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HEADQUARTERS
TASK GROUP 7.1
JOINT TASK FORCE SEVEN
LOS ALAMOS SCIENTIFIC LABORATORY
J Division, P. O. Box 1663
Los Alamos, New Mexico

NMB-U

J-19161

17 August 1953

TO: DISTRIBUTION LIST

FROM: Commander, Task Group 7.1

SUBJECT: GENERAL CONCEPT OF OPERATION CASTLE (REVISION #1)

REFERENCE: (a) CTG 7.1 Sec. Ltr. J-16757 of 7 April 1953.

1. This is Revision #1 of the GENERAL CONCEPT OF OPERATION CASTLE which cancels and supersedes reference (a).

GENERAL CONCEPT OF OPERATION CASTLE (REVISION #1)

This concept is provided for planning purposes. It will be revised from time to time as significant changes occur.

A. SHOT SCHEDULE

Shot	Code	Date	Model	Yield (MT) (Presumed Range)	Site
#1	NECTAR	N Day 15 Feb.		4 (1½ - 7)	Bikini: On reef 2950 feet bearing 250° true from SW tip of Namu
#2	UNION	U Day 25 Feb.		3 - 4 (1 - 6)	Bikini (Barge): Inter-Section of arcs with radii of 6900' from Yurochi and 3 statute miles from Aomoen.
#3	BRAVO	B Day 8 Mar.		6 (4 - 8)	Bikini - ENE [redacted] on line toward Aomoen. (Barge)
#4	KOON	K Day 17 Mar.		1 (1/3 - 2½)	Bikini - Eninman
#5	ECHO	E Day 24 Mar.		125 KT (65-275 KT)	Eniwetok - Eberiru
#6	YANKEE	Y Day 3 Apr.		8 (6 - 10)	Eniwetok - Eugelab Crater (Barge)

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The present most probable yields and limits are given, but limits are not absolute. Experimenters must instrument to accept a rather wide range yieldwise on the respective shots. Probable times of LASL shots will be between 1 hour [redacted] and 1/2 hour before sunrise depending upon results of experiments to be conducted in the forward area. The probable times of UCRL shots will be 1/2 hour before sunrise.

Exact shot positions will be indicated on an instrumentation chart soon to be distributed by J-6.

B. Basic Principles:

1. [redacted] will be done at Eniwetok atoll. DOE
2. [redacted] and maintenance work will be done on Eniwetok (Parry).
3. Five of the six devices and weapons will be assembled on Eniwetok (Parry and Eberiru).
4. Machine shop, laboratory, photographic, warehouse and stockroom facilities will remain on Eniwetok (Parry and Eniwetok) except for limited field facilities at Bikini.
5. The USS CURTISS will be the principal shipboard facility for project laboratory, shop, and office spaces.
6. Mech preliminary assembly, testing of experimental equipment, and rehearsals will be done on Eniwetok (Parry).
7. Port of entry for aircraft and most shipping will be on Eniwetok.
8. Radio links with Los Alamos and Oahu will be maintained on Eniwetok.
9. Temporary working camps will be located on Rojoa (Eniwetok Atoll), and on Enirman, Namu, and Romurikku (Bikini). Enyu and Bikini will have small temporary camps to support project personnel necessary at those sites.
10. The camp site facilities on Eniwetok, Parry, and at Bikini will be severely taxed due to population congestion at these principal locations. Shipboard accommodations, especially aboard the CVE and AGC, will also be limited. In view of these expected conditions, it is necessary that:

a. Only those personnel necessary to get the job done should be in the forward area.
b. Personnel should leave the forward area as soon as their jobs are completed.
c. Personnel should be at Bikini only as long as their operations require it.

11. The Air Force Task Group will be based on Eniwetok Island.
12. The Task Group Commander and major elements of the task units and staff sections will be located on Parry. Commander, Joint Task Force SEVEN, CTG 7.1, CTG 7.4, CTG 7.5, and key operations staff personnel and certain task unit personnel will be aboard the AGC at Bikini from about two (2) days before to one (1) day after each shot.

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[redacted]

C. Timing and Firing:

1. The AGC Command ship will be positioned within VHF communications range of Enyu (Nan) during each Bikini shot. Firing of the four shots at Bikini Atoll will be accomplished from the timing and firing station on Enyu, by a firing party of six or less. This station will also serve as a photo station and for intra-atoll communications. Six radio time signals in addition to the wired signals will be furnished at Eniwetok and Bikini. Certain time signals will be repeated back from Bikini to Parry (Elmer) to allow correlation of operations with the Bikini shots. Firing of the shots at Eniwetok Atoll will be accomplished from the control station on Parry.

D. Construction:

1. The construction phase must be completed by 1 January 1954. The submission of any new major construction requirements will require the approval of CTG 7.1 and, if approved, may only be accomplished by the cancellation of some construction requirements already submitted. CTG 7.1 will also decide what cancellations will be made; the projects affected will be notified.

2. An instrumentation chart will be published separately by J-6. It will include: coordinates of the shots, power supplies, instrument stations, telephones, bunkers, photo towers, etc.

3. As much construction equipment and material as possible will be evacuated to Eniwetok prior to the first Bikini shot. Some construction equipment and material required for post-shot re-entry will be relocated to islands out of the danger area or evacuated by LST's and LCU's.

E. Evacuation:

1. Present plans for personnel evacuation are as follows:

[redacted]

Partial evacuation
Almost complete evacuation
Almost complete evacuation
Complete evacuation
No evacuation
No evacuation

DOE

a. [redacted] A small firing party will be on Enyu. Only the personnel required for early re-entry, and early preparatory activities for subsequent shots, will be on Eninman (Tare), or aboard ships in the Bikini area.

DOE

b. [redacted] Because of the possibility of contamination, all personnel, except the firing party on Enyu and a skeleton crew for operating the utilities of the base camp on Eninman, will be evacuated aboard ship or to Eniwetok. The numbers of personnel on Enyu and Eninman will be within the capability of helicopter lift.

DOE

[redacted]

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[redacted]

c. [redacted] All personnel, except the firing party, will be evacuated to Eniwetok or aboard ship. Material and equipment not required in recovery operations will be evacuated to Eniwetok. Data and equipment recovery operations will be conducted from afloat or from Enyu. DOE

d. [redacted] There will be no pre-shot evacuation of personnel or material from Eniwetok Atoll. DOE

e. An emergency capability for post-shot, personnel evacuation of Bikini and Eniwetok Atolls will exist. An emergency post-shot evacuation will be executed only if radiological conditions indicate it is necessary and will be capable of accomplishment on four (4) hours notice. Such evacuation will not involve movement of materiel.

2. Trailer Locations:

a. The choice of trailer locations has been considered from the point of view of expected blast damage. It has been assumed in these predictions that the trailers will be of thin sheet metal construction, suitably braced inside, dimensions about 35' x 13' x 8', with full length double cargo doors on one end and a smaller personnel door on one side. Typical contents have been assumed to consist of instrument repair and calibration facilities, office furnishings, small machine tools, and photographic processing equipment.

b. The upper limits of the expected yields have been chosen for the calculations. It is believed that trailers will be safe up to 1.5 or possibly 2.0 p.s.i. Trailers should be safe from external damage with doors open and their smallest areas presented to the blast in order to reduce the area exposed to the high but short durations of wind. However, for protection of the interior, it would be advisable to seal the unit as completely as possible to prevent damage to interior equipment due to wind. If a ventilation system is provided, it should be sealed off since it has been observed that gases at a low level of overpressures flowing through a small opening into an enlarged chamber may behave as compressible flow through a throat or nozzle, with the formation of damaging secondary shock waves. Wheels should be chocked to prevent any tendency to roll. Project officers will have to weigh the above factors in deciding their respective trailer attitudes.

The following table is a general guide indicating peak over-pressures and velocities to be expected. Detailed studies of specific problems may be requested from J-10, Fran Porzel.

[redacted]

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DOE

Shot No.	Shot	Yield Used For Calcs.	Range to Western tip of ENINMAN (ft)	Range to Eastern tip of AIRUKILJI (ft)	Range to ENYU (ft)	PSI			WIND (mph)		
						Eninman	Airukiiji	Enyu	Eninman	Airukiiji	Enyu
1		7 MT	78500	84500	120,000	1.3	1.2	0.8	47	44	28
2		6 MT	62300	59000	79,500	1.6	1.75	1.2	58	63	44
3		8 MT	63500	59500	78,000	1.85	2.0	1.4	67	72	51
4		2 MT	-	-	69,000	-	-	0.9	-	-	34

		Range to Southern Tip of Engebi (ft)	Range to Northern Tip of PARRY (ft)	Engebi	Parry	Engebi	Parry
5	300 KT	25650	81880	1.4	0.3	51	12
6	10 MT	-	114500	-	0.95	-	35

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DOE

[redacted]

On the basis of 2.0 p.s.i. upper limit, the following locations for trailers are deemed advisable:

Shot 1	Eninman, Enyu, Bikini
Shot 2	Eninman, Enyu, Bikini
Shot 3	Eninman, Enyu, Bikini
Shot 4	Enyu, Bikini
Shot 5	Engebi, Parry
Shot 6	Parry

F. RADSAFE SURVEYS AND RECOVERY OPERATIONS:

1. Radiation Safety is a responsibility of the Task Unit Commanders, Program Directors, and Project Leaders. It is a requirement that responsible members of the scientific projects and task units be designated as radiological safety monitors and that they attend a 3-day training course at the Nevada Proving Ground or at Los Alamos Scientific Laboratory during the month of November (See CTG 7.1 ltr. to Project Officers and Task Unit Commanders, Subj: Radiological Safety Monitors, J-18507 dtd. 22 June 1953).

2. All atoll, land, and lagoon areas in the vicinity of the detonations will be considered contaminated after each shot until cleared for operations by the Task Force Commander. Entry to and from contaminated areas will be via Rad-Safe check points on Eninman (or Enyu as an alternate), CVE, and Parry (Elmer).

3. Rad-Safe monitors assigned to individuals or groups working in contaminated areas or with contaminated equipment during recovery operations will act in an advisory capacity to keep the recovery party leader informed of radiation intensities at all times. The recovery leader is expected to accept this advice and act accordingly. It is the responsibility of the leader and members of the recovery party to adhere to the radiation limits for personnel. Task Unit 7 will furnish film badges and protective equipment, i.e., booties, coveralls, respirators, gloves, etc.

4. The maximum permissible exposure (MPE) for personnel involved in this operation is 3.9 roentgens, gamma only, unless reduced because of previous or anticipated future exposure. All exposure to external gamma radiation will be regarded as total body irradiation.

5. Appendix C is a chart of Radiological Contours indicating the radiological situation of IVY MIKE shot, ground surface. A smaller percentage of contamination can be expected from the water surface shots than from the ground surface shots. A rule of thumb for estimating contamination levels from the chart is: 1/10 of the chart readings for one day after the shot, and 1/100 of the reading for the 7th day after the shot.

6. There will be no requirement for personnel to take Rad-Safe physical examinations, but medical examinations will be covered by separate correspondence.

7. The arrival and proposed use of radioactive sources in the forward area should be reported to the task group Radiological Safety Officer.

[redacted]

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[redacted]

G. Communications:

The following communication facilities will be available for Task Group 7.1 use:

1. One permanent relay-crypto center at Eniwetok to be installed, operated and maintained by TG 7.2. Tributary stations serviced by this relay center will include: Hqs., JTF SEVEN, TG 7.2, TG 7.3 (afloat), USS ESTES, and other ships as required (i.e., CURTISS, CVE, LSD), and TG 7.4. Headquarters, JTF SEVEN communications center will provide service for TG 7.1, TG 7.5, and TG 7.3 (ashore).

2. Crypto center, Eniwetok, will be crypto guard for all above mentioned tributary stations except TG 7.3 (afloat). For handling of teletype traffic up to and including SECRET, between major forward and rear echelon task force elements, the following radio teletype circuits will be operated "ON-LINE," using SIGTOT with SAMSON (synchronous mixer):

CIRCUIT	TYPE
Eniwetok - Oahu	Full Dux (1)
Eniwetok - Bikini	Full Dux (1)
Eniwetok - Kwajalein	Full Dux (2)
Eniwetok - Los Alamos	Full Dux (1)
Eniwetok - AGC (USS ESTES)	Full Dux (1)

NOTE: Full Dux - sending and receiving simultaneously.

Traffic not capable of being handled by means of on-line facilities will be enciphered off-line prior to transmission. All Top-Secret and Restricted Data traffic will be enciphered off-line. This is necessary to meet AEC requirements, and, in addition, terminal communications personnel are not in all instances TOP SECRET or "Q" cleared.

3. Telecon facilities will be available at Headquarters, JTF SEVEN (Parry Island).

4. Wire telephone facilities cleared for conversations up to and including SECRET will be available at:

(a) ENIWETOK ISLAND (400 line dial exchange) with connecting service to other islands.
(b) BIKINI ATOLL (connecting service between necessary islands).
(c) PARRY ISLAND (220 line manual with connecting service to other islands).
(d) Ship-Shore, buoy cable at Eniwetok, Parry, and Bikini.
(e) AN/TRC radio, limited to unclassified traffic, will be used as a back-up for the foregoing facilities.

5. Voice Radio Facilities for unclassified traffic.

(a) Eniwetok - Bikini.
(b) Enyu firing party - USS ESTES (VHF).
(c) Between Ships (UHF, VHF, AN/TRC and HF).
(d) Ship-Shore (VHF, AN/TRC, and HF).
(e) TG 7.1 Commercial Radio Nets on Eniwetok, Bikini, and on selected ships and aircraft to provide for scientific and operational needs.

