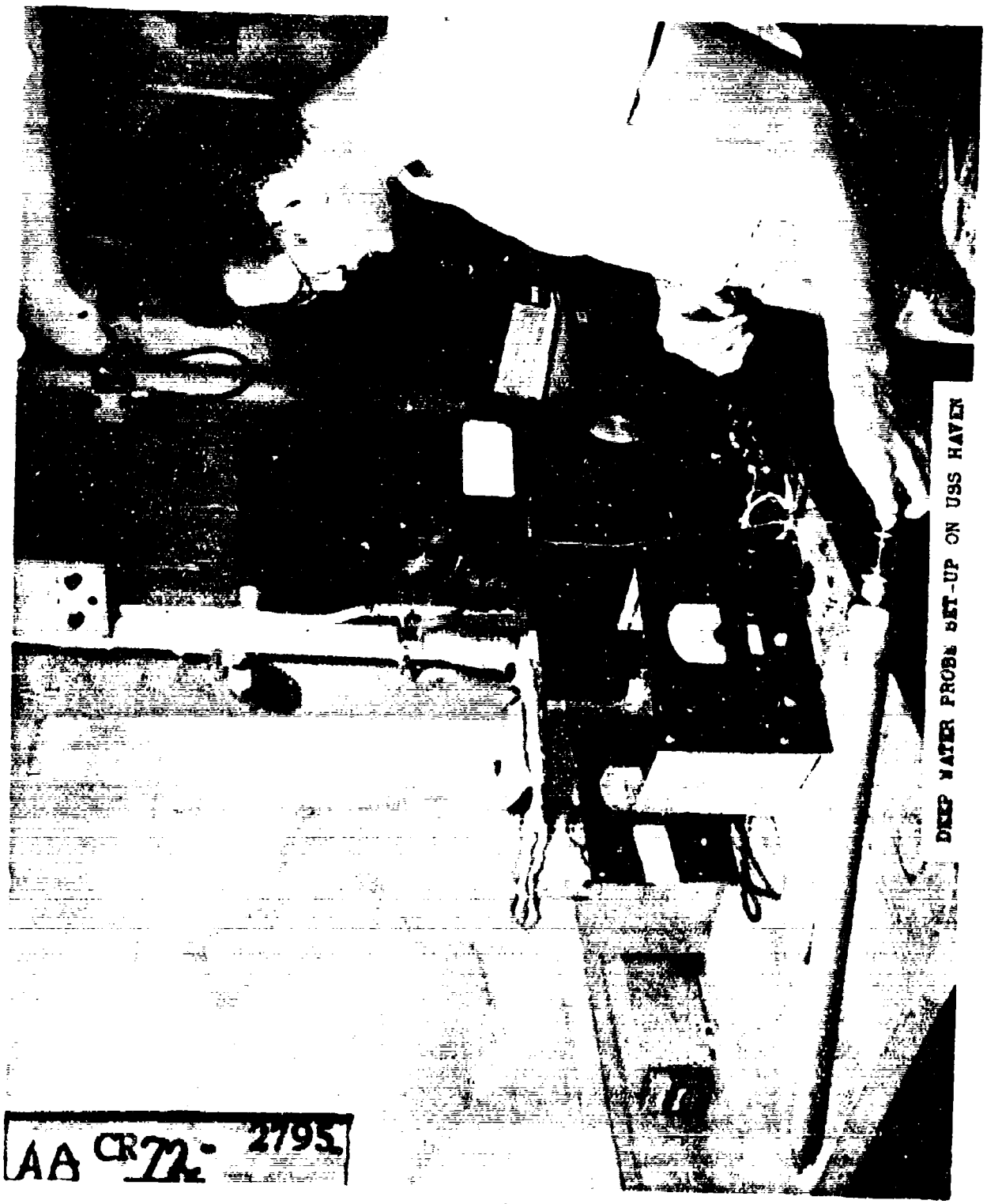
SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED

