

DNA 1251-2-EX

**COMPILATION OF LOCAL FALLOUT DATA
FROM TEST DETONATIONS 1945-1962
EXTRACTED FROM DASA 1251**

Volume II -Oceanic U.S. Tests

General Electric Company-TEMPO
DASIAC
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Extract

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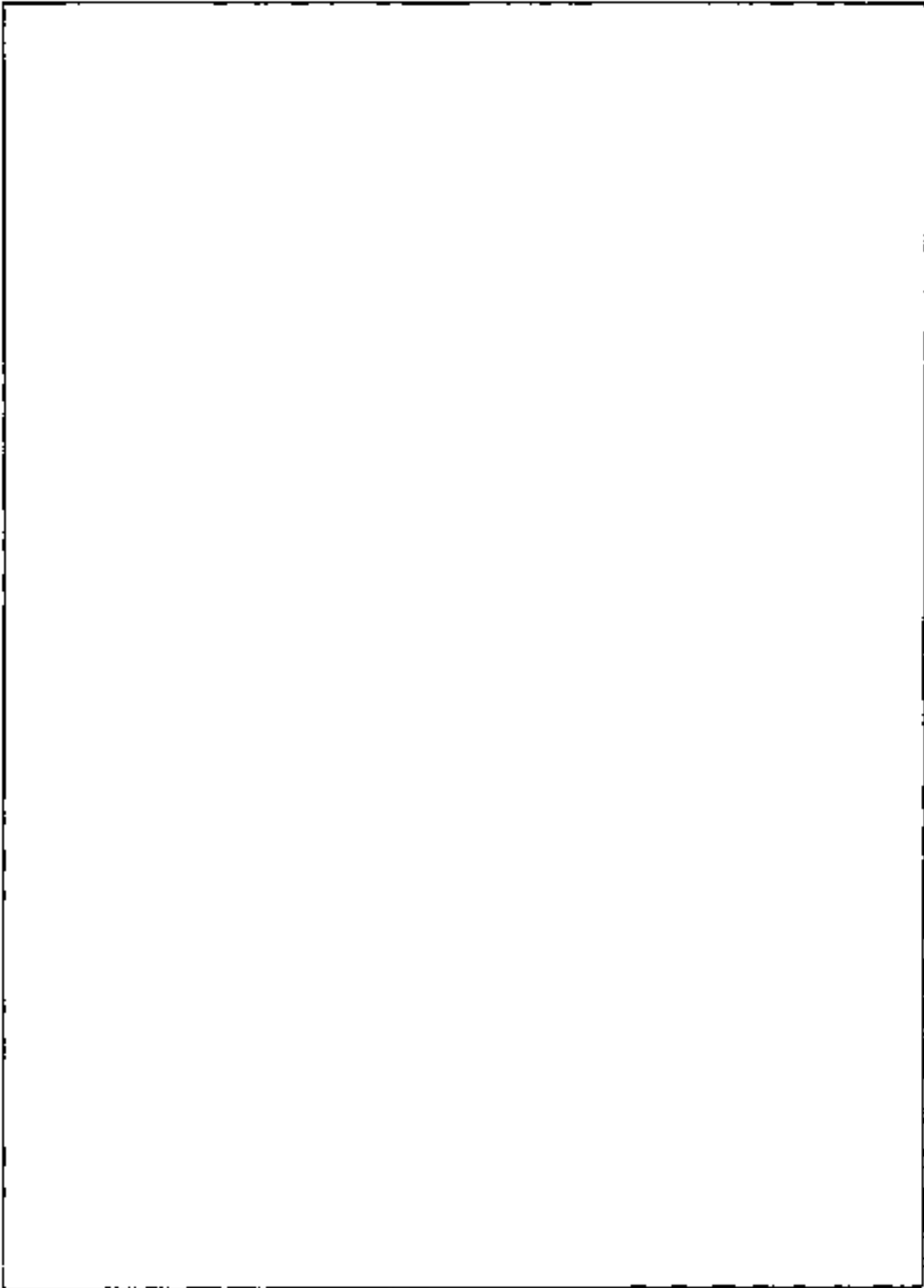
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PREFACE

This report has been prepared to serve as an unclassified source of information and data concerning the atmospheric nuclear test program conducted by the United States prior to 1963. The information contained herein was reproduced directly from the classified versions of the DASA 1251 series of reports. The classified material which was deleted to prepare this report was in accordance with the requirements of the Atomic Energy Act of 1954 and would not contribute to an understanding of the radiation interactions with personnel. All fallout plots and radiation contours are presented exactly as they appeared in the classified version of DASA 1251.



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INTRODUCTION

The objective of this report is to provide a ready reference of fallout patterns and related test data for those engaged in the analysis of fallout effects.

This compilation was extracted from DASA 1251 "Local Fallout from Nuclear Test Detonations" (I) Vol. 2 "Compilation of Fallout Patterns and Related Test Data" (II) Parts 1 through 5. DASA 1251 Vol. 2 was the work of Manfred Morgenthau, Harry Meieran, Richard Showers, Jeffrey Morse, Norman Bombeck, and Arnaldo Garcia of the U.S. Army Nuclear Defense Laboratory under Defense Atomic Support Agency (now Defense Nuclear Agency) sponsorship.

Although local (early) fallout is emphasized, the data presented will be useful to those studying world-wide (delayed) fallout as well. In this report local fallout is defined as all fallout which consists principally of the larger particles that are deposited within 24 hours after the detonation. World-wide or delayed fallout is defined as fallout which consists of very small particles which descend very slowly over large areas of the earth's surface.

Data resulting from each U.S. detonation are presented chronologically. For each detonation, the basic information useful for an interpretation of the fallout data is tabulated first. This is followed by both on-site and off site fallout patterns where available. A graph of the growth-rate of the cloud and stem is presented next. Wind speed and direction are then tabulated as a function of altitude, and hodographs are drawn from these data.

EXPLANATION COMMENTS ON DATA PRESENTED

Fallout Patterns

One or more fallout patterns are given for each event, except for those shots for which no significant residual radiation was observed downwind of G2 or for which no patterns were found in the literature. In the remarks included on the basic data sheet for each shot, the individual fallout patterns are discussed briefly; some comments are made for those shots for which no patterns were available. The dose-rate contours for the fallout patterns have been drawn to show the gamma dose rate in roentgens per hour, three feet above the ground, in terms of the one hour after burst reference time. The $t^{-1.2}$ approximation was used when no actual decay data was available to adjust radiation measurements to the one hour reference time. It is important to recognize the 11+1 hour is used as a reference time, and that only the contours from low yield weapons are complete at one hour after burst. For high yield weapons, fallout over some parts of the vast areas

shown does not commence until many hours after the burst. The time of arrival of fallout is indicated on some of the fallout patterns by "dot-dash" lines. The time lines are intended to give only a rough average arrival time in hours as estimated from the wind reports and the available monitoring information.

Induced Activity Patterns

The contamination resulting from low air bursts is due primarily to the activity induced by neutrons which are captured by certain elements in the soil, notably sodium, manganese and aluminum. The resulting radiation field is circular and covers a limited area about ground zero. Weather conditions have very little influence on the location or shape of the induced radiation pattern. However, increasing the moisture content in soils can increase the induced activity levels. The rate of decay of the induced radiation field is different from the decay of fission products and depends on the composition of the soil over which the weapon was detonated. For Nevada soil, the sodium and manganese composition generally varies by a factor of 1.4 to 2 and the aluminum composition varies by a factor of 3 to 7 within and between test areas. For most induced activity patterns in this report, a general neutron-induced decay curve for Nevada soil was used to extrapolate the observed dose rates back to H+1 hour. For a few induced activity patterns, Na^{24} decay is used to extrapolate the observed dose rates to H+1 hour. This decay rate is not strictly applicable but it closely approximates the observed decay.

Wind Data

The tables of wind data give surface and upper air winds for heights up to at least the top of the nuclear cloud. These data are presented for times as close to shot time as possible and for several times after shot. Directions are in degrees from which the wind is blowing, and are measured clockwise from North. Velocities are in statute miles per hour. The height of the tropopause at shot time is given when available. Although the meteorological data were taken in close proximity to ground zero, they do not necessarily represent the wind field downwind from ground zero in space and time.

The hodographs are drawn for a constant balloon rise rate of 5,000 ft/hr and are presented for illustrative purposes only. The fall rates of particles vary considerably with altitude; therefore, errors will result from the use of a constant fall-rate hodograph for fallout prediction. In general, particles in higher altitude levels fall faster and the percentage change in the falling rate is greater for larger particles. The numbers on the hodographs represent altitudes in thousands of feet. The associated points represent the locations on the surface where particles having a constant fall-rate of 5,000 ft/hr would land if they originated over GZ at the altitudes shown. The letter S on the hodographs stands for "Surface" and the number next to it in parenthesis (for the Nevada shots) is the site elevation of ground zero in feet above MSL.

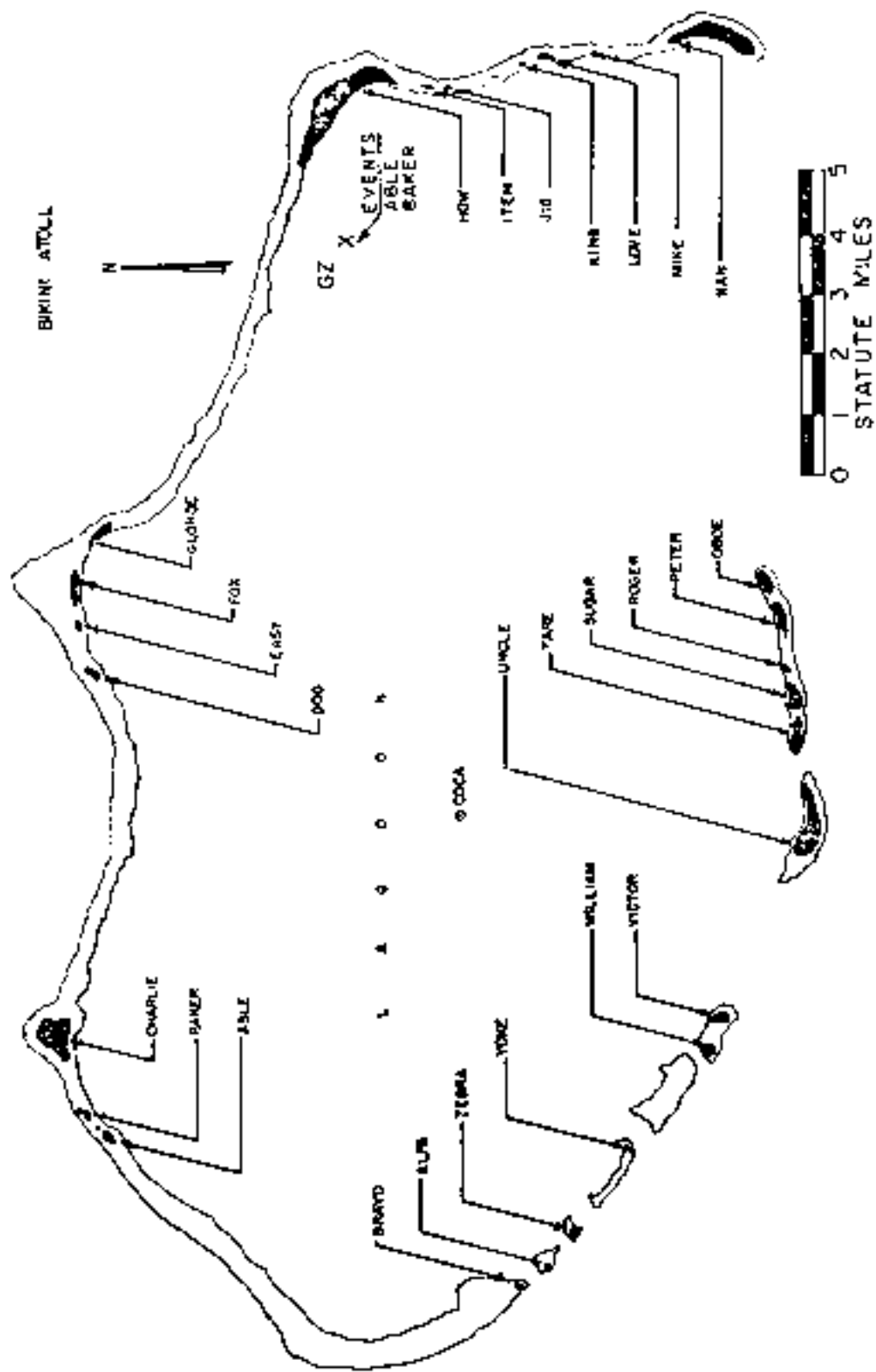


Figure 1 Operations CROSSROADS, Step 1 operations.

OPERATION CROSSROADS - Able

	<u>PTG time</u>	<u>GMI</u>
<u>DATE:</u>	1 Jul 1956	30 June 1956
<u>TIME:</u>	0700	2200

Sponsors: NASL and DOD

SITE: PPG - Bikini
11° 37' 10" N
165° 29' 26" E
Site elevation: Sea level

TOTAL YIELD: 23 kt

HEIGHT OF BURST: 120 ft

TYPE OF BURST AND PLACEMENT:
Air burst over water

PERFORMANCE DATA:

Time to 1st minimum:	RM
Time to 2nd minimum:	RM
Radius at 2nd minimum:	~ 576 ft

HEIGHT TOB SPHERE: 40,000 ft MSL

CLOUD BOTTOM HEIGHT: N/A available

CRITICAL DATA: N/A available

REMARKS:

The residual radioactivity on burst vessels was 1.44 Ci (56.8 kg) radioactivity. Residuals that 50 yr per 100 years were found on 10 of vessels. The residual radioactivity in the water after 100 yr was negligible.

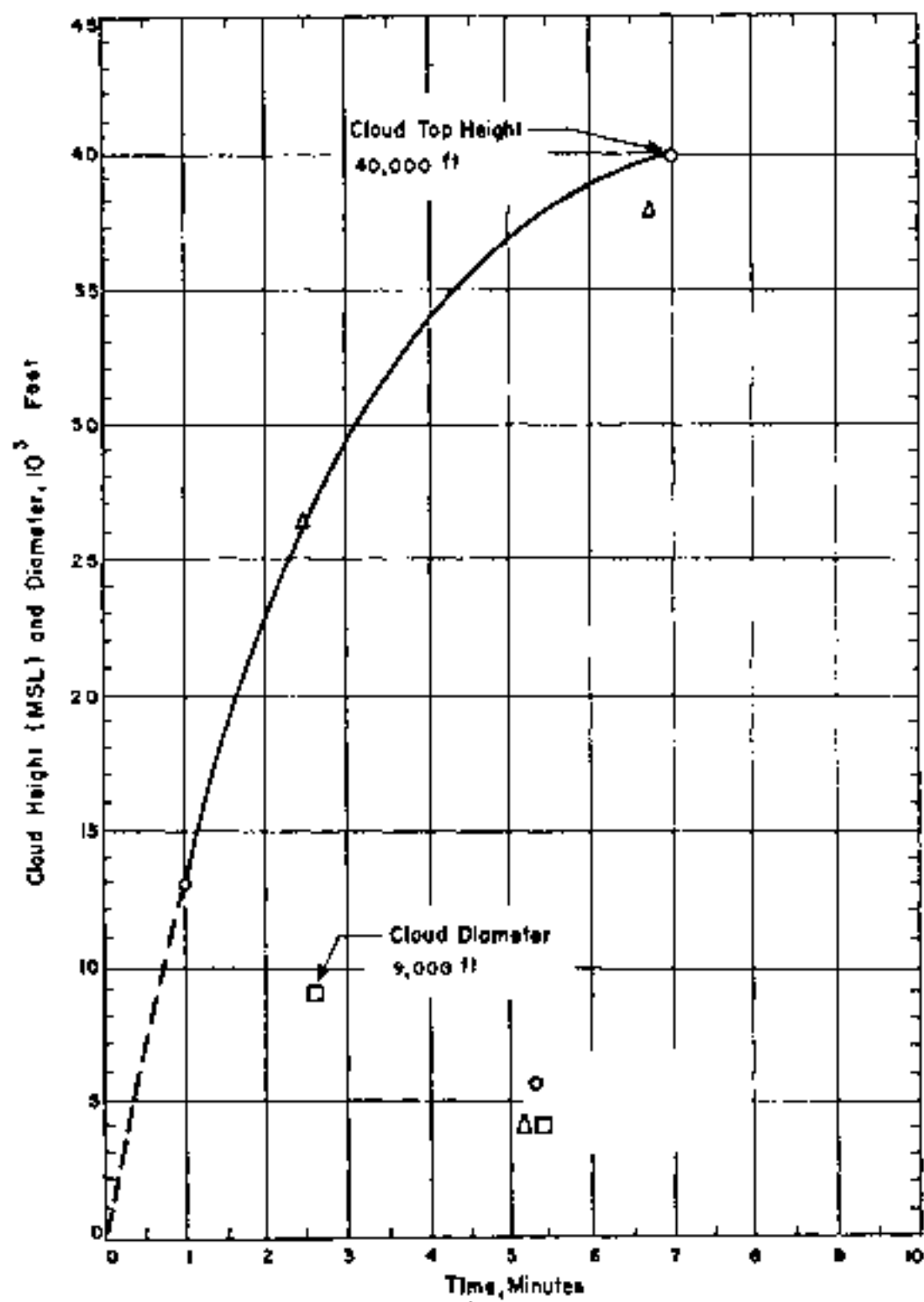


Figure 2. Cloud Dimensions: Operation CROSSROADS - Able.

TABLE 1 BIKINI WIND DATA FOR OPERATION CROSSROADS,

TABLE

Altitude (MSL)	H-hour		H+2 hours		H+4 hours	
	Dir	Speed	Dir	Speed	Dir	Speed
feet	degrees	mph	degrees	mph	degrees	mph
Surface	(070)	(09)	045	09	070	08
2,000	130	15	---	--	---	--
4,000	130	16	130	16	120	14
5,000	(130)	(16)	(130)	(15)	(120)	(14)
6,000	140	17	130	14	120	15
8,000	120	13	120	14	070	16
10,000	(120)	(19)	130	17	120	16
12,000	120	08	110	16	130	17
14,000	100	10	110	10	070	13
15,000	100	08	020	06	040	06
20,000	330	05	150	17	170	09
25,000	180	09	280	02	230	07
30,000	340	07	330	05	310	05
35,000	340	02	080	06	Calm	Calm
40,000	070	09	360	25	350	28
45,000	030	30	330	31	320	32

NOTES:

1. Numbers in parentheses are estimated values.
2. Surface wind data was obtained on Bikini; upper wind data was obtained on board the Mt. McKinley.
3. Tropopause height was 54,000 to 60,000 feet (exact height is uncertain).
4. At H-hour the surface air pressure was 14.68 psi, the temperature 27.2°C and the dew point 23.4°C.

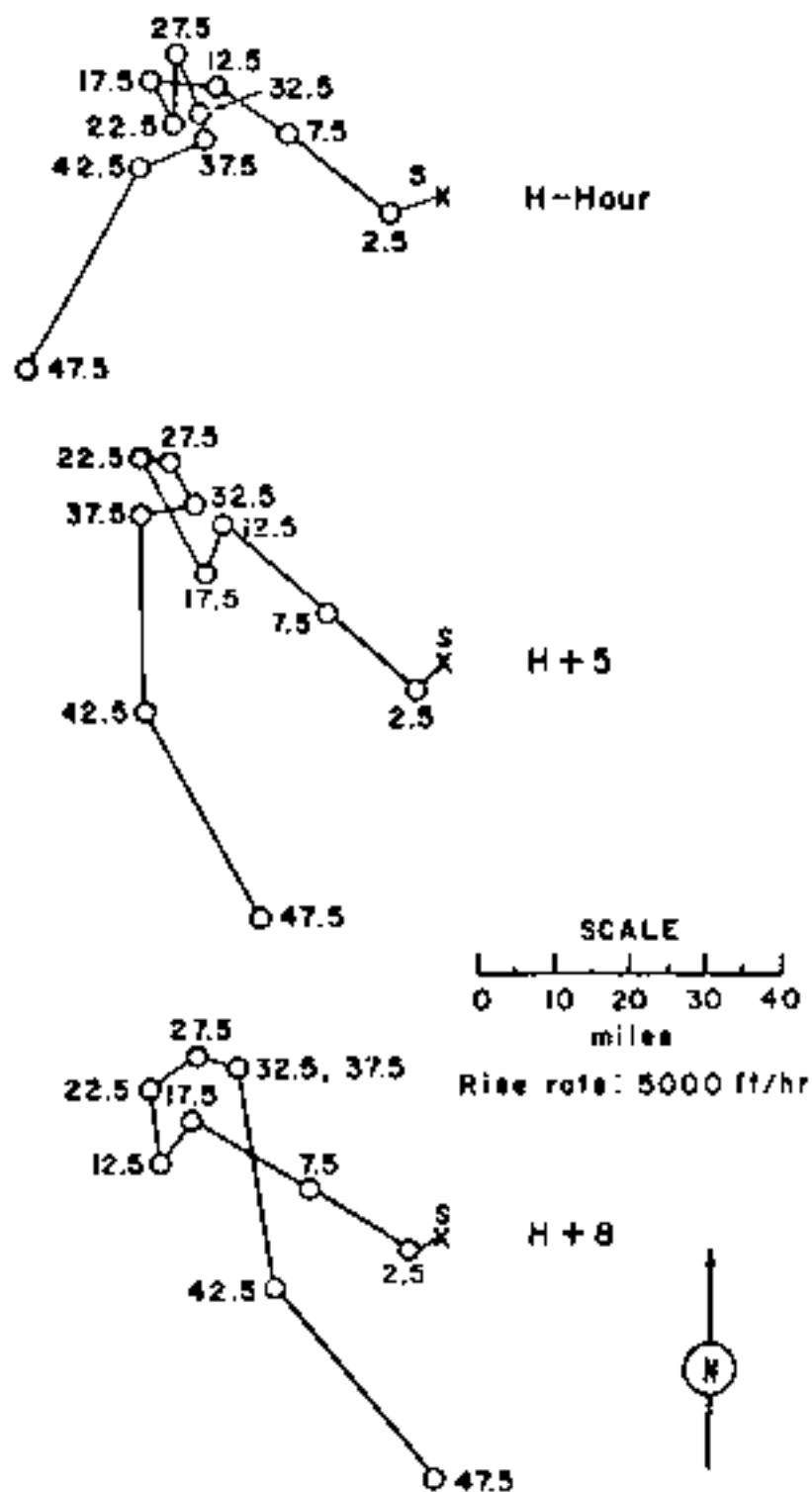


Figure 3. Hodographs for Operation CROSSROADS - Able.

OPERATION CHOLINERANG -

Baker

PPG time GMT
DATE: 27 Jun 1966 27 Jun 1966
TIME: 0835 2135

Sponsors: LAGL and 100

SITE: PPG - Bikini - Near How
11° 31' 10" N
169° 23' 28" E
Site elevation: Sea level

TOTAL YIELD: 23 kt

HEIGHT OF BURST: 400 ft

TYPE OF BURST AND PLACEMENT:

Underwater - 400 ft depth
90 ft above target ship
Target was 100 ft long

FIREBALL DATA:

Time to 1st maximum: 1M
Time to 2nd maximum: 1M
Radius at 2nd maximum: 1M

CLOUD TOP HEIGHT: 1,000 ft

CRACKS DATA:

Number of cracks: 1
Depth: 10 ft

REMARKS:

The contamination pattern is unreliable. The dose-rate readings used for the pattern were obtained from the total dose rate reading film badges collected between D10 days and D15 days. The radioactivity on the target vessels diminished. At the greatest extent the base surge extended about 2,000 yd upwind, 3,000 yd downwind and 4,000 yd downwind. "The contamination resulted from the radioactive rain from the mushroom cloud reinforced somewhat by wind-blown ash of the base surge. Ideally there should have been an annular fall-out dose pattern as a result of fallout from the sides of the mushroom cloud. This ideal pattern was changed because of the intermittent behavior of the rain-out and because of the varying ability of the different target ships to retain the fallout activity."

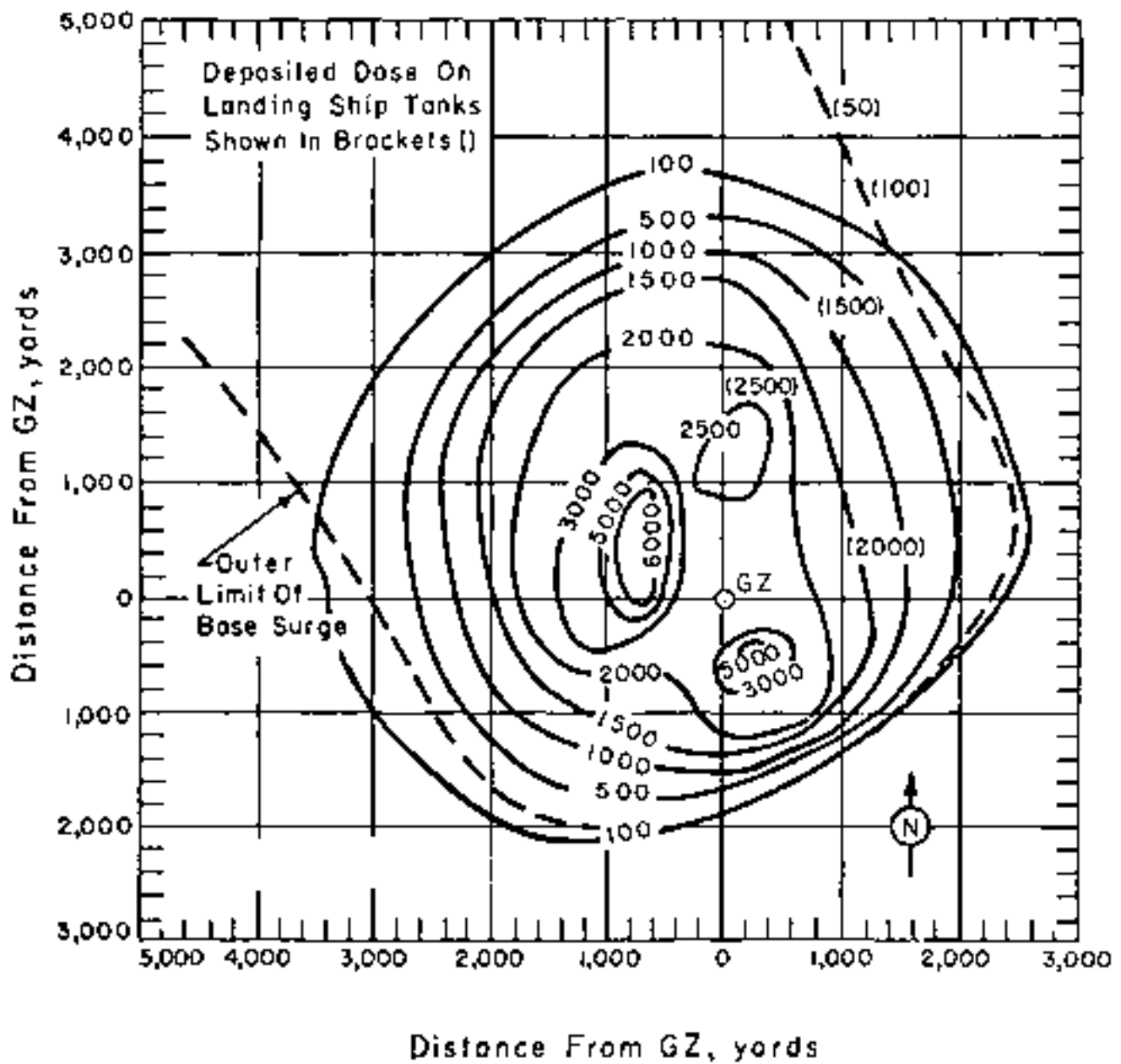


Figure 4. Operation CROSSROADS - Baker. On-site dose rate contours in r/hr at H+1 hour.

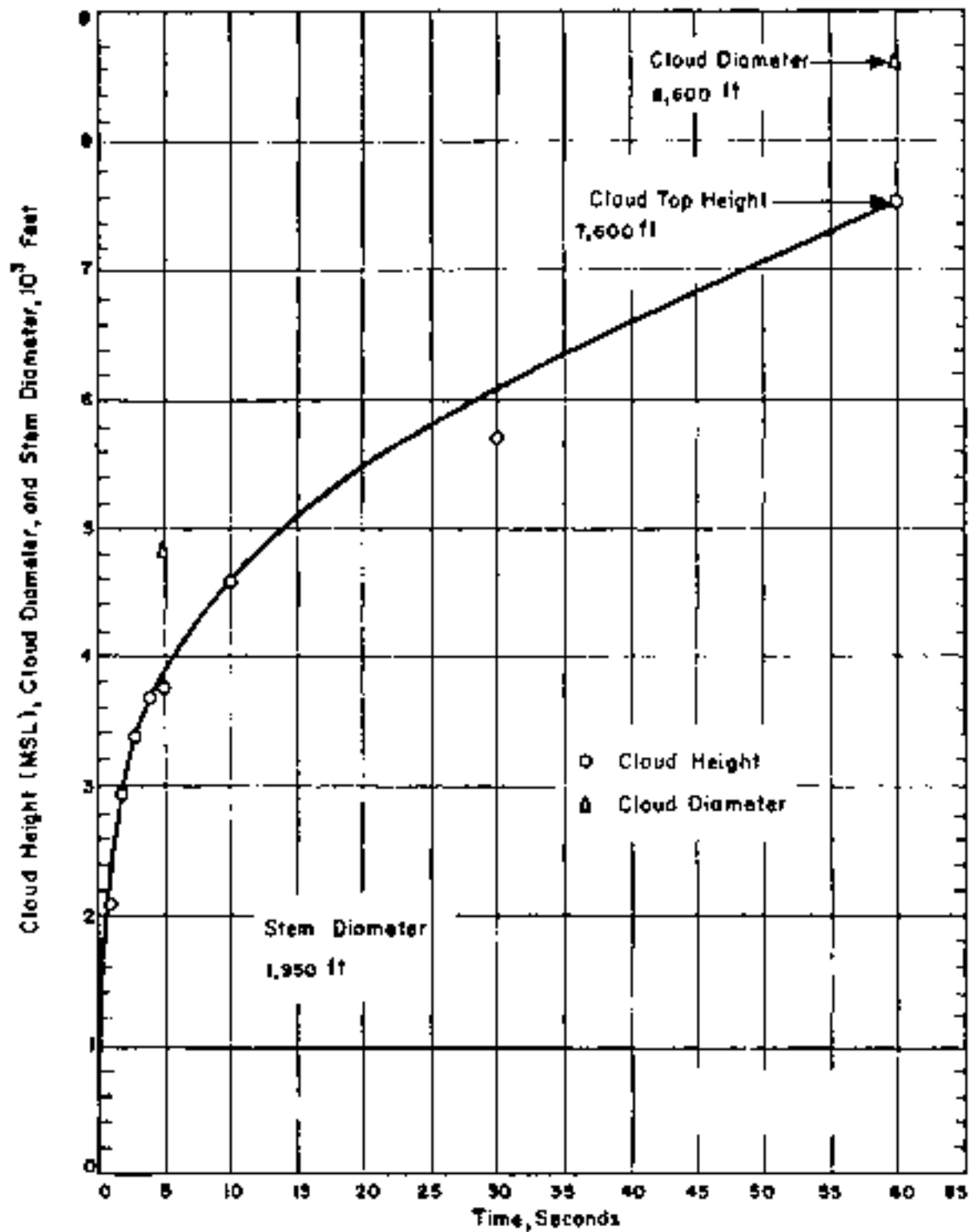


Figure 5. Cloud Dimensions: Operation CROSSROADS - Baker.

TABLE 2. BIKINI WIND DATA FOR OPERATION CROSSROADS -

Baker

Altitude (MSL) feet	H-hour		Altitude (MSL) feet	H-hour	
	Direction degrees	Speed mph		Direction degrees	Speed mph
Surface	200	03	14,000	080	09
2,000	160	12	15,000	080	09
4,000	160	12	16,000	080	13
6,000	150	09	20,000	110	09
8,000	150	06	25,000	050	12
10,000	120	05	30,000	040	20
12,000	110	14	35,000	060	32

NOTES:

1. Surface wind data was obtained at H+1 hour on Bikini; upper wind data was obtained on board the "Poll River."
2. Tropopause height was 34,000 to 40,000 feet (exact height is uncertain).
3. At H-hour the surface air pressure was 14.48 psi, the temperature 28.9°C and the dew point 21.3°C.

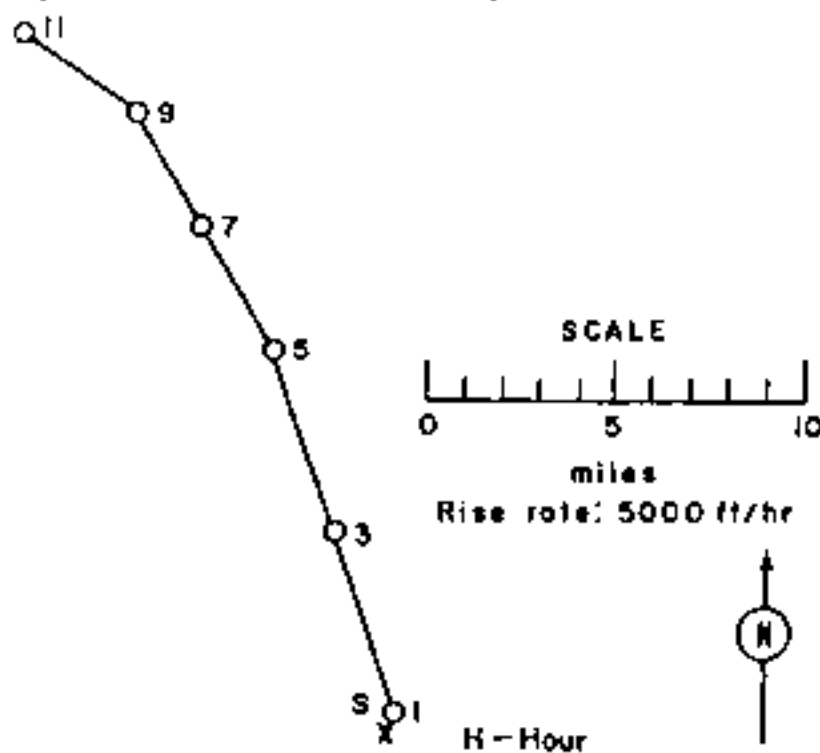


Figure 6. Hodographs for Operation CROSSROADS -

Baker

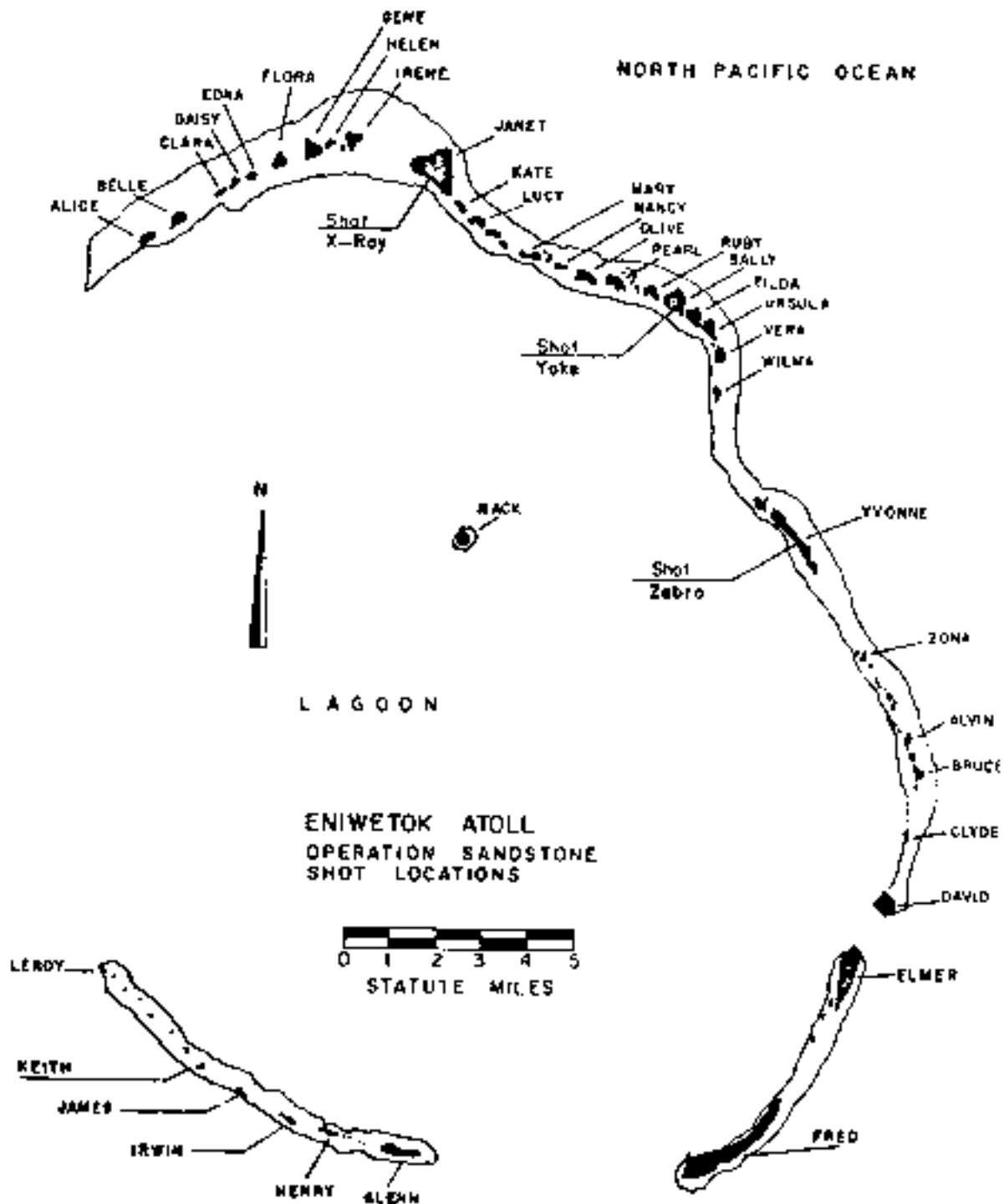


Figure 7. Operation SANDSTONE, Shot Locations.

OPERATION SANDSTONE -

X-Day

	<u>PGC Time</u>	<u>GMI</u>
<u>DATE:</u>	19 Apr 1948	14 Apr 1948
<u>TIME:</u>	0617	1817

Sponsor: LADL

SITE: PGC - Kwiwetok - Jurel
13° 40' N
167° 24' 37" E
Site elevation: Sea level

TOTAL YIELD: 37 kt

HEIGHT OF BURST: 500 ft

TYPE OF BURST AND PLACEMENT:
Tower burst, very close, 500 ft

PIERCEAL DATA:

Time to 1st minimum: 124
Time to 3rd maximum: 124
Radius at 3rd maximum: 124

CLOUD TOP HEIGHT: 40,000 ft MSL
CLOUD BOTTOM HEIGHT: 25,000 ft MSL

OTHER DATA: Not available

REMARKS:

No fallout pattern available. Radioactive samples were taken from Ground Zero and showed a decay curve. Also, much activity due to Na^{24} was observed. Cloud reached top of picture in 12 minutes.

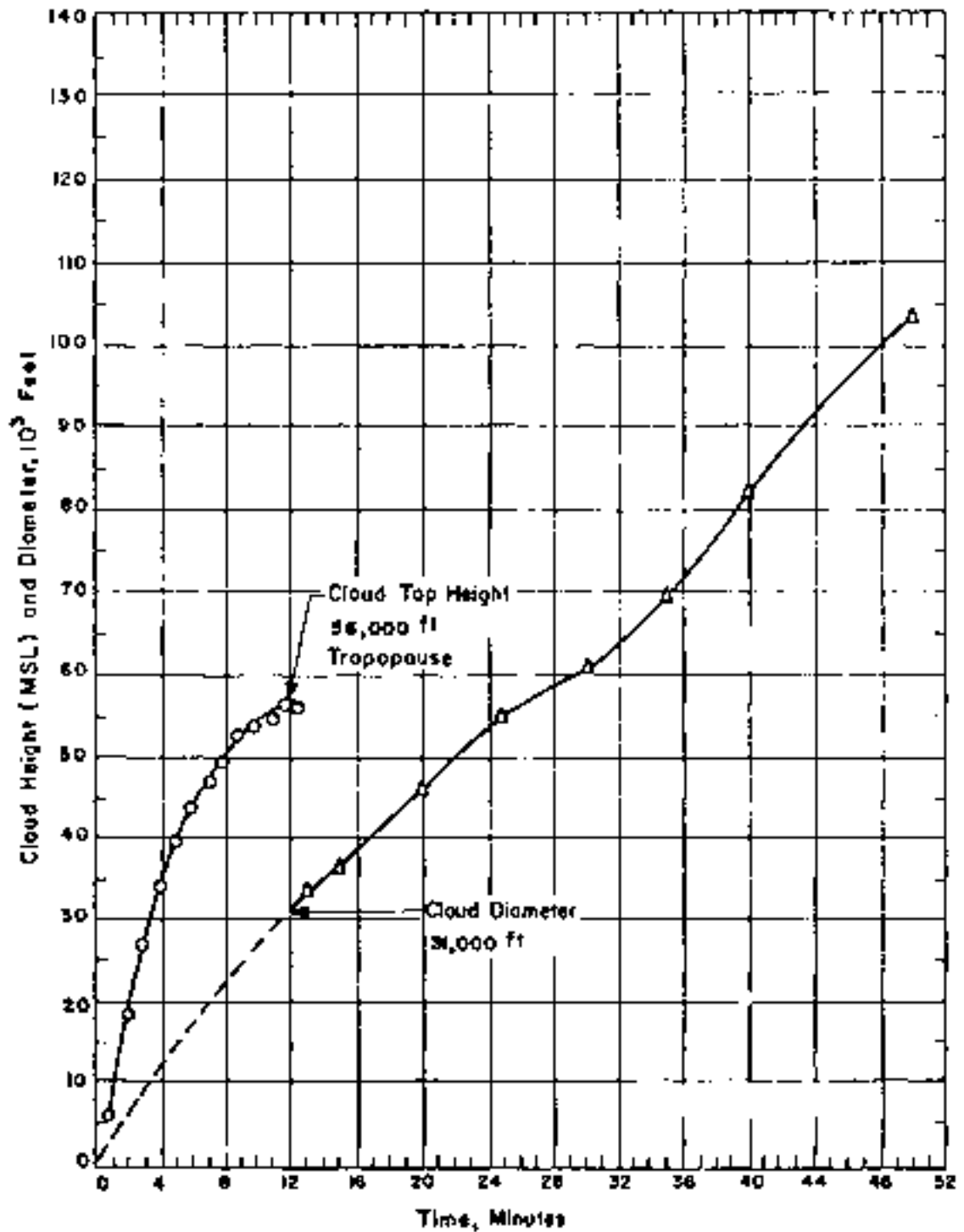


Figure 8. Cloud Dimensions: Operation SANDSTONE -

X-Ray

TABLE 3 ENIWEK WIND DATA FOR OPERATION GARGSTONE -

X-RAY

Altitude (MSL)	H-hour		H+2 hours		H+3 hours	
	Dir	Speed	Dir	Speed	Dir	Speed
feet	degrees	mph	degrees	mph	degrees	mph
Surface	090	10	090	12	070	16
2,000	---	--	100	15	070	23
4,000	---	--	100	12	090	23
5,000	100	14	(100)	(12)	(090)	(24)
6,000	---	--	090	12	100	25
8,000	---	--	110	21	090	23
10,000	130	14	130	15	080	16
12,000	---	--	120	15	080	12
14,000	---	--	100	09	070	09
15,000	150	09	(140)	(09)	(070)	(08)
16,000	---	--	140	10	080	07
18,000	---	--	140	09	360	07
20,000	160	09	140	07	210	02
25,000	230	10	220	12	120	09
30,000	240	11	210	15	---	--
35,000	220	23	210	21	---	--
40,000	220	15	220	21	---	--
45,000	220	26	220	37	---	--
50,000	230	23	230	21	---	--
55,000	220	14	---	--	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 55,000 ft MSL at H-hour.
3. The H-hour wind data was estimated by the USAF weather station on Eniwetok Island. The H+2 and H+3 hour winds were measured.
4. At H-hour the sea level pressure was 1190 mb, temperature 75°F, and the dew point 71°F.

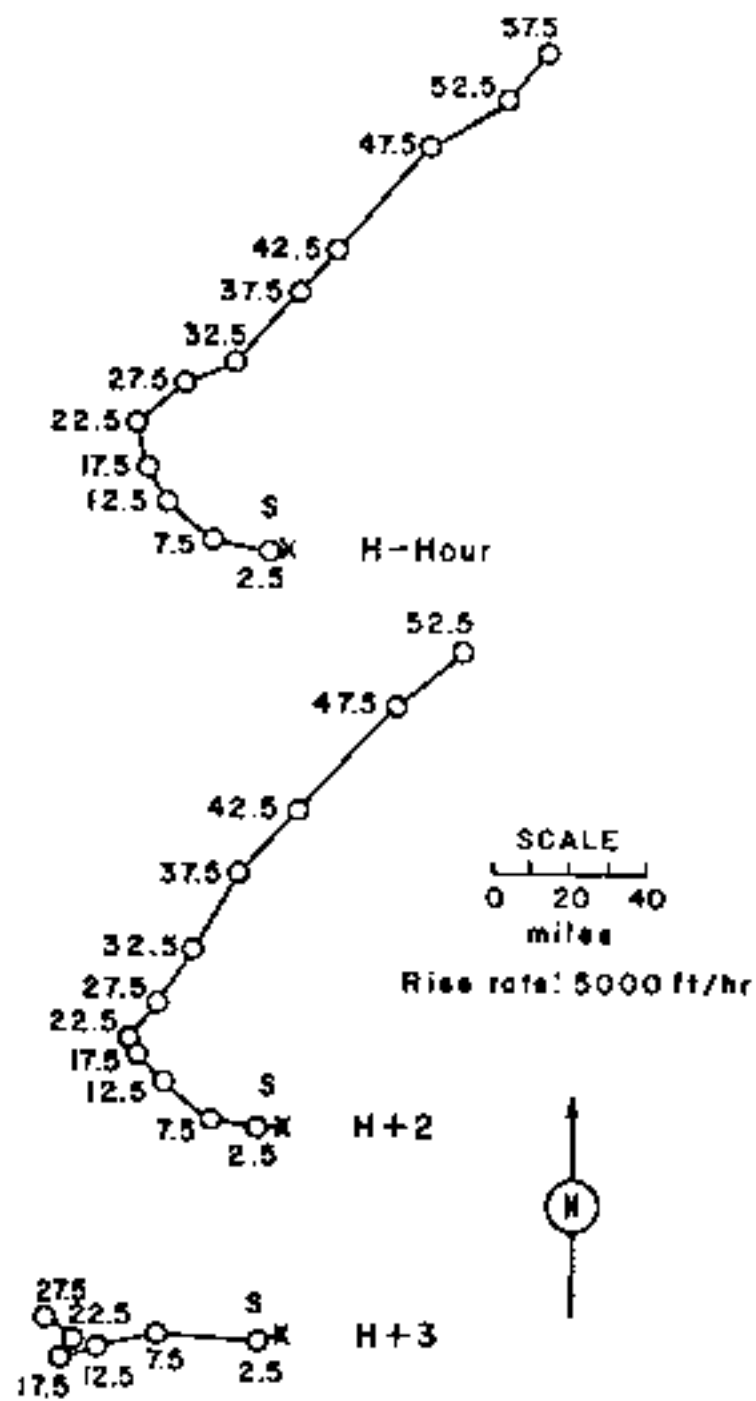


Figure 9. Hodographs for Operation SANDSTONE -

X-Ray.

OPERATION GREENSTONE - Yoke

DATE: 1 May 1948 30 Apr 1948
TIME: 0609 1800

TOTAL YIELD: 49 kt

FIRING DATA:

Time to 1st minimum: NM
Time to 2nd maximum: NM
Radius to 2nd maximum: NM

Sponsor: IAGL

SITE: FPG - Kaitakek - Sally
11° 37' 40" N
162° 19' 27" E
Site elevation: Sea level

HEIGHT OF PAGES: 100 ft

TYPE OF BURN AND PLACEMENT:

Tower burst over coral soil

CLOUD TOP HEIGHT: 20,000 ft MSL
CLOUD BOTTOM HEIGHT: 10,000 ft MSL

CRATER DATA: Not available

REMARKS:

No fallout pattern available. Cloud reached tropopause in 12 minutes. Yoke rain-out was observed on Kaitakek at 10:00 hours; rain fell for 10 hours and the maximum activity observed was 5 to 10 mr/hr.

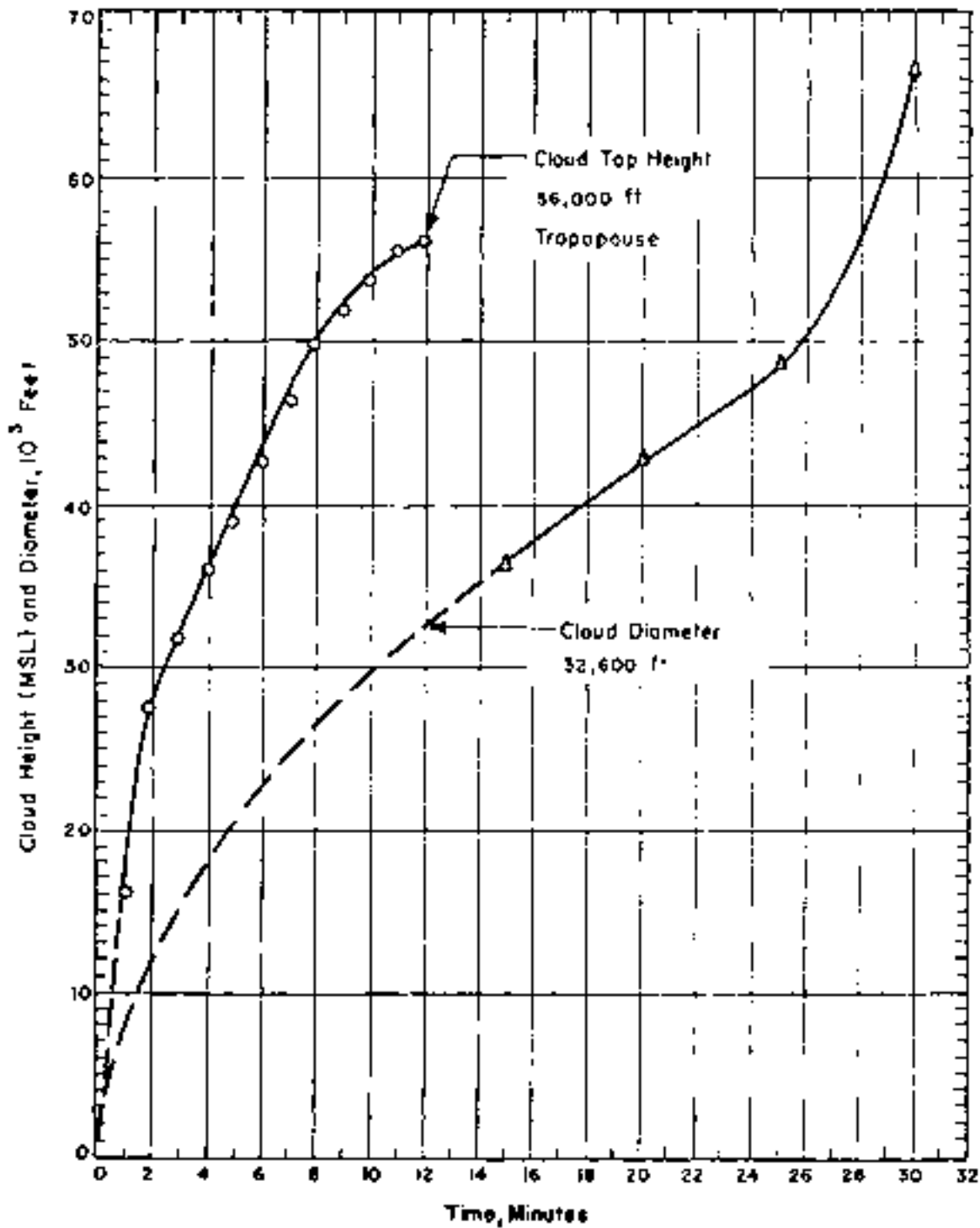


Figure 10. Cloud Dimensions: Operation SANIXTONE - Yoke.

TABLE 4. ENIWETOK WIND DATA FOR OPERATION SANDSTONE -

YORK

Altitude (MSL) feet	H-hour		H+3 hour	
	Dir degrees	Speed mph	Dir degrees	Speed mph
Surface	050	16	070	15
2,000	---	--	070	21
4,000	---	--	090	12
5,000	090	14	170	07
6,000	---	--	180	06
10,000	160	12	170	39
14,000	---	--	080	40
15,000	090	07	090	29
16,000	---	--	100	28
20,000	220	12	170	42
25,000	210	16	250	70
30,000	210	24	270	47
35,000	220	45	---	--
40,000	210	37	---	--
45,000	210	54	---	--
50,000	200	47	---	--
55,000	200	40	---	--

NOTES:

1. Tropopause height was estimated to be 7,000 ± 500 ft. H-hour.
2. The H-hour wind data was estimated by the WAP weather station on Eniwetok Island. The H+3 hour winds were measured.
3. At H-hour the sea level pressure was 1050 mb, the temperature 79°F, and the dewpoint 72°F.

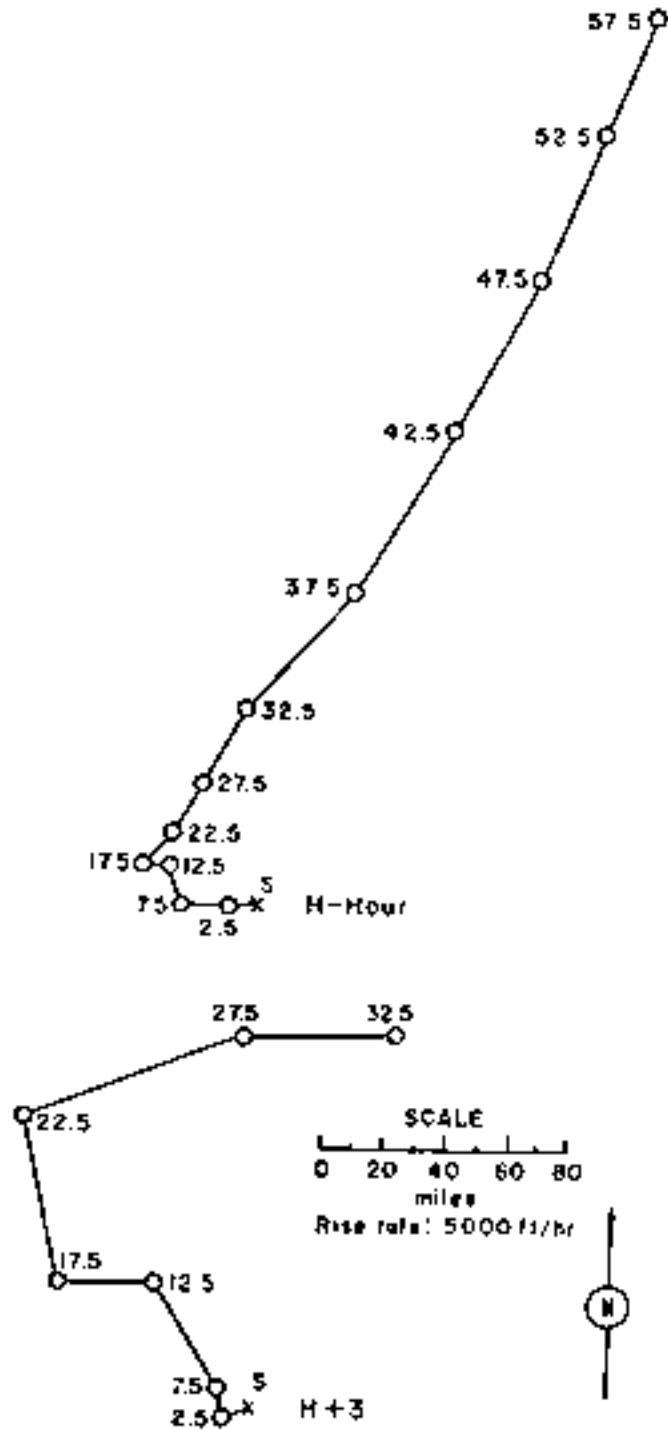


Figure 11. Hodographs for Operation SANDSTONE - Yoke.

OPERATION BATTLESTONE - Zebra

	<u>FPG time</u>	<u>GPST</u>
<u>DATE:</u>	15 May 1968	15 May 1968
<u>TIME:</u>	0601	1804

TOTAL YIELD: 18 kt

FIRBALL DATA:

Time to 1st maximum:	100
Time to 2nd maximum:	100
Radius at 2nd maximum:	100

Sponsor: IACI

SITE: FPG - Baitwick - Yvonne
13° 35' 12" N
162° 21' 24" E
Site elevation: Sea level

HEIGHT OF BURST: 140 ft

TYPE OF BURST AND CHARACTERISTICS:

Tower burst over water.

CLOUD TOP HEIGHT: 20,000 ft MSL
CLOUD BOTTOM HEIGHT: 20,000 ft MSL

CRATER DATA: Not available

REMARKS:

No fallout pattern available.

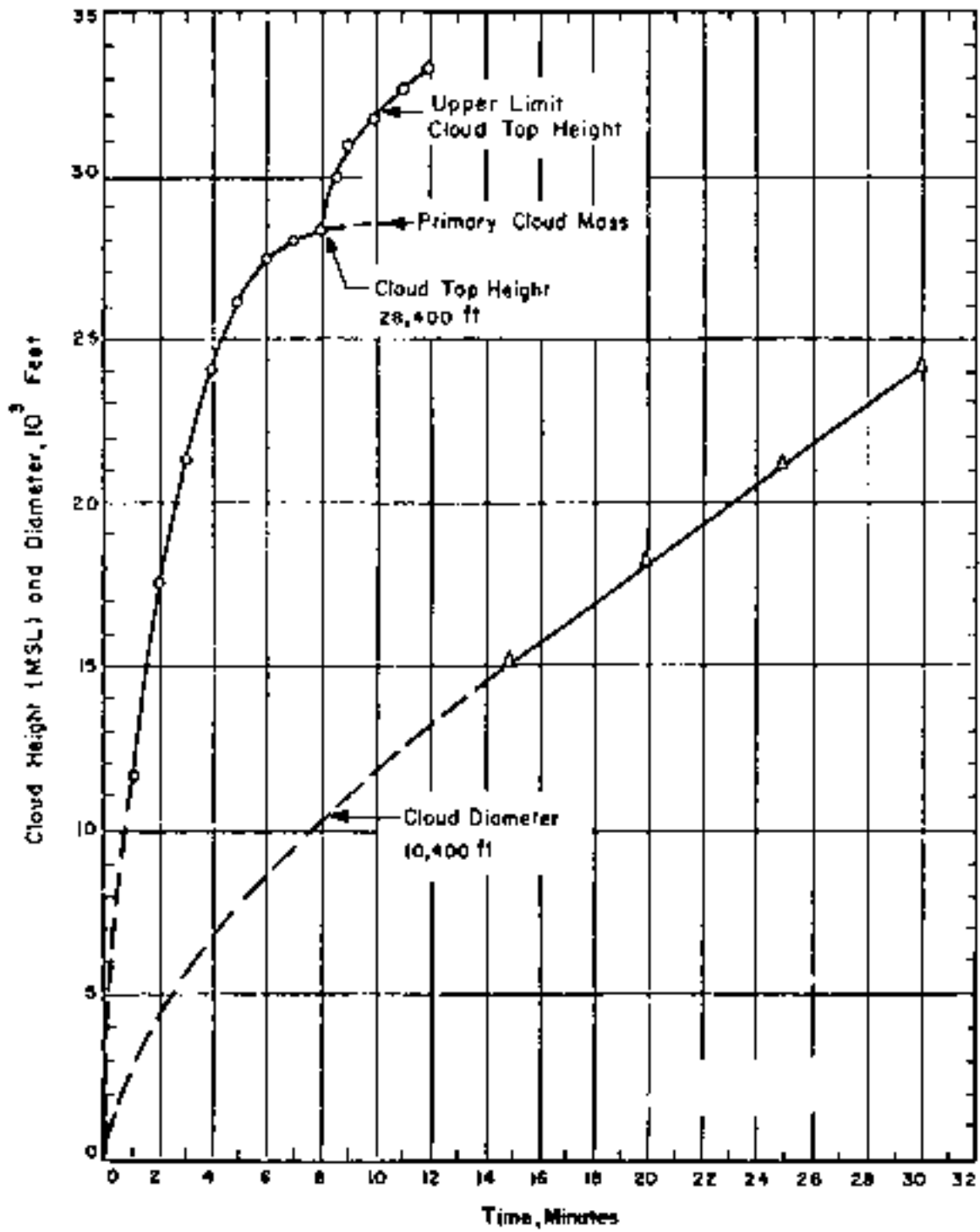


Figure 12. Cloud Dimensions: Operation SANDSTONE -

Zebra.

TABLE 5 KILIMBTOK WIND DATA FOR ORINATION SANDSTONE -

ZEPRA

Altitude (MSL) feet	H-hour		H+2 hours		H+3 hours	
	Dir degrees	Speed mph	Dir degrees	Speed mph	Dir degrees	Speed mph
Surface	090	10	100	09	090	09
2,000	100	17	110	16	100	17
5,000	130	23	110	15	110	14
10,000	200	13	190	12	220	14
15,000	270	14	240	07	260	08
20,000	240	21	250	20	260	24
25,000	250	31	260	29	250	36
30,000	270	50	260	45	270	44
35,000	280	50	260	46	290	44
40,000	270	83	290	48	290	56
45,000	270	40	100	48	270	35

NOTES:

1. Tropopause height was 74,000 feet MSL at H-hour.
2. The H-hour data was estimated by the UOAP weather station on Salvetok Island. The H+2 and H+3 hour winds were measured.
3. At H-hour the sea level pressure was 31.0 mb, the temperature 81°F, and the dew point 74°F.

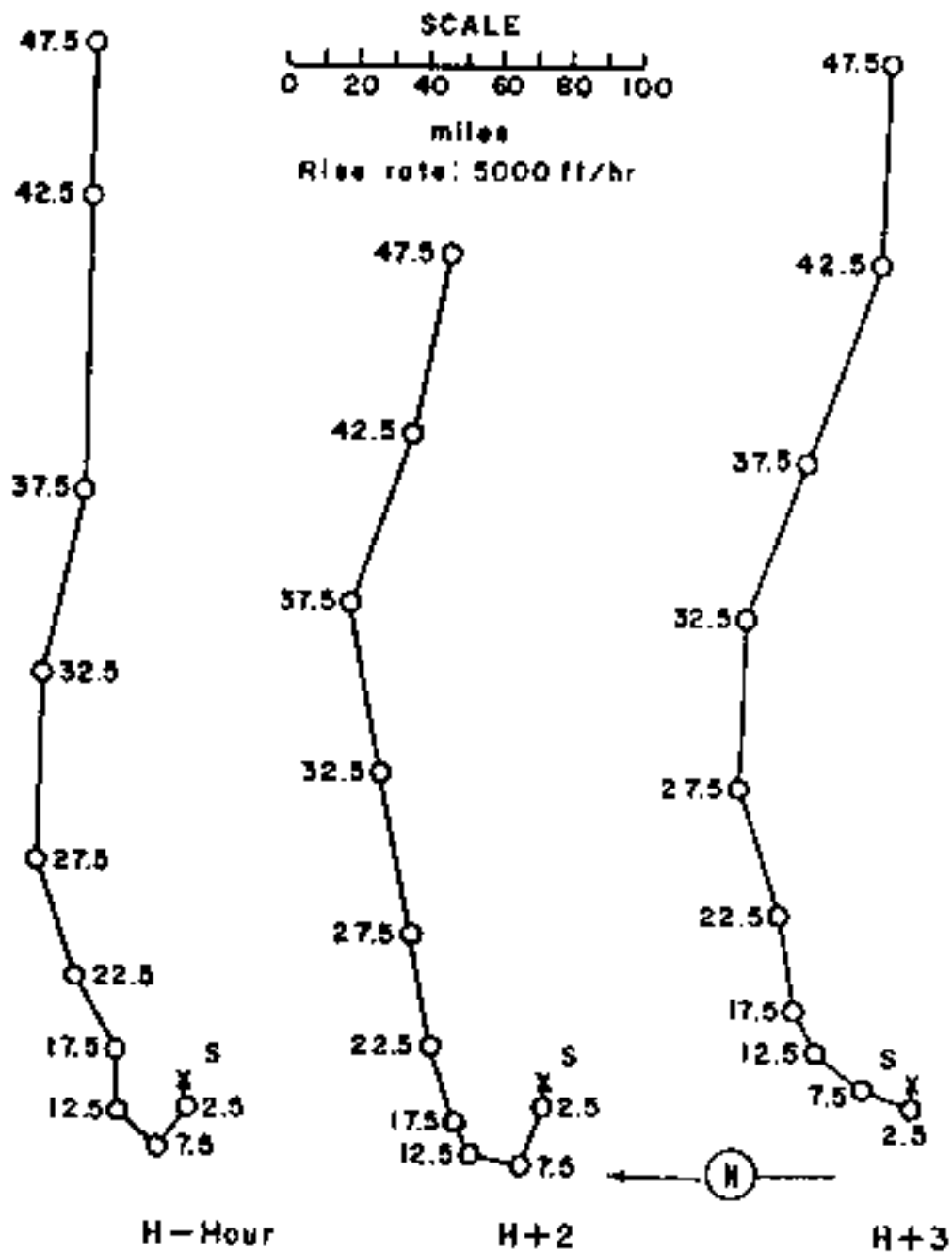


Figure 13. Hodographs for Operation SANDSTONE - Zebra

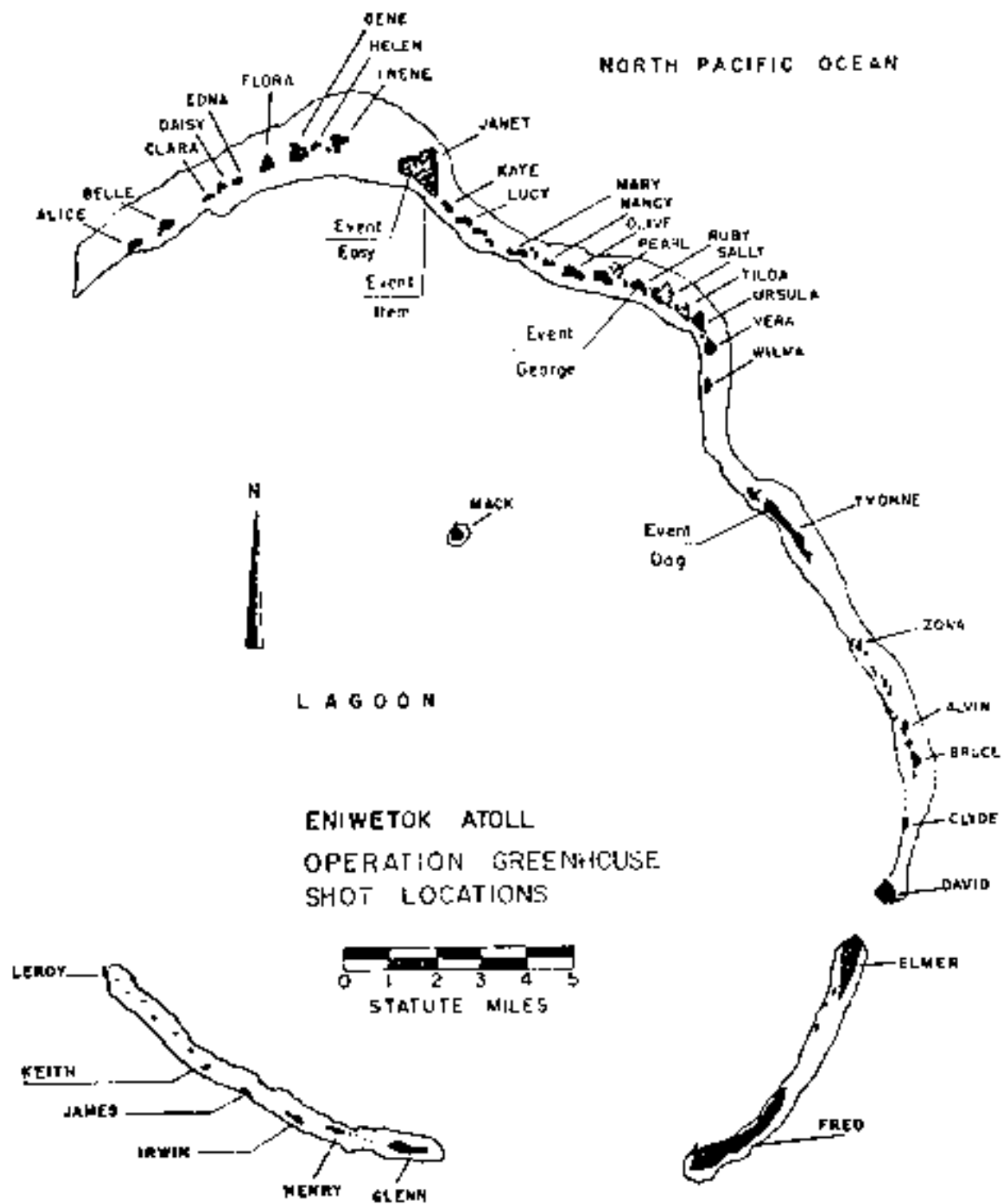


Figure 14. Operation GREENHOUSE, Shot Locations

OPERATION GREENWATER -

Doc

DATE: FFG 1951 OMP
TIME: 0830 1830

Sponsor: IAGS.

SITE: FIC - Eniwetok - Yucca
11° 33' 31" N
169° 21' 16" E
Site elevation: Sea level

HEIGHT OF MOUNT: 300 ft

TYPE OF MOUNT AND PLACEMENT:
Tower mount over coral hill

CLOUD TOP HEIGHT: 90,000 ft MSL
CLOUD BOTTOM HEIGHT: 33,000 ft MSL

REMARKS:

The dose-rate readings were corrected to H+1 hour by applying the $t^{-1.2}$ law to measurements made by the Radiological Safety organization. Measurements on Yucca were made at H+2½ hours. Many of the measurements were obtained from a helicopter flying at an altitude of 10 to 20 feet above the ground. These readings may therefore be low by as much as 20 to 50 percent. The wind shear at about 20,000 feet accounts for the higher dose rates on the south-eastern part of the atoll, as compared to the southern end of the shot island.

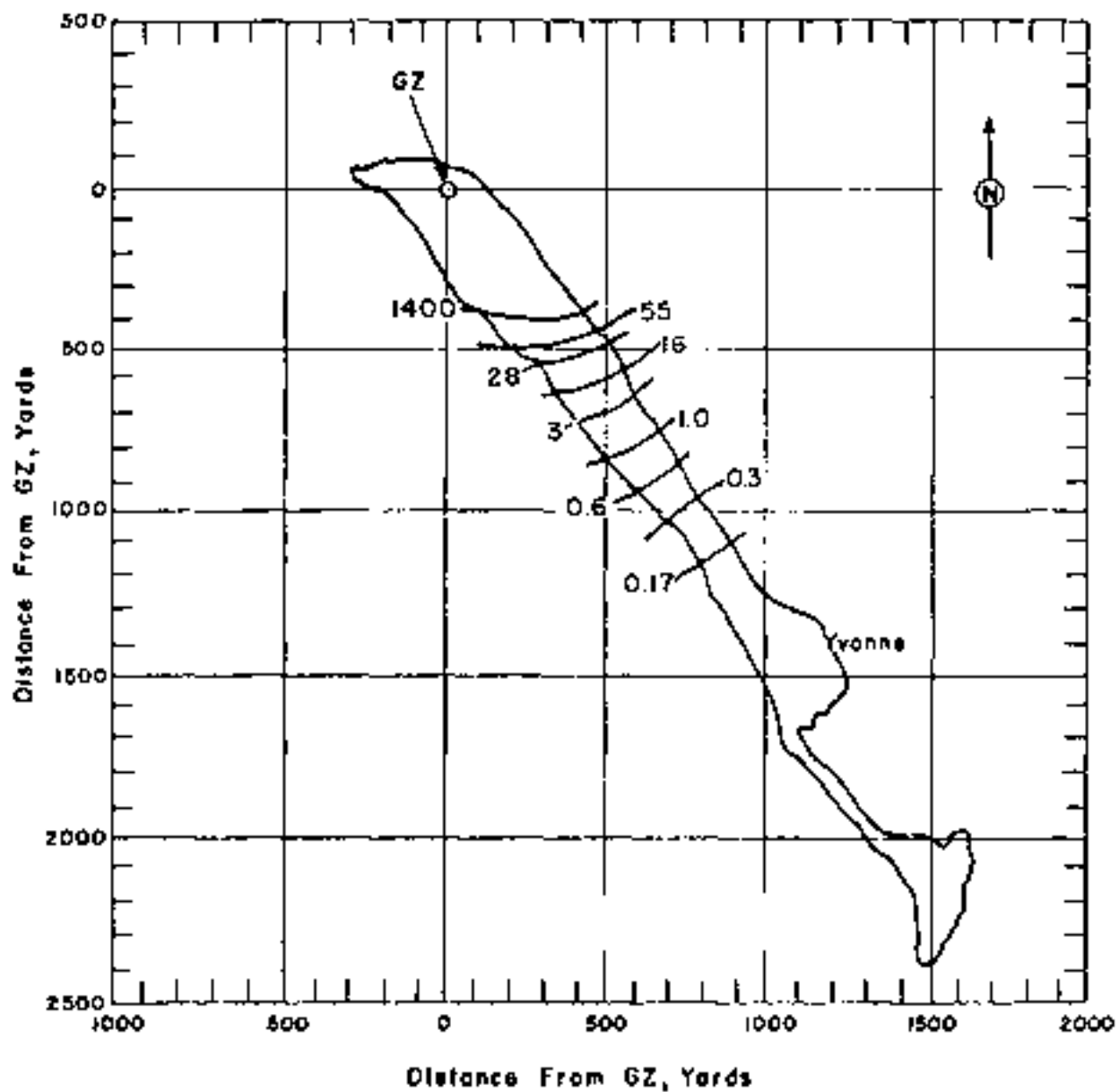


Figure 15. Operation GREENHOUSE - Dog.
 Shot - Island dose rate contours in r/hr at H+1 hour.

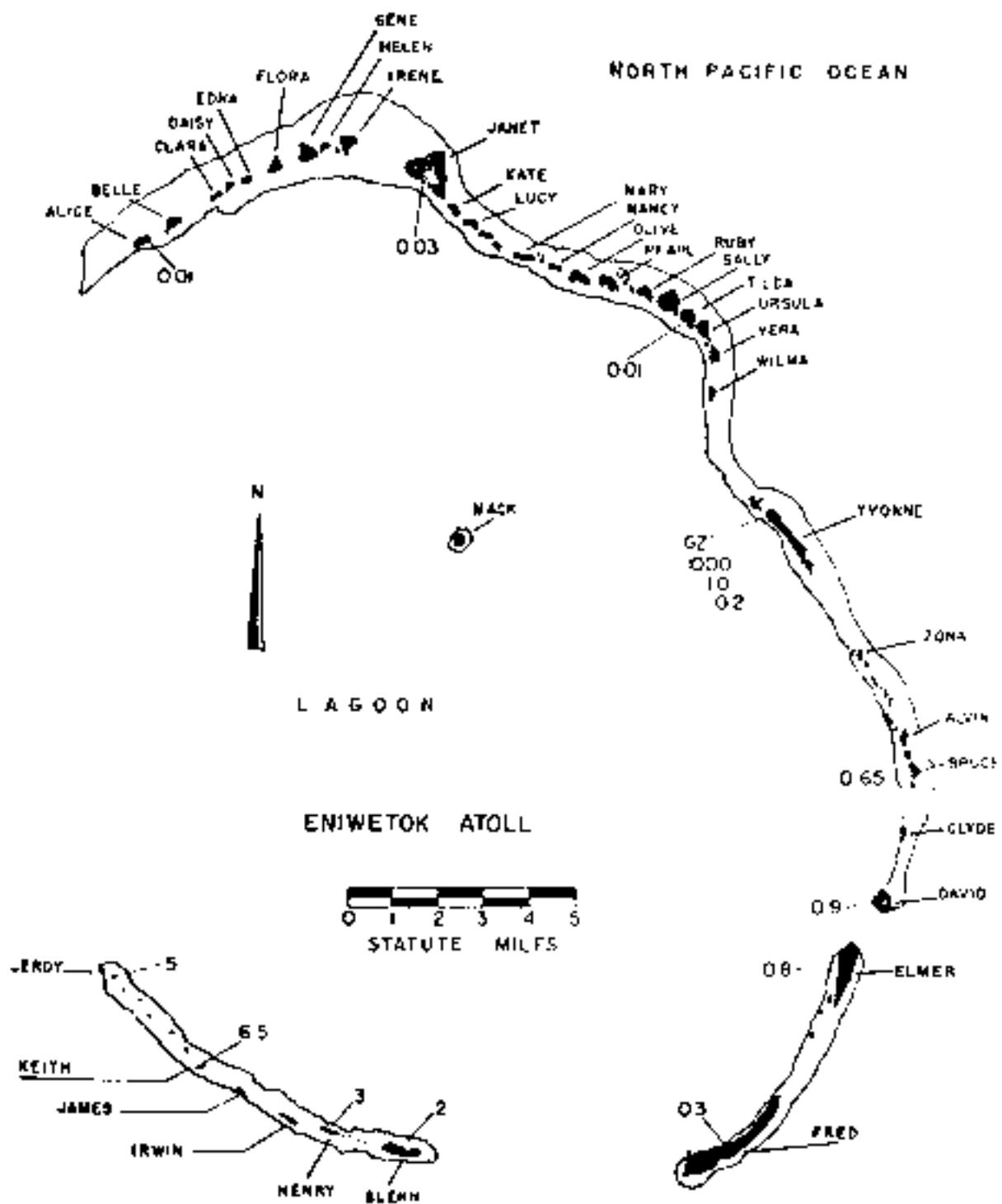


Figure 1b. Operation GREENHOUSE - rates in r/tr at H+1 hour.

Dog. Atoll dose

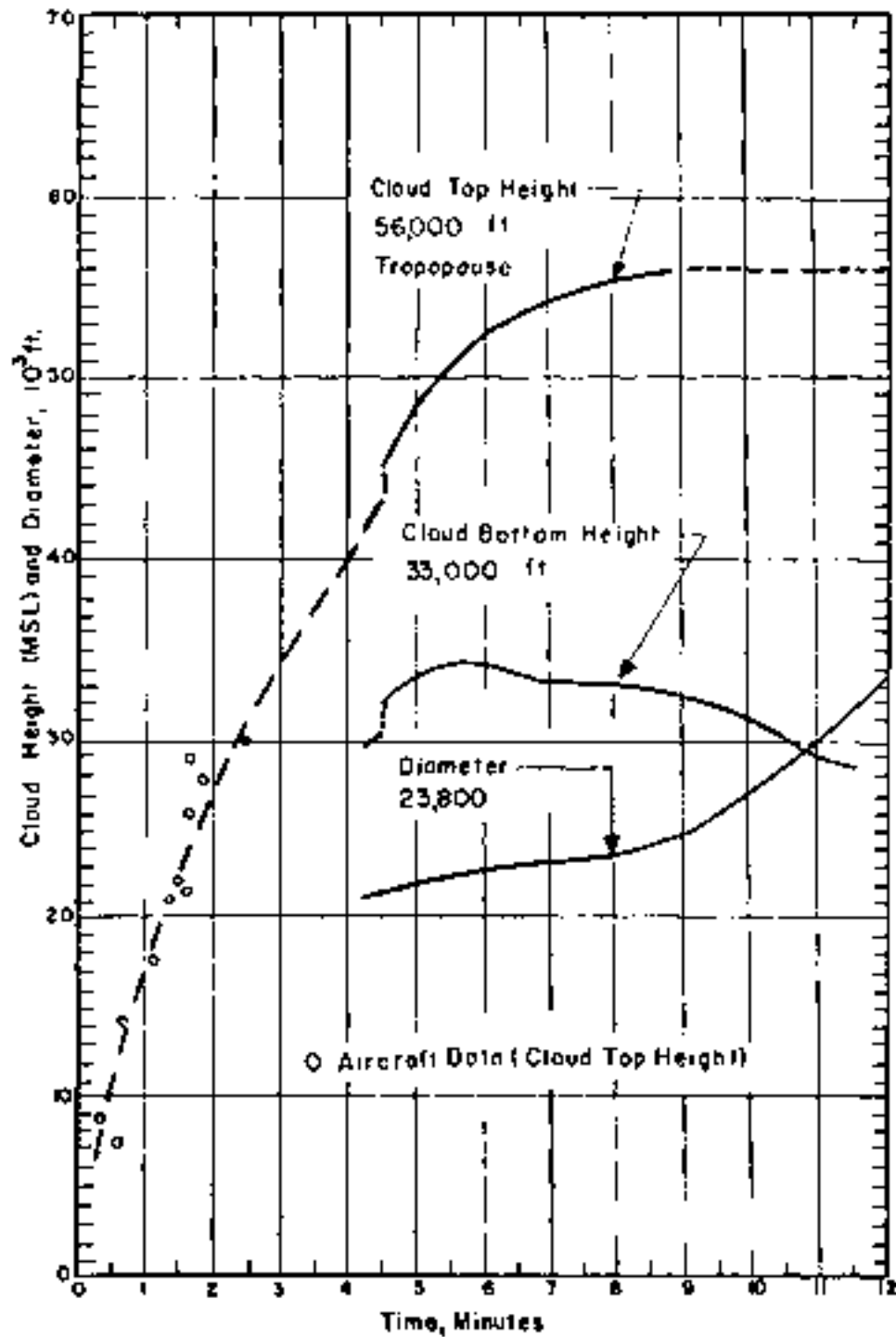


Figure 17. Cloud Dimensions: Operation GREENHOUSE -

Dog.

TABLE 6 WASHINGTON WIND DATA FOR OPERATION GREENHOUSE -

100

Altitude (ft)	H-hour		H+24 hours	
	Dir degrees	Speed mph	Dir degrees	Speed mph
Surface	070	22	040	21
4,000	080	33	---	--
5,000	(080)	(30)	090	24
6,000	080	26	---	--
10,000	080	22	100	25
14,000	070	21	070	25
15,000	(070)	(24)	(070)	(25)
16,000	070	29	070	26
20,000	030	27	050	27
25,000	300	12	340	17
30,000	280	31	190	29
35,000	220	29	250	29
40,000	220	33	230	37
45,000	280	26	260	31
50,000	310	22	330	23
55,000	340	31	360	30
60,000	030	33	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 55,000 ft MSL at H-hour.
3. At H-hour at a pressure of 1000 mb the temperature was 25°C and the dew point 22°C.