[redacted]

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[redacted]

6. CTG 7.1 expects to have a dual commercial radio teletype link between Parry and Bikini.

7. Holmes and Narver, under the direction of the Field Manager, Eniwetok Field Office, is responsible for installation, issue and maintenance of military type radio equipment for the telephone and buoy cable systems on Eniwetok Atoll less Eniwetok Island and for the telephone and buoy cable systems on Bikini Atoll. Edgerton, Germeshausen, and Grier, Inc., is responsible for installation, issue and maintenance of Commercial Type radio equipment and for the operation of the TG 7.1 link between atolls.

8. Requests for the installation of new communication facilities should be submitted directly to the TG 7.1 Communication Officer, J-3, who will process requirements and submit them to the appropriate agency for implementation.

H. Inter-Atoll Transportation:

1. Air -

a. There will be four C-47 aircraft for personnel and cargo lift between Eniwetok Island (Fred) and Enirman (Tare) [redacted] For planning purposes four round-trip flights daily appear possible, thus 100 persons can be carried daily, each way. Two PBM aircraft will augment the C-47 service as necessary, and [redacted] will be the primary air lift between Eniwetok Island and Bikini lagoon. At least two round-trips daily appear feasible, thus 40 persons can be carried daily, each way. The PBM cargo capacity is limited by the small cargo hatch and the difficulty, when making water landings, of transferring cargo by boat. Radioactive sample return from Bikini will be [redacted] Users should submit requirements for personnel and cargo space at least one day before the day lift is scheduled.

See Appendix D for Summary of Military Support Items

2. Surface -

a. One LST will provide regular surface cargo lift between Eniwetok and Bikini. An additional LST will augment this lift when not engaged in re-supply of Weather Islands. For planning purposes two round trips every week appear possible. The LST cargo deck has an overhead limiting height of 11'3" and therefore cannot carry oversize trailers, large cranes, etc. The LST's can beach alongside the freight pier on Parry (Elmer), at Enirman (Tare) and Bikini Island (How). In the forward area users should plan and request movements of material and equipment at least one week in advance of the scheduled lift.

b. The LSD will be used to transport shot barges and devices from Parry (Elmer) to shot locations at Bikini and for rehearsals of these movements. The LSD can transport oversize trailers, cranes, etc., loaded in LCU's. An LST will be used to transport [redacted] associated equipment from Parry (Elmer) to Enirman (Tare) and for a rehearsal of this movement.

[redacted]

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[redacted]

I. Inter-Island Transportation:

1. Aircraft -

a. Bikini: Helicopter service will consist of H-19's from the Enirman (Tare) airstrip to instrumented islands. Helicopter service for immediate re-entry activities will be from the CVE. There will be helicopter service to the floating helicopter platform (YCV) located in the vicinity of shot barges 2, 3, and 6. The USS ESTES has a helicopter platform which will be used for special flights only. Adverse boating conditions in Bikini Lagoon, due to rough water, spray, and difficult landing conditions, will place an additional burden on helicopter service.

b. Eniwetok: There are operational airstrips on Eniwetok (Fred), Parry (Elmer), Runit (Yvonne), and Biijiri (Tilda). There will be liaison type aircraft and helicopter service for high priority traffic to these islands, and helicopter service to islands without airstrips, and to the floating helicopter platform located near [redacted]. The helicopter barge will probably be relocated from Bikini to Eniwetok. [redacted]. The airstrip of Engebi (Janet) will probably be reactivated. DOE

c. When possible, users will submit requirements to the J-3 representative the evening before lifts are required.

2. Boats -

a. Bikini: The Holmes and Narver and Navy boat pools will consist of LCU's, LCM's, LCP(L)'s, Water taxis, DUKWs, Air-Sea rescue craft (AVR's), barges and harbor tugs, in sufficient numbers to provide necessary surface transportation. During shore-based operations, the H&N boat pool will operate from Enirman (Tare), and the Navy boat pool, from the LSD. The boat pools will provide regularly scheduled service each day, and special service to Enyu (Nan), Namu (Charlie), Aomoen (George), and to other islands as required. When the Task Force goes afloat, the boat pools will operate from the LSD until operations from ashore can be re-established. There will be day and night boat service, as required, in the shot barge area to provide transportation between the barges, helicopter platform, USS CURTISS and Aomoen (George). DUKW's and operators will be furnished for use at locations inaccessible to boats and where work must be accomplished on reefs. At locations on island complexes and reefs distant from boat landings, where DUKW's must be used, launching and recovery of DUKW's by an LCU may be necessary. However, this is a difficult and unreliable operation and will be avoided if possible. Instead DUKW's will be unloaded ashore at the regular boat landings and will proceed by the safest possible route to the sites, i.e., by skirting the reefs or by island and connecting sand spits or reefs. Yurochi (Dog) to Aomoen (George) will be connected by a causeway. Prior to each shot, the boat pools will be moved out of the danger areas.

[redacted]

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[redacted]

(1) Boating conditions are unsatisfactory in Bikini Lagoon. The waves, under average wind (ENE, 14-20 knots) conditions, are 2.5 to 3.0 feet high in the areas unprotected to windward by islands and reefs. Therefore, the running times between landings will be at reduced speeds much of the time. All boating will be rough and wet so that protection of equipment from salt spray and securing for pounding and rolling are important factors to be considered.

See Appendix F for Marine Craft Beaching Conditions at Bikini.
See Appendix G for Wave, Wind and Current Conditions at Bikini.

b. Eniwetok: The H&N and Navy boat pools will consist of the same type craft as at Bikini in sufficient numbers to provide necessary surface transportation. There will be regularly scheduled boat service each day between Parry (Elmer), Eniwetok (Fred), Runit (Yvonne), Aomon (Sally), and the barge in Elugelab crater, and DUKW service at locations which cannot be approached by boat. Where scheduled boat service will not meet the needs of the users, special service will be provided. There will be boat service between the helicopter platform, and Engebi (Janet). Prior to each shot the boats will be returned to Parry (Elmer). Do

c. Users should submit requirements for boats to the J-3 boat officer the evening before the transportation is needed.

See Appendix D for Summary of Military Support Items.
See Appendix E for Marine Craft Characteristics.
See Appendix H for Marine Craft Beaching Conditions at Eniwetok.

3. Vehicles:

(a) The motor pools will consist of jeeps, 3/4 ton cargo carriers, 2½ ton cargo trucks and additional special vehicles in amounts expected to meet the needs of the programs. At Bikini atoll there will be a motor pool on Eninman (Tare) for control of all vehicles on the Bikini Atoll islands. At Eniwetok atoll, vehicles will be dispatched from a central motor pool on Parry (Elmer), and if practical, from a secondary motor pool on Eberiru (Ruby).

(b) Vehicles will be serviced by Holmes and Narver maintenance shop at each motor pool and policies for maintenance and dispatch of vehicles will be announced later. TG 7.1 vehicle officer will allocate TG 7.1 vehicles and handle TG 7.1 vehicle problems.

(c) Vehicles will be evacuated from danger areas for each shot and re-entered as necessary for use between shots. It is intended that maximum service will be given all project and program leaders with a modified motor pool system as experienced on Operation IVY.

J. COURIER AND SAMPLE RETURN:

1. With the exception of aircraft samples, samples will mainly be recovered by helicopter and flown by C-47 or PBM to Eniwetok (Fred). There they will be ferried by helicopter or boat to Parry for immediate analysis or returned by courier aircraft to their destinations in the ZI. Coordination of sample

[redacted]

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[redacted]

return, courier, and monitor assignments will be the responsibility of the J-3 section in the forward area. The J-4 section will arrange for and control the ZI transportation and furnish or arrange for couriers as necessary for samples which arrive at ZI Air Force Bases for LASL, UCRL, and others.

2. All samples of radioactive material which are couriered in aircraft will be packaged and loaded so as to reduce radiation to a minimum. The Rad-Safe Officer of TG 7.4 will have a survey made of the package to determine if adequate precautions have been taken. The following criteria will determine space and packaging requirements:

a. Prior exposure of aircraft and courier personnel.
b. Anticipated future exposures on trip.
c. Length of time of exposure on trip.
d. In all cases, crew members will be limited to exposure rates of less than 20 mr/hr.

K. OFF-ATOLL SUPPORT:

1. Weather Stations will be located at the following Atolls: Rongerik, Majuro, Kusaie, and Ponape. These stations will be established by IST and will be operating by about 10 January. Weekly re-supply will be made from Kwajalein by PBM. Those projects considering use of atolls distant from Eniwetok and Bikini should confine their activities to the Weather Stations and Kwajalein since limited support is available at these locations.

L. TRANSPORTATION TO THE FORWARD AREA:

See transportation instructions, CTG 7.1 restricted letter J-18583 of 15 June 1953.

M. WEATHER:

Weather observation, analysis, and forecasts will be made by the task force Weather Central on Eniwetok Island and aboard the AGC when the Command is afloat. Forecasts will be made on a 24-hour basis and distributed every six hours and will include expected boating conditions. (See Appendix J)

N. SECURITY:

1. Personnel Security within TG 7.1 is handled by the J-1 Section and includes processing all "Q" clearance and forward area badge matters, providing assistance and advice on security matters to 7.1 personnel and liaison with security offices of other agencies.

2. Physical security in the forward area is handled by CTG 7.2, under guidance of CTG 7.5. Lockable storage facilities and secure working areas are furnished TG 7.1 projects as required. All TG 7.1 personnel are responsible to Commander, TG 7.1 for proper observance of all security practices.

[redacted]

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3. It is anticipated that "Q" clearances will be required for all TG 7.1 personnel in the forward area after 1 December 1953, and badges will be required 1 January 1954, with the exception of a few people who will be at distant stations.

4. Detailed instructions pertaining to clearance required in the forward area, badges, travel clearances, transmission of documents, messages, and material, etc., will be furnished to all TG 7.1 personnel by separate correspondence.

5. CTG 7.5 (J-2) will provide repositories on Eninman, Namu, and Enyu for classified matter. Security patrols on these and connected islands will provide additional safeguards.

O. EXPERIMENTAL PLANS:

A pamphlet on CASTLE experimental plans, corresponding to the IVY TURQUOISE BOOK will be published about 1 September 1953 by this headquarters. The purpose of this pamphlet is to furnish information about each project's experimental plan, plan of operations, and a tabulation of major and special support items which will be provided. It will be an annex to CTG 7.1 Operation Plan (Scheduled for publication about 1 November 1953) and will be distributed to CJTF SEVEN, Commanders of Tash Groups, Task Unit Commanders, and Project Leaders. The classification will be SECRET - RESTRICTED DATA.

P. STATUS REPORTS

Attention is invited to changes in schedule and code names and letters in paragraph A. Status reports for August 20 should reflect these changes.

P. L. HOOPER
J-3
Plans and Operations

APPENDICES:

A. Bikini Map with code identifications
B. Eniwetok Map with code identifications
C. Radiological Situation - IVY MIKE
D. Summary of Military Support Items
E. Naval Vessel and Marine Craft Characteristics
F. Marine Craft Beaching Conditions at Bikini
G. Wave, Wind and Current Conditions at Bikini
H. Marine Craft Beaching Conditions at Eniwetok
I. Average Running Times of Marine Craft
J. Climatology of the Eniwetok-Bikini Area and Weather Services
K. Tide Tables - Eniwetok Atoll, Bikini Atoll

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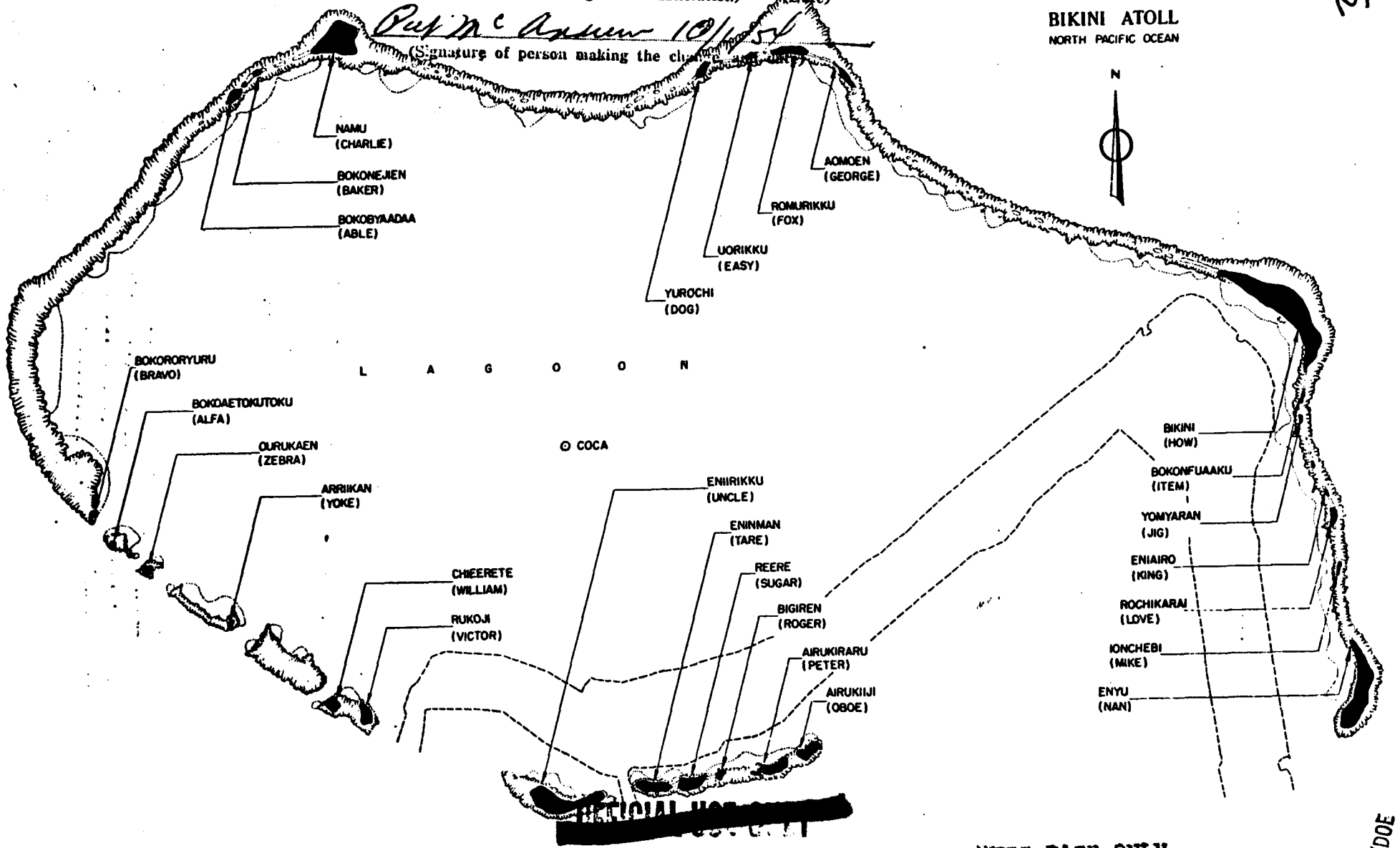
BIKINI ATOLL
NORTH PACIFIC OCEAN