USE MILITARY CLASSIFICATION SAFEGUARDS

RESTRICTED DATA



MAIN ENGINE ROOM OF P.S.M. BEING CHECKED FOR RADIOACTIVITY

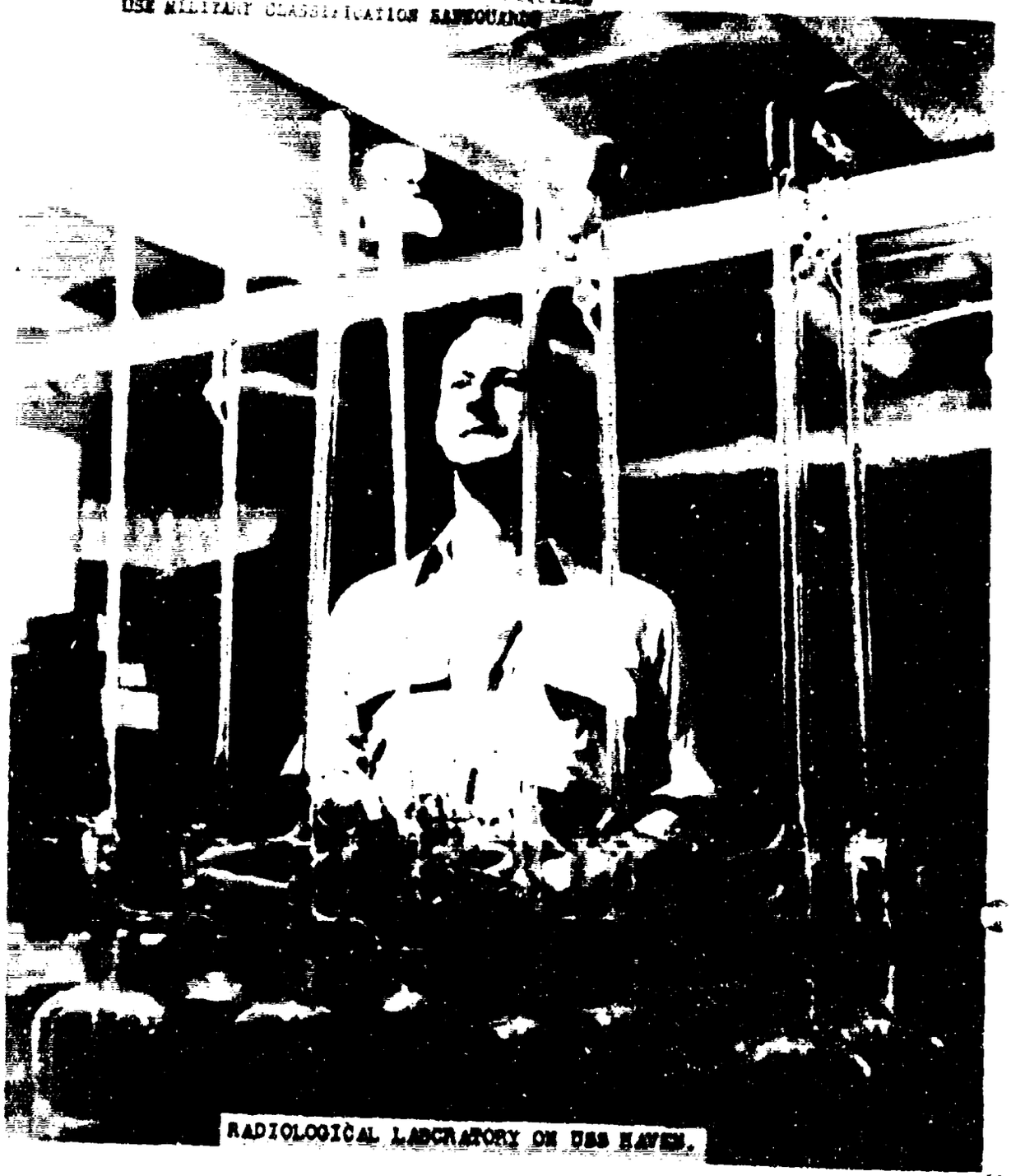


DEEP WATER PROBE SET-UP ON USS HAVEN

AA CR 72- 2795

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