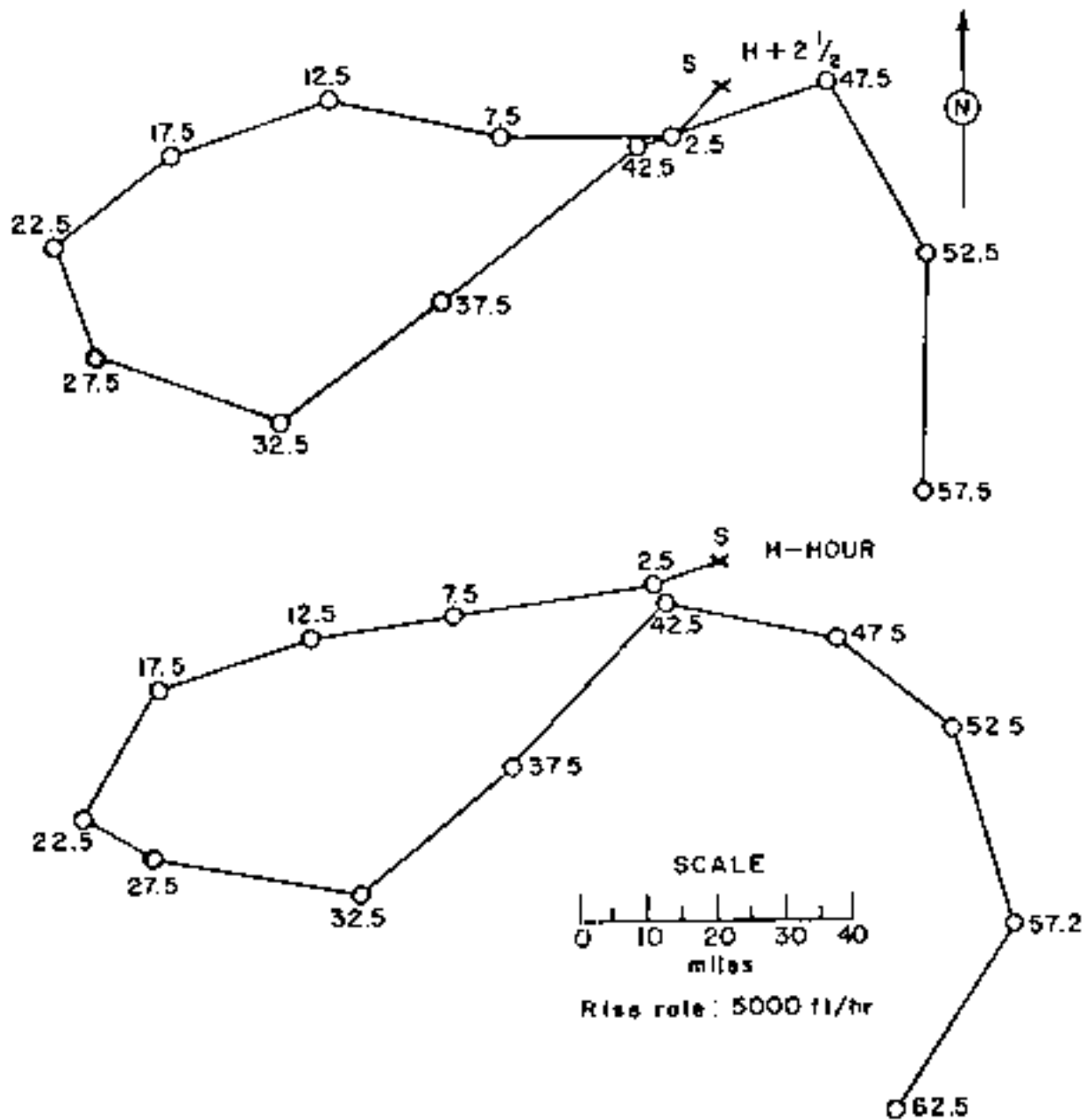


Figure 18. Hodographs for Operation GREENHOUSE -

Log.

OPERATION GREENHOUSE - Easy

DATE: FPG time: GMT
21 Apr 1951 130 Apr 1951
TIME: 0607 1827

Sponsor: IAGI

SITE: FPG - Fairweather - Janet
11° 40' 00" N
162° 15' 20" W
Site elevation: Sea level

TOTAL YIELD: 47 kt

HEIGHT OF BURST: 5-6 km

TYPE OF BURST AND PLACEMENT:
Tower burst over central island

FIREBALL DATA:

Time to 1st maximum: 19 to 20-5 msec
Time to 2nd maximum: 200 to 230 msec
Radius at 2nd maximum: NM

CLOUD TOP HEIGHT: 42,000 ft MSL
CLOUD BOTTOM HEIGHT: 27,000 ft MSL

CRATER DATA: Diameter: 836 ft
Depth: 2.4 ft

REMARKS:

The fallout readings on the shot island were obtained by the Radiological Safety organization at H+2 hours and corrected to H+1 hours, using the $t^{-1.2}$ decay approximation. Core rates shown for other islands are based upon daily surveys made to determine field decay rates. Readings were made 1 meter above the ground with gamma ionization chambers. The values shown were corrected to H+1 hour by extrapolating from the experimental decay curves. There was a wind shear at about 15,000 feet.

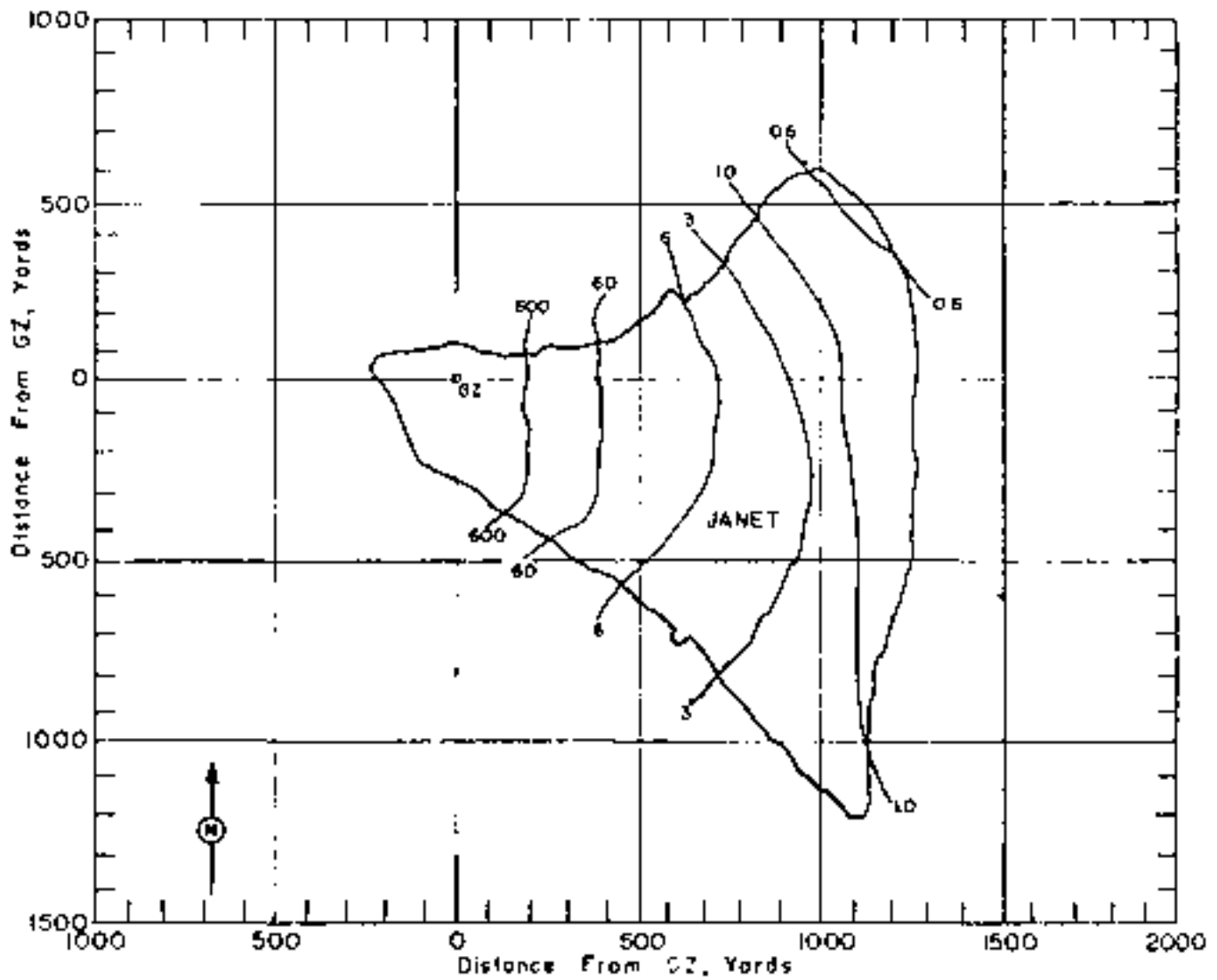


Figure 19. Operation GREENHOUSE - Easy. Shot Island
 dose rate contours in r/hr at H+1 hour.

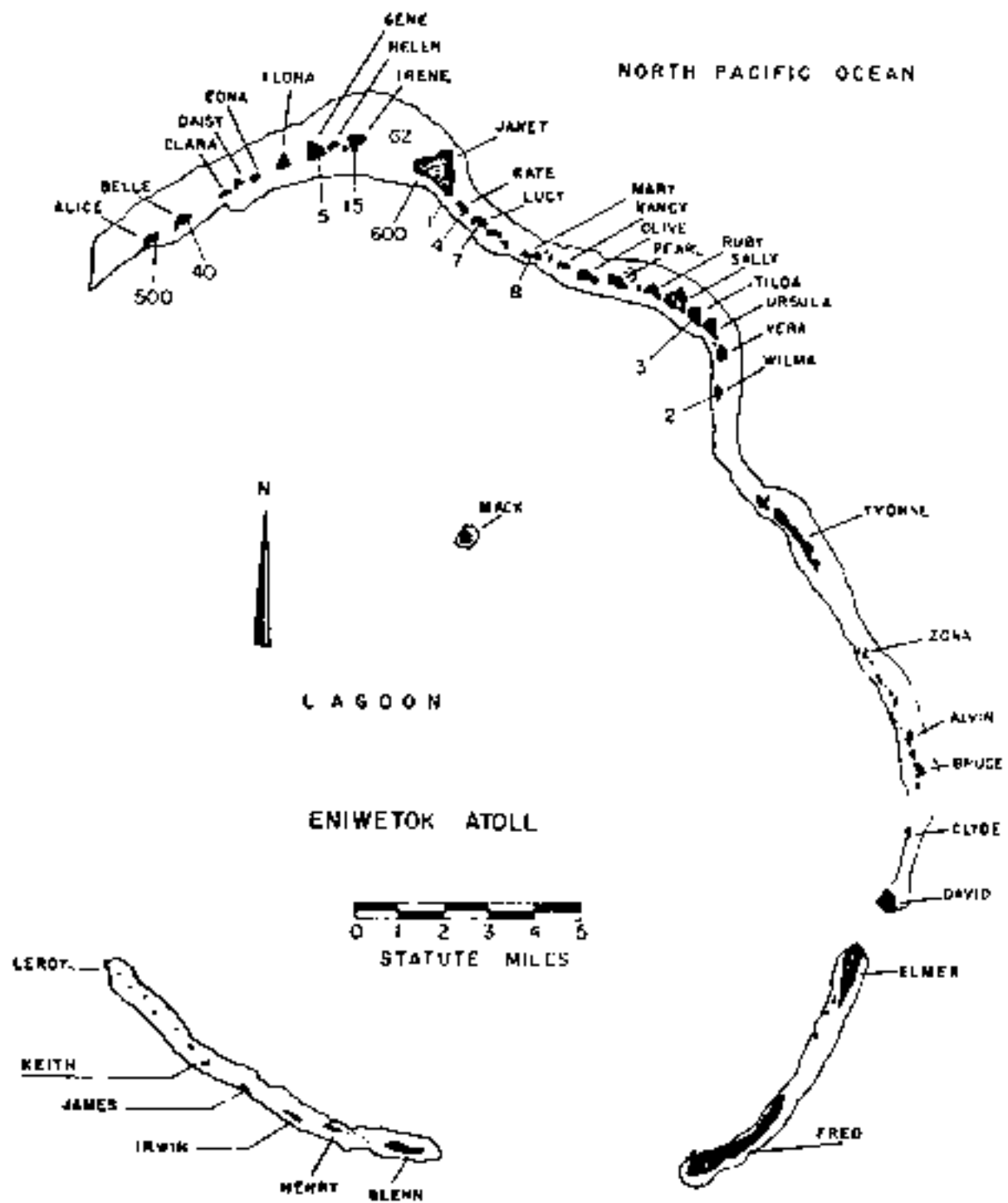


Figure 20. Operation GREENHOUSE - rates in r/hr at H+2 hour.

Ensy. Atoll dose

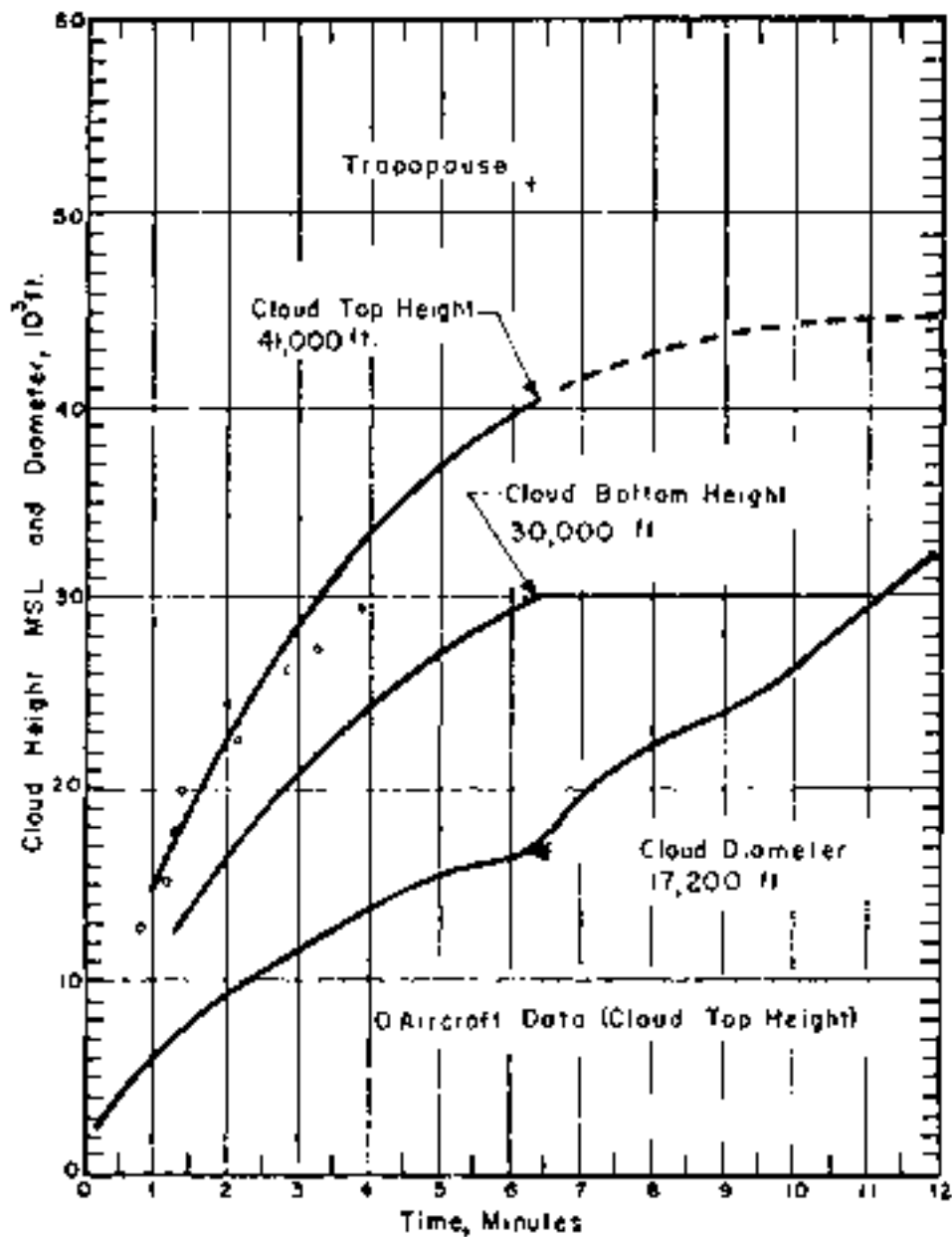


Figure 21. Cloud Dimensions; Operation GREENHOUSE -

Easy.

TABLE 7. ENTRANCE WIND DATA FOR OPERATION GREENHOUSE - EAST

Altitude (MSL) feet	H+3½ hours		H-hour		H+2½ hours		H+1½ hours	
	Dir degrees	Speed mph	Dir degrees	Speed mph	Dir degrees	Speed mph	Dir degrees	Speed mph
Surface	090	16	060	16	070	17	070	20
5,000	100	09	080	13	070	16	070	06
10,000	070	08	090	06	100	05	090	14
14,000	210	03	---	---	270	07	210	07
15,000	---	---	240	06	(190)	(07)	(230)	(03)
16,000	280	07	---	---	250	07	260	17
20,000	310	05	330	04	360	04	041m	04.1m
25,000	320	13	350	13	300	08	310	22
30,000	260	20	270	28	270	18	270	40
35,000	270	28	280	31	280	23	270	44
40,000	260	32	280	37	280	30	270	40
45,000	260	34	270	38	280	37	260	36
50,000	270	28	260	37	270	30	270	28
55,000	350	35	240	24	240	17	230	---
60,000	330	15	330	15	---	---	---	---

NOTES:

1. Numbers in parentheses are estimated values.
2. H-hour values were determined by interpolating between the H+1½ and H+2½ hour values.
3. Tropopause height was 53,000 ft MSL at H-hour.
4. At H-hour at a pressure of 1,000 mb the temperature was 29°C and the dew point 23°C.

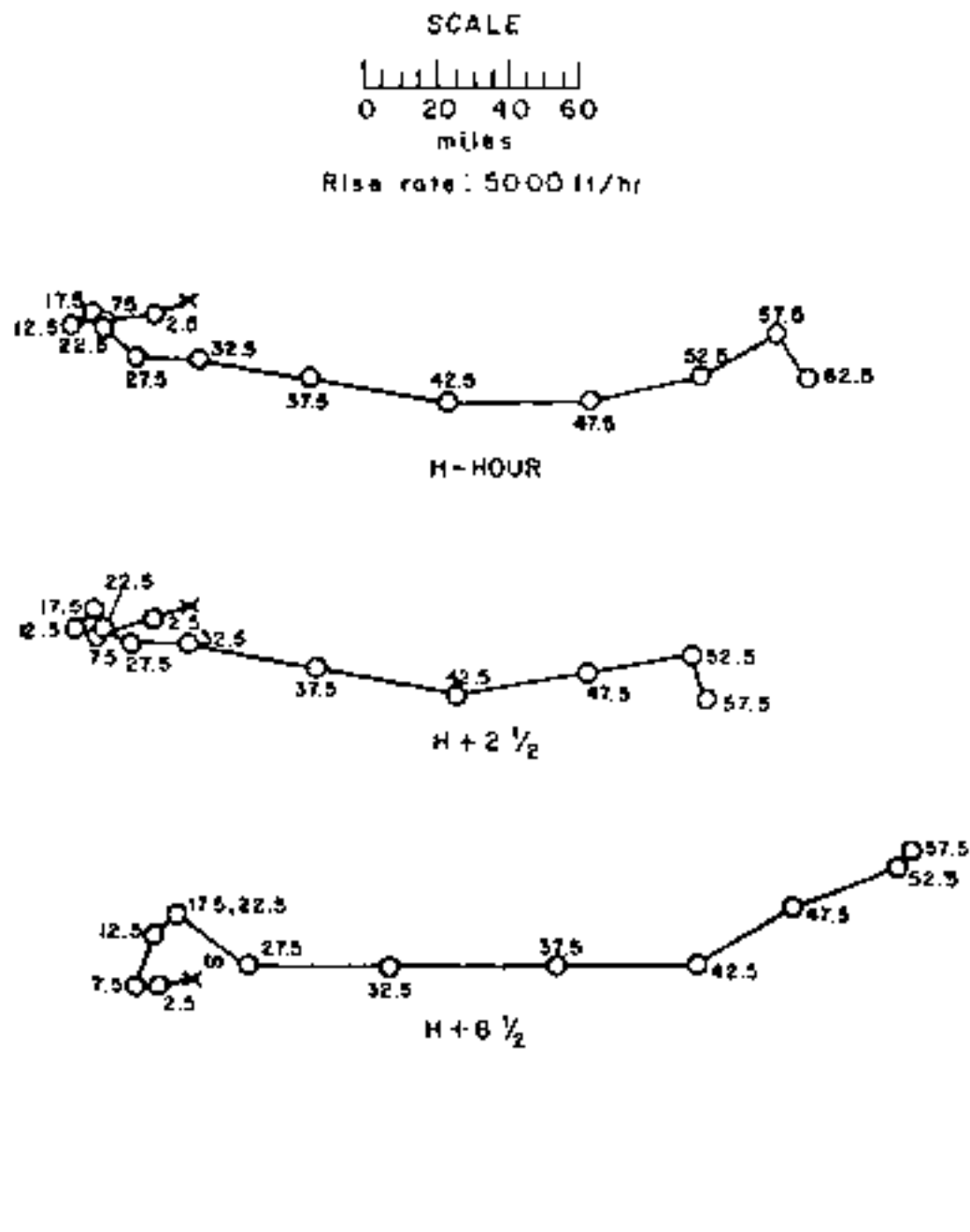


Figure 22. Hodographs for Operation GRACEHOUSE -

Easy.

OPERATION GREENHOUSE -

George

	<u>PPG time</u>	<u>(GMT)</u>
<u>DATE:</u>	9 May 1951	8 May 1951
<u>TIME:</u>	0930	2130

Sponsor: IAS.

SITE: PPG - Eniwetok - Ruby
14° 37' 37" N
169° 18' 53" E
Site elevation: Sea level

HEIGHT OF BURST: 200 ft

TYPE OF BURST AND PLACEMENT:
Tower burst over coral soil

CLOUD TOP HEIGHT: 56,000 ft MSL
CLOUD BOTTOM HEIGHT: 41,000 ft MSL

REMARKS:

The survey readings on the shot island were obtained at H+24 hours and extrapolated to H+1 hour using the $t^{-1.2}$ decay approximation. Since the winds were from the west-southwest throughout their entire structure, no radiation reading higher than twice background was observed on islands beyond 2,000 yards from ground zero.

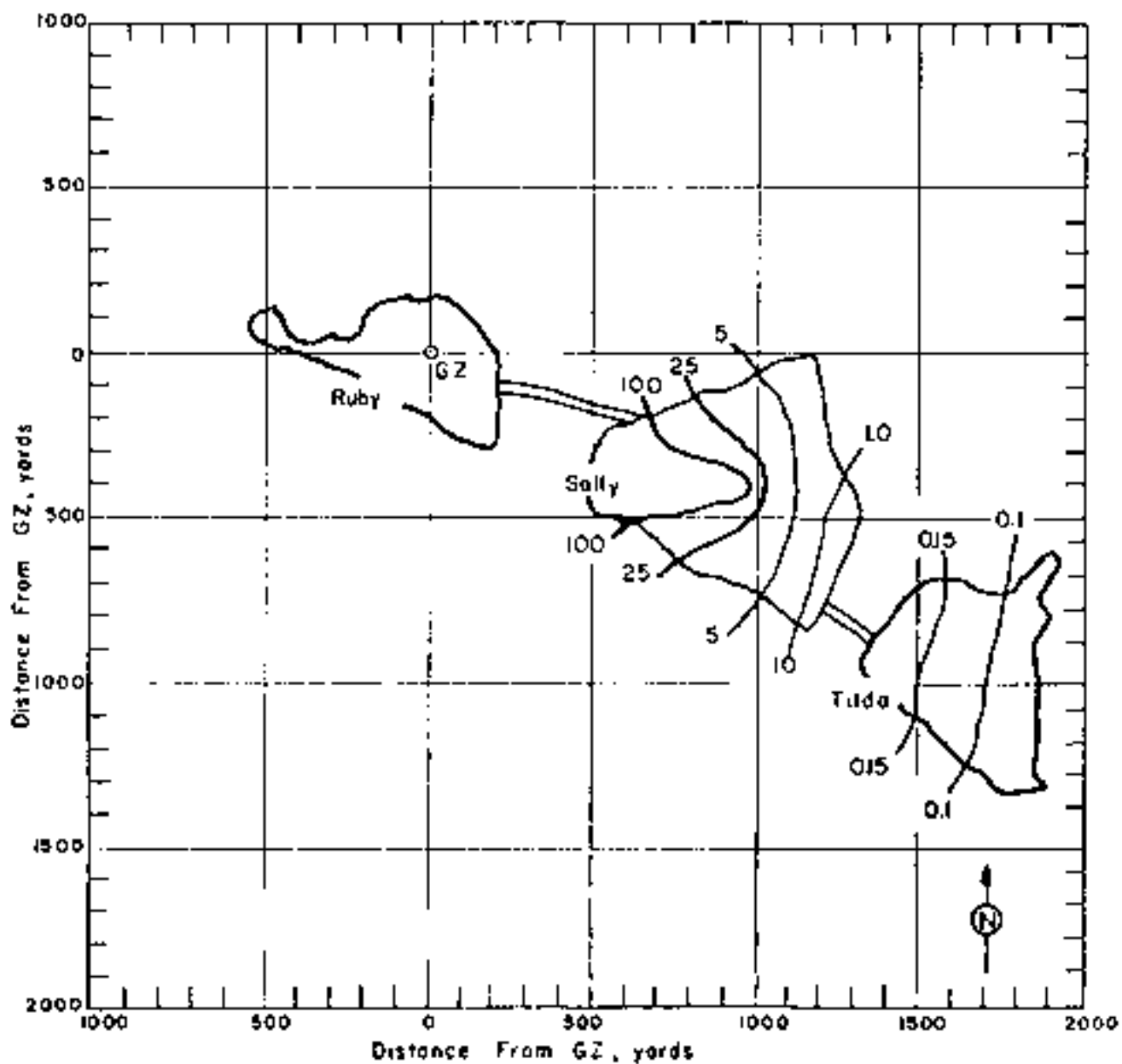


Figure 23. Operation GREENHOUSE - George. On-site dose rate contours in r/hr at 11:1 hour.

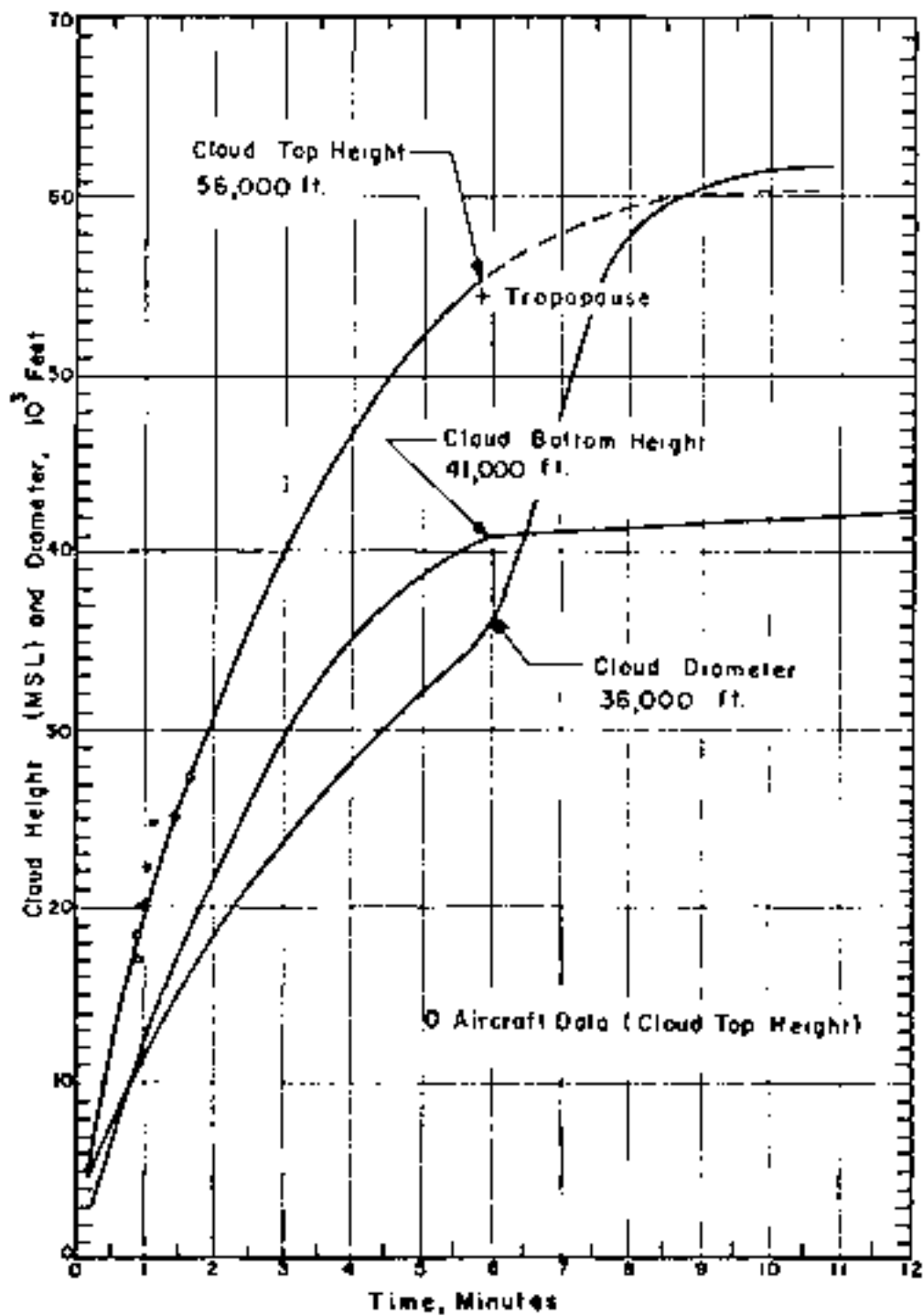


Figure 24. Cloud Dimensions: Operation GREENHOUSE -

George.

TABLE 8 ENROUTE WIND DATA FOR OPERATION GREENHOUSE -

GEORGE

Altitude (MSL)	H-hour		H+1 hours		H+2 hours	
	Dir	Speed	Dir	Speed	Dir	Speed
feet	degrees	mph	degrees	mph	degrees	mph
Surface	240	14	260	16	130	12
4,000	260	35	---	--	---	--
5,000	(250)	(32)	260	25	280	15
6,000	250	31	---	--	---	--
10,000	250	48	270	31	260	26
14,000	---	--	260	30	270	31
15,000	260	26	(260)	(31)	(260)	(30)
16,000	---	--	260	32	260	39
20,000	230	23	280	32	260	23
25,000	190	25	200	23	240	37
30,000	230	24	180	20	180	33
35,000	270	20	160	18	160	31
40,000	290	18	200	13	160	26
45,000	170	03	070	07	170	16
50,000	310	15	---	--	030	31
55,000	020	12	---	--	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 55,000 ft MSL at H-hour.
3. At H-hour at a pressure of 1,000 mb the temperature was 27°C and the dew point 23°C.

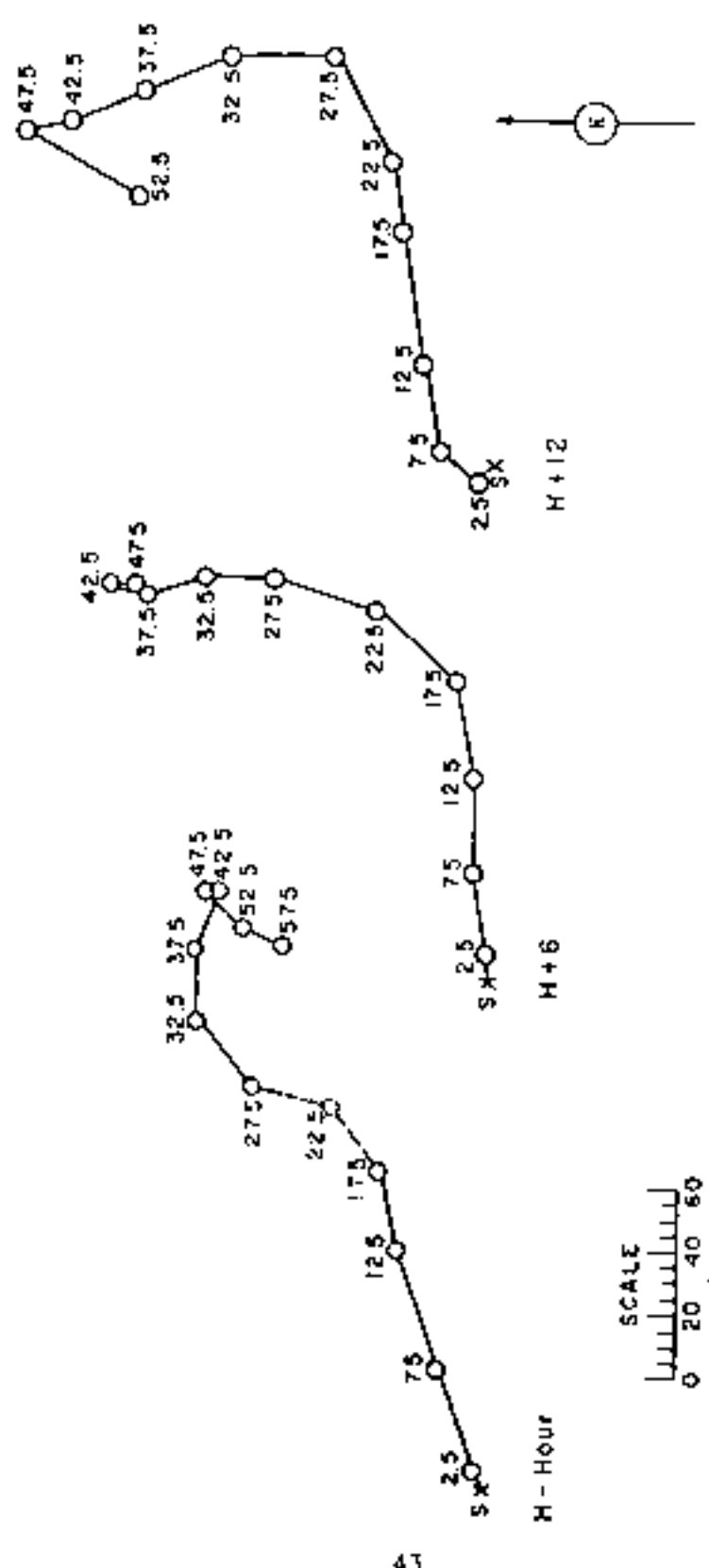


Figure 25. Hodographs for Operation ORPHEUS - George.

OPERATION GREENHOUSE - 2106

	<u>PGC Time</u>	<u>GMT</u>
<u>DATE:</u>	25 May 1951	25 May 1951
<u>TIME:</u>	0117	1817

Sponsor: LASL

SITE: PGC - Balwicz - Janet
11° 40' 23" N
162° 14' 59" E
Site elevation: Sea level

HEIGHT OF INSTR: 200 ft.

TYPE OF INSTR AND MANUFACT:
Tower burst over coral reef

CLOUD TOP HEIGHT: 40,000 ft. 250
CLOUD BOTTOM HEIGHT: 200

REMARKS:

The survey readings of the shot island, Janet, were obtained by the Radiological Safety Organization at H+04 and H+12 hours and extrapolated to H+1 hour by the $t^{-1.2}$ decay approximation. Most readings were obtained from a helicopter flying at an altitude of 10 to 20 feet and the observations were considered representative of readings 3 feet above ground. Such readings may be low by 20 to 50 percent.

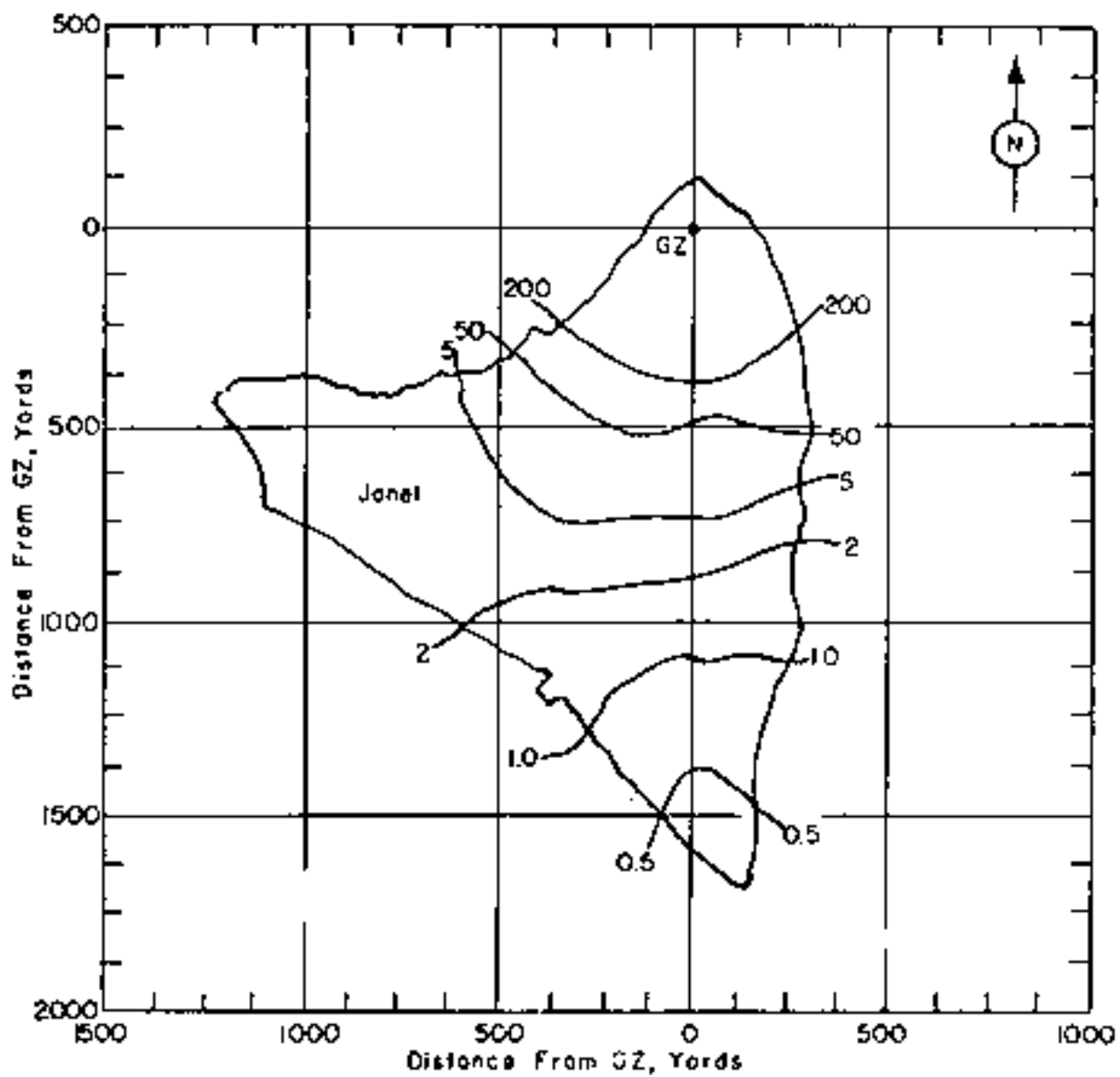


Figure 26. Operation GREENHOUSE - Item. Shot Island
 dose rates in r/hr at T+1 hour.

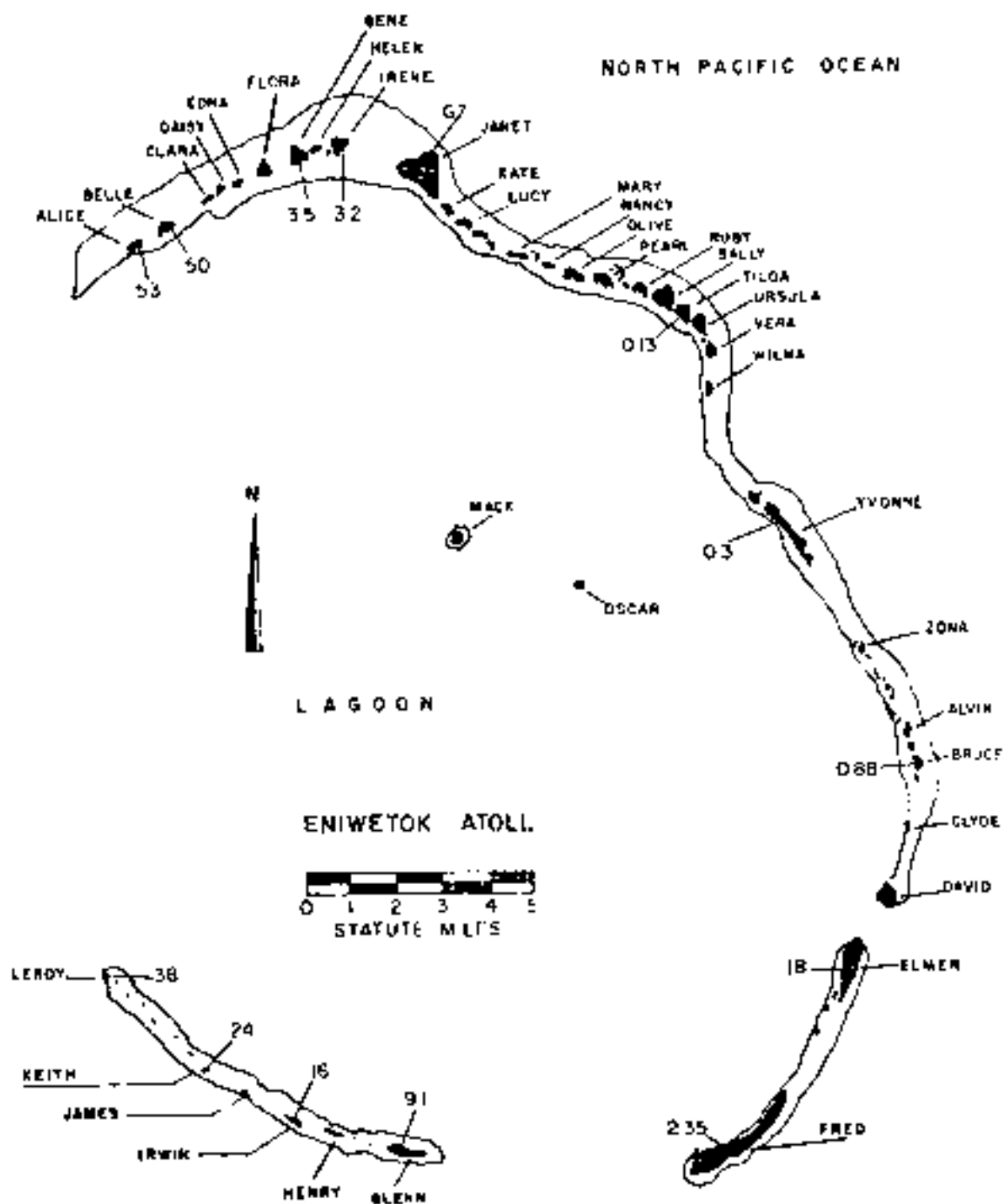


Figure 27. Operation GREENHOUSE - rates in r/hr at H+1 hour.

Item. Atoll dose

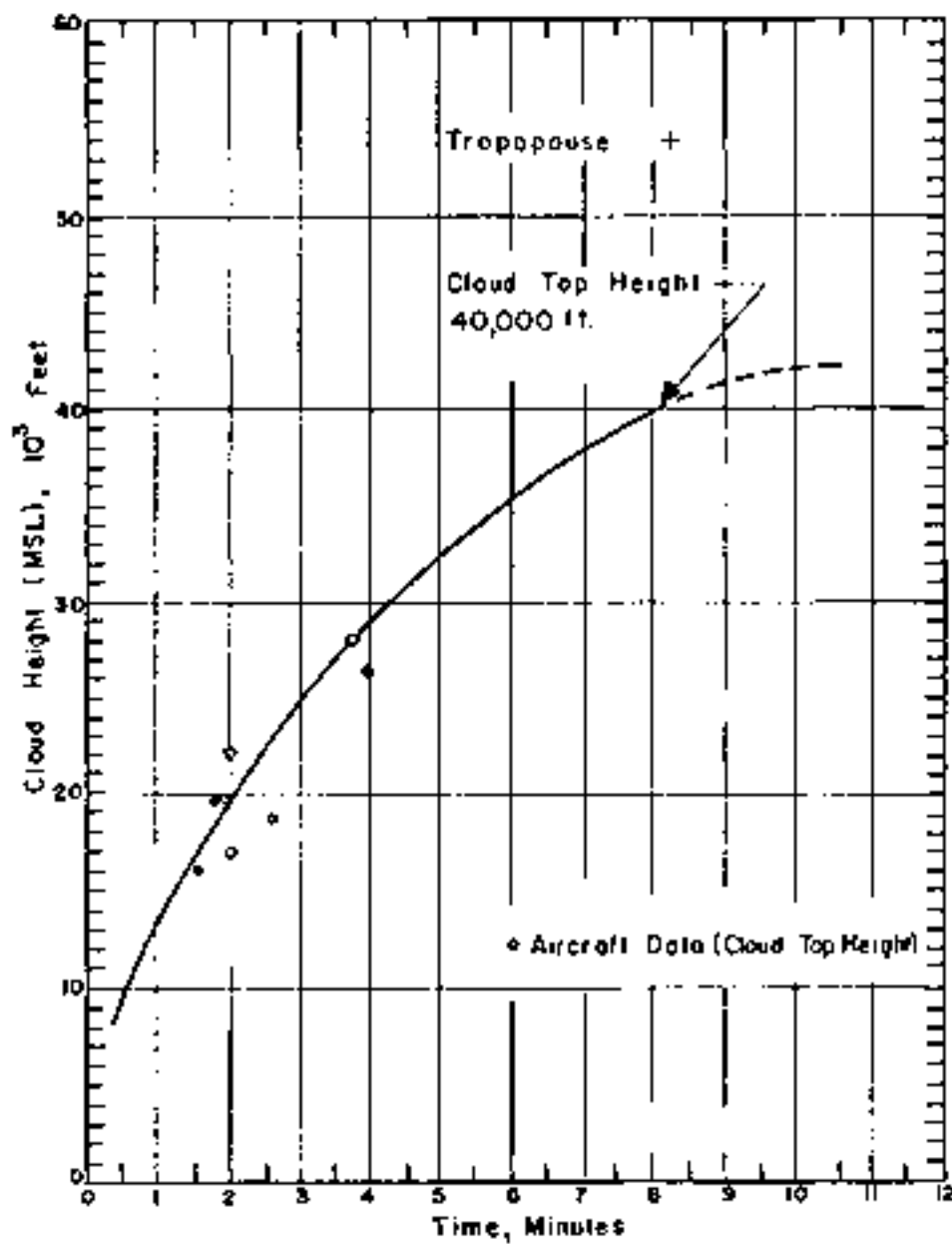


Figure 28. Cloud Dimensions: Operation GREENHOUSE -

Item

TABLE 9. ENTIRETOK WIND DATA FOR OPERATION GREENHOUSE -

ITEM

Altitude (MSL)	H-hour		HCP hours		H-68 hours	
	Dir	Speed	Dir	Speed	Dir	Speed
feet	degrees	mph	degrees	mph	degrees	mph
Surface	070	15	070	22	070	15
5,000	090	16	080	17	090	15
10,000	090	05	060	02	Calm	Calm
14,000	250	10	250	10	250	09
15,000	(260)	(09)	(260)	(09)	(270)	(10)
16,000	280	(08)	270	09	290	13
20,000	290	09	300	10	310	16
25,000	250	12	360	09	350	13
30,000	360	10	---	--	350	12
35,000	250	09	---	--	250	06
40,000	260	08	---	--	---	--
45,000	150	08	---	--	---	--
50,000	330	10	---	--	---	--

NOTES:

1. Numbers in parentheses are estimation values.
2. Tropopause height was 55,000 ft MSL at H-hour.
3. At H-hour at a pressure of 1,000 mb the temperature was 31°C and the dew point 23°C.

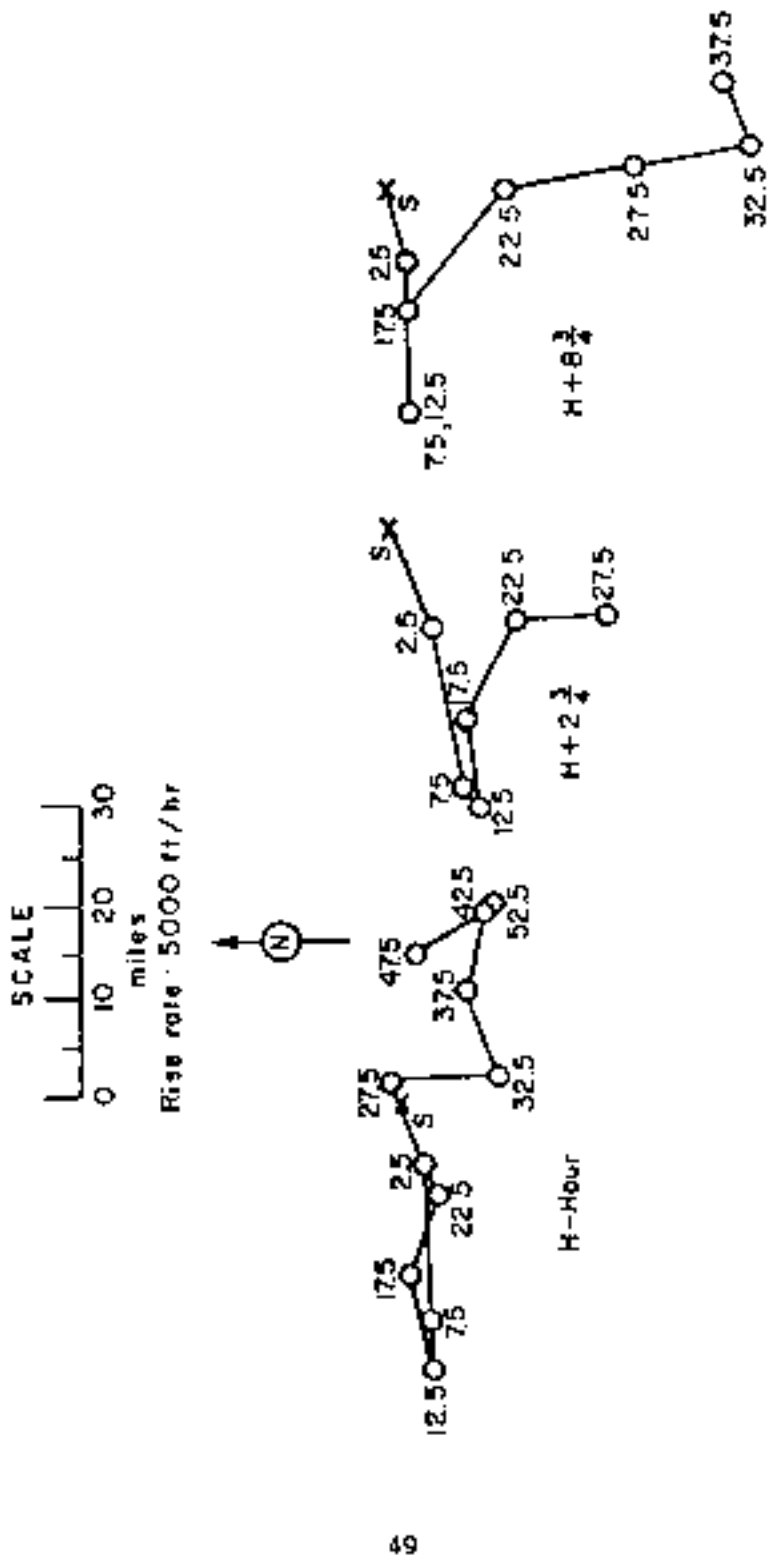


Figure 29. Hodographs for Operation GREENHOUSE - Item.

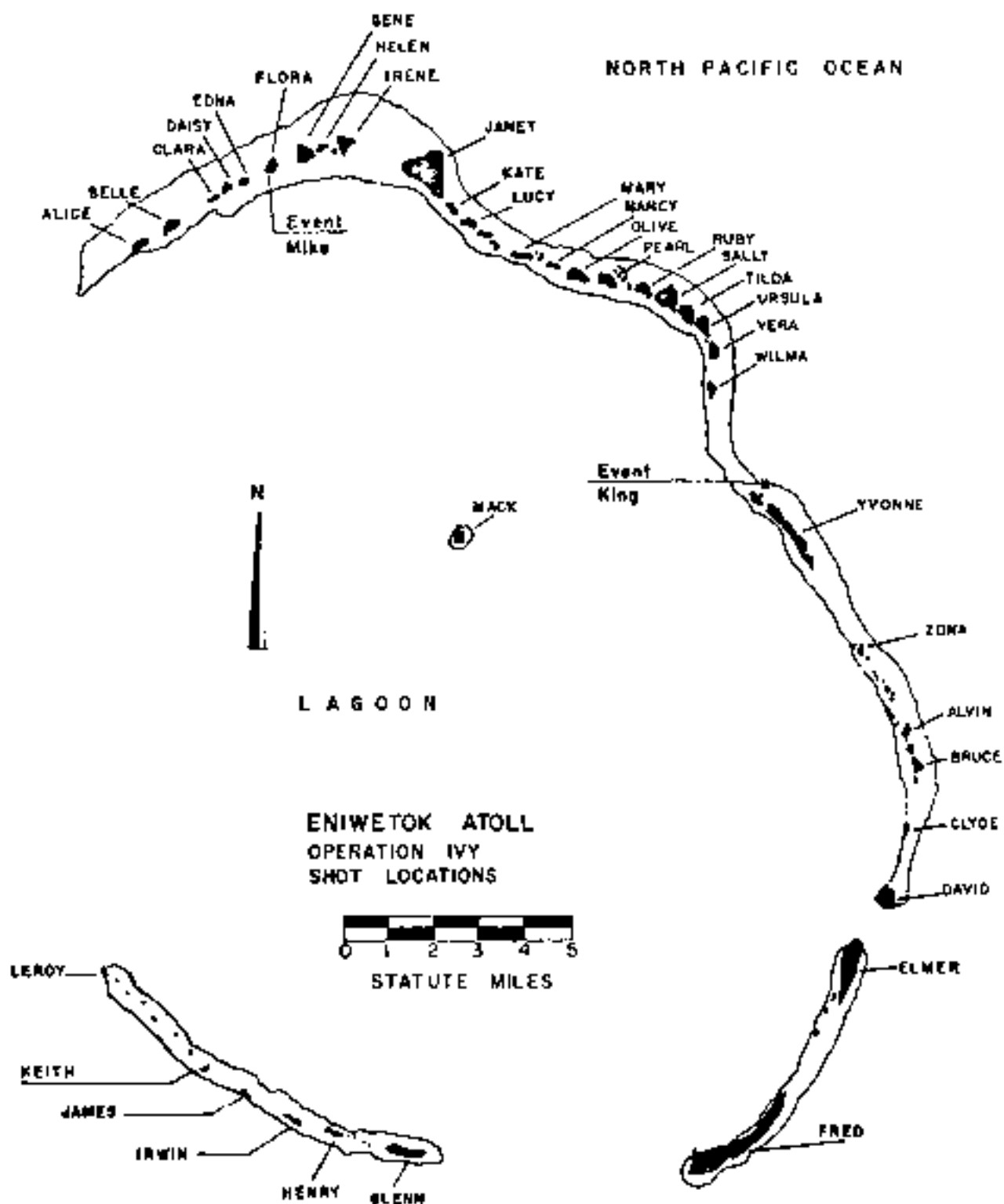


Figure 30. Operation IVY, Shot Locations.

OPERATION IVY - Mize

DATE: FPG Time GMI
1 Nov 1952 31 Oct 1952
TIME: 0715 1915

Sponsor: IASL

SITE: FPG - Eniwetok - Flora
11° 14' 14" N
162° 11' 41" E
Site elevation: Sea level

TOTAL YIELD: 10.4 mt

HEIGHT OF BURST: Surface

FIREBALL DATA:

Time to 1st minimum: 270 to 310 msec
Time to 2nd maximum: 3 to 3.5 sec
Radius at 2nd maximum: NM

TYPE OF BURST AND PLACEMENT:
Surface burst on coral soil
and water

CLOUD TOP HEIGHT: 98,000 ft MSL
CLOUD BOTTOM HEIGHT: 59,000 ft MSL

CRATER DATA: Diameter: 6,240 ft
Depth: 164 ft

REMARKS:

Most of the fallout occurred over the open sea. Documentation of the fallout was thus limited to the islands and the lagoon of Eniwetok atoll. The lagoon dose rates were determined by multiplying the readings obtained on rafts by the factor 7. This factor is based upon the ratio of Operation Jangle field dose rates and readings taken over flat plates after their removal from the contaminated area. The data presented for the lagoon stations can thus be considered as approximations only. The island dose rates are based upon ground- and aerial-survey readings and were adjusted to H+1 hour by using the $t^{-1.2}$ law to approximate the decay.

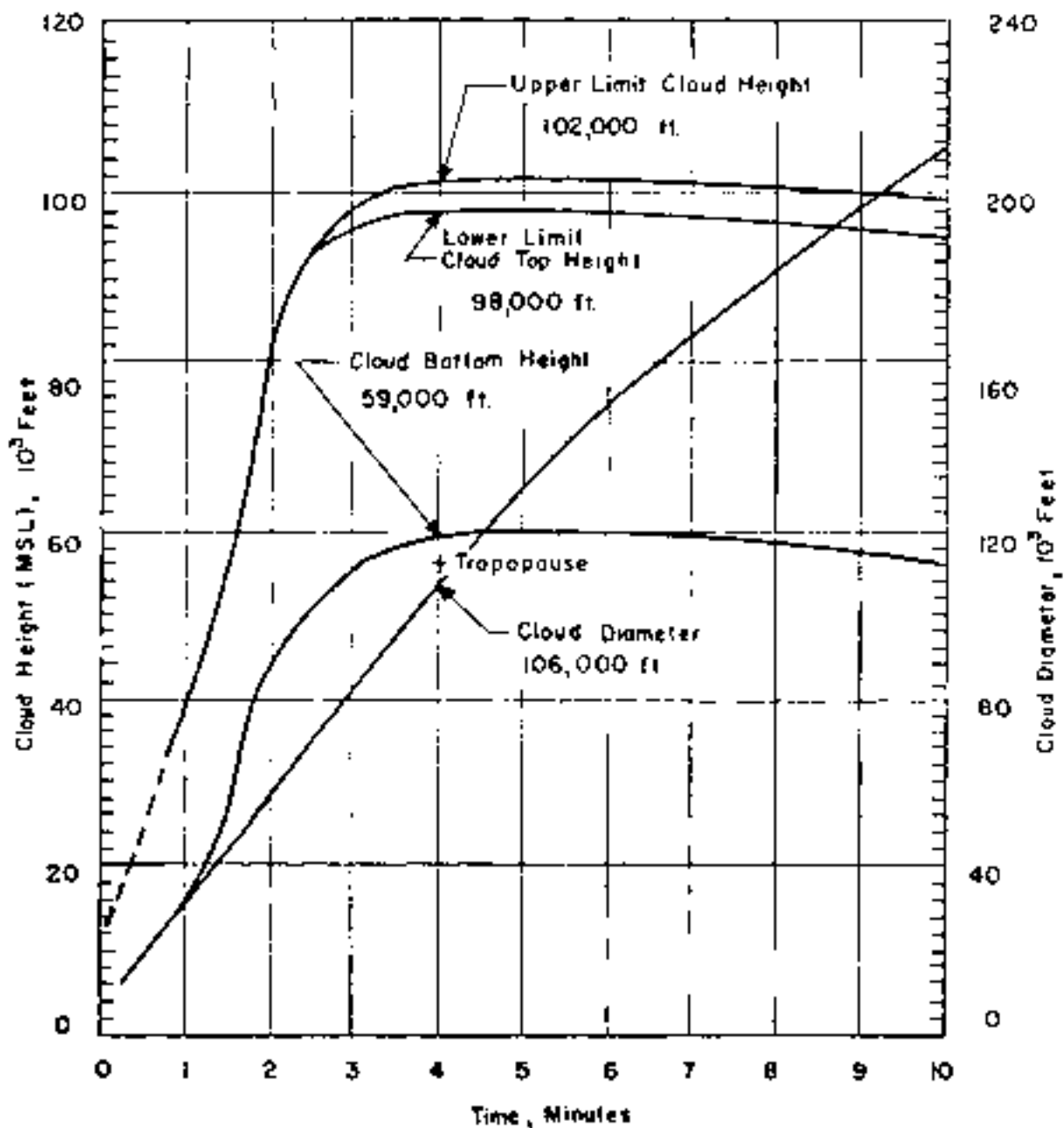


Figure 32 . Cloud Dimensions: Operation IVY - Mike.

TABLE 10. BALLOON WIND DATA FOR OPERATION IVY -

MIXI.

Altitude (MIL)	Heading	
	Dir	Speed
feet	degrees	mph
Surface	090	09
5,000	090	10
10,000	095	11
15,000	115	17
20,000	125	14
25,000	170	15
30,000	220	20
40,000	230	27
50,000	220	24
60,000	040	09
70,000	100	23
80,000	085	09
90,000	220	11
100,000	250	12
110,000	300	25
120,000	040	06
130,000	Calm	Calm
135,000	Calm	Calm

NOTES:

1. Tropopause height was 16,000 ft MSL at 0800Z.
2. The surface air pressure was 10.00 p.s.i., the temperature 29.4°C and the dew point 23.6°C.

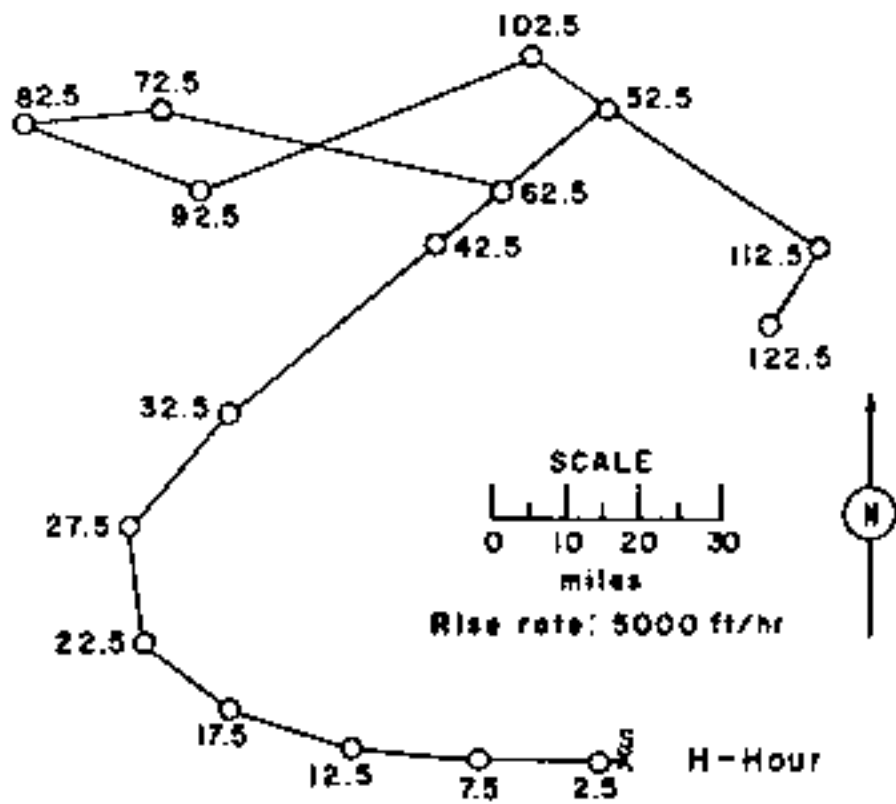


Figure 53 . Hodograph for Operation IVY - Mike.

OPERATION IVY - King

DATE: PPG time GMI
15 Nov 1952 15 Nov 1952
TIME: 1130 2330

Sponsor: IAGL

SITE: PPG - Reef northeast of
north end of Yonau
11° 33' 44" S
162° 21' 09" E
Site elevation: Sea level

TOTAL YIELD: 500 kt

FIREBALL DATA:

Time to 1st maximum: 42 to 70 msec
Time to 2nd maximum: 700 to 850 msec
Radius at 2nd maximum: 1,065 ft

HEIGHT OF BURST: 1,120 ft

CRATER DATA: No crater

CLOUD TOP HEIGHT: 67,000 ft MSL
CLOUD BOTTOM HEIGHT: 21,800 ft MSL

TYPE OF BURST AND PLACEMENT:
Air burst over coral, soil and
sea water

REMARKS:

Contamination of the islands of Eniwetok atoll was generally traced by the contamination resulting from the earlier Mike shot. The dose rates indicated in figure 102 are estimated based upon readings taken from helicopters flying 25 feet above the ground. The estimates are corrected for dose-rate levels existing on D-1.

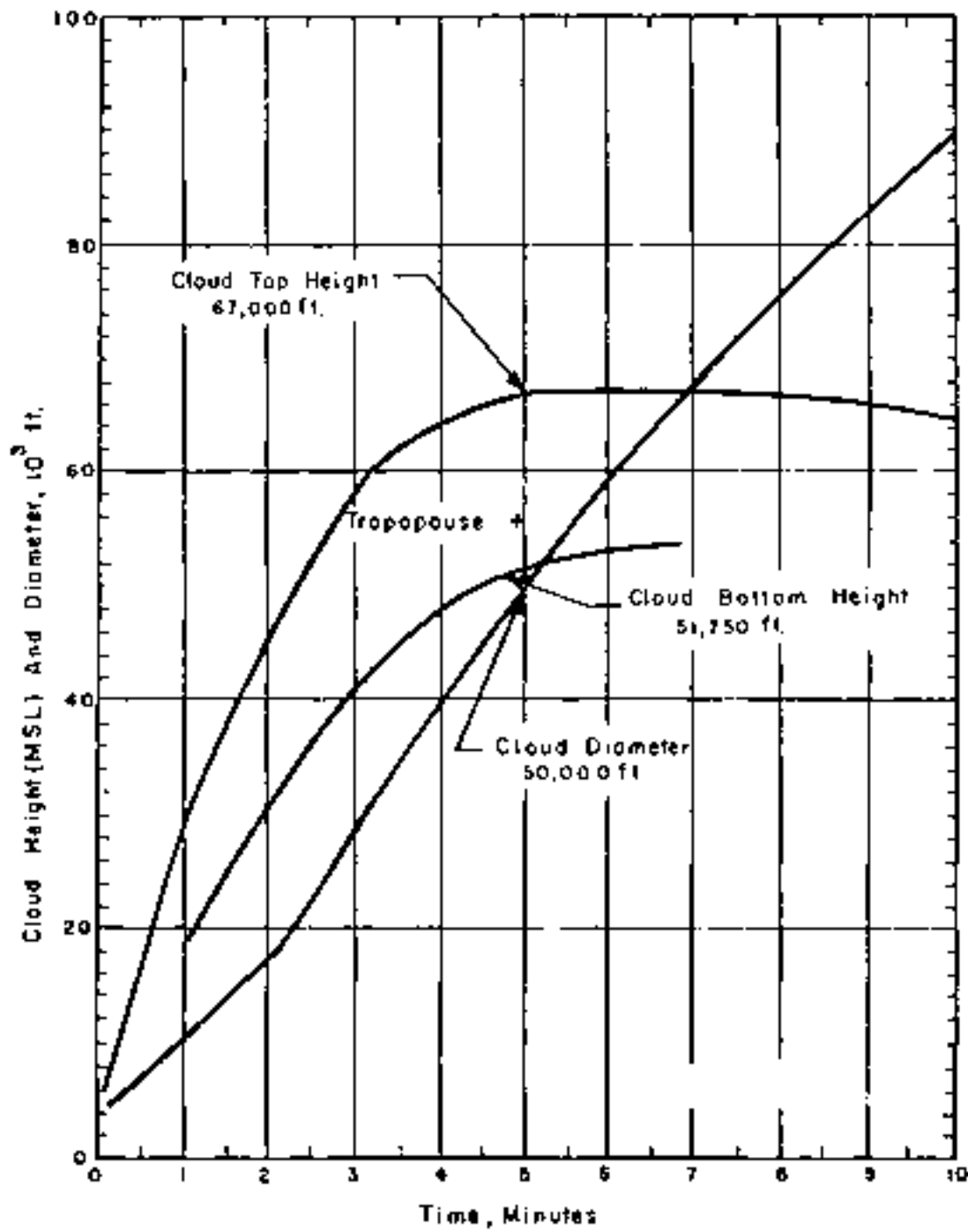


Figure 36. Cloud Dimensions: Operation IVY - King.

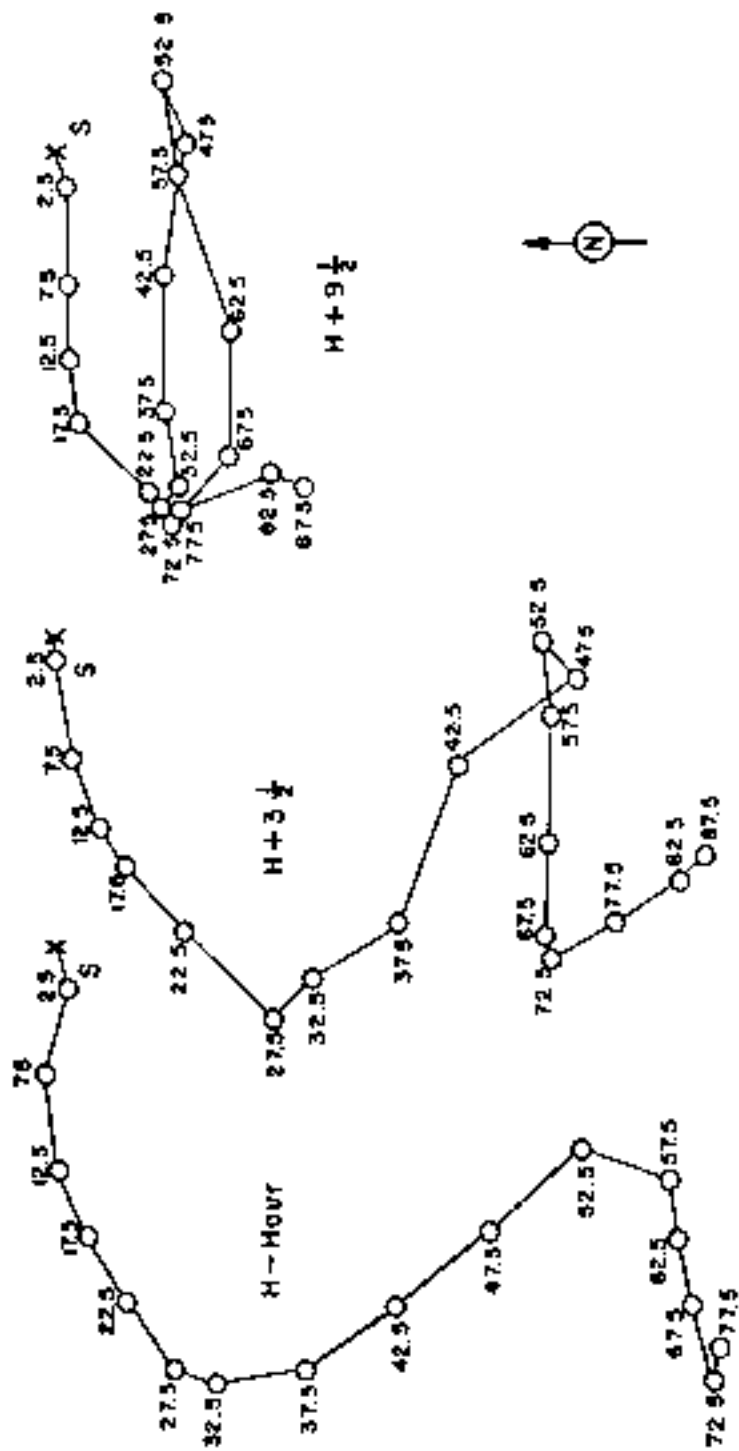
TABLE 11. ENTWISCHER WIND DATA FOR OPERATION IVY -

KING

Altitude (MSL)	H-hour		H+15 hours		H+30 hours	
	Dir degrees	Speed mph	Dir degrees	Speed mph	Dir degrees	Speed mph
Surface	070	20	080	22	070	20
5,000	100	23	080	26	030	20
10,000	000	23	070	20	070	20
14,000	---	--	070	12	060	13
15,000	060	19	---	--	---	--
16,000	060	16	040	12	070	17
20,000	050	20	050	09	060	20
25,000	050	24	050	33	050	05
30,000	018	12	310	13	300	06
35,000	(301)	(21)	330	26	160	18
40,000	300	20	290	14	070	33
45,000	(300)	(19)	320	36	280	41
50,000	300	30	230	08	150	17
55,000	(301)	(18)	080	20	080	26
60,000	080	14	090	33	070	43
65,000	(079)	(17)	090	24	090	30
70,000	070	21	070	05	130	23
75,000	080	07	330	12	300	05
80,000	---	--	320	16	340	25
85,000	---	--	310	09	020	05
90,000	---	--	320	06	---	--
95,000	---	--	200	30	---	--

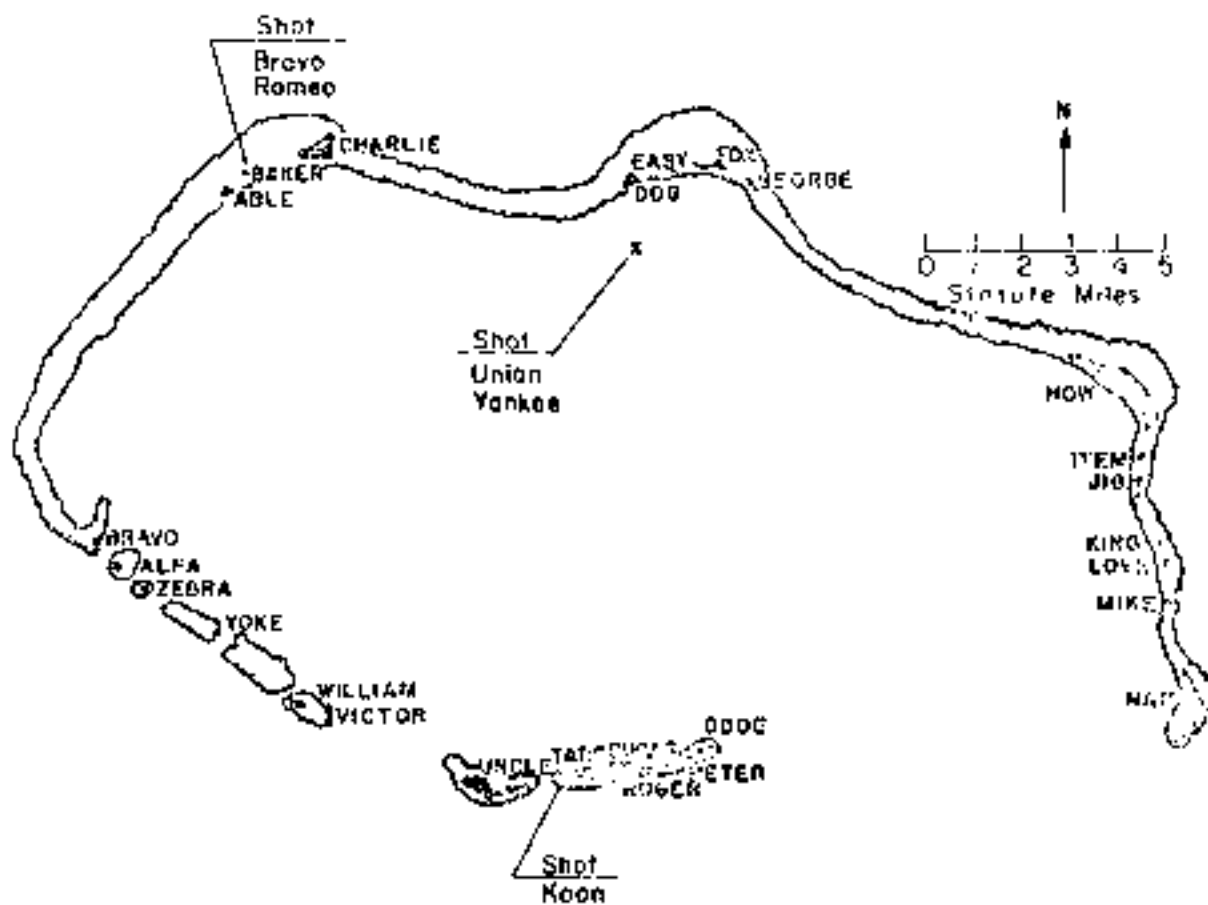
NOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 16,000 ft MSL at H-hour.
3. The surface air pressure was 10.06 psi, the temperature 28.0°C and the dew point 23.5°C.



SCALE
 0 20 40 60
 miles
 Rise rate: 5000 ft/hr
 X10g.

Figure 36. Hodographs for Operation IVY -



**BIKINI ATOLL
OPERATION CASTLE
SHOT LOCATIONS**

Figure 37. Operation CASTLE, Shot Locations.

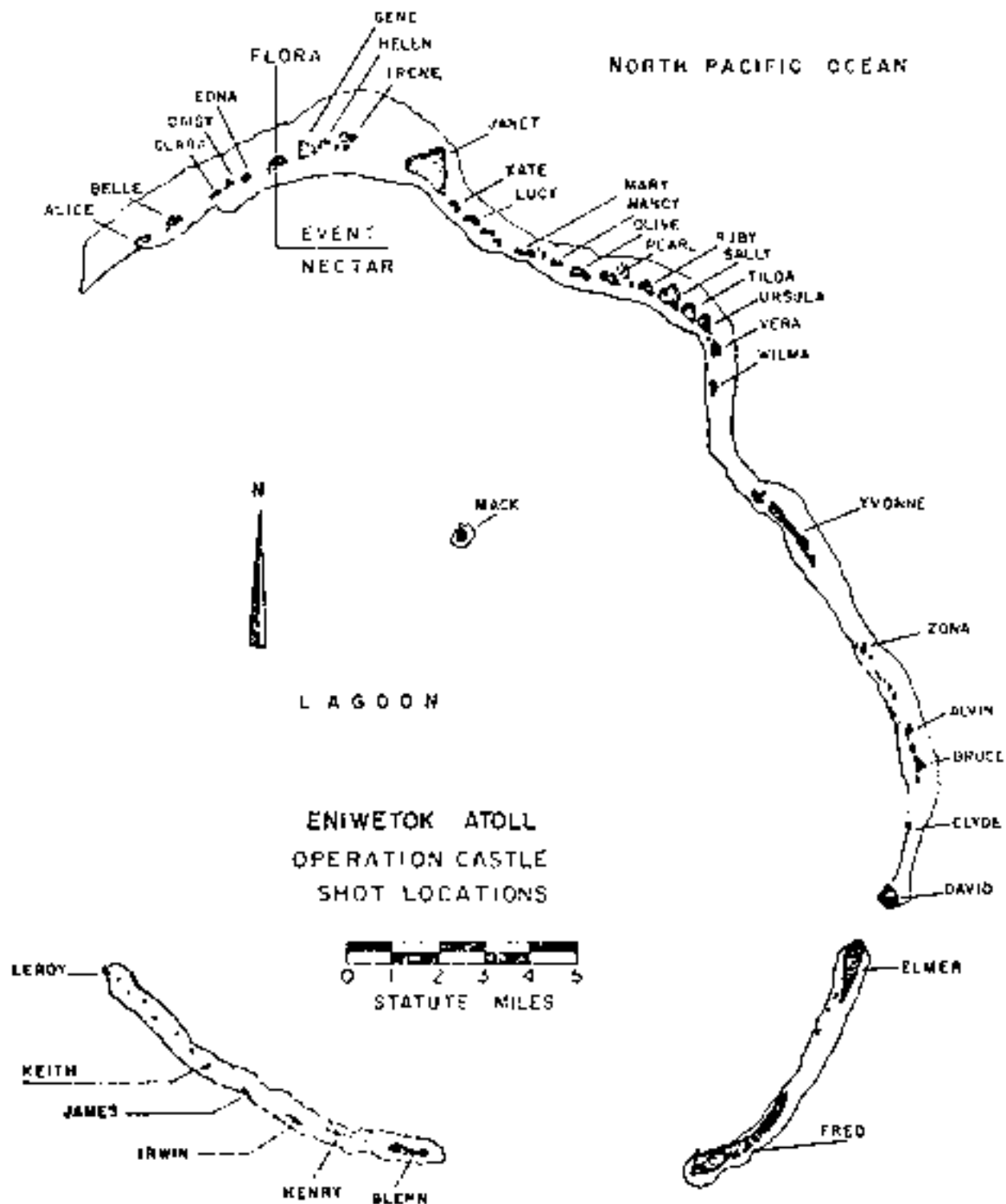


Figure 38. Operation CASTLE, Shot Locations.

OBSERVATION FACILITY - Bravo

DATE: 1 Mar 1954 GM⁰: 18° 30' 12" S
TIME: 0843 1954

SEALED VIALS: 15 ml

REMARKS:

Time to first rainout 3.5 to 3.6 sec
Time to end rainout 3.4 to 3.9 sec
Radius at end rainout 9,500 ft

TYPE OF PLATFORM AND INSTRUMENT:

Surface barometer from platform on
Coral reef

Operator: MCB

TYPE: PFD - T-414 - 60 roof 11' x 60'
2nd floor 7' x 11'
1st floor 20' x 30'
10' x 10' 10' x 10'
Site description: See below

HEIGHT OF PLATFORM: 10 ft

CORRECTION FOR WIND: 10,000 ft

CORRECTION FOR WIND: 10,000 ft

CHIMNEY DATA: Diameter 6,000 ft
Depth 200 ft
Type: Apparently
washed away

REMARKS:

The on-site fallout pattern was constructed from survey area normal to Bikini Atoll, and from samples obtained with the total collector and gamma paper collectors. The free-floating aerosol samples were not in the correct location to receive primary fallout. The data were extrapolated to 101 hour by the composite gamma-ionization-decay curve obtained from samples measured in the laboratory.

This is the only region that where some downwind land areas were unexpectedly contaminated; thus, partial documentation of fallout effects was possible. However, the major portion of the fallout occurred over the open ocean and was not documented. Because this chart is one of those used as the basis of fallout predictions for regional field studies, three off-site fallout patterns are presented. The most widely known pattern is shown in Figure 40. It was constructed immediately after the event from the preliminary data available as of 1200, 1954. The second pattern was constructed by MCB by establishing an experimental model: the field data plus a thorough analysis of the wind structure existing at and after that time was used. The third pattern was constructed by RAND Corp., by supplementing field observations with model calculations.

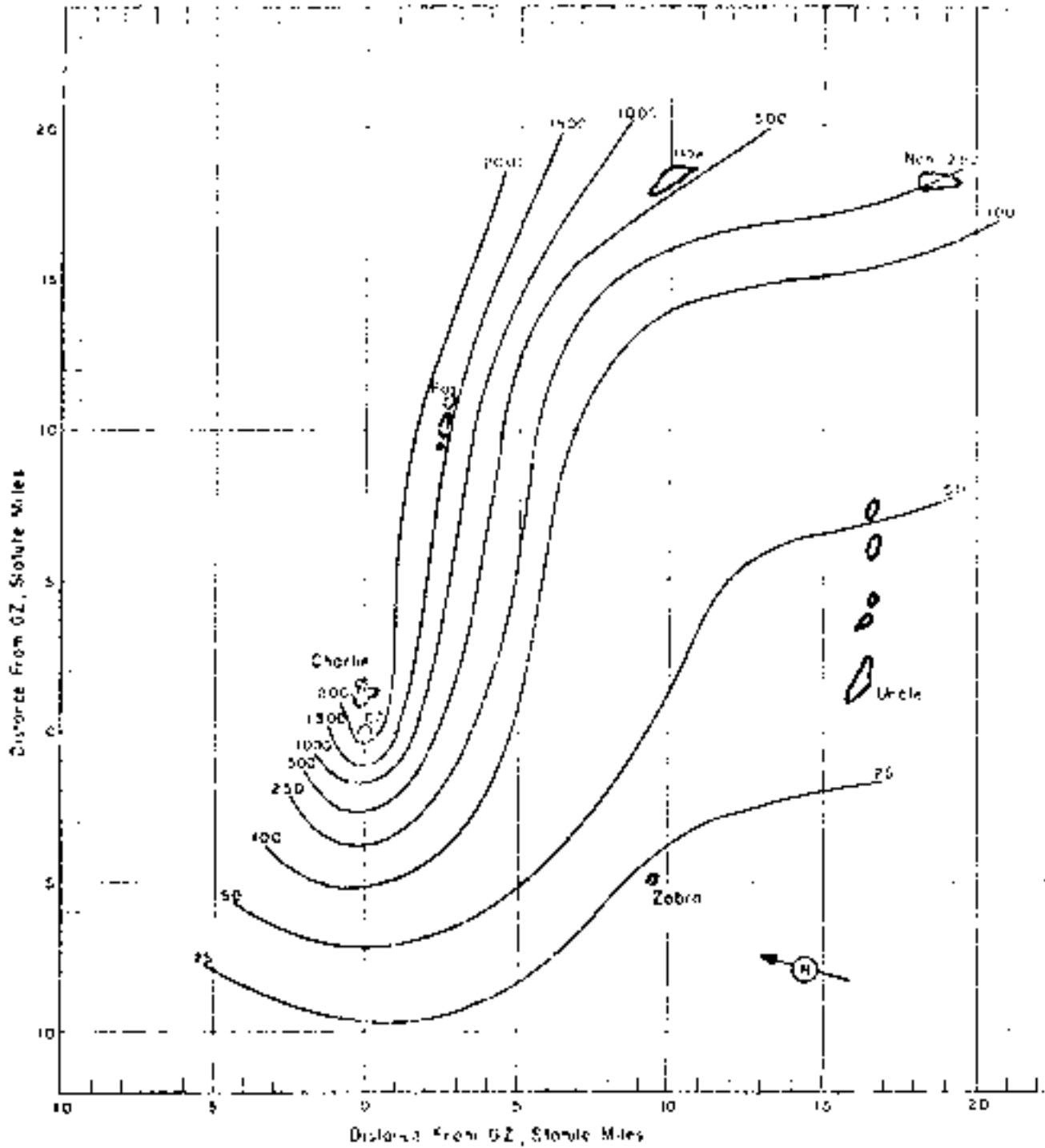


Figure 39. Operation 035 1100 - 1200. Charlie down to 1000 ft at 1141 hours.