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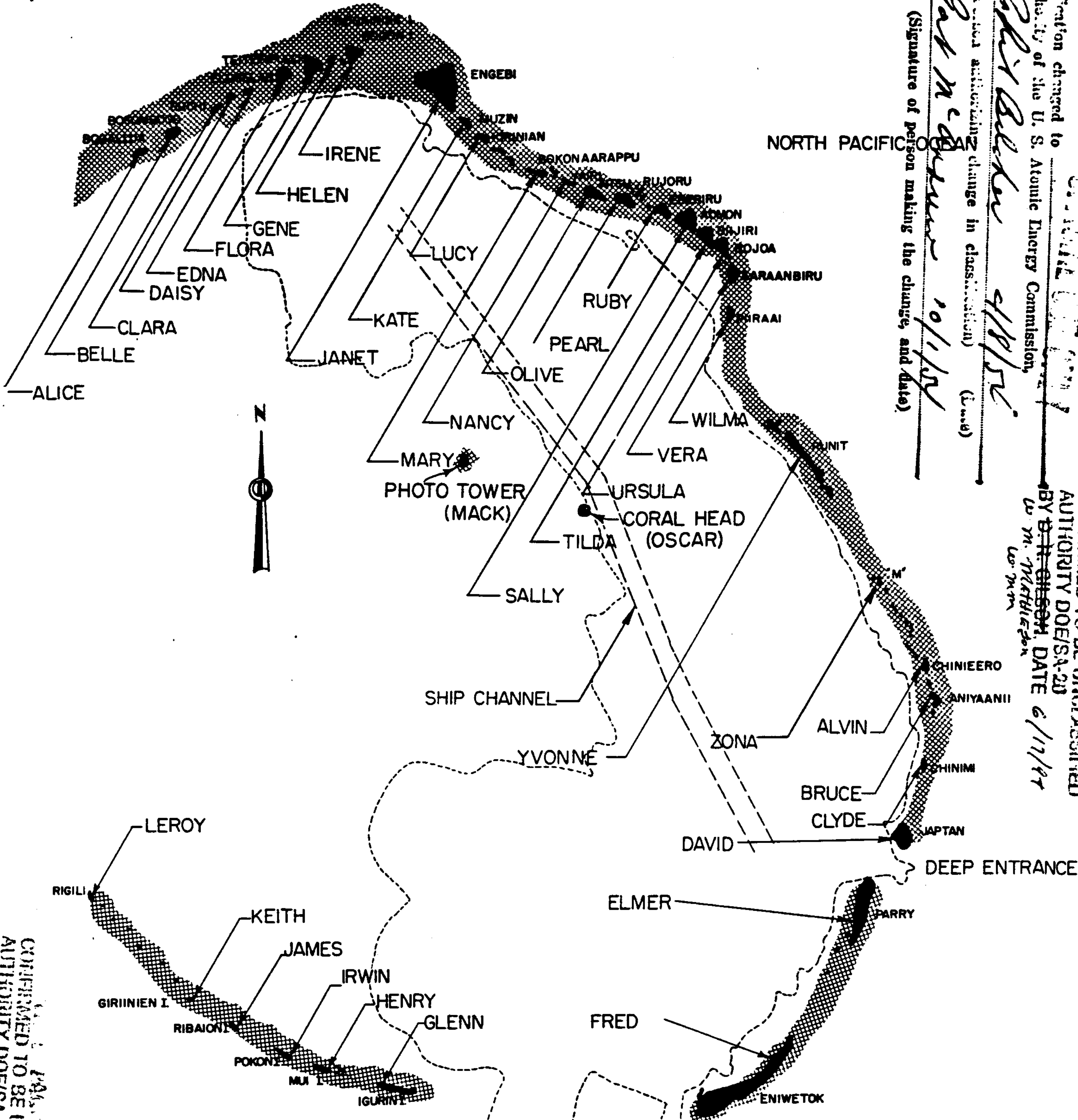

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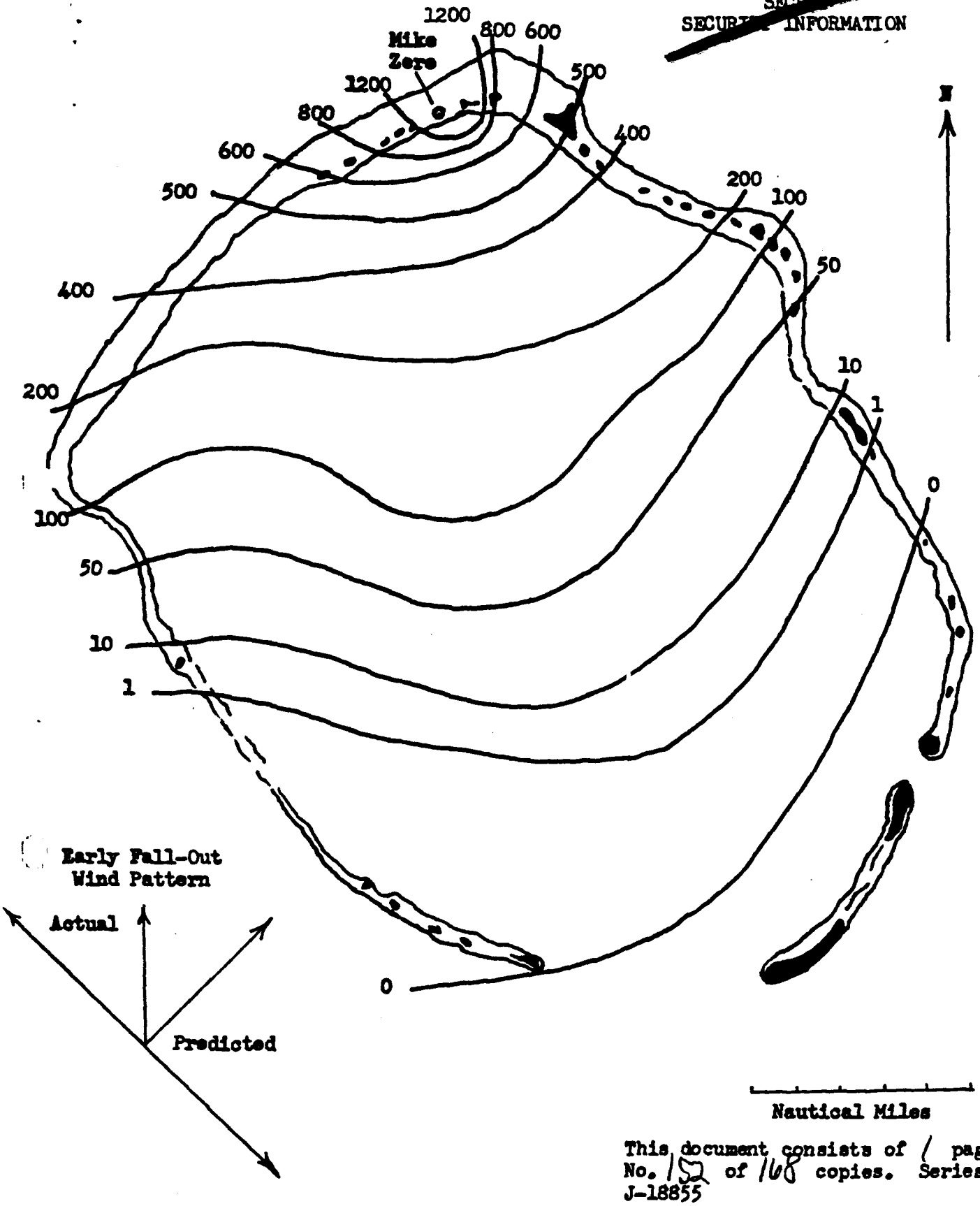
3556



This document consists of 1 pages
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J-18855

Mike Shot gamma fall-out pattern extrapolated to H plus 3 hours. All values given in r/hr. Lagoon values represent equivalent land mass contamination.

3557

Map compiled from TU-7 and Project 5.4a data.

[redacted]

SUMMARY OF MILITARY SUPPORT ITEMS

1. **Surface Components:**

Type	Due in FA	Mission
1 AGC (with helicopter platform)	1 Feb. '54	Command and Control Facilities and for remote control firing and telemetering. Prior to each Bikini shot the AGC will embark the JTF Command at Eniwetok, take station off Bikini for the shot, and return to Eniwetok. Between shots, the AGC will be moored to a telephone buoy off Eninman (Tare). For Eniwetok shots, the AGC will moor in Eniwetok Lagoon off Parry (Elmer).
1 AV (USS CURTISS AV-4)	1 Jan. '54 (On West Coast)	Transportation of devices to Parry (Elmer). Located close to shot barges, Bikini, for weapon assembly and certain project installations in Acmoen (George) area, from about 20 January [redacted]; thereafter at Eniwetok.
1 CVE (with 6 HRS helicopters)	1 Jan. '54 (On West Coast	Rapid post-shot reentry at Bikini for TU-7 surveys and Rad-Safe lab. services; Base and control point for project personnel requiring immediate recovery operations by helicopter.
1 ISD	15 Jan. '54	Transportation of shot barges from Parry (Elmer) to Bikini. Evacuation of oversize trailers and equipment from Bikini to Eniwetok. Mother shi for TG 7.3 boat pool.
1 LST	Now in FA	Regular lift between Eniwetok and Bikini for trailers under 11'3" high equipment, materials, vehicles, etc. Lift from danger areas (Bikini) of equipment, etc., from locations accessible by LST; Charlie, Hew, Tare. Alternate tender for TG 7.3 boat pool at Bikini. Special lifts of [redacted] Parry to Eninman.

[redacted]

3558

[redacted]

Type	Due in FA	Mission
1 IST	1 Dec. '53	Logistic support of weather islands (Rongerik, Majuro, Ponape, Kusaie). Augment inter-atoll lift.
5 ATF (Seagoing tugs)	1 Feb. '54	Scientific projects and towing: Primary uses - one ATF to accompany drone vessels (Project 6.4) from West Coast on 1 Nov. 1953. Two ATF's to tow drone vessels after shots 2, 4, 6 from Bikini to Eniwetok. One ATF to move YCV from Bikini to Eniwetok. One ATF to assist Project 1.4 instrumenting for shots 2 and 3.
1 ARSD (Net tender, LSM type)	15 Jan. '54	For Project 1.4 mooring requirements.
2 AVR	One each now at Eniwetok, Bikini	Air-sea rescue craft. Movement of firing party.
Vessels to support Project 2.5a	1 Feb. '54	Lay and recover distant, floating fall-out collectors.
2 Liberty ships	27 Jan. '54	Drone vessels for Project 6.4.
1 YCV	1 Feb. '54	Helicopter landing platform for use near shot barges 2, 3, and 6.

Three telephone buoy moorings will be installed off Eninman (Tare) for major vessel use (CVE, ESTES, LSD).

Two mooring buoys (non-telephone) will be installed in Bikini Lagoon for emergency use of the drone vessels and two moorings in Anchorage "A", B-3, and C-3 off Parry (Elmer) for decontamination of these vessels.

2. Aircraft Components:

Type	Capacity	Mission
15 L-13 Liaison	3 persons	Inter-island lift at Eniwetok using
6 L-20 Liaison	6 persons	landing strips
6 HRS Helicopters	6 persons (1000 lbs)	Inter-island lift at Bikini and
7 H-19A Helicopters	6 persons (1000 lbs) max.	Eniwetok for instrumentation, radiological surveys, recovery
3 H-13 Helicopters	2 persons	of date.

Appendix D [redacted]

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[redacted]

Type	Capacity	Mission
4 C-47	25 persons each, freight	Inter-atoll lift between Eniwetok (Fred) and Enirman (Tare) [redacted] DOE
2 PBM-5A	20 persons each, freight. Arrive FA 15 Jan. '54.	Inter-atoll lift between Eniwetok (Fred) and Bikini; Eninman (Tare) [redacted] DOE
2 PBM-5A	20 persons each, freight	Operate from Kwajalein. Re-supply of weather islands, project instrumentation.
15 F-84G		Cloud Sampling
1 B-36		Cloud Sampling Control Aircraft
2 B-36 (1 approved, 1 pending approval)		High altitude sampler with possible B-57 augmentation.
1 B-36		Effects aircraft
10 WB-29		Weather reconnaissance
2 SA-16		Search and rescue at Eniwetok
1 RB-50		Documentary photography
3 C-54 or 1 C-119		Documentary photography
1 P2V		Project 6.4 control of drone vessels.
1 P2V		Project 1.4 telemetering.