USE MILITARY CLASSIFICATION SAFEGUARDS

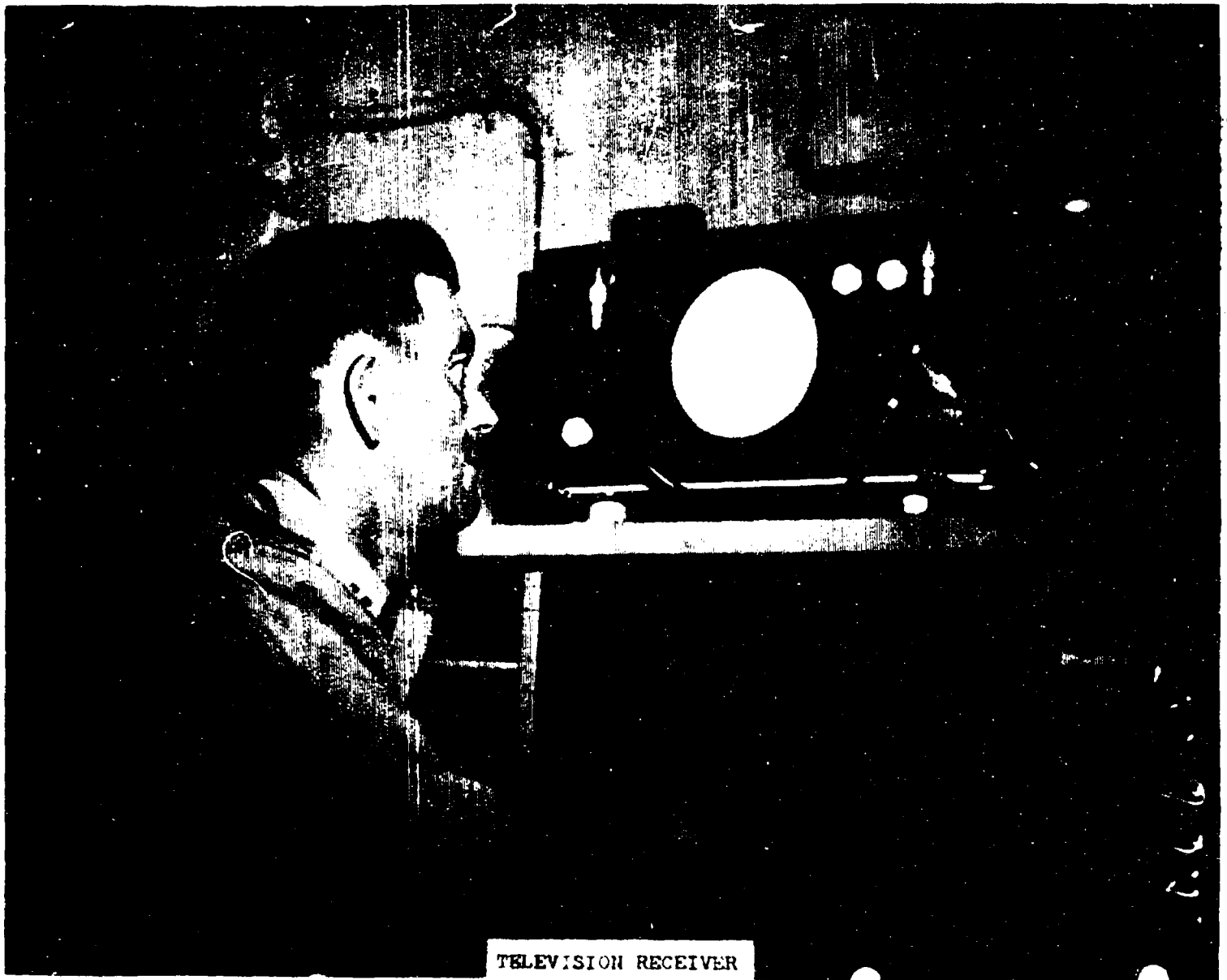


RADIOLOGICAL LABORATORY ON USS HAVEN.



RADIO CONTROL SET-UP FOR DRONE BOATS.

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



TELEVISION RECEIVER

RADIO RELAY STATION ON USS HAVEN
RECEIVING FROM USS MT. MCKINLEY.