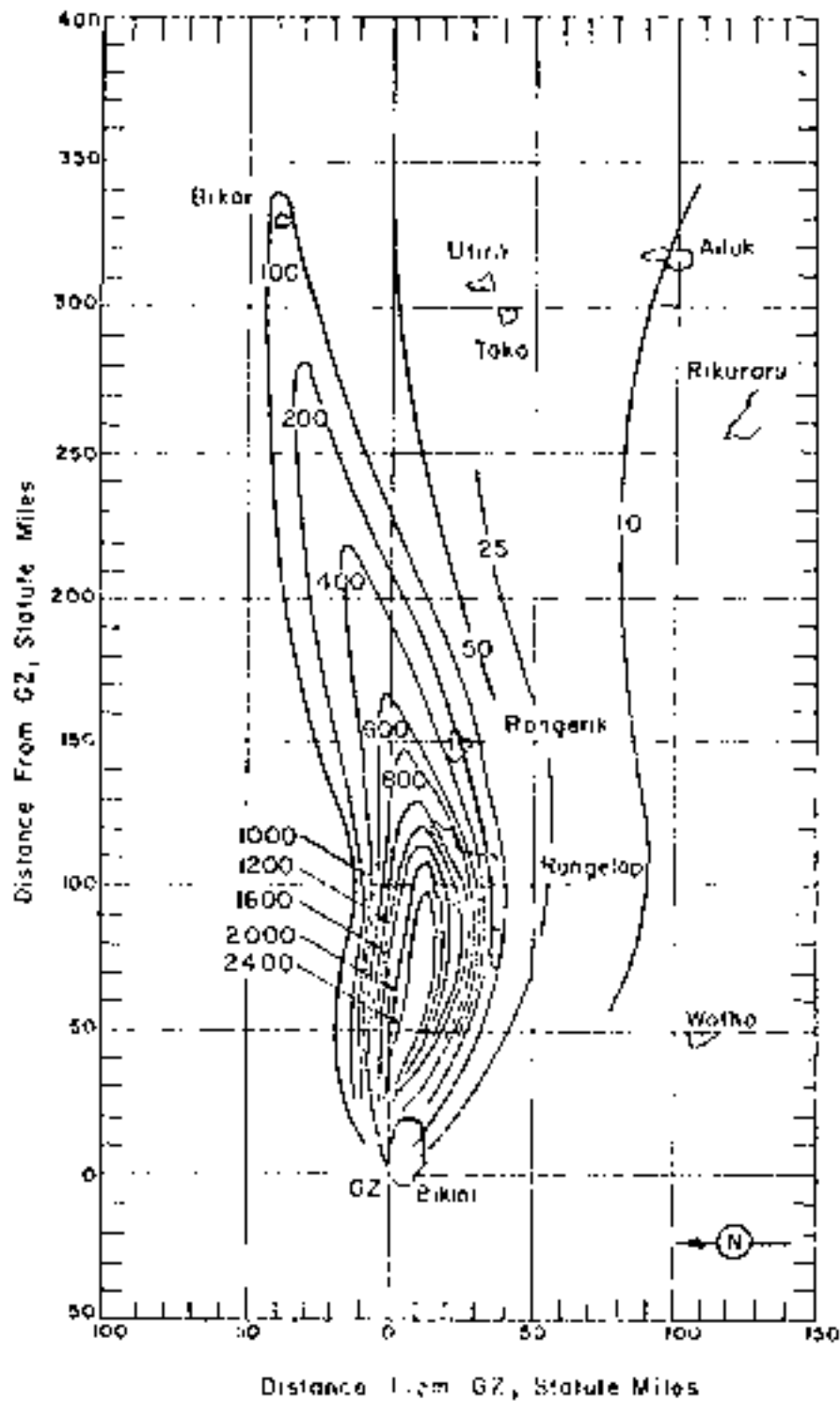


Figure 40. Operation GLENN - Bikini. Off-site dose rate contours in r/hr for 11+2 hour (ADWP).

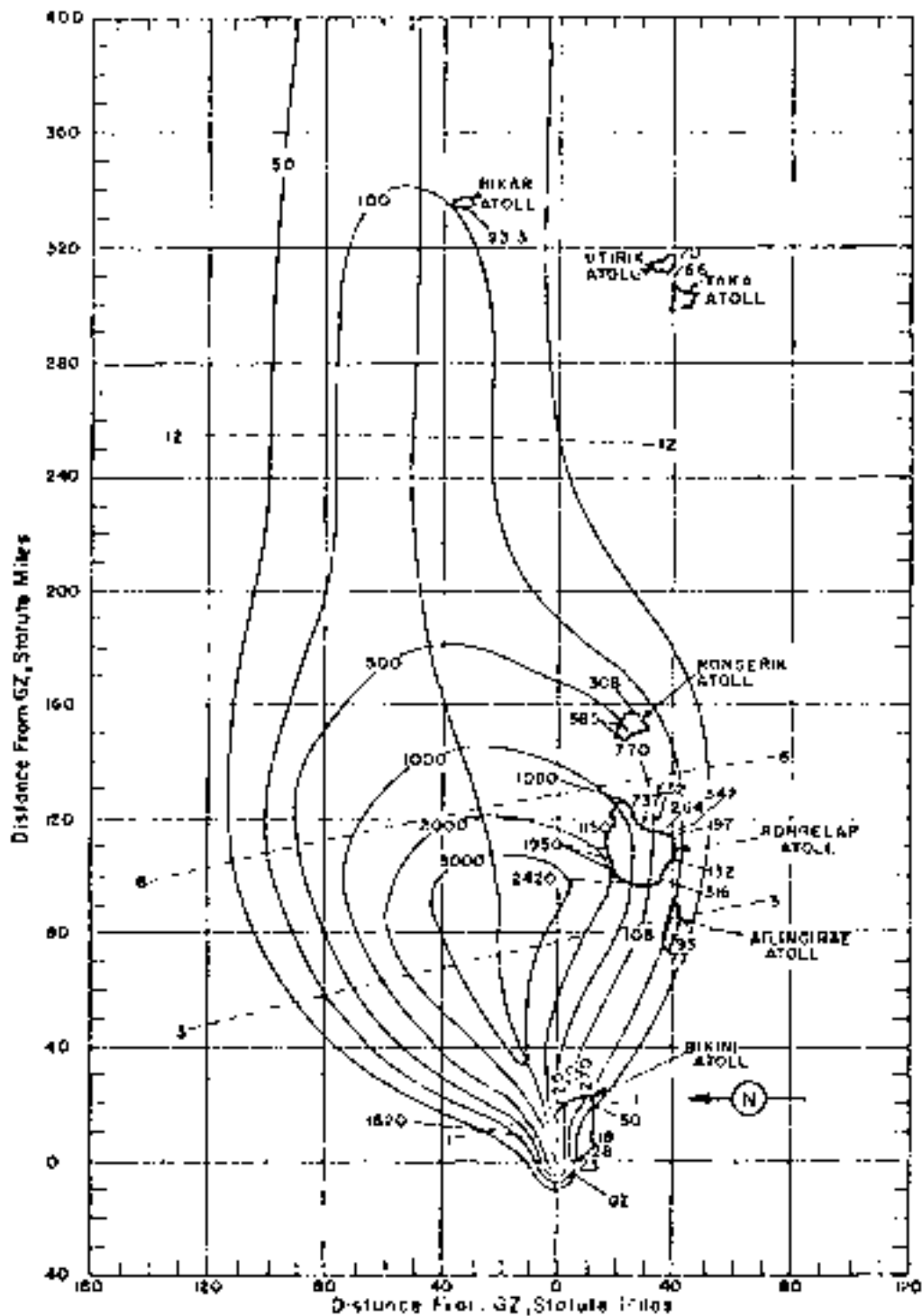


Figure 41 Operation CASTLE - Bravo.
 Off-situ dose rate contours in r/hr at H+1 hour (NSEL).

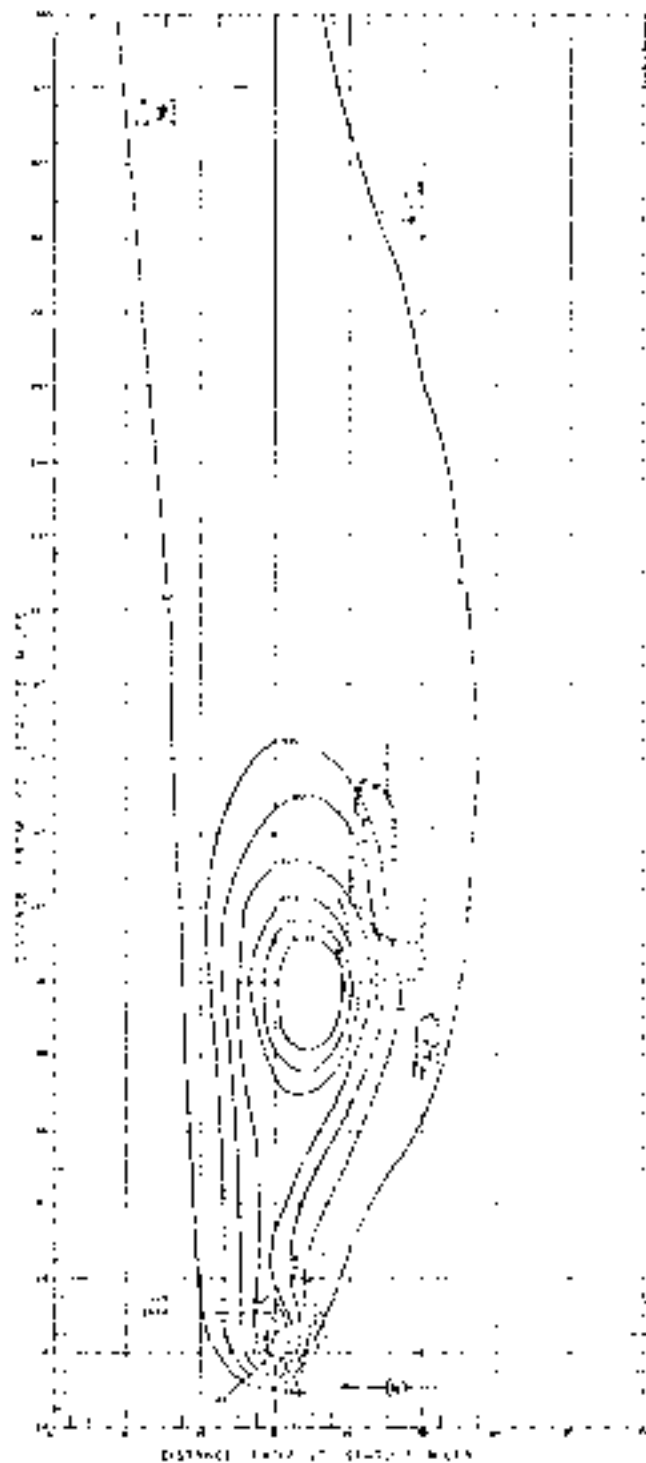


Figure 42. Operation CASPLI - Bravo.
Off-site dose rate contours in r/hr at 11:01 hour (RSD).

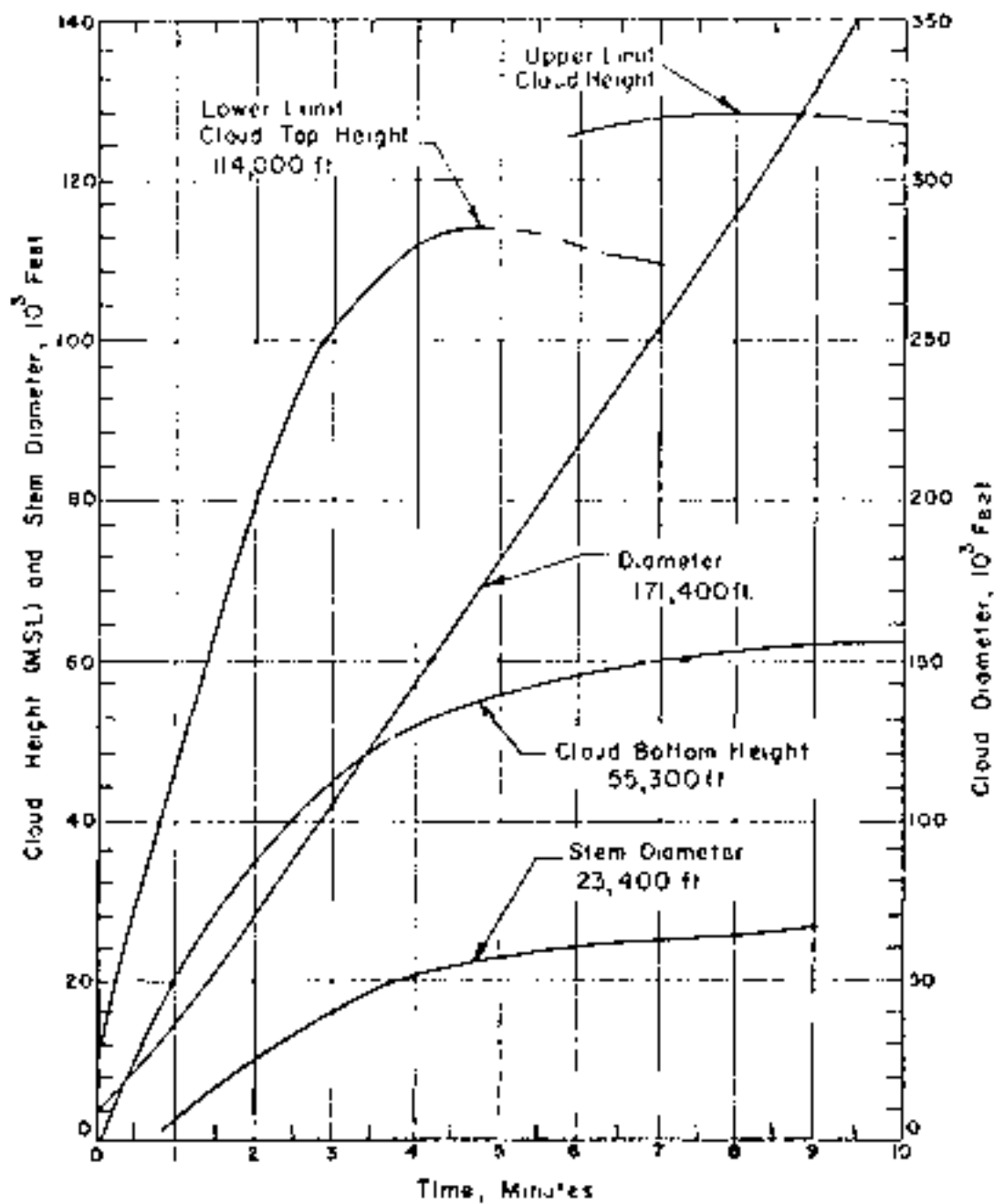


Figure 43. Cloud Dimensions Operations (MSL) -

Bravo.

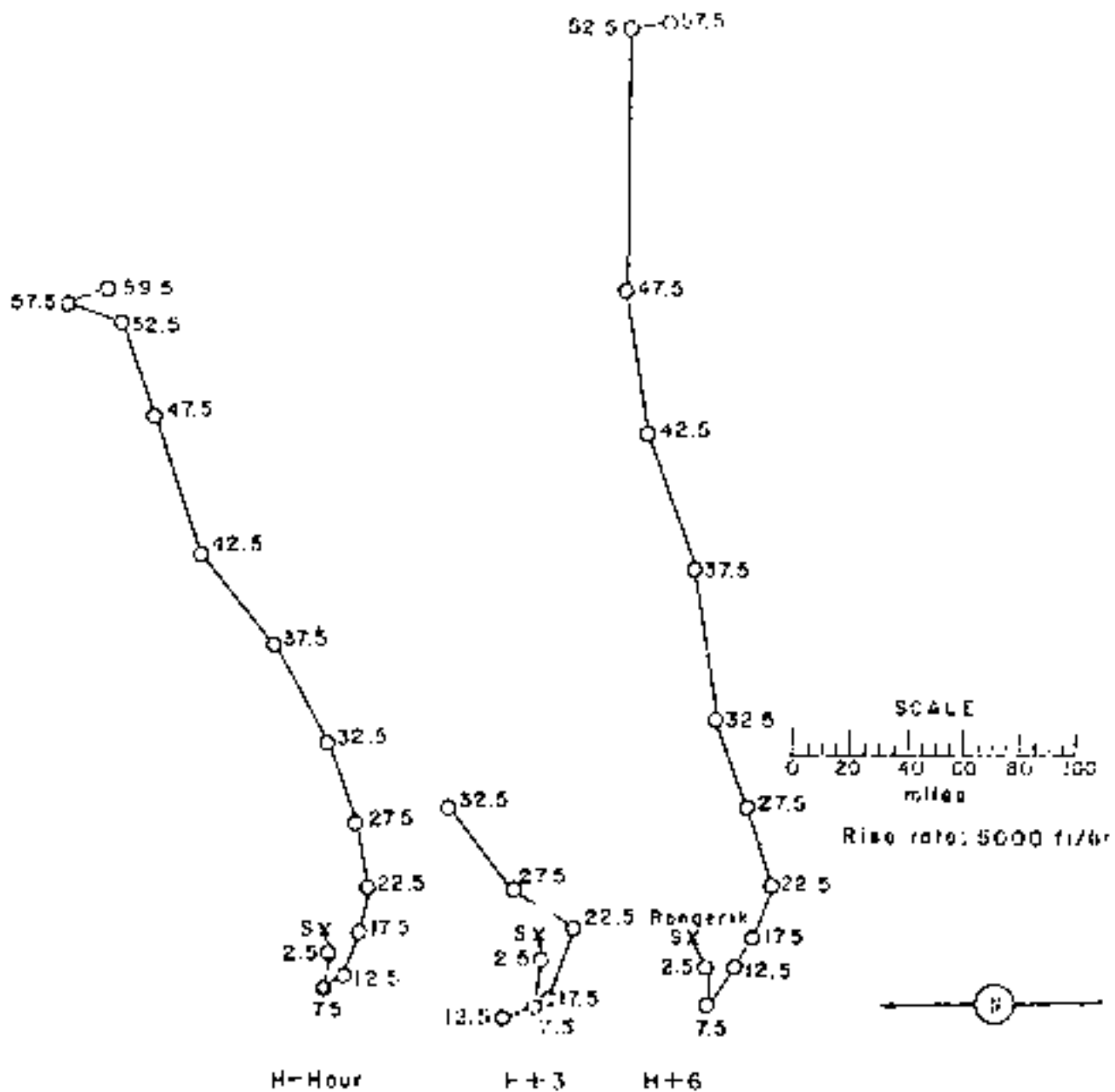


Figure 44 - Hydrographs for Operation OWS 1 -

Bravo.

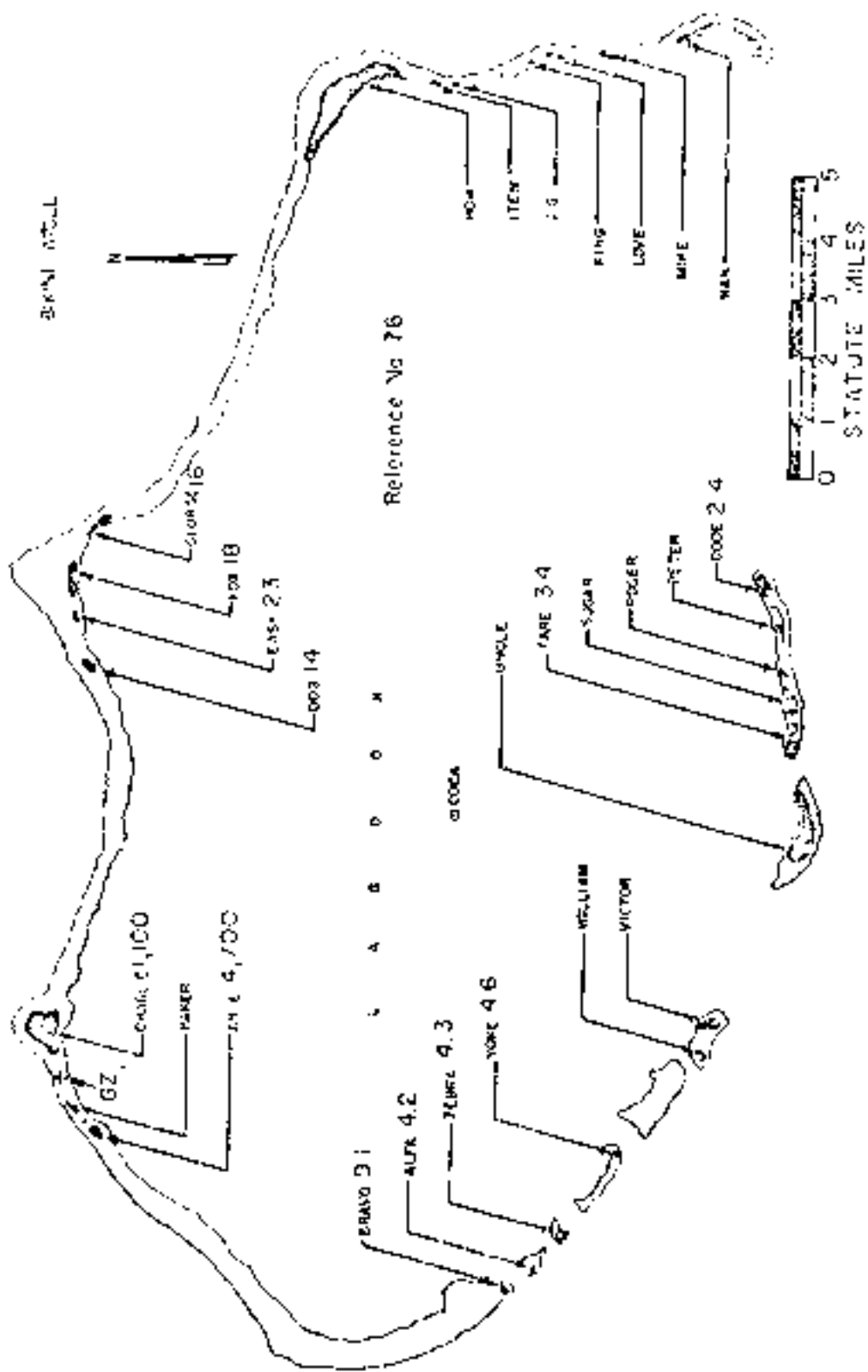


Figure 4b. Operation Cuckoo - Force. Inland down route in time of 100 hours.

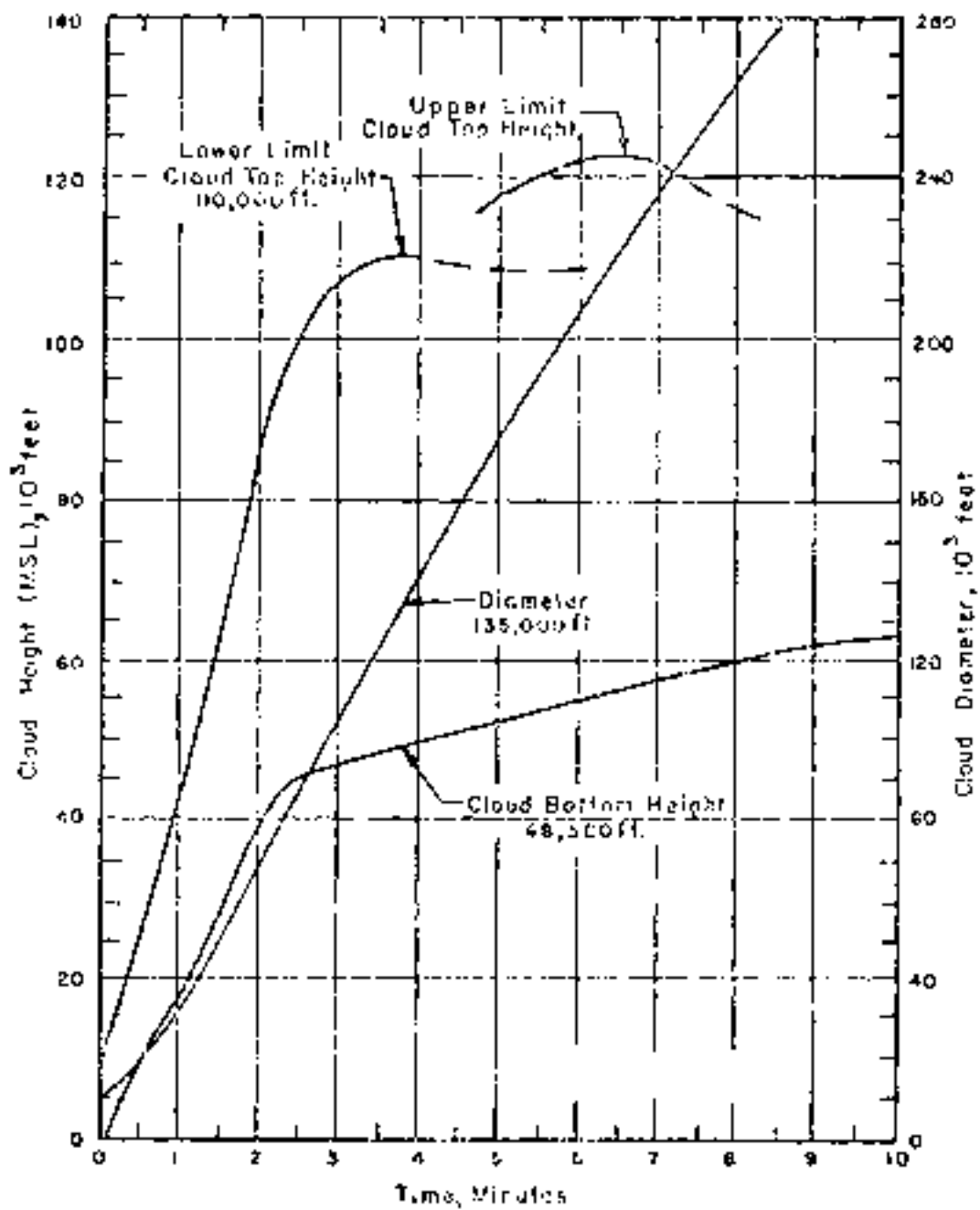


Figure 46. Cloud Dimensions: Operation 007110 -

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TABLE 13. BULK WIND DATA FOR GALE-FORCE CATEGORY

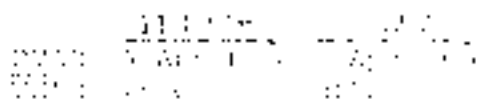
30000

Altitude (ft)	1500 ft		1000 ft		500 ft	
	Dir. degrees	Spd. mph	Dir. degrees	Spd. mph	Dir. degrees	Spd. mph
30,000	050	12	070	02	070	20
1,000	050	15	070	17	090	21
2,000	070	16	070	17	070	15
3,000	060	15	050	16	070	11
4,000	050	13	050	09	110	21
5,000	050	05	150	12	150	12
6,000	050	05	100	13	(000)	(05)
7,000	100	02	100	14	150	15
8,000	150	04	240	06	140	10
9,000	---	---	170	05	190	09
10,000	150	09	160	05	180	06
12,000	170	11	140	08	050	05
14,000	150	11	100	13	150	17
15,000	(100)	(15)	(170)	(17)	(100)	(16)
16,000	050	17	070	17	(050)	(20)
18,000	100	20	100	20	150	20
20,000	100	23	100	29	(050)	(17)
25,000	110	15	180	07	200	09
30,000	150	07	130	05	170	10
35,000	150	21	150	20	230	15
40,000	200	41	190	15	210	05
45,000	30	06	250	10	200	17
50,000	150	17	190	10	250	20
55,000	150	17	200	12	270	05
56,000	---	---	100	02	---	---
60,000	270	15	---	---	250	15
62,000	---	---	---	---	260	12
65,000	320	11	---	---	---	---
67,000	030	25	---	---	---	---

NOTES:

1. Numbers in parentheses are null data values.
2. Wind data was obtained on board the U. S. S. Cortes.
3. Transparency height was 55,000 ft MSL.
4. At E-hour the sea level pressure was 30.2 mb, the temperature 80°F, the dew point 72°F and the relative humidity 77%.

CH₂=CH-CH=CH₂ + H₂O



CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂

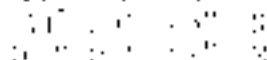
CH₂=CH-CH=CH₂ + H₂O
CH₂=CH-CH=CH₂ + H₂O
CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂ + H₂O
CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂

CH₂=CH-CH=CH₂ + H₂O



CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂ + H₂O

CH₂=CH-CH=CH₂ + H₂O

Experiment

The synthesis of 1,3-butadiene was carried out in a dry reaction flask by heating 100 g of 1,4-butanediol in the presence of 10 g of concentrated phosphoric acid in a round-bottom flask equipped with a reflux condenser and a thermometer. The flask was cooled in an ice-water bath and the reaction mixture was stirred with a magnetic bar. The reaction mixture was then poured into a beaker of water and the white solid was washed with water. The white solid was extracted with 100 ml of 10% sodium hydroxide solution.

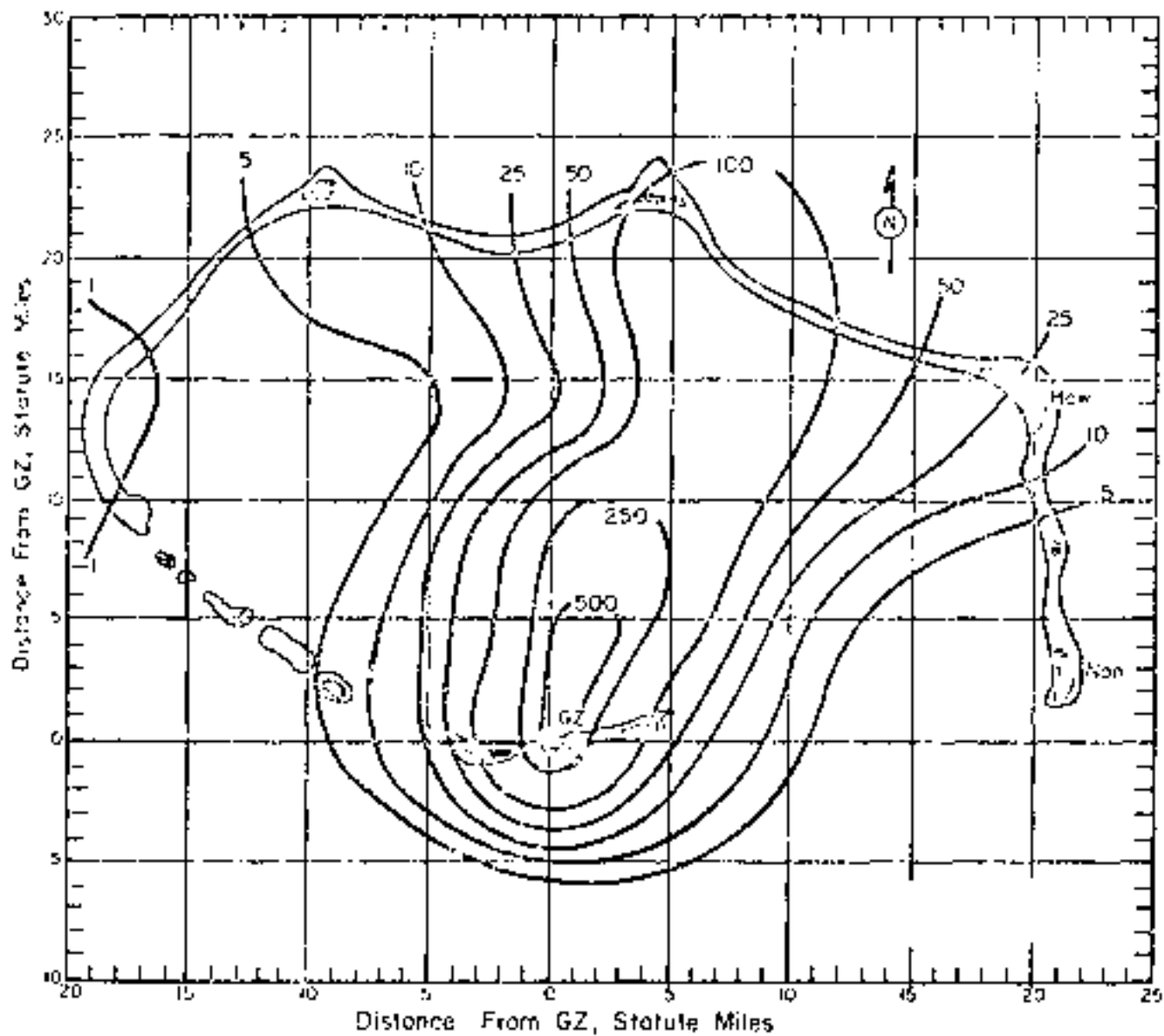


Figure 48 - Operation CASTLE - Koon.
 GZ(0) dose rate contours in r/hr at 11+1 hours.

TABLE 14. THERMAL STABILITY OF POLYMERIZATION OF α -MMA

KOPPEL

T_p , °C	$\log k_p/k_t^{1/2}$		$\log k_p/k_t^{1/2}$		$\log k_p/k_t^{1/2}$	
	Exp.	Calc.	Exp.	Calc.	Exp.	Calc.
50°C	0.8	0.5	1.0	1.0	0.6	0.6
60°C	0.7	0.7	---	---	---	---
70°C	1.0	1.0	0.6	0.5	0.5	0.7
80°C	0.8	0.9	---	---	---	---
90°C	---	0.8	0.7	0.8	0.6	0.6
100°C	(0.6)	(0.7)	(0.6)	(0.7)	(0.5)	(0.5)
110°C	1.0	1.1	1.0	1.1	0.7	0.7
120°C	1.0	1.1	---	---	---	---
130°C	1.0	1.0	1.0	1.0	1.0	1.0
140°C	1.0	1.0	---	---	---	---
150°C	1.0	1.0	1.0	1.0	1.0	1.0
160°C	1.0	1.0	1.0	1.0	1.0	1.0
170°C	1.0	1.0	1.0	1.0	1.0	1.0
180°C	1.0	1.0	1.0	1.0	1.0	1.0
190°C	1.0	1.0	1.0	1.0	1.0	1.0
200°C	1.0	1.0	1.0	1.0	1.0	1.0
210°C	1.0	1.0	1.0	1.0	1.0	1.0
220°C	1.0	1.0	1.0	1.0	1.0	1.0
230°C	1.0	1.0	1.0	1.0	1.0	1.0
240°C	1.0	1.0	1.0	1.0	1.0	1.0
250°C	1.0	1.0	1.0	1.0	1.0	1.0
260°C	1.0	1.0	1.0	1.0	1.0	1.0
270°C	1.0	1.0	1.0	1.0	1.0	1.0
280°C	1.0	1.0	1.0	1.0	1.0	1.0
290°C	1.0	1.0	1.0	1.0	1.0	1.0
300°C	1.0	1.0	1.0	1.0	1.0	1.0
310°C	1.0	1.0	1.0	1.0	1.0	1.0
320°C	1.0	1.0	1.0	1.0	1.0	1.0
330°C	1.0	1.0	1.0	1.0	1.0	1.0
340°C	1.0	1.0	1.0	1.0	1.0	1.0
350°C	1.0	1.0	1.0	1.0	1.0	1.0
360°C	1.0	1.0	1.0	1.0	1.0	1.0
370°C	1.0	1.0	1.0	1.0	1.0	1.0
380°C	1.0	1.0	1.0	1.0	1.0	1.0
390°C	1.0	1.0	1.0	1.0	1.0	1.0
400°C	1.0	1.0	1.0	1.0	1.0	1.0
410°C	1.0	1.0	1.0	1.0	1.0	1.0
420°C	1.0	1.0	1.0	1.0	1.0	1.0
430°C	1.0	1.0	1.0	1.0	1.0	1.0
440°C	1.0	1.0	1.0	1.0	1.0	1.0
450°C	1.0	1.0	1.0	1.0	1.0	1.0
460°C	1.0	1.0	1.0	1.0	1.0	1.0
470°C	1.0	1.0	1.0	1.0	1.0	1.0
480°C	1.0	1.0	1.0	1.0	1.0	1.0
490°C	1.0	1.0	1.0	1.0	1.0	1.0
500°C	1.0	1.0	1.0	1.0	1.0	1.0

NOTES

1. Based on preliminary results of the authors.
2. Kinetic data was obtained at 1 atm. by G.I.S. Ostlund.
3. Temperature used was 50°C. in 1956.
4. At 100°C. the $\log k_p/k_t^{1/2}$ values were 1.00-1.01, the temperature 61°F., the dew point 57°F. and the humidity 85%.

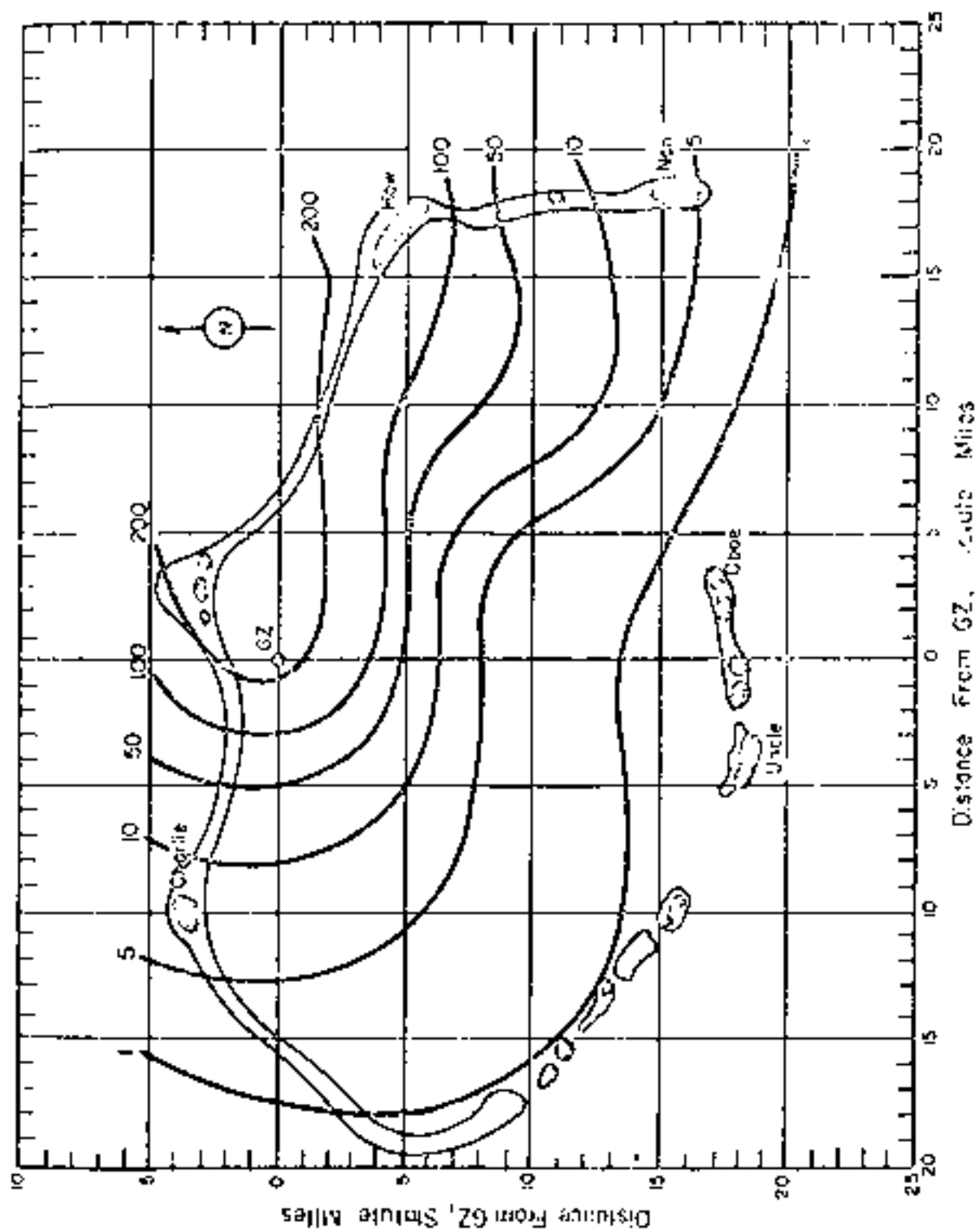


Figure 50. Operation Chart - Loss Rate Contour
 Loss rate contours plotted at 500 knots.

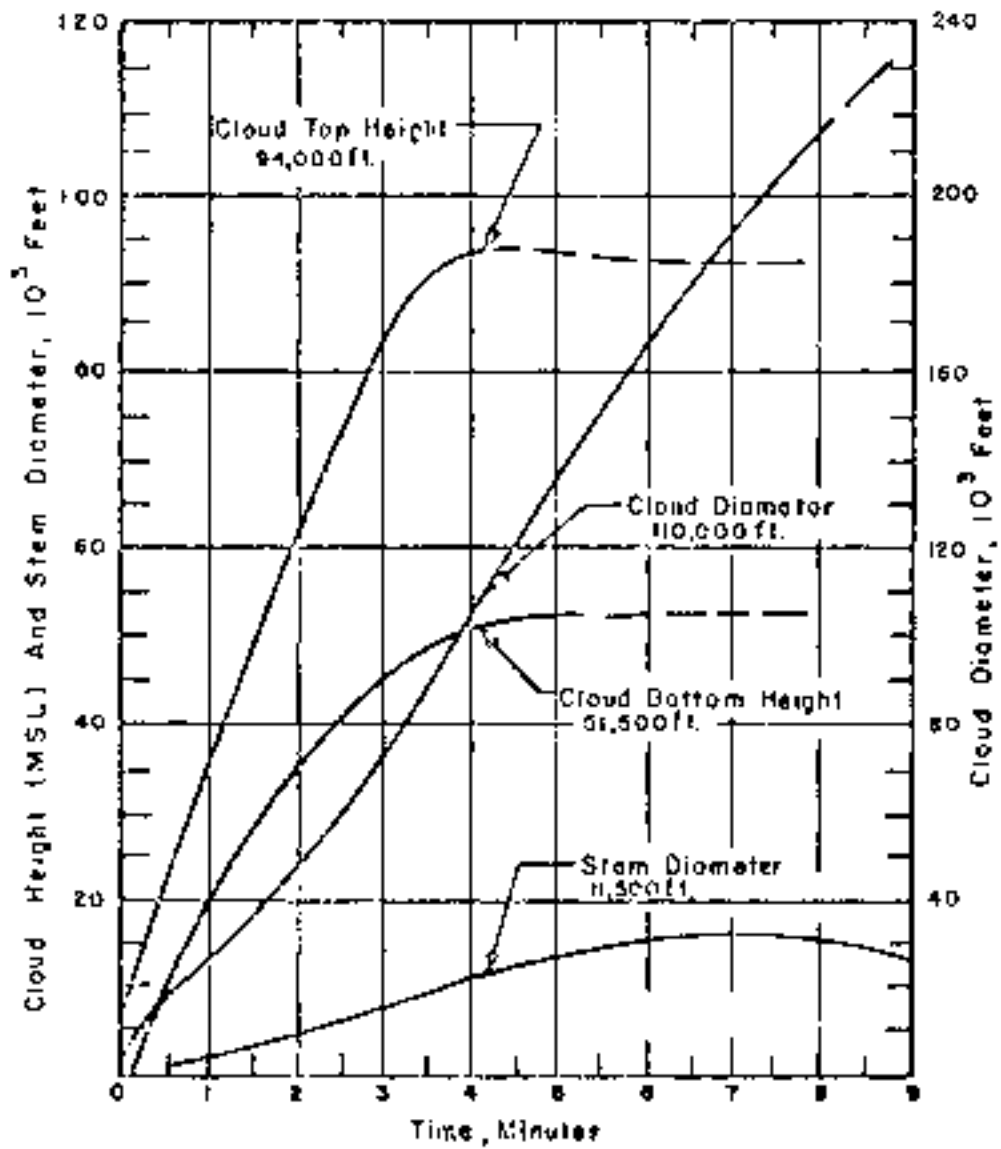


Figure 51. Cloud Dimensions Operation 110758 - Union.

TABLE 15. WAXENI WAX DATA FOR DIFFERENT CRYSTALS

171-67

ATMOSPHERE (%)	Crystal			Wax		T _m (°C)	T _g (°C)
	Hex	Hept	Oct	D.P.	Wt. %		
100%	20000	10	0.0%	10	100	10	10
0%	---	---	---	---	---	---	---
10%	---	---	---	---	---	---	---
20%	---	---	---	---	---	---	---
30%	---	---	---	---	---	---	---
40%	---	---	---	---	---	---	---
50%	---	---	---	---	---	---	---
60%	---	---	---	---	---	---	---
70%	---	---	---	---	---	---	---
80%	---	---	---	---	---	---	---
90%	---	---	---	---	---	---	---
100%	---	---	---	---	---	---	---
10%	---	---	---	---	---	---	---
20%	---	---	---	---	---	---	---
30%	---	---	---	---	---	---	---
40%	---	---	---	---	---	---	---
50%	---	---	---	---	---	---	---
60%	---	---	---	---	---	---	---
70%	---	---	---	---	---	---	---
80%	---	---	---	---	---	---	---
90%	---	---	---	---	---	---	---
100%	---	---	---	---	---	---	---
10%	---	---	---	---	---	---	---
20%	---	---	---	---	---	---	---
30%	---	---	---	---	---	---	---
40%	---	---	---	---	---	---	---
50%	---	---	---	---	---	---	---
60%	---	---	---	---	---	---	---
70%	---	---	---	---	---	---	---
80%	---	---	---	---	---	---	---
90%	---	---	---	---	---	---	---
100%	---	---	---	---	---	---	---

NOTES:

1. Numbers in parentheses are calculated values.
2. Wax data was obtained on 100% 100, 100, 100, 100, 100.
3. Temperature held was 100°C for 10 min.
4. At 10-hour time new level pressure was 100, 100, 100, the temperature 100°C, the new point 100°F and the density 100.

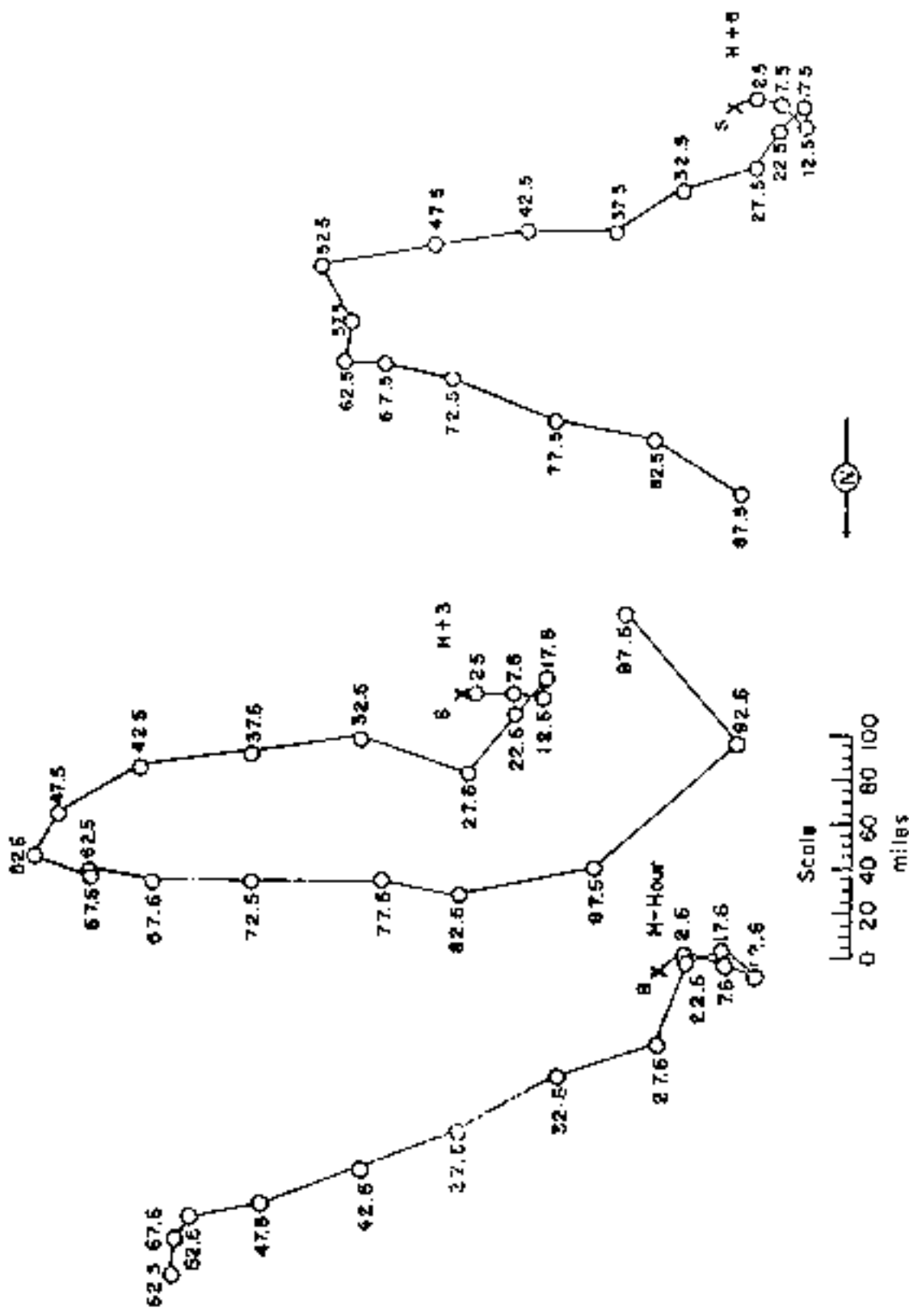


Figure 52. Topography for Operation CASTLE - Union.

QUANTIFICATION OF YIELD - Yields

	<u>Pls. Yields</u>	<u>GMF</u>
<u>1979:</u>	5.8 kg/ha	0.100 x 10 ³
<u>1980:</u>	10.0	10.0

TOTAL YIELD: 15.5 Mt

Spore count: 1400

1979: 1400 = 100000 = 100000 x 10⁻⁵
100000
10⁵ x 10⁵ = 10¹⁰ = 10¹⁰
10¹⁰ x 10⁵ = 10¹⁵ = 10¹⁵
10¹⁵ x 10⁵ = 10²⁰ = 10²⁰

1980: 1400 = 100000 = 100000 x 10⁻⁵

GMF: 100000 = 100000 x 10⁻⁵
GMF: 100000 = 100000 x 10⁻⁵

TYPE OF SITE: 100 PLANTINGS:
100000 = 100000 x 10⁻⁵

DISCUSSION:

The individual related dose rates were computed from the D.C. 1979
in situ-airway readings of the radiological data by extrapolation. The
various readings were corrected to 100 hours, using the 10¹⁰ and
10¹⁵ factors, and extrapolated to 100 above the surface, using the air-to-
ground conversion factors determined later for the Baffin Peninsula
1979. The Fox, George, Son, Olen, Uncle and K. Line readings were taken
at ground level. All other readings were obtained by in situ airways.
The off-site fallout pattern was documented for the first time by a
combined water surface reading, aerial survey, and water sampling program.
The data-base readings were extrapolated to 100 hours by using corrected
decay ratios.

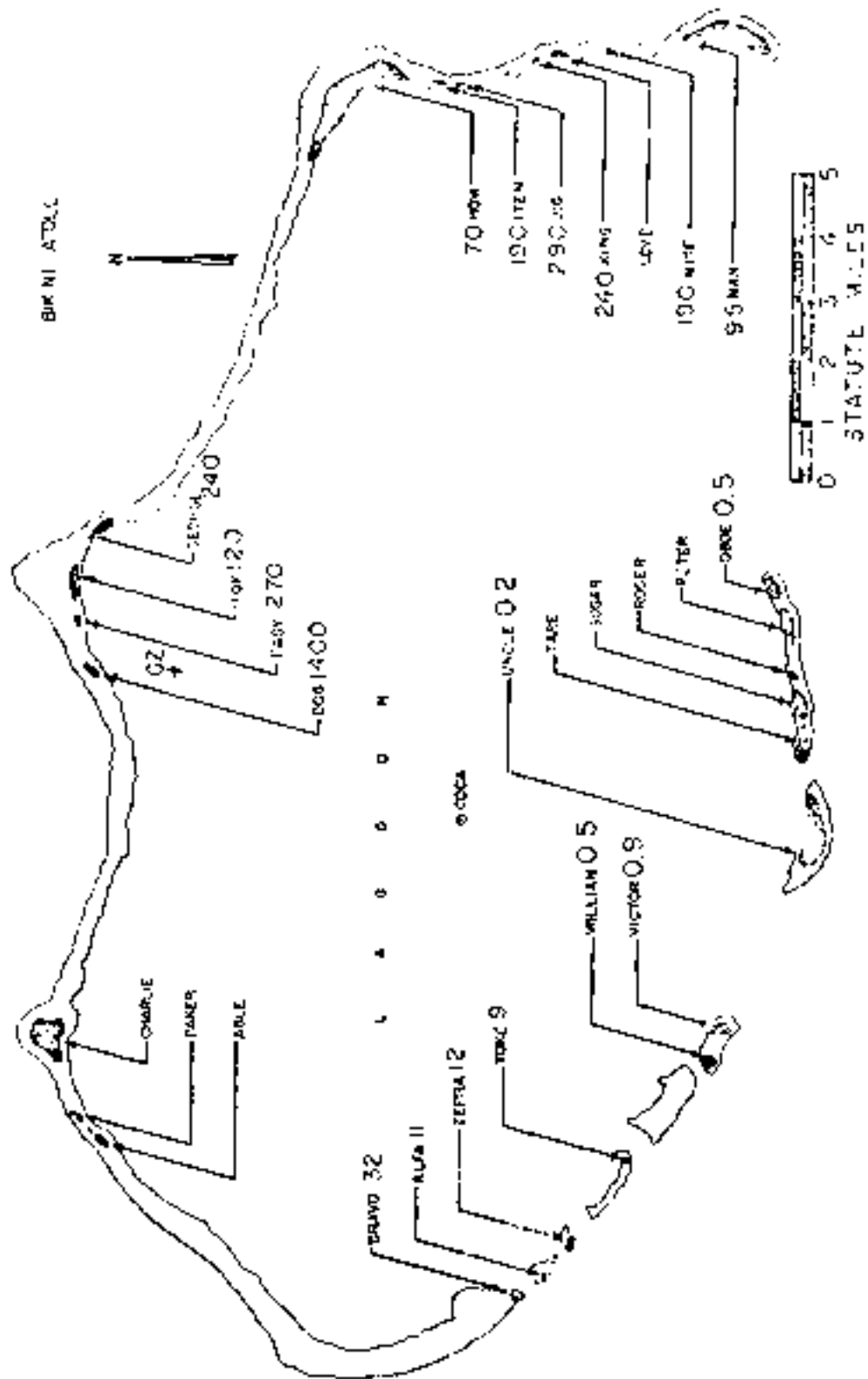


Figure 53. Operation Center - Yagoua.
 Island case frame in 1/10" to 1/100" hour.

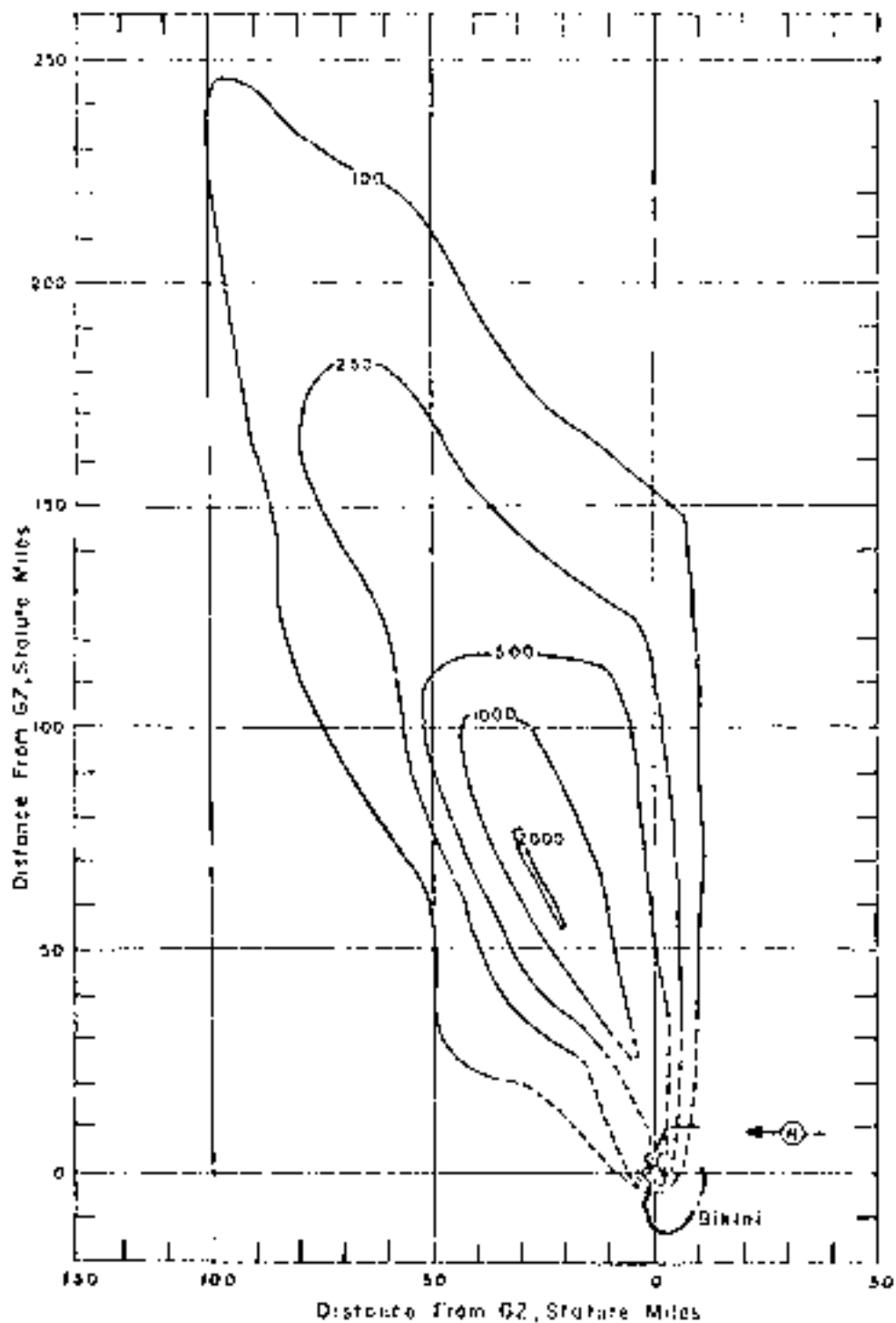


Figure 54. Operation GAMMA - Yankee.
Off-site dose rate contours in r/hr at 11+3 hour.

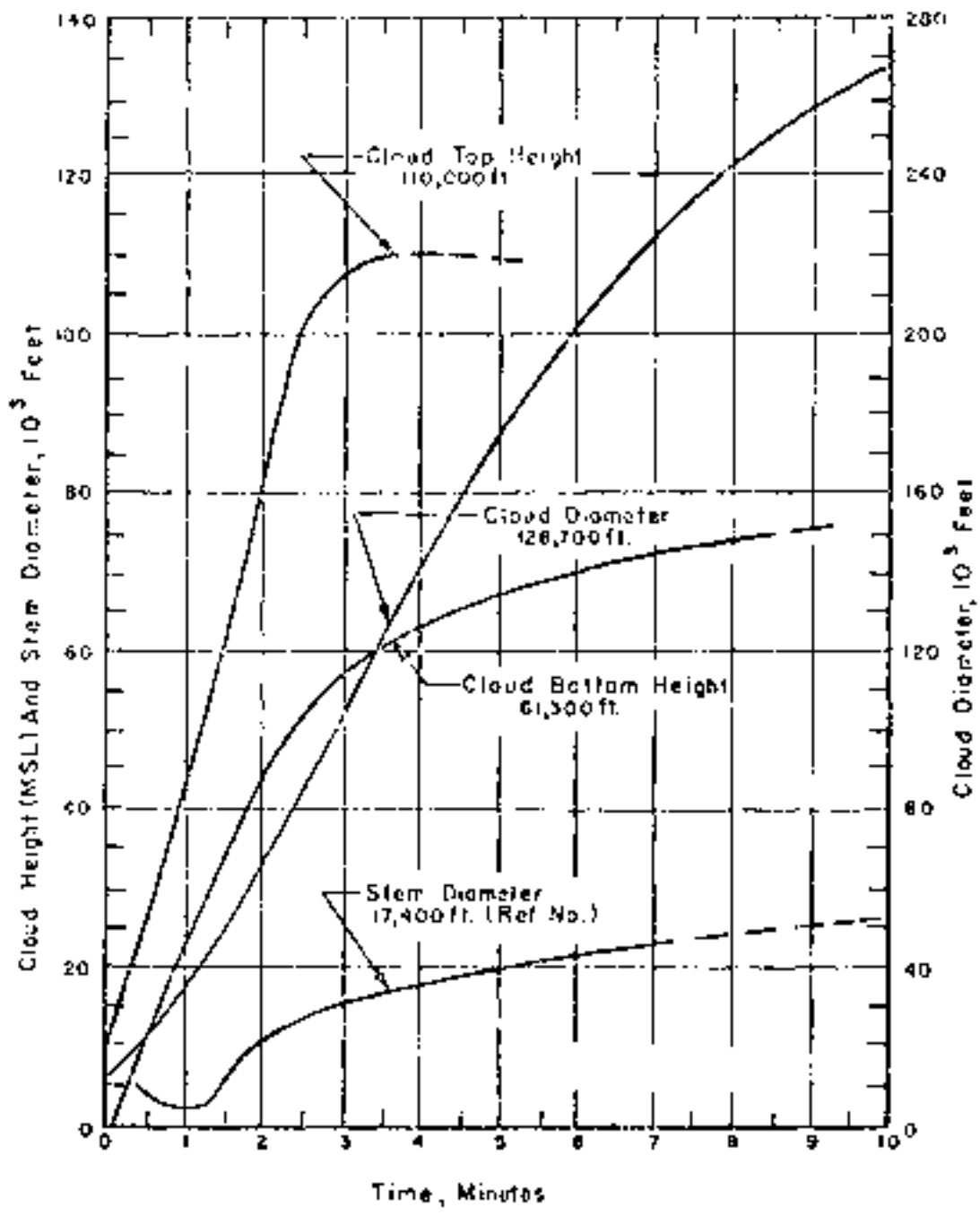


Figure 55. Cloud Parameters: Operation 045703 - Yorktown

TABLE 16. JOINT PROBABILITY OF WIND DIRECTION AND VELOCITY

TABLE 16

Direction (true)	0-10		11-20		21-30		31-40	
	W	%	W	%	W	%	W	%
000-090	0	0	1	1	2	2	0	0
100-180	0	0	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---
0-90	(0)	(0)	(1)	(1)	(2)	(2)	(0)	(0)
100-180	---	---	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---
0-90	0	0	1	1	2	2	0	0
100-180	0	0	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---
0-90	0	0	1	1	2	2	0	0
100-180	0	0	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---
0-90	0	0	1	1	2	2	0	0
100-180	0	0	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---
0-90	0	0	1	1	2	2	0	0
100-180	0	0	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---
0-90	0	0	1	1	2	2	0	0
100-180	0	0	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---
0-90	0	0	1	1	2	2	0	0
100-180	0	0	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---
0-90	0	0	1	1	2	2	0	0
100-180	0	0	---	---	---	---	---	---
200-270	0	0	1	1	2	2	0	0
300-360	0	0	---	---	---	---	---	---

NOTE:

1. Read as in present time, except the first column.
2. Wind direction was obtained on level 1 by T. G. G. Charting.
3. Temperature by level was 22.0°C at 800.
4. At 8-hour the sea level pressure was 1016.8 mb, the temperature 66.6 F, the dew point 71.0°F and the relative humidity 84%.

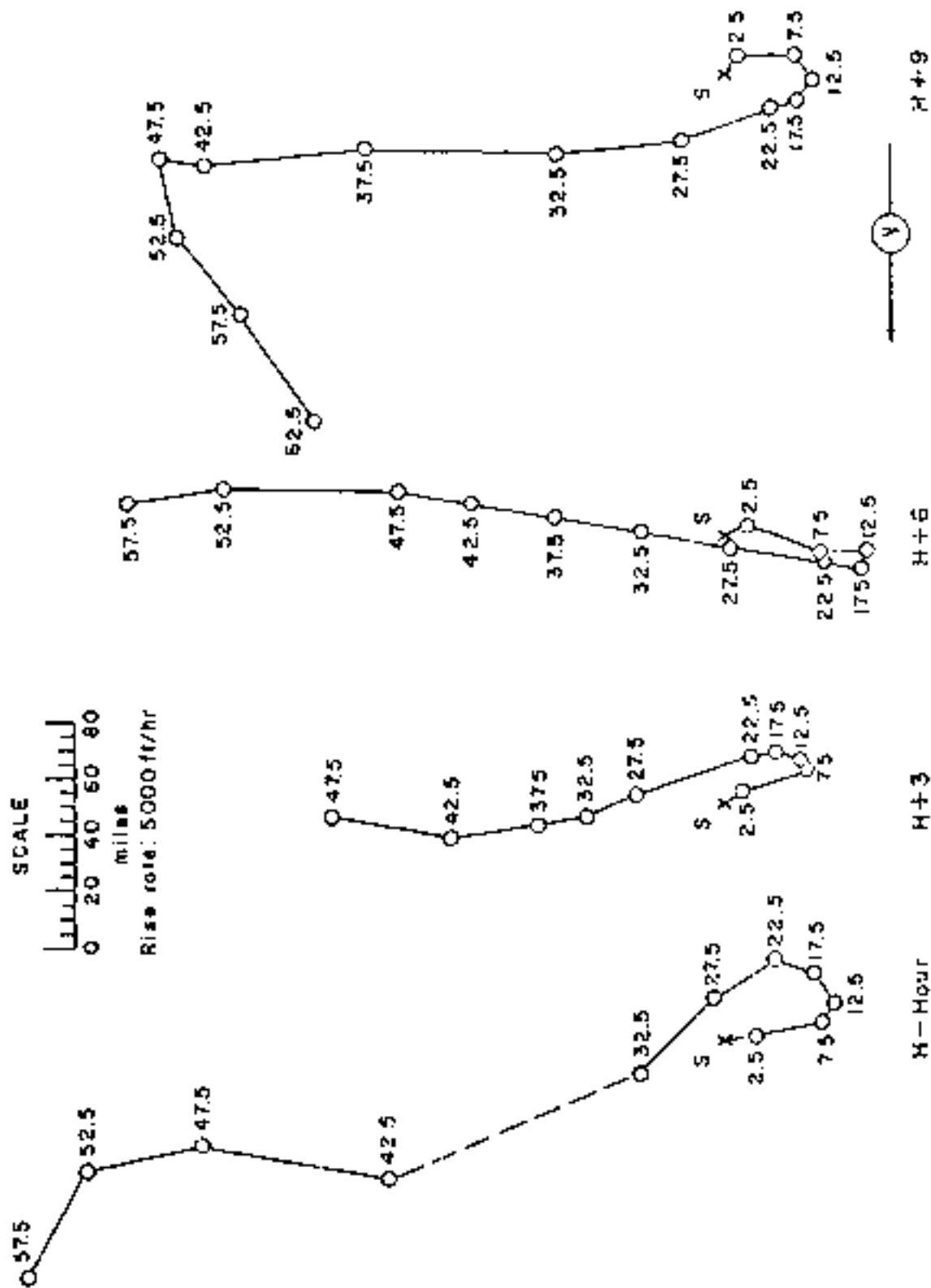


Figure 56. Redesign for Operation of 1977.

OPERATION GROUP - Rocky

DATE: $\frac{175 \text{ lbs.}}{23 \text{ May } 1974}$ $\frac{641}{13 \text{ Nov } 1974}$
TIME: 0800 1800

TOTAL YIELD: 1.69 Mt

Quantity: 1400

SIZE: 110 - 800 μ -
100 Mesh Pan
1.2 μ - 10 μ - 2
10 μ - 100 μ - 5
Size element out - 100 μ level

WIND DIRECTION: 114

STATE OF HEAVEN: 0, 0, 0, 0, 0, 0
STATE OF WIND: 0, 0, 0, 0, 0, 0

TYPE OF WIND AND FANNOIL:

Surface wind from 114, 0, 8 knots

REMARKS:

The mass fall-out pattern was drawn from data obtained on a log-spiralization disk and by converting the readings obtained from fall-out samples to equivalent air mass loading. Since the fall-out went in a westerly direction from ground zero very few of the collecting stations received significant fall-out. The fall-out collected was primarily against fallout. Aerial survey was used for reconnaissance parts of the study, and two tape airplanes were used to locate the fallout area. At a portion of the water samples, analyzed with an estimate of the depth of mixing, served to determine the integrated exposure rate at a number of points. The aerial survey proved to fail in the southeast.

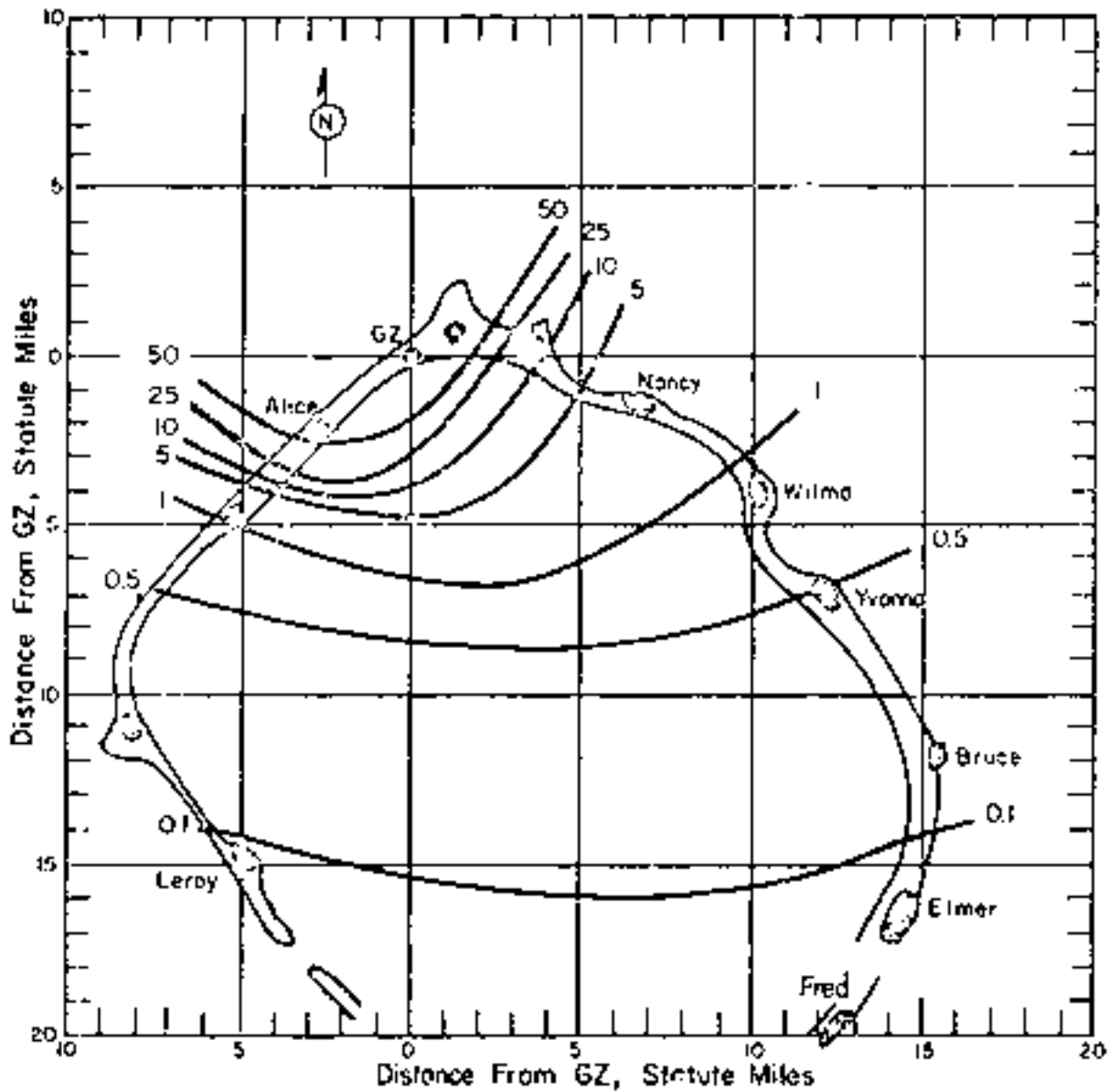


Figure 57. Operation CASTLE - Nectar.
 On-site dove rate contours in r/hr at H+1 hour.

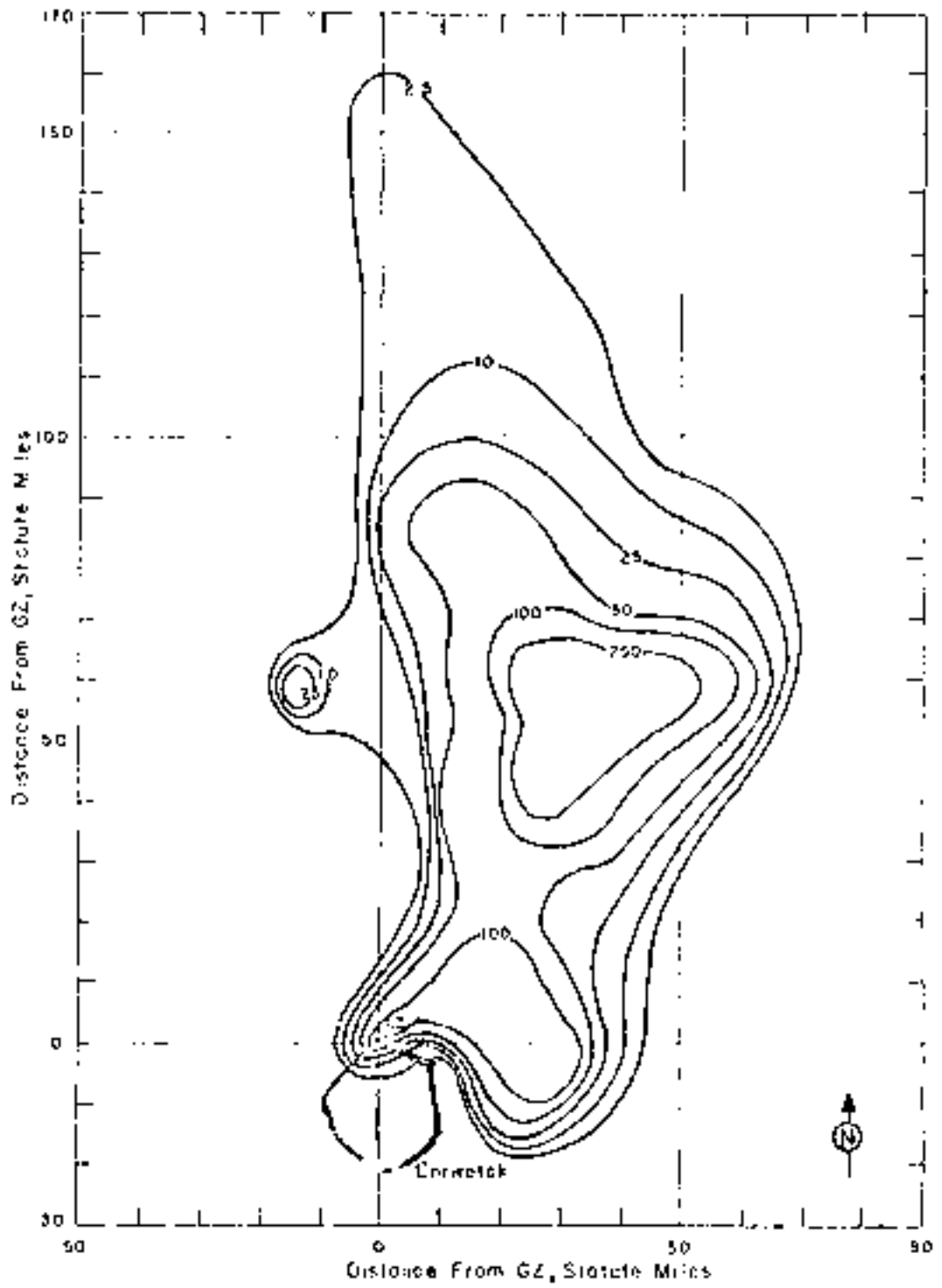


Figure 58. Operation CASTLE - Nectar.
Off-site dose rate contours in $\mu\text{R/hr}$ at 3+1 hour.

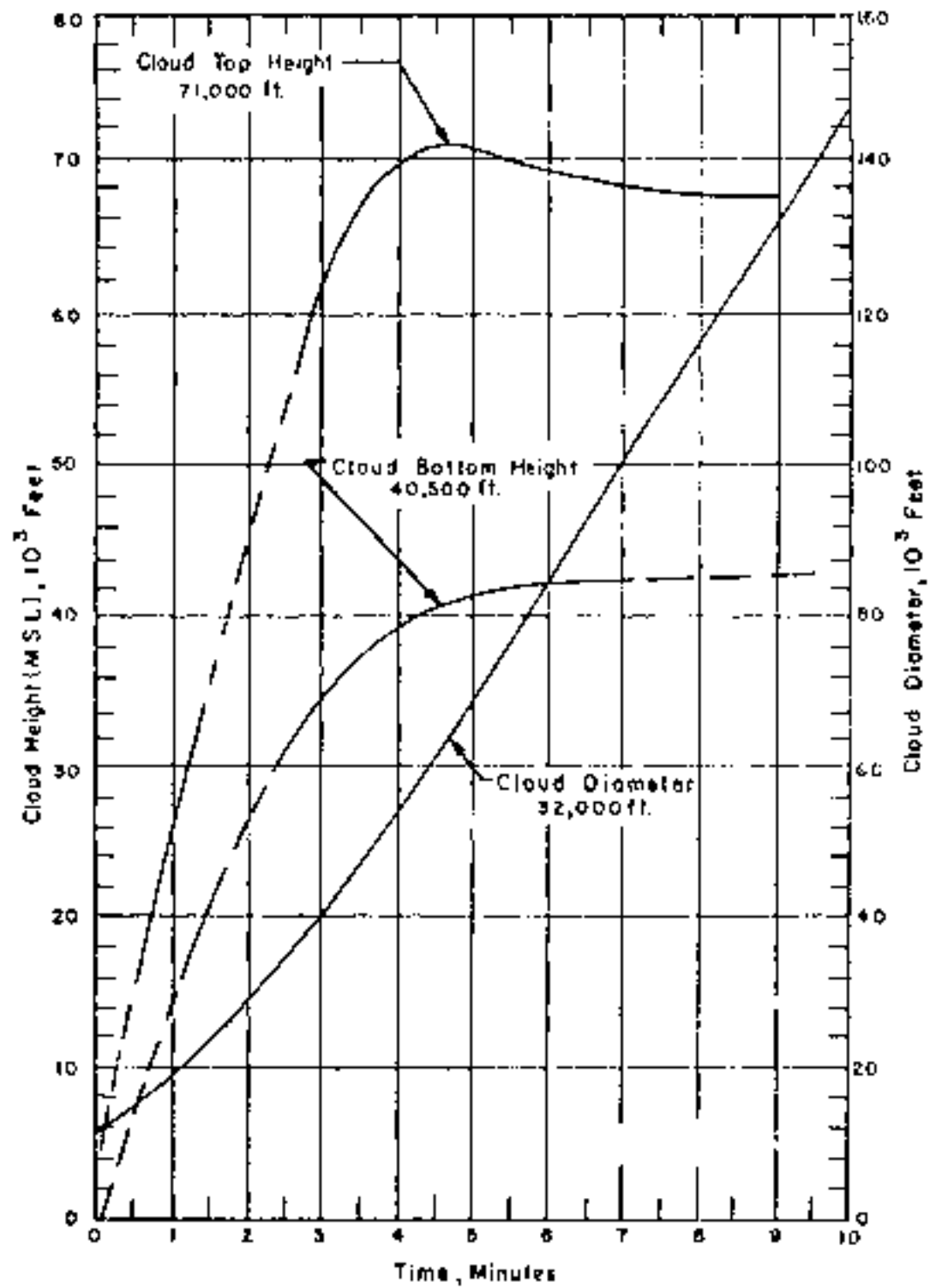


Figure 59 . Cloud Dimensions: Operation 000000 - 000000

TABLE 17. ESTIMATION WIND DATA FOR USE OF PROLOG CABLE -

NOVEMBER

Altitude (ft.)	23 May		24 May		25 May	
	Dir.	Speed	Dir.	Speed	Dir.	Speed
feet	degrees	mph	degrees	mph	degrees	mph
Surface	090	22	070	23	090	23
1,000	090	24	---	---	---	---
2,000	100	20	110	24	100	20
3,000	110	22	---	---	---	---
4,000	110	22	110	23	100	20
5,000	(110)	(18)	(100)	(16)	(100)	(17)
6,000	110	16	100	15	100	17
7,000	100	14	---	---	---	---
8,000	110	17	120	15	100	16
9,000	110	15	---	---	---	---
10,000	110	16	130	16	100	16
12,000	120	20	140	17	100	20
14,000	110	21	120	16	100	17
15,000	(100)	(17)	(110)	(16)	(100)	(18)
16,000	100	14	100	16	100	17
18,000	200	14	500	08	100	17
20,000	150	09	100	11	100	17
25,000	100	07	210	06	010	010
30,000	200	09	200	10	010	010
35,000	210	10	210	09	100	10
40,000	210	09	210	09	100	10
45,000	210	37	250	24	010	010
50,000	200	40	280	27	010	010
55,000	190	44	320	30	200	14
60,000	---	---	---	---	200	18

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was obtained by the weather station on Eniwetok Island.
3. Tropopause height was 50,000 ft MSL.
4. At E-hour the sea level pressure was 30.010 mb, the temperature 80°F, the dew point 75°F and the relative humidity 85%.