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Appendix D

[redacted]

[redacted]

NAVAL VESSEL AND MARINE CRAFT CHARACTERISTICS

Type	Use	Capacity	Description
LSD (Landing Ship dock)	To transport loaded landing craft and barges. Hold is flooded and craft are moved out.	3 LCU or 14 LCM or 47 DUKW	Two 35 ton cranes service the craft, handle vehicles and cargo. Hold dimensions 334' x 44'.
LST(Landing Ship, Tank)	To land vehicles from deck over a bow ramp on a beach. Carry cargo on main deck.	Pay load 1900 tons (400 ton on main deck)	Tank deck dimensions 288' x 30' x 11'3" high. (Limiting height) ramp width 14'.
LCU (T boat)*	To land vehicles over bow ramp on a beach.	150 tons	Vehicle deck dimensions 96' x 13'11" (least width) 26' (greatest width) 7.5 knots. Ramp width 12'4".
LCM (M boat)	To land vehicles over bow ramp on a beach.	30 tons	Vehicle deck, 31'6" x 10'9". 9 knots. Ramp width 10'9".
DUKW	Army truck for amphibious transport on beaches inaccessible to landing craft.	2½ tons cargo 25 passengers.	2½ ton, 6 x 6 amphibious truck. 5.5 knots.
LCP (L)	Personnel craft. Can beach.	36 passengers	8 knots

*Same type craft also called LSU (See Appendix F)

[redacted]

Appendix E

3561

[redacted]

BEACHING CONDITIONS
AT
BIKINI ATOLL

Code Name	Island	Beaching Conditions
Able	Bokobyaadaa	Restricted to DUKW only - Can be worked by LCM but only in calm weather - Heavy ground swells
Alfa	Bokoaetokutoku	Restricted to DUKW only - Blasting not recommended
Baker	Bokonejien	Restricted to DUKW only - Can be workedby LCM but only in calm weather - Heavy ground swells
Bravo	Bokororyuru	Restricted to DUKW only - Blasting not recommended
Charlie	Namu	LCM - Any tide Sandy beach DUKW - Any tide LSU - Low tide only (+ -) to 1.6 - Beaching on reef All tide channel with blasting
Dog	Yurochi)	
Easy	Uorikku)	Connected by causeway.
Fox	Romurikku)	
George	Aomoen	LSU - 0.6 tide or better LCM and DUKW any tide Sandy beach Joined to Fox at all tides by a sand spit
How	Bikini	LST, LSU, LCM and DUKW any tide Sandy beach
Item	Bokonfuaaku)	
Jig	Yomyaran)	At present these sites have only been worked
King	Eniairo)	by DUKW - with blasting, channels could be made
Love	Rochikarai)	for LSU and LCM
Mike	Ionchebi)	
Nan	Enyu	LSU, LCM, and DUKW any tide, blasted channel Sandy beach
Tare	Eninman	Oboe-Airukiiji, Peter-Airukiraru, Roger-Bigiren, Sugar-Reere connected to Tare by Causeway LST, LSU and LCM - Any tide

[redacted]

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Code Name	Island	Beaching Conditions
Uncle	Eniirikku	LST landing - Possible channel with blasting LSU - 4.8 tide or better LCM - 1.0 tide or better Sandy beach
Victor	Rukoji	LSU) Low tide only - $\frac{1}{2}$ to 1.4 LCM) Beaching on reef DUKW - Any tide
William	Chieerete	LSU - 6.0 tide or better LCM - 3.0 tide or better DUKW - Any tide Sandy beach
Yoke	Arriikan	LCM - 3.0 tide or better DUKW - Any tide Sandy beach
Zebra	Ourukaen	LSU - 2.0 tide or better LCM - Any tide DUKW - Any tide Sandy beach

Note: Plus X Tide indicates a tide for which the highwater level is X feet above mean low water springs.

[redacted]

WIND - WAVE CURRENT CONDITIONS AT BIKINI ATOLL

Between 3 and 15 April 1953 a survey was made at Bikini Atoll to determine wave and wind conditions, the relationship between wind and waves, and in addition, current observations.

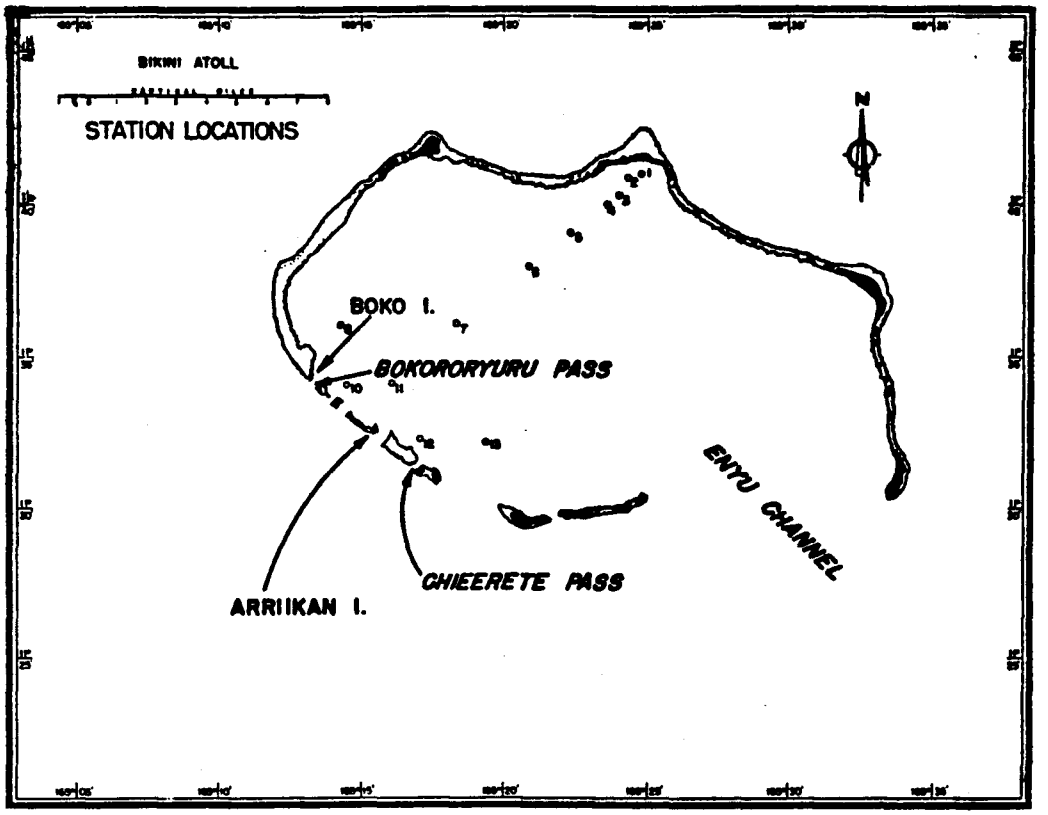
Wind and Waves - The lagoon is almost completely protected from the predominant ocean swell on the windward side (ENE). A secondary swell from east to east-southeast enters Enyu channel and dominates the wave conditions throughout the lagoon in spite of the fact that winds blew continuously from east-northeast with a velocity of 4 to 20 knots. The mean wind was 13.5 knots. Ninety percent of the observations fell between 9 and 19 knots. Although the winds changed the height of the waves, relative to the wind velocity and fetch, the waves maintained their characteristic pattern radiating from Enyu Channel with little directional influence from the wind. The secondary swell influence inside the lagoon may be expected to reach a maximum during July and August and be at a minimum during January and February. The average periods for the observations in the lagoon range from 4.0 to 5.9 seconds. The swell that enters the lagoon does not have the "long" period normally attributed to swell (any wave not being generated by local winds). This is the case when wave direction is markedly different from the wind direction.

OBSERVED WAVE HEIGHTS

STA.	WIND (kn.)	FETCH (n. mi.)	OBS. HT. (ft.)
1	15	0.9	1.5
2	16	1.5	1.6
3	15	1.8	2.0
3A	20	1.8	2.0
4	15	2.3	1.8
5	14	4.5	2.3
5A	15	3.5	2.9
6	16	5.7	2.6
7	15	9.0	2.4
7A	16	9.0	3.1
8	20	11.5	2.7
10	18	13.0	2.6
11	19	17.0	3.6
12	19	16.5	3.3
12A	15	15.3	2.9
13	18	14.0	3.0

[redacted]

3564



The currents were measured in the passes from Chieerete Pass to Bokororyuru Pass. All the passes were similar in total current velocities. During low tidal ranges (0-3 feet), the current velocities ranged from 1.5 knots during ebb to 0.5 knot during flood setting SW. During high tidal ranges (3-6 feet), the current would flood with velocities reaching 1.0 knot setting NE. Maximum ebb is expected to reach about 3.0 knots setting SW.

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BEACHING CONDITIONS
AT
ENIWETOK ATOLL

Code Name	Island	Beaching Conditions
Alice Belle	Bogallua) Bogombogo)	LCM's and LSU's beach on sand bar through break in reef. Require plus 1.5 tide or under. Tracked equipment and vehicles only.
Clara	Ruchi	LCM's beach on sand bar through break in reef. Require plus 1.5 tide or under. Tracked equipment and vehicles only.
Daisy	Cochiti	Access by DUKW from Clara. LCM approach questionable
Gene Helen Irene	Teiteiripucchi) Bogairikk) Bogon)	Entrance channel at Gene. LCM's, LSU's and Water Taxis can enter at any tides.
Janet	Engebi	LCM's, LSU's and Water Taxis can enter at any tides Freight pier and a hard sand ramp.
Kate	Muzinbaarikku	LCM's require a plus 1.5 tide and LSU's require a plus 3.0 tide. Sandy beach landing
Lucy	Kirinian	LCM's require a plus 1.5 tide and LSU's require a plus 3.0 tide. Sandy beach landing.
Mary	Bokonaarappu	LCM's can enter at any tide LSU's require a plus 2.0 tide Sandy beach landing
Nancy Olive Pearl	Yeiri) Aitsu) Rujoru)	LCM's (only) require a plus 2.0 tide Sandy and coral beach landing
Ruby Sally Tilda Ursula	Eberiru) Aomon) Biijiri) Rojoa)	Connected by causeway Entrance channel at Ursula LCM's, LSU's and Water Taxis can enter at any tide Freight pier and hard coral ramp
Vera	Aaraanbiru	LCM's (only) require a plus 3.0 tide Sand and coral beach

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[redacted]

Code Name	Island	Beaching Conditions
Yvonne	Runit	LCM's, LSU's, and YTL's (Tugs) can enter at any tide Freight pier and a hard coral ramp
David	Japtan	LCM's, LSU's, Water Taxis and YTL's (Tugs) can enter at any tide Freight pier and a sandy beach landing
Elmer	Parry	LCM's, LSU's, Water Taxis and YTL's (Tugs) can enter at any tide Freight pier, personnel pier and two concrete ramps
Fred	Eniwetok	LCM's, LSU's, Water Taxis and YTL's (Tugs) can enter at any tide Freight pier, personnel pier, two steel ramps for vehicles, and one sand and loose coral ramp for tracked equipment
Leroy	Rigili	LCM's require a plus 2.0 tide and LSU's require a plus 4.0 tide Sandy beach landing

Note: Plus X Tide indicates a tide for which the highwater level is X feet above mean low water springs.

[redacted]

3567

[redacted]

AVERAGE RUNNING TIMES FOR MARINE CRAFT

BIKINI

From	To	Time
LCM:		
Eninman	Enyu	1 hr, 20 Min
Eninman	Bikini	1 hr, 35 Min
Enyu	Bikini	35 Min
Eninman	Aomoen	1 hr, 35 Min
Enyu	Aomoen	1 hr, 50 Min
Eninman	Namu	2 hr
Namu	Aomoen	1 hr, 30 Min
Bikini	Aomoen	1 hr, 20 Min
LCU:		
Eninman	Enyu	1 hr, 36 Min
Eninman	Bikini	2 hr, 5 Min
Enyu	Bikini	42 Min
Eninman	Aomoen	2 hr, 5 Min
Enyu	Aomoen	2 hr, 20 Min
Eninman	Namu	2 hr, 30 Min
Namu	Aomoen	1 hr, 40 Min
Bikini	Aomoen	1 hr, 30 Min

These times are estimated from running times for proportional distances at Eniwetok. They may be somewhat longer than indicated due to rougher lagoon water at Bikini.

APPENDIX I

[redacted] INFORMATION

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[redacted]

AVERAGE RUNNING TIMES FOR MARINE CRAFT

ENIWETOK

From	To	Time
Water Taxi:		
Parry Personnel Pier	Eniwetok Pers. Pier	19 Min
Parry " "	Runit	45 Min
Parry " "	Rojoa	60 Min
Parry " "	Biijiri	1 hr, 10 Min
Parry " "	Engebi	1 hr, 30 Min
Parry " "	Elugelab(barge)	1 hr, 45 Min
Runit	Biijiri	25 Min
Engebi	Elugelab(barge)	15 Min
LCM:		
Parry Freight Pier	Eniwetok Pers. Pier	25 Min
Parry " "	Eniwetok Freight Pier	35 Min
Parry " "	Runit	60 Min
Parry " "	Rojoa	1 hr, 20 Min
Parry " "	Biijiri	1 hr, 35 Min
Parry Personnel Pier	Engebi	2 hr
Parry " "	Elugelab(barge)	2 hr, 20 Min
Runit	Biijiri	30 Min
Engebi	Elugelab(barge)	20 Min
LCU:		
Parry Freight Pier	Eniwetok Pers. Pier	30 Min
Parry " "	Eniwetok Freight Pier	42 Min
Parry " "	Runit	1 hr, 12 Min
Parry " "	Rojoa	1 hr, 36 Min
Parry " "	Biijiri	2 hr, 5 Min
Parry Personnel Pier	Engebi	2 hr, 25 Min
Parry " "	Elugelab(barge)	2 hr, 50 Min
Runit	Biijiri	45 Min
Engebi	Elugelab(barge)	25 Min

[redacted]

3569

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CLIMATOLOGY OF THE ENIWETOK - BIKINI AREA FOR THE MONTHS OF JANUARY, FEBRUARY, MARCH AND APRIL

1. This period of the year is generally known as the "dry" season in the Marshall Island area, particularly in the Eniwetok - Bikini area. It is better known as the "trade" season. Over this area east-northeast to northeast winds prevail in the lower levels, the wind speeds ranging between 10 to 20 knots. Small amounts of cumulus clouds, usually not exceeding 4/8 coverage, are found in this current, and the cloud tops do not usually extend above 8,000 feet. Rain sometimes falls from these clouds, usually as showers. No extensive upper middle cloud decks are found. Although the lower winds are northeast and quite fresh, as one goes aloft, one finds that the winds turn more westerly with elevation until at about 20,000 feet they lie between northwest and southwest. The westerlies then extend upwards to the tropopause increasing in speed to about 35 knots at 45,000 feet. If the upper winds are mainly southwesterly, rain from the trade cumulus is likely and the amount of cloud may increase to 6/8 or 7/8. If the upper winds are, however, chiefly northwesterly, the cumulus clouds will decrease to as little as 1/8 or 2/8 and showers are less likely.