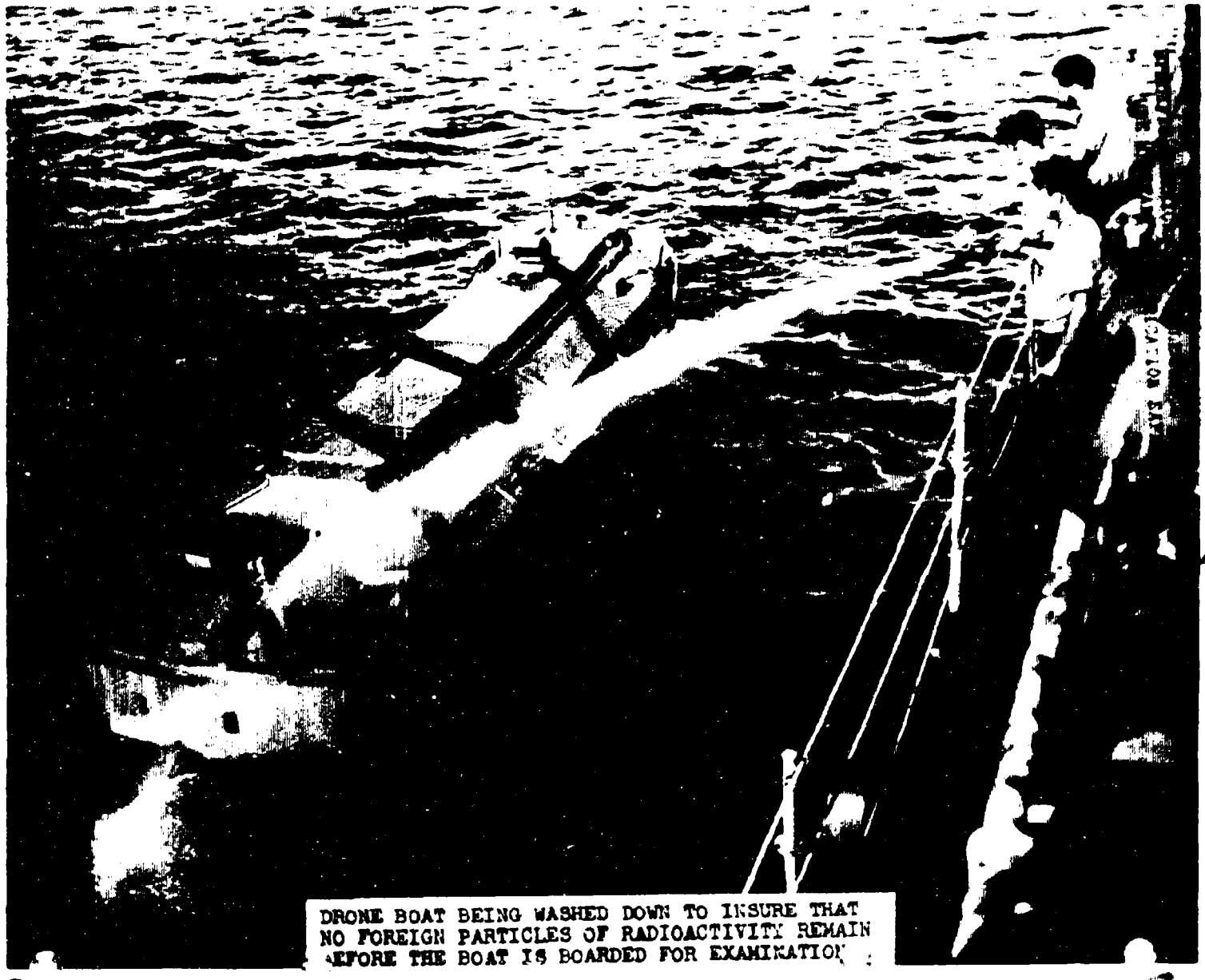
RESTRICTED DATA
ATOMIC ENERGY ACT - 1954
SPECIFIC RESTRICTIONS CONTAINED IN DOD DIRECTIVE
USE MILITARY CLASSIFICATION CATEGORY 10