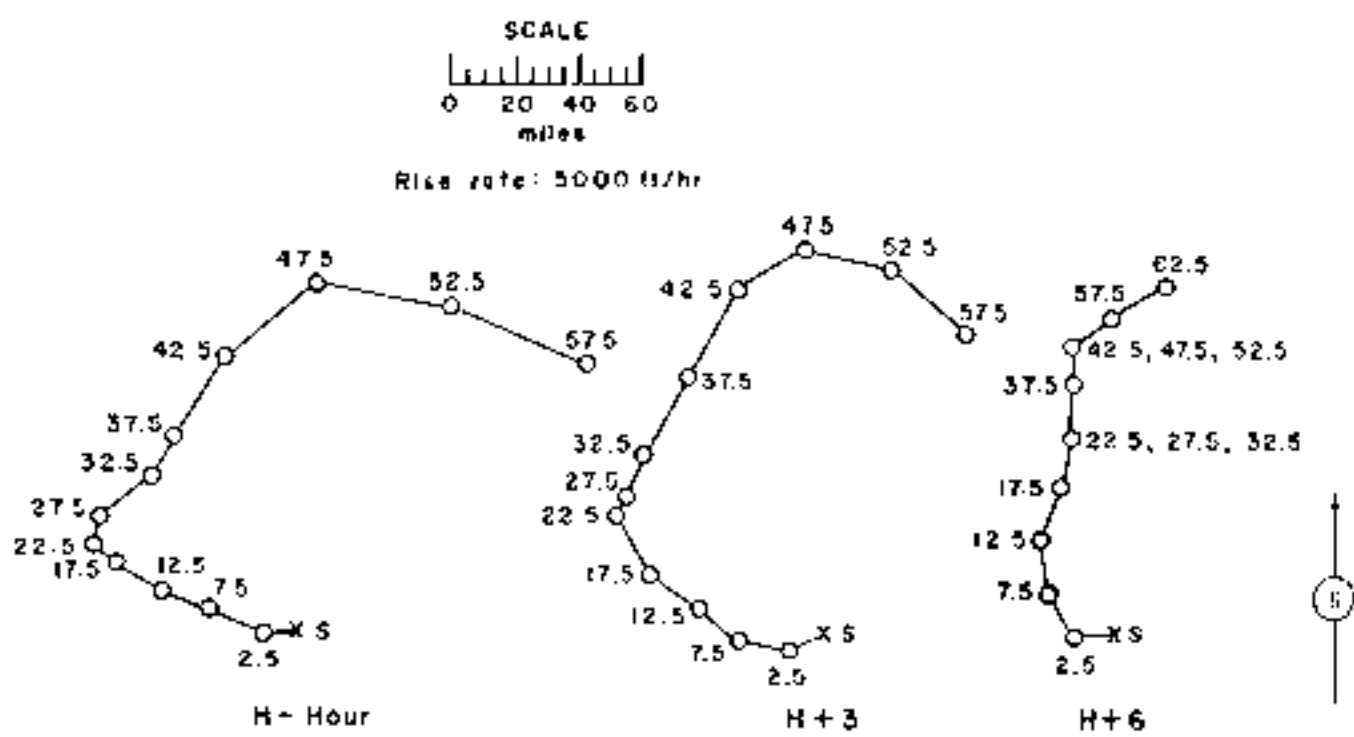


Figure 60. Bathymetry for Operation CASPER - Western.

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$$\frac{D_{10} - D_{100}}{D_{100} - D_{10}} = \frac{D_{10} - D_{100}}{D_{100} - D_{10}}$$

WIND VELOCITY 50 kt

TEMPERATURE

Top to 100 ft 100

Top to 200 ft 100

Bottom at 200 ft 100

Specimen 1000

REMARKS Periodic cloudiness and development of cumulus clouds
200-100-5
100-100-5
Site clear from 100-100

HEIGHT OF CLOUDS 200-100-5
200-100-5

STATUS OF SURFACE WIND 100-100-5
For surface wind - 100-100-5
suspended by clouds from 100-100

QUALITY 100-100-5
HEIGHT 100-100-5

REMARKS

"The observations given (for 100-100-5) were reported on the basis of surface wind and surface water samples and were reported on the basis of the following: They do not present sufficient activity data to be of any value. The activity was not seen throughout a surface area which is not necessarily completely covered by the cloud two days. This is particularly true in the case of a dense, heavy, low cloud during the surface water area from spilling of contaminated water from below. The downwind activity and activity varied with the low clouds and yielded very little if any positive fallout." At 1000 minutes the contaminated water area was about 100-100-5. The area was contaminated in an irregular manner, the peak being 100-100-5. The activity was 100-100-5. The activity intensity of 2% to 10% per day, 10% above the surface. The area diameter is 100-100-5. The activity intensity was 100-100-5. At 1000 hr it had decreased to 100-100-5. Measurements of water samples indicated a radioactive decay constant.

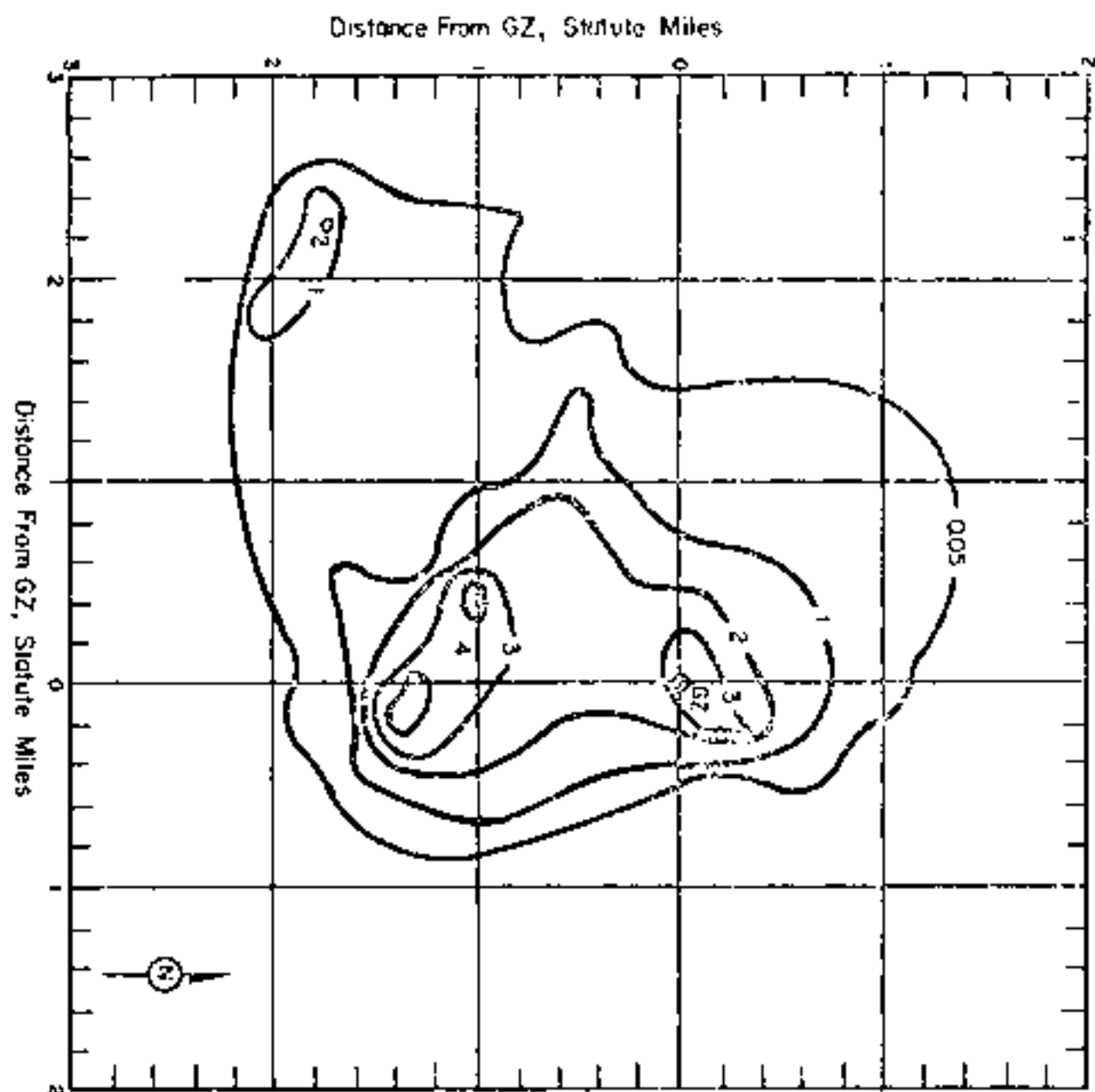


Figure 61. Operation WIGWAM. Off-site dose rate contours in r/hr at 111.4 hours.

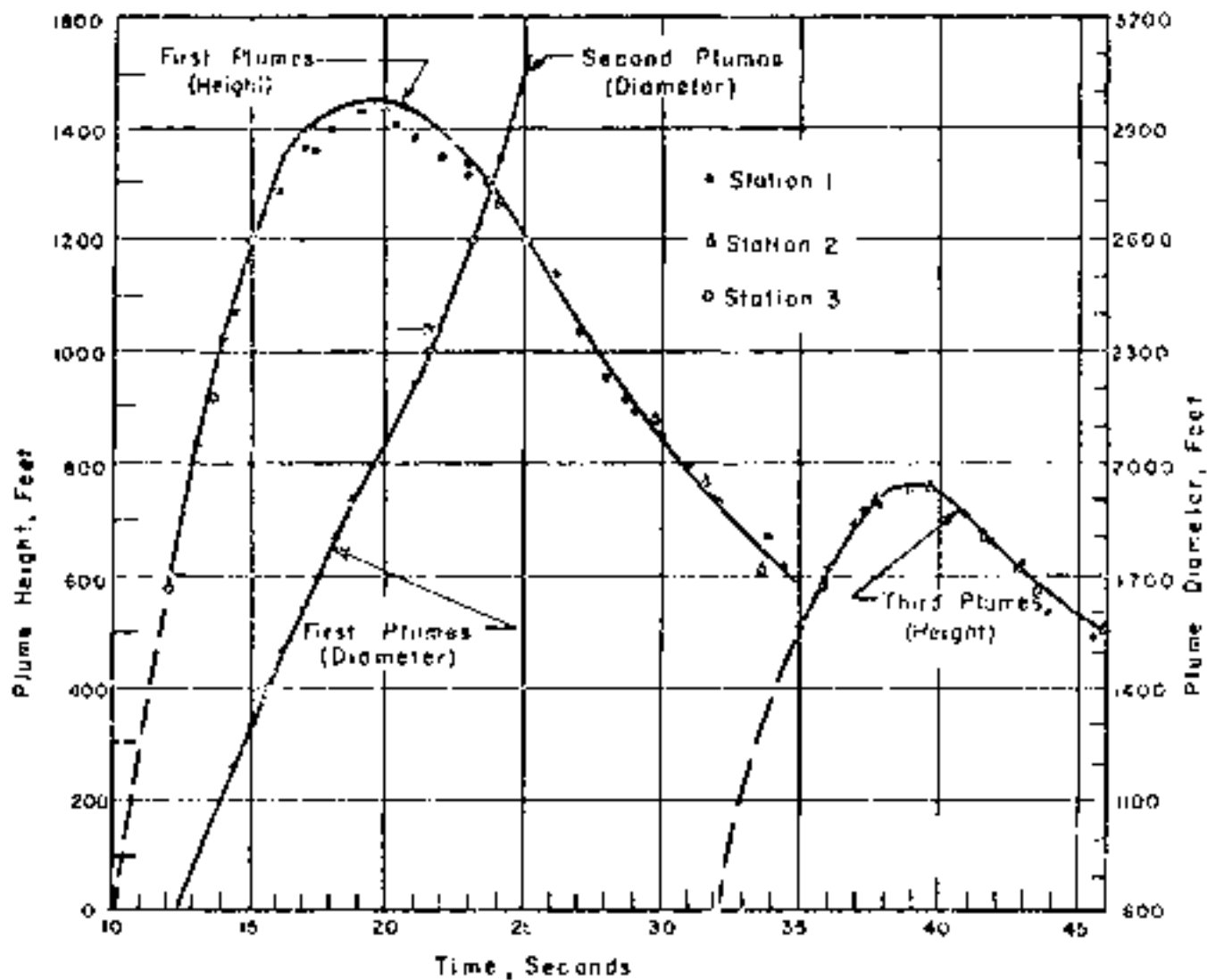


Figure 62. Plume Height Dimensions: Operation 11GWM.



Figure 63. Operation BIRDING, Shot Locations, Ekinote Atoll.

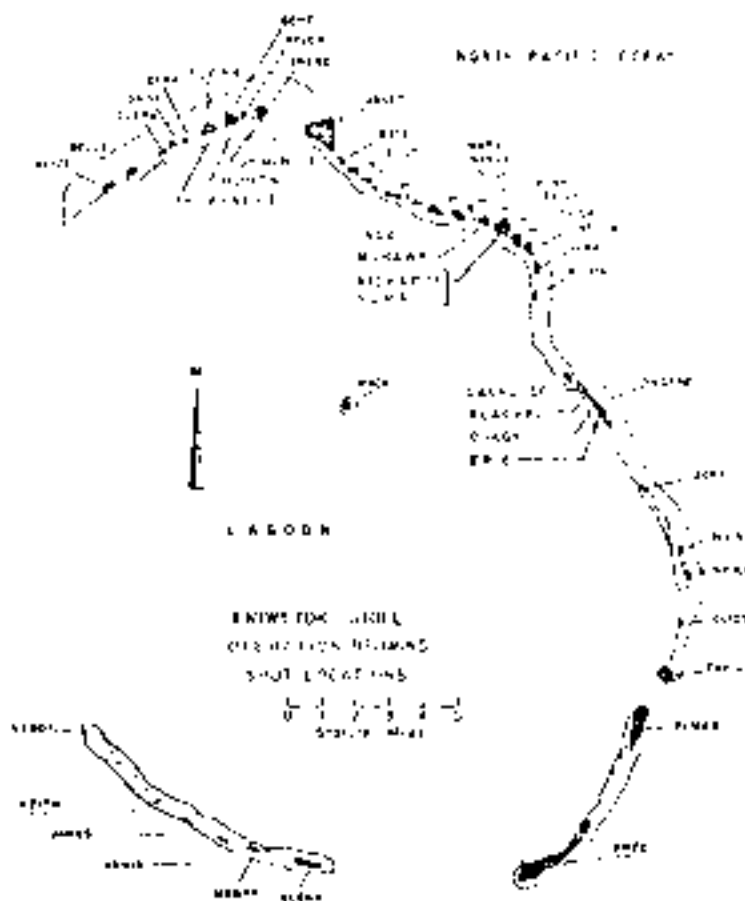


Figure 64. Operation BIRDING, Shot Locations, Ekinote Atoll.

OPERATION NUMBER: 4

Reference

DATE: 194 Time GMT
9 May 1966 4 May 1966
TIME: 0800 1400

Operator: LAG

SITE: FPN - Rajahmundry - Yerraco
13° 35' 28" N
150° 21' 16" E

Water level (m): 1.86 (Low)

WIND VELOCITY: 40 kt

HEIGHT OF SURVEY: 10 ft

REMARKS:

Time to 100 m depth: 15 to 30 sec
Time to 200 m depth: 100 to 200 sec
Reading at 200 m depth: 6720 r/hr

TYPE OF SURVEY AND MEASUREMENTS:
Surface count by 100 ft beam as
shown and

WINDSPEED:

Direction: 024 ft
Height: 04 ft
Speed: 19 ft

COUNT RATE AT 200m

30,000 r/hr (100 ft)

57,000 r/hr (100 ft)

COUNT RATE AT 100m

20,000 r/hr (100 ft)

35,000 r/hr (100 ft)

REMARKS:

The dose-rates shown for the intervals of the trial were based upon ground and aerial surveys made by the Radiological Safety Organization and by Project 0.62. The dose-rate readings in the immediate environment of the crater were calculated from survey readings at low tide on 042 day and 047 days, after the reef around the crater had been flushed by at least two high tides. The measured field gamma decay constant

was used to extrapolate the readings to 101 hours. The one reading which gave an 101 hour dose rate of 57,000 r/hr was uniquely high and may have been due to one of the extremely radioactive, partially fused, pieces of metal scattered about near the crater.

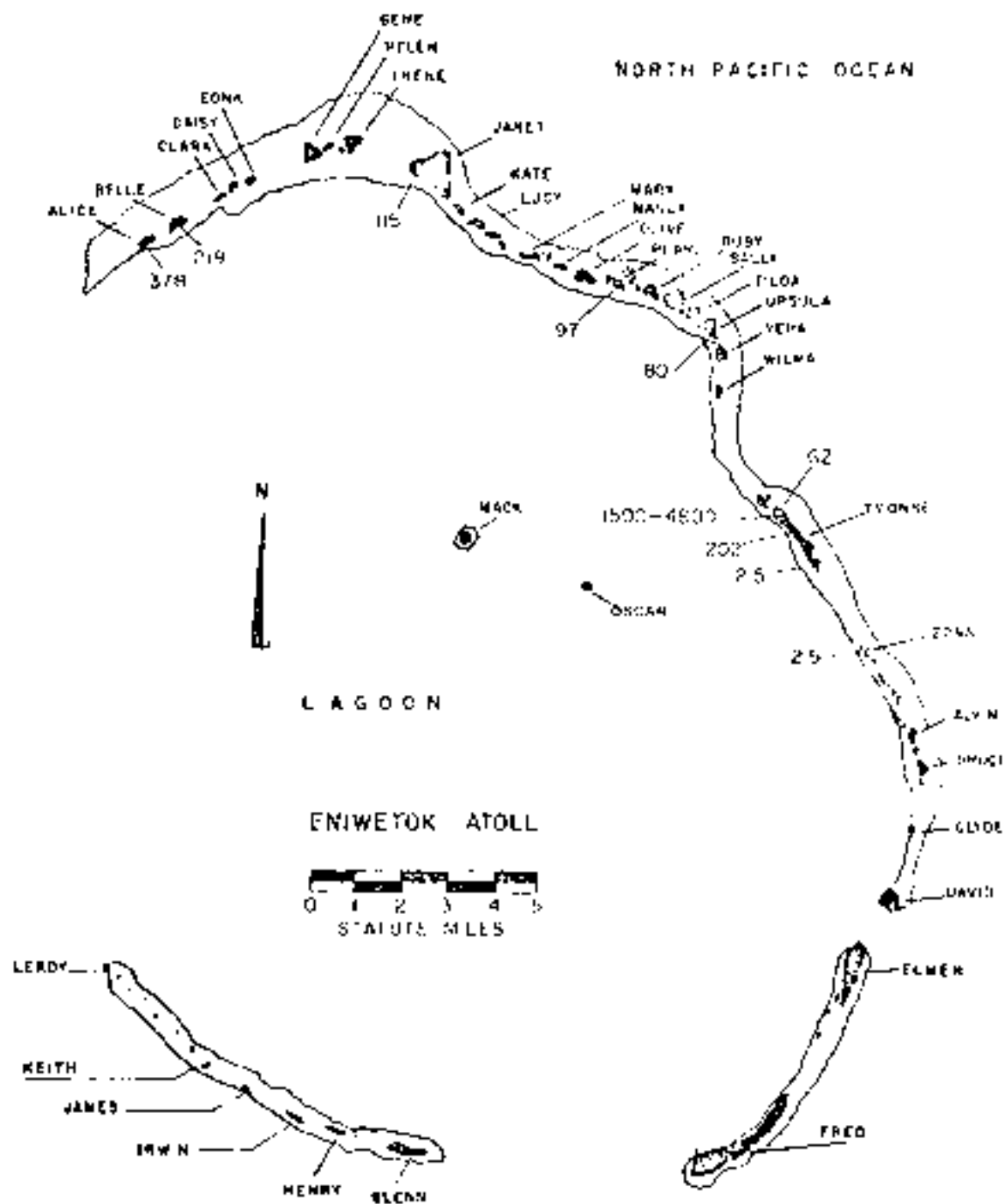


Figure 65. Operation BELLEFLO - [unclear]
Island dose rates in r/hr at 0+1 hour.

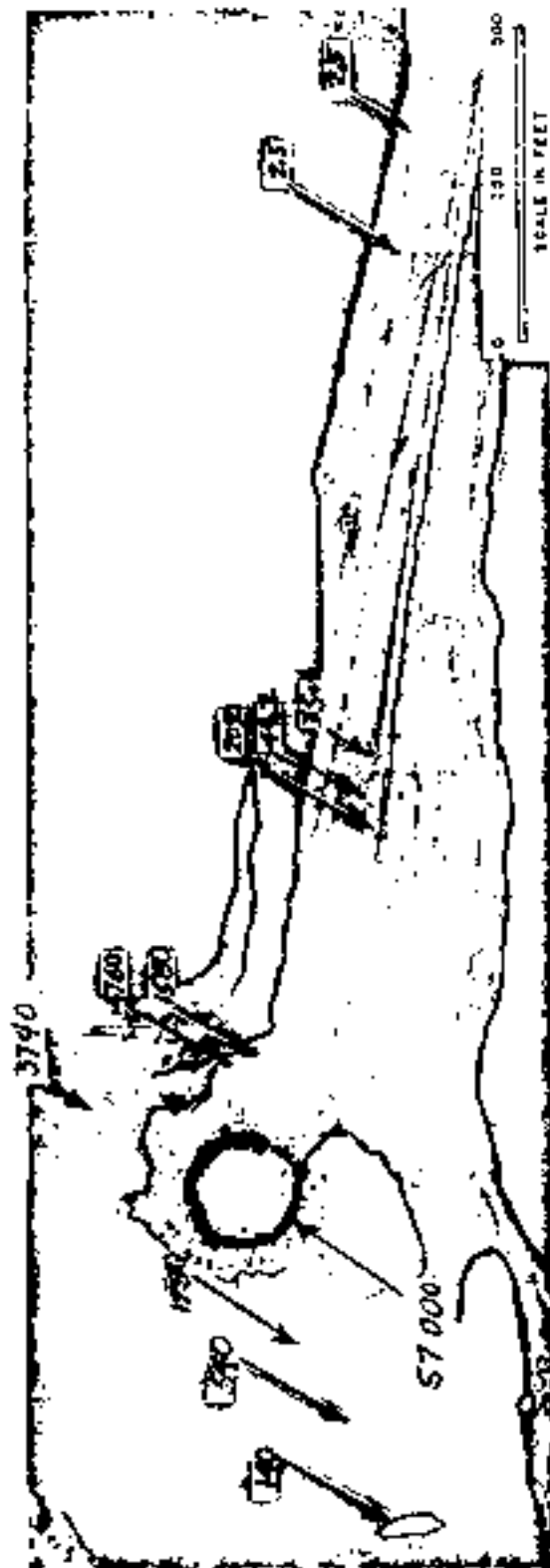


Figure 66. Dose rate readings near the Lacrosse crater in r/hr at H+1 hour.

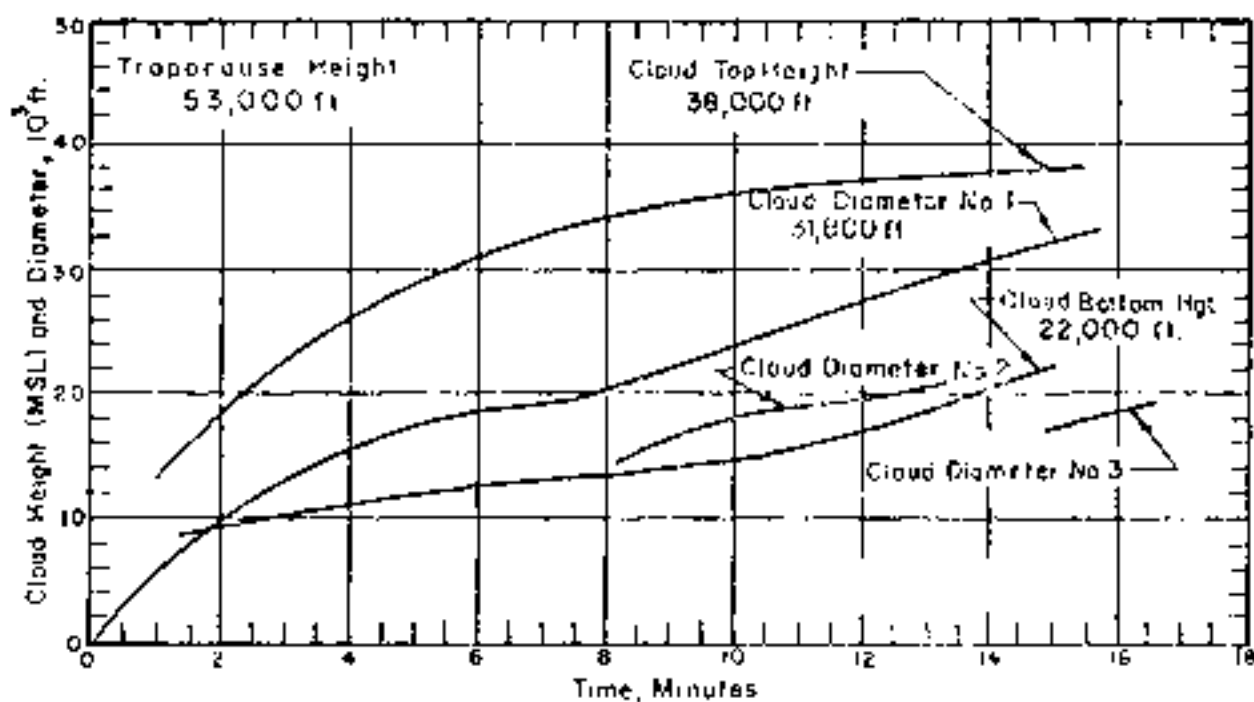


Figure 67. Cloud Dimensions: Operation BHM511 - Increase.
 Diameter-curve 1 represents the diameter of the main cloud; curve 2 refers to a portion of the cloud which resulted from a shear at 0 minutes; curve 3 represents the average diameter of two clouds which resulted from a shear of the second cloud at 14 minutes.

TABLE 18. INFLUENCE WIND VELOCITY ON REACTIVE LOADS.—

LARGE 171

Altitude (ft)	8-hour		4-hour		1-hour		100% Velocity	
	WV	WV ²	WV	WV ²	WV	WV ²	WV	WV ²
Surface	0.0	17	0.0	17	0.0	17	0.0	17
1,000	20	23	0.0	23	0.0	18	0.0	28
2,000	210	23	120	24	0.0	24	0.0	29
3,000	110	26	110	25	110	29	110	37
4,000	110	29	110	25	110	31	100	31
5,000	110	33	110	29	110	29	100	32
6,000	100	34	120	28	110	33	110	30
7,000	100	32	110	28	120	33	110	26
8,000	0.0	26	110	31	120	31	110	23
9,000	0.0	23	100	33	110	31	120	22
10,000	100	23	100	33	110	26	120	19
12,000	100	13	100	22	100	17	120	20
14,000	110	05	090	07	0.0	02	120	00
15,000	(150)	(05)	(020)	(07)	(NA)	(02)	(60)	(15)
16,000	250	05	320	07	350	03	30	07
18,000	230	05	260	07	210	03	200	05
20,000	240	15	250	17	250	17	250	09
25,000	200	25	260	31	250	30	260	32
30,000	240	43	250	47	250	51	250	47
35,000	260	60	260	55	260	54	260	59
40,000	260	69	250	73	260	63	260	71
45,000	260	58	250	74	260	71	260	75
50,000	260	70	250	71	250	69	260	64
55,000	280	33	250	44	270	32	250	35
60,000	130	09	150	03	180	06	150	13
65,000	130	15	210	05	170	07	150	07
70,000	080	12	090	05	090	13	080	12
75,000	110	32	090	25	110	38	070	37
80,000	090	48	110	47	110	51	150	49
85,000	100	64	090	04	090	62	080	56
90,000	100	72	110	69	100	71	100	61
94,000	100	65	---	---	---	---	---	---
97,000	---	---	100	64	100	57	100	62
98,000	---	---	---	---	---	---	100	63
100,000	---	---	100	65	100	63	---	---
102,000	---	---	---	---	100	63	---	---
105,000	---	---	100	67	---	---	---	---
106,000	---	---	100	67	---	---	---	---

NOTES:

1. Numbers in parentheses are estimated values.
2. Tropicase height was 52,300 ft MSL. (Reference 160).
3. Wind data was obtained by the weather station on Briveter Island.
4. At the surface the air pressure was 14.66 psi, the temperature 27.2°C, the dew point 25.0°C, and the relative humidity 85%.

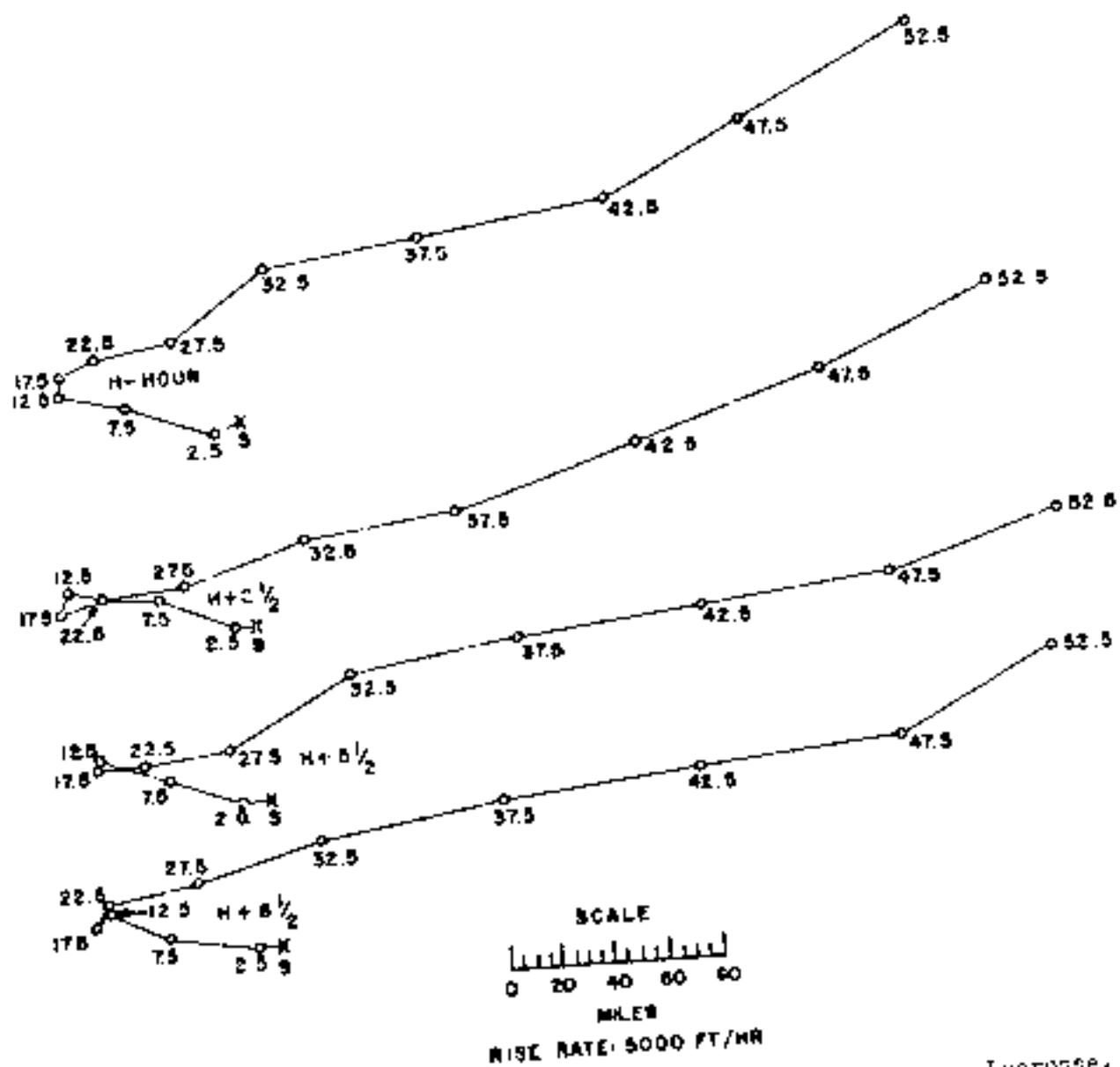


Figure 68. Hodographs for Operation MICHING -

Increases.

ORIENTALIS INSTITUTUM -

Or. number

DATE: 11/11/1955 1955
TIME: 09.00 1955

Specimens: 1675

TYPE: 11/11/1955 1955
TIME: 09.00 1955
TYPE: 09.00 1955
TYPE: 09.00 1955
TYPE: 09.00 1955

TYPE: 09.00 1955

TYPE: 09.00 1955
TYPE: 09.00 1955

TYPE: 09.00 1955
TYPE: 09.00 1955

REMARKS:

No birds were observed on the island. Very few birds were observed north of the island. Some birds were seen on the island. No birds were observed on the island.

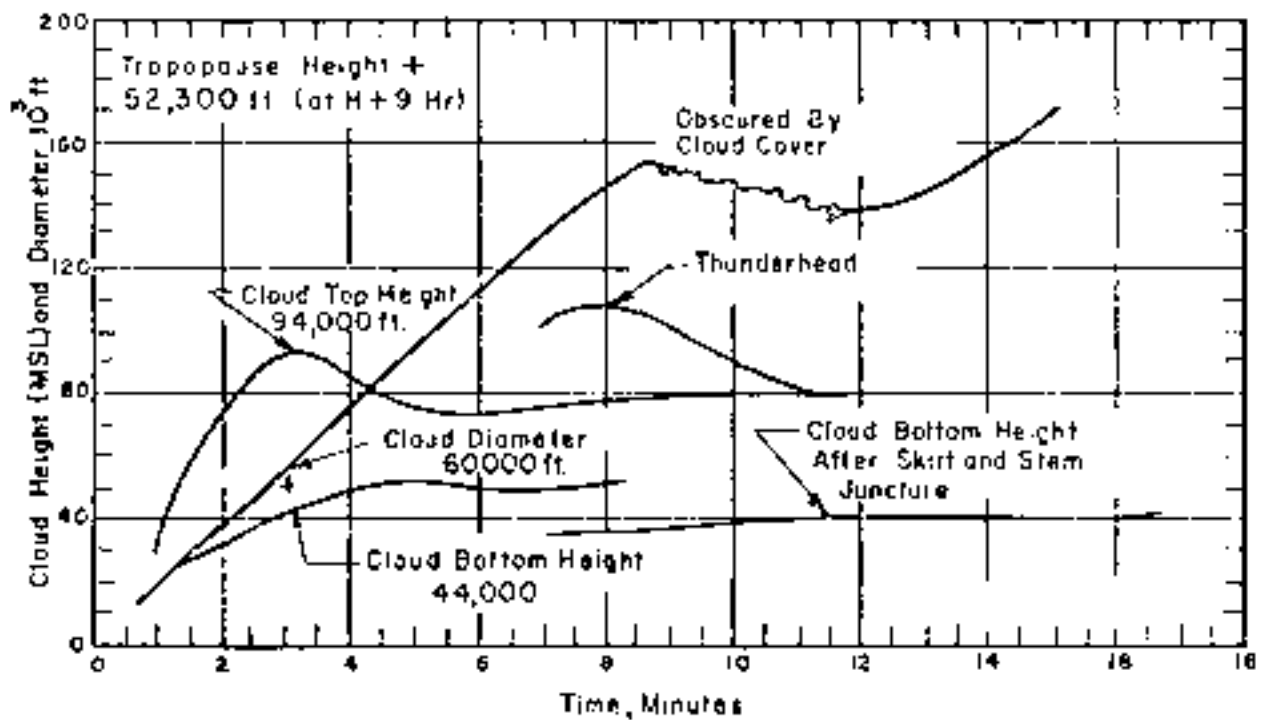


Figure 69. Cloud Dimensions: Operation HEISTHO - Cherokee.

TABLE 19. WIKING WIND DATA FOR OPERATIONAL HEIGHTS -

CIRQUE

Altitude (MSL) feet	H-hour		113 hours		114 hours	
	Dir degrees	Speed mph	Dir degrees	Speed mph	Dir degrees	Speed mph
Surface	090	06	120	16	120	17
1,000	100	20	090	16	090	22
2,000	090	23	100	15	100	25
3,000	090	23	110	23	100	26
4,000	090	24	110	24	100	26
5,000	090	21	110	22	100	22
6,000	090	16	110	17	090	21
7,000	090	16	110	17	090	23
8,000	090	15	100	18	090	22
9,000	100	13	100	15	090	17
10,000	120	13	090	18	120	13
12,000	120	14	110	17	120	16
14,000	140	16	130	16	110	15
15,000	(140)	(16)	(140)	(17)	(130)	(15)
16,000	140	17	150	17	150	15
18,000	130	17	160	16	170	23
20,000	140	21	170	15	150	15
25,000	150	10	090	20	160	20
30,000	140	07	150	14	150	10
35,000	260	07	220	12	220	09
40,000	250	17	250	23	230	25
45,000	240	18	250	37	270	38
50,000	250	37	250	39	240	25
55,000	210	01	180	07	230	14
60,000	160	20	100	12	150	09
65,000	030	23	090	30	090	23
70,000	100	25	090	40	090	31
75,000	090	55	090	45	080	53
78,000	---	--	---	--	080	60
80,000	090	58	090	53	---	--
85,000	080	63	090	39	---	--
87,000	---	--	090	39	---	--
90,000	080	70	---	--	---	--
95,000	090	85	---	--	---	--
100,000	090	93	---	--	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 52,500 ft MSL.
3. Wind data was obtained on board the U. S. S. Curtiss.
4. At H-hour the sea level pressure was 1009.0 mb, the temperature 81°F, the dew point 73°F, and the relative humidity 76%.

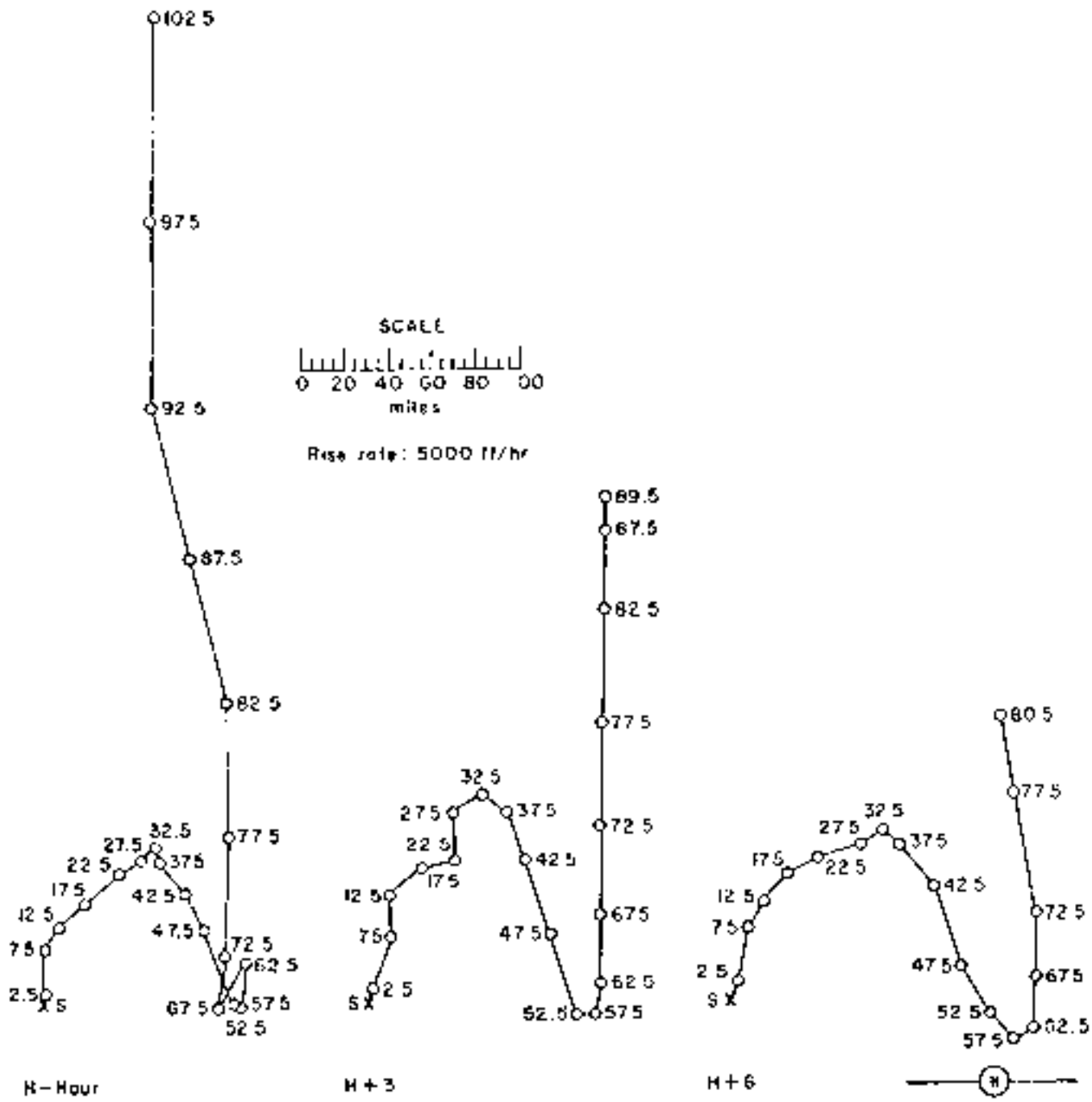


Figure 70 . Hodographs for Operation REDWING - Cherokee.

0115 101 111.513 - 2 mi

DATE 1968-11-17 TIME 17:45
TDLR 0.15 1750

TO AL Y. 15.0 5.5 mi

PARAMETERS:

Particle size analysis 100 & 150 microns
Thermal conductivity 1000 & 150 microns
Porosity 0.15 & 150 microns

GRAIN DATA: Diameter 1,200 ft
Depth 103 ft
Type 10 apparent slip

SPREAD 100 ft

DEPTH 110 - 150 ft
100 ft
150 ft
Site elevation 100 ft

ENCLOSURE 100 ft

GRAIN DATA 100 ft
Diameter 1,200 ft
Depth 103 ft

GRAIN DATA 100 ft
Diameter 1,200 ft
Depth 103 ft

RESULTS:

The results of the pattern was drawn from a series of 100 ft of scientific project data implemented by the and sample collection methods and large in the ocean. The measured data from the pattern was used to extrapolate the discrete pattern to the ocean. It was observed that the water migrated to the bottom of the pattern in bulk of the water was generally much more than the rest of the the island.

The off-site fallout pattern was drawn from a series of 100 ft of scientific project data implemented by the and sample collection methods and large in the ocean. The measured data from the pattern was used to extrapolate the discrete pattern to the ocean. It was observed that the water migrated to the bottom of the pattern in bulk of the water was generally much more than the rest of the the island.

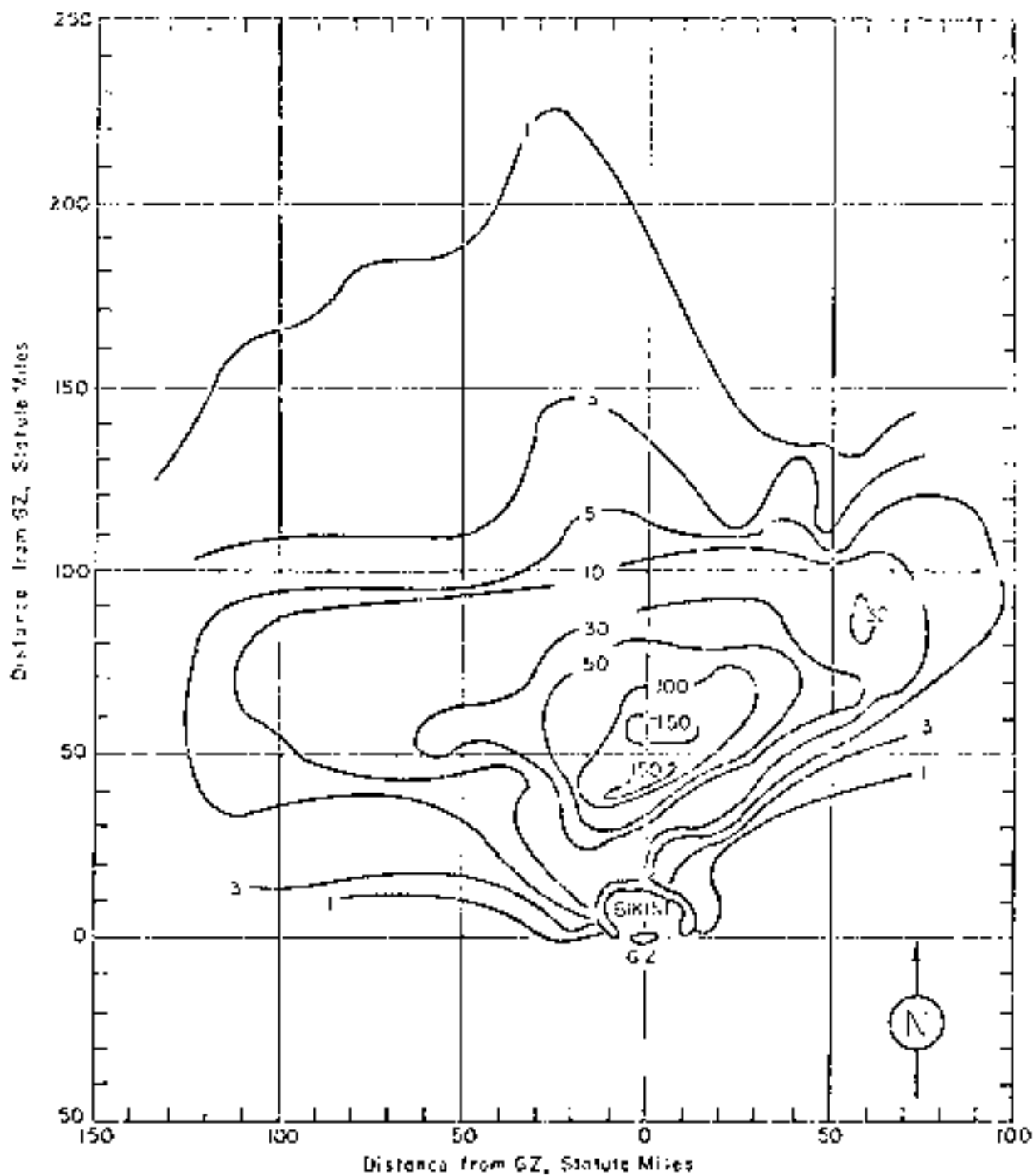


Figure 72. Operation REDWING - Final, Off-site dose rate contours in r/hr at 1141 hour.

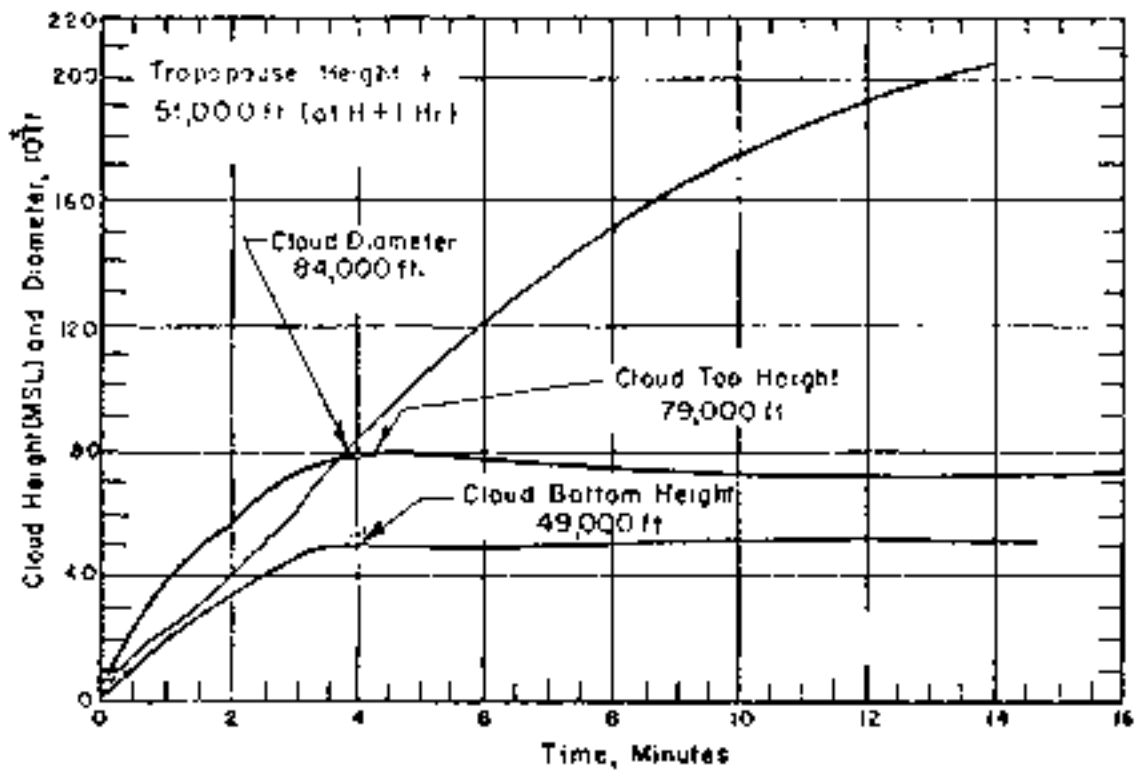


Figure 73. Cloud Dimensions: Operation BALSAM -

Zuni.

Year (UTC)	1981		1982		1983		1984	
	Speed (m/s)	Dir. (deg)	Speed (m/s)	Dir. (deg)	Speed (m/s)	Dir. (deg)	Speed (m/s)	Dir. (deg)
01,000	07	27	050	22	17	34	07	14
02,000	07	27	080	26	17	25	070	17
03,000	07	25	070	25	18	20	070	14
04,000	07	24	070	25	18	20	070	14
05,000	07	24	090	28	17	21	07	14
06,000	07	24	090	28	16	21	07	14
07,000	07	24	090	28	16	21	07	14
08,000	07	24	090	28	16	21	07	14
09,000	07	24	090	28	16	21	07	14
10,000	07	24	090	28	16	21	07	14
11,000	07	24	090	28	16	21	07	14
12,000	07	24	090	28	16	21	07	14
13,000	07	24	090	28	16	21	07	14
14,000	07	24	090	28	16	21	07	14
15,000	07	24	090	28	16	21	07	14
16,000	07	24	090	28	16	21	07	14
17,000	07	24	090	28	16	21	07	14
18,000	07	24	090	28	16	21	07	14
19,000	07	24	090	28	16	21	07	14
20,000	07	24	090	28	16	21	07	14
21,000	07	24	090	28	16	21	07	14
22,000	07	24	090	28	16	21	07	14
23,000	07	24	090	28	16	21	07	14
24,000	07	24	090	28	16	21	07	14
25,000	07	24	090	28	16	21	07	14
26,000	07	24	090	28	16	21	07	14
27,000	07	24	090	28	16	21	07	14
28,000	07	24	090	28	16	21	07	14
29,000	07	24	090	28	16	21	07	14
30,000	07	24	090	28	16	21	07	14
31,000	07	24	090	28	16	21	07	14
32,000	07	24	090	28	16	21	07	14
33,000	07	24	090	28	16	21	07	14
34,000	07	24	090	28	16	21	07	14
35,000	07	24	090	28	16	21	07	14
36,000	07	24	090	28	16	21	07	14
37,000	07	24	090	28	16	21	07	14
38,000	07	24	090	28	16	21	07	14
39,000	07	24	090	28	16	21	07	14
40,000	07	24	090	28	16	21	07	14
41,000	07	24	090	28	16	21	07	14
42,000	07	24	090	28	16	21	07	14
43,000	07	24	090	28	16	21	07	14
44,000	07	24	090	28	16	21	07	14
45,000	07	24	090	28	16	21	07	14
46,000	07	24	090	28	16	21	07	14
47,000	07	24	090	28	16	21	07	14
48,000	07	24	090	28	16	21	07	14
49,000	07	24	090	28	16	21	07	14
50,000	07	24	090	28	16	21	07	14
51,000	07	24	090	28	16	21	07	14
52,000	07	24	090	28	16	21	07	14
53,000	07	24	090	28	16	21	07	14
54,000	07	24	090	28	16	21	07	14
55,000	07	24	090	28	16	21	07	14
56,000	07	24	090	28	16	21	07	14
57,000	07	24	090	28	16	21	07	14
58,000	07	24	090	28	16	21	07	14
59,000	07	24	090	28	16	21	07	14
60,000	07	24	090	28	16	21	07	14
61,000	07	24	090	28	16	21	07	14
62,000	07	24	090	28	16	21	07	14
63,000	07	24	090	28	16	21	07	14
64,000	07	24	090	28	16	21	07	14
65,000	07	24	090	28	16	21	07	14
66,000	07	24	090	28	16	21	07	14
67,000	07	24	090	28	16	21	07	14
68,000	07	24	090	28	16	21	07	14
69,000	07	24	090	28	16	21	07	14
70,000	07	24	090	28	16	21	07	14
71,000	07	24	090	28	16	21	07	14
72,000	07	24	090	28	16	21	07	14
73,000	07	24	090	28	16	21	07	14
74,000	07	24	090	28	16	21	07	14
75,000	07	24	090	28	16	21	07	14
76,000	07	24	090	28	16	21	07	14
77,000	07	24	090	28	16	21	07	14
78,000	07	24	090	28	16	21	07	14
79,000	07	24	090	28	16	21	07	14
80,000	07	24	090	28	16	21	07	14
81,000	07	24	090	28	16	21	07	14
82,000	07	24	090	28	16	21	07	14
83,000	07	24	090	28	16	21	07	14
84,000	07	24	090	28	16	21	07	14
85,000	07	24	090	28	16	21	07	14
86,000	07	24	090	28	16	21	07	14
87,000	07	24	090	28	16	21	07	14
88,000	07	24	090	28	16	21	07	14
89,000	07	24	090	28	16	21	07	14
90,000	07	24	090	28	16	21	07	14
91,000	07	24	090	28	16	21	07	14
92,000	07	24	090	28	16	21	07	14
93,000	07	24	090	28	16	21	07	14
94,000	07	24	090	28	16	21	07	14
95,000	07	24	090	28	16	21	07	14
96,000	07	24	090	28	16	21	07	14
97,000	07	24	090	28	16	21	07	14
98,000	07	24	090	28	16	21	07	14
99,000	07	24	090	28	16	21	07	14
100,000	07	24	090	28	16	21	07	14

NOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 51,000 ft MSL.
3. Wind data was obtained on board the U. S. S. Cassin.
4. Hourly data for altitudes over 51,000 ft was determined by interpolation. Data measurements taken between 0300 and 0330 h were.
5. At 0300 the sea level pressure was 1010.5 mb, the temperature 81°F, the dew point 70°F, and the relative humidity 75%.

Annual (%)	Wind				Energy	
	300 hr.		300 hr.		300 hr.	
	Day	Night	Day	Night	Day	Night
1,000	17	25	0.5	22	0.70	15
2,000	17	25	0.5	22	0.70	15
3,000	18	24	0.6	23	0.70	19
4,000	18	24	0.7	20	0.70	21
5,000	18	24	0.7	18	0.70	20
6,000	18	24	0.8	18	0.70	18
7,000	18	24	0.8	18	0.70	17
8,000	18	24	0.8	21	0.70	17
9,000	18	24	0.8	21	0.70	16
10,000	18	24	0.8	21	0.70	17
11,000	18	24	0.8	22	0.70	16
12,000	18	24	0.8	21	0.70	16
13,000	(18)	(24)	(0.8)	(18)	(0.70)	(16)
14,000	18	24	0.8	17	0.70	16
15,000	18	24	0.8	24	0.70	16
20,000	18	24	0.8	23	0.70	19
25,000	18	24	0.8	20	0.70	25
30,000	18	24	0.8	18	0.70	16
35,000	18	24	0.8	13	0.70	15
40,000	18	24	0.8	26	0.70	25
45,000	18	24	0.8	30	0.70	20
50,000	18	24	0.8	32	0.70	25
55,000	---	---	0.8	31	---	---
60,000	20	26	---	---	0.70	27
65,000	18	23	---	---	0.70	14
70,000	18	26	---	---	0.70	24
75,000	18	31	---	---	0.70	23
80,000	18	37	---	---	0.70	40
85,000	18	35	---	---	0.70	47
90,000	18	34	---	---	0.70	52
95,000	18	35	---	---	0.70	26
98,000	100	65	---	---	0.80	69
99,000	100	65	---	---	---	---
99,000	---	---	---	---	0.80	81

NOTES:

1. Values in parenthesis are estimated values.
2. Wind data for 300 hours and 300 hours were obtained for hours the U. S. S. Gullies. Wind data for 3001 hours was obtained by weather station in the water column (Kawarik Atoll).

TABLE 20. WINDSPEED AND WAVE FOR CHESAPEAKE BAY, 1961

TABLE (Cont'd)

Wind speed (mph)	Wind velocity		Wave height		Wave period	
	ft/s	mph	ft	sec	sec	sec
Surface	0.0	15	0.97	16	0.60	11
1,000	16	21	0.97	16	0.67	13
2,000	32	27	0.97	17	0.74	15
3,000	48	31	0.97	16	0.77	16
4,000	64	33	0.95	13	0.79	17
5,000	80	35	1.00	29	1.00	17
6,000	96	34	0.90	26	0.99	17
7,000	112	33	0.80	26	0.90	17
8,000	128	33	0.70	26	0.70	17
9,000	144	33	0.70	16	0.60	17
10,000	160	33	0.60	13	0.60	16
12,000	192	29	0.60	13	0.60	15
15,000	(240)	(13)	(0.60)	(10)	(0.60)	(15)
16,000	256	27	0.97	10	0.60	14
18,000	288	17	0.97	12	0.60	16
20,000	320	15	0.80	11	0.60	15
25,000	400	22	0.80	12	0.60	15
30,000	480	24	0.70	12	0.70	15
35,000	560	08	3.30	17	1.10	14
40,000	640	10	2.00	16	1.00	14
45,000	720	10	1.90	16	0.90	14
50,000	790	14	3.20	17	0.90	14
55,000	870	14	2.00	19	0.80	17
60,000	960	16	3.60	25	0.70	17
65,000	1040	22	1.00	15	0.90	18
70,000	1120	23	0.90	23	0.70	16
75,000	1200	38	1.00	32	0.70	18
80,000	1280	36	0.90	31	0.60	17
85,000	1360	55	0.90	56	1.00	17
90,000	1440	60	0.90	61	0.90	17
95,000	---	--	---	--	0.80	17
99,000	0.70	74	0.90	69	---	--
100,000	0.90	81	0.70	81	---	--
105,000	0.90	84	0.80	89	---	--
110,000	0.90	69	0.80	102	---	--
114,000	0.90	69	0.80	102	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was obtained by the weather station on Elizabeth Island (see remark A111).

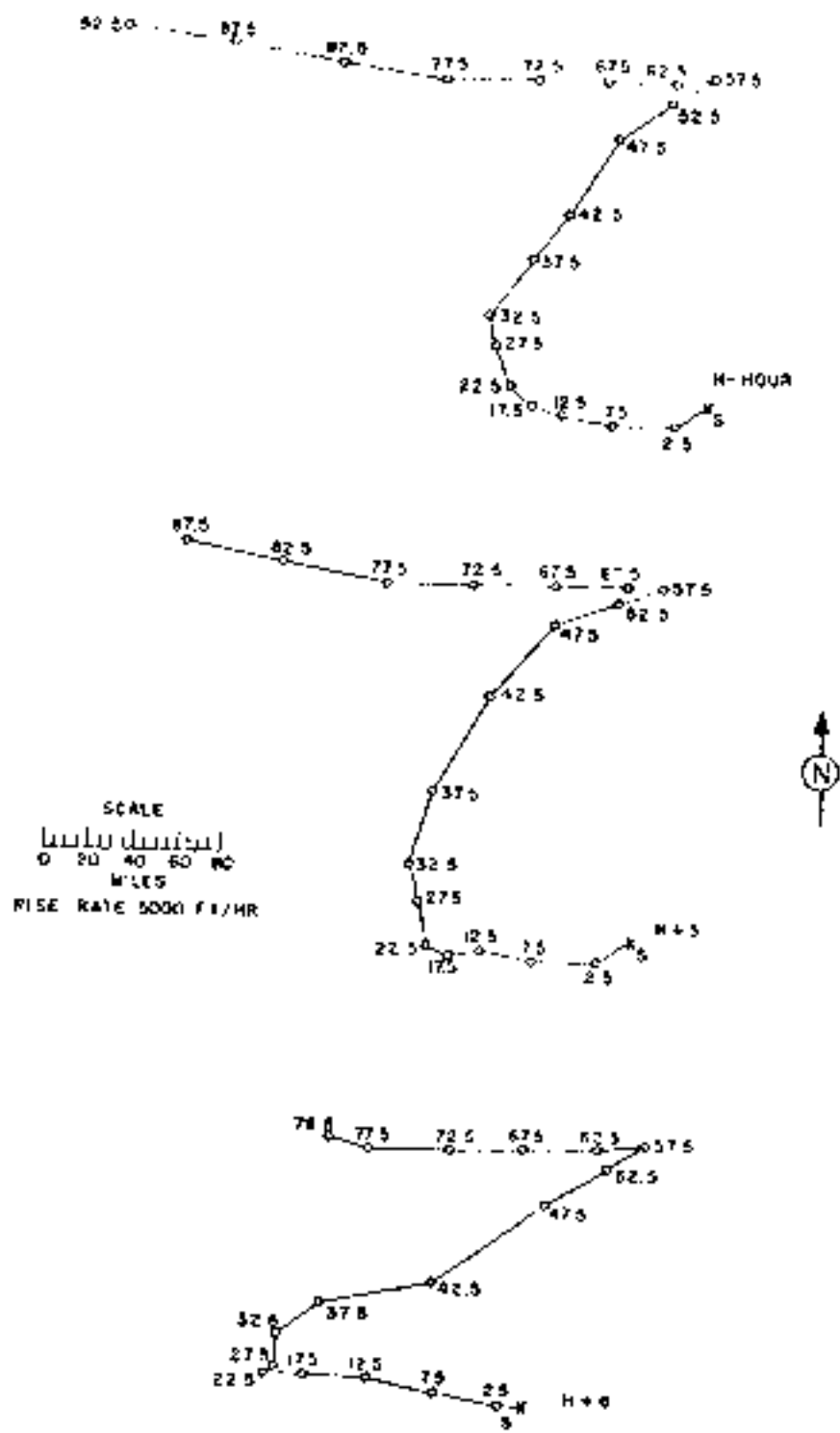


Figure 74 . Hodographs for Operation BUDWING -

7uni.

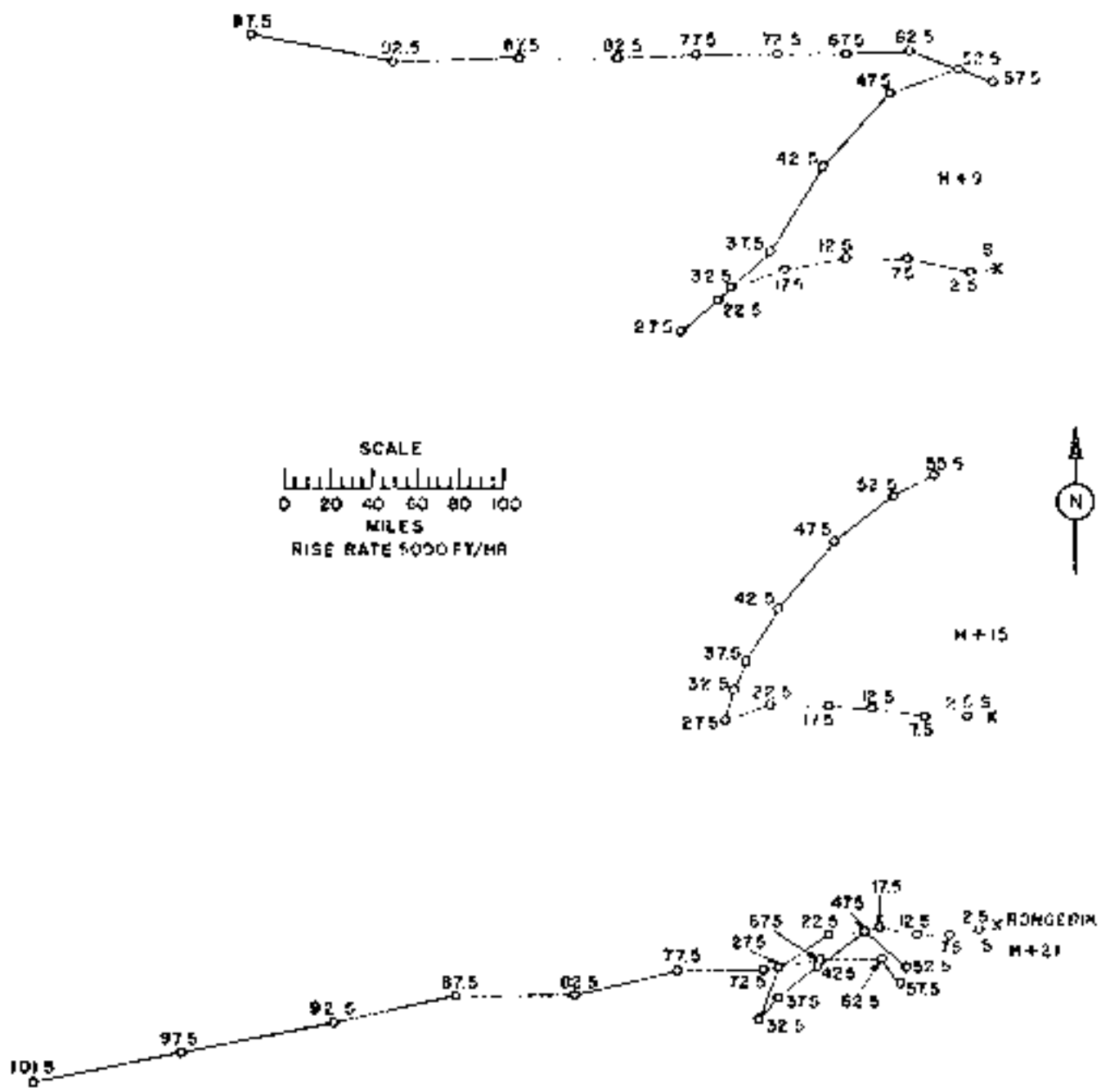


Figure 75. Hodographs for Operation KHEWING - Zuni.

CONTAINER DESIGNATION - Yuma

	<u>DATE</u>	<u>TIME</u>
	14 May 1954	19 May 1954
	0700	0900

Operator - USCG

GRID: 117 - 5140000 - 0000
10° 30' 35" N
100° 10' 00" E
Site elevation - Sea Level

HEIGHT OF INSTRUMENT: 100 ft

SLIGHT CORRECTION: 8,000 ft MSL
CLOUD HEIGHT HEIGHTS: 1,000 ft MSL

TYPE OF INSTRUMENT AND PLACEMENT:
Tower instrument over coral soil

REMARKS:

Galy Island dose rate readings are available. These were taken from the aerial and ground surveys made by the Radiological Safety organization. The $t^{-1.2}$ decay approximation was used to extrapolate the dose rate readings to 101 hours. Significant amounts of alpha (plutonium) contamination were found on the shot island.

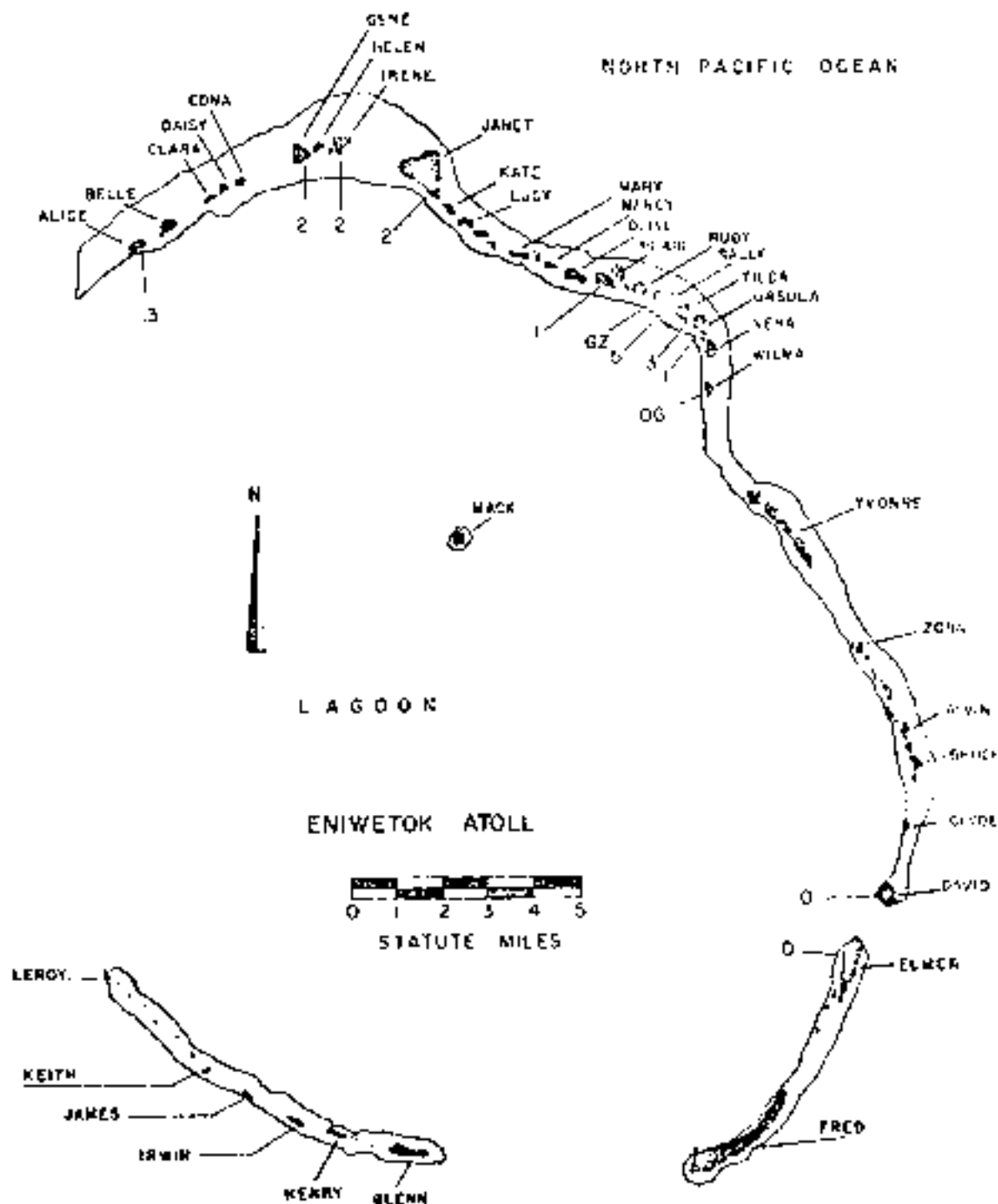


Figure 76. Operation KEDWING - Yuma.
Island distances in r/hr at 11+1 hour.

TABLE 21. WIND LOG WITH DELETSION OF 2003-11-11 -

1955

TIME (GMT)	WIND DIRECTION		WIND VELOCITY		WIND VELOCITY		WIND VELOCITY	
	FROM	TO	MPH	KTS	MPH	KTS	MPH	KTS
1001								
2,001	070	05	30	13	100	43	100	43
3,001	070	15	30	13	070	30	200	87
4,001	070	30	030	13	100	43	200	87
5,001	070	15	070	13	100	43	100	43
6,001	070	15	070	13	100	43	100	43
7,001	070	20	070	17	100	43	100	43
8,001	070	20	070	17	100	43	100	43
9,001	070	20	070	17	090	39	100	43
10,001	070	20	070	17	090	39	100	43
11,001	070	20	070	17	090	39	100	43
12,001	070	20	070	17	090	39	100	43
13,001	110	20	070	17	090	39	070	30
14,001	150	20	120	16	110	16	200	87
15,001	150	20	100	43	100	43	200	87
16,001	150	05	100	43	100	43	200	87
17,001	170	05	100	43	100	43	200	87
18,001	170	05	100	43	100	43	200	87
19,001	200	20	100	43	100	43	200	87
20,001	200	20	100	43	100	43	200	87
21,001	200	20	100	43	100	43	200	87
22,001	200	20	100	43	100	43	200	87
23,001	200	20	100	43	100	43	200	87
24,001	---	---	100	43	100	43	200	87
25,001	---	---	100	43	100	43	200	87
26,001	---	---	100	43	100	43	200	87
27,001	---	---	100	43	100	43	200	87
28,001	---	---	100	43	100	43	200	87
29,001	---	---	100	43	100	43	200	87
30,001	---	---	100	43	100	43	200	87
31,001	---	---	100	43	100	43	200	87
32,001	---	---	100	43	100	43	200	87
33,001	---	---	100	43	100	43	200	87
34,001	---	---	100	43	100	43	200	87
35,001	---	---	100	43	100	43	200	87
36,001	---	---	100	43	100	43	200	87
37,001	---	---	100	43	100	43	200	87
38,001	---	---	100	43	100	43	200	87
39,001	---	---	100	43	100	43	200	87
40,001	---	---	100	43	100	43	200	87
41,001	---	---	100	43	100	43	200	87
42,001	---	---	100	43	100	43	200	87
43,001	---	---	100	43	100	43	200	87
44,001	---	---	100	43	100	43	200	87
45,001	---	---	100	43	100	43	200	87
46,001	---	---	100	43	100	43	200	87
47,001	---	---	100	43	100	43	200	87
48,001	---	---	100	43	100	43	200	87
49,001	---	---	100	43	100	43	200	87
50,001	---	---	100	43	100	43	200	87
51,001	---	---	100	43	100	43	200	87
52,001	---	---	100	43	100	43	200	87
53,001	---	---	100	43	100	43	200	87
54,001	---	---	100	43	100	43	200	87
55,001	---	---	100	43	100	43	200	87
56,001	---	---	100	43	100	43	200	87
57,001	---	---	100	43	100	43	200	87
58,001	---	---	100	43	100	43	200	87
59,001	---	---	100	43	100	43	200	87
60,001	---	---	100	43	100	43	200	87
61,001	---	---	100	43	100	43	200	87
62,001	---	---	100	43	100	43	200	87
63,001	---	---	100	43	100	43	200	87
64,001	---	---	100	43	100	43	200	87
65,001	---	---	100	43	100	43	200	87
66,001	---	---	100	43	100	43	200	87
67,001	---	---	100	43	100	43	200	87
68,001	---	---	100	43	100	43	200	87
69,001	---	---	100	43	100	43	200	87
70,001	---	---	100	43	100	43	200	87
71,001	---	---	100	43	100	43	200	87
72,001	---	---	100	43	100	43	200	87
73,001	---	---	100	43	100	43	200	87
74,001	---	---	100	43	100	43	200	87
75,001	---	---	100	43	100	43	200	87
76,001	---	---	100	43	100	43	200	87
77,001	---	---	100	43	100	43	200	87
78,001	---	---	100	43	100	43	200	87
79,001	---	---	100	43	100	43	200	87
80,001	---	---	100	43	100	43	200	87
81,001	---	---	100	43	100	43	200	87
82,001	---	---	100	43	100	43	200	87
83,001	---	---	100	43	100	43	200	87
84,001	---	---	100	43	100	43	200	87
85,001	---	---	100	43	100	43	200	87
86,001	---	---	100	43	100	43	200	87
87,001	---	---	100	43	100	43	200	87
88,001	---	---	100	43	100	43	200	87
89,001	---	---	100	43	100	43	200	87
90,001	---	---	100	43	100	43	200	87
91,001	---	---	100	43	100	43	200	87
92,001	---	---	100	43	100	43	200	87
93,001	---	---	100	43	100	43	200	87
94,001	---	---	100	43	100	43	200	87
95,001	---	---	100	43	100	43	200	87
96,001	---	---	100	43	100	43	200	87
97,001	---	---	100	43	100	43	200	87
98,001	---	---	100	43	100	43	200	87
99,001	---	---	100	43	100	43	200	87
100,001	---	---	100	43	100	43	200	87
101,001	---	---	100	43	100	43	200	87
102,001	---	---	100	43	100	43	200	87

NOTES:

1. Tropopause height was 10,000 FT. MSL.
2. Wind data was obtained by the weather station on Enderby Island.
3. If near values were interpolated, from data taken at 0000 hours and 0100 hours.
4. At the surface the air pressure was 30.0 psi, the temperature 27.2°C, the dew point 20.2°C and the relative humidity 64%.

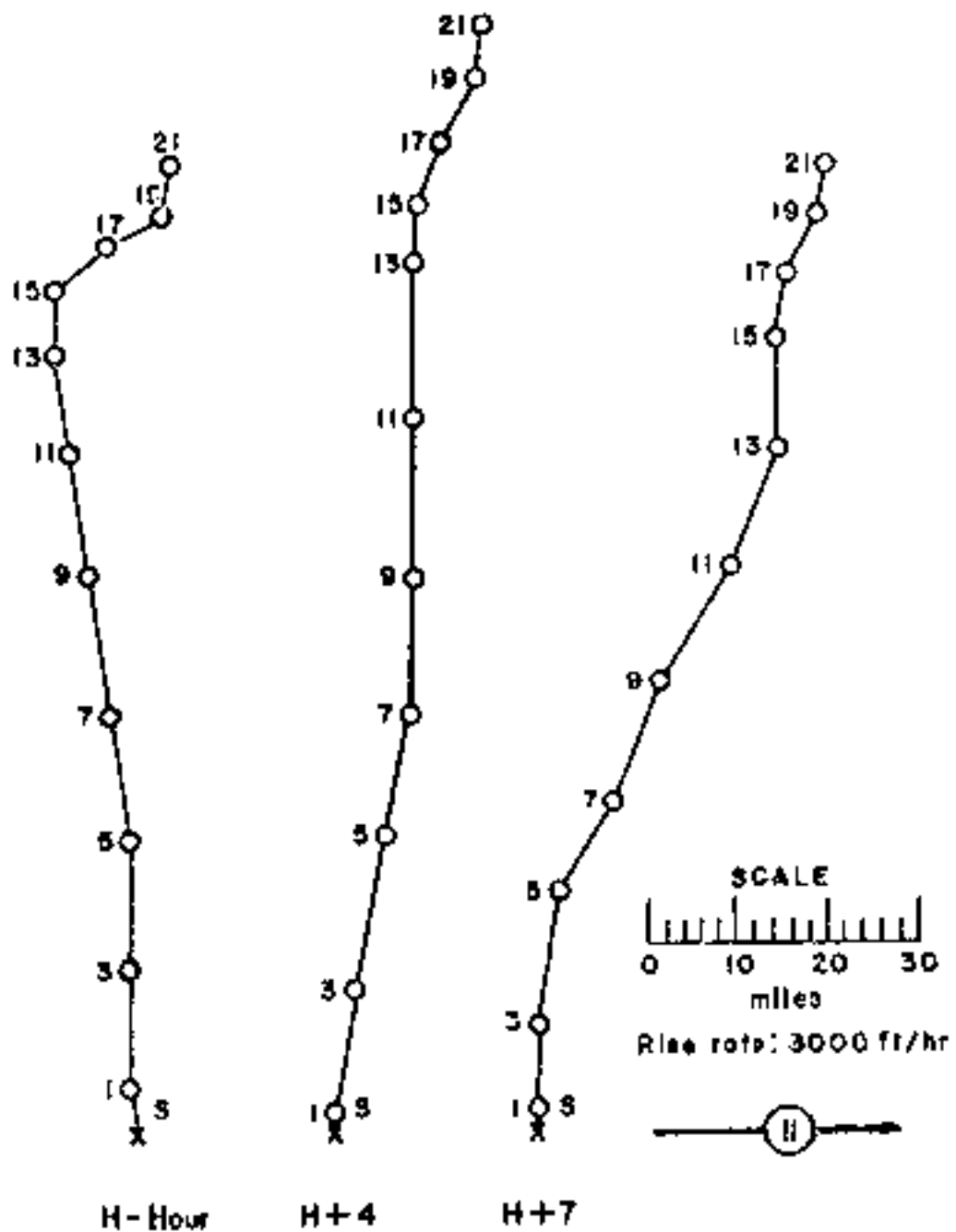


Figure 77. Hodographs for Operation REDWING - Yuma.

CONTAMINATION DATA - 1975

$$\frac{11.4 \text{ } \mu\text{Ci/g}}{2.0 \text{ } \mu\text{Ci/g}} = \frac{2.7 \text{ } \mu\text{Ci/g}}{0.2 \text{ } \mu\text{Ci/g}}$$

Specimen: 1455

NOTE: $10^6 = \text{Micro}(\mu) = \text{Yen}(\text{y})$
 $10^3 = \text{Milli}(m)$
 $10^2 = \text{Centi}(c)$
 210 - conventional sea level

HEIGHT OF ISLAND - 300 ft

SCALE OF PLOTS AND CALCULATIONS
 1 cm = 100 ft (30.5 m)

COUNTING RANGE - 100 - 10,000

COUNTING RATE - 100 - 10,000

REMARKS:

Only island data available. Data were obtained from aerial and ground surveys made by the International Safety Organization at 1000 hours. The 210P decay approximation was used to extrapolate the dose-rate readings to 1000 hours. Islands north of Yucca in the atoll were only slightly contaminated.

TABLE 22. WINDING DATA FROM FOR OF THE 1942-43 SEASON.