2. Occasionally during this period, the winds throughout the entire Marshall Islands will show speeds of less than 10 knots from the northeast or east-north-east. Cloud cover will, however, be only 2/8 or 3/8 with tops below 4,000 feet, interspersed with stationary lines of cumulonimbus and heavy showers and an occasional thunderstorm. There will be an extensive sheet of altostratus and altocumulus which will make aircraft operations above 20,000 feet difficult and occasionally hazardous. This situation is more particularly true in late March and April. Again, as during the normal trade flow which is found during this time of the year, the easterly winds will vary in direction with height, becoming very strong westerlies above 30,000 feet and reaching as high as 100 knots at 45,000 feet on occasion. These winds are associated with a weather system aloft which can become quite intense and which can persist for periods in excess of a week. This situation is the one to be the most wary of during this period of operations.

3. In summary, normal trade flow weather is to be expected during the greater part of the period of CASTLE operation. Day to day fluctuations from the normal will be those elements of digression which will have to be forecast.

[redacted]

Appendix J

3570

[redacted]

WEATHER SERVICE AVAILABLE DURING OPERATION CASTLE

1. For Operation CASTLE, the Task Force Weather Central will be established on Eniwetok during early 1954. Later, this central will be moved aboard the command ship when the Commander, Joint Task Force SEVEN moves his command forces aboard; however, the weather station at Eniwetok will remain fully operational during the Bikini phase. When operations shift back to Eniwetok, the Central will again be re-established on Eniwetok. The Task Force Weather Central will be directly supported by four outlying weather stations, a weather reconnaissance flight, Navy patrol aircraft and weather observations from various aircraft and vessels of the Task Force. The outlying weather stations will be established on Kusaie, Majuro, Ponape and Rongerik. The weather reconnaissance unit will be based on Eniwetok. The Pacific Weather Broadcast Network will be intercepted for all presently available weather observations which will be needed. The outlying stations will make 3-hourly surface observations (8 per day) and 12-hourly upper air soundings (2 per day). The number of observations will be stepped up just prior to each shot. The weather reconnaissance unit will normally fly two tracks per day to obtain surface weather information over water areas where no land reports are available. Just prior to each shot, the flights will be increased to three per day. In addition, the weather reconnaissance unit will be responsible for storm and typhoon reconnaissance in this area for the duration of the tests.

2. The Weather Central will analyze the following charts:

a. Surface Maps: Four (4) times daily for 000Z, 0600Z, 1200Z, and 1800Z, of the entire Central Pacific Ocean area.

b. 1500 ft Streamline Chart: Four (4) times daily for 0300Z, 0900Z, 1500Z and 2100Z.

c. 700 Millibar Chart: Twice daily for 0300Z and 1500Z.

d. 10,000 ft Streamline Chart: Twice daily for 0900Z and 2100Z.

e. 500 Millibar - 20,000 ft Streamline Chart, 300 Millibar - 30,000 ft Streamline Chart, 200 Millibar - 40,000 ft Streamline Chart, 50,000 ft Streamline Chart and 60,000 ft Streamline Chart: All will be analyzed four (4) times daily for 0300Z, 0900Z, 1500Z and 2100Z.

f. Weather Distribution Chart: Once daily at 0000Z.

g. Weather Reconnaissance Cross Section: For each individual reconnaissance.

h. Wind Time Graphs or Sections: Plotted continuously for all stations.

i. Wind Tabulation Sheets: Kept continuously for all stations.

j. Adiabatic Diagrams and Tabulation Charts: For each individual report from all necessary radiosonde stations in the Pacific area.

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k. 24-Hour Prognostic Charts of Surface and 700 Millibar: Once per day at 0600Z.

l. 3-Hourly Logs of Surface Reports and Winds Aloft: For all stations in the Task Force weather net.

m. Base of Westerlies Chart: Continuously for all observations.

n. Height of Moist Layer: Continuously for all observations.

o. Height of Tropopause: Continuously for all observations.

3. The Weather Central will issue the following forecasts on a routine basis:

a. Daily

(1) Local terminal forecasts for Eniwetok and Bikini of surface winds, amount of clouds, precipitation and sea swells and waves every six (6) hours for 24 hours with a further outlook of 24 more hours. These forecasts will be revised when necessary. Widest possible dissemination will be made.

(2) Local area forecasts once per day to Naval vessels (aircraft carrier, tender) of the expected weather.

(3) Local winds aloft forecast to be made four (4) times daily for all levels up to 70,000 feet for 24, 48, and 60 hours in advance.

b. Special:

(1) Any specialized forecasts necessary will be made if the requirement is known. The specialized forecasts which it is felt will be needed are as follows and will ordinarily be made once daily if needed:

(a) Four-day trajectory forecast to be made daily for all levels up to 70,000 feet.

(b) Storm warnings and wind warnings for winds in excess of 25 knots.

(c) 60-hour forecast of the height and temperature of the tropopause.

(d) 60-hour local terminal forecast with revisions at 48, 24, and 12 hours, when necessary.

(e) 24-hour forecast of temperature in the stratosphere.

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4. An Operational Forecast will be made 60 to 72 hours before each rehearsal or actual shot. This forecast will be the one given by the Staff Weather Officer to the Commander, Joint Task Force SEVEN and staff during briefings. All necessary revisions will be made and issued to all using agencies up to approximately shot time minus six (6) hours. This forecast will include:

a. Upper Wind Forecast for the Shot Island: Direction and speed of the wind at 2,000-foot intervals from the surface to 20,000 feet and 5,000-foot intervals from 20,000 to 80,000 feet.

b. Cloud Trajectory Forecast: These cloud trajectory forecasts will be made for shot time plus 24, 48, and 72 hours.

c. State of the Atmosphere Above the Tropopause: A forecast of the height of and temperature at the tropopause at shot time.

d. Local Area Terminal Forecast: This is for a period of 24 hours with a further outlook for the following 48 hours of amounts and bases and tops of clouds, visibility, surface maximum and minimum temperatures, precipitation, winds at all levels up to 60,000 feet and sea swells and wave action.

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(Person authorizing change in classification) (Date)

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BY W. M. Mathieson DATE 6-17-94

ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR DECEMBER

DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT
1	0001	H	3.08	9	0532	H	3.64	17	0110	H	3.32	25	0100	L	0.84
Tu	0645	L	1.56	W	1124	L	0.84	Th	0723	L	1.24	F	0650	H	3.48
	1307	H	3.40		1745	H	4.68		1347	H	4.04		1243	L	1.16
	1935	L	1.80						2026	L	1.08		1857	H	4.12
2	0105	H	3.32	10	0024	L	0.68	18	0212	H	3.40	26	0134	L	1.00
W	0733	L	1.40	Th	0611	H	3.56	F	0815	L	1.00	Sa	0727	H	3.32
	1348	H	3.72		1203	L	0.92		1437	H	4.36		1323	L	1.40
	2018	L	1.48		1825	H	4.52		2116	L	0.84		1931	H	3.96
3	0153	H	3.32	11	0103	L	0.84	19	0303	H	3.56	27	0209	L	1.24
Th	0804	L	1.24	F	0654	H	3.40	Sa	0900	L	0.84	Su	0809	H	3.24
	1425	H	4.04		1246	L	1.08		1521	H	4.68		1406	L	1.64
	2054	L	1.24		1908	H	4.28		2200	L	0.60		2005	H	3.48
4	0234	H	3.40	12	0151	L	1.00	20	0346	H	3.64	28	0251	L	1.48
F	0838	L	1.08	Sa	0748	H	3.32	Su	0940	L	0.76	M	0900	H	3.08
	1457	H	4.28		1338	L	1.32		1601	H	4.84		1506	L	1.96
	2129	L	1.00		1958	H	3.96		2239	L	0.52		2051	H	3.16
5	0311	H	3.56	13	0245	L	1.24	21	0426	H	3.64	29	0344	L	1.64
Sa	0910	L	0.92	Su	0844	H	3.24	M	1020	L	0.68	Tu	1013	H	3.08
	1531	H	4.52		1453	L	1.56		1639	H	4.84		1640	L	2.12
	2201	L	0.84		2101	H	3.64		2318	L	0.52		2200	H	2.84
6	0345	H	3.64	14	0352	L	1.40	22	0504	H	3.64	30	0458	L	1.72
Su	0937	L	0.84	M	1004	H	3.24	Tu	1056	L	0.68	W	1140	H	3.16
	1601	H	4.68		1622	L	1.72		1715	H	4.76		1843	L	2.12
	2235	L	0.68		2221	H	3.32		2352	L	0.60		2341	H	2.76
7	0421	H	3.64	15	0509	L	1.48	23	0539	H	3.64	31	0620	L	1.72
M	1015	L	0.76	Tu	1130	H	3.40	W	1132	L	0.76	Th	1300	H	3.40
	1634	H	4.76		1805	L	1.64		1750	H	4.60		1958	L	1.80
	2309	L	0.60		2350	H	3.24								
8	0454	H	3.64	16	0622	L	1.40	24	0027	L	0.68				
Tu	1049	L	0.76	W	1246	H	3.64	Th	0615	H	0.92				
	1708	H	4.76		1926	L	1.40		1208	L	0.92				
	2346	L	0.60						1823	H	4.36				

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Datum plane approximately ½' below mean low water springs.

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AUTHORITY DOE/SA-20

BY W. M. Mathieson DATE 6/17/94

[redacted]

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SECURITY INFORMATION

ENIWETOK ATOLL, MARSHALL ISLANDS [redacted] THIS PAGE ONLY

TIDE TABLE FOR JANUARY 1954

DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT	
1	0124	H	2.84	9	0046	L	0.52	17	0312	H	3.32	25	0119	L	1.00
F	0725	L	1.64	Sa	0644	H	3.96	Su	0858	L	1.16	M	0728	H	3.72
	1401	H	3.72		1242	L	0.76		1522	H	4.44		1329	L	1.40
	2043	L	1.48		1857	H	4.52		2201	L	0.84		1927	H	3.64
2	0223	H	3.08	10	0123	L	0.68	18	0351	H	3.56	26	0146	L	1.24
Sa	0814	L	1.40	Su	0726	H	3.88	M	0939	L	0.92	Tu	0802	H	3.56
	1442	H	4.12		1326	L	1.00		1600	H	4.68		1406	L	1.72
	2121	L	1.16		1938	H	4.12		2234	L	0.60		1955	H	3.32
3	0307	H	3.32	11	0203	L	1.00	19	0425	H	3.80	27	0217	L	1.48
Su	0856	L	1.16	M	0812	H	3.72	Tu	1017	L	0.76	W	0846	H	3.32
	1520	H	4.36		1418	L	1.32		1635	H	4.84		1458	L	2.04
	2156	L	0.84		2024	H	3.64		2305	L	0.52		2032	H	2.92
4	0345	H	3.48	12	0250	L	1.24	20	0458	H	3.96	28	0259	L	1.72
M	0934	L	0.92	Tu	0910	H	3.56	W	1051	L	0.68	Th	1000	H	3.16
	1555	H	4.68		1527	L	1.64		1707	H	4.84		1659	L	2.28
	2229	L	0.60		2125	H	3.24		2333	L	0.44		2153	H	2.60
5	0421	H	3.72	13	0351	L	1.56	21	0528	H	4.04	29	0431	L	1.96
Tu	1011	L	0.76	W	1032	H	3.48	Th	1124	L	0.68	F	1202	H	3.24
	1630	H	4.84		1718	L	1.88		1737	H	4.76		1946	L	2.04
	2302	L	0.44		2301	H	2.92								
6	0455	H	3.88	14	0521	L	1.72	22	0001	L	0.52	30	0058	H	2.60
W	1047	L	0.60	Th	1215	H	3.56	F	0558	H	4.04	Sa	0648	L	1.96
	1706	H	4.92		1919	L	1.72		1155	L	0.76		1334	H	3.48
	2337	L	0.36						1806	H	4.52		2039	L	1.64
7	0530	H	3.96	15	0100	H	2.84	23	0028	L	0.60	31	0220	H	2.92
Th	1124	L	0.60	F	0658	L	1.64	Sa	0628	H	3.96	Su	0802	L	1.72
	1742	H	4.92		1339	H	3.80		1226	L	0.92		1428	H	3.88
					2034	L	1.40		1833	H	4.28		2114	L	1.24
8	0010	L	0.36	16	0221	H	3.08	24	0054	L	0.76				
F	0606	H	3.96	Sa	0806	L	1.40	Su	0658	H	3.88				
	1201	L	0.60		1438	H	4.12		1257	L	1.16				
	1819	H	4.76		2123	L	1.08		1900	H	4.04				

Datum plane approximately 2' below meen low water springs.

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ENIWETOK ATOLL, MARSHALL ISLANDS

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AUTHORITY DOE/SA-20
BY [redacted] DATE 6-17-94
W. M. Matheson (W.M.M.)