RESTRICTED DATA
ATOMIC
STRICTLY RESTRICTED
USE MILITARY

DRONE BOAT OPERATION CONTROL

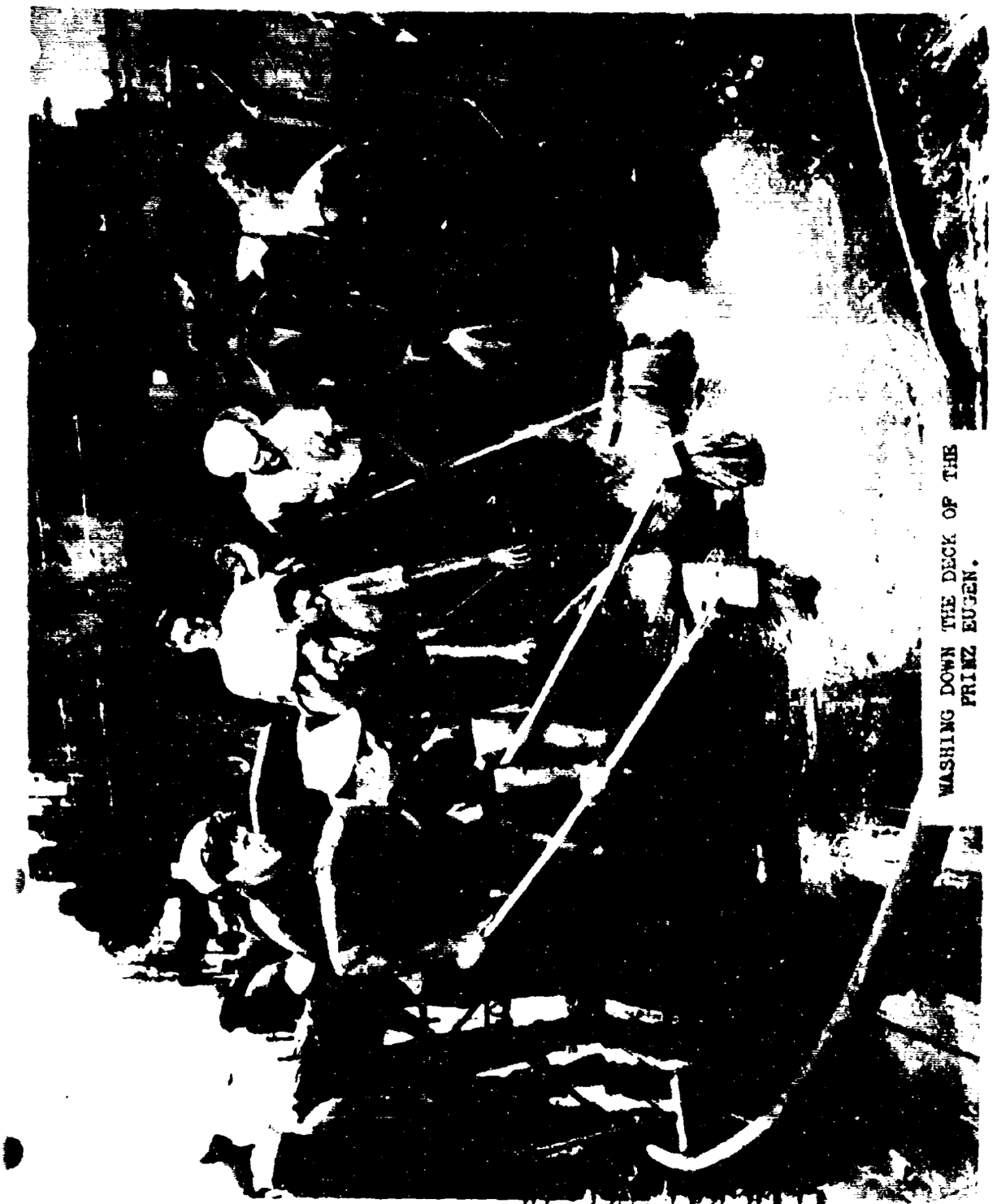
DRONE BOAT UNDERWAY OFF PORT SIDE OF USS HEGOR. OPERATORS AND OBSERVERS IN FOREGROUND.

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



DRONE BOAT BEING WASHED DOWN TO INSURE THAT NO FOREIGN PARTICLES OF RADIOACTIVITY REMAIN BEFORE THE BOAT IS BOARDED FOR EXAMINATION

RESTRICTED DATA



WASHING DOWN THE DECK OF THE PRINZ EUGEN.

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

FIGURE



CLOSE UP OF TAIL FOR JTF-1
IN WELL OF LCVP.



[illegible] DATA

[illegible]

SITE [illegible]

USE MILITARY [illegible]

ACT – [illegible]