1518

Alt. (ft.)	Bar. (in.)		W. (m.p.h.)		W. (m.p.h.)	
	Max.	Min.	Max.	Min.	Max.	Min.
1,000	30.0	29.0	10.0	10.0	0.0	10
2,000	30.0	29.0	10.0	10.0	0.0	10
3,000	30.0	29.0	10.0	10.0	0.0	10
4,000	30.0	29.0	10.0	10.0	0.0	10
5,000	30.0	29.0	10.0	10.0	0.0	10
6,000	30.0	29.0	10.0	10.0	0.0	10
7,000	30.0	29.0	10.0	10.0	0.0	10
8,000	30.0	29.0	10.0	10.0	0.0	10
9,000	30.0	29.0	10.0	10.0	0.0	10
10,000	30.0	29.0	10.0	10.0	0.0	10
11,000	30.0	29.0	10.0	10.0	0.0	10
12,000	30.0	29.0	10.0	10.0	0.0	10
13,000	30.0	29.0	10.0	10.0	0.0	10
14,000	30.0	29.0	10.0	10.0	0.0	10
15,000	30.0	29.0	10.0	10.0	0.0	10
16,000	30.0	29.0	10.0	10.0	0.0	10
17,000	30.0	29.0	10.0	10.0	0.0	10
18,000	30.0	29.0	10.0	10.0	0.0	10
19,000	30.0	29.0	10.0	10.0	0.0	10
20,000	30.0	29.0	10.0	10.0	0.0	10
21,000	30.0	29.0	10.0	10.0	0.0	10
22,000	30.0	29.0	10.0	10.0	0.0	10
23,000	30.0	29.0	10.0	10.0	0.0	10
24,000	30.0	29.0	10.0	10.0	0.0	10
25,000	30.0	29.0	10.0	10.0	0.0	10
26,000	30.0	29.0	10.0	10.0	0.0	10
27,000	30.0	29.0	10.0	10.0	0.0	10
28,000	30.0	29.0	10.0	10.0	0.0	10
29,000	30.0	29.0	10.0	10.0	0.0	10
30,000	30.0	29.0	10.0	10.0	0.0	10
31,000	30.0	29.0	10.0	10.0	0.0	10
32,000	30.0	29.0	10.0	10.0	0.0	10
33,000	30.0	29.0	10.0	10.0	0.0	10
34,000	30.0	29.0	10.0	10.0	0.0	10
35,000	30.0	29.0	10.0	10.0	0.0	10
36,000	30.0	29.0	10.0	10.0	0.0	10
37,000	30.0	29.0	10.0	10.0	0.0	10
38,000	30.0	29.0	10.0	10.0	0.0	10
39,000	30.0	29.0	10.0	10.0	0.0	10
40,000	30.0	29.0	10.0	10.0	0.0	10
41,000	30.0	29.0	10.0	10.0	0.0	10
42,000	30.0	29.0	10.0	10.0	0.0	10
43,000	30.0	29.0	10.0	10.0	0.0	10
44,000	30.0	29.0	10.0	10.0	0.0	10
45,000	30.0	29.0	10.0	10.0	0.0	10
46,000	30.0	29.0	10.0	10.0	0.0	10
47,000	30.0	29.0	10.0	10.0	0.0	10
48,000	30.0	29.0	10.0	10.0	0.0	10
49,000	30.0	29.0	10.0	10.0	0.0	10
50,000	30.0	29.0	10.0	10.0	0.0	10
51,000	30.0	29.0	10.0	10.0	0.0	10
52,000	30.0	29.0	10.0	10.0	0.0	10
53,000	30.0	29.0	10.0	10.0	0.0	10
54,000	30.0	29.0	10.0	10.0	0.0	10
55,000	30.0	29.0	10.0	10.0	0.0	10
56,000	30.0	29.0	10.0	10.0	0.0	10
57,000	30.0	29.0	10.0	10.0	0.0	10
58,000	30.0	29.0	10.0	10.0	0.0	10
59,000	30.0	29.0	10.0	10.0	0.0	10
60,000	30.0	29.0	10.0	10.0	0.0	10
61,000	30.0	29.0	10.0	10.0	0.0	10
62,000	30.0	29.0	10.0	10.0	0.0	10
63,000	30.0	29.0	10.0	10.0	0.0	10
64,000	30.0	29.0	10.0	10.0	0.0	10
65,000	30.0	29.0	10.0	10.0	0.0	10
66,000	30.0	29.0	10.0	10.0	0.0	10
67,000	30.0	29.0	10.0	10.0	0.0	10
68,000	30.0	29.0	10.0	10.0	0.0	10
69,000	30.0	29.0	10.0	10.0	0.0	10
70,000	30.0	29.0	10.0	10.0	0.0	10
71,000	30.0	29.0	10.0	10.0	0.0	10
72,000	30.0	29.0	10.0	10.0	0.0	10
73,000	30.0	29.0	10.0	10.0	0.0	10
74,000	30.0	29.0	10.0	10.0	0.0	10
75,000	30.0	29.0	10.0	10.0	0.0	10
76,000	30.0	29.0	10.0	10.0	0.0	10
77,000	30.0	29.0	10.0	10.0	0.0	10
78,000	30.0	29.0	10.0	10.0	0.0	10
79,000	30.0	29.0	10.0	10.0	0.0	10
80,000	30.0	29.0	10.0	10.0	0.0	10
81,000	30.0	29.0	10.0	10.0	0.0	10
82,000	30.0	29.0	10.0	10.0	0.0	10
83,000	30.0	29.0	10.0	10.0	0.0	10
84,000	30.0	29.0	10.0	10.0	0.0	10
85,000	30.0	29.0	10.0	10.0	0.0	10
86,000	30.0	29.0	10.0	10.0	0.0	10
87,000	30.0	29.0	10.0	10.0	0.0	10
88,000	30.0	29.0	10.0	10.0	0.0	10
89,000	30.0	29.0	10.0	10.0	0.0	10
90,000	30.0	29.0	10.0	10.0	0.0	10
91,000	30.0	29.0	10.0	10.0	0.0	10
92,000	30.0	29.0	10.0	10.0	0.0	10
93,000	30.0	29.0	10.0	10.0	0.0	10
94,000	30.0	29.0	10.0	10.0	0.0	10
95,000	30.0	29.0	10.0	10.0	0.0	10
96,000	30.0	29.0	10.0	10.0	0.0	10
97,000	30.0	29.0	10.0	10.0	0.0	10
98,000	30.0	29.0	10.0	10.0	0.0	10
99,000	30.0	29.0	10.0	10.0	0.0	10
100,000	30.0	29.0	10.0	10.0	0.0	10

NOTES:

1. Numbers in parentheses are calculated values.
2. True wind velocity was 94,100 ft. Mils. (Reference 10).
3. Wind data was obtained by the weather station on Gravelly Island.
4. At 11-hour the sea level pressure was 1004.1 mb, the temperature 80.5°F, the dew point 74.0°F, and the relative humidity 90.0%.



Rise rate - 5000 ft/hr

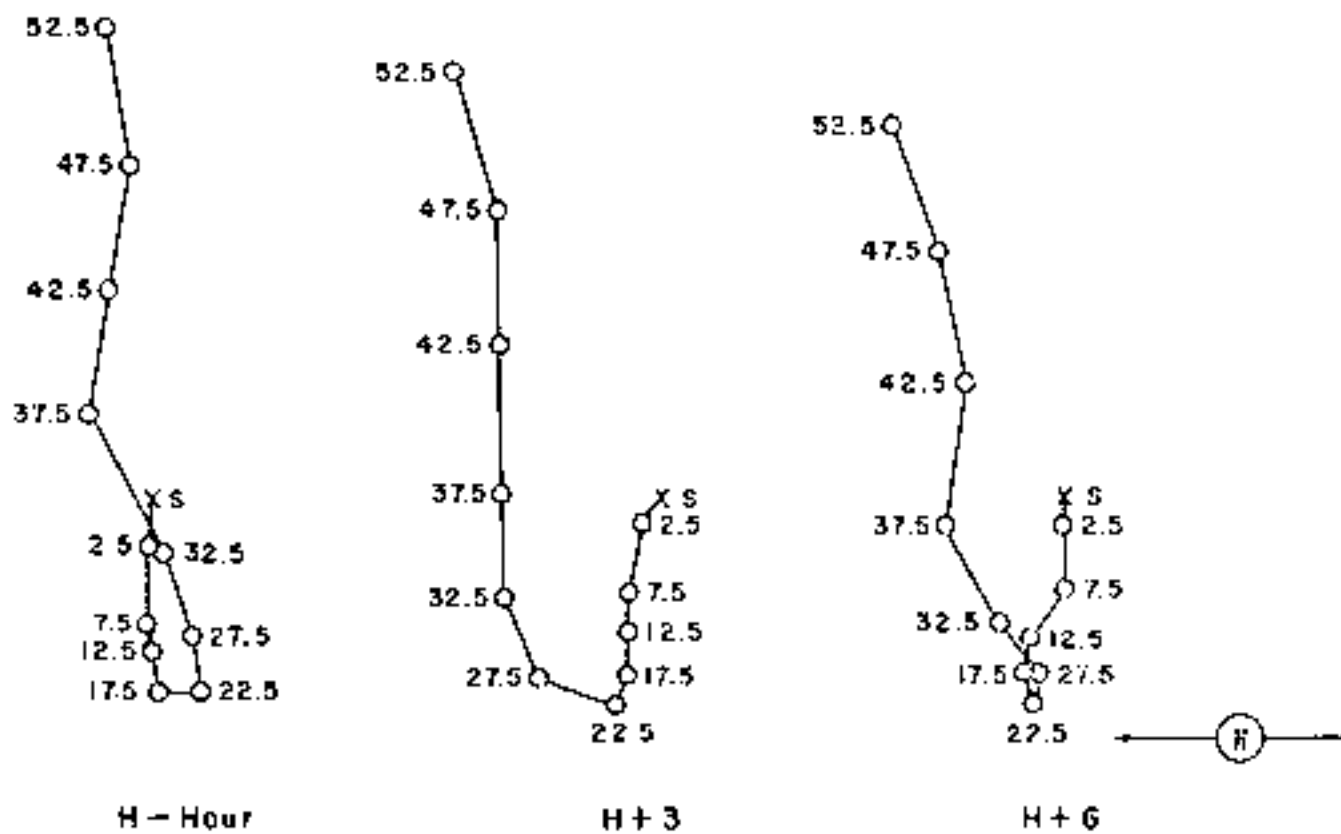


Figure 79 . Hodographs for Operation BROMBERG -

Eric.

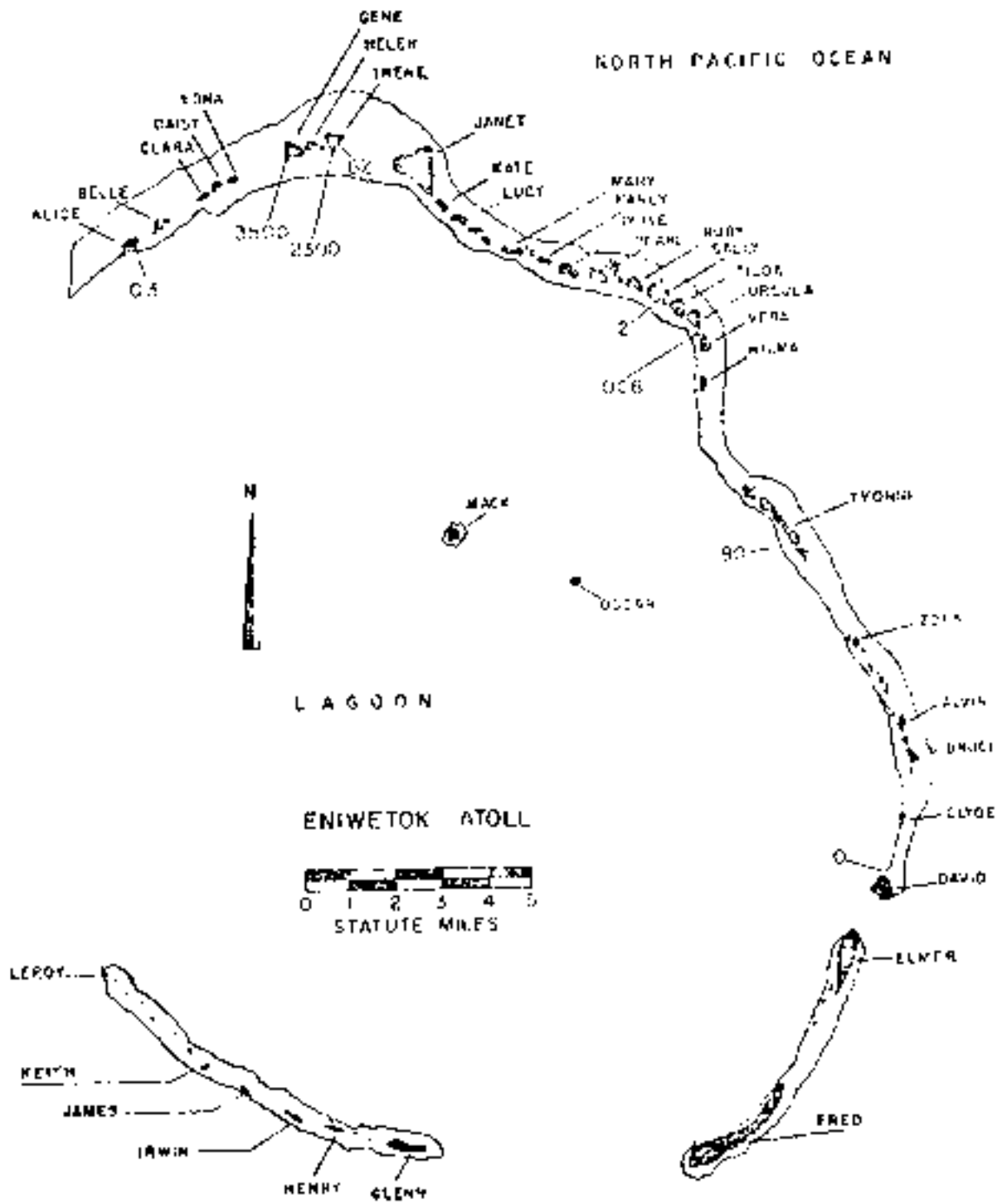


Figure 80. Operation HEADING - Sea turtle island distribution in r/30 n° 114 hour.

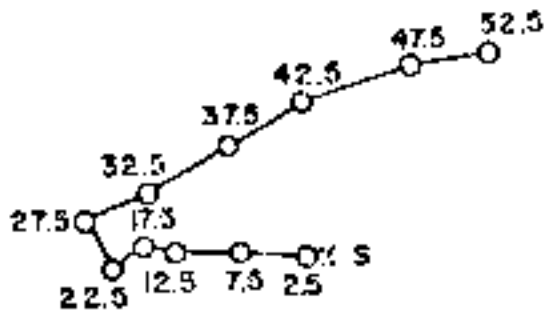
TABLE 23. WINDPARK WIND DATA FOR GENERATION PLANTING -

CONTINUED

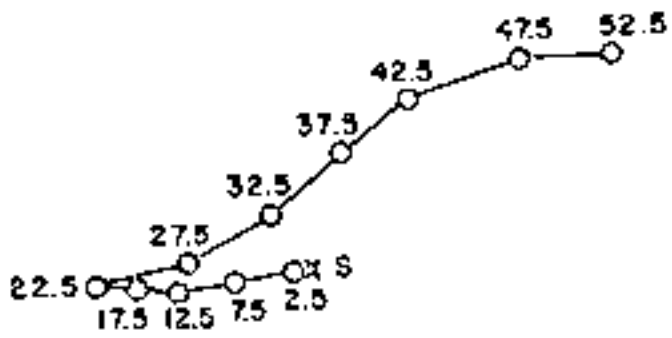
Altitude (ft.)	11-1 hour		11-hour		11-1 hour		11-1 hour	
	Dir.	Speed	Dir.	Speed	Dir.	Speed	Dir.	Speed
Feet	degrees	mph	degrees	mph	degrees	mph	degrees	mph
Surface	101	13	107	12	090	07	090	10
1,000	098	16	095	15	080	14	070	20
2,000	090	15	090	17	090	20	070	20
3,000	090	22	090	18	080	17	100	20
4,000	098	20	090	17	080	15	100	20
5,000	090	20	090	17	080	17	090	17
6,000	100	25	090	20	080	15	090	20
7,000	100	20	100	17	100	14	090	17
8,000	100	10	110	12	100	14	100	15
9,000	090	13	090	13	100	14	100	15
10,000	090	14	090	14	090	14	090	09
12,000	090	12	080	10	090	09	100	07
14,000	090	09	090	06	100	07	100	07
15,000	---	---	(100)	(09)	(100)	(07)	(090)	(06.5)
16,000	100	09	100	06	100	07	090	06.5
18,000	100	02	100	04	100	07	090	06.5
20,000	090	08	090	09	090	10	100	09
25,000	080	09	100	13	090	20	090	6
30,000	090	14	090	17	090	28	090	14
35,000	090	13	090	23	090	23	090	17
40,000	090	20	090	20	090	21	090	15
45,000	090	22	090	20	090	25	090	21
50,000	060	18	060	20	090	20	090	17
55,000	090	09	090	07	090	07	090	09
60,000	090	13	080	12	060	10	100	09
65,000	090	26	100	26	100	20	110	24
70,000	070	15	080	17	090	09	090	10
75,000	090	60	090	60	100	61	100	56
80,000	090	63	090	63	090	76	100	64
85,000	100	75	100	75	090	79	100	74
90,000	100	77	100	79	090	84	090	71
93,000	---	---	---	---	090	84	090	71
96,000	100	81	100	80	---	---	---	---
100,000	100	68	100	68	---	---	---	---

NOTES:

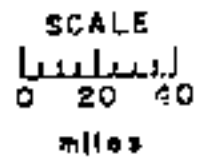
1. Numbers in parentheses are estimated values.
2. Turbine height was 57,000 ft MSL. (Reference 149).
3. Wind data was obtained by the weather station on Siletzok Island.
4. E-hour values were interpolated from data taken at 11-1 hour and 112 hours.
5. At the surface the air pressure was 14.64 psi, the temperature 30.5°C, the dew point 24.7°C, and the relative humidity 73%.



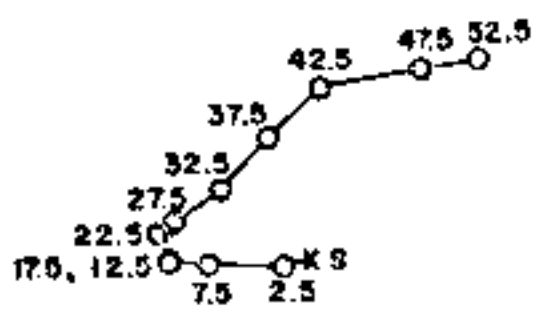
H - Hour



H + 2



Rise rate: 5000 ft/hr



H + 5



Figure 81. Hodographs for Operation RASCAL -

Seminole.

$$\frac{dC}{dt} = \frac{1}{V} \frac{dC}{dt} = \frac{1}{V} \frac{dC}{dt}$$

Equation 11

$$\frac{dC}{dt} = \frac{1}{V} \frac{dC}{dt} = \frac{1}{V} \frac{dC}{dt}$$

Equation 12

$$\frac{dC}{dt} = \frac{1}{V} \frac{dC}{dt}$$

Equation 13

$$\frac{dC}{dt} = \frac{1}{V} \frac{dC}{dt}$$

DISCUSSION

The on-site fallout pattern was drawn from direct readings taken by scientific projects supplemented by fallout sample collection on rooftops and barges in the lake. Actual data were used wherever they indicated a decay exponent. Extrapolations were used to extrapolate the dose-rate readings to 24 hours.

The off-site fallout pattern was drawn from cinematographic surveys. The cinematographic surveys used detector grids for measuring the dose-rate at depths to one meter below the thermocline. Water-sampling equipment was used for the taking of surface samples and for the collection of samples from any desired depth. The dose-rate readings were extrapolated to 100 hours by using the decay measurements of the samples collected. Very little of the fallout should have been associated with solid particles large enough to penetrate below the thermocline.

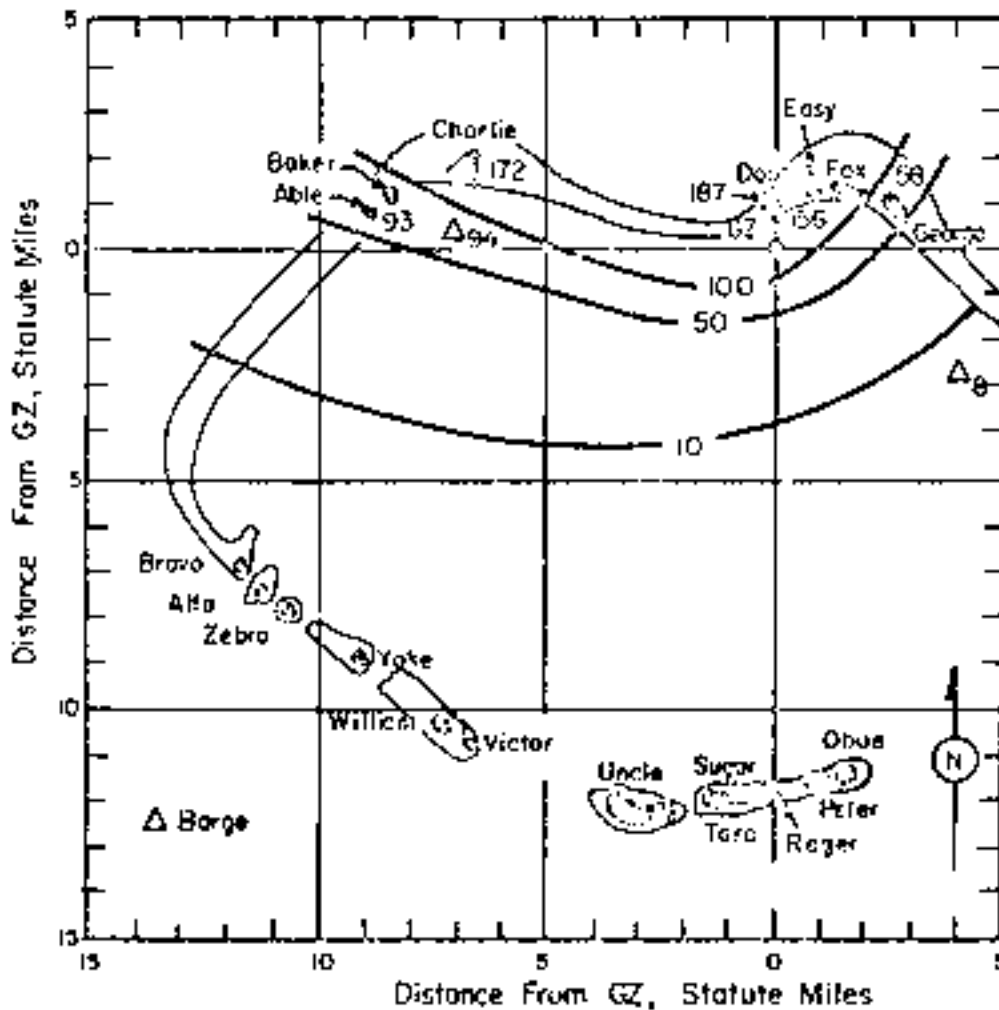


Figure 82. Operation BERING - Flathead. On-site dose rate contours in r/hr at 11:1 hour.

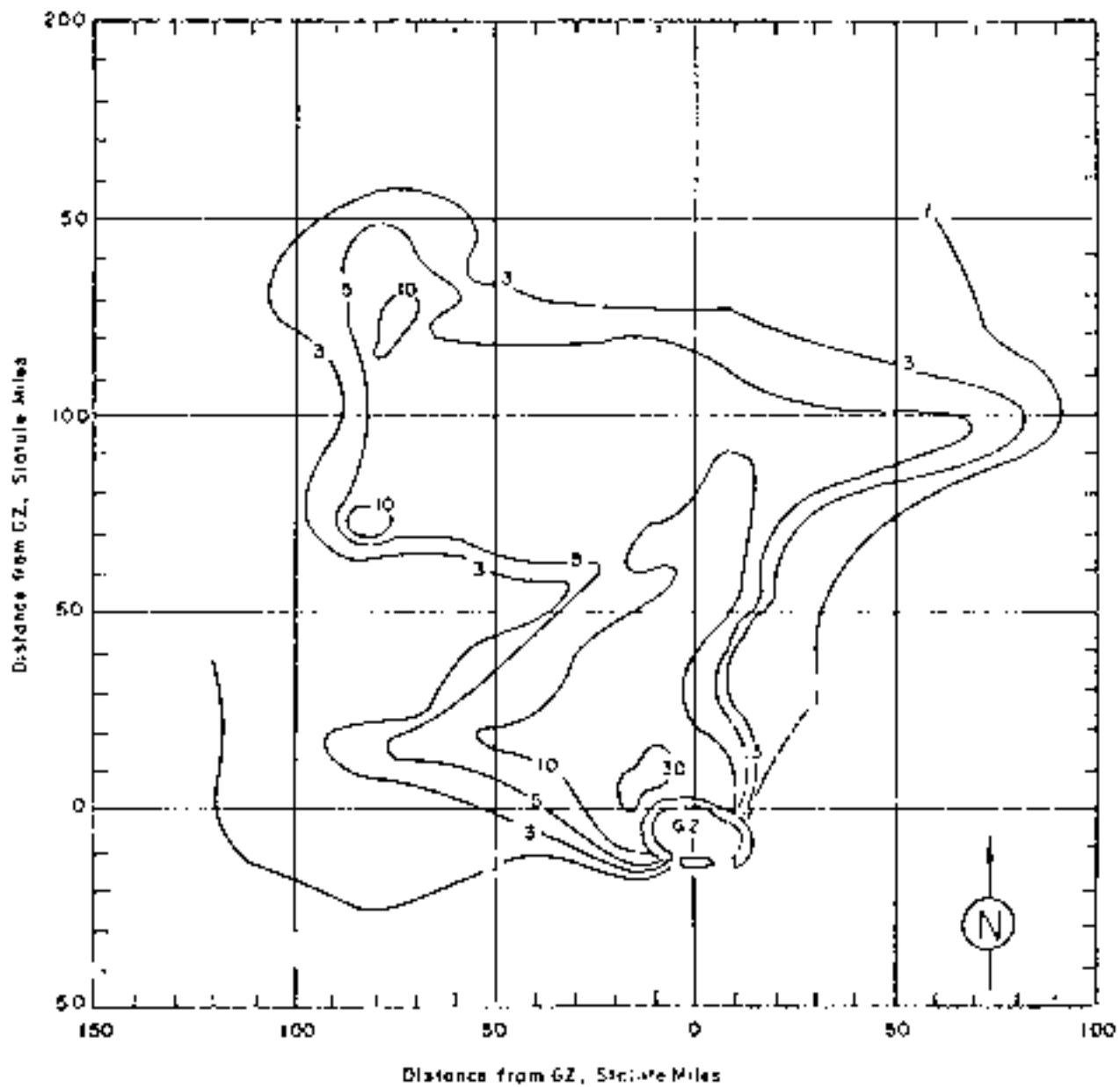


Figure 83. Operation REEWING - Flathead.
Off-site dose rate contours in r/hr at H+0 hour.

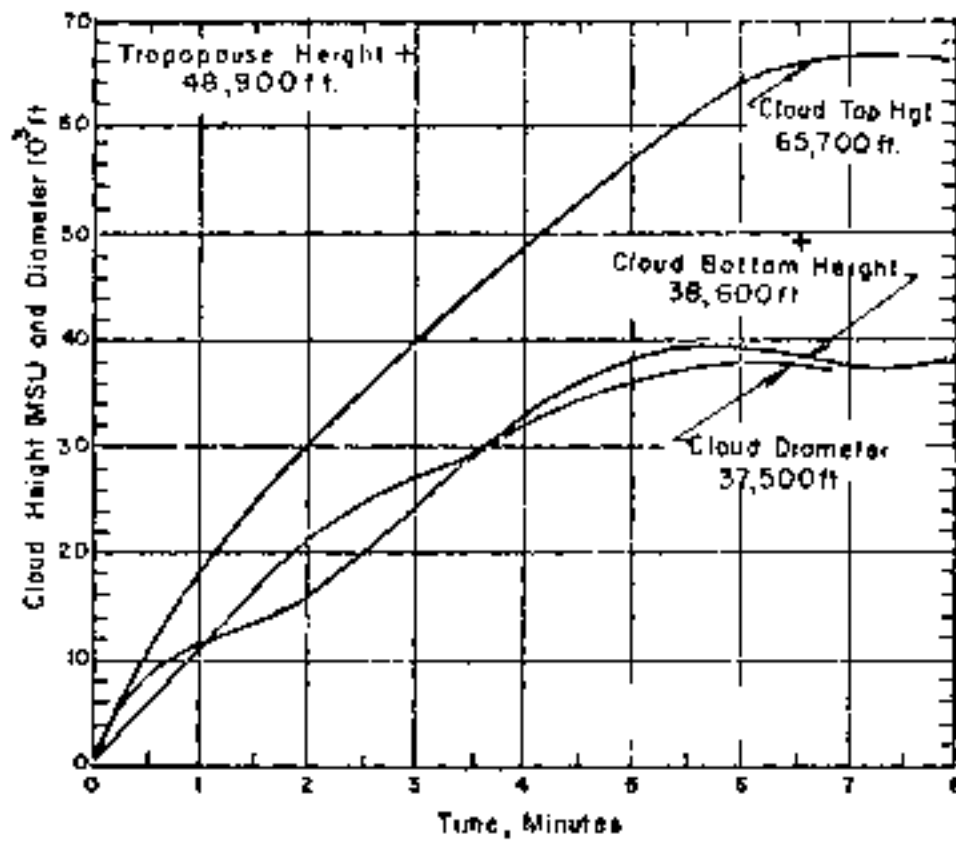


Figure 84. Cloud Dimensions: Operation REIWTNS - Flathead.

TABLE 14. WINDS AND PRESSURE AT 46,000 FT. ALTITUDE - CONTINUED

Altitude (ft.)	H=2		H=3		H=4		H=5		H=6	
	Wind kts	Dir.	Wind kts	Dir.	Wind kts	Dir.	Wind kts	Dir.	Wind kts	Dir.
Surface	070	13	070	22	070	24	070	22	070	25
1,000	070	17	070	21	070	25	070	24	070	27
2,000	070	14	070	17	067	20	070	18	060	23
3,000	070	14	070	15	070	15	070	18	070	24
4,000	070	16	070	14	100	13	070	18	070	25
5,000	070	17	100	15	100	13	070	18	070	24
6,000	070	15	100	14	100	14	070	16	070	24
7,000	070	14	070	14	070	14	070	09	070	24
8,000	070	17	070	10	070	10	070	09	070	24
9,000	070	19	070	09	100	08	070	07	070	24
10,000	070	09	100	08	100	07	070	06	070	24
12,000	070	08	070	07	070	05	070	08	100	05
14,000	110	03	120	05	130	05	0-12	0-12	0-12	0-12
16,000	070	07	110	06	160	08	070	03	100	07
18,000	110	06	130	10	170	14	100	05	070	04
20,000	160	09	160	12	160	13	150	07	170	07
25,000	050	14	170	17	170	20	170	14	170	12
30,000	210	12	200	17	200	21	200	15	200	16
35,000	240	13	250	14	250	14	250	15	240	21
40,000	260	22	240	21	230	21	240	22	270	21
45,000	220	22	230	21	240	20	270	18	310	16
50,000	350	21	300	16	300	15	330	14	070	14
55,000	070	14	070	17	100	20	070	21	100	20
60,000	070	26	070	28	---	---	100	29	070	16
65,000	100	28	100	28	---	---	070	24	070	21
70,000	100	33	100	33	---	---	070	40	070	37
75,000	070	46	070	46	---	---	070	46	070	57
80,000	---	---	---	---	---	---	070	63	070	61
85,000	---	---	---	---	---	---	070	64	070	68
90,000	---	---	---	---	---	---	070	59	080	59
91,000	---	---	---	---	---	---	---	---	080	60
93,000	---	---	---	---	---	---	070	56	---	---

Notes:

1. Tropopause height was 46,000 ft MSL at H-hour.
2. Wind data was obtained on board the U. S. S. Curtiss.
3. Values were interpolated from data taken at H-2½ hours and H+1½ hours.
4. At H-hour the sea level pressure was 3011.9 mb, the temperature: 82.0°F, the dew point: 76.0°F and the relative humidity 82.6%.

SCALE
 0 20 40 60
 miles

Rise rate, 5000 ft/hr

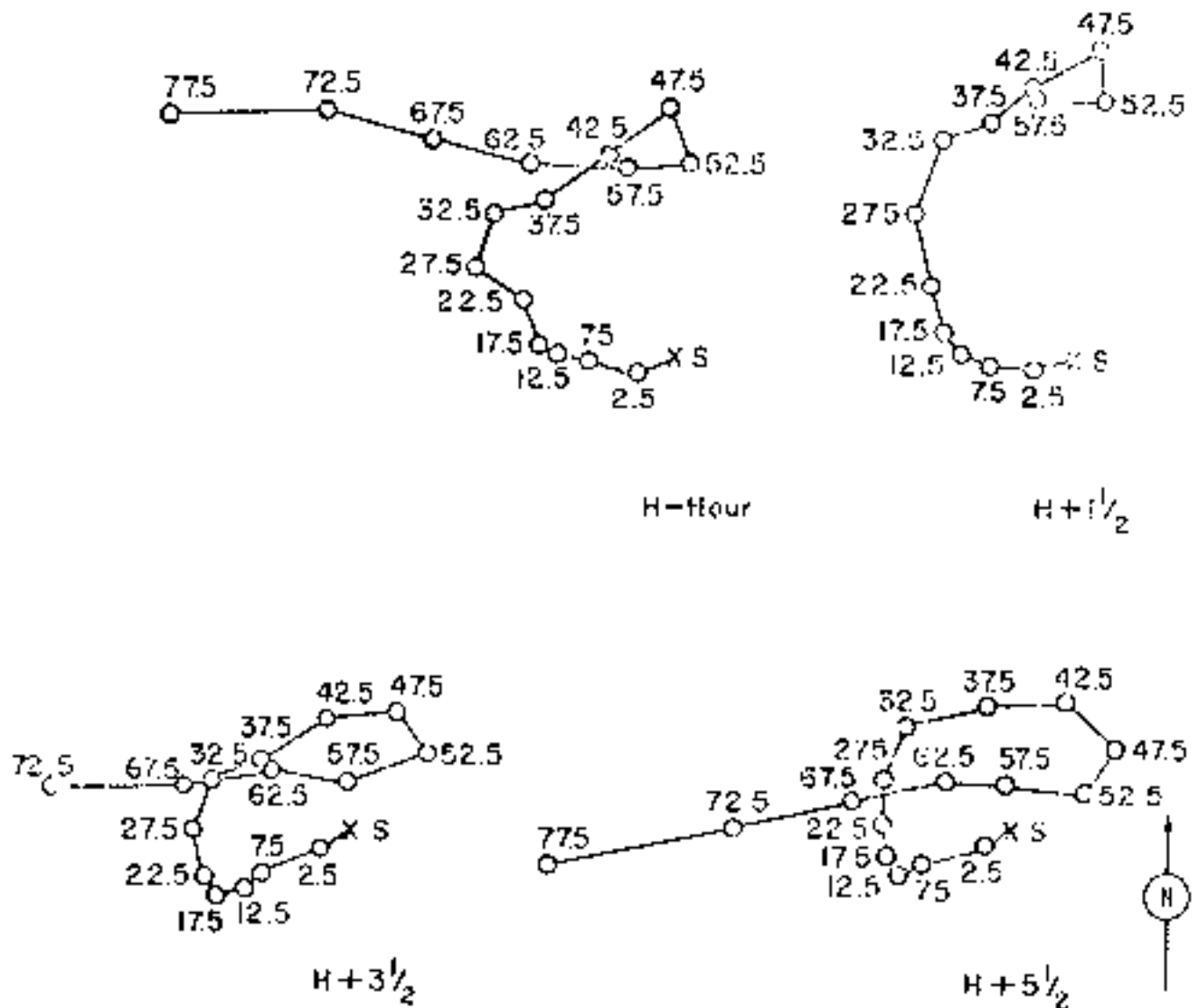


Figure 85 - Evolution of the Coast Line for $H=4$ -

Platons.

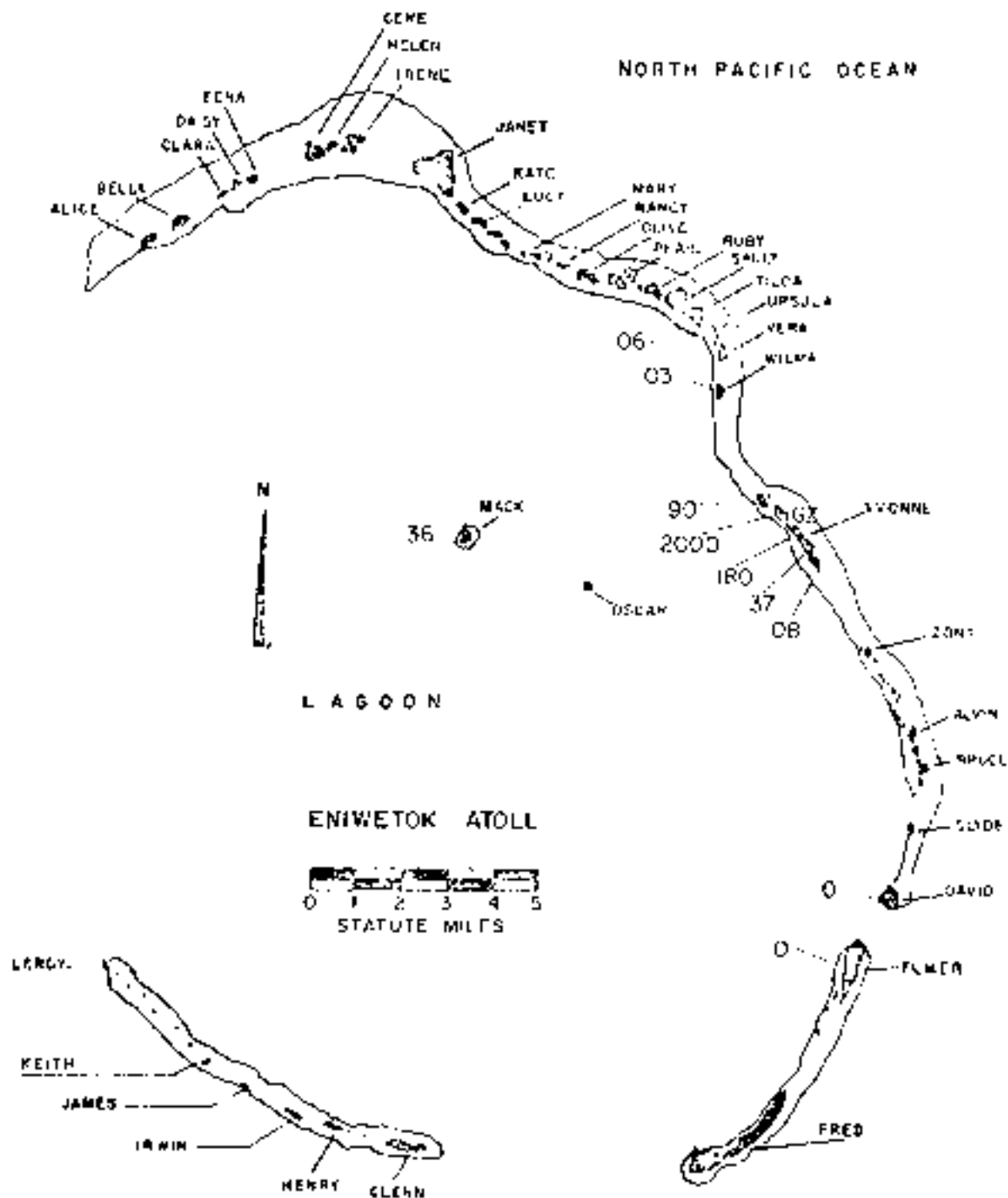


Figure 86. Operation JEDWARD - Blackfoot. Island dose rates in r/hr at 1:41 hour.

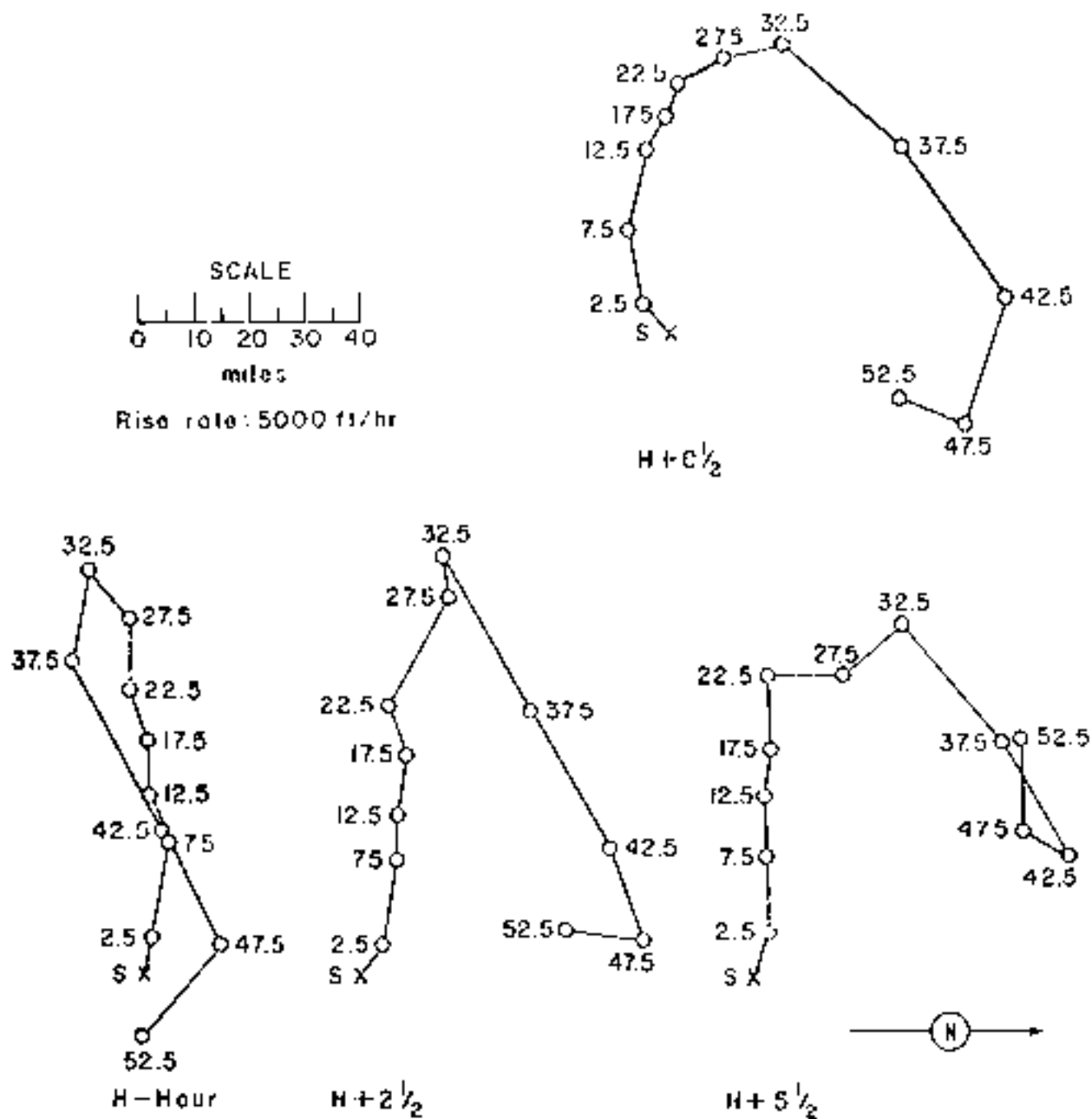


Figure 87. Meteorographic for Operation BEECHLOG

- Blackfoot.

ORGANIZATION IDENTIFICATION

Rocky Top

	<u>PERMITS</u>	<u>DATE</u>
<u>ISSUED:</u>	24 June 1957	13 June 1956
<u>EXPIRES:</u>	1958	1956

Operator: WCHL

SLT = $\frac{100}{10^3} \times \frac{1000}{10^3} \times \frac{1000}{10^3} \times \frac{1000}{10^3} \times \frac{1000}{10^3}$
 1000 1000 1000 1000 1000
 1000 1000 1000 1000 1000
 Site elevation: 8000' Level

PERCENTAGE THERMIST: 50 10

TYPE OF WINDT AND PLACEMENT:

Power line over road on hill

SLIGHT TOWER HEIGHT: 10,000 ft. 1000
CLOSEST TOWER TO ISLAND: 11,000 ft. 1000

REMARKS: Only island dose-rate readings are available. These were obtained from aerial and ground surveys made by the Radiological Safety Organization. The $t^{1/2}$ decay approximation was used to extrapolate the dose-rate readings to H+1 hour. Heavy contamination was not detected only on Holly, the chief island. Significant alpha (plutonium) contamination was also found on the chief island.

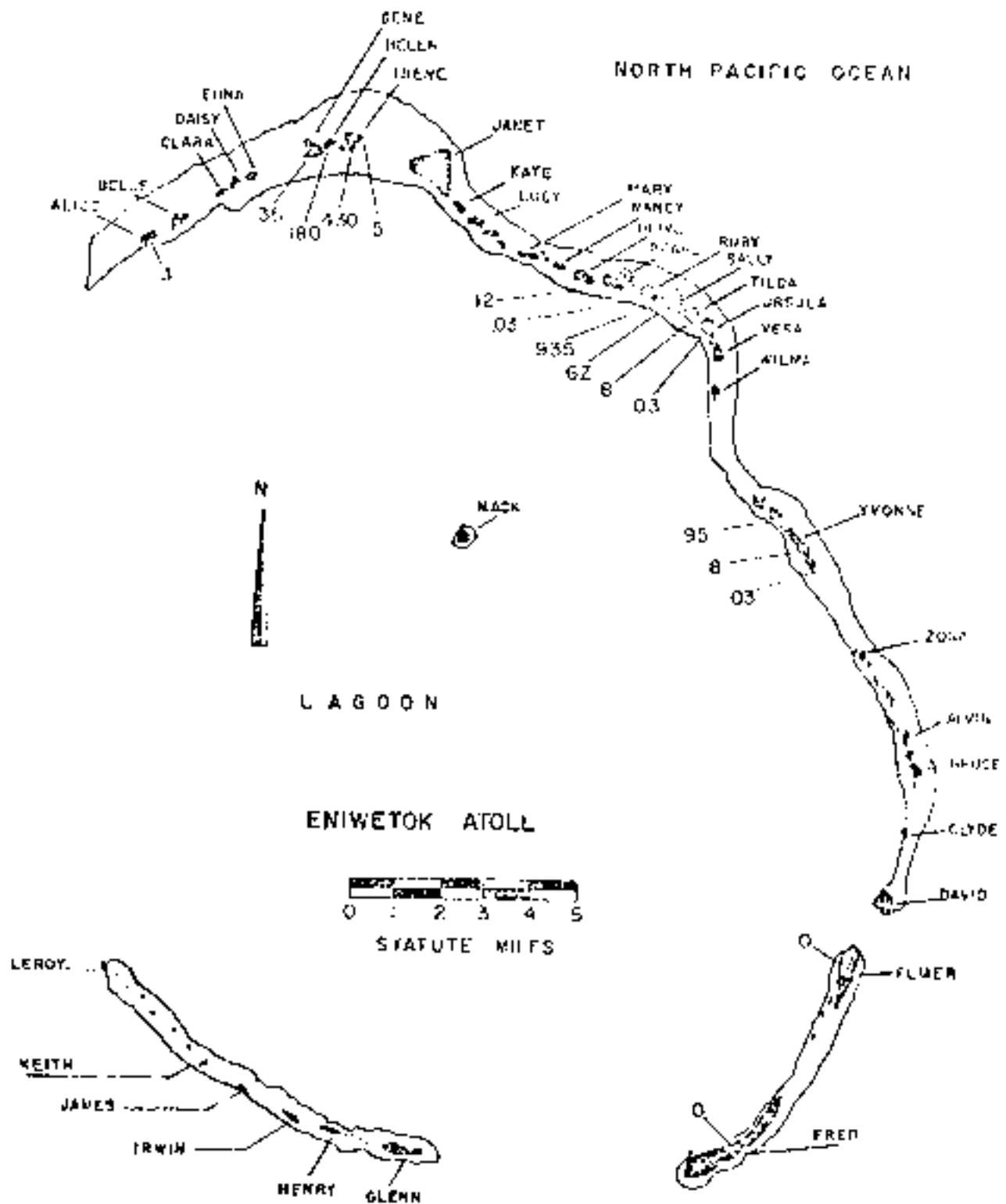


Figure 88. Operation REDWING - Island dose rates in r/hr at H+1 hour.

Kikopoo.

TABLE 26. ESTIMATED WIND DATA FOR OPERATING RAINING

R. H. FRANCO

Altitude (ft)	Wind speed		Direction		Wind duration	
	ft/min	km/h	ft/min	km/h	ft/min	km/h
Surface	00	15	000	18	000	15
1,000	100	12	000	12	000	14
2,000	000	14	000	14	000	14
3,000	200	17	000	17	000	14
4,000	000	16	100	20	000	13
5,000	100	14	100	14	000	10
6,000	120	12	120	12	000	06
7,000	100	07	100	08	000	07
8,000	000	05	100	12	000	07
9,000	000	09	100	12	000	03
10,000	000	10	070	03	000	09
11,000	000	13	000	00	000	09
12,000	000	10	000	07	000	05
13,000	(00)	(00)	(00)	(00)	(00)	(06)
14,000	000	05	000	13	040	07
15,000	000	11	000	09	040	12
16,000	000	12	000	07	020	14
17,000	000	10	040	15	000	23
18,000	000	00	200	17	010	10
19,000	000	17	300	13	040	10
20,000	000	20	020	18	030	10
25,000	000	20	000	24	010	23
30,000	000	24	200	26	000	20
35,000	000	25	000	32	000	30
40,000	000	24	000	16	000	20
45,000	000	31	110	37	100	39
50,000	000	45	000	51	000	51
55,000	000	77	100	61	100	50
60,000	100	74	100	60	000	65
61,000	---	---	---	---	000	60
80,000	100	71	000	70	---	---
90,000	000	83	000	60	---	---
95,000	100	90	000	86	---	---
98,000	100	90	---	---	---	---
100,000	---	---	000	68	---	---
107,000	---	---	000	60	---	---

FOOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 53,100 ft MSL.
3. Wind data was obtained by weather station on Eniwetok Island.
4. At the surface the air pressure was 14.65 psi, the temperature 29.0°C, the relative humidity 73%.

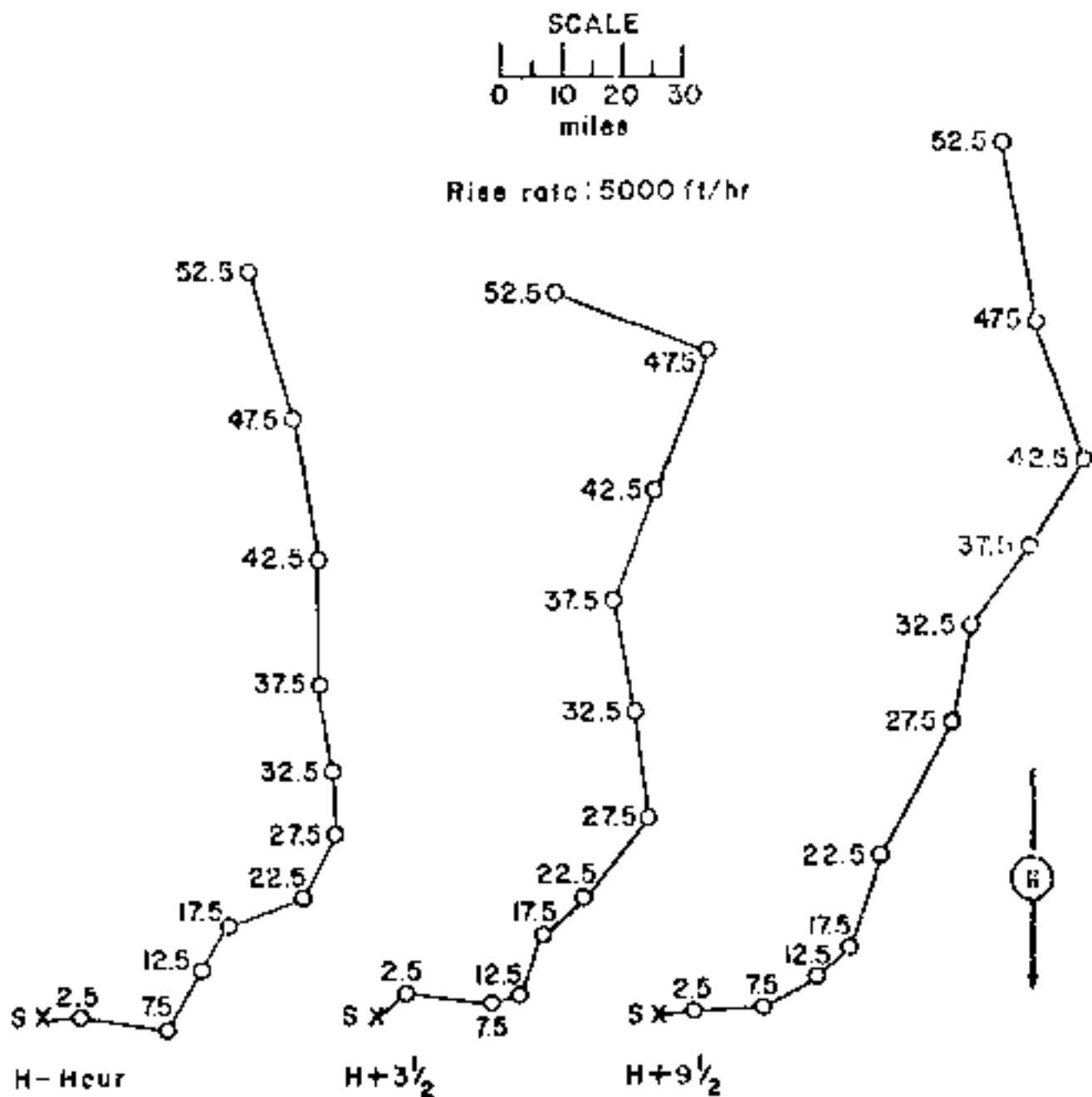


Figure 89. Hodographs for Operation RFDNEN -

Kickapoo

QUESTION 10: HEATING -

10000

$$\frac{\text{DUE}}{\text{PUE}} = \frac{\text{EPD} \times \text{LHV}}{\text{LHV} \times \text{LHV}} = \frac{\text{EPD}}{\text{LHV}}$$

Given: $\text{PUE} = 10000$

$$\frac{\text{DUE}}{\text{PUE}} = \frac{\text{EPD}}{\text{LHV}} = \frac{\text{EPD}}{\text{LHV}} = \frac{\text{EPD}}{\text{LHV}}$$

Site electricity at 0.10 level

$$\frac{\text{DUE}}{\text{PUE}} = \frac{\text{EPD}}{\text{LHV}} = \frac{\text{EPD}}{\text{LHV}} = \frac{\text{EPD}}{\text{LHV}}$$

$$\frac{\text{DUE}}{\text{PUE}} = \frac{\text{EPD}}{\text{LHV}} = \frac{\text{EPD}}{\text{LHV}} = \frac{\text{EPD}}{\text{LHV}}$$

Air conditioning system

$$\frac{\text{DUE}}{\text{PUE}} = \frac{\text{EPD}}{\text{LHV}} = \frac{\text{EPD}}{\text{LHV}} = \frac{\text{EPD}}{\text{LHV}}$$

REMARKS: K = 0.001, then, the calculation was the same.

TABLE 27. THE FOG WITH PVA FOR CALIBRATION OF MIST -

665

Air flow (L/min)	$\frac{W_2 - W_1}{L}$		H-20 air		H-20		H-20 + H ₂ O	
	g	min	g	min	g	min	g	min
8,000	13	15	150	15	16	16	16	15
10,000	15	16	150	16	---	---	16	16
20,000	13	18	160	17	---	---	17	16
25,000	15	18	150	17	---	---	16	18
30,000	16	18	150	17	---	---	17	17
35,000	16	17	150	16	---	---	17	19
40,000	16	16	160	16	---	---	17	17
45,000	16	15	170	15	---	---	16	15
50,000	15	15	150	15	---	---	15	15
55,000	15	15	150	15	---	---	15	15
60,000	15	15	150	15	---	---	15	15
65,000	15	15	150	15	---	---	15	15
70,000	15	15	150	15	---	---	15	15
75,000	15	15	150	15	---	---	15	15
80,000	15	15	150	15	---	---	15	15
85,000	15	15	150	15	---	---	15	15
90,000	15	15	150	15	---	---	15	15
95,000	15	15	150	15	---	---	15	15
100,000	15	15	150	15	---	---	15	15
105,000	15	15	150	15	---	---	15	15
110,000	15	15	150	15	---	---	15	15
115,000	15	15	150	15	---	---	15	15
120,000	15	15	150	15	---	---	15	15
125,000	15	15	150	15	---	---	15	15
130,000	15	15	150	15	---	---	15	15
135,000	15	15	150	15	---	---	15	15
140,000	15	15	150	15	---	---	15	15
145,000	15	15	150	15	---	---	15	15
150,000	15	15	150	15	---	---	15	15
155,000	15	15	150	15	---	---	15	15
160,000	15	15	150	15	---	---	15	15
165,000	15	15	150	15	---	---	15	15
170,000	15	15	150	15	---	---	15	15
175,000	15	15	150	15	---	---	15	15
180,000	15	15	150	15	---	---	15	15
185,000	15	15	150	15	---	---	15	15
190,000	15	15	150	15	---	---	15	15
195,000	15	15	150	15	---	---	15	15
200,000	15	15	150	15	---	---	15	15

NOTES:

1. Numbers in parentheses are estimated values.
2. Temperature before use: 24.5°C (76.1°F).
3. Mist data was obtained by the weather station on mist (S. T. Unit).
4. H-20 air values at 100,000 L were lower. Data from Table 26, at H-20, 1 hour and H-10, 1 hour.
5. At the surface the air pressure was 14.65 psi, the air density 0.075 lb./cu. ft., and the relative humidity 74%.

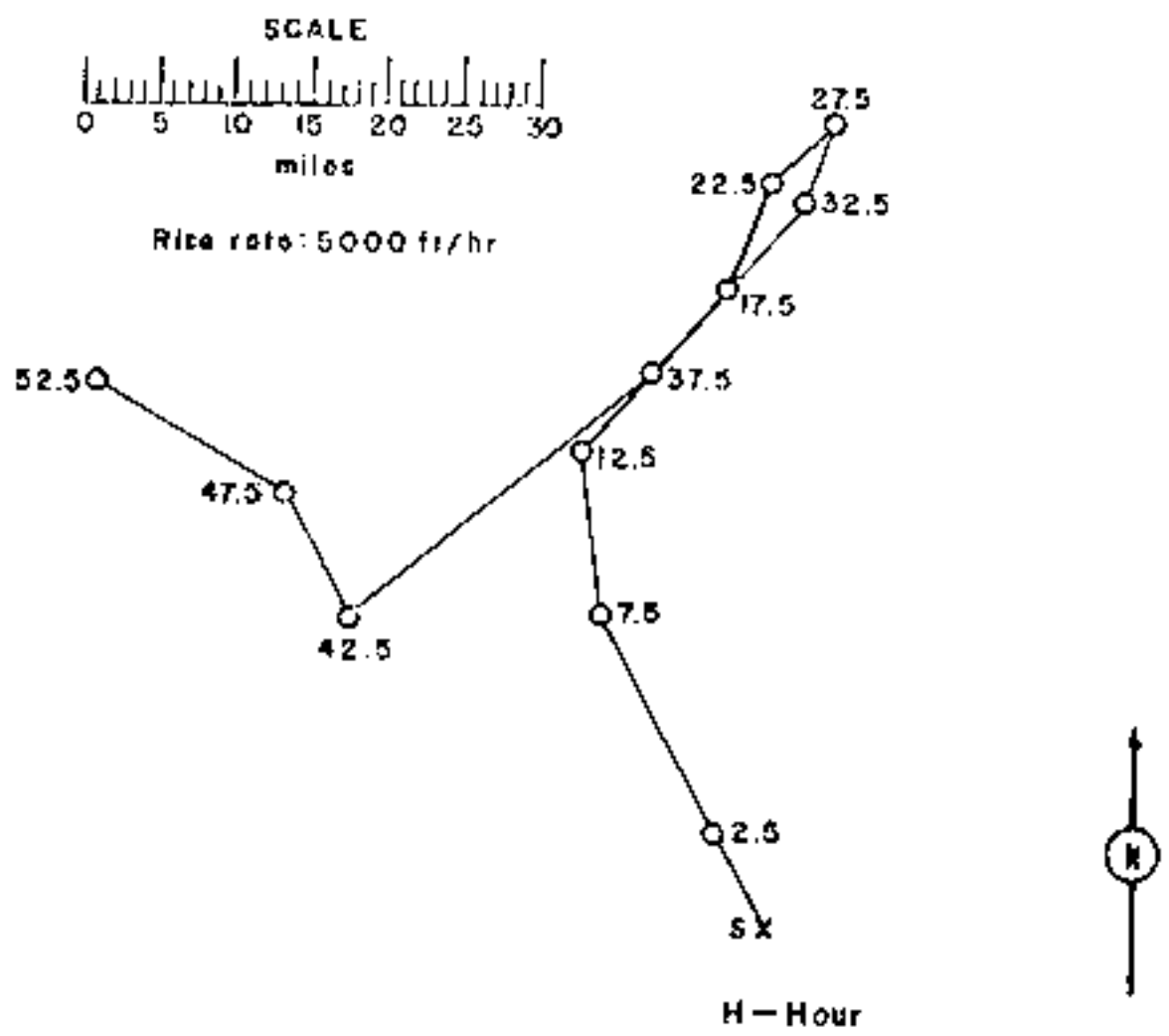


Figure 90. Holograph for Operation REMINDO -

Onrge

OBJECTIVE: MEASURING -

Isma

DATE: 20 June 1956 GMT 21 June 1956
TIME: 09:00 0126

Specimen: 3614

SITE: 114 - Enderby - Island
21° 31' 00" S
169° 21' 00" E
Site elevation: 300 ft

HEIGHT OF INSTRUMENT: 10 ft

TYPE OF WIND AND FLIGHT LOG:
Tower built on 20 June 1956

CLOUD TOP HEIGHT: 40,000 ft MSL
CLOUD BASE HEIGHT: 30,000 ft MSL

REMARKS: Only island dose-rate readings are available. These were obtained from aerial and ground surveys made by the Radiological Safety Organization. The $t^{-1.2}$ decay approximation was used to extrapolate the dose rate readings to 0:01 hour. Heavy contamination is noted only on the shot island.

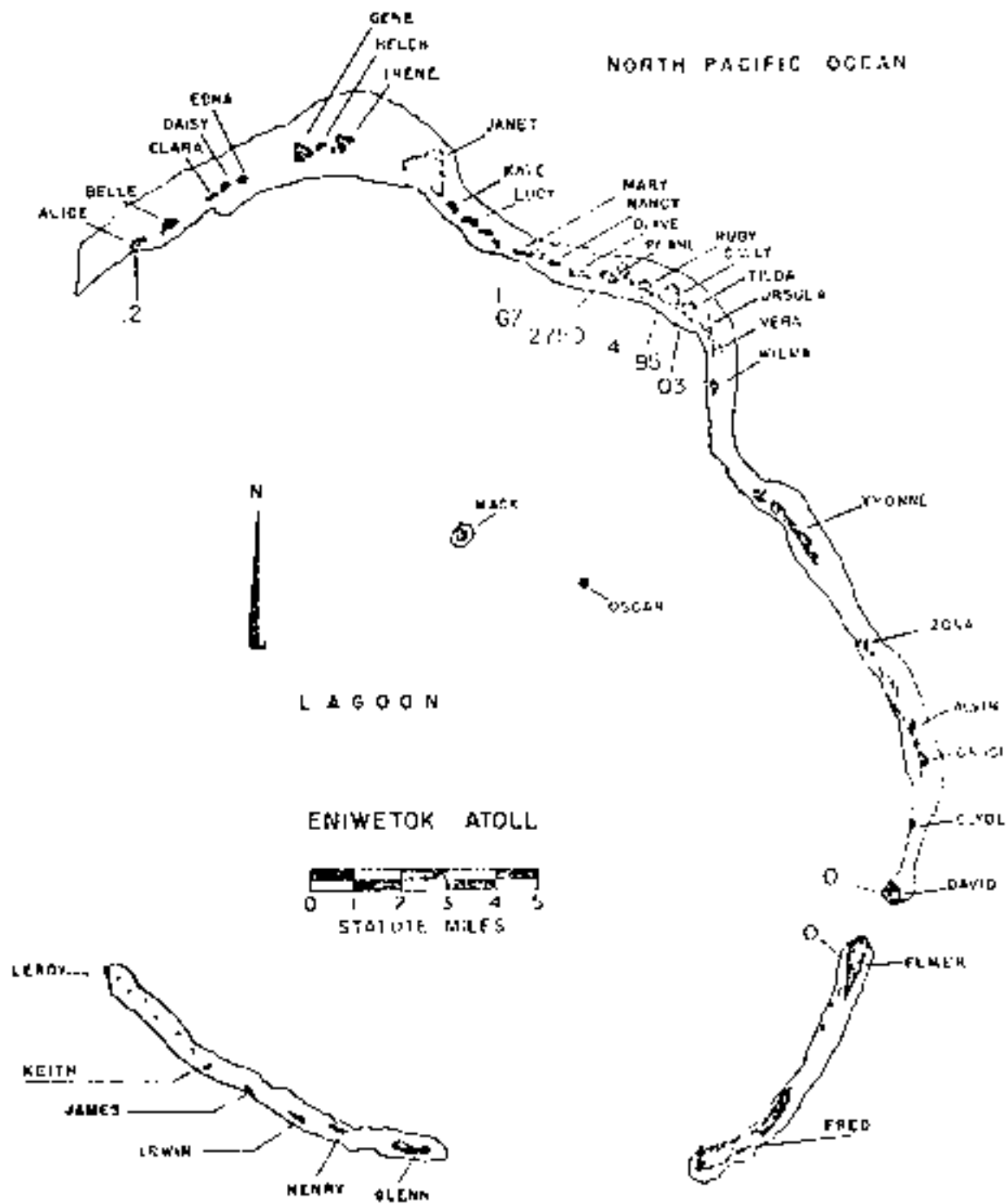


Figure 91. Operation REDWATER - Eniwetok Atoll - Island distribution rates in r/hr at 0-1 hour.

TABLE 28. WINDS FOR WIND DATA FOR ORBITATION STUDIES -

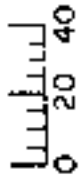
1954

Altitude (ft.)	H+1 hour		H-hour		H-1 hour		H+2 hour		H-2 hour	
	Dir. deg. True	Speed mph	Dir. degrees	Speed mph	Dir. deg. True	Speed mph	Dir. deg. True	Speed mph	Dir. deg. True	Speed mph
Surface	150	12	140	14	170	18	090	12	090	18
1,000	100	20	100	20	090	21	090	21	090	16
2,000	100	22	100	23	090	24	090	23	090	20
3,000	110	26	100	26	090	28	100	29	090	26
4,000	110	29	100	29	090	28	100	29	090	26
5,000	110	29	100	29	090	29	100	29	090	25
6,000	110	29	110	29	100	30	100	28	090	29
7,000	100	29	100	29	100	30	100	24	090	27
8,000	100	29	100	30	100	31	100	24	110	23
9,000	090	29	090	29	100	29	100	24	110	24
10,000	090	29	090	28	100	24	100	24	100	24
12,000	090	29	090	28	100	24	090	20	090	21
14,000	100	29	100	26	100	23	090	22	110	23
15,000	(100)	(25)	(100)	(26)	(100)	(24)	(100)	(21)	(100)	(22)
16,000	100	25	100	26	100	25	100	21	100	22
18,000	090	24	090	24	090	23	120	20	090	22
20,000	150	22	090	23	090	26	100	22	090	20
25,000	010	25	020	22	040	16	010	13	040	09
30,000	210	18	220	16	170	12	18	14	150	13
35,000	210	25	230	23	170	17	170	14	210	20
40,000	210	30	210	29	200	25	270	27	260	30
45,000	230	36	240	36	200	35	270	31	300	26
50,000	---	--	300	23	320	24	090	27	100	13
55,000	---	--	350	22	330	21	110	21	110	14
60,000	---	--	---	--	---	--	100	23	090	24
65,000	---	--	---	--	---	--	100	29	090	24
70,000	---	--	---	--	---	--	090	49	100	57
75,000	---	--	---	--	---	--	160	33	100	42
80,000	---	--	---	--	---	--	110	49	100	43
85,000	---	--	---	--	---	--	100	54	090	56
90,000	---	--	---	--	---	--	090	53	090	74
95,000	---	--	---	--	---	--	090	27	090	44
97,000	---	--	---	--	---	--	---	--	100	43
100,000	---	--	---	--	---	--	100	85	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 54,400 ft MSL at H+5 hours.
3. Wind data was obtained by the weather station on Pitavotok Island.
4. H-hour values were interpolated from data taken at H-1 hour and H+2 hours.
5. At the surface the air pressure was 24.63 mb, the temperature 28.6°C and the relative humidity 81%.

SCALE



miles

Rise rate: 5000 ft/hr

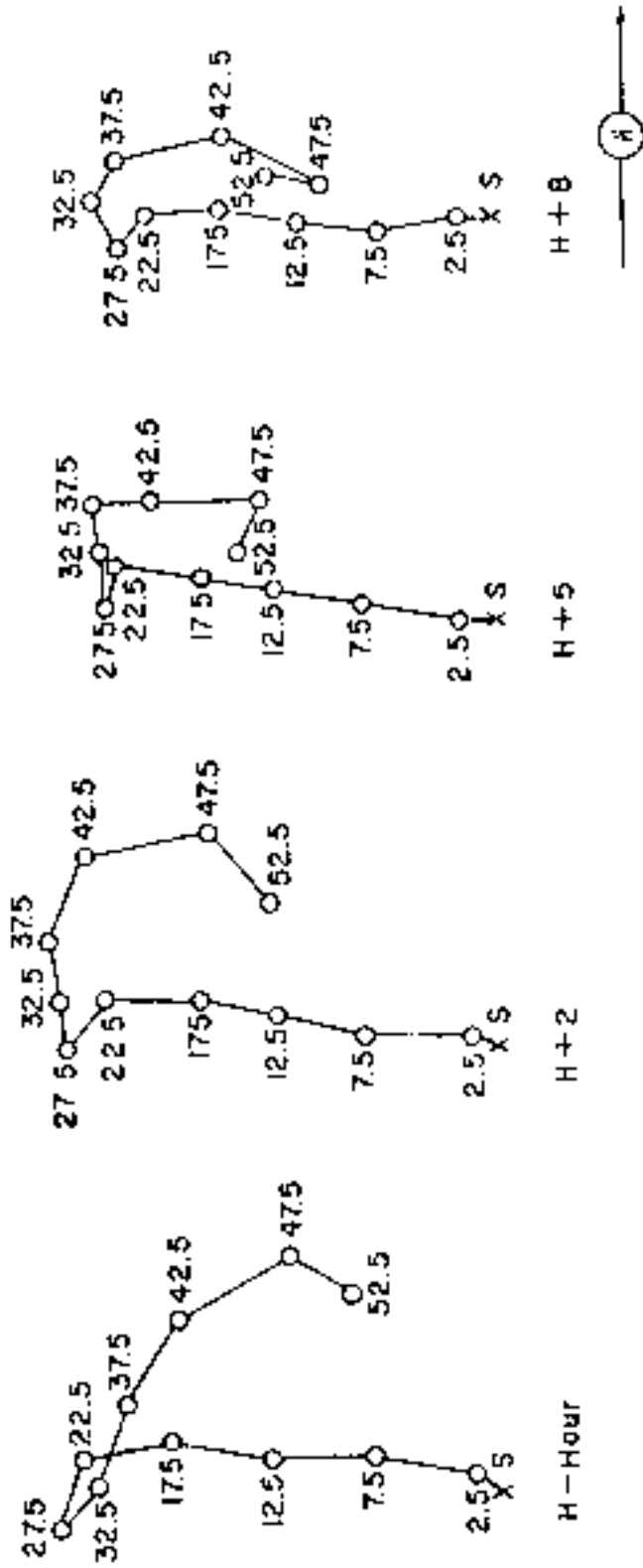


Figure 92. Meangraphs for Operation FEMING -

Inc

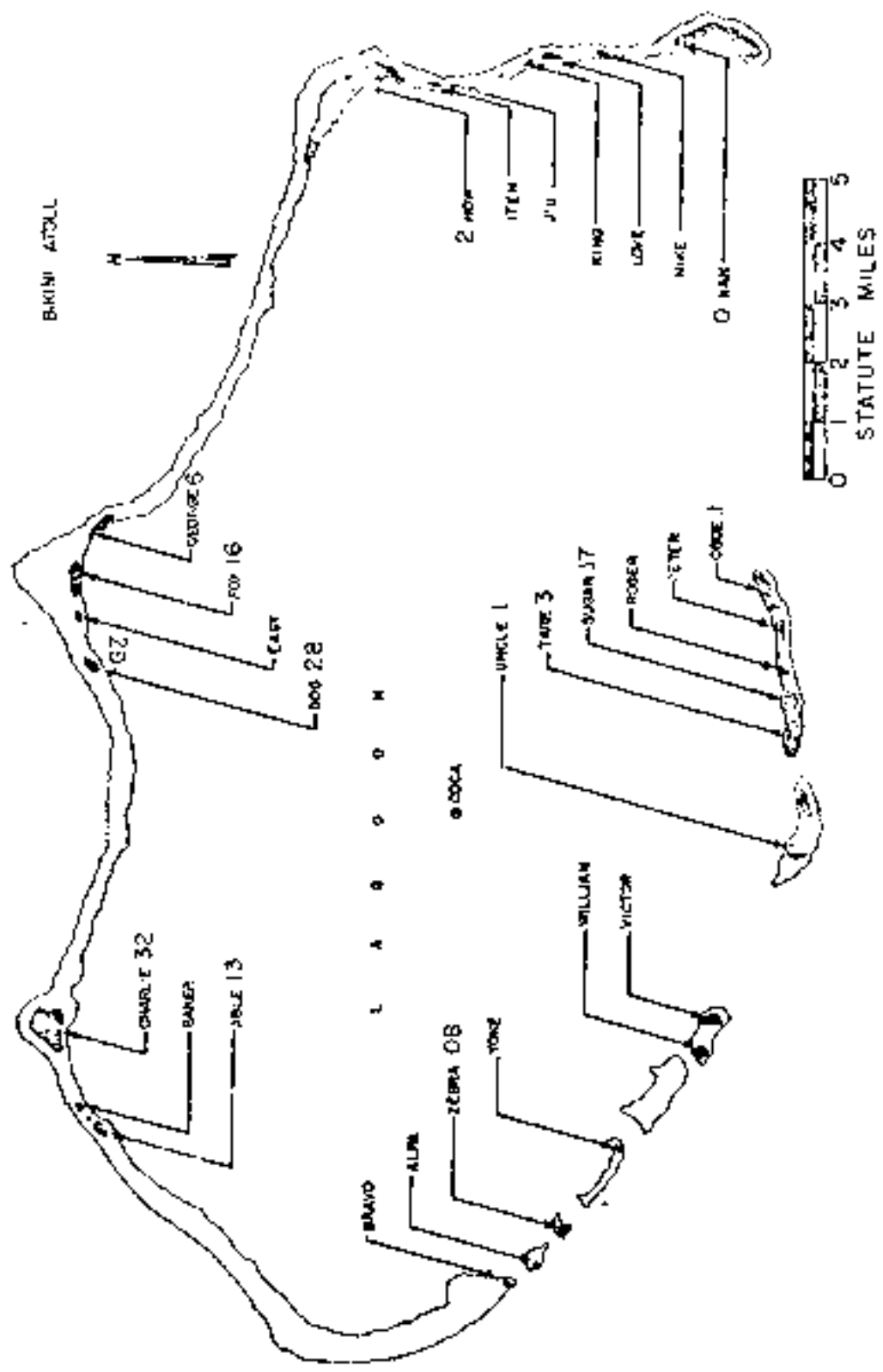


Figure 95. Operation Hootenanny - **Bravo**. Island assignments in effect at 241 hours.

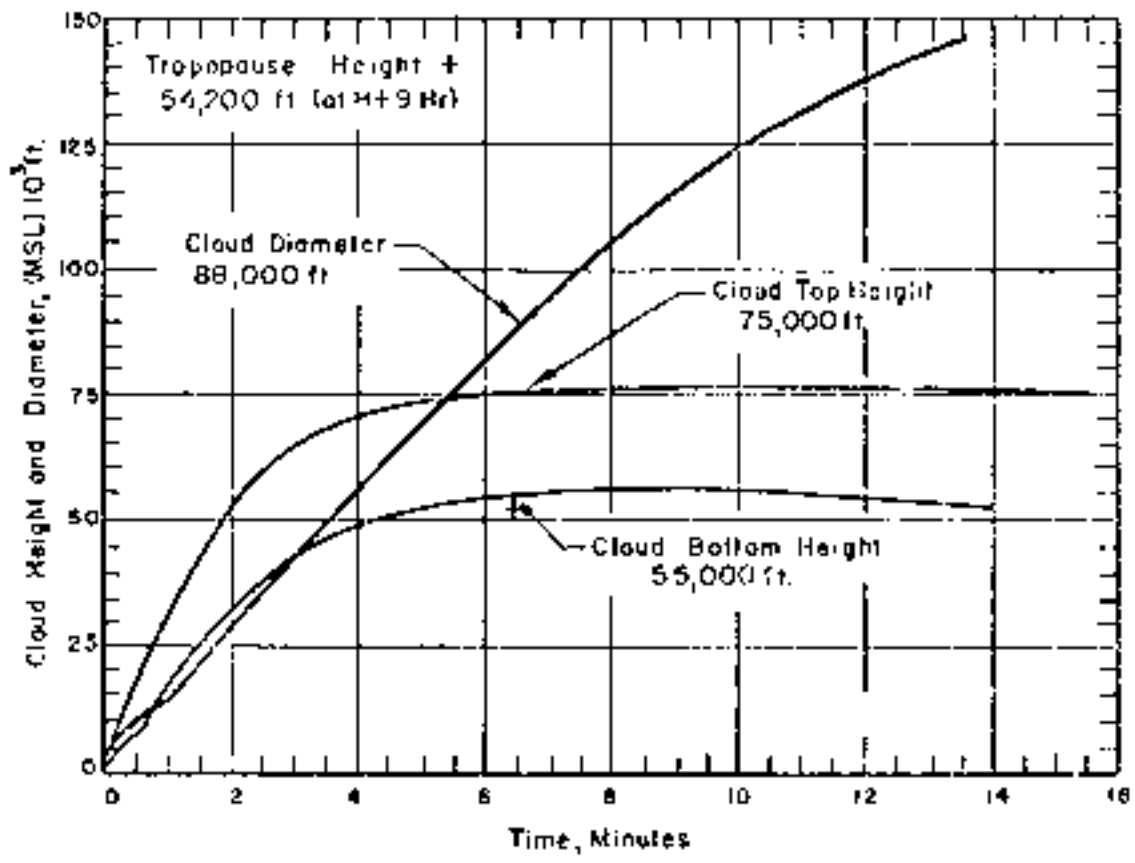


Figure 94. Cloud Dimensions: Operation 6024153 - Data

TABLE 29. WIND DATA FROM THE SURFACE PLUNING—

DARTON

Altitude (ft.)	H-1 hr		H-1.5 hr		H-2 hr		H-2.5 hr		H-3 hr	
	Dir	Spd	Dir	Spd	Dir	Spd	Dir	Spd	Dir	Spd
Time	300	110	17	64	27	110	30	110	30	110
5,000	070	17	070	21	070	17	080	15	070	18
7,000	070	17	070	21	---	---	070	17	070	17
9,000	080	15	080	18	---	---	080	21	100	21
11,000	130	17	080	15	110	11	070	23	100	21
13,000	080	16	070	17	110	12	100	22	070	20
15,000	120	15	070	17	100	15	100	17	070	20
17,000	180	14	070	17	100	16	110	15	080	17
19,000	110	17	080	15	100	14	110	15	100	16
21,000	180	15	100	17	120	17	120	17	110	16
23,000	140	15	110	15	120	17	100	18	100	20
25,000	150	14	100	14	120	16	100	17	100	16
27,000	120	12	110	15	110	15	120	10	070	16
29,000	160	06	100	13	130	15	080	17	080	15
31,000	210	05	080	07	160	05	070	07	100	07
33,000	150	06	210	10	150	05	240	07	210	05
35,000	250	07	210	07	210	11	200	05	210	09
37,000	270	05	240	05	230	10	250	17	250	23
39,000	230	14	240	23	240	25	260	27	260	26
41,000	250	25	250	32	240	11	260	45	230	15
43,000	250	41	240	45	250	51	260	54	230	30
45,000	250	56	250	35	250	57	260	60	260	45
47,000	270	75	250	54	280	55	270	53	250	50
50,000	080	07	---	---	090	08	---	---	150	10
60,000	100	22	---	---	100	16	---	---	080	23
65,000	080	34	---	---	080	37	---	---	090	35
70,000	100	45	---	---	080	53	---	---	090	45
75,000	080	58	---	---	080	62	---	---	100	55
80,000	090	63	---	---	100	74	---	---	090	71
85,000	090	51	---	---	090	85	---	---	090	87
90,000	100	59	---	---	---	---	---	---	080	77

NOTES:

1. Tropopause height was 54,200 ft MSL at H+9 hours.
2. Wind data was obtained on board the U.S.S. Curtiss.
3. At H-hour the sea level pressure was 1009.1 mb, the temperature 82.0° F, the dew point 75.0° F and the relative humidity 80.0%.

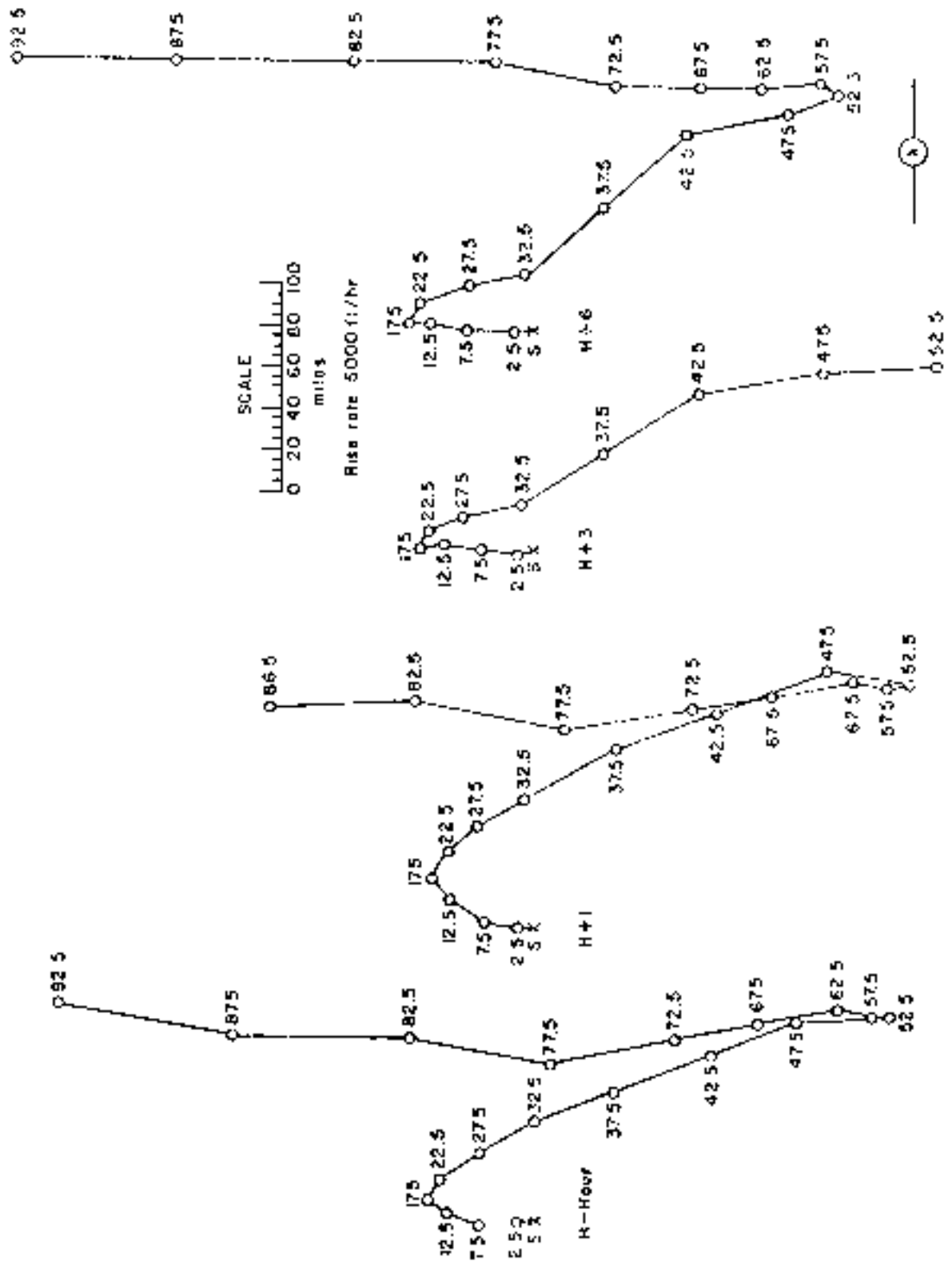


Figure 95. Hydrographs for Operation 207110 - Dakota

OBSERVATION RECORDING -

Mars

DATE: $\frac{\text{FEB } 21}{1962}$ / $\frac{\text{GMT}}{1700-1720}$
TIME: 0100 1100

Site: 00RL

SITE: FIG - Project - 3.3g
 11° 30' 28" S
 162° 18' 50" E
 Site elevation: Sea level

DEPTH OF MESS: 300 ft

TYPE OF TEST AND PLACEMENT:
 1000 barrel over crater area

CRATER TOP ELEVATION: 6000 ft MSL
CRATER CENTER ELEVATION: 5000 ft MSL

REMARKS: The dose-rate readings on the topside of the shell were taken by aerial and ground surveys of scientific projects between 1958 hour and 1956 hours. The experimentally determined gamma field decay exponent λ was used to extrapolate the dose rate readings to 1954 hour. Extremely heavy local contamination resulted in Ruby. In addition, significant amounts of crater material were deposited on the northern side of the shell. The readings taken between sites, Janet and Olive, were corrected for the local dose rates observed there before the shot. No such corrections were applied to sites, Regl and Sally, because the contamination from shot H-128 was so heavy that the pre-shot dose rates could not be neglected. The readings in the vicinity of the crater were taken between 1932 hours and 1956 hours. The average field decay exponent λ was used to extrapolate the readings to 1954 hour. Approximately 2 hours after detonation, light fallout started on Shear and continued for one hour. Peak intensity was 22 m/hr.