TIDE TABLE FOR FEBRUARY 1954

DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT	
1	0302	H	3.24	8	0052	L	0.52	15	0315	H	3.32	22	0015	L	0.68
M	0848	L	1.48	M	0700	H	4.36	M	0900	L	1.32	M	0623	H	4.36
	1509	H	4.36		1310	L	0.76		1517	H	4.36		1230	L	0.92
	2145	L	0.84		1914	H	4.12		2151	L	0.92		1828	H	4.12
2	0337	H	3.64	9	0126	L	0.84	16	0344	H	3.64	23	0038	L	0.84
Tu	0928	L	1.00	Tu	0739	H	4.12	Tu	0936	L	1.00	Tu	0649	H	4.12
	1546	H	4.68		1354	L	1.24		1550	H	4.60		1258	L	1.24
	2216	L	0.52		1951	H	3.64		2217	L	0.68		1851	H	3.80
3	0410	H	3.96	10	0202	L	1.24	17	0412	H	3.96	24	0100	L	1.08
W	1004	L	0.68	W	0825	H	3.80	W	1009	L	0.76	W	0717	H	3.96
	1620	H	4.92		1451	L	1.64		1620	H	4.76		1329	L	1.56
	2247	L	0.28		2037	H	3.08		2242	L	0.52		1916	H	3.40
4	0443	H	4.20	11	0245	L	1.64	18	0439	H	4.20	25	0124	L	1.40
Th	1041	L	0.44	Th	0934	H	3.48	Th	1039	L	0.60	Th	0749	H	3.72
	1654	H	5.08		1639	L	2.04		1648	H	4.76		1409	L	1.88
	2318	L	0.2		2204	H	2.68		2306	L	0.44		1943	H	3.08
5	0516	H	4.44	12	0411	L	2.04	19	0505	H	4.36	26	0153	L	1.72
F	1117	L	0.28	F	1143	H	3.40	F	1107	L	0.60	F	0839	H	3.40
	1728	H	5.08		1940	L	1.96		1714	H	4.76		1527	L	2.20
	2349	L	0.2						2330	L	0.44		2030	H	2.68
6	0550	H	4.52	13	0121	H	2.60	20	0531	H	4.44	27	0241	L	2.04
Sa	1152	L	0.28	Sa	0656	L	2.04	Sa	1135	L	0.60	Sa	1033	H	3.24
	1804	H	4.92		1339	H	3.64		1740	H	4.60		1921	L	2.20
					2046	L	1.56		2353	L	0.52				
7	0021	L	0.28	14	0238	L	3.00	21	0557	H	4.44	28	0036	H	2.52
Su	0624	H	4.44	Su	0813	L	1.72	Su	1203	L	0.76	Su	0610	L	2.28
	1230	L	0.52		1437	H	4.04		1804	H	4.44		1304	H	3.40
	1839	H	4.60		2122	L	1.16						2019	L	1.72

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Datum plane approximately ½' below mean low water springs.

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BY [redacted] DATE 6-17-94
W. M. Matheson (W.M.M.)

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ENIWETOK ATOLL, MARSHALL ISLANDS [redacted]

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BY ~~D. R. GILSON~~ DATE 6-17-94
W. M. Mathieson / W.M.M.

TIDE TABLE FOR MARCH 1954

DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT	
1	0209	H	2.92	9	0024	L	0.60	17	0324	H	3.88	25	0025	L	1.16
M	0751	L	1.88	Tu	0635	H	4.68	W	0922	L	1.16	Th	0645	H	4.28
	1408	H	3.88		1253	L	0.76		1529	H	4.36		1309	L	1.48
	2051	L	1.32		1852	H	4.04		2148	L	0.84		1851	H	3.48
2	0249	H	3.40	10	0054	L	0.92	18	0348	H	4.20	26	0049	L	1.48
Tu	0834	L	1.40	W	0712	H	4.36	Th	0952	L	0.92	F	0717	H	3.96
	1449	H	4.36		1335	L	1.24		1555	H	4.52		1349	L	1.80
	2120	L	0.92		1926	H	3.56		2210	L	0.68		1924	H	3.08
3	0317	H	3.88	11	0125	L	1.32	19	0412	H	4.44	27	0119	L	1.80
W	0914	L	1.00	Th	0753	H	3.96	F	1019	L	0.68	Sa	0803	H	3.64
	1525	H	4.68		1428	L	1.72		1621	H	4.60		1502	L	2.12
	2150	L	0.52		2005	H	3.00		2233	L	0.60		2025	H	2.68
4	0349	H	4.28	12	0158	L	1.80	20	0437	H	4.68	28	0211	L	2.12
Th	0951	L	0.60	F	0854	H	3.56	Sa	1046	L	0.60	Su	0936	H	3.32
	1600	H	5.00		1626	L	2.20		1646	H	4.60		1806	L	2.12
	2221	L	0.28		2135	H	2.60		2255	L	0.52		2357	H	2.68
5	0421	H	4.60	13	0310	L	2.28	21	0503	H	4.76	29	0525	L	2.36
F	1026	L	0.28	Sa	1116	H	3.32	Su	1112	L	0.60	M	1211	H	3.48
	1635	H	5.08		1944	L	2.04		1711	H	4.52		1928	L	1.80
	2252	L	0.2						2318	L	0.60				
6	0454	H	4.84	14	0148	H	2.68	22	0528	H	4.76	30	0131	H	3.08
Sa	1102	L	0.28	Su	0703	L	2.28	M	1140	L	0.76	Tu	0717	L	1.96
	1710	H	4.08		1329	H	3.56		1736	H	4.36		1329	H	3.80
	2323	L	0.2		2032	L	1.64		2340	L	0.76		2010	L	1.32
7	0527	H	4.92	15	0234	H	3.08	23	0552	H	4.68	31	0213	H	3.56
Su	1138	L	0.2	M	0811	L	1.88	Tu	1207	L	0.92	W	0810	L	1.48
	1744	H	4.84		1425	H	3.88		1800	H	4.12		1418	H	4.28
	2353	L	0.36		2101	L	1.32						2044	L	0.92
8	0601	H	4.92	16	0300	H	3.48	24	0003	L	0.92				
M	1215	L	0.44	Tu	0851	L	1.48	W	0618	H	4.44				
	1819	H	4.52		1459	H	4.20		1236	L	1.16				
					2125	L	1.08		1826	H	3.80				

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Datum plane approximately ½' below mean low water springs.

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AUTHORITY DOE/SA-20
BY ~~D. R. GILSON~~ DATE 6-17-94
W. M. Mathieson
WMM

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SECURITY INFORMATION

ENIWETOK ATOLL, MARSHALL ISLANDS ~~OFFICIAL USE ONLY~~

TIDE TABLE FOR APRIL 1954

DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT	
1 Th	0248	H	4.12	9 F	0103	L	1.48	17 Sa	0341	H	4.60	25 Su	0114	L	1.80
	0852	L	0.92		0736	H	4.04		0956	L	0.92		0753	H	3.88
	1459	H	4.60		1423	L	1.80		1551	H	4.28		1457	L	1.88
	2117	L	0.60		2001	H	2.92		2156	L	0.76		2046	H	2.92
2 F	0322	H	4.60	10 Sa	0142	L	1.96	18 Su	0408	H	4.76	26 M	0225	L	2.12
	0930	L	0.52		0835	H	3.64		1024	L	0.76		0917	H	3.56
	1536	H	4.84		1613	L	2.12		1618	H	4.28		1649	L	1.96
	2150	L	0.36		2152	H	2.68		2221	L	0.76		2259	H	2.92
3 Sa	0354	H	4.92	11 Su	0312	L	2.36	19 M	0433	H	4.84	27 Tu	0445	L	2.20
	1008	L	0.28		1040	H	3.32		1052	L	0.76		1112	H	3.56
	1613	H	4.92		1846	L	2.04		1646	H	4.28		1822	L	1.72
	2222	L	0.28						2245	L	0.76				
4 Su	0430	H	5.16	12 M	0107	H	2.84	20 Tu	0501	H	4.84	28 W	0035	H	3.32
	1045	L	0.2		0631	L	2.36		1121	L	0.84		0634	L	1.96
	1649	H	4.84		1246	H	3.40		1713	H	4.12		1240	H	3.80
	2254	L	0.28		1946	L	1.72		2311	L	0.84		1917	L	1.40
5 M	0504	H	5.24	13 Tu	0201	H	3.24	21 W	0527	H	4.76	29 Th	0128	H	3.80
	1123	L	0.28		0747	L	1.96		1150	L	0.92		0738	L	1.48
	1724	H	4.60		1347	H	3.64		1741	H	3.88		1340	H	4.04
	2326	L	0.44		2019	L	1.48		2336	L	1.00		2001	L	1.08
6 Tu	0540	H	5.16	14 W	0227	H	3.64	22 Th	0556	H	4.60	30 F	0212	H	4.28
	1202	L	0.52		0827	L	1.64		1223	L	1.16		0826	L	1.08
	1800	H	4.28		1426	H	3.88		1810	H	3.64		1428	H	4.28
	2359	L	0.76		2044	L	1.24						2040	L	0.76
7 W	0616	H	4.92	15 Th	0251	H	3.96	23 F	0003	L	1.24				
	1243	L	0.84		0858	L	1.32		0626	H	4.44				
	1835	H	3.88		1458	H	4.12		1300	L	1.40				
					2109	L	1.00		1844	H	3.40				
8 Th	0031	L	1.08	16 F	0316	H	4.28	24 Sa	0033	L	1.48				
	0653	H	4.52		0927	L	1.08		0705	H	4.12				
	1326	L	1.32		1524	H	4.20		1347	L	1.64				
	1914	H	3.40		2132	L	0.84		1928	H	3.08				

Datum plane approximately ½' below mean low water springs.

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~~OFFICIAL USE ONLY~~

~~SECURITY INFORMATION~~

ENIWETOK ATOLL, MARSHALL ISLANDS [redacted]

TIDE TABLE FOR MAY 1954

DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT
1	0251	H	4.68	9	0145	L	1.96	17	0341	H	4.68	25	0228	L	1.88
Sa	0909	L	0.68	Su	0823	H	3.72	M	1007	L	1.00	Tu	0856	H	3.80
	0510	H	4.44		1534	L	1.88		1554	H	3.96		1553	L	1.64
	2116	L	0.60		2134	H	2.92		2150	L	0.92		2208	H	3.24
2	0329	H	5.00	10	0305	L	2.28	18	0410	H	4.76	26	0405	L	1.96
Su	0951	L	0.44	M	0944	H	3.48	Tu	1037	L	0.92	W	1020	H	3.64
	1550	H	4.52		1713	L	1.96		1625	H	3.88		1712	L	1.64
	2153	L	0.52		2335	H	3.00		2220	L	0.92		2331	H	3.48
3	0407	H	5.24	11	0521	L	2.36	19	0439	H	4.84	27	0544	L	1.88
M	1033	L	0.36	Tu	1126	H	3.32	W	1109	L	0.92	Th	1147	H	3.64
	1629	H	4.44		1828	L	1.80		1658	H	3.88		1820	L	1.48
	2229	L	0.52						2249	L	1.00				
4	0446	H	5.24	12	0052	H	3.24	20	0511	H	4.76	28	0041	H	3.80
Tu	1113	L	0.44	W	0654	L	2.12	Th	1142	L	0.92	F	0702	L	1.56
	1709	H	4.28		1244	H	1.64		1731	H	3.72		1259	H	3.72
	2305	L	0.68		1916	L	3.40		2320	L	1.08		1916	L	1.24
5	0524	H	5.16	13	0136	H	3.56	21	0544	H	4.68	29	0136	H	4.20
W	1154	L	0.60	Th	0748	L	1.88	F	1219	L	1.08	Sa	0802	L	1.24
	1748	H	3.96		1336	H	3.56		1808	H	3.56		1357	H	3.88
	2340	L	0.92		1951	L	1.48		2355	L	1.24		2004	L	1.08
6	0604	H	4.92	14	0211	H	3.88	22	0620	H	4.52	30	0226	H	4.60
Th	1237	L	0.92	F	0828	L	1.56	Sa	1258	L	1.24	Su	0854	L	0.92
	1829	H	3.64		1416	H	3.64		1847	H	3.40		1448	H	3.96
					2023	L	1.32						2049	L	0.84
7	0017	L	1.24	15	0242	H	4.20	23	0032	L	1.48	31	0311	H	4.92
F	0644	H	4.52	Sa	0902	L	1.32	Su	0702	H	4.36	M	0940	L	0.68
	1324	L	1.32		1450	H	3.80		1346	L	1.40		1534	H	4.04
	1913	H	3.32		2053	L	1.16		1937	H	3.32		2131	L	0.76
8	0056	L	1.56	16	0312	H	4.44	24	0120	L	1.64				
Sa	0728	H	4.12	Su	0934	L	1.16	M	0751	H	4.04				
	1419	L	1.64		1522	H	3.88		1441	L	1.56				
	2008	H	3.08		2122	L	1.00		2042	H	3.24				

Datum plane approximately ½' below mean low water springs.