[illegible] REQUIRED

[illegible] SAFEGUARDS

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

USS SKATE UNDERWAY AFTER BEING REFLOATED

AAC-2996-

DAMAGED USS SKATE RE-FLOATED

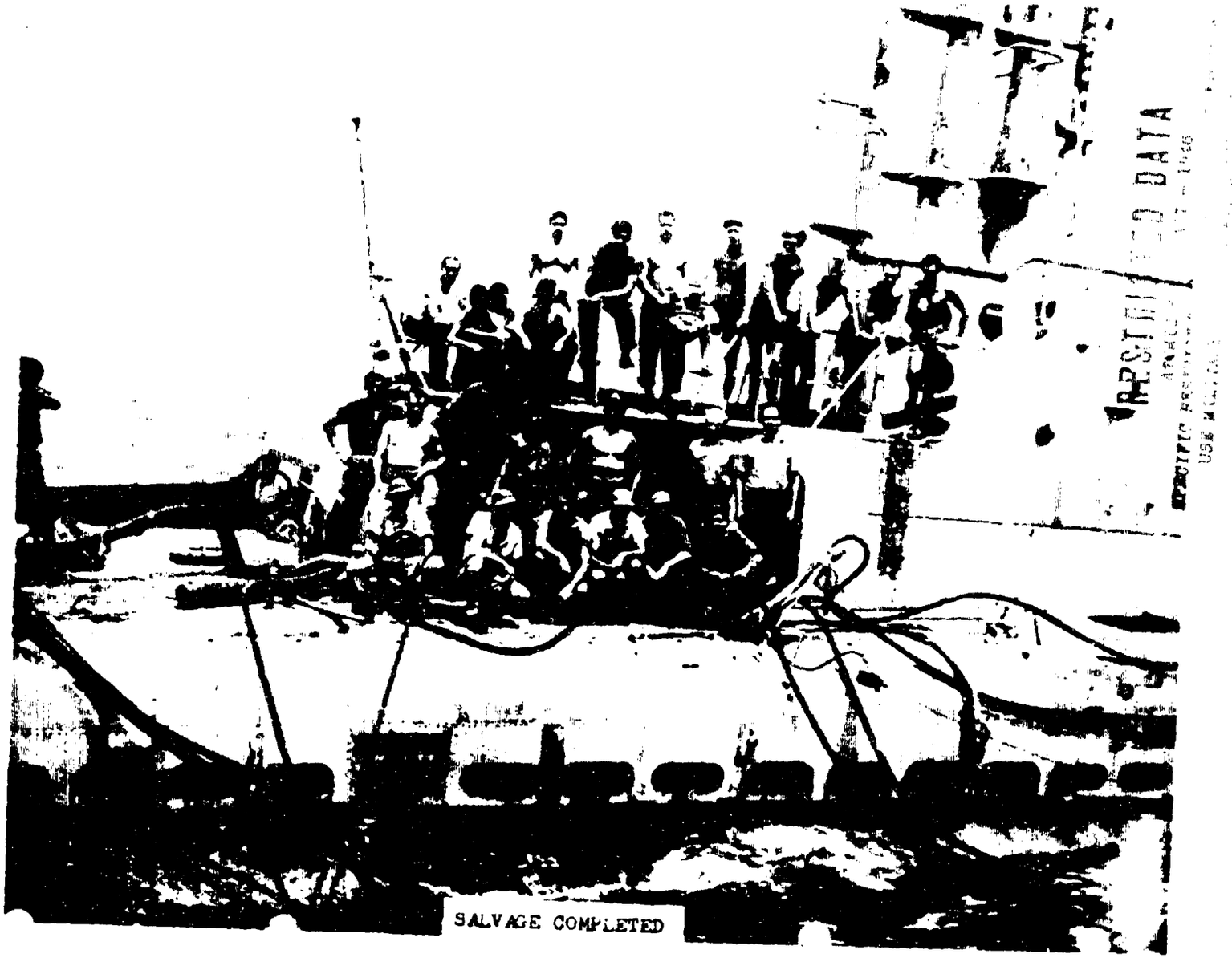
NACP64-27244

RESTRICTED DATA

AEC [illegible]

SEE [illegible] COMMANDER [illegible]