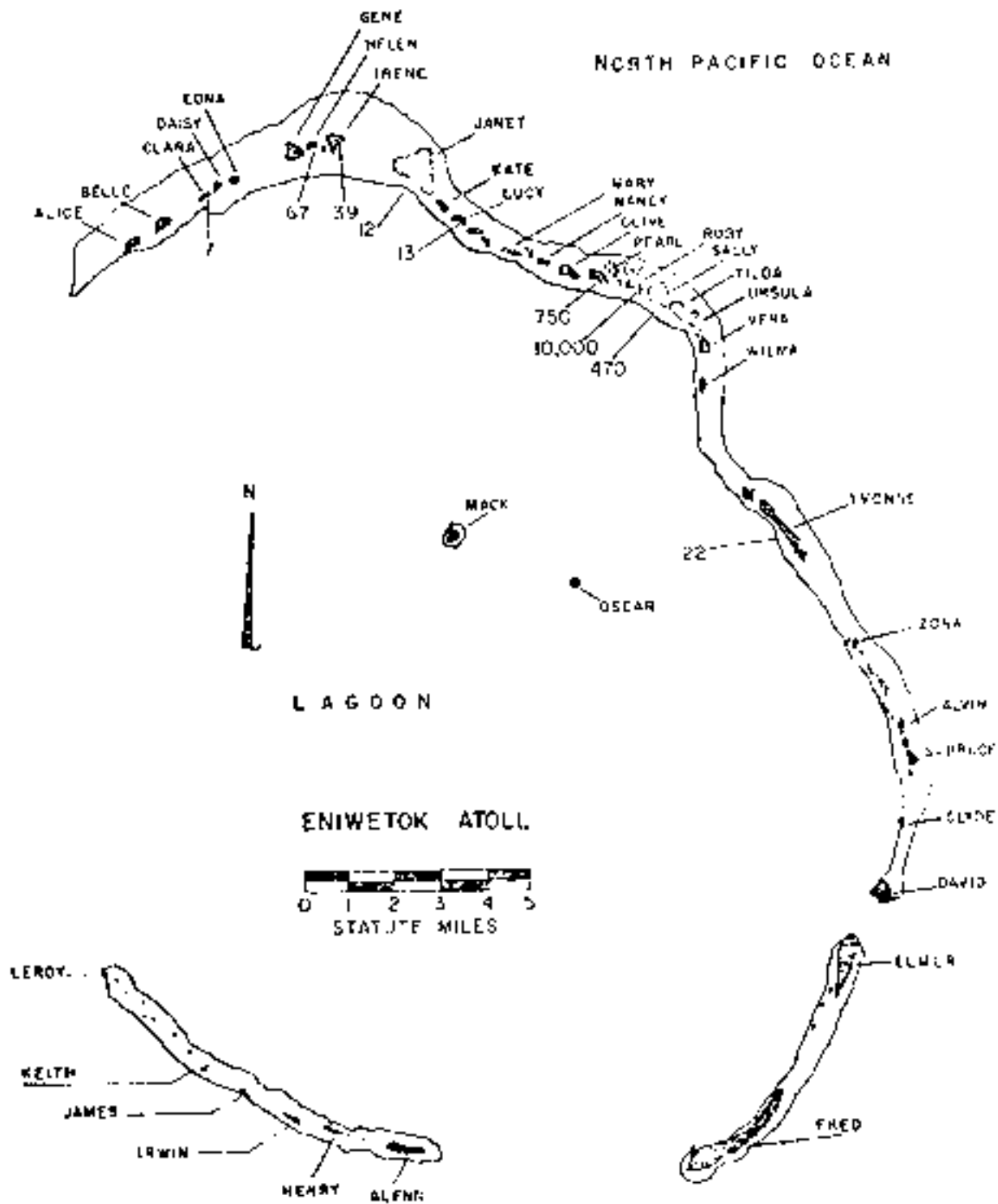


Figure 96. Operation REDWING - Island dose rates in r/hr at H+1 hour.

Island.



Figure 97. Dose rate readings near the Mohawk crater in r/hr at H+1 hour

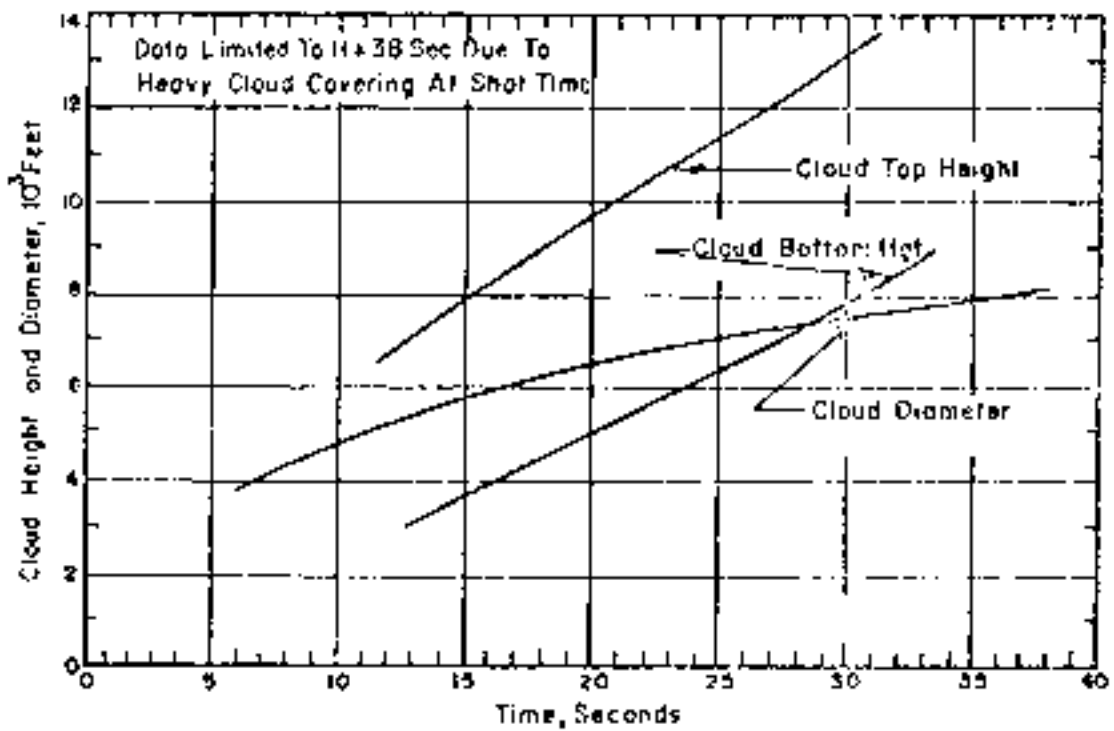


Figure 98. Cloud Dimensions: Operation SEPWICK - Mohr's

TABLE 10. WIND SPEED WITH WIND DOD OF A 50% FREQUENCY -

CONTINUED

Altitude (ft.)	12-3 hours		15-18 "		18-21 "		21-24 "	
	Direction	Speed	Direction	Speed	Direction	Speed	Direction	Speed
5,000	100	25	130	21	140	18	150	18
10,000	110	24	140	18	040	18	050	17
15,000	110	24	140	21	130	23	040	21
20,000	100	26	140	26	140	17	050	24
25,000	100	22	130	20	140	15	050	23
30,000	110	20	140	17	140	16	110	23
35,000	110	24	140	15	120	14	110	24
40,000	050	19	130	14	110	16	140	14
45,000	050	20	110	17	100	18	120	17
50,000	050	16	100	14	100	16	120	17
10,000	070	17	040	17	030	16	110	17
12,000	070	17	070	18	060	18	050	16
14,000	040	17	010	15	130	17	050	14
15,000	---	---	(100)	(16)	(050)	(17)	(110)	(15)
16,000	070	19	100	14	150	17	080	14
18,000	110	16	080	09	070	08	070	09
20,000	140	20	230	11	040	17	070	14
25,000	170	16	150	06	150	07	050	14
30,000	200	19	100	14	190	20	010	17
35,000	240	16	180	11	100	17	110	16
40,000	240	18	050	17	040	14	100	18
45,000	050	14	050	07	070	10	120	14
50,000	070	16	070	10	060	14	050	16
55,000	070	19	100	05	150	07	150	14
60,000	100	16	100	10	110	04	050	14
65,000	---	---	---	---	050	10	100	16
70,000	---	---	---	---	100	12	100	15
75,000	---	---	---	---	110	14	100	16
80,000	---	---	---	---	110	09	100	16
85,000	---	---	---	---	---	---	100	16
90,000	---	---	---	---	100	61	---	---
95,000	---	---	---	---	050	74	---	---
100,000	---	---	---	---	050	79	---	---
105,000	---	---	---	---	050	88	---	---

NOTES:

1. Values in parentheses are estimated values.
2. Tropopause height was 56,500 ft MSL.
3. Wind data was obtained by the weather station on Rikwetuk Island.
4. 8-hour values interpolated for 45,000 ft and above from 12-3 hours and 103 hours data.
5. At the surface the dry pressure was 1013 mb, the temperature 26.1°C, the dew point 20.2°C and the relative humidity 67%.

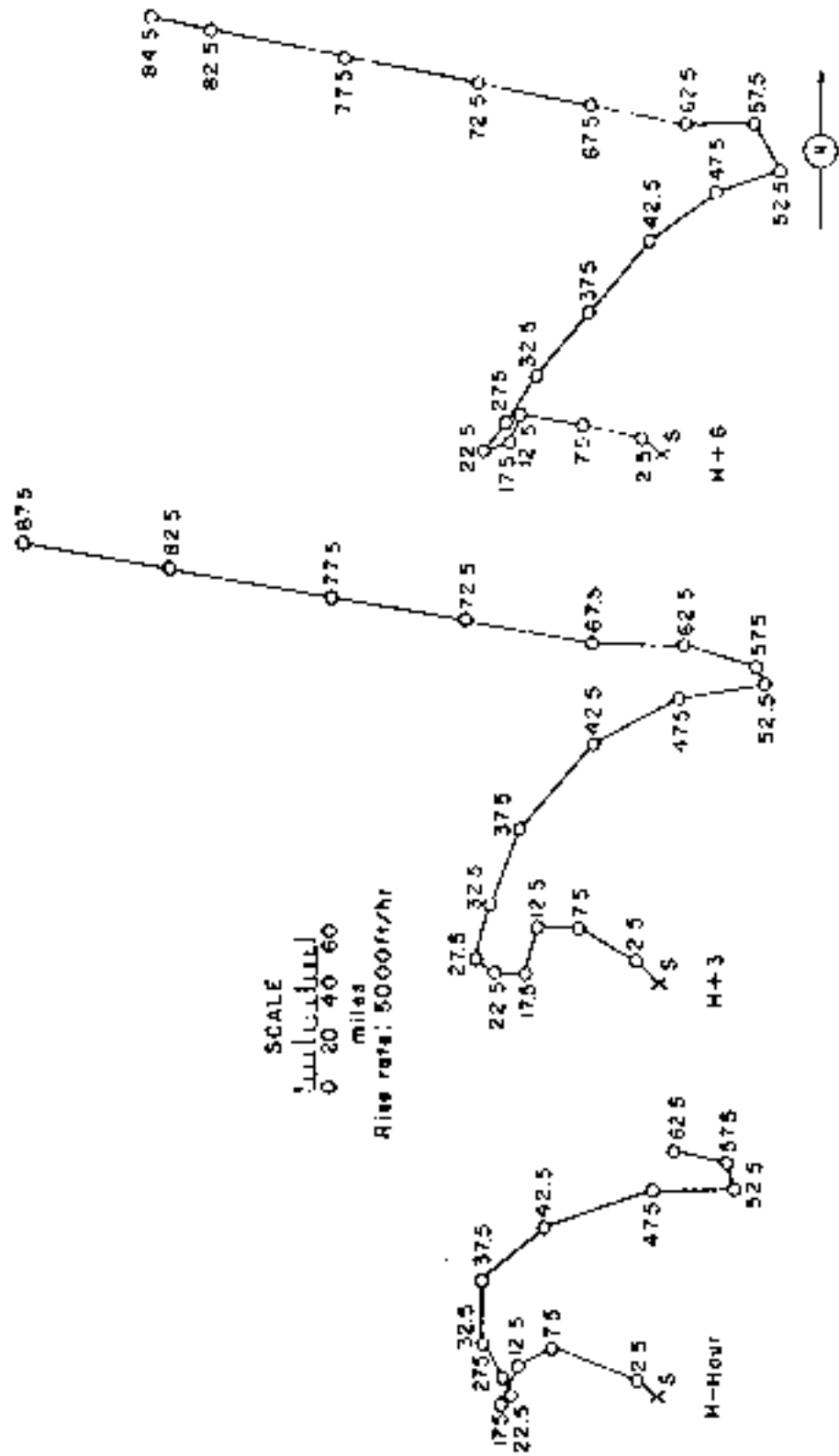


Figure 99. Hodographs for Operation KSUMING - Monrak.

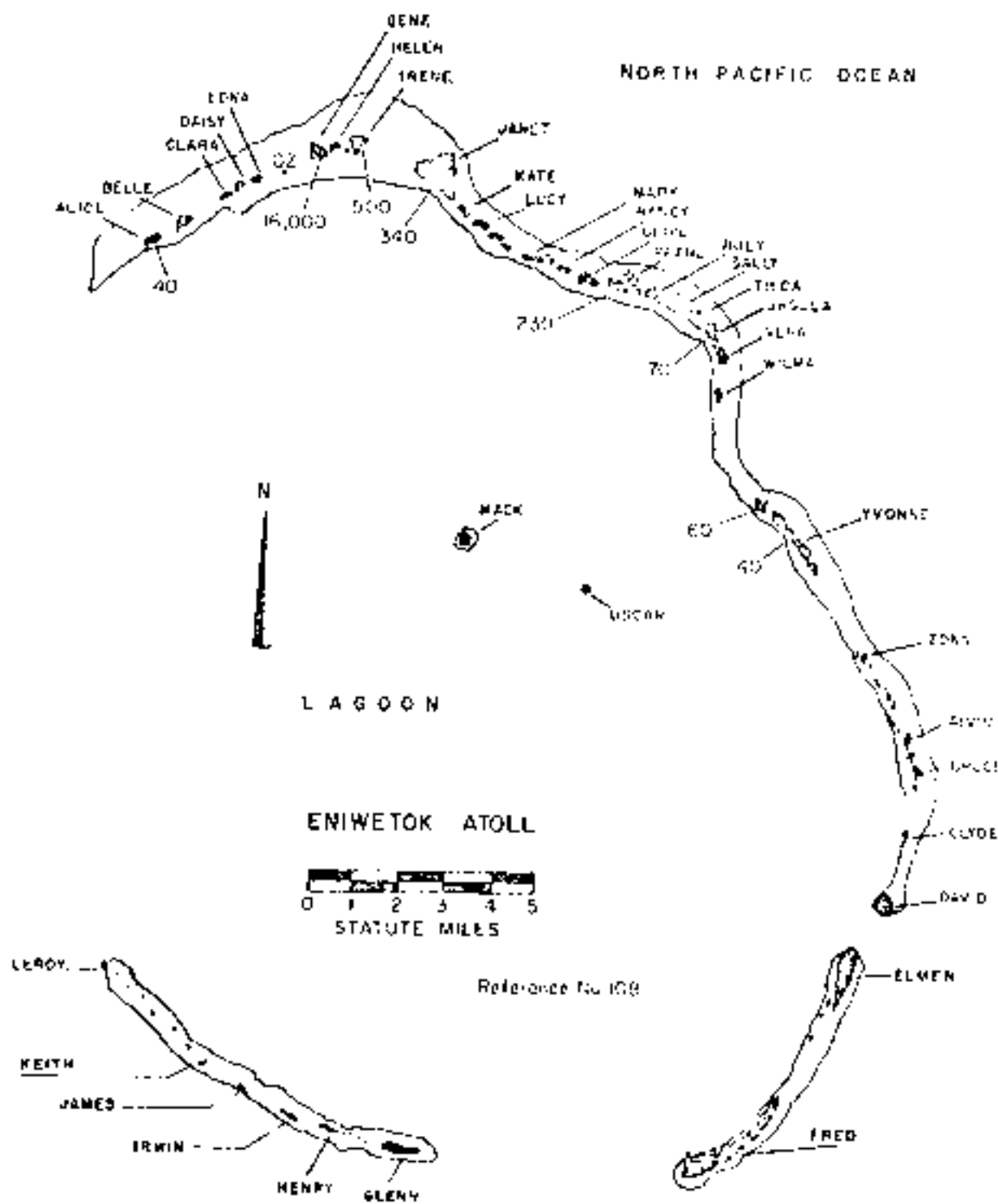


Figure 100. Operation BROWNING - Appear. Island dose rates in r/hr at 1400 hours.

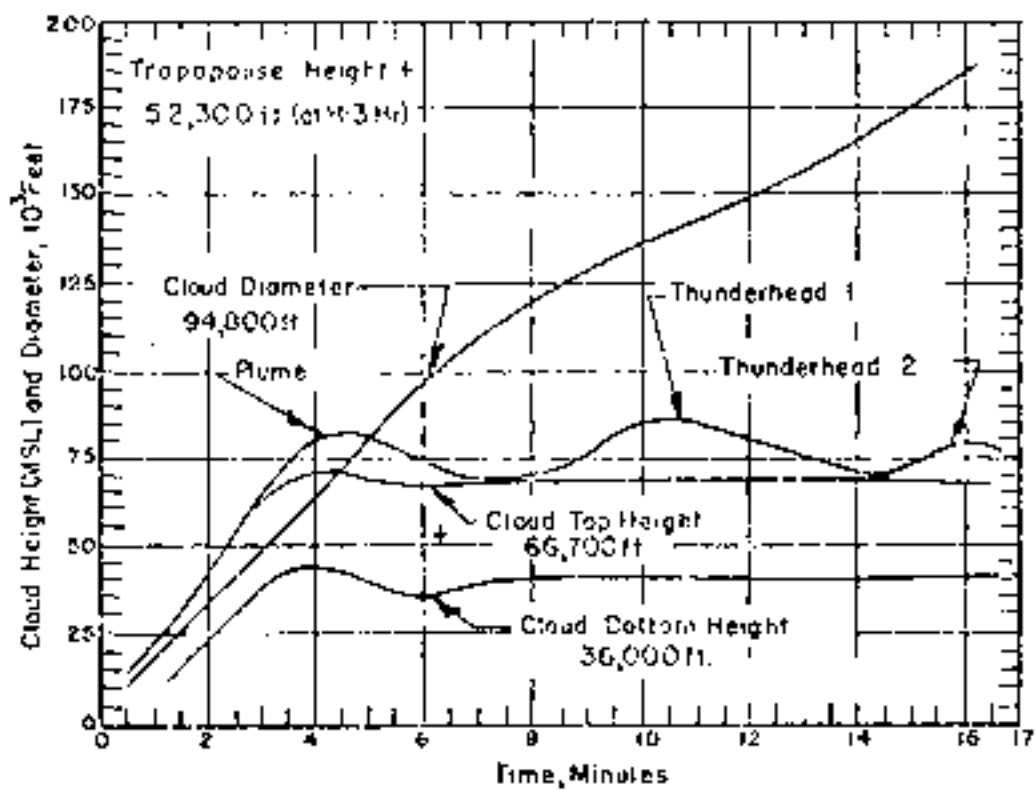


Figure 101. Cloud Dimensions: Operation FIDWING -

Apache.

TABLE 31. KAWAIAKI WIND DATA FOR OBSERVATION NO. 1002 -

MAUI

Altitude (ft)	H=2 hour		H=3 hour		H=4 hour		H=5 hour		H=6 hour	
	Dir	Spd	Dir	Spd	Dir	Spd	Dir	Spd	Dir	Spd
Feet	degrees	mph	degrees	mph	degrees	mph	degrees	mph	degrees	mph
Surface	070	12	070	12	070	12	140	11	070	14
1,000	070	14	070	16	070	20	070	21	070	16
2,000	070	14	070	18	070	23	080	22	070	17
3,000	070	17	070	17	070	24	070	25	070	24
4,000	100	15	070	20	070	26	070	22	100	22
5,000	100	15	100	23	100	31	070	23	100	17
6,000	110	17	110	19	110	22	090	21	100	24
7,000	110	17	110	18	120	21	090	21	100	21
8,000	090	15	130	22	130	21	100	21	100	19
9,000	130	15	130	21	130	25	130	21	110	20
10,000	140	18	140	21	140	25	110	21	110	20
12,000	150	07	150	10	160	13	110	17	130	25
14,000	120	08	120	08	110	08	100	08	100	12
16,000	060	07	050	06	060	6	230	17	120	12
18,000	080	06	020	05	250	5	150	09	300	09
20,000	050	07	030	11	080	6	050	09	300	10
25,000	200	07	270	08	160	09	220	10	200	10
30,000	300	11	270	10	210	09	180	09	210	12
35,000	110	24	200	14	200	11	210	9	210	09
40,000	210	10	290	09	080	11	110	06	210	10
45,000	250	16	270	16	240	12	210	20	240	20
50,000	270	17	200	16	240	17	210	21	240	21
55,000	180	28	180	23	---	---	070	01	200	30
60,000	100	30	180	30	---	---	---	30	070	31
65,000	080	39	080	39	---	---	090	41	100	40
70,000	---	---	---	---	---	---	100	41	100	39
75,000	---	---	---	---	---	---	100	41	090	36
80,000	---	---	---	---	---	---	070	42	090	41
85,000	---	---	---	---	---	---	090	43	---	---
90,000	---	---	---	---	---	---	---	---	110	40
95,000	---	---	---	---	---	---	---	---	110	30

NOTES:

1. Numbers in parentheses are estimated values.
2. Tropopause height was 52,300 ft MSL at H=3 hours.
3. Wind data was obtained by the weather station on Pinnacle Island.
4. H-hour values interpolated; H=2 hour and H=4 hour data was used for surface through 50,000 ft; H=1 hour and H=4 hour data was used for 55,000 ft and above.
5. At the surface the air pressure was 14.63 psi, the temperature 26.8°C, the dew point 23.7°C, and the relative humidity 89%.

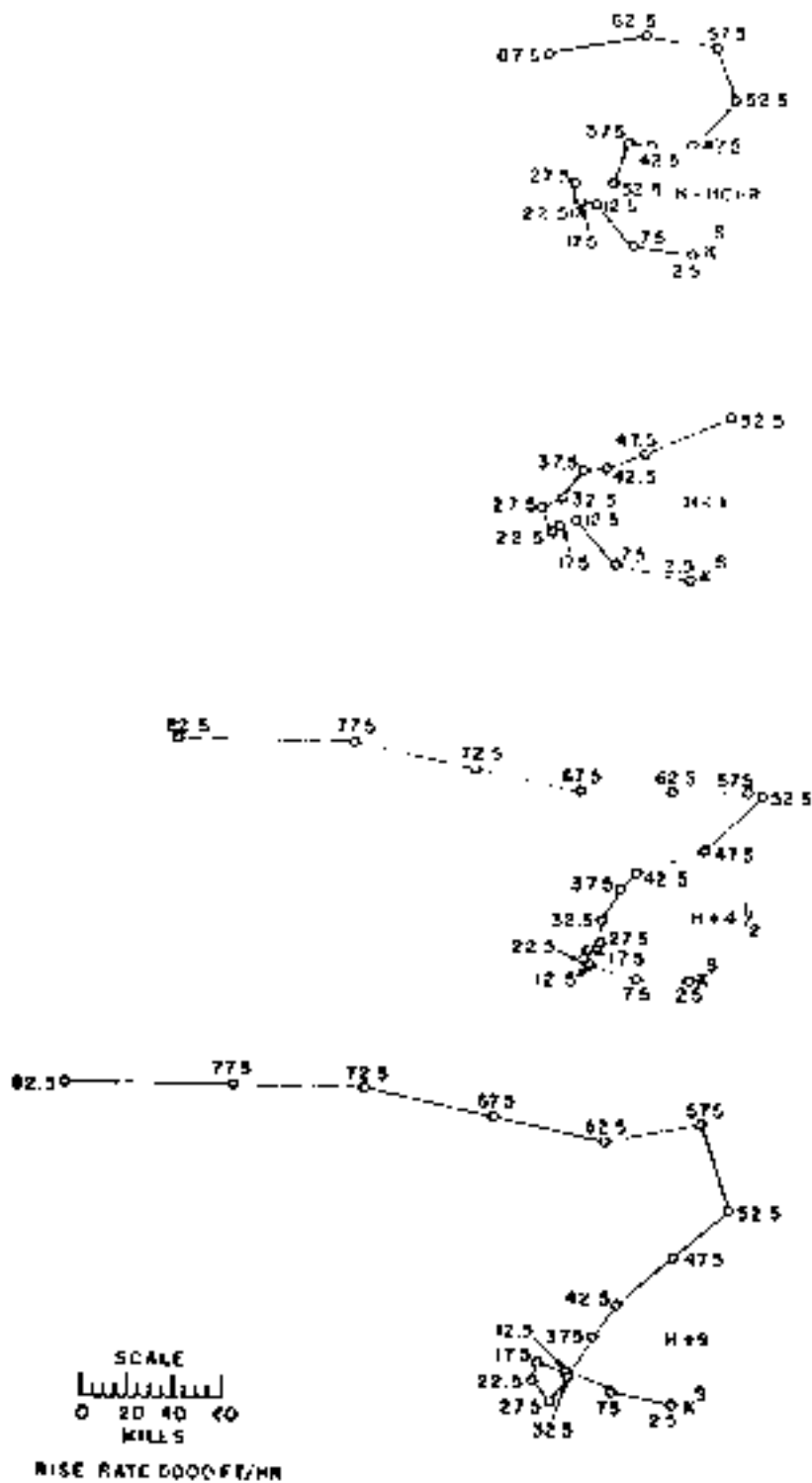


Figure 102. Hodographs for Operation RYUJING -

Apache.

OPERATION REPORTING -

Navajo

	<u>PPG Time</u>	<u>GMC</u>
<u>DATE:</u>	11 Jul 1956	10 Jul 1956
<u>TIME:</u>	0536	1756

Sponsor: IASD.

SITE: PPG - Bikini - South of Dog
 11° 39' 48" N
 169° 23' 13" E
 Site elevation: Sea level

HEIGHT OF MAST: 15 ftTYPE OF MAST AND PLACEMENT:

Surface mast from large sea
 water; center of gravity
 approx. 15 ft above surface
 of water; depth to bottom=215 ft

CLOUD TOP HEIGHT: 35,000 ft MSLCLOUD BOTTOM HEIGHT: 52,000 ft MSLREMARKS:

The on-site fallout pattern was drawn from island readings taken by scientific projects supplemented by fallout sample collections on rafts and barges in the lagoon. The survey readings were obtained on D-day. A gamma decay exponent determined from laboratory gamma decay measurements, was used to convert the D-day readings to H+1 hour values. Light fallout occurred on Nan approximately 18 hours after detonation, with peak gamma intensities of 22 m/hr.

The off-site fallout pattern was drawn from aerial and oceanographic surveys. The oceanographic surveys used detector probes for measuring the dose rate at depths to and below the thermocline. Water sampling equipment was used for taking of surface samples and for the collection of samples from any desired depth. The dose rate readings were extrapolated to H+1 hour by using the decay measurements of the samples collected.

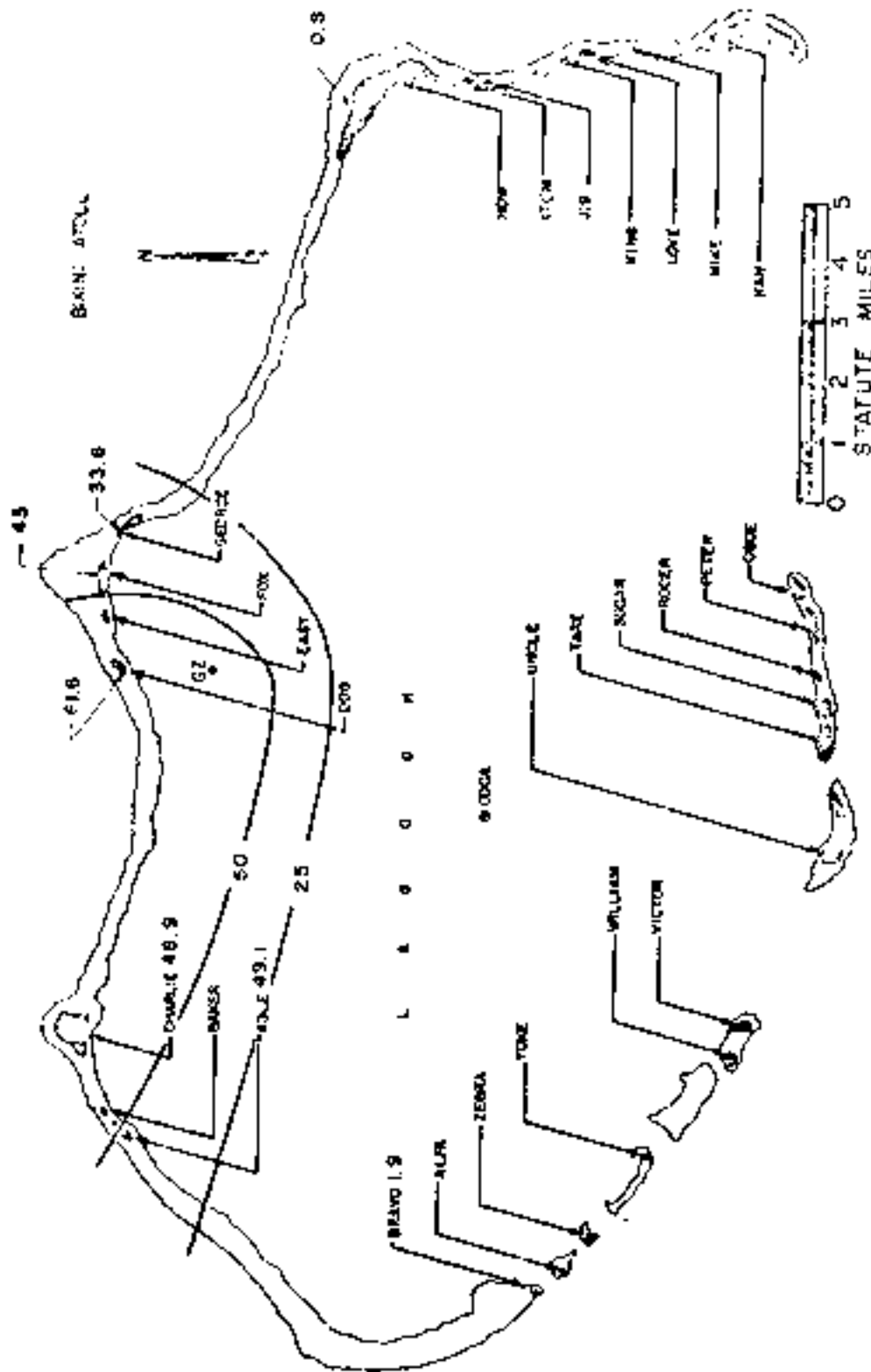


Figure 103. Operation Reliance - Line Islands atoll routes to 1/31 at 1445 hours.

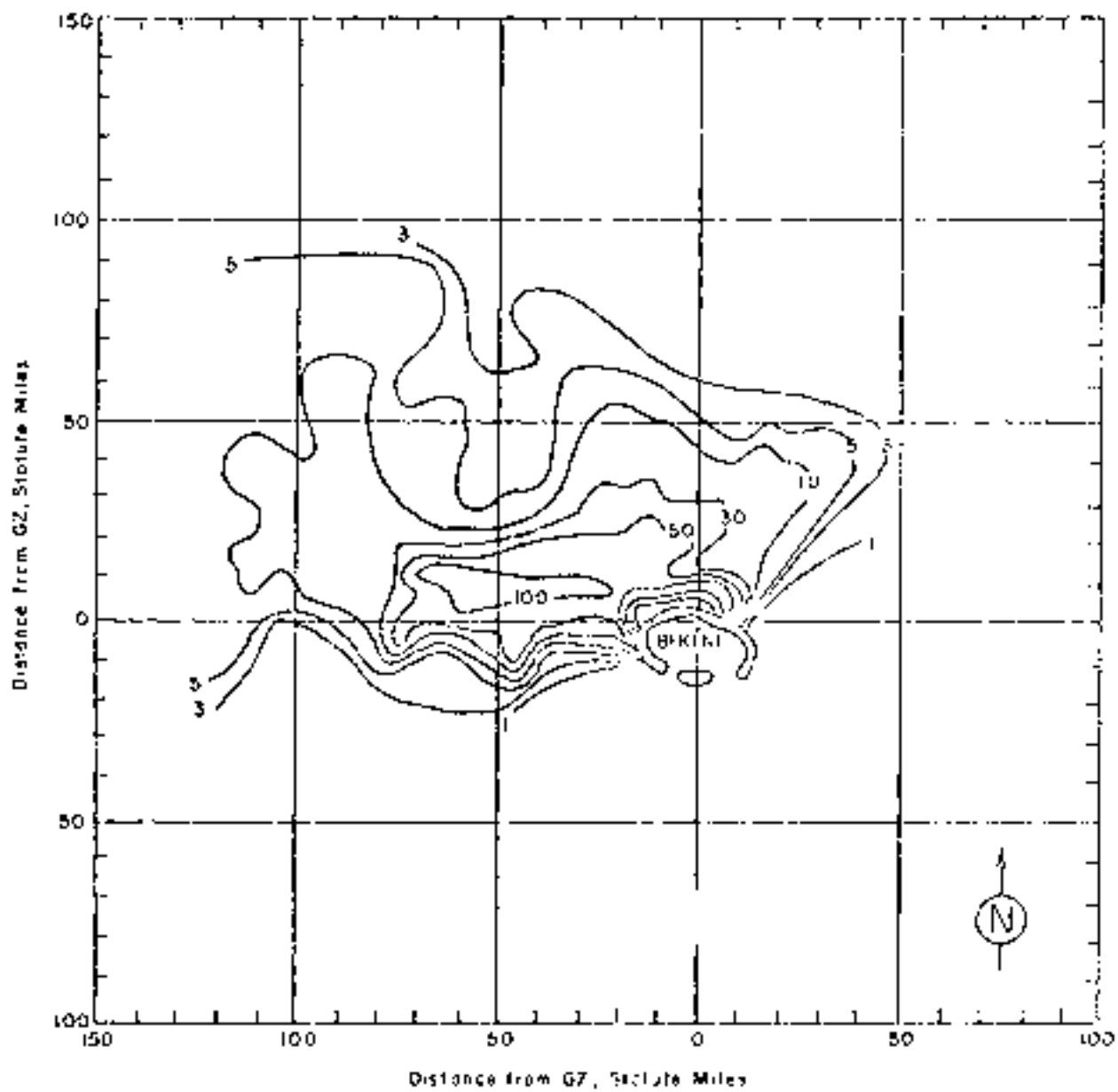


Figure 104. Operation BEEHIVE - Pivajo. Off-site decay rate contours in r/hr at E+1 hour.

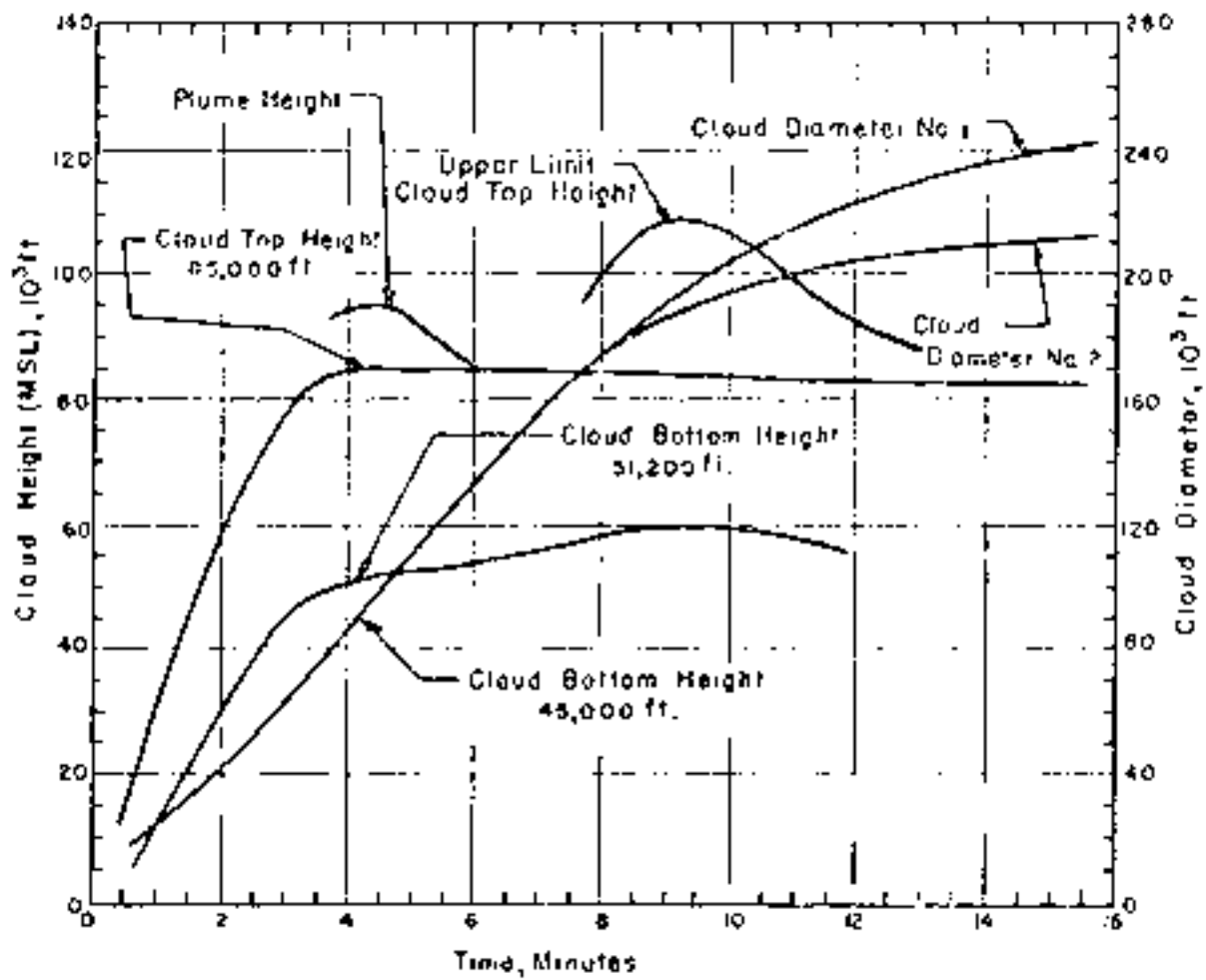


Figure 105. Cloud Dispersal: Operation MCDWING - Navajo.

Altitude (ft.)	Wind from		Wind from		Wind from		Wind from	
	110°	135°	160°	180°	205°	230°	255°	280°
Feet	degrees	mph	degrees	mph	degrees	mph	degrees	mph
5000	070	12	090	23	070	14	070	16
1,000	070	14	090	24	060	20	070	18
2,000	060	20	080	25	100	25	070	21
3,000	060	19	080	27	080	26	060	19
4,000	060	21	080	26	080	26	060	20
5,000	060	23	080	26	080	27	060	21
6,000	060	21	080	24	080	21	060	21
7,000	060	20	080	24	080	21	060	21
8,000	060	28	090	25	100	21	060	22
9,000	060	20	080	26	080	25	060	23
10,000	060	21	080	20	080	21	060	21
12,000	070	15	080	20	070	23	070	21
14,000	060	14	070	12	060	17	060	17
15,000	(060)	(12)	(070)	(12)	(060)	(11)	(060)	(11)
16,000	060	16	070	13	060	14	060	16
18,000	060	19	080	16	060	18	070	18
20,000	060	20	080	20	060	20	070	20
25,000	060	28	110	29	070	25	060	25
30,000	070	17	240	13	200	16	220	17
35,000	080	24	270	17	210	16	210	21
40,000	080	18	260	22	210	20	210	20
45,000	080	35	210	27	210	27	210	28
50,000	080	33	210	24	210	30	210	28
55,000	---	---	---	---	---	---	---	---
60,000	---	---	120	14	300	16	090	18
65,000	---	---	080	21	110	30	110	25
68,000	---	---	090	40	090	35	080	35
70,000	---	---	080	50	090	47	090	48
72,000	---	---	---	---	090	48	---	---
74,000	---	---	---	---	---	---	090	49

NOTES:

1. Values in parentheses are estimated values.
2. Wind data was obtained on board the U. S. S. Curtiss.
3. Tropopause height was 50,000 ft MSL.
4. At 8-hour the sea level pressure was 1010.7 mb, the temperature 61.2°F, the dew point 74.0°F and the relative humidity 80.0%.

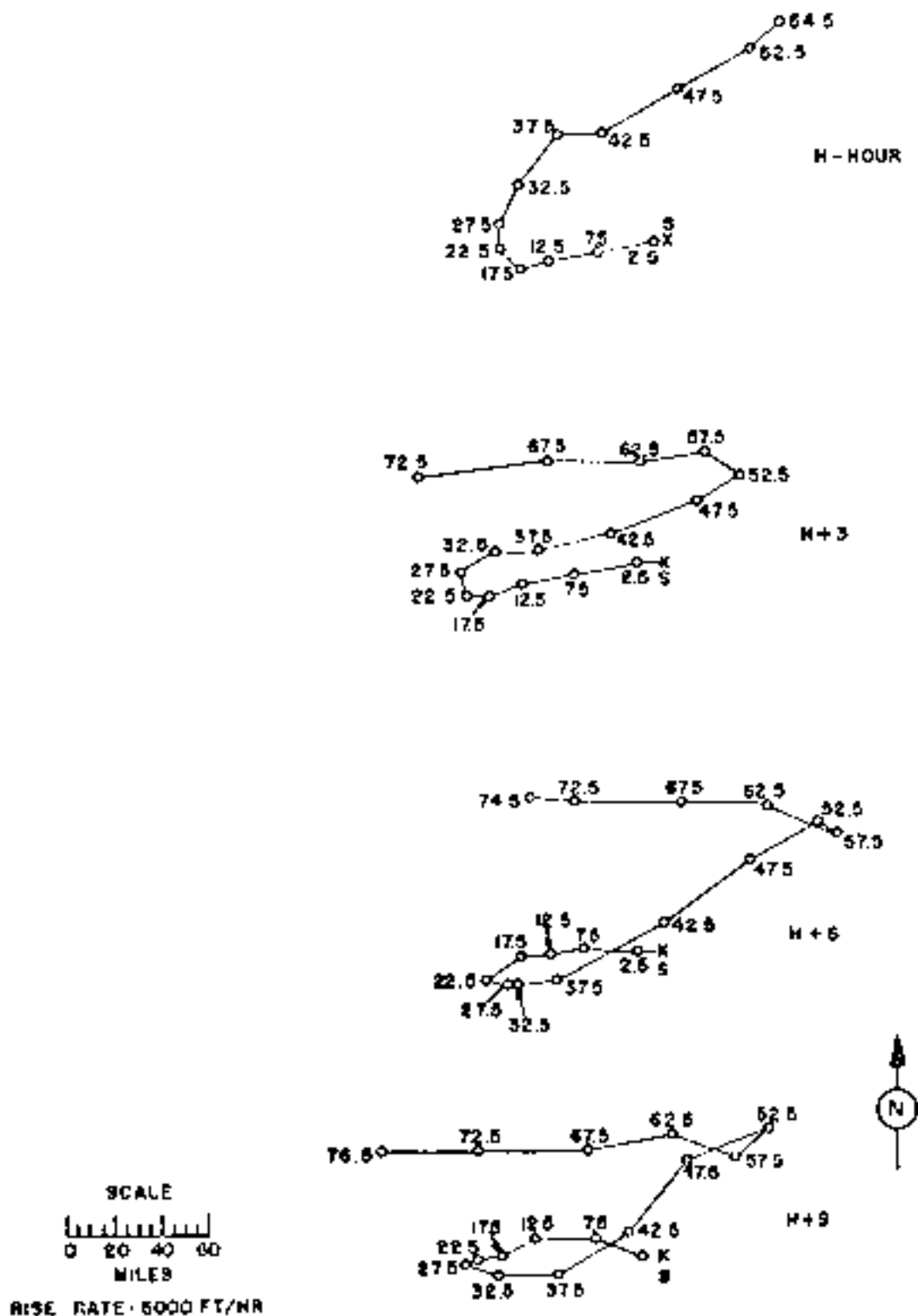


Figure 106. Hodographs for Operation FIDEX-50 -

NAVJCS-

01/20/50 8:45 AM -

5-41

WIND: 14 mph, 150° 100-150 ft
T.P.S.: 0.05 100-150

TEMP.: 50° 5 MC

MOISTURE: 70%

Time of day: 10:00 AM
Time to end: 10:00 AM
Radius of end: 100 ft

WAVE: 100 ft

Time: 10:00 AM
Depth: 100 ft

10:00 AM 100 ft

WIND: 14 mph, 150° 100-150 ft
T.P.S.: 0.05 100-150
TEMP.: 50° 5 MC
MOISTURE: 70%

WAVE: 100 ft

WIND: 14 mph, 150° 100-150 ft
T.P.S.: 0.05 100-150
TEMP.: 50° 5 MC
MOISTURE: 70%

01/20/50 8:45 AM -
WIND: 14 mph, 150° 100-150 ft

RESULTS:

The overall field pattern was drawn from oceanographic surveys by selected projection supported by field samples of the surface and lower in the top one. Actual field measurements of surface and deep equipment. This day was a very interesting day. The day was similar to H-1 hour. The extremely heavy rain was not that this day but an observable effect on the day pattern. It will cause the contamination remaining from previous days and multiply in any amount with the high production levels produced by the day. A good day. Following a morning approximately 70 hours after flight, increased the surface ground to be by approximately 100 m/hr. In contrast to the day, the day, a contamination was also experienced in the middle section of the day.

The overall field pattern was drawn from oceanographic surveys. The oceanographic surveys used data for poles. The measurements of the rate at depths 10 and below the top surface. Water-sampling equipment was used for the taking of surface samples and for the collection of samples from any desired depths. The data rate readings were extrapolated to 100 hours by using the deep measurements of the samples collected. Following from the firing of this device contaminated field's area. The surface on 10/20/50 was about approximately 9 hours after the surface was fired with a peak of 100 to 120 m/hr.

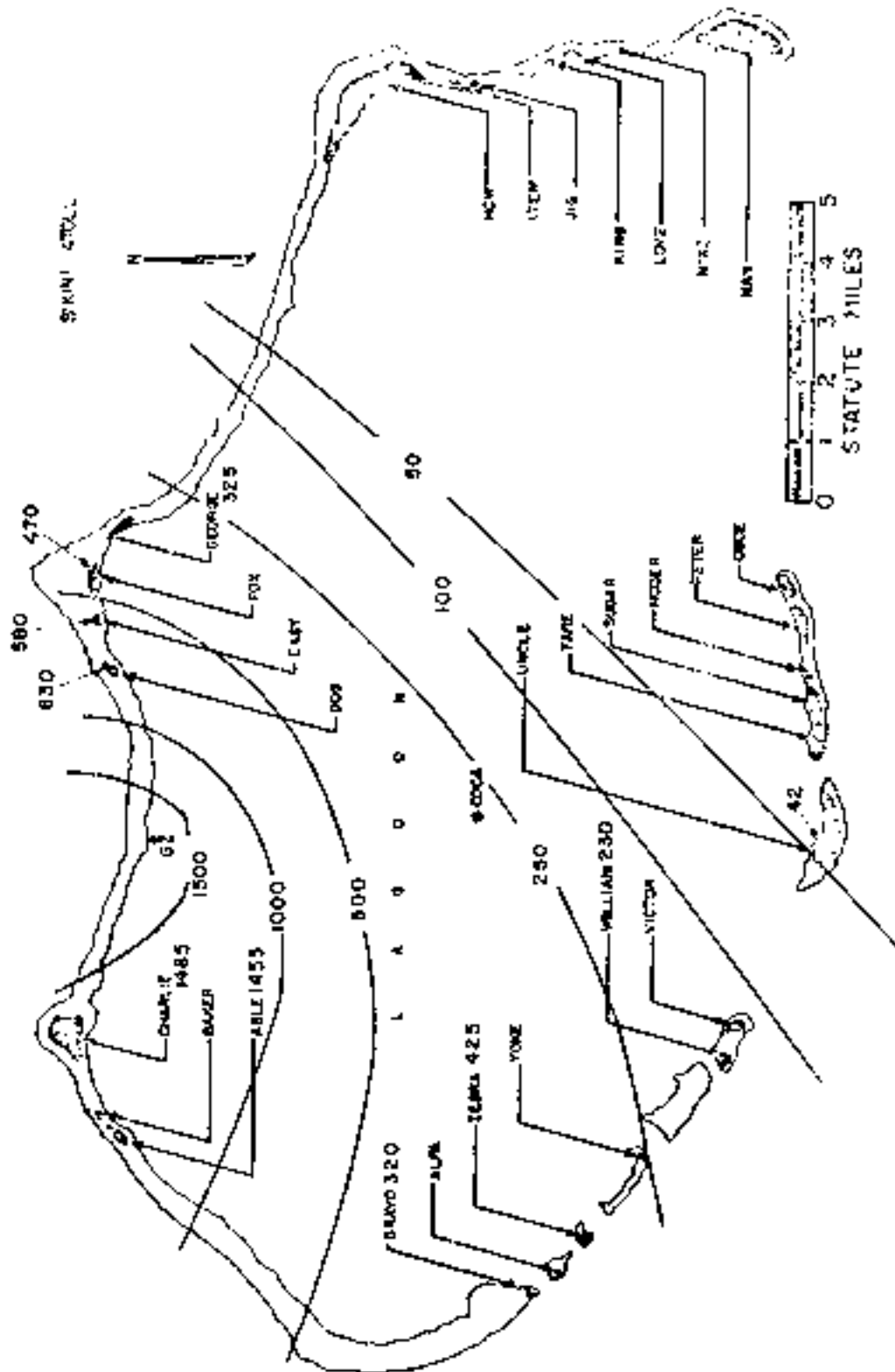


Figure 107. Operation REDWING - Terns. Altose rate contours in r/hr at 3+1 hour.

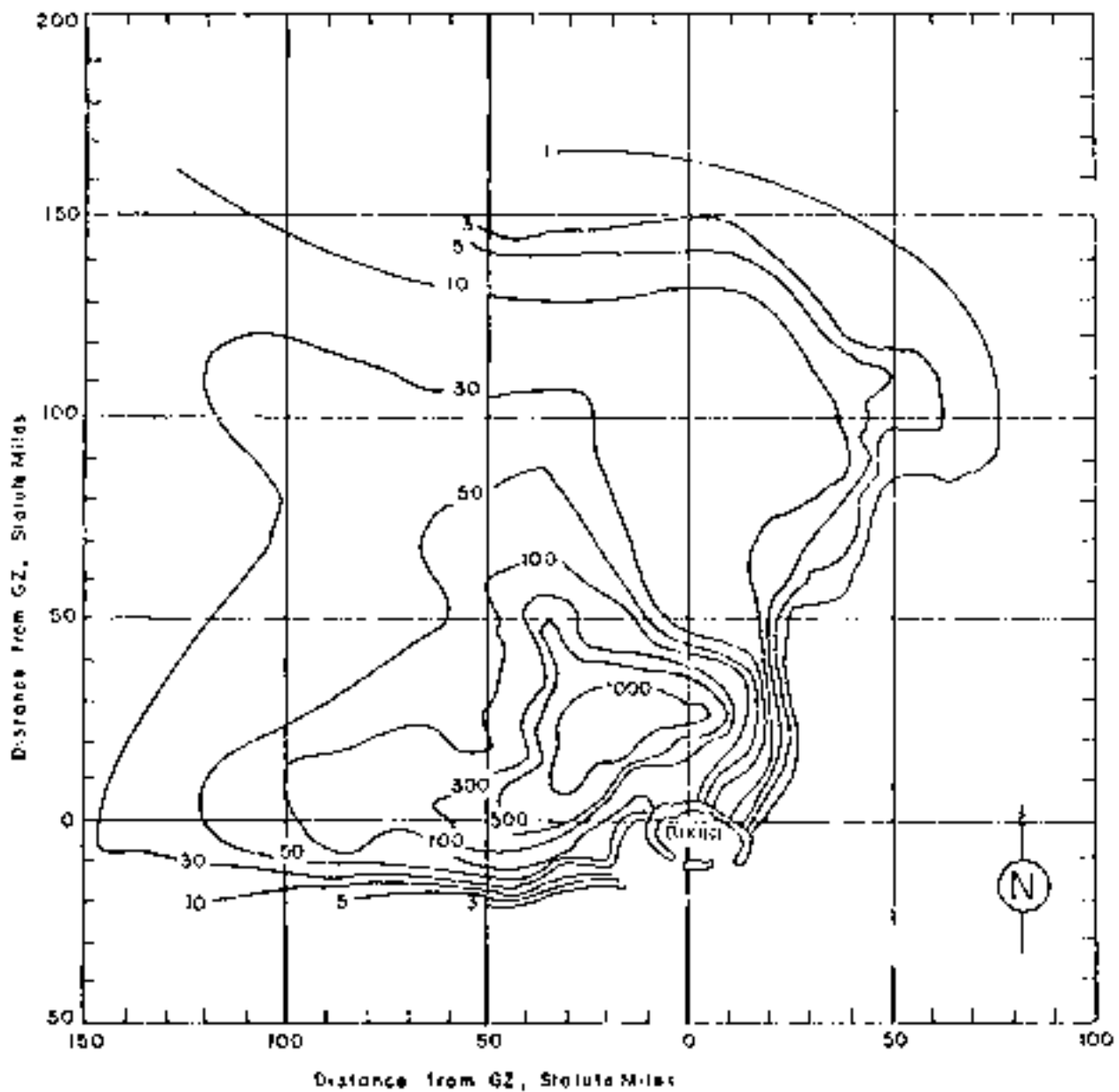


Figure 108. Operation REDWING - ⁹⁰Sr
 Off-site dose rate contours in r/hr at H+1 hour.

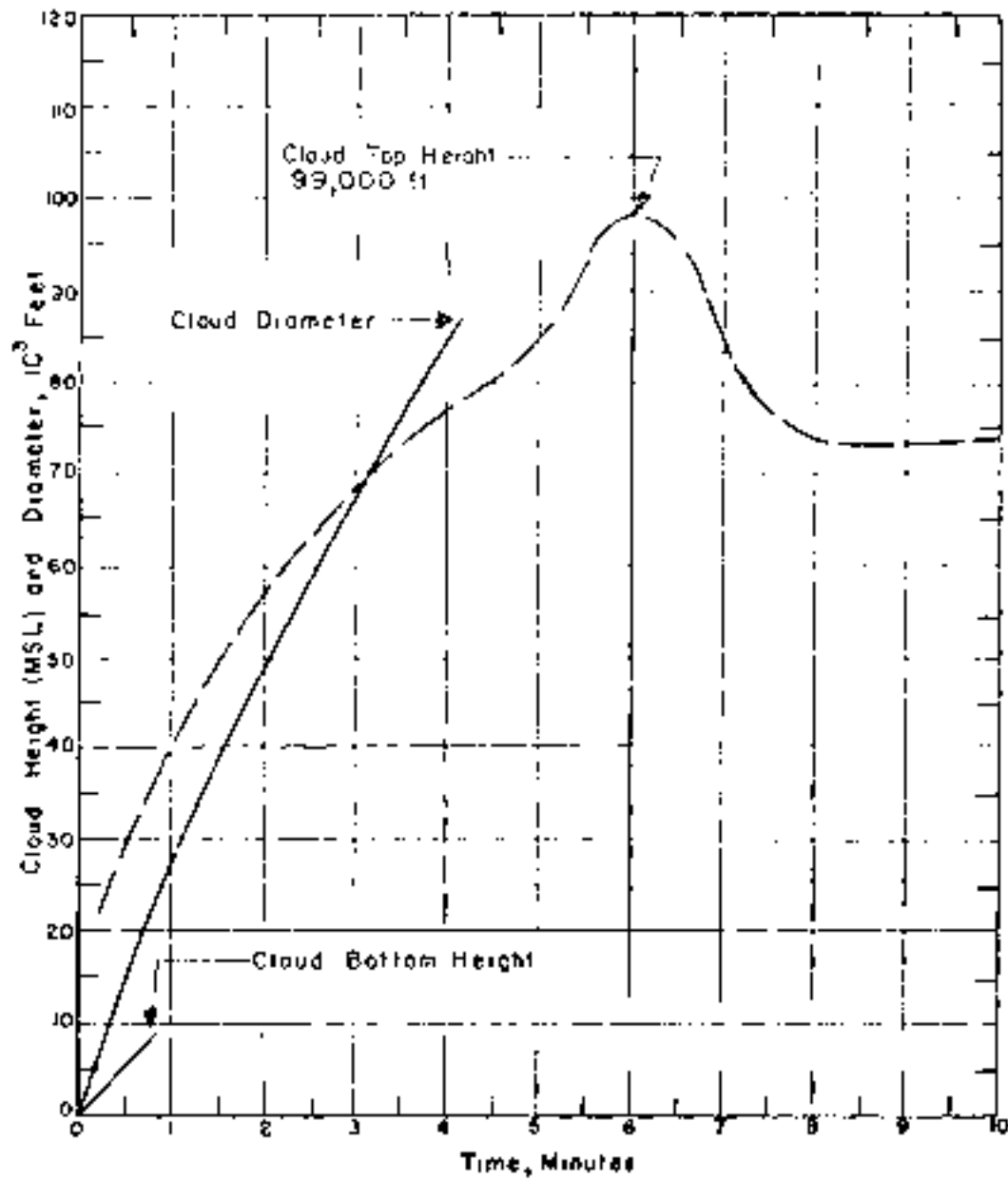


Figure 109. Cloud Dimensions: Operation MIMWING - Cove.

Age (days)	100% RH		75% RH		50% RH		25% RH	
	Survival (%)	Weight (mg)	Survival (%)	Weight (mg)	Survival (%)	Weight (mg)	Survival (%)	Weight (mg)
8,200-8	0.0	15	0.0	10	1.0	15	1.0	15
1,000-8	0.0	11	0.0	10	1.0	15	0.0	15
2,000-8	0.0	17	100	17	1.0	14	0.0	15
3,000-8	11.0	15	100	20	1.0	14	1.0	15
4,000-8	11.0	16	100	21	1.0	14	0.0	15
5,000-8	11.0	16	100	20	0.8	14	1.0	15
6,000-8	10.0	17	1.0	21	0.0	17	0.0	15
7,000-8	10.0	15	1.0	24	0.0	17	0.0	15
8,000-8	0.0	17	10.0	17	0.0	17	0.0	15
9,000-8	0.0	21	1.0	17	0.0	14	0.0	15
10,000-8	0.0	17	10.0	17	0.0	15	1.0	15
11,000-8	0.0	17	10.0	21	0.0	15	0.0	15
12,000-8	1.0	16	10.0	16	0.0	14	0.0	15
13,000-8	(10)	(15)	(10)	(15)	(10)	(15)	(10)	(15)
14,000-8	1.0	17	10.0	15	0.0	15	0.0	15
15,000-8	0.0	15	1.0	15	1.0	15	0.0	15
16,000-8	1.0	14	1.0	15	1.0	15	1.0	15
17,000-8	1.0	0.0	1.0	0.0	1.0	15	1.0	15
18,000-8	0.0	15	0.0	17	1.0	15	1.0	15
19,000-8	1.0	14	1.0	17	1.0	15	1.0	15
20,000-8	1.0	15	1.0	17	1.0	15	1.0	15
21,000-8	1.0	15	1.0	17	1.0	15	1.0	15
22,000-8	1.0	15	1.0	17	1.0	15	1.0	15
23,000-8	1.0	15	1.0	17	1.0	15	1.0	15
24,000-8	1.0	15	1.0	17	1.0	15	1.0	15
25,000-8	1.0	15	1.0	17	1.0	15	1.0	15
26,000-8	1.0	15	1.0	17	1.0	15	1.0	15
27,000-8	1.0	15	1.0	17	1.0	15	1.0	15
28,000-8	1.0	15	1.0	17	1.0	15	1.0	15
29,000-8	1.0	15	1.0	17	1.0	15	1.0	15
30,000-8	1.0	15	1.0	17	1.0	15	1.0	15
31,000-8	1.0	15	1.0	17	1.0	15	1.0	15
32,000-8	1.0	15	1.0	17	1.0	15	1.0	15
33,000-8	1.0	15	1.0	17	1.0	15	1.0	15
34,000-8	1.0	15	1.0	17	1.0	15	1.0	15
35,000-8	1.0	15	1.0	17	1.0	15	1.0	15
36,000-8	1.0	15	1.0	17	1.0	15	1.0	15
37,000-8	1.0	15	1.0	17	1.0	15	1.0	15
38,000-8	1.0	15	1.0	17	1.0	15	1.0	15
39,000-8	1.0	15	1.0	17	1.0	15	1.0	15
40,000-8	1.0	15	1.0	17	1.0	15	1.0	15
41,000-8	1.0	15	1.0	17	1.0	15	1.0	15
42,000-8	1.0	15	1.0	17	1.0	15	1.0	15
43,000-8	1.0	15	1.0	17	1.0	15	1.0	15
44,000-8	1.0	15	1.0	17	1.0	15	1.0	15
45,000-8	1.0	15	1.0	17	1.0	15	1.0	15
46,000-8	1.0	15	1.0	17	1.0	15	1.0	15
47,000-8	1.0	15	1.0	17	1.0	15	1.0	15
48,000-8	1.0	15	1.0	17	1.0	15	1.0	15
49,000-8	1.0	15	1.0	17	1.0	15	1.0	15
50,000-8	1.0	15	1.0	17	1.0	15	1.0	15

NOTES

1. Numbers in parentheses are estimated values.
2. Weight data was obtained on second day of life of the larvae.
3. Temperature held at 50,000 ft. MSL.
4. At 12-hour the low level pressure was 100.3 mb, the temperature 36°F, the dew point 17°F and the relative humidity 50%.

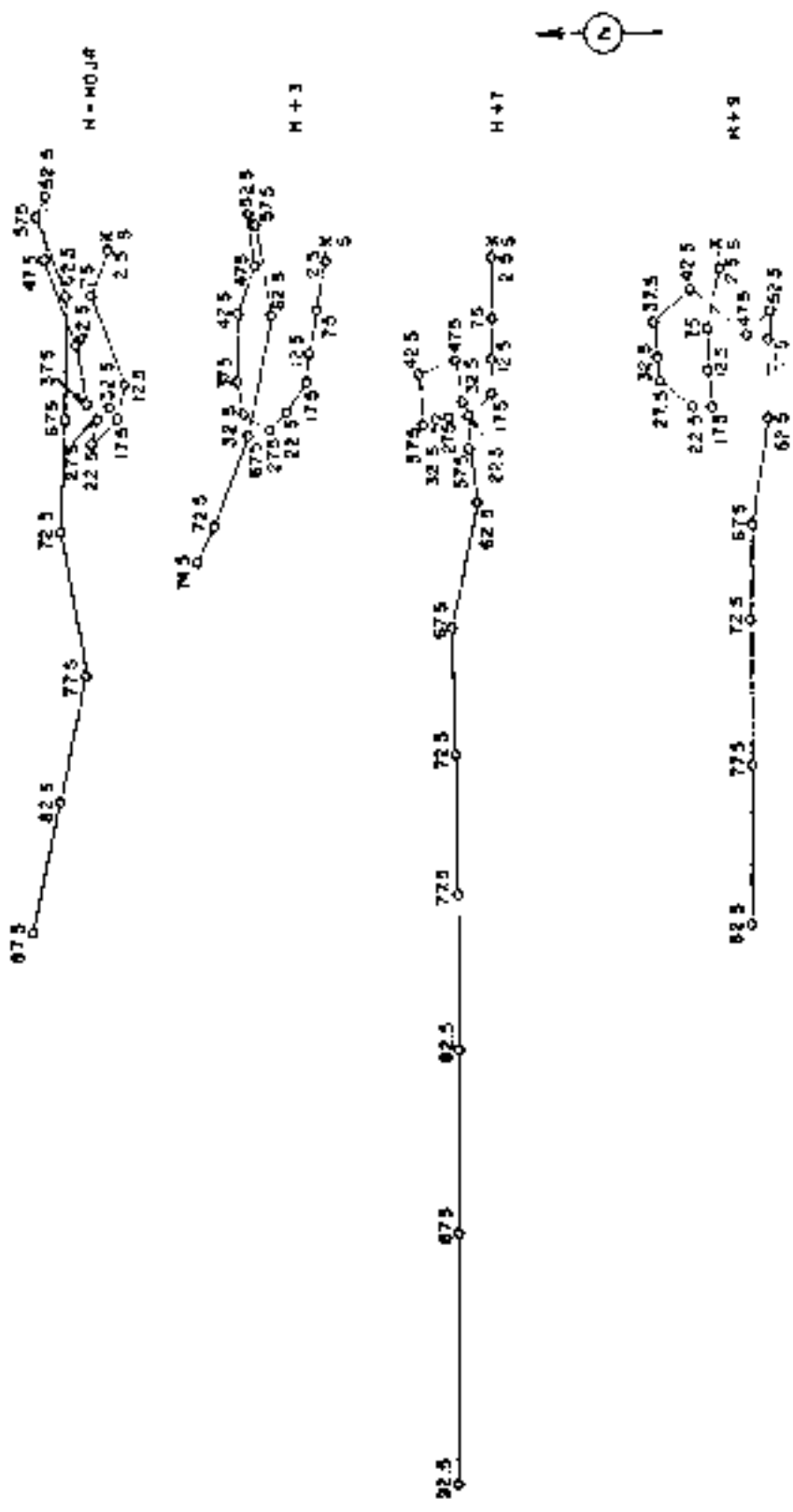


Figure 110 - Hodographs for Operator Training - Day 2.

GRAVIMETRIC ANALYSIS -

Mercury

$$\frac{\text{MERCURY}}{\text{TOTAL}} = \frac{\text{Wt. of Hg} \times 100}{\text{Wt. of Sample}}$$

Experiment 1509

$$\frac{\text{MERC}}{\text{TOTL}} = \frac{1.45 \times 100}{11.30} = 12.83\%$$

REVISION OF MERCURY: 12.83%

REVISION OF MERCURY: 12.83%

REVISION OF MERCURY: 12.83%

DISCUSSION:

Only indirect determinations are available. These were obtained from aerial and ground surveys made by the British Geographical Organization. The 1:250,000 map approximation was used to extrapolate the data into the study area, to 1:100,000.

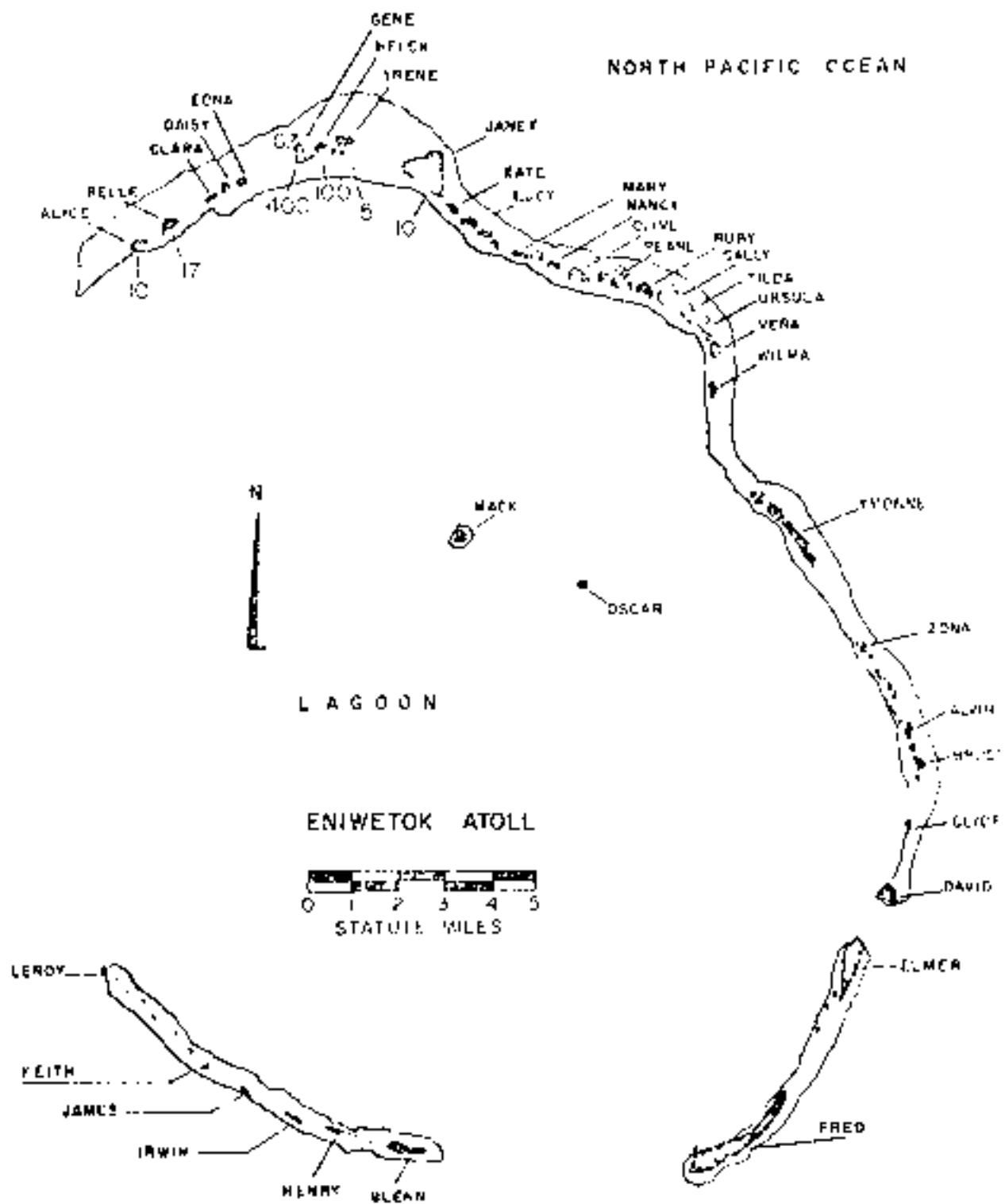


Figure 111. Operation BEWING - Barrow. Island dose rates in r/hr at 11:00 hours.

TABLE 34. IRRADIANCE AND DATA FOR GENERALIZED SC-51-1

175-15

λ , μ (μ) 2000	Irradiance		Polarization		Scattering		Mie theory	
	W ₀		P ₀		P ₁		P ₂	
	1000	1000	1000	1000	1000	1000	1000	1000
80000	100	14	0.0	16	107	17	109	18
85000	110	18	1.0	7	111	18	109	18
90000	125	18	1.0	24	108	18	111	17
95000	150	18	1.0	27	101	18	117	21
100000	170	18	1.0	36	91	19	119	21
105000	190	21	1.0	24	109	18	127	27
110000	170	20	1.0	28	101	16	121	28
115000	170	16	1.0	27	108	16	120	26
120000	170	19	0.0	21	113	18	118	27
125000	170	13	0.0	21	118	18	111	27
130000	170	18	1.0	26	111	17	111	27
135000	190	17	1.0	21	115	17	107	26
140000	190	14	1.0	23	103	17	107	26
145000	(170)	(18)	(0.0)	(28)	(101)	(18)	(113)	(16)
150000	160	17	0.0	25	107	17	107	27
155000	160	17	0.0	17	104	18	106	18
160000	170	17	0.0	29	107	17	109	18
165000	170	09	0.0	61	96	17	107	21
170000	180	26	0.0	19	100	20	100	19
175000	180	37	0.0	37	100	18	100	26
180000	160	40	0.0	39	100	20	107	29
185000	---	---	0.0	39	---	---	---	---
190000	170	52	---	---	107	21	100	29
195000	170	36	---	---	107	18	100	19
200000	170	23	---	---	107	13	100	14
60,000	100	38	---	---	120	21	100	40
65,000	100	51	---	---	100	21	100	30
70,000	107	55	---	---	110	20	100	17
75,000	100	71	---	---	100	37	107	25
80,000	100	79	---	---	100	17	107	17
85,000	100	87	---	---	100	13	107	17
90,000	100	107	---	---	---	---	---	---
95,000	---	---	---	---	---	---	100	17

NOTES

1. Numbers in parentheses are estimated values.
2. Tropopause height was 10,000 to 121 at 1000 km.
3. Wind data was obtained by the weather station on Biwetok Island.
4. At the surface the air pressure was 1013 mb, the temperature 27.0°C, the dew point 19.5°C and the relative humidity 66%.

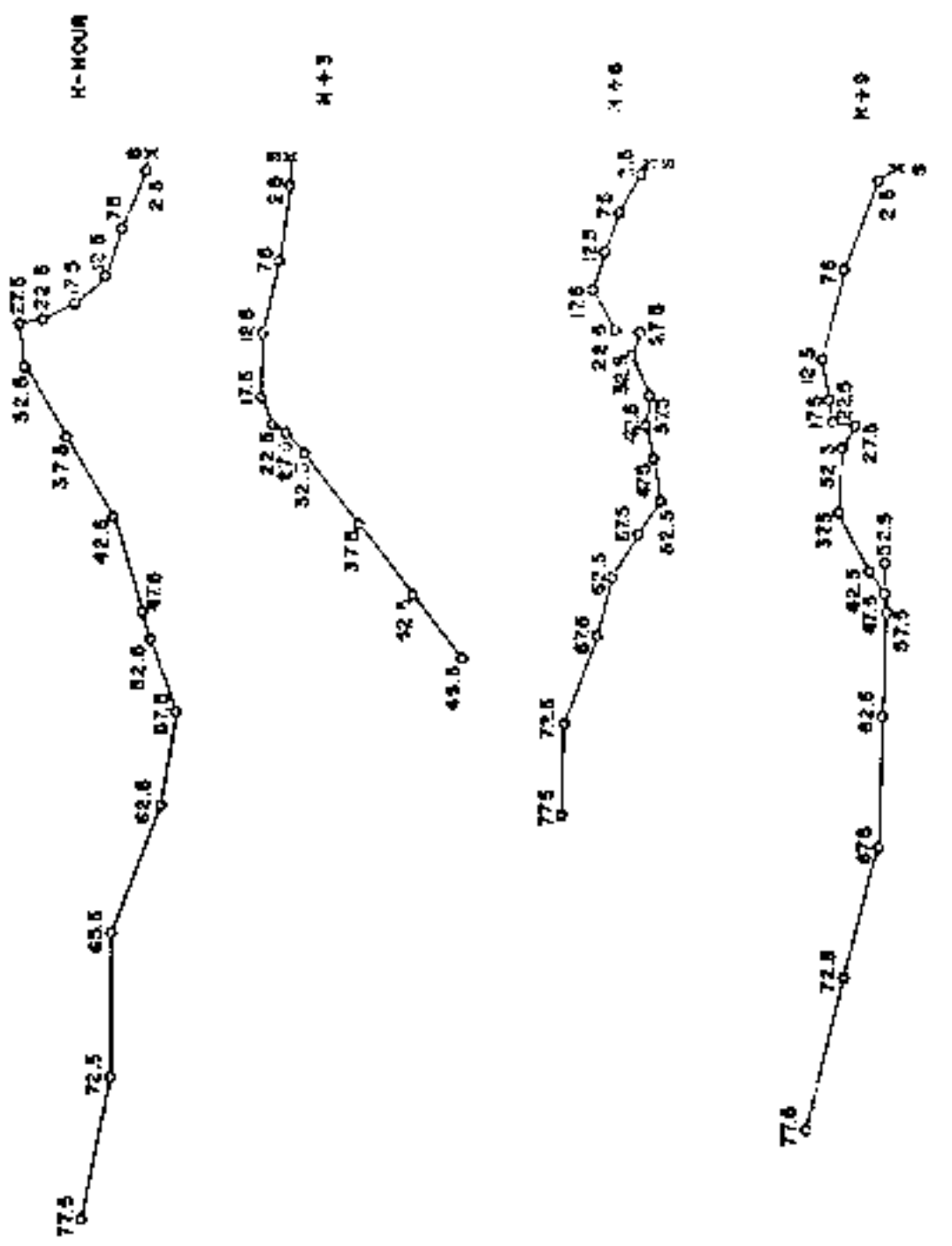


Figure 112. Hydrographs for Operation FLOODING - Season.



Figure 113. Operation HARDTACK I, Shot Locations, Eniwetok Atoll

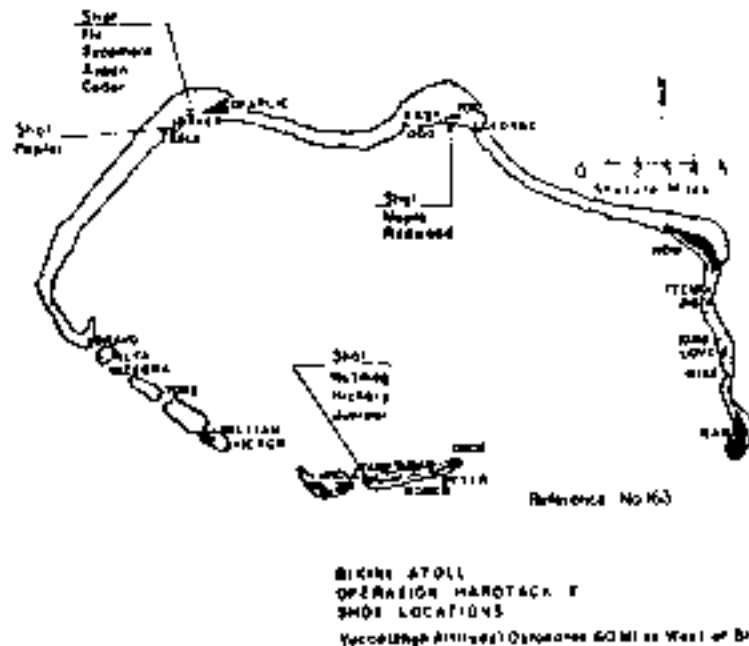


Figure 114. Operation HARDTACK I, Shot Locations, Bikini Atoll

OPERATION HARBORACK I -

Yucca

	<u>UTC Time</u>	<u>GMT</u>
<u>DATE:</u>	28 Apr 1968	28 Apr 1968
<u>TIME:</u>	1840	0240

Sponsor: DOD

SITE: 110 - 1000 Meter (3000 ft)
west of Bikini
12° 37' 00" N
163° 01' 00" W
Site elevation: Sea level

HEIGHT OF SENSORS: AA, 00 ft

TYPE OF SENSORS AND PLACEMENT:
Air Turbidity Probe (ATP) 10 ft
over water

CLOUD TOP HEIGHT: 00
CLOUD BASE HEIGHT: 00

REMARKS: No data

TABLE 35 BIKINI WIND DATA FOR OPERATION HADDTACK 7 -

YUCCA

Altitude (MSL) feet	H-hour	
	Dir degrees	Speed mph
Surface	040	16
1,000	050	29
2,000	050	35
3,000	070	36
4,000	130	09
5,000	350	12
6,000	360	14
7,000	150	15
8,000	190	12
9,000	210	09
10,000	230	06
12,000	350	12
14,000	320	15
15,000	(320)	(15)
16,000	330	16
18,000	300	15
20,000	260	07
23,000	210	15
25,000	240	18
30,000	200	13
35,000	210	32
40,000	270	44
45,000	270	51
50,000	270	40
55,000	270	36
60,000	280	33
65,000	250	18
70,000	070	15
75,000	180	09

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on board ship located within 30 nautical miles of the Tower at Nan Island, Bikini Atoll.
3. Tropopause height was 53,000 ft MSL.
4. At H-hour the surface air pressure was 24.67 psi, the temperature 25.7°C, the dew point 69.6°F, and the relative humidity 75%.

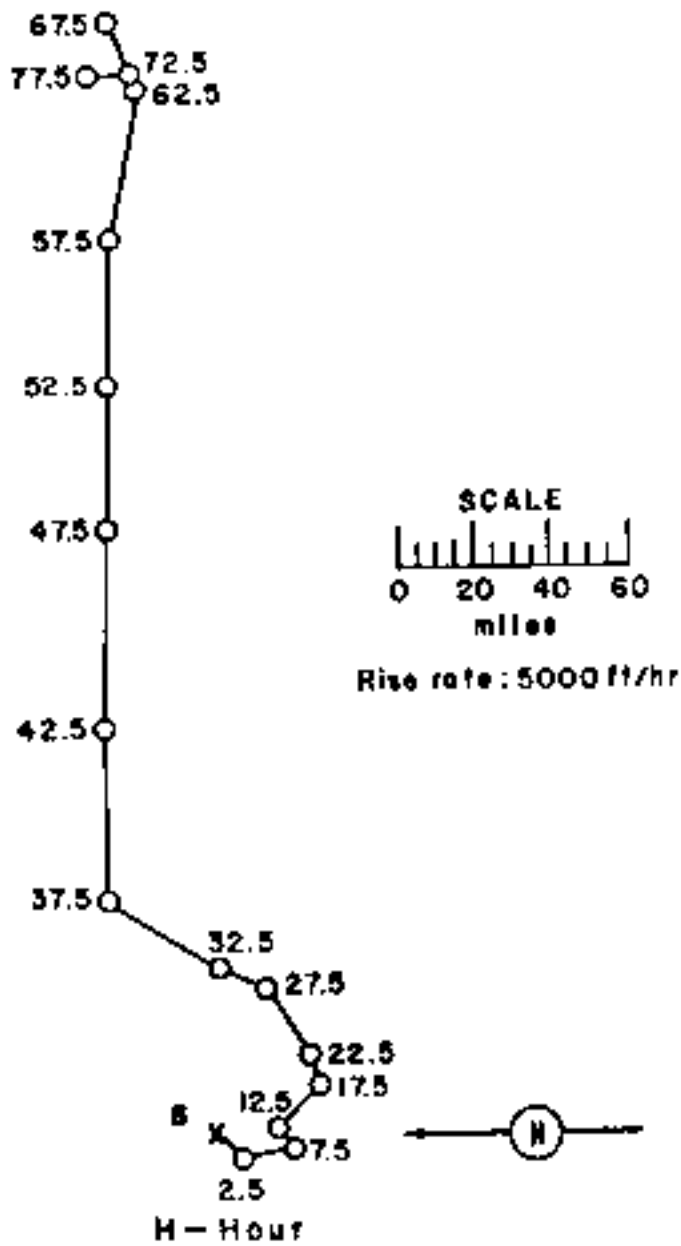


Figure 115. Hodograph for Operation HARDTACK I -

Yucca.

OPERATION SANDWICH I -

Cactus

DATE: PEG Time: GMT
6 May 1953 0745
TIME: 0615 1815

TOTAL YIELD: 18 kt

FIREBALL DATA:

Time to 1st maximum: 12 msec
Time to 2nd maximum: 1.5 msec
Radius at 2nd maximum: 52.6 ft

CRATER DATA:

Diameter: 200 ft
Depth: 34.5 ft
lip Height: 5 to 10 ft
lip Width: 100 to 150 ft

Sponsor: LAGL

SITE: PEG - Eastwick - Young
11° 31' 30" N
162° 21' 30" E
Site elevation: Sea level

HEIGHT OF BURST: 3 ft

TYPE OF BURST AND LOCATION:

Surface burst - 1.5 km from
coral reef.

CLOUD TOP HEIGHT: 1000 ft MSL
CLOUD BASE HEIGHT: 100

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys at H+4 hours made by the Radiological Safety organization. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, in which a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PDR-39 survey meter modified to read up to 500 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the H+4 hour dose-rate readings to H+1 hour.