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ENIWETOK ATOLL, MARSHALL ISLANDS [redacted]

TIDE TABLE FOR MAY 1954

DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT
1	0251	H	4.68	9	0145	L	1.96	17	0341	H	4.68	25	0228	L	1.88
Sa	0909	L	0.68	Su	0823	H	3.72	M	1007	L	1.00	Tu	0856	H	3.80
	0510	H	4.44		1534	L	1.88		1554	H	3.96		1553	L	1.64
	2116	L	0.60		2134	H	2.92		2150	L	0.92		2208	H	3.24
2	0329	H	5.00	10	0305	L	2.28	18	0410	H	4.76	26	0405	L	1.96
Su	0951	L	0.44	M	0944	H	3.48	Tu	1037	L	0.92	W	1020	H	3.64
	1550	H	4.52		1713	L	1.96		1625	H	3.88		1712	L	1.64
	2153	L	0.52		2335	H	3.00		2220	L	0.92		2331	H	3.48
3	0407	H	5.24	11	0521	L	2.36	19	0439	H	4.84	27	0544	L	1.88
M	1033	L	0.36	Tu	1126	H	3.32	W	1109	L	0.92	Th	1147	H	3.64
	1629	H	4.44		1828	L	1.80		1658	H	3.88		1820	L	1.48
	2229	L	0.52						2249	L	1.00				
4	0446	H	5.24	12	0052	H	3.24	20	0511	H	4.76	28	0041	H	3.80
Tu	1113	L	0.44	W	0654	L	2.12	Th	1142	L	0.92	F	0702	L	1.56
	1709	H	4.28		1244	H	1.64		1731	H	3.72		1259	H	3.72
	2305	L	0.68		1916	L	3.40		2320	L	1.08		1916	L	1.24
5	0524	H	5.16	13	0136	H	3.56	21	0544	H	4.68	29	0136	H	4.20
W	1154	L	0.60	Th	0748	L	1.88	F	1219	L	1.08	Sa	0802	L	1.24
	1748	H	3.96		1336	H	3.56		1808	H	3.56		1357	H	3.88
	2340	L	0.92		1951	L	1.48		2355	L	1.24		2004	L	1.08
6	0604	H	4.92	14	0211	H	3.88	22	0620	H	4.52	30	0226	H	4.60
Th	1237	L	0.92	F	0828	L	1.56	Sa	1258	L	1.24	Su	0854	L	0.92
	1829	H	3.64		1416	H	3.64		1847	H	3.40		1448	H	3.96
					2023	L	1.32						2049	L	0.84
7	0017	L	1.24	15	0242	H	4.20	23	0032	L	1.48	31	0311	H	4.92
F	0644	H	4.52	Sa	0902	L	1.32	Su	0702	H	4.36	M	0940	L	0.68
	1324	L	1.32		1450	H	3.80		1346	L	1.40		1534	H	4.04
	1913	H	3.32		2053	L	1.16		1937	H	3.32		2131	L	0.76
8	0056	L	1.56	16	0312	H	4.44	24	0120	L	1.64				
Sa	0728	H	4.12	Su	0934	L	1.16	M	0751	H	4.04				
	1419	L	1.64		1522	H	3.88		1441	L	1.56				
	2008	H	3.08		2122	L	1.00		2042	H	3.24				

Datum plane approximately ½' below mean low water springs.

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[redacted]

ENIWETOK ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR JUNE 1954

DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT
1	0352	H	5.08	9	0358	L	2.20	17	0428	H	4.76	25	0457	L	1.80
Tu	1025	L	0.60	W	0956	H	3.32	Th	1102	L	0.84	F	1055	H	3.40
	1617	H	4.04		1650	L	1.80		1652	H	3.72		1721	L	1.56
	2211	L	0.76		2323	H	3.24		2239	L	1.00		2356	H	3.80
2	0433	H	5.16	10	0537	L	2.20	18	0502	H	4.84	26	0633	L	1.72
W	1108	L	0.60	Th	1116	H	3.16	F	1136	L	0.84	Sa	1221	H	3.32
	1659	H	3.96		1756	L	1.80		1727	H	3.72		1834	L	1.48
	2251	L	0.84						2315	L	1.00				
3	0514	H	5.08	11	0032	H	3.48	19	0537	H	4.84	27	0109	H	4.04
Th	1150	L	0.68	F	0659	L	2.04	Sa	1211	L	0.84	Su	0749	L	1.48
	1741	H	3.80		1231	H	3.16		1805	H	3.72		1337	H	3.40
	2331	L	1.00		1851	L	1.72		2355	L	1.08		1938	L	1.32
4	0555	H	4.84	12	0125	H	3.72	20	0614	H	4.68	28	0208	H	4.36
F	1231	L	0.92	Sa	0756	L	1.80	Su	1248	L	0.92	M	0849	L	1.16
	1824	H	3.64		1331	H	3.24		1843	H	3.72		1438	H	3.56
					1937	L	1.56						2032	L	1.16
5	0011	L	1.16	13	0208	H	3.96	21	0033	L	1.16	29	0259	H	4.68
Sa	0635	H	4.60	Su	0840	L	1.56	M	0653	H	4.52	Tu	0938	L	0.92
	1314	L	1.08		1421	H	3.32		1328	L	1.00		1528	H	3.72
	1907	H	3.48		2017	L	1.40		1927	H	3.64		2120	L	1.00
6	0053	L	1.48	14	0245	H	4.20	22	0119	L	1.32	30	0344	H	4.92
Su	0717	H	4.28	M	0918	L	1.32	Tu	0737	H	4.28	W	1022	L	0.76
	1357	L	1.32		1501	H	3.48		1413	L	1.16		1613	H	3.80
	1954	H	3.32		2054	L	1.24		2018	H	3.56		2207	L	0.84
7	0139	L	1.72	15	0319	H	4.44	23	0215	L	1.56				
M	0800	H	3.88	Tu	0954	L	1.16	W	0829	H	3.96				
	1446	L	3.24		1539	H	3.64		1505	L	1.32				
	2051	H	1.56		2130	L	4.44		2120	H	3.56				
8	0238	L	2.04	16	0353	H	4.68	24	0327	L	1.72				
Tu	0851	H	3.56	W	1028	L	1.00	Th	0933	H	3.64				
	1544	L	1.72		1616	H	3.72		1608	L	1.48				
	2202	H	3.16		2205	L	1.08		2234	H	3.64				

Datum plane approximately ½' below mean low water springs.

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BIKINI ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR DECEMBER 1953

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1 Tu	0630 L 1.7		9 W	0517 H 4.3		17 Th	0055 H 3.9		25 F	0045 L 0.8	
	1252 H 4.0			1109 L 0.8			0708 L 1.3			0635 H 4.1	
	1920 L 2.0			1730 H 5.6			1332 H 4.8			1228 L 1.2	
							2011 L 1.1			1842 H 4.9	
2 W	0050 H 3.7		10 Th	0009 L 0.6		18 F	0157 H 4.0		26 Sa	0119 L 1.0	
	0718 L 1.5			0556 H 4.2			0800 L 1.0			0712 H 3.9	
	1333 H 4.4			1148 L 0.9			1422 H 5.2			1308 L 1.5	
	2003 L 1.6			1810 H 5.4			2101 L 0.8			1916 H 4.7	
3 Th	0138 H 3.9		11 F	0048 L 0.8		19 Sa	0248 H 4.2		27 Su	0154 L 1.3	
	0749 L 1.3			0639 H 4.0			0845 L 0.8			0754 H 3.8	
	1410 H 4.8			1231 L 1.1			1506 H 5.6			1351 L 1.8	
	2039 L 1.3			1853 H 5.1			2145 L 0.5			1950 H 4.1	
4 F	0219 H 4.0		12 Sa	0136 L 1.0		20 Su	0331 H 4.3		28 M	0236 L 1.6	
	0823 L 1.1			0733 H 3.9			0925 L 0.7			0845 H 3.6	
	1442 H 5.1			1323 L 1.4			1546 H 5.8			1451 L 2.2	
	2114 L 1.0			1943 H 4.7			2224 L 0.4			2036 H 3.7	
5 Sa	0256 H 4.2		13 Su	0330 L 1.3		21 M	0411 H 4.3		29 Tu	0329 L 1.8	
	0855 L 0.9			0829 H 3.8			1005 L 0.6			0958 H 3.6	
	1516 H 5.4			1428 L 1.7			1624 H 5.8			1625 L 2.4	
	2146 L 0.8			2046 H 4.3			2303 L 0.4			2145 H 3.3	
6 Su	0330 H 4.3		14 M	0337 L 1.5		22 Tu	0449 H 4.3		30 W	0443 L 1.9	
	0922 L 0.8			0949 H 3.8			1041 L 0.6			1125 H 3.7	
	1546 H 5.6			1607 L 1.9			1700 H 5.7			1828 L 2.4	
	2220 L 0.6			2236 H 3.9			2337 L 0.5			2326 H 3.2	
7 M	0406 H 4.3		15 Tu	0454 L 1.6		23 W	0524 H 4.3		31 Th	0605 L 1.9	
	1000 L 0.7			1115 H 4.0			1117 L 0.7			1245 H 4.0	
	1619 H 5.7			1750 L 1.8			1735 H 5.5			1943 L 2.0	
	2254 L 0.5			2335 H 3.8							
8 Tu	0439 H 4.3		16 W	0507 L 1.5		24 Th	0012 L 0.6				
	1034 L 0.7			1231 H 4.3			0600 H 4.2				
	1653 H 5.7			1911 L 1.5			1153 L 0.9				
	2331 L 0.5						1808 H 5.2				

Datum plane approximately ½' below mean low water springs.

TIDE TABLE FOR JANUARY 1954

ENIWETOK, MARSHALL ISLANDS

DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT	DAY	TIME		HEIGHT
1	0109	H	3.3	9	0031	L	0.4	17	0257	H	3.9	25	0104	L	1.0
F	0710	L	1.8	Sa	0629	H	4.7	Su	0843	L	1.2	M	0713	H	4.4
	1346	H	4.4		1227	L	0.7		1507	H	5.3		1314	L	1.5
	2028	L	1.6		1842	H	5.4		2146	L	0.8		1912	H	4.3
2	0208	H	3.6	10	0108	L	0.6	18	0336	H	4.2	26	0131	L	1.3
Sa	0759	L	1.5	Su	0711	H	4.6	M	0924	L	0.9	Tu	0747	H	4.2
	1427	H	4.9		1311	L	1.0		1545	H	5.6		1351	L	1.9
	2106	L	1.2		1923	H	4.9		2219	L	0.5		1940	H	3.9
3	0252	H	3.9	11	0148	L	1.0	19	0410	H	4.5	27	0202	L	11.6
Su	0841	L	1.2	M	0757	H	4.4	Tu	1002	L	0.7	W	0831	H	3.9
	1505	H	5.2		1403	L	1.4		1620	H	5.8		1443	L	2.3
	2141	L	0.8		2009	H	4.3		2250	L	0.4		2017	H	3.4
4	0330	H	4.1	12	0235	L	1.3	20	0443	H	4.7	28	0244	L	1.9
M	0919	L	0.9	Tu	0855	H	4.2	W	1036	L	0.6	Th	0945	H	3.7
	1540	H	5.6		1512	L	1.8		1652	H	5.8		1644	L	2.6
	2214	L	0.5		2110	H	3.8		2318	L	0.3		2138	H	3.0
5	0406	H	4.4	13	0336	L	1.7	21	0513	H	4.8	29	0416	L	2.2
Tu	0956	L	0.7	W	1017	H	4.1	Th	1109	L	0;6	F	1147	H	3.8
	1615	H	5.8		1703	L	2.1		1722	H	5.7		1931	L	2.3
	2247	L	0.3		2246	H	3.4		2346	L	0.4				
6	0440	H	4.6	14	0506	L	1.9	22	0543	H	4.8	30	0043	H	3.0
W	1032	L	0.5	Th	1200	H	4.2	F	1140	L	0.7	Sa	0633	L	2.2
	1651	H	5.9		1904	L	1.9		1751	H	5.4		1319	H	4.1
	2322	L	0.2										2024	L	1.8
7	0515	H	4.7	15	0045	H	3.3	23	0013	L	0.5	31	0205	H	3.4
Th	1109	L	0.5	F	0643	L	1.8	Sa	0613	H	4.7	Su	0747	L	1.9
	1727	H	5.9		1324	H	4.5		1211	L	0.9		1413	H	4.6
	2355	L	0.2		2019	L	1.5		1818	H	5.1		2059	L	1.3
8	0551	H	4.7	16	0206	H	3.6	24	0039	L	0.7				
F	1146	L	0.5	Sa	0751	L	1.5	Su	0643	H	4.6				
	1804	H	5.7		1423	H	4.9		1242	L	1.2				
					2108	L	1.1		1845	H	4.8				

Datum plane approximately ½' below mean low water springs.

BIKINI ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR FEBRUARY 1954

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1 M	0247 H 3.8		9 Tu	0111 L 0.8		17 W	0357 H 4.7		25 Th	0109 L 1.5	
	0833 L 1.6			0724 H 4.9			0954 L 0.7			0734 H 4.4	
	1454 H 5.2			1339 L 1.3			1605 H 5.7			1354 L 2.1	
	2130 L 0.8			1936 H 4.3			2227 L 0.4			1928 H 3.6	
2 Tu	0322 H 4.3		10 W	0147 L 1.3		18 Th	0424 H 5.0		26 F	0138 L 1.9	
	0913 L 1.0			0810 H 4.5			1024 L 0.5			0824 H 4.0	
	1531 H 5.6			1436 L 1.8			1633 H 5.7			1512 L 2.5	
	2201 L 0.4			2022 H 3.6			2251 L 0.3			2015 H 3.1	
3 W	0355 H 4.7		11 Th	0230 L 1.8		19 F	0450 H 5.2		27 Sa	0226 L 2.3	
	0949 L 0.6			0919 H 4.1			1052 L 0.5			1018 H 3.8	
	1605 H 5.9			1624 L 2.3			1659 H 5.7			1906 L 2.5	
	2232 L 0.1			2149 H 3.1			2315 L 0.3				
4 Th	0428 H 5.0		12 F	0356 L 2.3		20 Sa	0516 L 5.3		28 Su	0021 H 2.9	
	1026 L 0.3			1128 H 4.0			1120 L 0.5			0555 L 2.6	
	1639 H 6.1			1925 L 2.2			1725 H 5.5			1249 H 4.0	
	2303 L 0.0						2338 L 0.4			2004 L 1.9	
5 F	0501 H 5.3		13 Sa	0106 H 3.0		21 Su	0542 H 5.3				
	1102 L 0.1			0641 L 2.3			1148 L 0.7				
	1713 H 6.1			1324 H 4.3			1749 H 5.3				
	2334 L 0.0			2031 L 1.7							
6 Sa	0535 H 5.4		14 Su	0223 H 3.5		22 M	0000 L 0.6				
	1137 L 0.1			0758 L 1.9			0608 H 5.2				
	1749 H 5.9			1422 H 4.8			1215 L 0.9				
				2107 L 1.2			1813 H 4.9				
7 Su	0006 L 0.1		15 M	0300 H 3.9		23 Tu	0023 L 0.8				
	0609 H 5.3			0845 L 1.4			0634 H 4.9				
	1215 L 0.4			1502 H 5.2			1243 L 1.3				
	1824 H 5.5			2136 L 0.9			1836 H 4.5				
8 M	0037 L 0.4		16 Tu	0329 H 4.3		24 W	0045 L 1.1				
	0645 H 5.2			0921 L 1.0			0702 H 4.7				
	1255 L 0.7			1535 H 5.5			1314 L 1.7				
	1859 H 4.9			2202 L 0.6			1901 H 4.0				

Datum plane approximately $\frac{1}{2}$' below mean low water springs.