USE [illegible] CLASSIFICATION GUIDELINES



SALVAGE COMPLETED



DAMAGE SUSTAINED BY THE
USS SKATE

AA CR44-

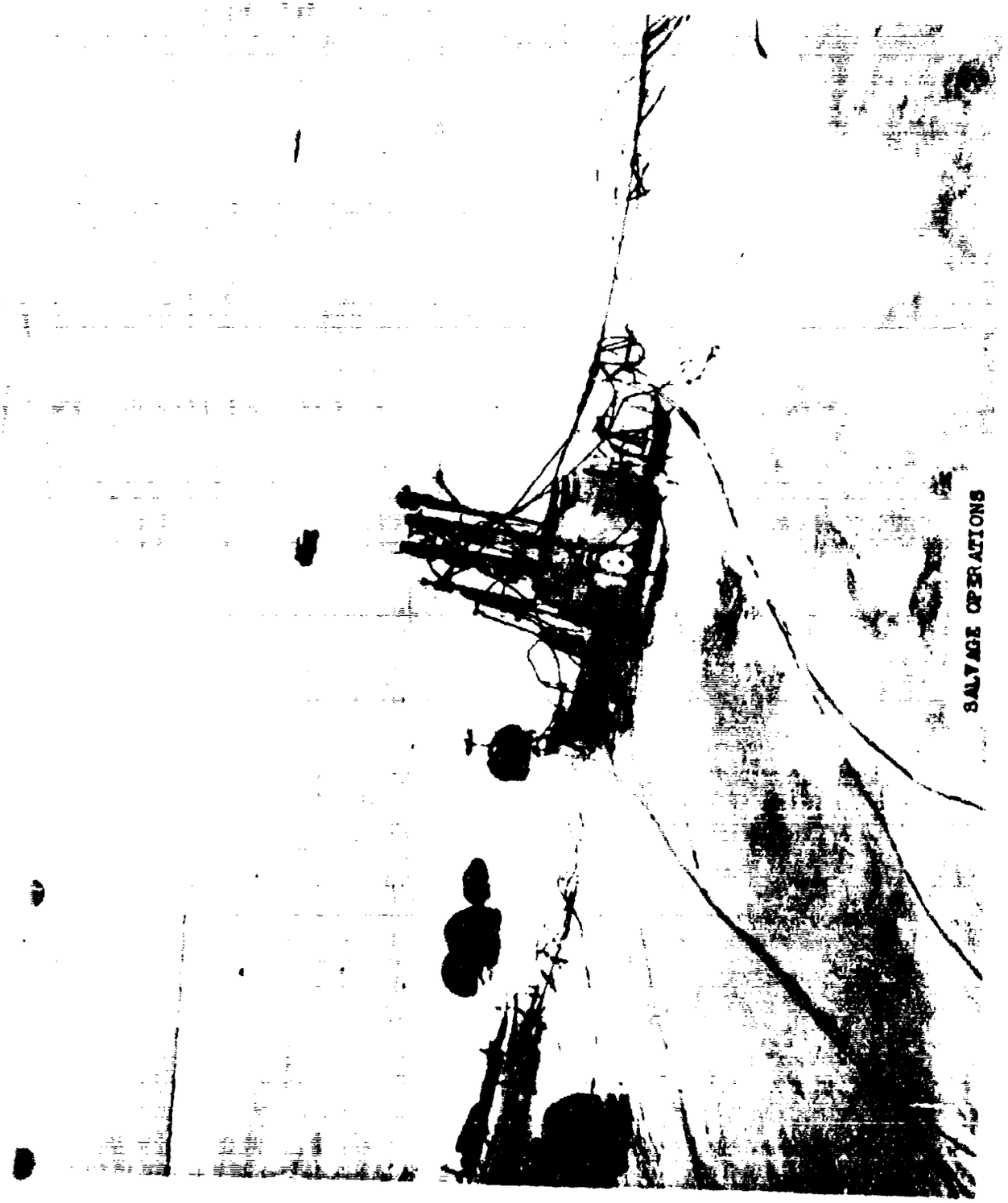
RESTRICTED DATA

AT VI[illegible] A.T. 1946

DISCLOSURE SUBJECT TO [illegible] CHARGES NOT REQUIRED
[illegible] MILITARY [illegible] STATES PARTICIPATION

RESTRICTED DATA

SALVAGE OPERATIONS



SALVAGE OPERATIONS

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

RESTRICTED DATA
ATOMIC ENERGY ACT - 1946
RESTRICTED INFORMATION - CONTAINS ATOMIC ENERGY DEFENSE
USE MILITARY CLASSIFICATION GUIDELINES

SINKING OF THE SARATOGA.



AACR-542922-7

[illegible] LU DATA

[illegible] – 1945

[illegible]

RESTRICTED DATA

ENLISTED MEN'S RECREATION AREA
BIKINI

DECLASSIFIED

ENLISTED MEN'S RECREATION PARTY
ON BEACH AT BIKINI

RESTRICTED DATA
ATOMIC ENERGY ACT 1946
SPECIAL HANDLING REQUIRED
NOT RELEASABLE TO FOREIGN NATIONALS

UNCLASSIFIED

CANCELED



INSTRUMENT REPAIR SHOP, USS HAVEN.

CANCELED

UNCLASSIFIED