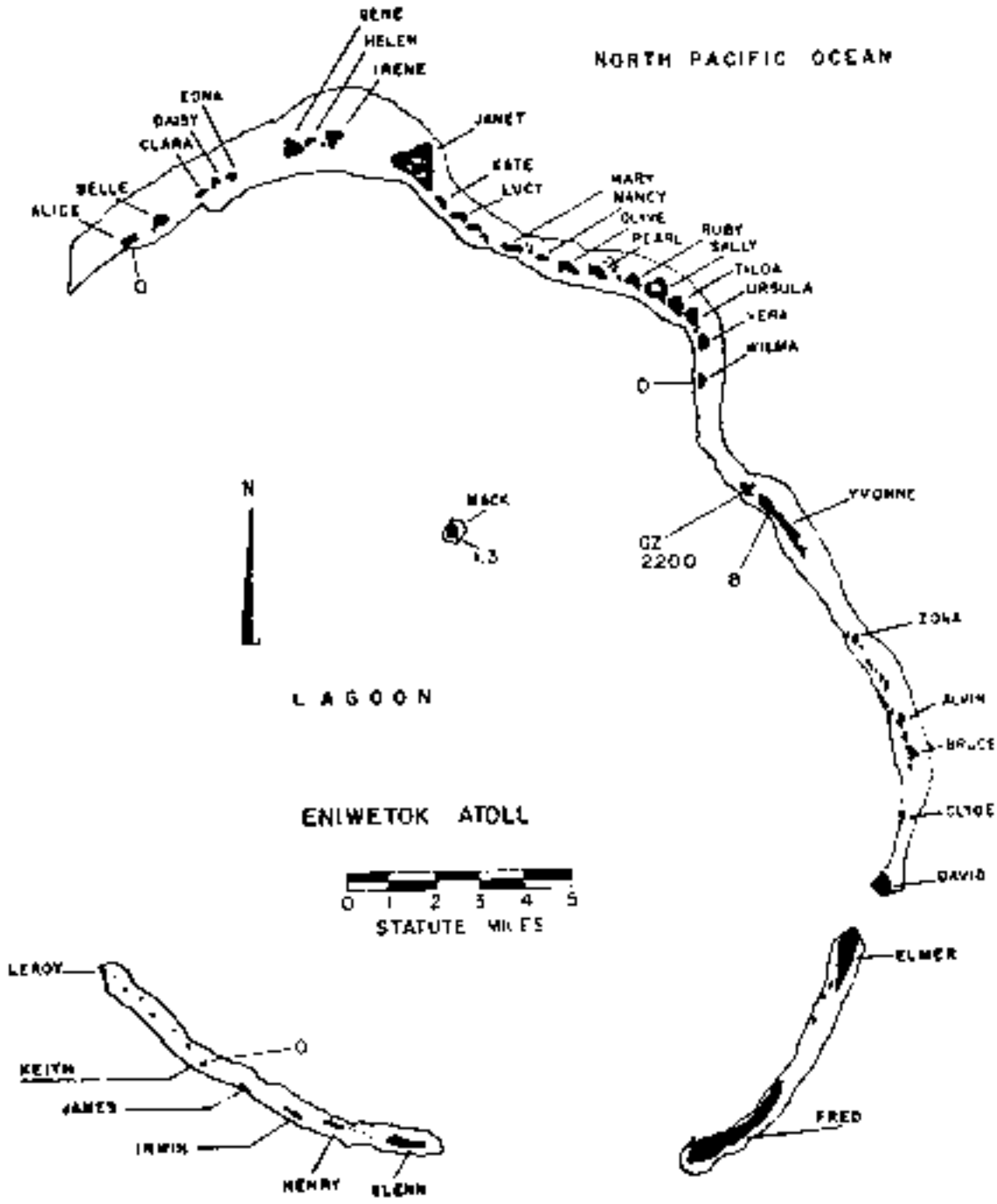


Figure 116. Operation SANDTACK I - Cactus.
Island dose rates in r/hr at H+1 hour.

TABLE 36 ENLWICK WIND DATA FOR OPERATION SWIFTACK 1 - CACIFIC

Altitude (MSL) Feet	04-10-57		05-10-57	
	Dir. degrees	Speed kts	Dir. degrees	Speed kts
Surface	060	16	060	16
1,000	070	24	060	29
2,000	070	25	060	24
3,000	060	26	060	25
4,000	060	24	060	24
5,000	060	23	060	24
6,000	060	23	060	24
7,000	080	15	060	17
8,000	090	10	060	8
9,000	110	31	090	7
10,000	060	03	060	08
12,000	200	02	200	11
14,000	150	12	120	13
15,000	(130)	(12)	(120)	(12)
16,000	100	18	120	17
18,000	100	18	120	15
20,000	120	16	120	17
23,000	090	13	120	14
25,000	090	09	090	11
30,000	270	17	250	20
35,000	---	--	230	22
40,000	220	27	270	30
45,000	200	31	270	33
50,000	310	39	270	24
55,000	230	07	270	10
60,000	260	17	240	17
65,000	---	--	250	12
67,000	210	07	---	--
70,000	120	08	090	05
75,000	070	13	080	12
80,000	080	31	090	23
85,000	080	32	100	15
90,000	090	60	100	40
95,000	---	--	100	50
96,000	100	57	---	--
100,000	---	--	090	49
105,000	---	--	090	51
110,000	---	--	090	59
112,000	---	--	090	61

NOTES:

1. Number in parentheses are estimated values.
2. Wind data was taken by the Eniwetok weather station.
3. Tropopause height was 51,000 ft MSL.
4. The surface air pressure was 14.66 ps., the temperature 26.7°C, the dew point 72°F and the relative humidity 66%.

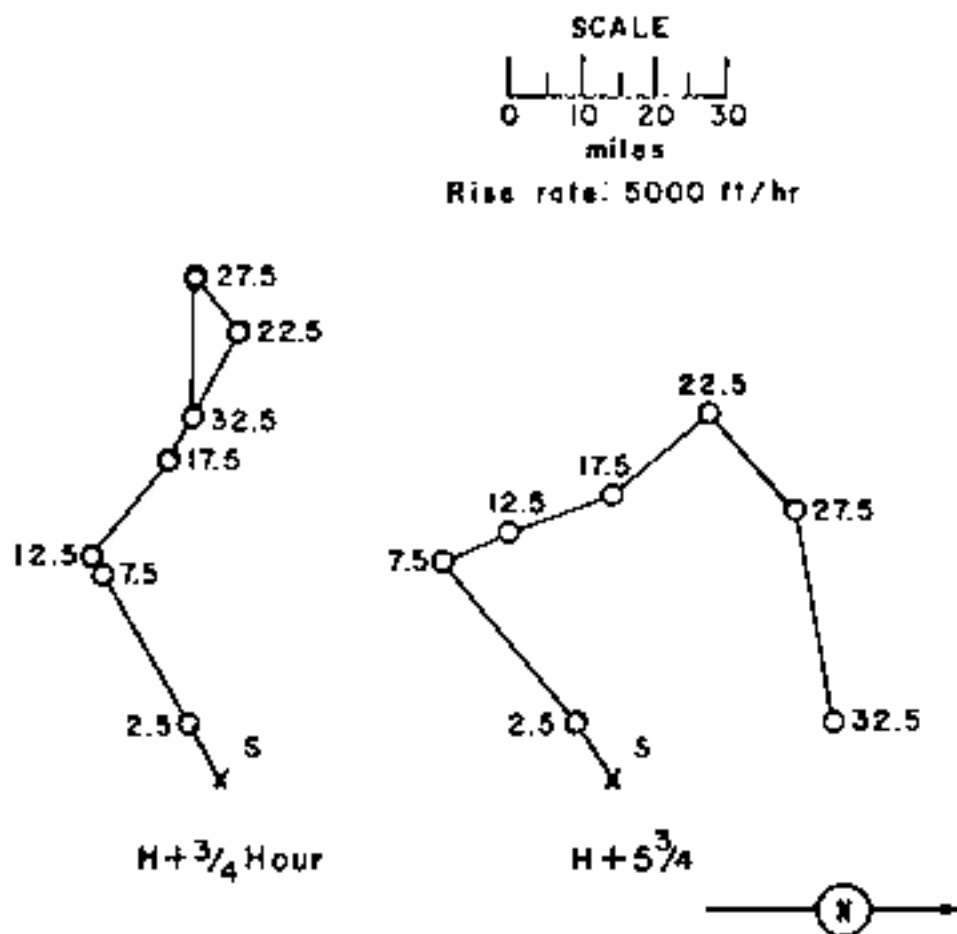


Figure 117. Hodographs for Operation BARTACK I - Cactus.

OPERATION HARBLOCK I -

Fir

PPG Title GMT
DATE: 11 May 1966 11 May 1966
TIME: 08:00 1700

Sponsor: OCRM

SITE: 1220 - 12300 - NW of
 Charlie Lake, 2000 ft. from
 nearest edge of the island
 14° 41' 00" N
 165° 10' 00" W
 Site elevation: 12000 ft.

HEIGHT OF MEASUREMENT: 1000 ft.

CLOUD TOP HEIGHT: 10000 ft. MSL
CLOUD BASE ALTITUDE: 10000

TYPE OF SURFACE AND PLACEMENT:
 Surface: 10000 ft. MSL
 Water

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety organization helicopter surveys at H+4 hours. The helicopter survey technique called for the pilot either to lower the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PDR-39 survey meter modified to read up to 500 r/hr. The $t_{1/2} = 2$ decay approximation was used to extrapolate the H+4 hour dose rate readings to H+1 hour.

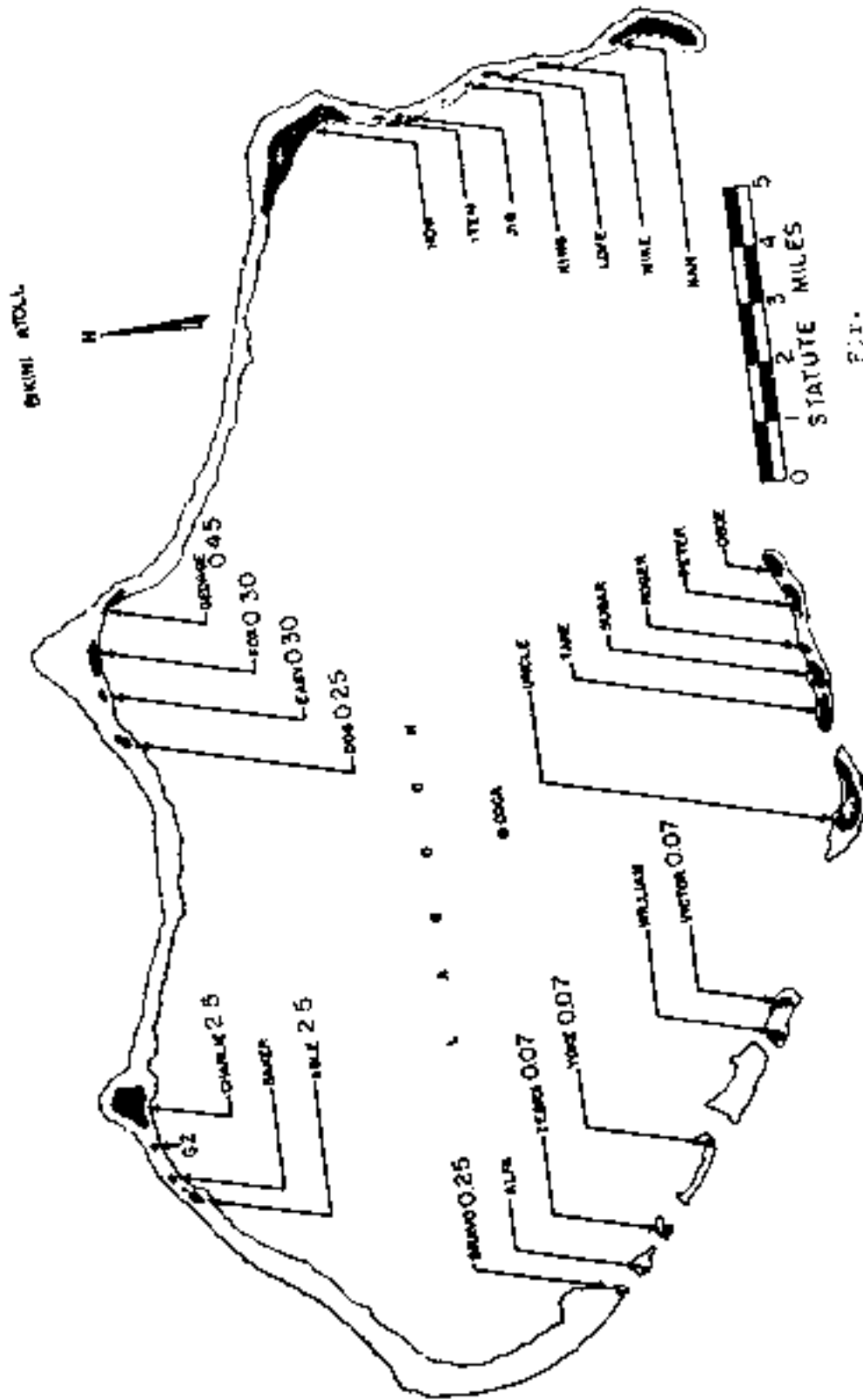


Figure 118. Operation HARBOR: 1 - 1/2 hr at 150 knots. Island base rates in 1/2 hr at 150 knots.

TABLE 37. DIKING WIND DATA FOR OBSERVATION NUMBER 1 -

711

Altitude (MFT)	075° True		090° True		105° True	
	Dir	Spd	Dir	Spd	Dir	Spd
feet	degrees	mps	degrees	mps	degrees	mps
Surface	070	25	070	25	060	28
1,000	070	26	060	25	060	26
2,000	075	26	070	25	070	29
3,000	080	22	080	26	080	20
4,000	090	26	090	20	190	26
5,000	090	36	100	30	110	29
6,000	110	26	100	29	110	25
7,000	130	23	110	24	130	31
8,000	130	27	110	28	120	29
9,000	140	27	130	28	130	28
10,000	170	25	110	26	150	25
12,000	120	22	170	27	200	25
14,000	110	28	220	24	210	22
15,000	(090)	(18)	(190)	(10)	(210)	(18)
15,000	---	24	190	27	180	26
18,000	070	27	140	24	190	28
20,000	070	27	160	23	250	25
22,000	070	24	200	23	260	26
24,000	070	27	220	26	250	20
25,000	080	27	230	27	210	27
30,000	(090)	(34)	(210)	(28)	(210)	(22)
40,000	270	48	220	27	270	48
45,000	250	26	(250)	(19)	220	25
50,000	260	25	220	25	240	23
54,000	240	26	---	---	---	---
55,000	(270)	(21)	(270)	(24)	(270)	(21)
56,000	---	---	180	22	270	18
60,000	210	27	290	29	360	25
61,000	---	---	250	24	---	---
65,000	(120)	(12)	(190)	(13)	(110)	(12)
67,000	360	20	---	---	---	---
70,000	040	20	090	17	090	13
75,000	080	26	(090)	(22)	(090)	(16)
80,000	120	26	090	26	090	20
85,000	110	40	---	---	---	---
88,000	---	---	---	---	100	53

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on board ship located within 30 nautical miles of the Tower at Van Island, Bikini Atoll.
3. Tropopause height was 54,000 ft MSL.
4. The surface air pressure was 14.64 psi, the temperature 26.1°C, the dew point 73.0°F, and the relative humidity 80%.

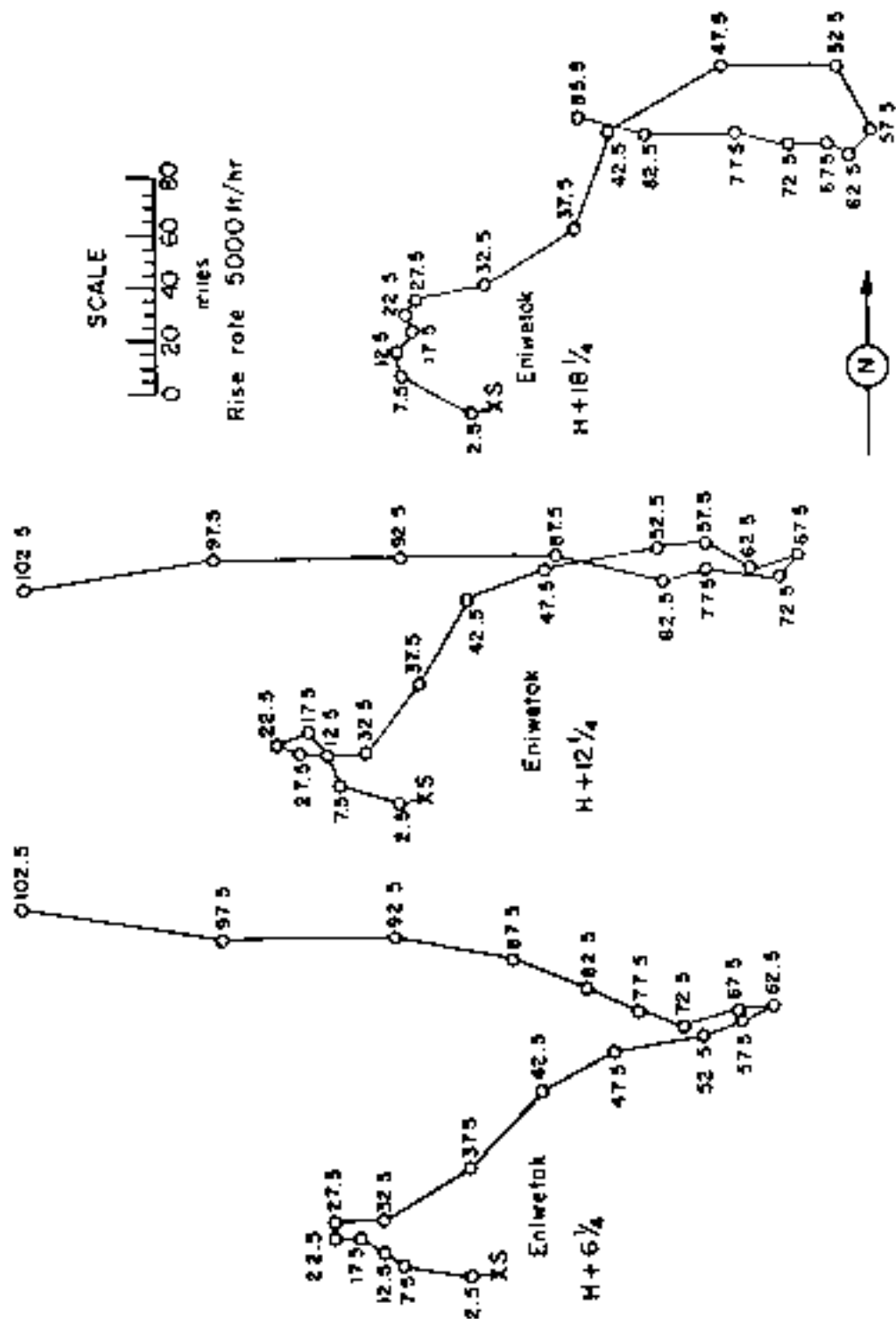


Figure 110. Hodographs for Operation BENTACK I - Fir.

OPERATION HANDJACK 1 - Butternut

	<u>FPS Time:</u>	<u>327</u>
<u>DATE:</u>	12 May 1968	11 May 1968
<u>TIME:</u>	0615	1315

Sponsor: LASL.

SITE: HPG - Kiliweik - SW of Yvonne
 4,000 ft from the seaward edge of the island
 11° 20' 41" N
 162° 21' 30" E
 Site elevation: Sea level

HEIGHT OF MAST: 10.15 ft

TYPE OF MAST AND PLACEMENT:
 Surface mast from base of water
 Water depth: 42 ft

CLOUD COVER HEIGHT: 2,000 ft MSL
CLOUD COVER DENSITY: 03

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys at H+4 hours made by the Radiological Defense Organization. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PBH-39 survey meter modified to read up to 500 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the H+4 hour dose-rate readings to H+1 hour.

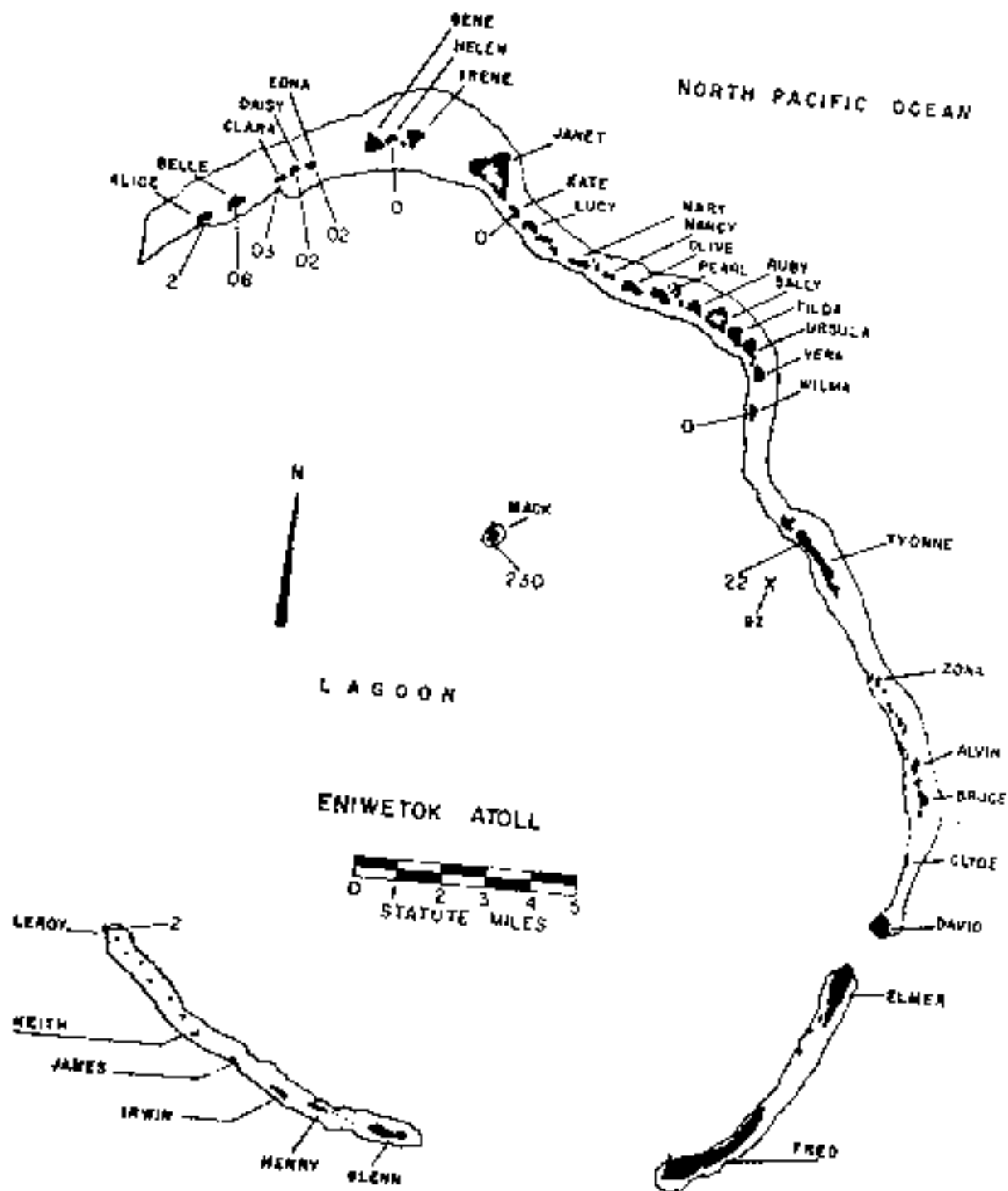


Figure 120. Operation HARBOR I - Patternat.
Island dose rates in r/hr at 11:01 hour.

TABLE 38 ENVIRONMENT WIND DATA FOR OPERATION HANDBOOK I -

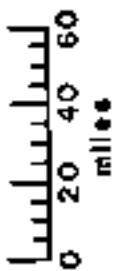
BIRMINGHAM

Altitude (MSL) feet	H-1 hour		H-5 hour		H-15 hour	
	Dir degrees	Speed mph	Dir degrees	Speed mph	Dir degrees	Speed mph
Surface	080	12	080	17	070	16
1,000	090	24	080	24	080	28
2,000	090	25	080	24	080	29
3,000	090	25	090	25	090	29
4,000	100	21	090	28	100	26
5,000	120	15	100	24	110	24
6,000	120	18	120	24	130	21
7,000	150	16	150	21	130	17
8,000	150	13	170	16	150	13
9,000	130	09	170	15	170	15
10,000	100	15	120	08	160	10
12,000	090	09	190	07	230	09
14,000	080	09	150	09	270	09
15,000	(180)	(14)	(120)	(14)	(150)	(09)
16,000	070	15	090	09	080	08
18,000	100	12	110	09	070	07
20,000	100	09	090	07	070	05
21,000	110	07	160	02	240	05
25,000	Calm	Calm	200	03	300	03
30,000	250	02	270	17	270	24
35,000	(230)	(-1)	240	36	200	33
37,000	210	15	---	---	---	---
40,000	230	43	220	39	210	37
45,000	260	17	240	23	250	35
50,000	250	40	260	33	250	40
54,000	260	21	---	---	---	---
55,000	---	---	250	16	260	17
60,000	200	05	250	09	300	12
65,000	---	---	080	12	250	15
66,000	070	12	---	---	---	---
70,000	080	16	070	18	050	10
72,000	100	25	---	---	---	---
75,000	---	---	110	16	100	17
80,000	090	37	110	20	080	20
84,000	100	36	---	---	---	---
85,000	---	---	110	29	100	38

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Eriwetok weather station.
3. Tropopause height was 53,000 ft MSL.
4. The surface air pressure was 14.53 psi, the temperature 27°C, the dew point 74°F, and the relative humidity 90%.

SCALE



Rise rate: 5000ft/hr

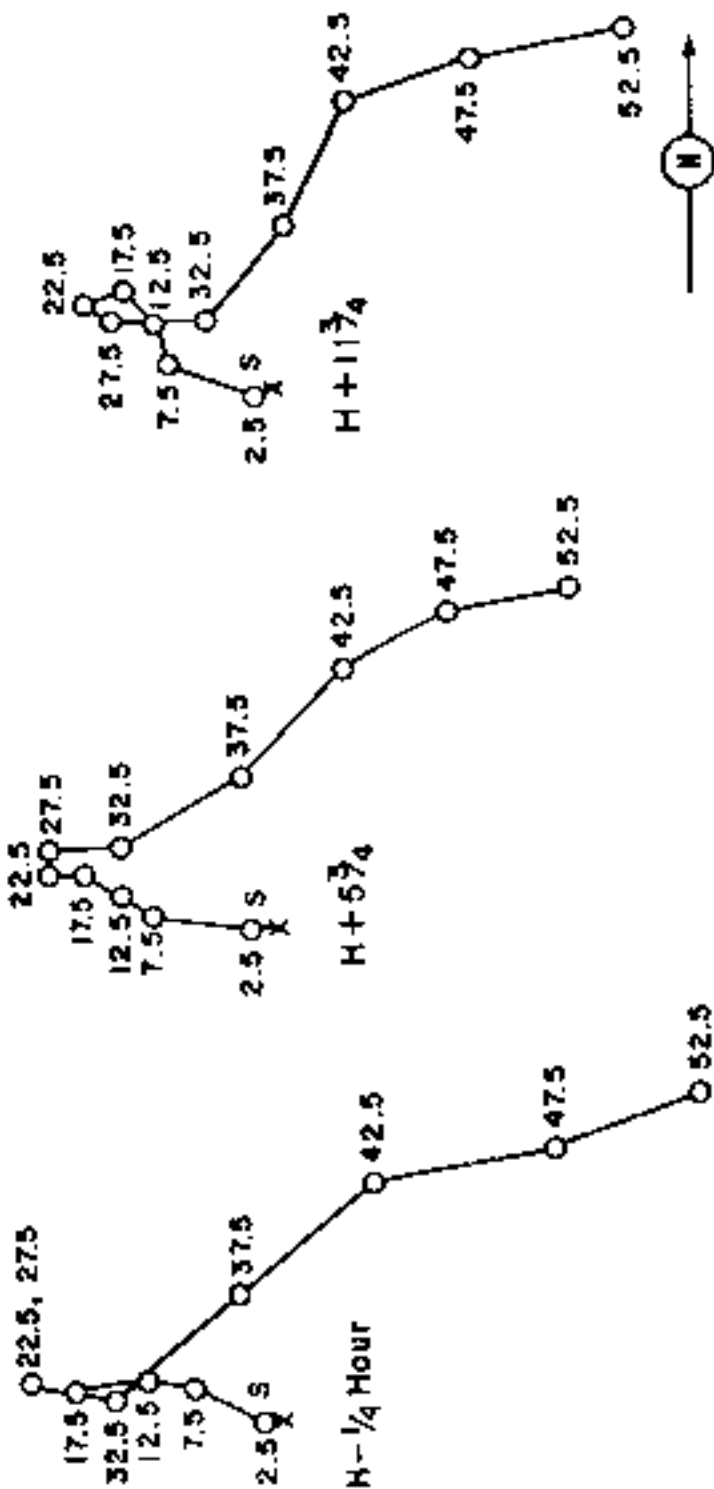


Figure 121. Hodographs for Operation WAFBACK 7 - Surremout.

OPERATION BARREAGE I- Koa

DATE: 1967 May 1-1967 May 1967
TIME: 0630 1830

TOTAL YIELD: 1.57 Mt

WINDWAVE DATA:

Time to 1st minimum 100 msec
Time to 2nd maximum 1.40 to 1.50 sec
Reading at 1st maximum 3,000 cts

CHARGE DATA:

Charge 200000000
Depth 100 ft
Type Apparently wet-dredging

Spreader 1250

STOCK: 110 - 110000000 - West
end of zone
117 40' 25" N
162° 11' 25" W
Site elevation: Sea level

HEIGHT OF MOUNTAIN: 20

CYCLE OF HEIGHT AND PLACEMENT:

Surface level 100000000
Level of water surface on 100000000

CHARGE TO SURFACE: 100000000
CHARGE TO SURFACE: 100000000

REMARKS:

Only individual island dose rates are available. Counts were obtained from Radiological Safety Organization helicopter surveys at 100000000. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to cast a probe over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PDR-30 survey meter modified to read up to 500 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the 100000000 hour dose rate readings to 100000000 hour.

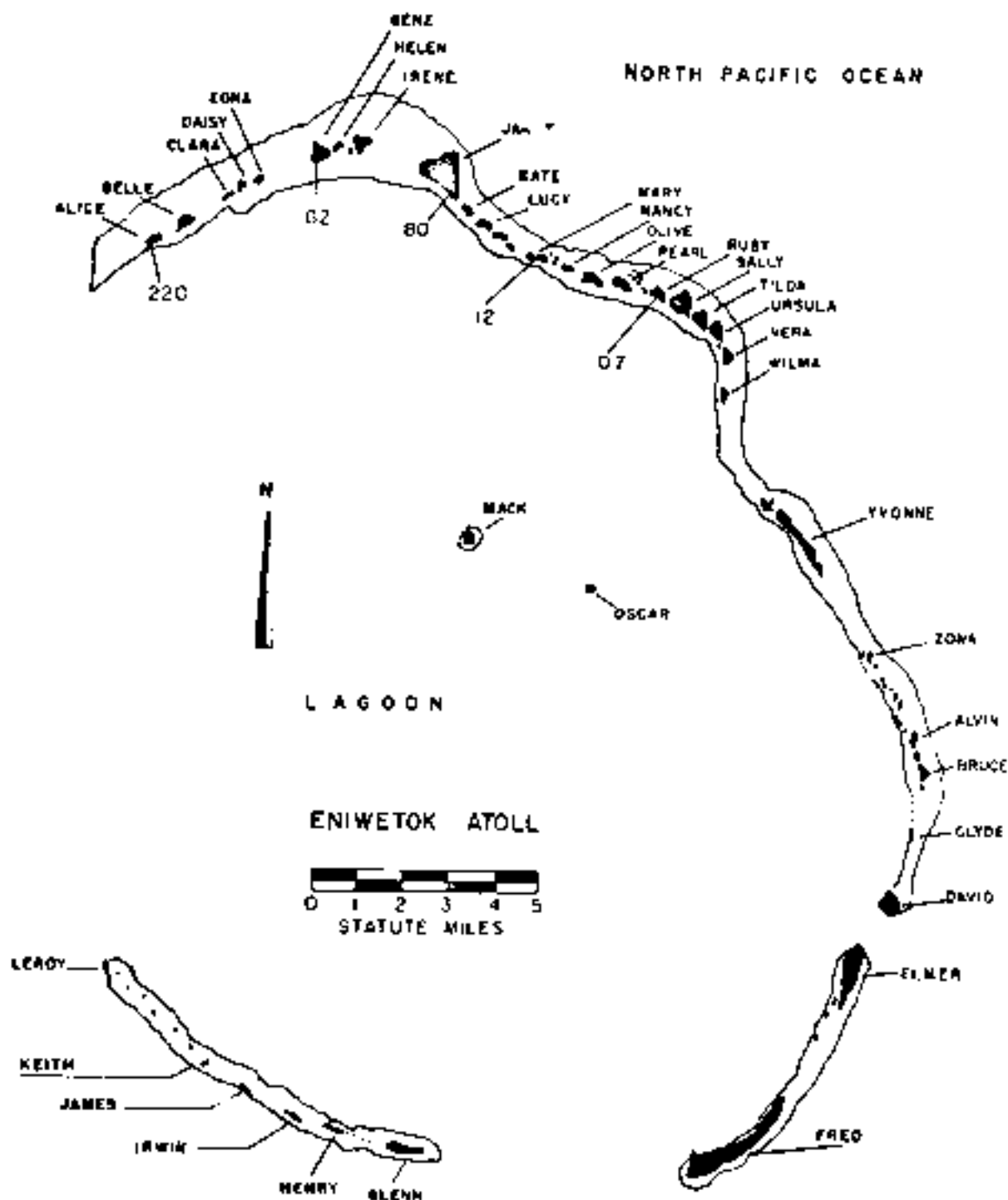


Figure 122. Operation HARDTACK I - Koa.
Island dose rates in r/hr at H+1 hour.

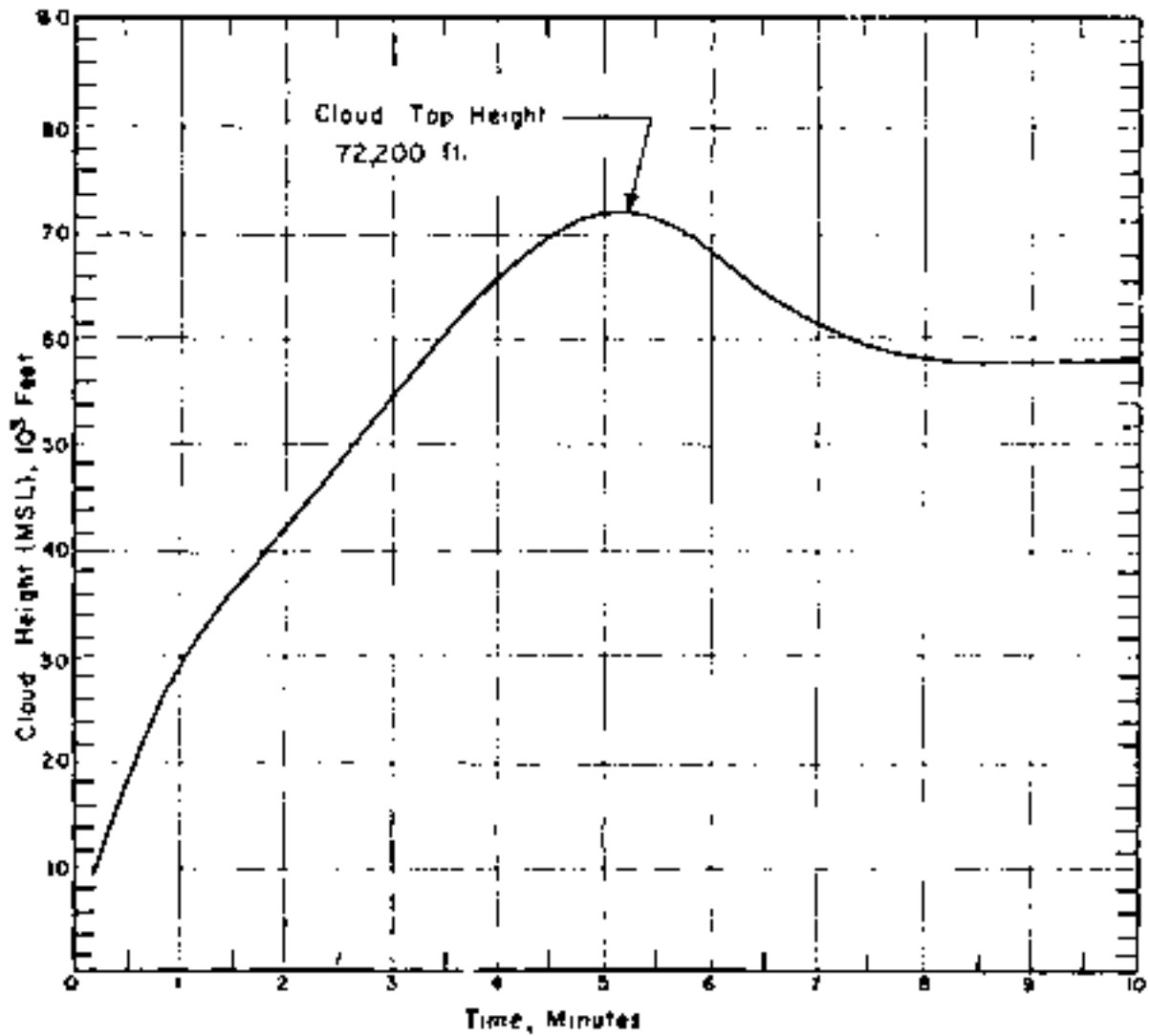


Figure 123. Cloud Dimensions: Operation HARDACK 1 - Kos.

TABLE 39. ESTIMATED WIND DATA FOR ORBITATION WINDSTACK 1-

109

Altitude (ft.)	1000 ft./sec.		1500 ft./sec.		2000 ft./sec.	
	Dir.	Mag.	Dir.	Mag.	Dir.	Mag.
feet	degrees	ft./sec.	degrees	ft./sec.	degrees	ft./sec.
Surface	050	18	060	18	060	18
1,000	070	29	080	32	080	26
2,000	070	31	070	32	080	29
3,000	060	32	070	37	090	29
4,000	080	36	080	29	090	31
5,000	090	33	080	29	100	26
6,000	100	29	090	23	110	26
7,000	100	31	100	19	100	26
8,000	100	31	100	20	060	25
9,000	090	28	100	20	070	20
10,000	090	25	100	15	090	14
12,000	100	29	130	20	120	15
14,000	110	25	150	14	120	08
15,000	(110)	(20)	(150)	(15)	(160)	(07)
16,000	120	14	160	14	170	12
18,000	110	12	160	14	180	07
20,000	070	08	170	05	220	09
23,000	200	30	180	18	180	11
25,000	200	14	160	12	170	10
30,000	200	24	240	21	270	21
35,000	190	31	170	31	180	24
40,000	08	25	190	29	230	31
45,000	200	40	200	12	(230)	(12)
50,000	200	36	280	35	280	33
55,000	280	13	230	14	200	33
60,000	100	17	210	17	270	12
65,000	090	07	050	09	(210)	(06)
70,000	100	16	130	09	170	07
74,000	---	---	---	---	070	10
75,000	110	23	070	20	080	16
80,000	100	21	070	26	100	30
85,000	070	41	100	53	---	---
90,000	090	59	110	71	100	62
92,000	090	66	---	---	---	---
95,000	---	---	100	77	---	---
100,000	---	---	100	83	100	69
105,000	---	---	100	85	---	---
110,000	---	---	100	126	100	75
118,000	---	---	---	---	100	101

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Endevco weather station.
3. Tropopause height was 51,000 ft MSL.
4. The surface air pressure was 14.66 psi, the temperature 27.2°C, the dew point 70°F, and the relative humidity 70%.

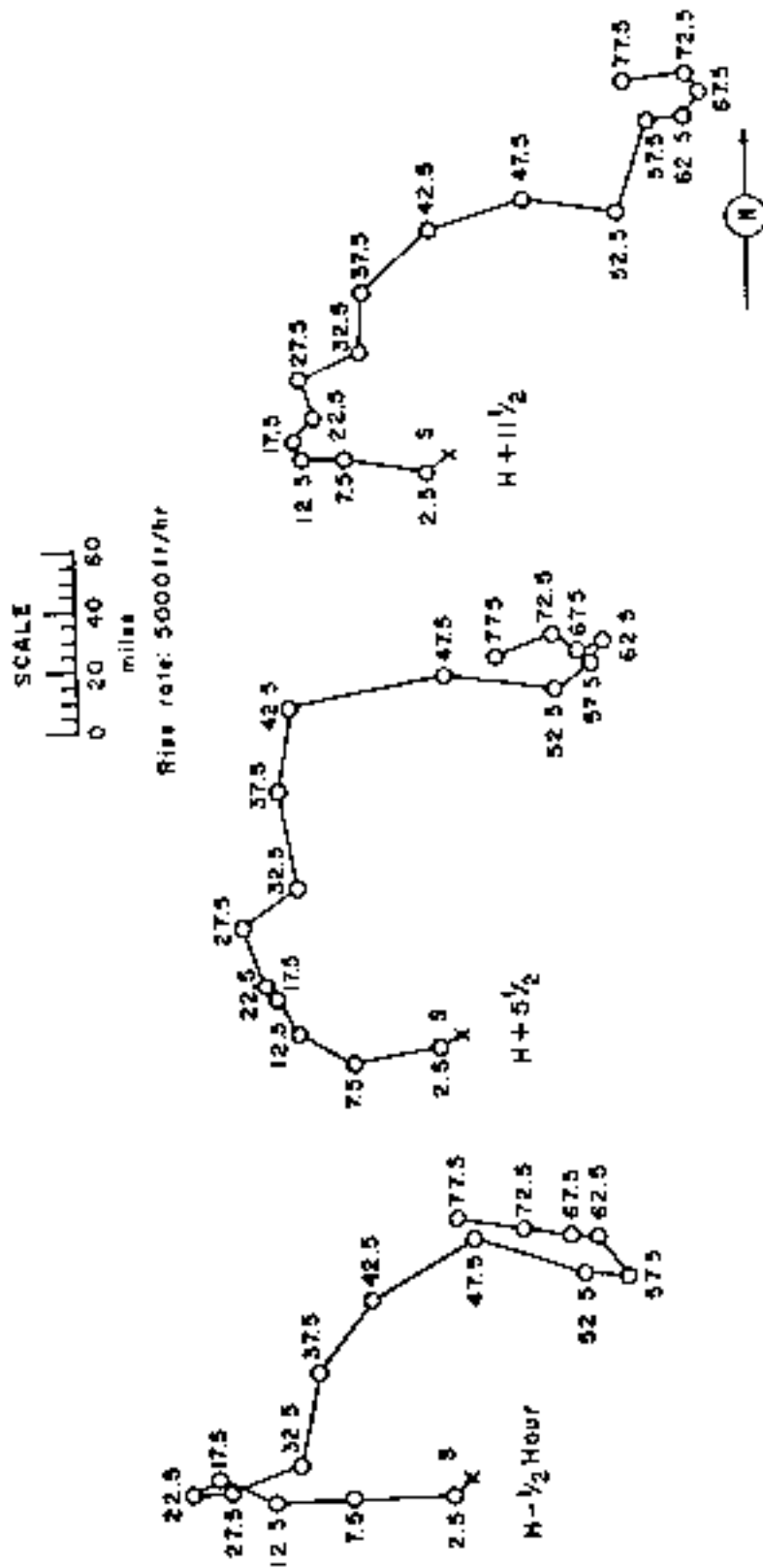


Figure 134. Hodographs for Operation WARECK I - Xoe.

	<u>PPG Rise</u>	<u>ZCT</u>
<u>DATE:</u>	12 May 1968	12 May 1968
<u>TIME:</u>	0100	0130

Sponsor: LAGL/100

SITE: PPG - Helinet's - south by
SSW of Ipaia, about 5,000
ft from the island
11° 20' 51" N
168° 10' 31" W
Site elevation: Sea level

HEIGHT OF BUOY: -100 ft under
water

TYPE OF BUOY AND PLACEMENT:
Underwater - Device suspended
by a cable. Water depth
3,200 ft

PRESSURE HEIGHT: 1,700 ft MSL
at 1 1/2 sec

PIPING DIAMETER: 3,400 ft MSL
at 1 1/2 sec

REMARKS:

"Nearly all of the total gamma-ray occurred within 10 minutes after zero time and was due to the passage of about one mile of total pipe. Gamma decay in excess of 10% occurred within the first 10 minutes and downwind distance was less than 10,000 feet. In both instances the residual field due to deposited radioactive material was relatively insignificant, although such material may represent a radiological hazard."

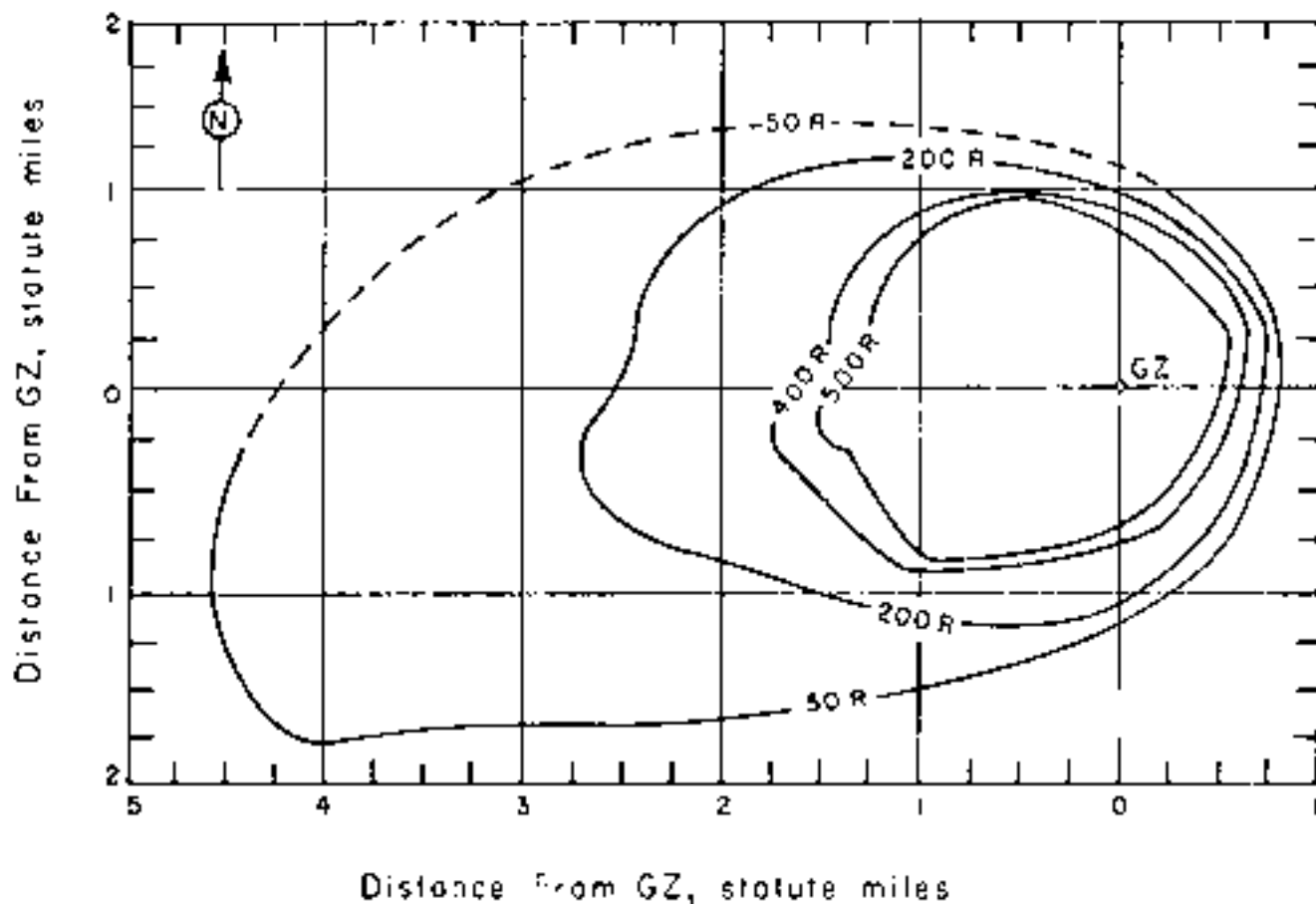


Figure 1.15. Operation BASTOGACK I - Wahoo.
On-site cumulative dose to 6 hours in rontgens.

TABLE 40 ENHANCED WIND DATA FOR OPERATION BARBACOCK I -

11/00

Altitude (MSL) feet	H-1, 1000h		H-41, 0600h	
	Air degrees	Wind mph	Air degrees	Wind mph
Surface	070	17	080	16
1,000	090	22	080	18
2,000	090	22	080	20
3,000	090	20	080	21
4,000	090	17	080	20
5,000	070	13	060	14
6,000	040	08	050	10
7,000	330	07	350	07
8,000	280	12	300	14
9,000	190	17	300	20
10,000	280	21	300	22
12,000	310	16	290	14
14,000	290	09	310	12
16,000	020	07	340	09
18,000	240	14	020	09
20,000	040	08	040	13
22,000	060	05	010	07
25,000	240	02	360	07
30,000	300	15	260	10
35,000	260	15	---	---
40,000	270	20	270	10
45,000	280	29	---	---
50,000	340	15	310	14
52,000	---	---	270	09
55,000	070	06	---	---
60,000	060	15	020	20
65,000	090	17	---	---
69,000	---	---	120	10
70,000	090	12	100	07
73,000	090	57	060	13
75,000	---	---	---	---
80,000	100	60	090	40
85,000	090	57	---	---
90,000	090	57	090	72
95,000	---	---	---	---
100,000	---	---	090	79
110,000	---	---	100	93
114,000	---	---	100	100

NOTES:

1. Wind data was taken by the Eniwetok weather station.
2. Tropopause height was 59,000 ft MSL.
3. The surface air pressure was 14.69 psi, the temperature 30.8°C, the dew point 73°F, and the relative humidity 63%.

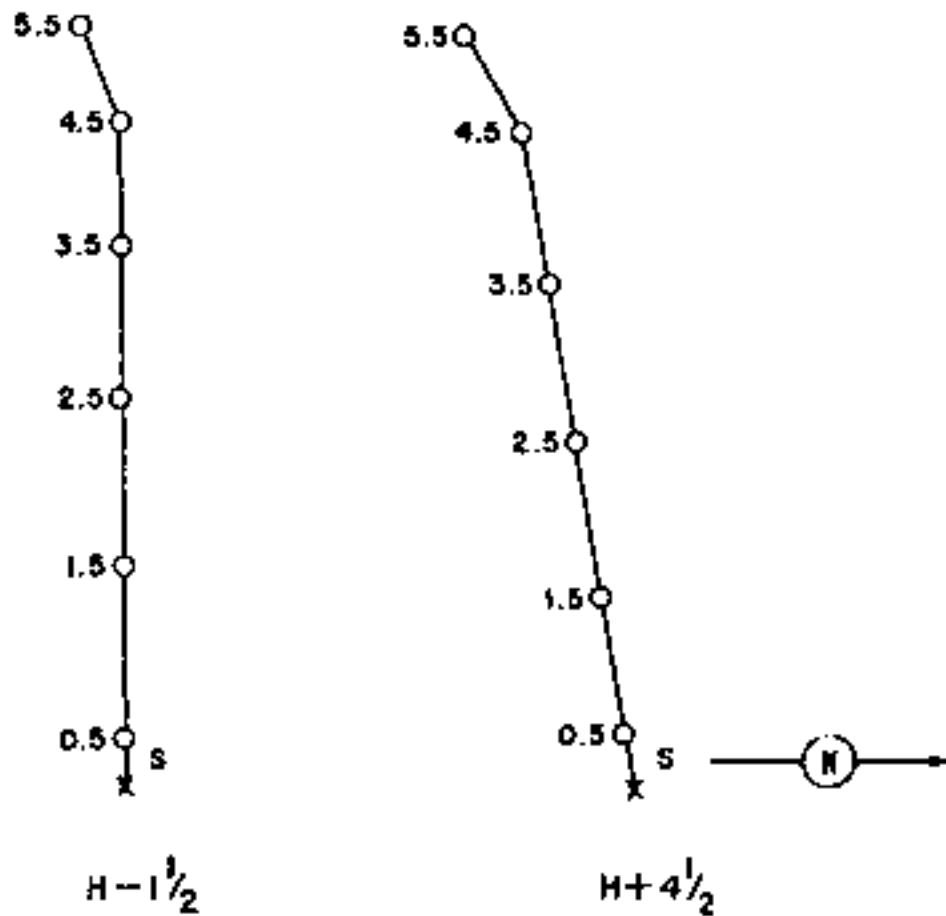
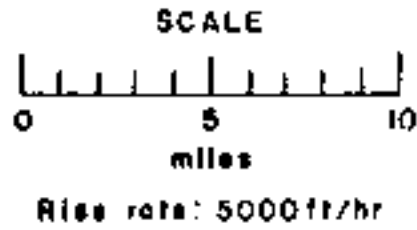


Figure 126. Hodographs for Operation HARDUACK I - Wahoo

OPERATION SANDTACH I -

Holly

DATE: 1950 Class EST
TIME: 21 May 1953 14 May 1953
TIME: 0630 1030

Sponsor: IAGI

SITE: 710 - Suwetch - West
of Yvonne, 1,000 ft.
from the seaward edge
of the island
11° 32' 30" N
162° 21' 30" E

Site elevation: Sea level

HEIGHT OF INSTRUMENT: 100 ft.

TYPE OF SURVEY AND MEASUREMENTS:
Surface current from surface of
water
Water depth 100 ft.

CLOUD TOP HEIGHT: 10,000 ft. MSL.
CLOUD BASE HEIGHT: 7,000 ft. MSL.

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys made by the Radiological Safety organization at H+3 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/DR-30 survey meter modified to read up to 500 r/hr. The $t^{-1/2}$ decay approximation was used to extrapolate the H+3 hour dose rate readings to H+1 hour.

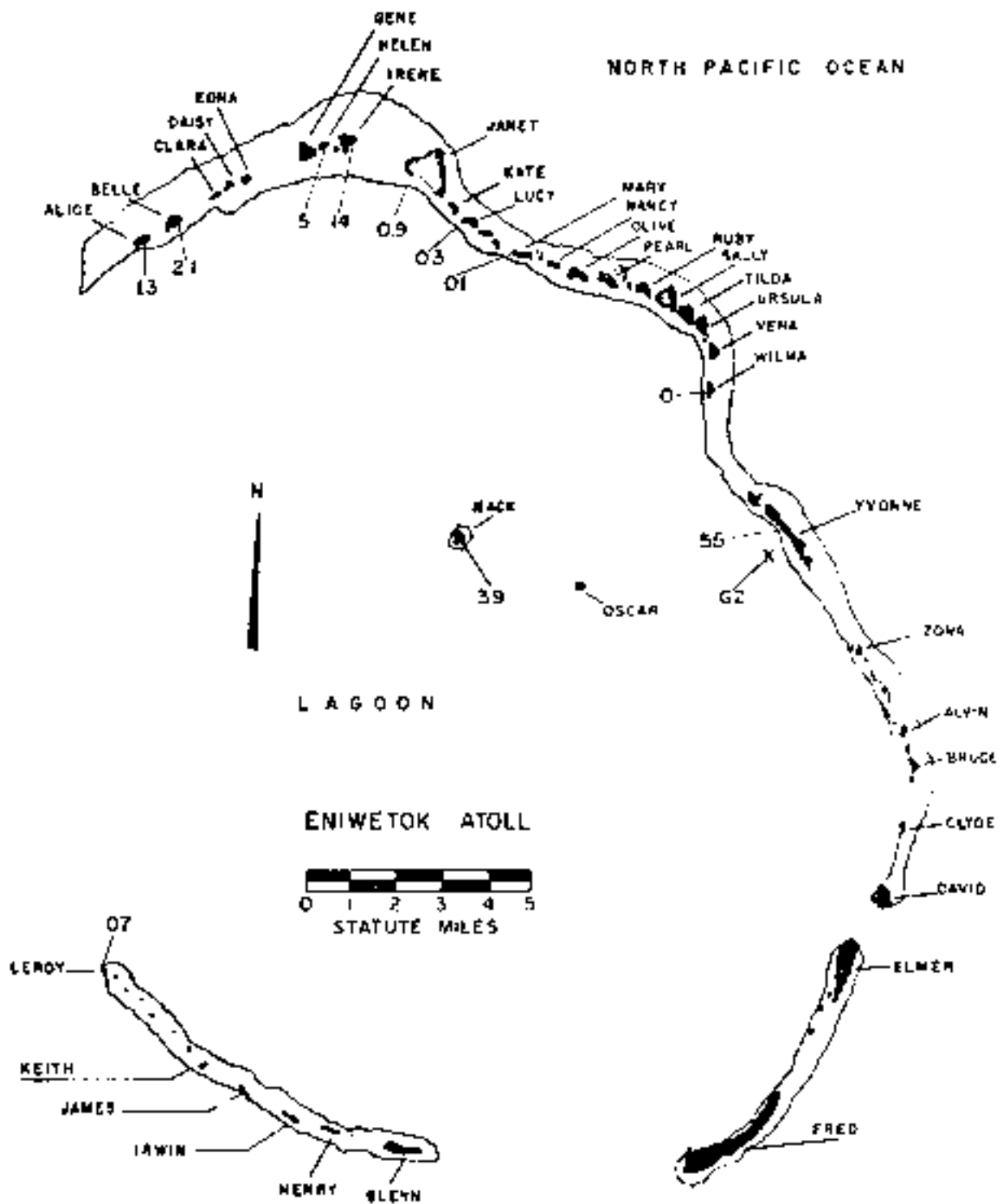


Figure 127. Operation HARDTACK I - Holly. Island dove rates in r/hr at 141 hours.

TABLE 41 ENINGSTOCK WIND DATA FOR OPERATION BALDWIN-02, I -

NOV 57

Altitude (MSL)	Wind Speed		Wind Dir.		Wind Dir.	Wind Dir.
	Dir.	Spd.	Dir.	Spd.		
feet	degrees	mph.	degrees	mph.	degrees	mph.
Surface	080	16	090	22	080	17
1,000	080	24	080	20	070	24
2,000	070	26	080	18	070	24
3,000	080	26	080	24	070	24
4,000	080	24	070	22	060	24
5,000	080	23	070	21	070	24
6,000	070	14	080	17	070	20
7,000	100	10	100	17	090	14
8,000	120	12	120	14	110	14
9,000	130	12	140	14	120	14
10,000	180	10	150	10	150	14
12,000	210	07	210	10	210	10
14,000	260	10	240	07	270	07
15,000	(270)	(07)	(260)	(07)	(260)	(07)
16,000	250	09	150	09	150	07
18,000	270	09	120	07	280	07
20,000	270	09	220	10	260	10
23,000	250	12	260	09	270	10
25,000	270	13	290	09	260	10
30,000	260	21	260	07	260	21
35,000	---	--	260	11	270	14
36,000	270	24	---	--	---	--
40,000	270	22	200	30	190	19
45,000	270	38	210	43	210	30
50,000	230	20	270	17	270	16

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Enningstock weather station.
3. Tropopause height was 52,000 ft MSL.
4. The surface air pressure was 14.65 psi, the temperature 27°C, the dew point 75°F, and the relative humidity 75%.

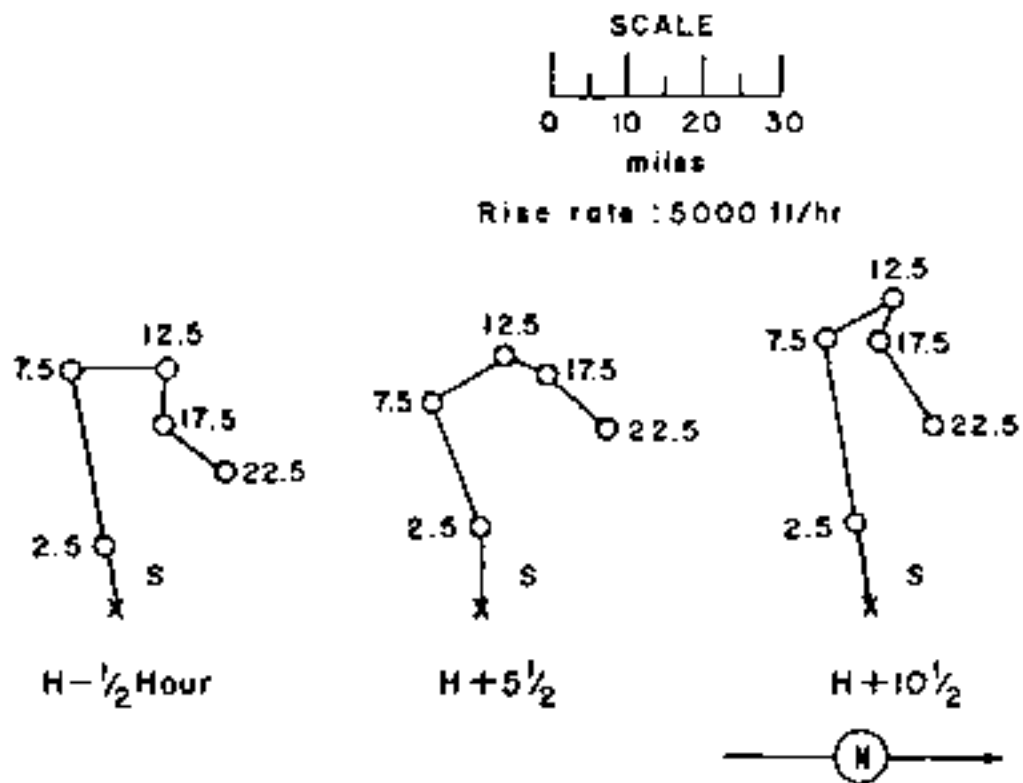


Figure 128. Hodographs for Operation PARTACAZ : - Holly.

OPERATION BASTAGE I -

DATE: PPG Time GMT
27 May 1965 21 May 1965
TIME: 0900 1130

Sponsor: UCRL

SITE: HAG - Bikini - West end Turn
 11° 29' 16" N
 169° 22' 15" W
 Site elevation: Sea level

HEIGHT OF INSTR: 10.11 ft

TYPE OF INSTR AND MEASUREMENT:

Surface Vane Flow counter in
water

CLOUDS FOR READING: 100% of MC

CLOUD BOTTOM HEIGHT: 100

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys made by the Radiological Safety Organization at H+4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to take a slow pass over the desired spot at an elevation of 1000 feet. Readings taken at 100 feet were multiplied by a factor of 10 in order to obtain a reasonable approximation of the true ground readings. The basic instrument used in the aerial surveys was the AN/PDR-30 survey meter modified to read up to 100 r/hr. The $t^{-1.2}$ decay approximation was used to correct the H+4 hour dose-rate readings to H+1 hour.

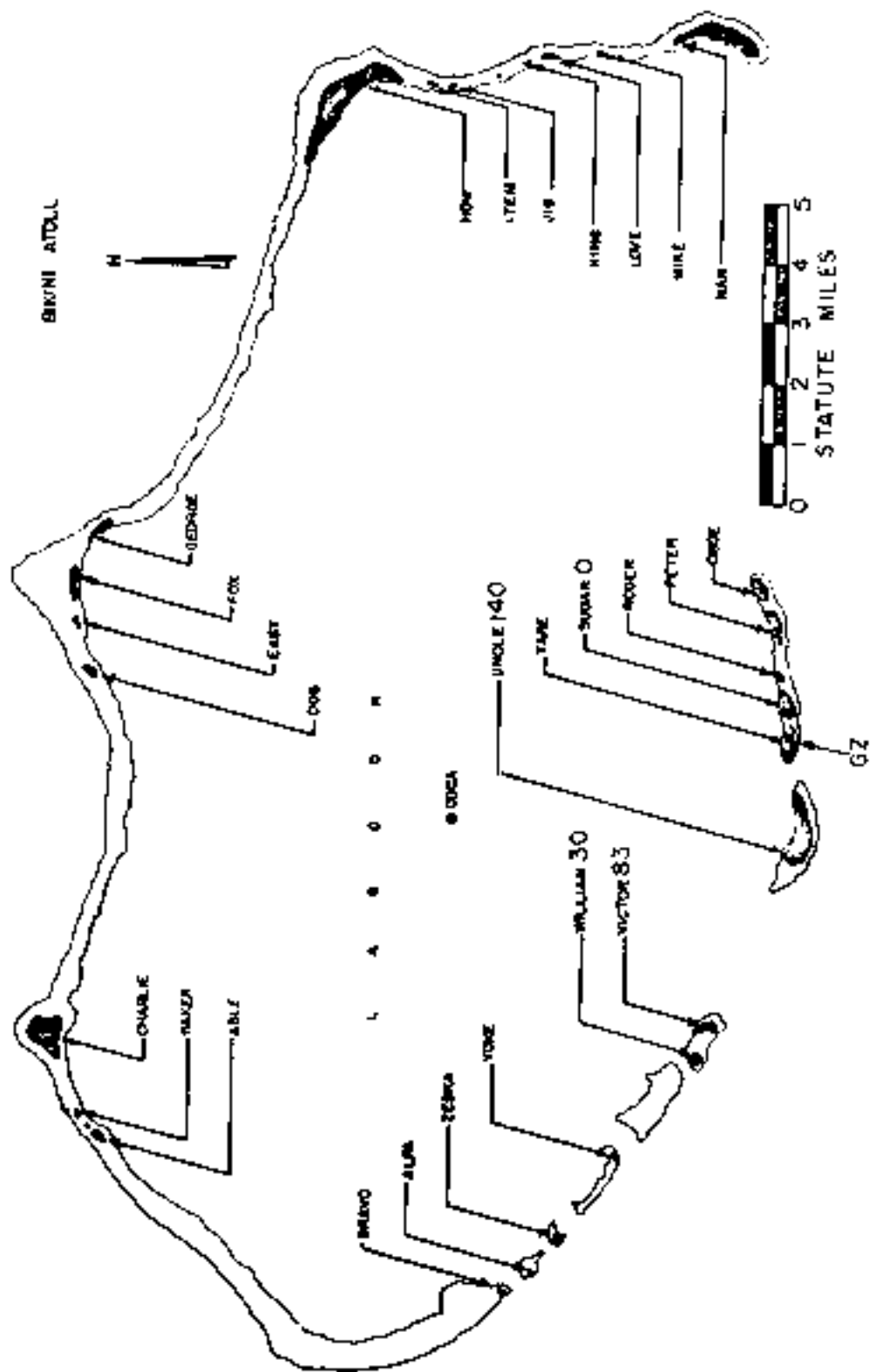


Figure 129. Operation HALLOWAY I - Status of aircraft crash sites in 1/5/47 at 0901 hours.

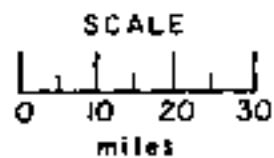
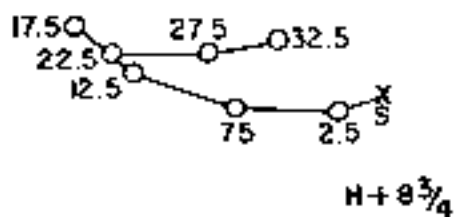
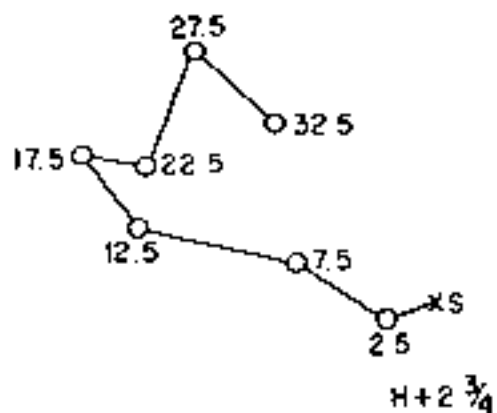
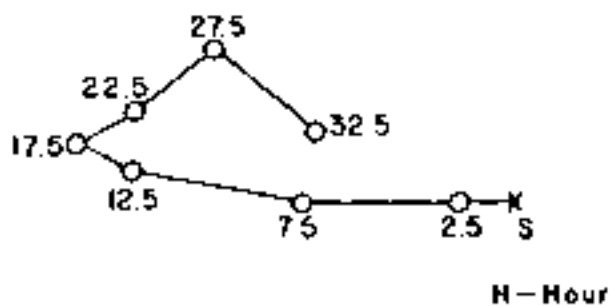
TABLE 42 SIXTENTH WIND DATA FOR DESIGNATED EXPONENTIAL -

CONTINUED

Altitude (MCL)	Barocly		Baro ₂		Baro ₃	
	Dir	Speed	Dir	Speed	Dir	Speed
Surf sea	090	16	080	16	080	14
1,000	090	16	090	16	070	14
2,000	090	15	070	16	080	15
3,000	090	18	090	16	080	14
4,000	090	28	090	15	090	13
5,000	090	16	120	14	090	12
6,000	100	17	110	17	110	13
7,000	090	18	100	20	110	14
8,000	070	18	080	20	050	14
9,000	090	19	090	22	090	14
10,000	100	17	100	20	100	14
12,000	080	19	130	10	120	14
14,000	120	10	130	12	150	14
15,000	(110)	(10)	(140)	(12)	(120)	(13)
16,000	110	12	120	10	120	13
18,000	220	12	340	10	100	12
20,000	240	09	280	08	310	11
23,000	210	09	290	07	320	11
25,000	230	06	240	13	290	12
30,000	310	04	110	11	290	12
33,000	---	---	---	---	260	16
34,000	300	01	---	---	---	---
35,000	---	---	260	16	---	---
40,000	200	3	200	24	240	14
45,000	240	23	---	---	240	14
50,000	120	10	310	17	210	12
55,000	---	---	080	07	040	12
57,000	030	07	---	---	---	---
60,000	200	06	160	06	250	07
64,000	---	---	---	---	080	07
65,000	090	09	120	08	---	---
70,000	110	10	110	08	080	06
72,000	---	---	---	---	050	06
75,000	080	25	---	---	---	---
80,000	090	36	090	35	090	37
82,000	---	---	090	38	---	---
83,000	---	---	---	---	090	22
85,000	090	32	---	---	---	---

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on board ship located within 30 nautical miles of the Tower at Nan Inland, Bikini Atoll.
3. Tropopause height was 34,000 ft MCL.
4. The surface air pressure was 10.18 psi, the temperature 27.4°C, the dew point 72.5°F, and the relative humidity 90%.



Rise rate : 5000 ft/hr



Figure 130. Holographs for Operation HARDTACK I -

Kutneg.

OPERATION HAWKBACK I -

Yellowwood

DATE: 26 May 1968 26 May 1968
TIME: 1400 0600

Sponsor: LACL

SITE: PSC - Hawkback - SW of
Junct 1,000 ft.
11° 39' 37" N
160° 15' 31" E
Site elevation: Sea level
Water depth: 15 ft.

HEIGHT OF MAST: 14.12 ft.

TYPE OF WIND AND WAVE DIRECTION:
Surface wind from easterly waves

CLOUD TOP HEIGHT: 10,000 ft. MSL.
CLOUD BASE HEIGHT: 5,000 ft. MSL.

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety organization helicopter surveys at 04- hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, or that a ground reading could be obtained, or to make a low pass over the desired spot at an elevation of 25 feet. Readings taken at 10 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/RES-33 survey meter modified to read up to 500 m/hr. The $t^{1/2}$ decay approximation was used to extrapolate the 04- hour dose-rate readings to 01- hour.

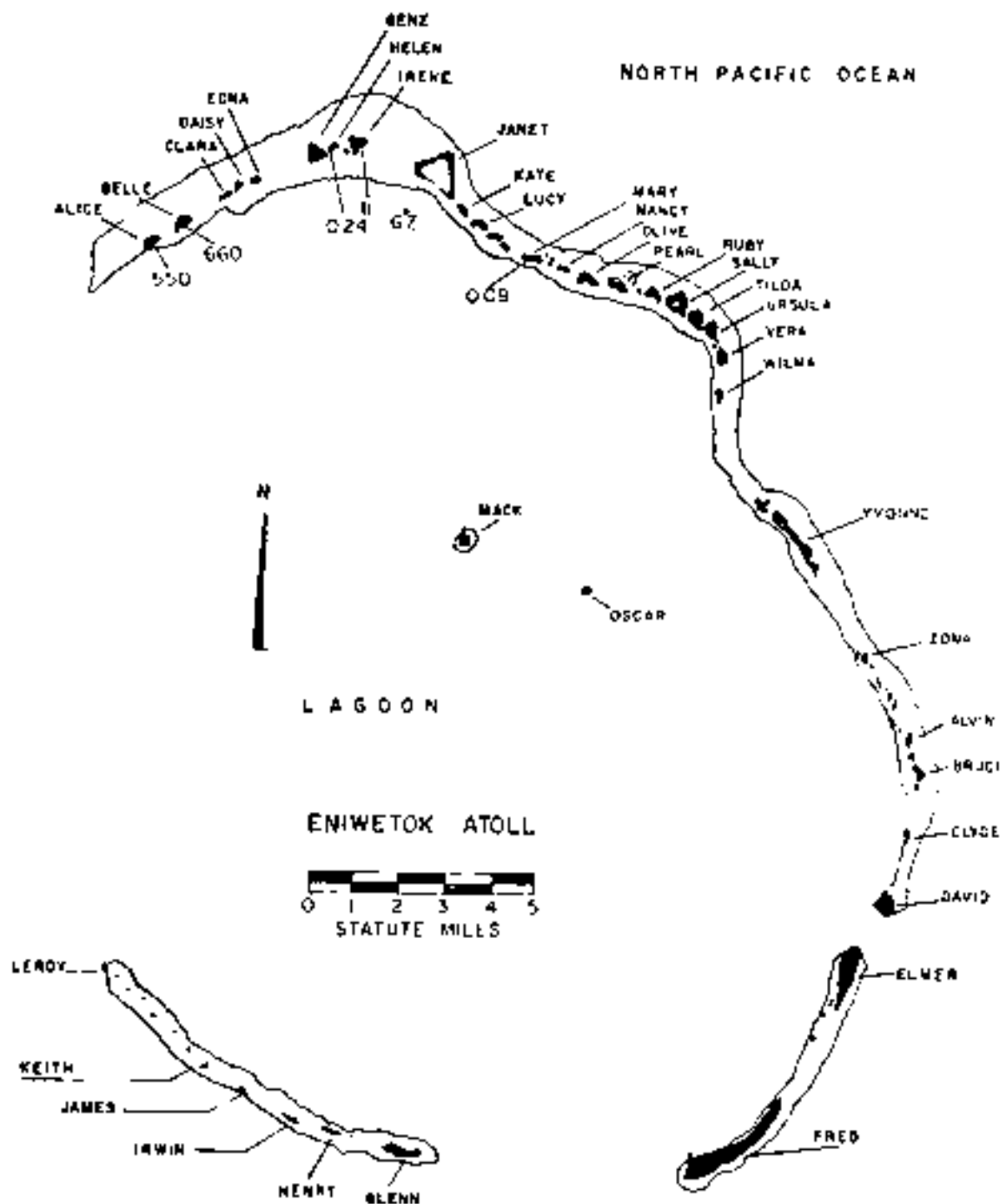


Figure 151. Operation HARDYACK I - Yellowwood.
Island dose rates in r/hr at H+1 hour.

TABLE 43 EXISTING WIND DATA FOR ORIENTATION BARBACACK I - YELLOWWOOD

Altitude (MSL)	U-Vector		W-Vector		RFD (MSL)	
	Dir. degrees	Spd. mph	Dir. degrees	Spd. mph	Dir. degrees	Spd. mph
Surface	090	24	070	18	080	15
1,000	090	16	080	20	080	18
2,000	070	16	080	17	080	18
3,000	070	18	080	17	070	18
4,000	080	17	090	15	100	15
5,000	080	16	090	12	100	12
6,000	070	17	080	09	100	12
7,000	060	13	070	07	070	12
8,000	050	09	70	12	070	5
9,000	070	10	070	12	090	7
10,000	050	08	060	13	070	10
12,000	040	10	050	14	070	12
14,000	050	07	020	09	070	10
15,000	(060)	(10)	(030)	(08)	(070)	(08)
16,000	070	07	040	07	070	08
18,000	060	20	050	12	100	08
20,000	070	30	060	14	070	08
23,000	090	18	080	16	060	21
25,000	100	22	090	17	070	17
30,000	080	29	070	23	070	20
35,000	110	37	090	23	050	23
40,000	110	31	080	30	070	20
45,000	090	32	090	20	050	22
50,000	080	24	090	17	070	21
55,000	050	24	050	22	070	20
60,000	070	22	060	20	070	20
65,000	060	07	050	16	080	21
70,000	090	07	100	23	080	21
75,000	080	43	100	39	110	27
80,000	100	49	100	48	090	35
85,000	100	51	080	59	090	60
90,000	100	57	090	54	090	61
95,000	100	63	090	53	---	---
100,000	090	76	090	79	---	---
105,000	060	96	090	94	---	---
110,000	060	79	090	109	---	---
115,000	100	105	090	105	---	---
120,000	110	112	100	92	---	---
122,000	---	---	100	90	---	---
123,000	110	114	---	---	---	---

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Malverick weather station.
3. Tropopause height was 15,000 ft MSL.
4. The surface air pressure was 14.66 psi, the temperature 30.6°C, the dew point 13° F, and the relative humidity 63%.

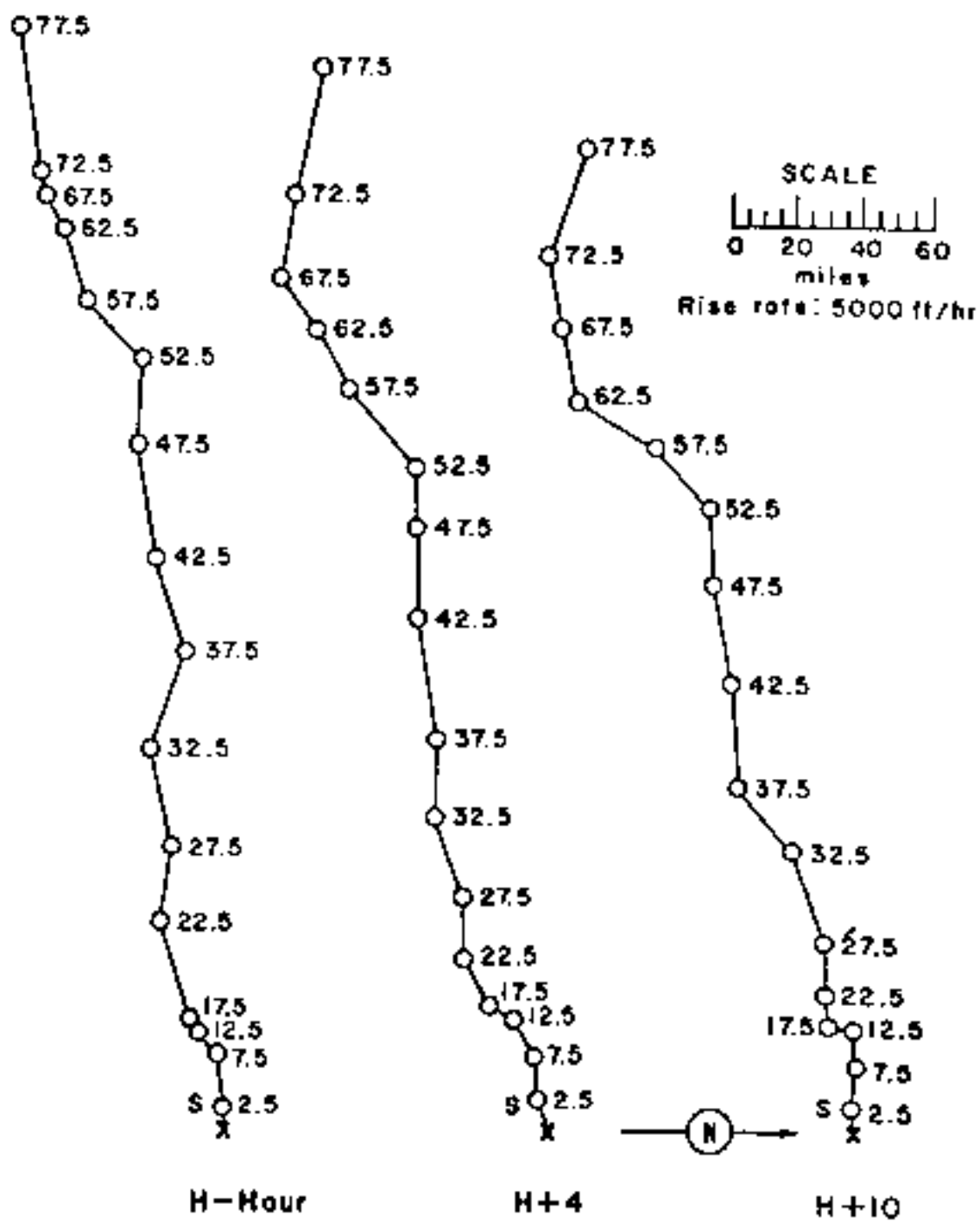


Figure 133. Hodographs for Operation HARDACK I - Yellowwood.

OPERATION HARDTACK I -

Magnolia

DATE: PPG Time GMT
27 May 1950 28 May 1950
TIME: 0600 1800

SPONSOR: LBSL

SITE: PFC - Eniwetok - NW of
Yonke, 3,000 ft from
the nearest edge of the
island
11° 32' 34" N
169° 21' 15" E
Site elevation: Sea level

HEIGHT OF POINT: 13.6' M

TYPE OF SURVEY AND LOCATION:
Surface Point from base of
water

CLOUD TOP HEIGHT: 11,000 ft MSL
CLOUD BOTTOM HEIGHT: 1,000 ft MSL

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys made by the Radiological Safety organization at H+4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PHE-39 survey meter modified to read up to 500 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the H+4 hour dose-rate readings to H+1 hour.

TABLE 44. ESTIMATED WIND DATA FOR 1949-1950 WINTER AT 1 -

MARCH 54

Altitude (M.S.L.) Feet	Surface		2000 Feet		5000 Feet	
	Wind Direction	Sp. H.	Wind Direction	Sp. H.	Wind Direction	Sp. H.
Surface	090	16	110	16	090	19
1,000	080	14	100	15	080	14
2,000	080	14	100	15	100	09
3,000	090	14	100	10	080	09
4,000	100	15	100	09	080	07
5,000	120	10	090	09	090	08
6,000	120	07	070	07	090	06
7,000	080	05	070	07	080	03
8,000	070	08	070	09	080	05
9,000	070	09	080	07	080	06
10,000	070	09	080	09	100	09
12,000	080	09	100	05	080	03
14,000	080	10	110	06	100	05
15,000	(080)	(14)	(110)	(07)	(100)	(05)
16,000	070	07	100	07	080	07
18,000	080	09	100	09	080	09
20,000	100	09	090	10	070	12
23,000	090	18	070	14	050	15
25,000	080	12	070	14	080	13
30,000	060	31	060	31	100	21
35,000	060	25	040	20	100	23
40,000	080	24	060	20	080	21
45,000	080	23	060	22	080	18
50,000	080	24	070	20	080	17
55,000	070	23	070	21	070	28
60,000	070	22	080	21	080	20
65,000	100	21	070	25	100	16
70,000	080	19	110	22	090	21
75,000	090	37	110	32	090	24
80,000	090	49	100	50	100	49
85,000	090	71	100	64	090	61
90,000	090	78	100	64	090	69
91,000	090	78	---	---	---	---
95,000	---	--	100	68	080	71
100,000	---	--	100	69	080	64
105,000	---	--	100	80	---	--
110,000	---	--	100	99	---	--
113,000	---	--	100	101	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Sibleyok weather station.
3. Tropopause height was 34,000 ft M.S.L.
4. The surface air pressure was 14.65 psi, the temperature 26.8°C, the dew point 72°F, and the relative humidity 76%.