BIKINI ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR MARCH 1954

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0154	H 3.4	9	0009	L 0.5	17	0309	H 4.6	25	0010	L 1.2
M	0736	L 2.1	Tu	0620	H 5.6	W	0907	L 1.2	Th	0630	H 5.1
	1353	H 4.6		1238	L 0.7		1514	H 5.2		1254	L 1.6
	2036	L 1.4		1837	H 4.8		2133	L 0.8		1836	H 4.1
2	0234	H 4.0	10	0039	L 0.9	18	0333	H 5.0	26	0034	L 1.6
Tu	0819	L 1.5	W	0657	H 5.2	Th	0937	L 0.9	F	0702	H 4.7
	1434	H 5.2		1320	L 1.3		1540	H 5.4		1334	L 2.0
	2105	L 0.9		1911	H 4.2		2155	L 0.6		1909	H 3.6
3	0302	H 4.6	11	0110	L 1.4	19	0357	H 5.3	27	0104	L 2.0
W	0859	L 1.0	Th	0738	H 4.7	F	1004	L 0.6	Sa	0748	H 4.3
	1510	H 5.6		1413	L 1.9		1606	H 5.5		1447	L 2.4
	2135	L 0.4		1950	H 3.5		2218	L 0.5		2010	H 3.1
4	0334	H 5.1	12	0143	L 2.0	20	0422	H 5.6	28	0156	L 2.4
Th	0936	L 0.5	F	0839	H 4.2	Sa	1031	L 0.5	Su	0921	H 3.9
	1545	H 6.0		1611	L 2.5		1631	H 5.5		1751	L 2.4
	2206	L 0.1		2120	H 3.0		2240	L 0.4		2342	H 3.1
5	0406	H 5.5	13	0255	L 2.6	21	0448	H 5.7	29	0510	L 2.7
F	1011	L 0.1	Sa	1101	H 3.9	Su	1057	L 0.5	M	1156	H 4.1
	1620	H 6.1		1929	L 2.3		1656	H 5.4		1913	L 2.0
	2237	L 0.0					2303	L 0.5			
6	0439	H 5.8	14	0133	L 3.1	22	0513	H 5.7	30	0116	H 3.6
Sa	1047	L -0.1	Su	0648	H 2.6	M	1125	L 0.7	Tu	0702	L 2.2
	1655	H 6.1		1314	L 4.2		1721	H 5.2		1314	H 4.5
	2308	L 0.0		2017	H 1.8		2325	L 0.7		1955	L 1.4
7	0512	H 5.9	15	0219	H 3.6	23	0537	H 5.6	31	0158	H 4.2
Su	1123	L 0.0	M	0756	L 2.1	Tu	1152	L 0.9	W	0755	L 1.6
	1729	H 5.8		1410	H 4.6		1745	H 4.9		1403	H 5.1
	2338	L 0.2		2046	L 1.4		2348	L 0.9		2029	L 0.9
8	0546	H 5.9	16	0245	H 4.1	24	0603	H 5.3			
M	1200	L 0.3	Tu	0836	L 1.6	W	1221	L 1.2			
	1804	H 5.4		1440	H 5.0		1811	H 4.5			
				2110	L 1.1						

Datum plane approximately ½' below mean low water springs.

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BIKINI ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR APRIL 1954

DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT		DAY	TIME	HEIGHT	
1	0233	H	4.9	9	0048	L	1.6	17	0326	H	5.5	25	0059	L	2.0
Th	0837	L	0.9	F	0721	H	4.8	Sa	0941	L	0.9	Su	0738	H	4.6
	1444	H	5.5		1408	L	2.0		1536	H	5.1		1442	L	2.1
	2102	L	0.5		1946	H	3.4		2141	L	0.7		2031	H	3.4
2	0307	H	5.5	10	0127	L	2.2	18	0353	H	5.7	26	0210	L	2.4
F	0915	L	0.4	Sa	0820	H	4.3	Su	1009	L	0.7	M	0902	H	4.2
	1521	H	5.8		1558	L	2.4		1603	H	5.1		1634	L	2.2
	2135	L	0.2		2137	H	3.1		2206	L	0.7		2244	H	3.4
3	0339	H	5.9	11	0257	L	2.7	19	0418	H	5.8	27	0430	L	2.5
Sa	0953	L	0.1	Su	1025	H	3.9	M	1037	L	0.7	Tu	1057	H	4.2
	1558	H	5.9		1831	L	2.3		1631	H	5.1		1807	L	1.9
	2207	L	0.1						2230	L	0.7				
4	0415	H	6.2	12	0052	H	3.3	20	0446	H	5.8	28	0020	H	3.9
Su	1030	L	0.0	M	0616	L	2.7	Tu	1106	L	0.8	W	0619	L	2.2
	1634	H	5.8		1831	H	4.0		1658	H	4.9		1225	H	4.5
	2239	L	0.1		1931	L	1.9		2256	L	0.8		1902	L	1.5
5	0449	H	6.3	13	0146	H	3.8	21	0512	H	5.7	29	0113	H	4.5
M	1108	L	0.1	Tu	0732	L	2.2	W	1135	L	0.9	Th	0723	L	1.6
	1709	H	5.5		1332	H	4.3		1726	H	4.6		1325	H	4.8
	2311	L	0.3		2004	L	1.6		2321	L	1.0		1946	L	1.1
6	0525	H	6.2	14	0212	H	4.3	22	0541	H	5.5	30	0157	H	5.1
Tu	1147	L	0.4	W	0812	L	1.8	Th	1208	L	1.2	F	0811	L	1.1
	1745	H	5.1		1411	H	4.6		1755	H	4.3		1413	H	5.1
	2344	L	0.7		2029	L	1.3		2348	L	1.3		2025	L	0.7
7	0601	H	5.9	15	0236	H	4.7	23	0611	H	5.3				
W	1228	L	0.8	Th	0843	L	1.4		1245	L	1.5				
	1820	H	4.6		1443	H	4.9		1829	H	4.0				
					2054	L	1.0								
8	0016	L	1.1	16	0301	H	5.1	24	0018	L	1.6				
Th	0638	H	5.4	F	0912	L	1.1	Sa	0650	H	4.9				
	1311	L	1.4		1509	H	5.0		1332	L	1.8				
	1859	H	4.0		2117	L	0.8		1913	H	3.6				

Datum plane approximately 1½' below mean low water springs.

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BIKINI ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR MAY 1954

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1	0236	L 5.6	9	0130	L 2.2	17	0326	H 5.6	25	0213	L 2.1
Sa	0854	L 0.6	Su	0808	H 4.4	M	0952	L 1.0	Tu	0841	H 4.5
	1455	H 5.3		1519	L 2.1		1539	H 4.7		1538	L 1.8
	2101	L 0.5		2119	H 3.4		2135	L 0.9		2153	H 3.8
2	0314	H 6.0	10	0250	L 2.6	18	0355	H 5.7	26	0350	L 2.2
Su	0936	L 0.3	M	0929	H 4.1	Tu	1022	L 0.9	W	1005	H 4.3
	1535	H 5.4		1658	L 2.2		1610	H 4.6		1657	L 1.8
	2138	L 0.4		2320	H 3.5		2205	L 0.9		2316	H 4.1
3	0352	H 6.3	11	0506	L 2.7	19	0424	H 5.8	27	0529	L 2.1
M	1018	L 0.2	Tu	1111	H 3.9	W	1054	L 0.9	Th	1132	H 4.3
	1614	H 5.3		1813	L 2.0		1643	H 4.6		1805	L 1.6
	2214	L 0.4					2234	L 1.0			
4	0431	H 6.3	12	0037	H 3.8	20	0456	H 5.7	28	0026	H 4.5
Tu	1058	L 0.3	W	0639	L 2.4	Th	1127	L 0.9	F	0647	L 1.7
	1654	H 5.1		1229	H 4.0		1716	H 4.4		1244	H 4.4
	2250	L 0.6		1901	L 1.8		2305	L 1.1		1901	L 1.3
5	0509	H 6.2	13	0121	H 4.2	21	0529	H 5.6	29	0121	H 5.0
W	1139	L 0.5	Th	0733	L 2.1	F	1204	L 1.1	Sa	0747	L 1.3
	1733	H 4.7		1321	H 4.2		1753	H 4.2		1342	H 4.6
	2325	L 0.9		1936	L 1.6		2340	L 1.3		1949	L 1.1
6	0549	H 5.9	14	0156	H 4.6	22	0605	H 5.4	30	0211	H 5.5
Th	1222	L 0.9	F	0813	L 1.7	Sa	1243	L 1.3	Su	0839	L 0.9
	1814	H 4.3		1401	H 4.3		1832	H 4.0		1433	H 4.7
				2008	L 1.4					2034	L 0.8
7	0002	L 1.3	15	0227	H 5.0	23	0017	L 1.6	31	0256	H 5.9
F	0629	H 5.4	Sa	0847	L 1.4	Su	0647	H 5.2	M	0925	L 0.6
	1309	L 1.4		1435	H 4.5		1331	L 1.5		1519	H 4.8
	1858	H 3.9		2038	L 1.2		1922	H 3.9		2116	L 0.7
8	0041	L 1.7	16	0257	H 5.3	24	0105	L 1.8			
Sa	0713	H 4.9	Su	0919	L 1.2	M	0736	H 4.8			
	1404	L 1.8		1507	H 4.6		1426	L 1.7			
	1953	H 3.6		2107	L 1.0		2027	H 3.8			

Datum plane approximately $\frac{1}{2}$' below mean low water springs.

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BIKINI ATOLL, MARSHALL ISLANDS

TIDE TABLE FOR JUNE 1954

DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT	DAY	TIME	HEIGHT
1 Tu	0337 H 6.1		9 W	0343 L 2.5		17 Th	0413 H 5.7		25 F	0442 L 2.0	
	1010 L 0.5			0941 H 3.9			1047 L 0.8			1040 H 4.0	
	1602 H 4.8			1635 L 2.0			1637 H 4.4			1706 L 1.7	
	2156 L 0.7			2308 H 3.8			2224 L 1.0			2341 H 4.5	
2 W	0418 H 6.2		10 Th	0522 L 2.5		18 F	0447 H 5.8		26 Sa	0618 L 1.9	
	1053 L 0.5			1101 H 3.7			1121 L 0.8			1206 H 3.9	
	1644 H 4.7			1741 L 2.0			1712 H 4.4			1819 L 1.6	
	2236 L 0.8						2300 L 1.0				
3 Th	0459 H 6.1		11 F	0017 H 4.1		19 Sa	0522 H 5.8		27 Su	0054 H 4.8	
	1135 L 0.6			0644 L 2.3			1156 L 0.8			0734 L 1.6	
	1726 H 4.5			1216 H 3.7			1750 H 4.4			1322 H 4.0	
	2316 L 1.0			1836 L 1.9			2340 L 1.1			1923 L 1.4	
4 F	0540 H 5.8		12 Sa	0110 H 4.4		20 Su	0559 H 5.6		28 M	0153 H 5.2	
	1216 L 0.9			0741 L 2.0			1233 L 0.9			0834 L 1.2	
	1809 H 4.3			1316 H 3.8			1828 H 4.4			1423 H 4.2	
	2356 L 1.2			1922 L 1.7						2017 L 1.2	
5 Sa	0620 H 5.5		13 Su	0153 H 4.7		21 M	0018 L 1.2		29 Tu	0244 H 5.6	
	1259 L 1.1			0825 L 1.7			0638 H 5.4			0923 L 0.9	
	1852 H 4.1			1406 H 3.9			1313 L 1.0			1513 H 4.4	
				2002 L 1.5			1912 H 4.3			2105 L 1.0	
6 Su	0038 L 1.6		14 M	0230 H 5.0		22 Tu	0104 L 1.4		30 W	0329 H 5.9	
	0702 H 5.1			0903 L 1.4			0722 H 5.1			1007 L 0.7	
	1342 L 1.4			1446 H 4.1			1358 L 1.2			1558 H 4.5	
	1939 H 3.9			2039 L 1.3			2003 H 4.2			2152 L 0.8	
7 M	0124 L 1.9		15 Tu	0304 H 5.3		23 W	0200 L 1.7				
	0745 H 4.6			0939 L 1.2			0814 H 4.7				
	1431 L 1.7			1524 H 4.3			1450 L 1.4				
	2036 H 3.8			2115 L 1.2			2105 H 4.2				
8 Tu	0223 L 2.3		16 W	0338 H 5.6		24 Th	0312 L 1.9				
	0836 H 4.2			1013 L 1.0			0918 H 4.3				
	1529 L 1.9			1601 H 4.4			1553 L 1.6				
	2147 H 3.7			2150 L 1.1			2219 H 4.3				

Datum plane approximately ½' below mean low water springs.

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