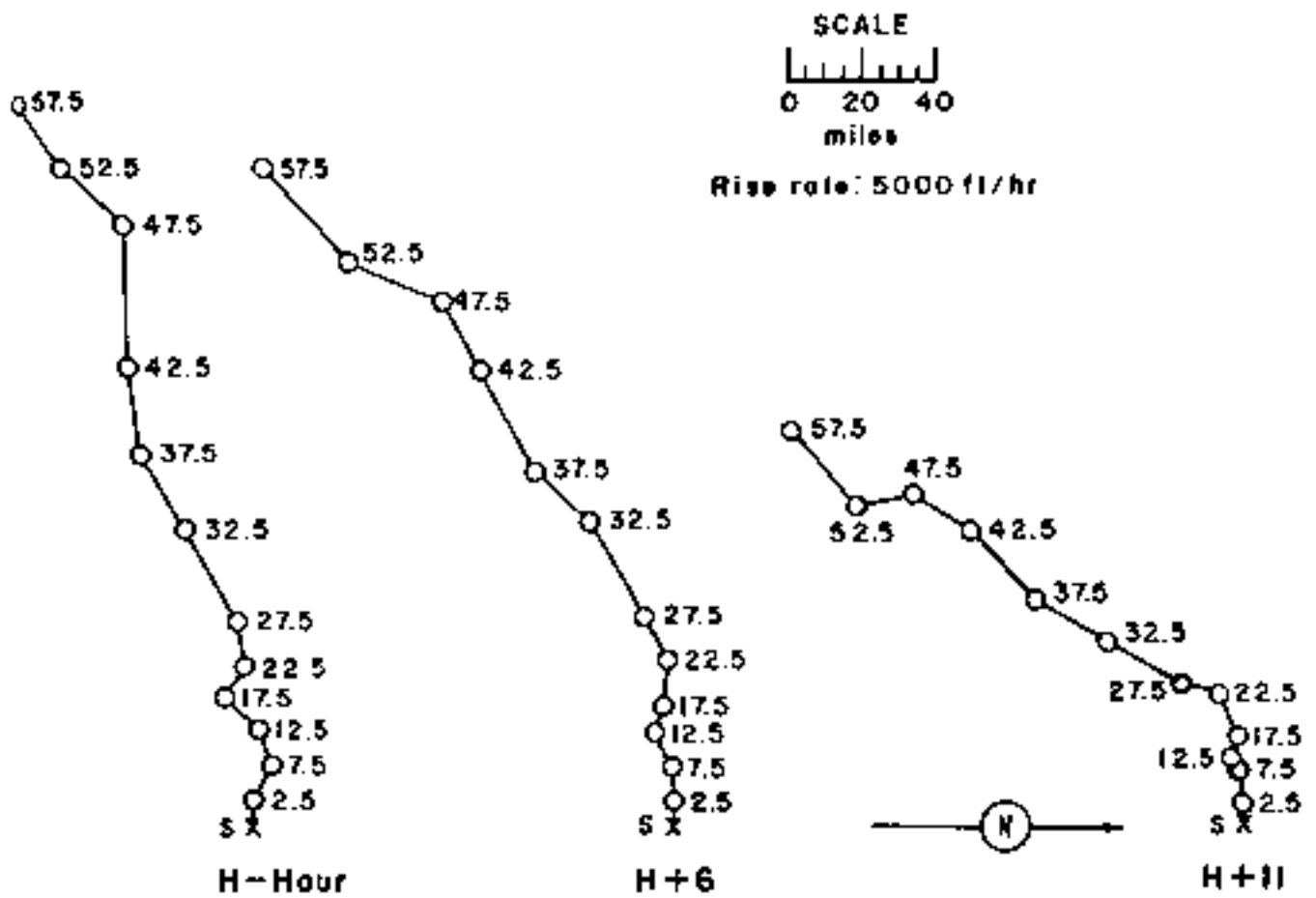


Figure 134. Hodographs for Operation WARDTACK I -

Magnolia.

OPERATION HARDACK I -

Tobacco

DATE: PTC Time GMT
30 May 1953 20 May 1953
TIME: 1015 0215

Spencer 1431.

SITE: 116 - Whitetok - 2,800 ft
W of Point
11° 31' 45" N
169° 13' 45" W
Site elevation: Sea level

TYPE OF READ AND PLACEMENT:
Surface level 1/2 meter
Water

CLOUD FOR 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
CLOUD FOR 1/2, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys made by the Radiological Safety Organization at 04 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PDH-20 survey meter modified to read up to 500 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the 04 hour dose rate readings to 01 hour.

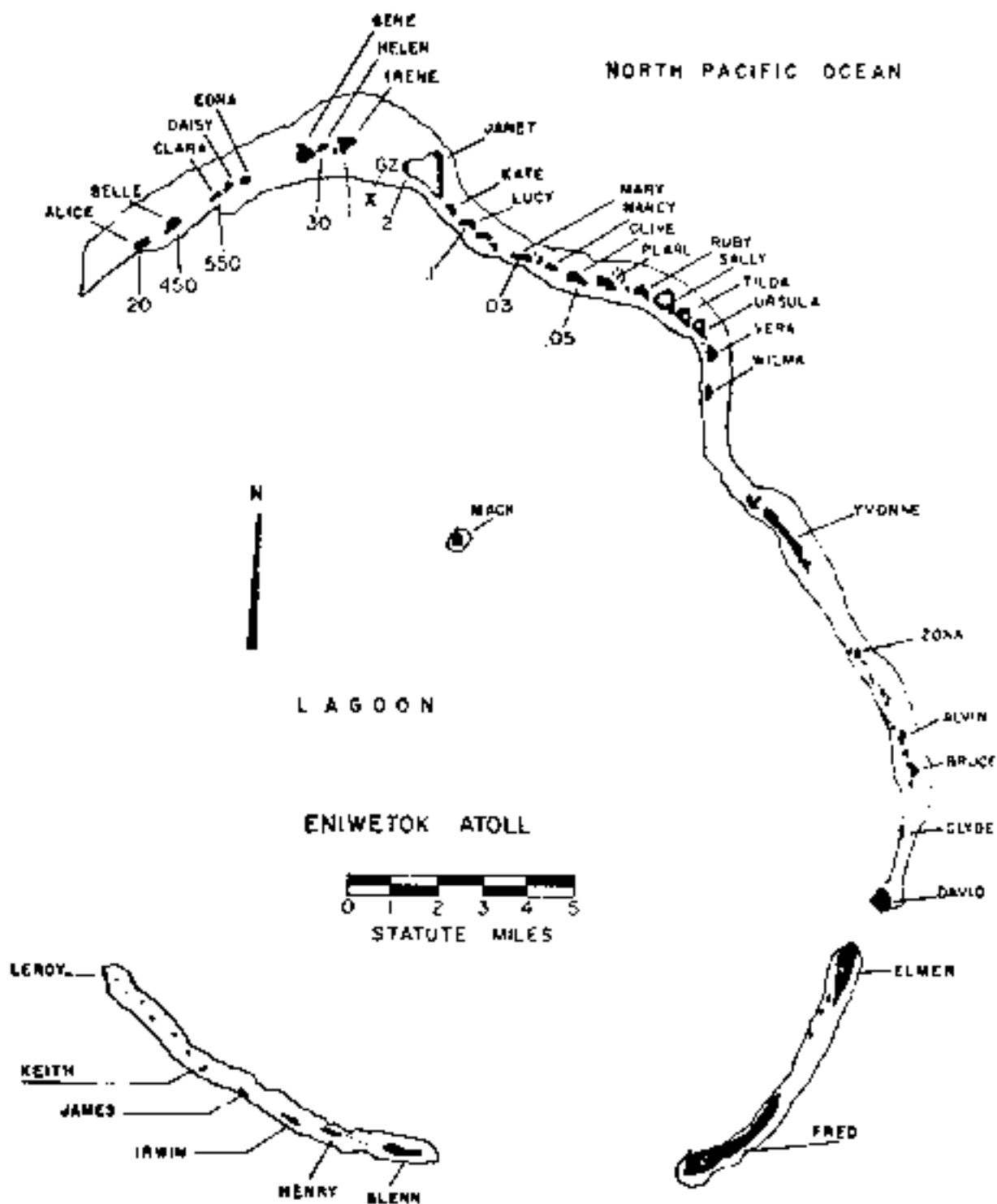


Figure 135. Operation HARDTACK I - Tobacco.
Island dose rates in r/hr at H+3 hour.

TABLE 45. EISENWECK WIND DATA FOR OBSERVATION BALLOON 1 -

201400Z

Altitude (Miles)	Kilometer		Miles		Miles	
	Dir	Speed	Dir	Speed	Dir	Speed
Feet	Direction	mph	Direction	mph	Direction	mph
Surface	080	14	080	23	170	26
1,000	080	24	080	20	090	24
2,000	080	36	080	33	100	25
3,000	090	21	090	24	110	30
4,000	090	16	090	26	110	21
5,000	090	14	100	22	110	21
6,000	090	17	100	20	110	20
7,000	090	22	110	21	110	20
8,000	100	21	110	17	110	19
9,000	110	18	110	17	120	19
10,000	130	20	110	20	110	18
12,000	140	14	120	19	120	20
14,000	130	10	130	17	120	19
15,000	(130)	(11)	(130)	(20)	(120)	(19)
16,000	140	13	130	15	120	19
18,000	120	12	140	14	110	18
20,000	120	12	110	12	110	17
23,000	130	14	110	17	110	15
25,000	120	12	130	17	110	16
30,000	110	09	240	04	010	11
35,000	240	10	240	12	200	10
40,000	230	17	220	14	210	10
45,000	240	17	220	21	210	20
50,000	230	17	210	18	210	19
55,000	200	07	220	11	190	16
60,000	070	08	070	13	110	15
65,000	130	24	140	18	110	12
70,000	110	17	070	23	070	21
75,000	090	35	090	31	090	38
80,000	090	48	100	35	090	47
85,000	100	68	100	68	090	69
90,000	100	69	100	69	090	71
94,000	---	--	---	--	090	71
97,000	100	71	090	69	---	--
100,000	100	77	090	69	---	--
105,000	100	72	100	76	---	--
110,000	090	77	---	--	---	--
118,000	090	95	---	--	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Eisenweck weather station.
3. Tropopause height was 55,000 ft MSL.
4. The surface air pressure was 30.60 psi, the temperature 28.9°C, the dew point 7°F, and the relative humidity 74%.

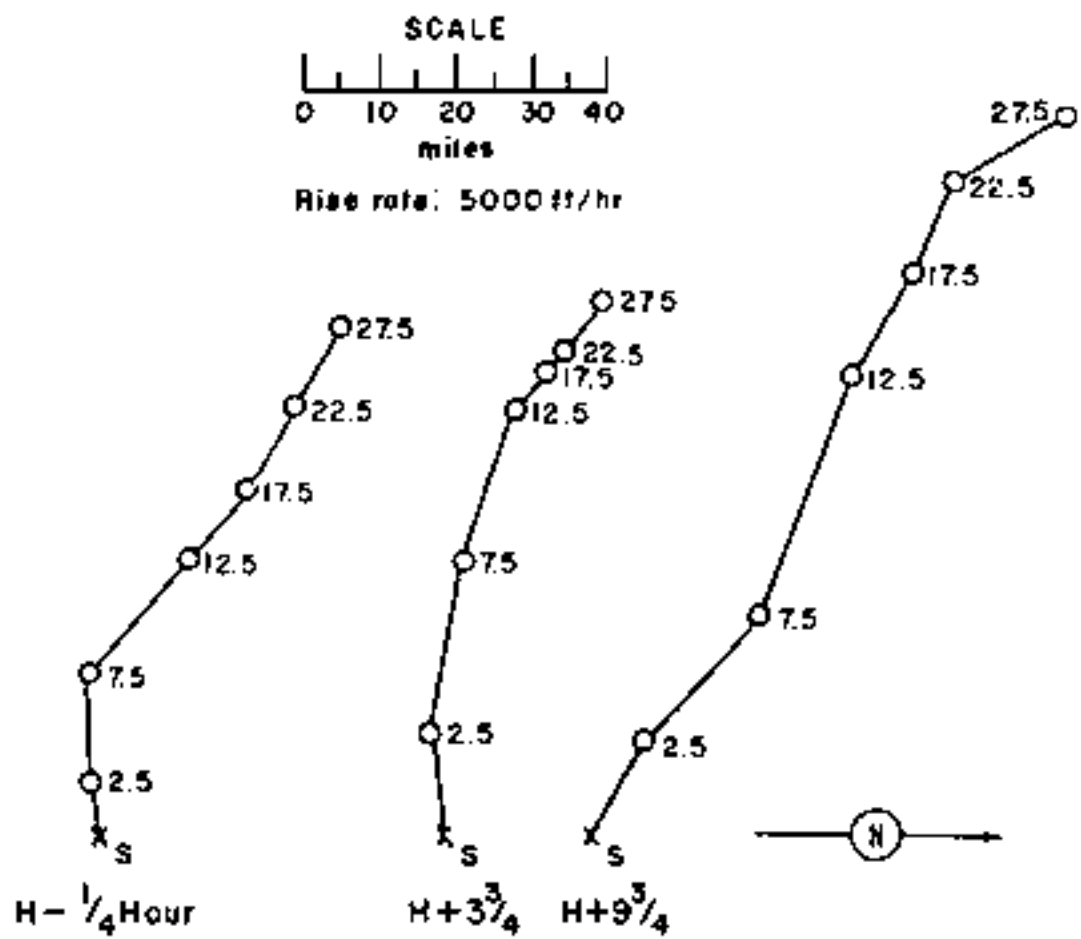


Figure 136. Hodographs for Operation HARDTACK I -

Tobacco.

OPERATION HARDENACE I -

Sydney

	<u>PPG Time</u>	<u>GMT</u>
<u>DATE:</u>	31 May 1953	31 May 1953
<u>TIME:</u>	1400	0300

Sponsor: USCG

SITE: PPG - Bikini - SW of
Charlie 4,000 ft from
the nearest edge of the
island
14° 41' 27" N
165° 16' 25" E
Site elevation: Sea level

HEIGHT OF FOREST: 11.5 ft

TYPE OF FOREST AND PLACEMENT:
Surface forest from edge of
water

CLOUD BASE HEIGHT: 10,000 ft MSL
CLOUD BOTTOM HEIGHT: 100

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys made by the Radiological Safety organization at H+4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/EDN-39 survey meter modified to read up to 500 μ /hr. The $t^{1/2}$ decay approximation was used to extrapolate the H+4 hour dose rate readings to H+1 hour.

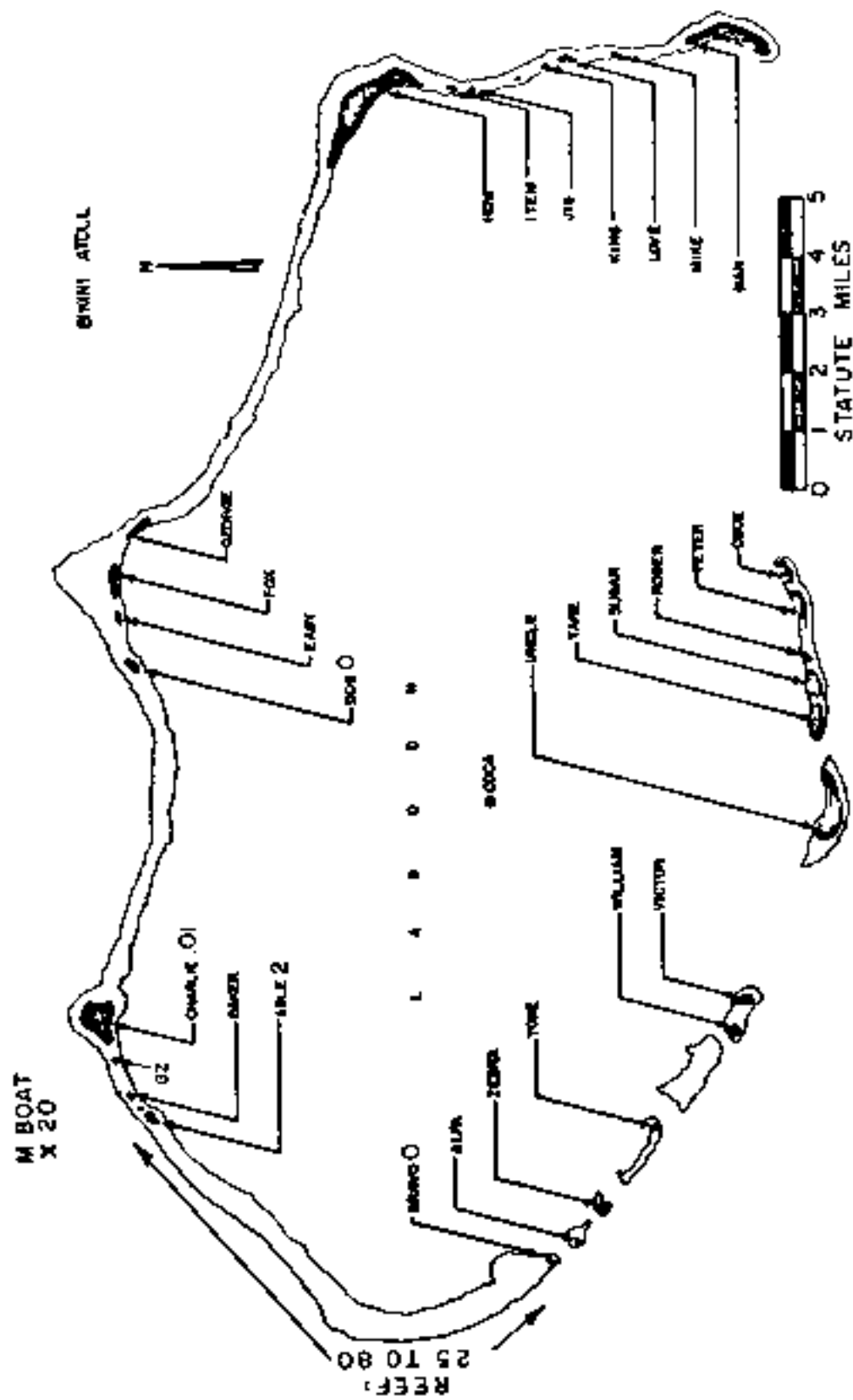


Figure 137. Operation PALMBOY I - Island dog race in r/h/r at H-1 camp.

TABLE 46. HIKINI WIND DATA FOR OPERATION HARDTACK 1 - 2000000

Altitude (Feet)	Wind		Wind Layers		Wind Layers	
	Dir. degrees	Spd. mph	Dir. degrees	Spd. mph	Dir. degrees	Spd. mph
Surface	090	12	100	17	070	21
1,000	110	22	090	21	080	22
2,000	100	23	090	22	080	24
3,000	110	28	090	24	090	24
4,000	110	24	100	23	090	25
5,000	110	16	100	22	080	28
6,000	110	14	110	18	090	20
7,000	100	27	100	18	100	21
8,000	100	27	100	18	100	21
9,000	110	14	100	17	090	20
10,000	120	14	110	16	110	14
12,000	120	15	110	16	110	16
14,000	090	17	090	13	100	17
15,000	(12)	(13)	(090)	(13)	(090)	(13)
16,000	09	12	090	12	080	16
18,000	120	13	100	09	100	17
20,000	110	18	100	12	100	17
23,000	100	10	100	14	090	18
25,000	100	29	100	14	010	11
30,000	090	14	040	13	060	13
33,000	270	01	---	---	---	---
34,000	---	---	---	---	190	10
35,000	(270)	(12)	280	17	(140)	(13)
40,000	100	27	250	23	210	23
45,000	090	24	(280)	(17)	110	09
50,000	080	13	280	12	210	18
53,000	---	---	080	06	---	---
55,000	(150)	(17)	(080)	(10)	060	10
57,000	100	39	---	---	---	---
60,000	120	20	120	22	100	20
65,000	080	16	---	---	---	---
66,000	---	---	060	30	---	---
70,000	100	24	090	31	090	29
75,000	090	38	---	---	---	---
80,000	100	55	100	53	090	53
81,000	100	59	---	---	---	---
85,000	---	---	---	---	090	41
90,000	---	---	090	59	080	70
91,000	---	---	090	59	---	---
94,000	---	---	---	---	080	68

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on board ship located within 30 nautical miles of the Tower on Sui Island, Bikini Atoll.
3. Tropopause height was 55,000 ft MSL.
4. The surface air pressure was 14.02 psi, the temperature 28.6°C, the dew point 74°F and the relative humidity 73%.

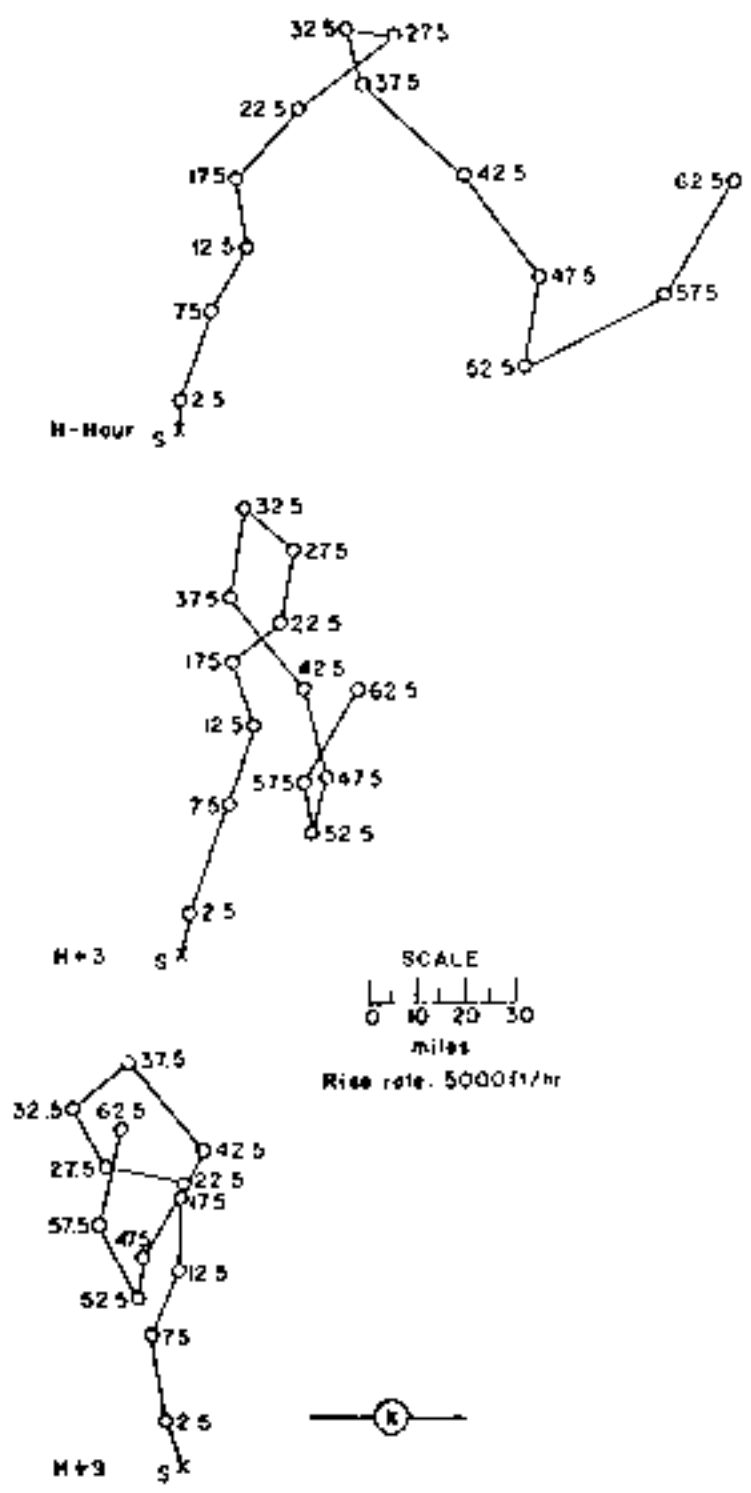


Figure 138. Hodographs for Operation HARDTACK I - Sycamore.

OPERATION HARDWARE : -

Rose

	<u>PPG Time</u>	<u>GMT</u>
<u>DATE:</u>	3 June 1953	2 June 1953
<u>TIME:</u>	0641	1845

Sponsor: IAGL

SITE: PPG - Eniwetok - SW of
Yvonne 2,000 ft from the
nearest edge of the island
Site elevation: Sea level

HEIGHT OF BURST: 10,000 ft

TYPE OF BURST AND PLACEMENT:
Surface burst from tank of
water

CLOUD TOP HEIGHT: 17,000 ft MSL

CLOUD BOTTOM HEIGHT: 1,000 ft MSL

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys made by the Radiological Safety organization at H+4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/TK-20 survey meter modified to read up to 500 r/hr. The $t^{1.2}$ decay approximation was used to extrapolate the H+4 hour dose-rate readings to H+1 hour.

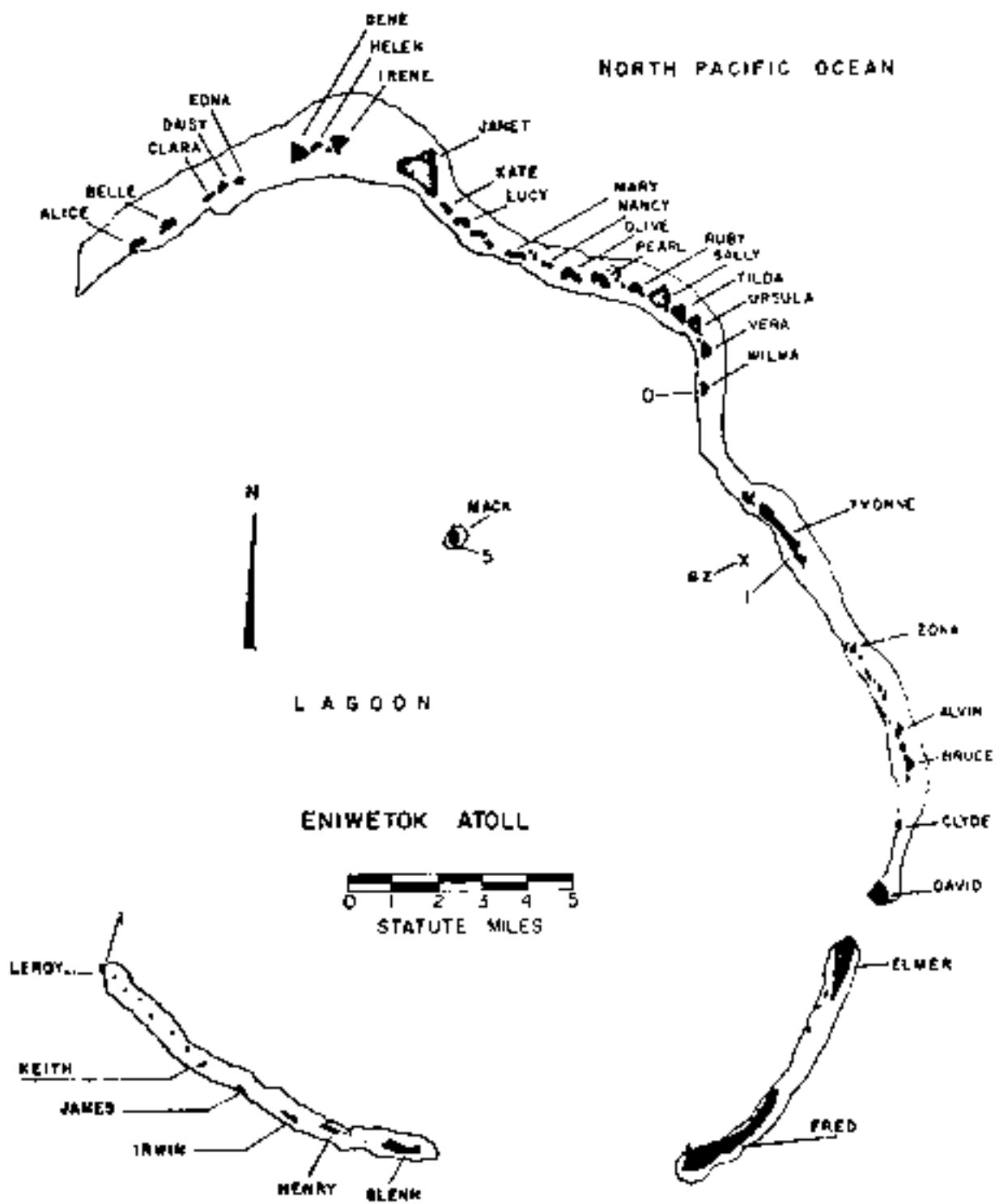


Figure 139. Operation HARDTACK I - Rose. Island dose rates in r/hr at H+1 hour.

TABLE 40. HORIZONTAL WIND SPEED AND DIRECTION AND DEWPOINT DEFICIT

1958

Altitude (Miles)	Wind Speed		Wind Direction	
	mi/hr	mph	dir	dir
Surface	080	21	000	03
1,000	070	20	040	09
2,000	070	20	040	04
3,000	070	20	070	05
4,000	050	21	070	06
5,000	050	20	070	17
6,000	070	19	070	03
7,000	050	20	070	05
8,000	070	20	070	07
9,000	070	21	070	05
10,000	070	20	070	04
12,000	070	18	100	09
14,000	070	7	100	04
15,000	(100)	(10)	(100)	(10)
16,000	080	20	100	07
18,000	070	19	100	05
20,000	070	19	100	07
22,000	070	19	100	11
24,000	080	20	100	07
30,000	080	21	100	09
35,000	080	20	100	07
40,000	080	20	090	08
45,000	080	21	090	04
50,000	080	21	090	09
55,000	080	21	090	04
60,000	080	20	090	05
65,000	080	22	090	03
70,000	090	33	100	36
75,000	---	---	110	35
77,000	100	45	---	---
80,000	---	---	110	43
85,000	---	---	090	42
90,000	---	---	090	54
95,000	---	---	100	66
100,000	---	---	100	76
105,000	---	---	080	56
110,000	---	---	080	70
114,000	---	---	110	76

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the surface weather station.
3. Tropopause height was 57,000 ft MSL.
4. The surface air pressure was 10.07 mb, the temperature 20.2 C, the dew point 10.1 C, and the relative humidity 50%.

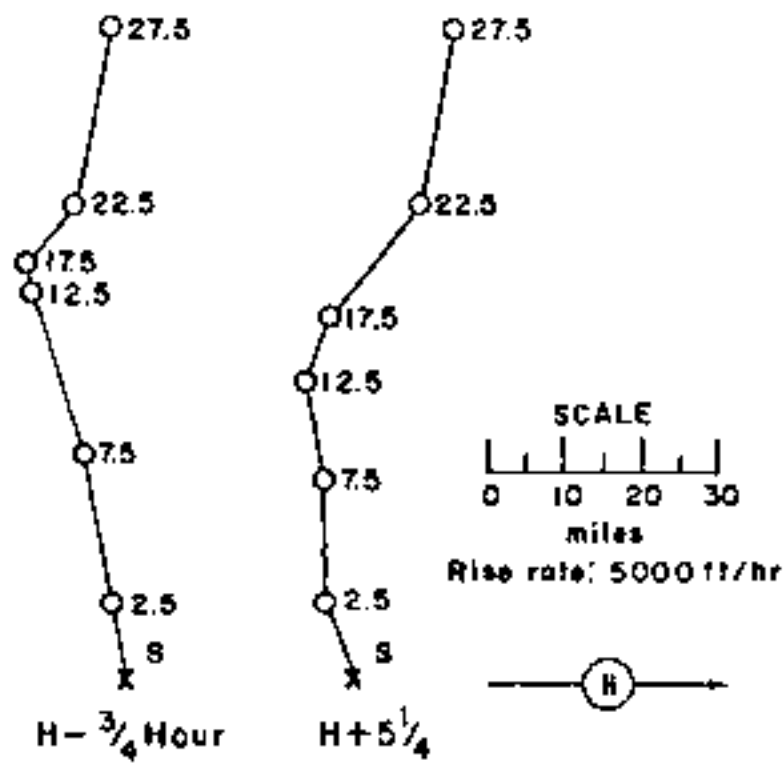


Figure 140 . Hodographs for Operation BARFACK I .

Base .

OPERATION BARSTOCK I

- Umbrella

	<u>PEG Time</u>	<u>DOT</u>
DATE:	9 June 1957	9 June 1957
TIME:	1115	2315

Sponsor: DOE

SITE: HIC - Midwick - NNE of
Henry
11° 22' 31" N
162° 13' 29" E
Site elevation: Sea level
Water depth: 150 ft

HEIGHT OF WIND: 15 ft in barometer

TYPE OF WIND AND PLACEMENT:
Sub-surface wind at 15 ft in
bottom.

REMARKS:

The pattern was clean. I took a total of 21 points which is really too few to place with precision on the center point of either of the downwind contours. "Nearly all of the total counts were measured within 25 minutes after zero time and was due to the passage of air-borne radioactive material. Gamma doses in excess of 100r occurred within the first 15 minutes at downwind distances less than 15,000 feet. The residual field due to deposited radioactive material was relatively insignificant, although radioactive foam may represent a radiological hazard."

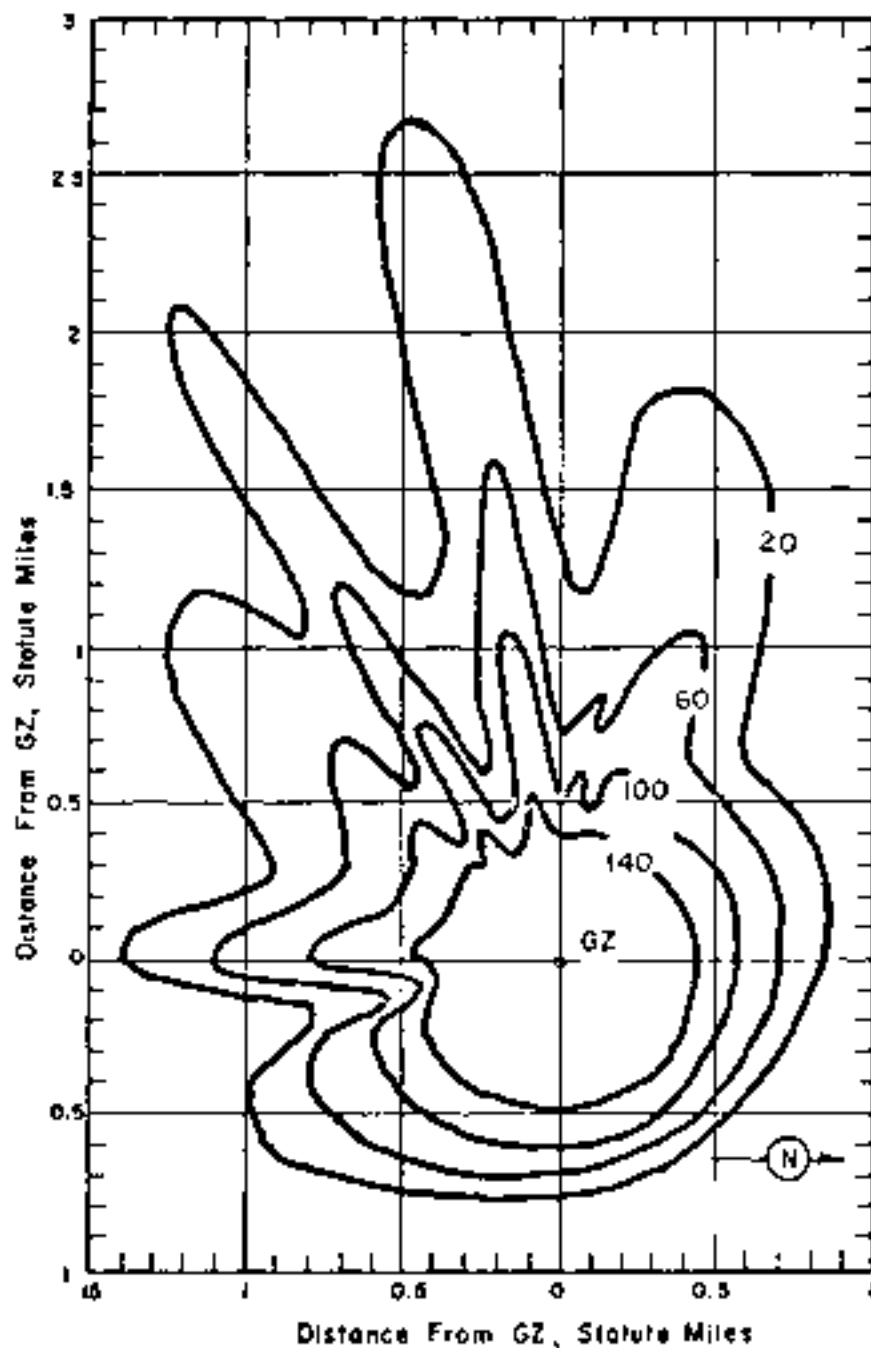


Figure 141. Operation HARDTACK I - Umbrella. Idealized rate contours in r. (Contours represent cumulative dose to 6 hours.)

TABLE 48. ISOTHERM WIND DATA FOR ORBITATION HABITACK 1 -

IMPERIA

Altitude (M.SL.) feet	11:00 AM		12:00 PM	
	Dir. degrees	Speed mph	Dir. degrees	Speed mph
Surface	060	23	070	23
1,000	050	26	---	--
2,000	060	25	---	--
3,000	070	24	---	--
4,000	080	25	---	--
5,000	080	28	---	--
6,000	090	28	---	--
7,000	100	27	---	--
8,000	100	27	---	--
9,000	100	20	---	--
10,000	100	24	---	--
12,000	110	18	---	--
14,000	120	17	070	39
16,000	130	09	060	15
18,000	160	05	090	07
20,000	070	07	190	05
23,000	090	02	130	09
25,000	080	06	360	05
30,000	070	06	350	17
35,000	220	14	250	25
40,000	260	14	270	15
45,000	270	15	200	39
50,000	280	10	200	20
55,000	150	08	150	07
60,000	140	07	040	08
65,000	070	24	120	22
70,000	100	20	060	16
75,000	100	15	---	--
80,000	100	27	090	27
85,000	090	27	---	--
90,000	090	62	090	63
95,000	090	63	---	--
99,000	---	--	090	56
100,000	090	60	---	--
105,000	090	58	---	--

NOTES:

1. Wind data was taken by the Eberick weather station.
2. Tropopause height was 14,000 ft MSL.
3. The surface air pressure was 14.60 psi, the temperature 30°C, the dew point 22°F, and the relative humidity 63%.

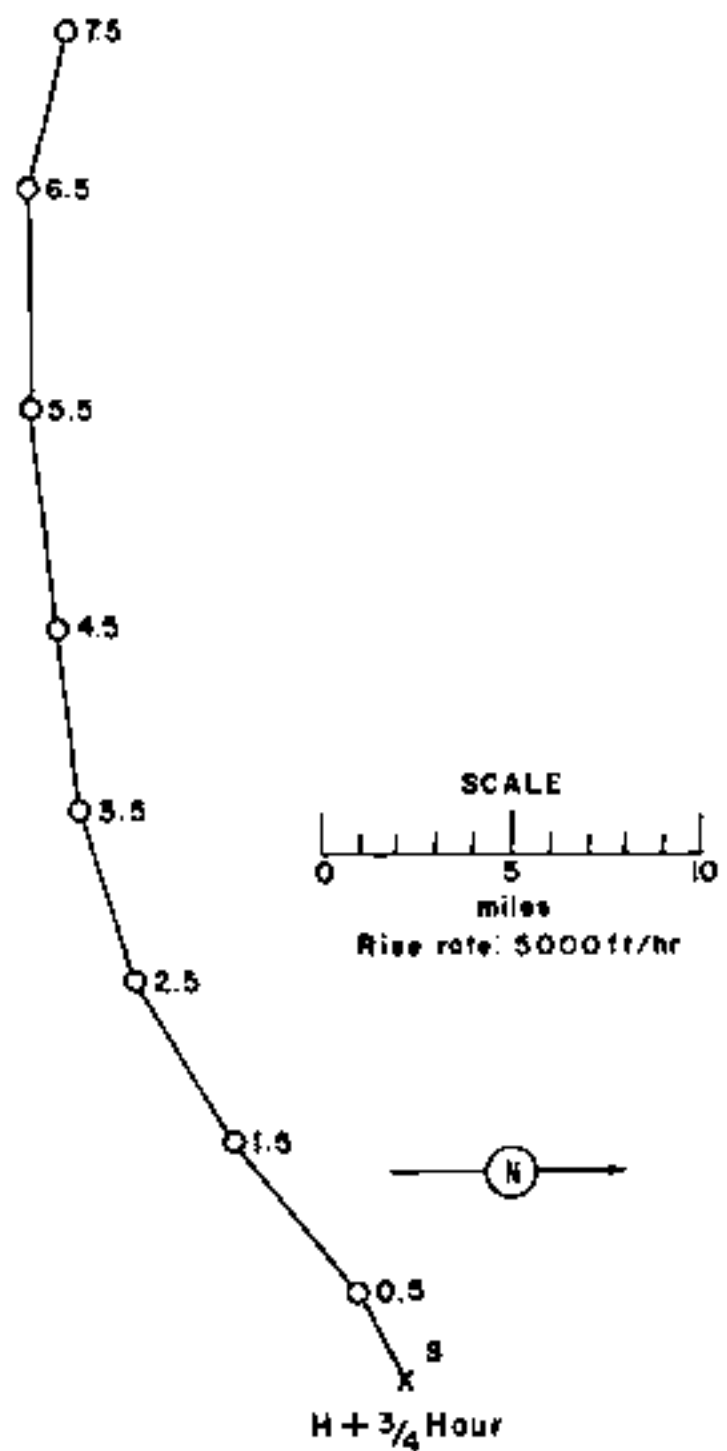


Figure 142. Hodograph for Operation HARDTACK I - Umbrella.

OPERATION BARTACK I -

Maple

DATE: 17 June 1958 18 June 1958
TIME: 0530 1130

Sponsor: UCRD.

SITE: POG - Bikini - South of
Fox
11° 41' 10" N
169° 24' 54" W
Site elevation: (Sea level)

HEIGHT OF SITE: 11.17 ft

TYPE OF MISC AND LEADERS:
Surface wind direction and
water

CLOUD COV. (5000 FT): 4, 10, 10, 100%
CLOUD HGT. (5000 FT): 100'

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety organization helicopter surveys at 11+ hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PDR-39 survey meter modified to read up to 500 μ R/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the 11+ hour dose-rate readings to 11+1 hour.

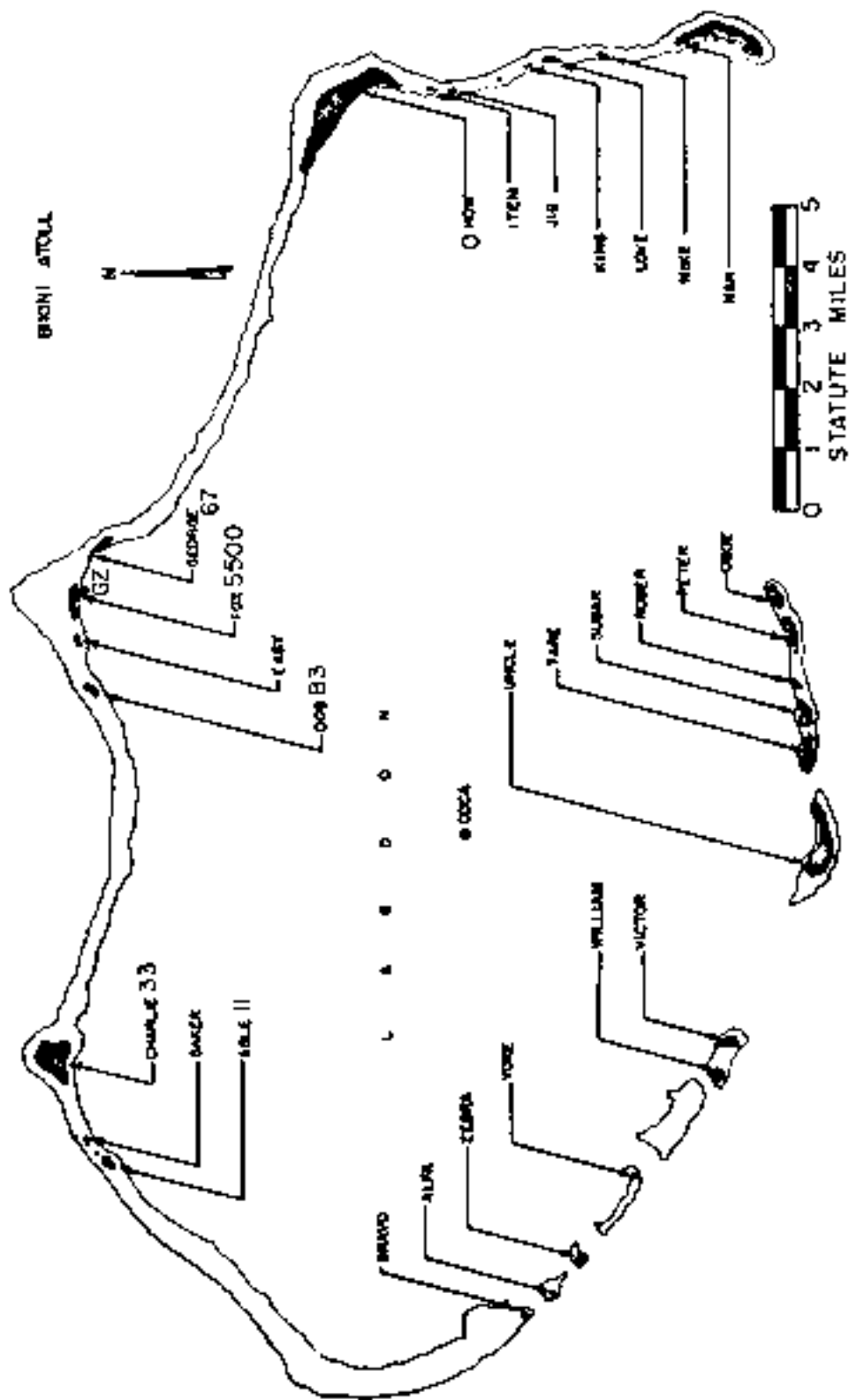


Figure 143. Operation HARBLOCK I - Muple. Island gose races in r/hy at H+1 hour.

TABLE 49. WINDING WIND DATA FOR OBSERVATION WAP100001 - 1 - NAME

Altitude (MSL)	10 m/sec		20 m/sec		30 m/sec	
	Dir	Speed	Dir	Speed	Dir	Speed
feet	degrees	kts	degrees	kts	degrees	kts
Surface	080	21	090	21	090	21
1,000	080	21	070	22	070	22
2,000	080	24	070	20	070	20
3,000	080	23	080	17	080	21
4,000	100	22	090	14	090	21
5,000	110	22	120	11	100	20
6,000	120	22	140	21	110	18
7,000	130	18	150	12	100	17
8,000	140	20	160	18	110	19
9,000	130	20	140	17	110	18
10,000	130	16	130	14	110	14
12,000	130	24	120	20	120	13
14,000	080	21	140	24	120	18
15,000	(080)	(22)	(140)	(21)	(120)	(20)
16,000	080	24	140	18	120	20
18,000	140	19	120	24	110	13
20,000	140	22	130	26	110	11
23,000	130	21	140	11	120	20
25,000	140	11	120	08	130	19
30,000	210	20	250	04	200	18
35,000	210	16	(250)	(11)	(200)	(17)
40,000	200	13	250	21	200	17
45,000	310	14	(310)	(14)	310	16
50,000	310	21	340	12	310	24
54,000	070	12	---	---	---	---
55,000	(080)	(20)	(300)	(11)	(200)	(17)
56,000	---	---	310	02	230	11
60,000	170	14	130	13	310	16
63,000	---	---	---	---	100	22
65,000	070	13	---	---	---	---
70,000	090	21	090	21	080	24
75,000	090	12	---	---	---	---
80,000	090	18	090	10	090	16
83,000	---	---	---	---	100	11
84,000	---	---	090	16	---	---
85,000	090	19	---	---	---	---
90,000	090	19	---	---	---	---

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on board ship located within 30 nautical miles of the Tower at Nan, Ulukin Atoll.
3. Tropopause height was 53,000 ft MSL.
4. The surface air pressure was 14.76 psi, the temperature 27.0°C, the dew point 14°C, and the relative humidity 51%.

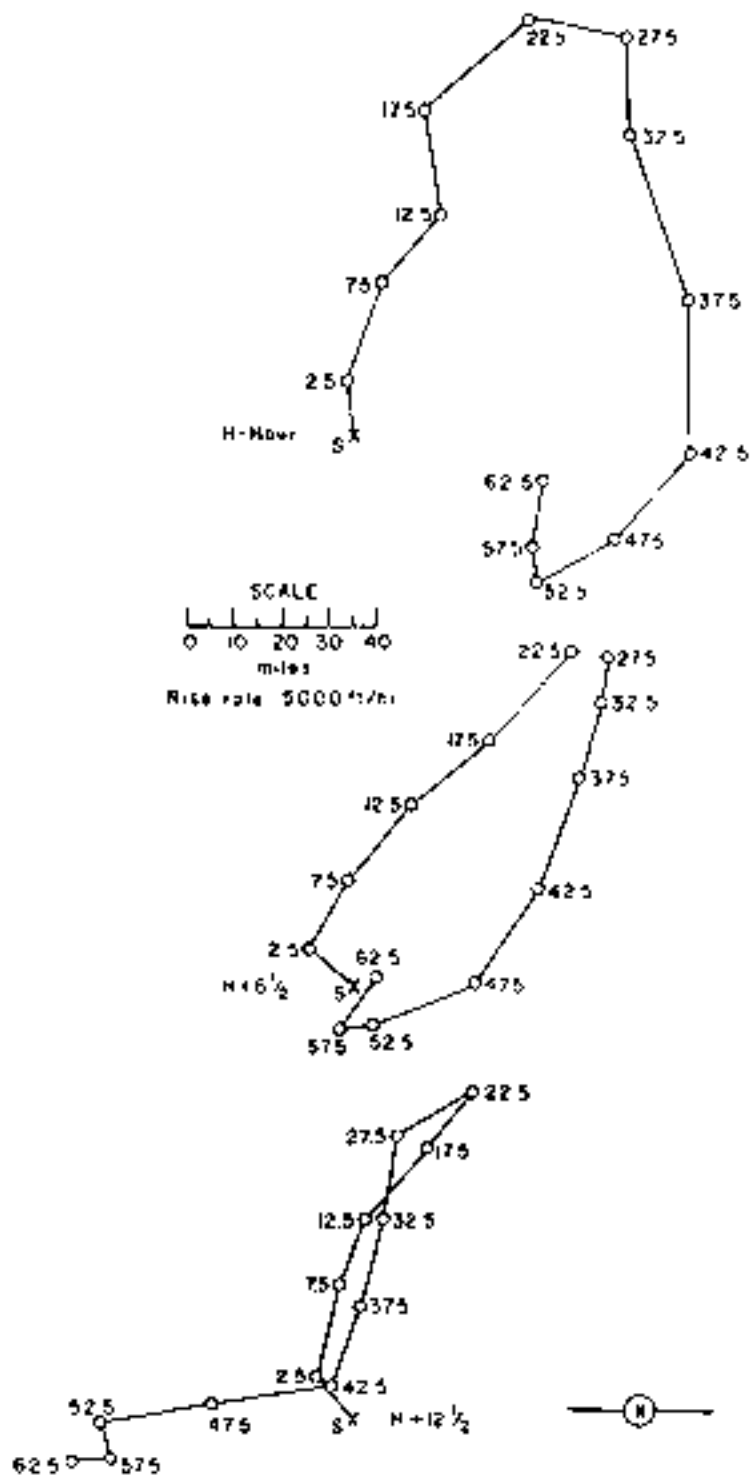


Figure 144. Hodographs for Operation NARDACK I -

Maple.

OPERATION HAMBACK I -

Aspen

DATE: FFG TIME: GMT
21 Jan 1950 16 Jan 1950
TIME: 0730 1730

Sponsor: UCRL

SITE: FFG - Bunkie - SW of
Charlie 4,000 ft from
the island
11° 41' 00" N
169° 16' 00" W
Site elevation: Sea level

HEIGHT OF BUNKIE: 10.80 m

CLOUD TOP HEIGHT: 4500 ft
CLOUD BASE HEIGHT: 100

TYPE OF SURFACE AND PLACEMENT:
Surface level from edge of
water

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety organization helicopter surveys at H+6 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 29 feet. Readings taken at 29 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PBR-39 survey meter modified to read up to 100 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the H+6 hour dose rate readings to H+1 hour.

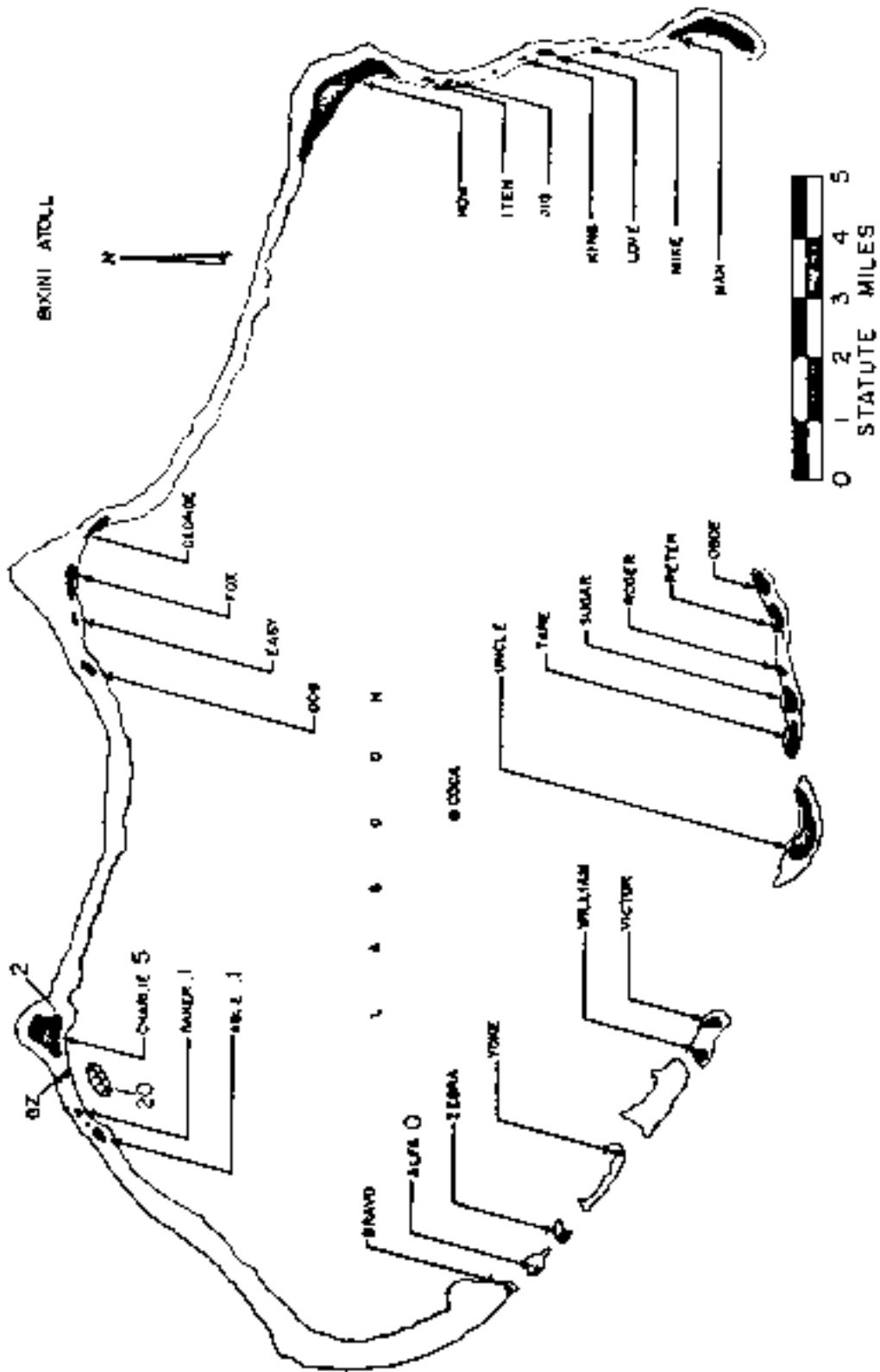


Figure 145. Operation HARDTACK - Island dose rates in r/hr at H+1 hour.

TABLE 50. HIKINI WIND DATA FOR OPERATION HAFSTACK I -

ACFAN

Altitude (MSL)	Dir. from		Dir. to		Wind speed	
	090	180	090	180	090	180
Feet	degrees	kts	degrees	kts	degrees	kts
Surface	090	21	090	21	060	23
1,000	070	22	090	22	070	24
2,000	060	21	050	22	070	24
3,000	090	21	070	22	070	22
4,000	070	21	090	24	070	24
5,000	070	20	090	25	070	24
6,000	100	22	---	---	090	22
7,000	110	22	---	---	090	12
8,000	110	22	---	---	080	23
9,000	120	23	100	22	080	21
10,000	110	14	100	22	090	17
12,000	110	16	100	13	090	17
14,000	120	13	110	11	070	15
15,000	(110)	(12)	(110)	(16)	(090)	(16)
16,000	110	13	110	17	070	18
18,000	120	13	110	15	070	17
20,000	120	13	120	13	070	17
23,000	140	21	120	17	100	15
25,000	150	23	130	21	120	15
30,000	150	25	140	23	130	23
35,000	170	29	(140)	(26)	(150)	(24)
37,000	---	---	140	28	---	---
40,000	150	26	200	33	170	29
44,000	---	---	---	---	180	46
45,000	160	23	---	---	---	---
50,000	180	30	190	29	200	20
54,000	100	14	---	---	---	---
55,000	(110)	(13)	(110)	(10)	(150)	(12)
56,000	---	---	---	---	110	10
57,000	---	---	070	15	---	---
60,000	190	08	060	17	100	20
62,000	060	20	---	---	---	---
64,000	---	---	---	---	110	08
66,000	---	---	120	38	---	---
70,000	090	29	090	23	060	23
73,000	---	---	060	45	---	---
78,000	---	---	---	---	080	48
89,000	---	---	---	---	110	57

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on board ship located within 30 nautical miles of the Tower at Nan, Bikini Atoll.
3. Tropopause height was 52,000 ft MSL.
4. The surface air pressure was 14.66 psi, the temperature 27.4°C, the dew point 24°F, and the relative humidity 78%.

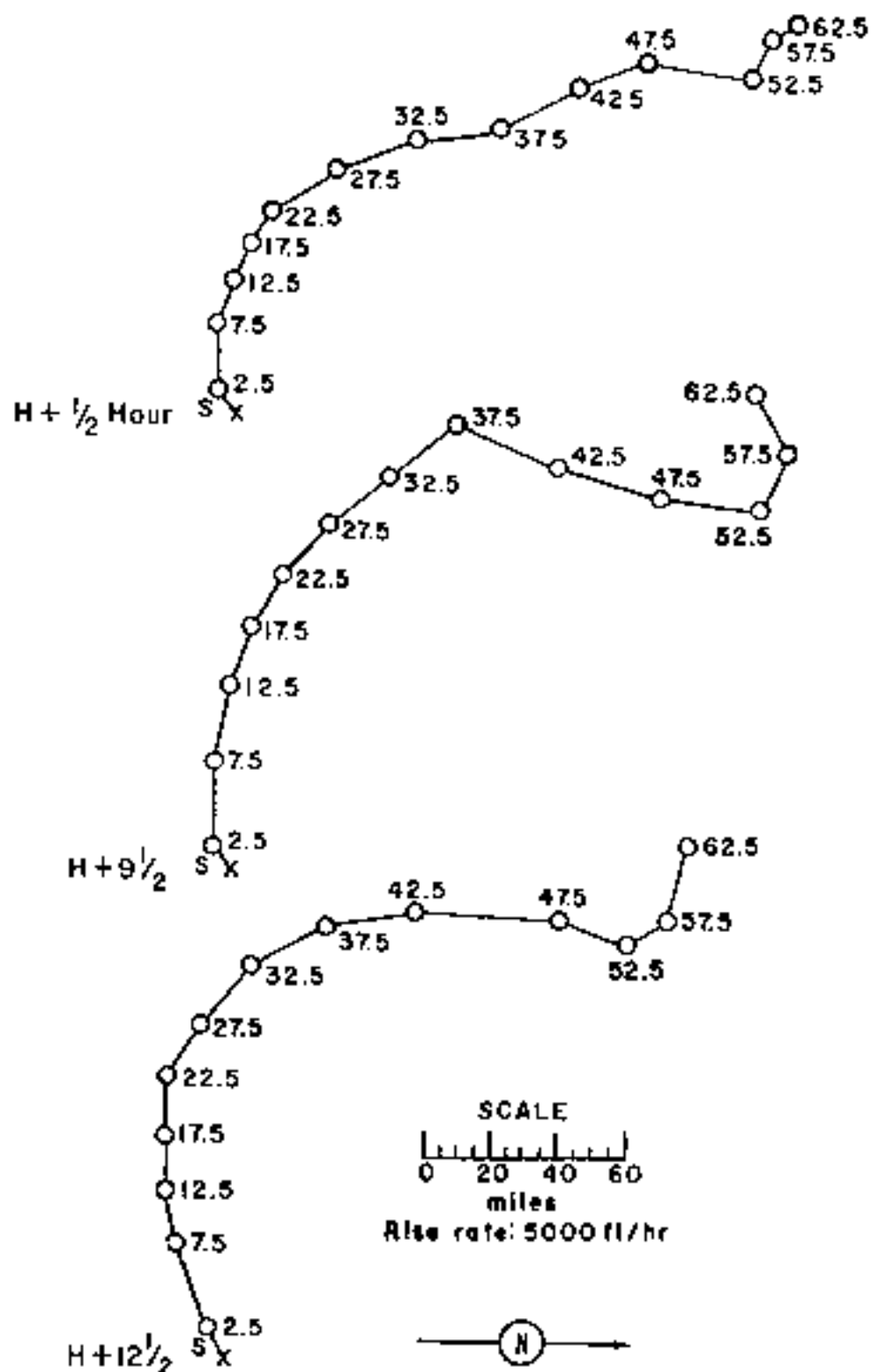


Figure 146. Hodographs for Operation HARDACK I -

Aspen.

OPERATION: BACKPACK I -

Walnut

	<u>PPG Time</u>	<u>GMT</u>
<u>DATE:</u>	28 Jan 1953	14 Jan 1953
<u>TIME:</u>	0630	1930

Spot: 1436.

SITE: 143 - Walnut A - 5,000 ft
NW of Janet
11° 39' 30" N
162° 11' 30" W
Site elevation: Sea level

HEIGHT OF WIND: 10.1 ft

TYPE OF WIND AND DIRECTION:

Surface wind: 10.1 ft/sec
On water

CLOUD TOP HEIGHT: 4,000 ft MSL
CLOUD BASE HEIGHT: 150

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety Organization helicopter surveys at H+4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PDR-19 survey meter modified to read up to 500 r/hr. The $t^{1/2}$ decay approximation was used to extrapolate the H+4 hour dose-rate readings to H+1 hour.

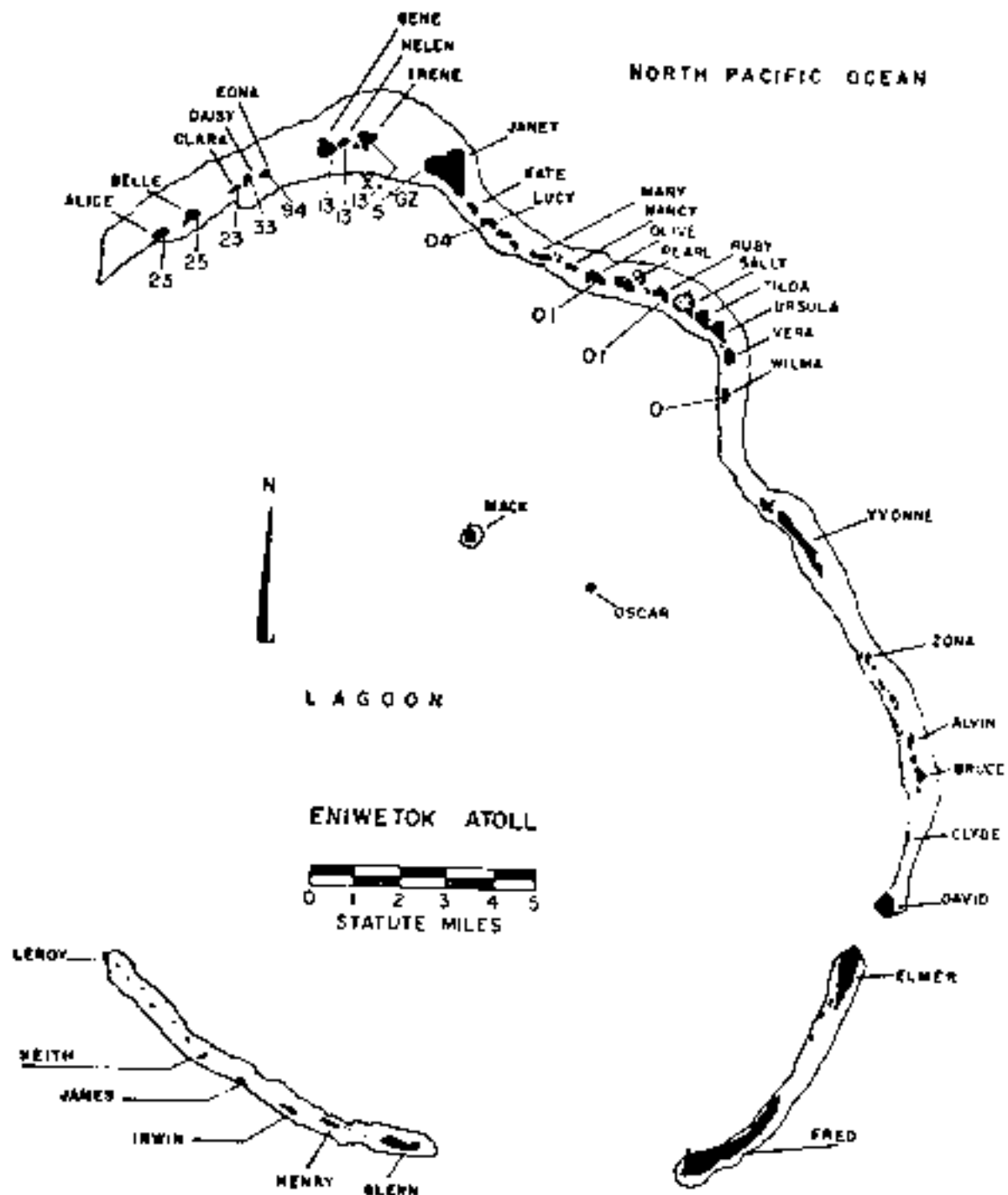


Figure 147. Operation HARDTACK I - Walnut.
Island dose rates in r/hr at H+2 hour.

TABLE 51. ESTIMATED WIND DATA FOR AIRCRAFT 1 -

MOUNTAIN

Altitude (MSL)	Wind direction		Wind speed		Wind direction	
	Dir.	Speed	Dir.	Speed	Dir.	Speed
feet	degrees	kts.	degrees	kph	degrees	kph
Surface	070	16	100	17	080	17
1,000	070	22	070	25	060	17
2,000	080	22	080	20	070	21
3,000	070	22	100	20	080	21
4,000	090	22	100	20	090	21
5,000	090	20	100	18	070	24
6,000	090	17	110	21	090	26
7,000	090	17	110	21	090	24
8,000	090	17	110	17	100	20
9,000	100	15	110	14	100	16
10,000	100	15	100	15	120	17
12,000	090	15	120	13	090	12
14,000	110	17	110	28	110	21
15,000	(110)	(20)	(120)	(22)	(110)	(25)
16,000	110	23	130	12	110	09
18,000	110	23	120	22	120	15
20,000	110	21	130	20	120	14
23,000	110	14	110	07	130	14
25,000	200	13	130	07	140	18
30,000	180	27	160	14	170	24
35,000	190	24	160	29	(170)	(20)
40,000	210	26	160	25	170	28
45,000	150	16	160	26	170	15
50,000	140	16	180	30	210	28
55,000	110	07	170	06	---	--
57,000	---	--	---	--	050	15
60,000	350	20	280	17	060	20
65,000	100	25	110	30	(090)	(23)
70,000	090	29	090	26	080	26
75,000	090	48	090	39	(080)	(38)
80,000	090	57	090	53	090	59
85,000	090	67	090	62	---	--
90,000	090	73	100	76	080	54
94,000	090	73	---	--	---	--
95,000	---	--	100	77	---	--
100,000	---	--	100	90	090	83
105,000	---	--	090	94	090	78

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Maitetuk weather station.
3. Tropopause height was 54,000 ft MSL.
4. The surface air pressure was 14.66 psi, the temperature 27.1°C, the dew point 76°F, and the relative humidity 65%.

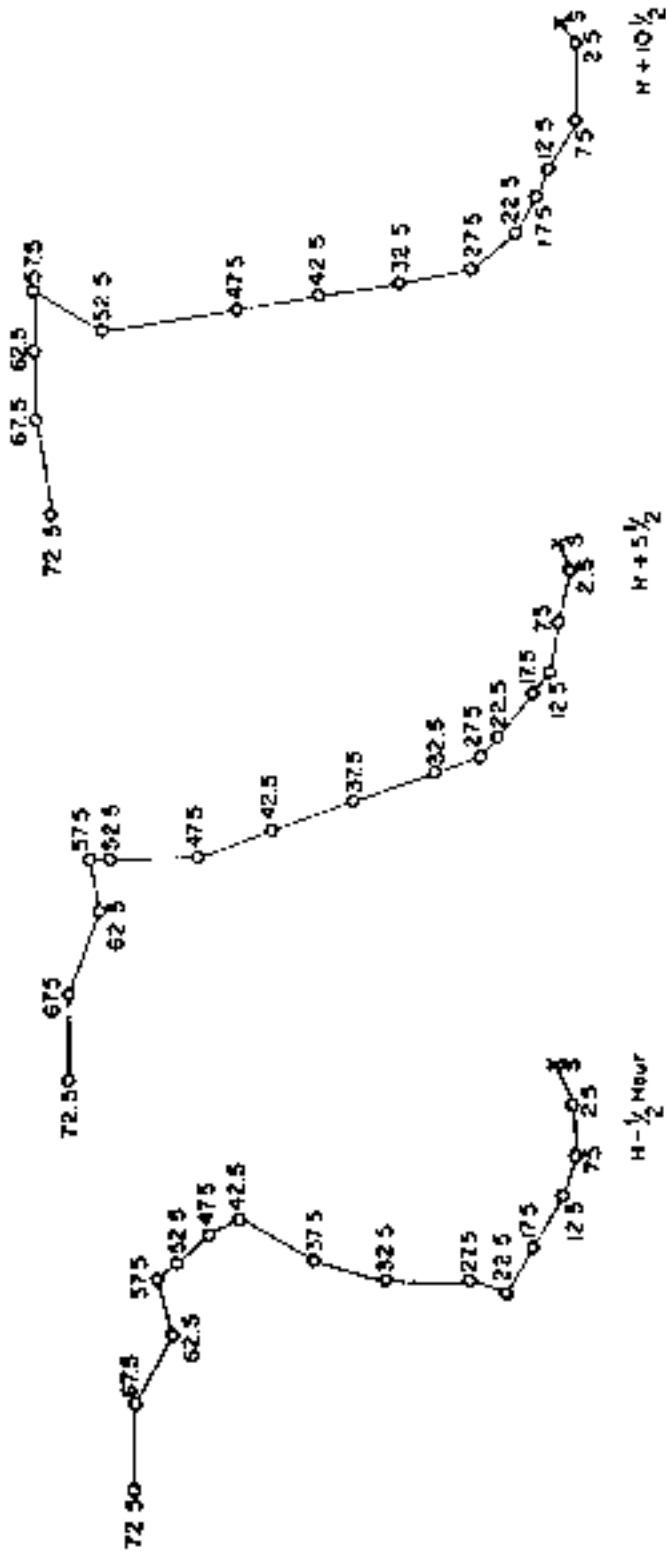


Figure 148. Hodographs for Operation HAKTACK I -

OPERATION BAMBACOCK I -

Linderoth

	<u>PPG TIME</u>	<u>GMT</u>
<u>DATE:</u>	15 Jun 1953	16 Jun 1953
<u>TIME:</u>	0500	0500

Operator: SAAG

SITE: PPG - Shiwetok - West of
Yvonne, 4,000 ft from
the island
11° 38' 39" N
169° 01' 23" W
Site elevation: Sea level
Water depth: 33 ft

HEIGHT OF PLUME: 200 ft

TYPE OF PLUME AND PLACEMENT:
Surface plume about 100 ft
water

CLOUD TOP HEIGHT: 4000 ft MSL

CLOUD BOTTOM HEIGHT: 100

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter survey made by the Radiochemical Safety organization at 11:4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to take a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/BSR-39 survey meter modified to read up to 500 n/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the 11:4 hour dose-rate readings to 11:1 hour.

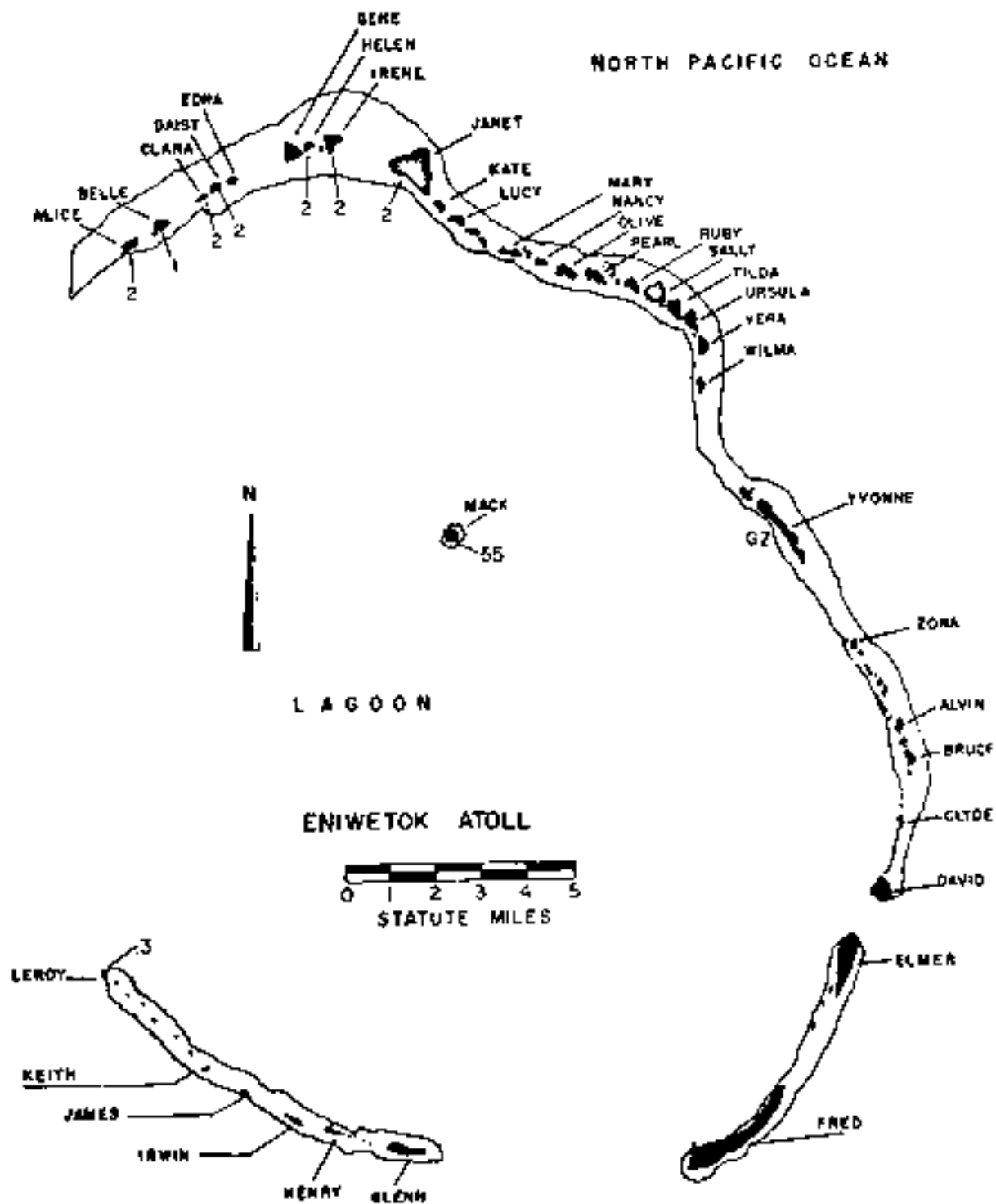


Figure 149. Operation HARDTACK I - Island dose rates in r/hr at H+2 hour.

TABLE 5.2 ENLWETOK WIND DATA FOR OPERATION PARACOCK I -

CONTINUED

Altitude (MSL)	1954 year		1953 season		1952 season	
	Dir	Speed	Dir	Speed	Dir	Speed
feet	degrees	mph	degrees	mph	degrees	mph
Surface	110	18	110	18	070	16
1,000	090	17	080	14	---	--
2,000	100	14	080	15	---	--
3,000	120	12	090	12	---	--
4,000	120	12	110	09	---	--
5,000	120	09	110	10	---	--
6,000	120	09	110	05	---	--
7,000	120	05	100	07	---	--
8,000	120	05	100	05	---	--
9,000	110	07	080	07	---	--
10,000	100	10	090	09	---	--
12,000	110	14	110	12	---	--
14,000	120	12	120	09	---	--
15,000	(130)	(14)	(120)	(12)	(120)	(14)
16,000	130	17	130	14	120	14
18,000	110	24	110	21	130	15
20,000	100	21	110	23	120	16
23,000	110	19	100	12	130	13
25,000	110	13	140	11	140	17
30,000	060	14	070	13	080	17
35,000	070	20	---	--	060	12
40,000	320	07	010	14	320	13
41,000	---	--	050	17	---	--
45,000	340	13	---	--	340	22
50,000	030	07	010	07	050	07
55,000	120	15	140	13	200	14
60,000	100	16	050	09	090	23
65,000	000	37	---	--	090	26
70,000	100	39	100	33	---	--
75,000	120	40	---	--	---	--
80,000	100	48	100	52	---	--
85,000	090	63	---	--	---	--
90,000	090	69	090	74	---	--
95,000	090	85	---	--	---	--
100,000	100	110	100	95	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Eniwetok weather station.
3. Tropopause height was 54,000 ft MSL.
4. The surface air pressure was 14.65 psf, the temperature 31.2°C, the dew point 17.50°C, and the relative humidity 71%.

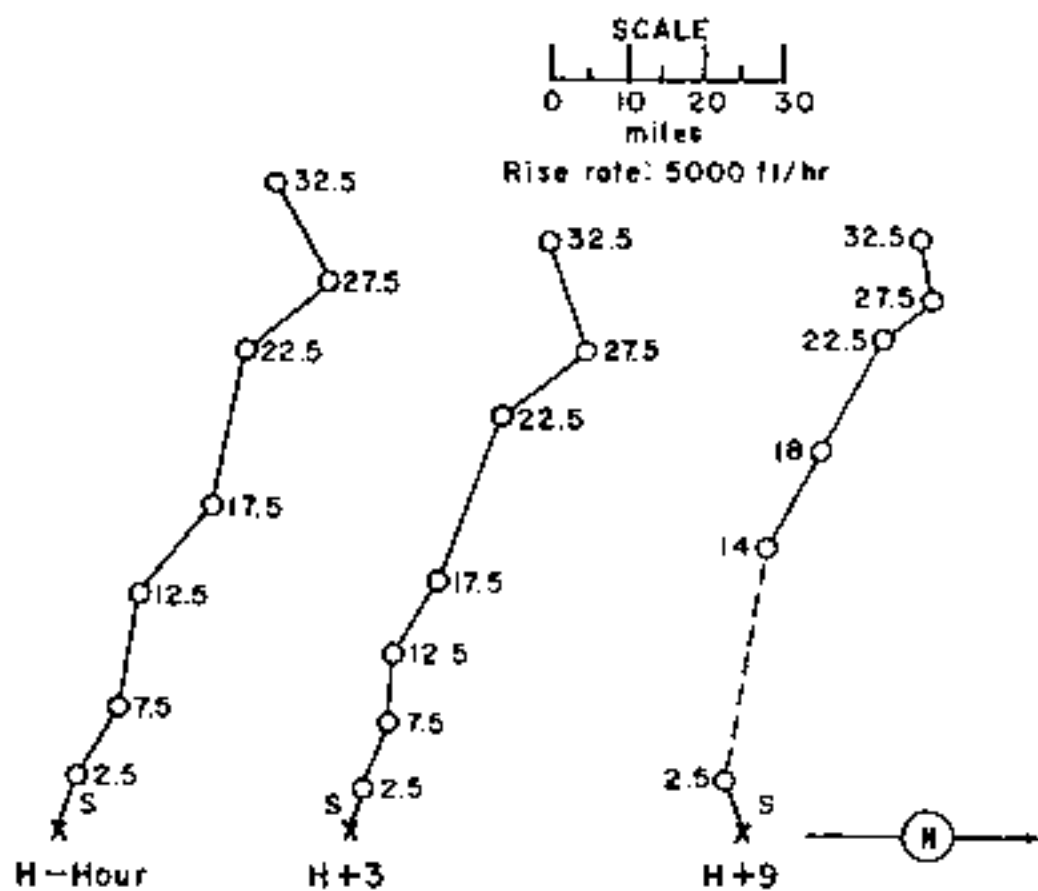


Figure 150. Hodographs for Operation BARBUCK T -

Linden.

OPERATION HARDACK I - - Redwood

	<u>PPG Time</u>	<u>GMT</u>
<u>DATE:</u>	28 Jun 1955	27 Jun 1955
<u>TIME:</u>	0730	1730

Sponsor: UCRL

SITE: PPG - Birnie South of Fox
11° 41' 14" N
165° 26' 50" W
Site elevation: Sea level

HEIGHT OF POINT: 10.79 ft

TYPE OF BEACON AND PLACEMENT:
Surface light from large in
water

CLOUD TOP HEIGHT: 21,000 ft MSL
CLOUD BOTTOM HEIGHT: 20,000 ft MSL

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety organization helicopter surveys at H+4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 75 feet. Readings taken at 75 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/FDR-39 survey meter modified to read up to 100 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the H+4 hour dose-rate readings to H+1 hour.

TABLE 53 BIKINI WIND DATA FOR OPERATION HARDTACK I -

BIRKWOOD

Altitude (ft.)	Temp. (°C)		Temp. (°F)		Wind Speed	
	Dir.	Speed	Dir.	Speed	Dir.	Speed
Feet	degrees	mph	degrees	mph	degrees	mph
Surface	070	23	060	23	090	25
1,000	070	23	090	29	090	35
2,000	070	24	060	29	160	29
3,000	070	23	060	28	160	24
4,000	070	20	090	25	160	12
5,000	080	18	100	23	110	17
6,000	100	21	100	22	110	16
7,000	100	22	110	22	110	23
8,000	110	22	120	20	110	21
9,000	110	23	120	18	110	20
10,000	110	22	120	20	110	24
12,000	110	21	110	20	120	25
14,000	110	19	120	21	130	24
15,000	(110)	(17)	(110)	(21)	(130)	(25)
16,000	100	18	110	21	130	26
18,000	090	16	120	25	120	19
20,000	100	18	110	21	110	22
23,000	080	12	100	22	120	20
25,000	040	12	100	28	140	23
30,000	070	06	---	--	110	13
35,000	180	08	---	--	140	17
40,000	170	16	---	--	190	17
45,000	210	25	---	--	220	19
50,000	230	24	---	--	040	16
55,000	310	07	---	--	140	18
60,000	120	08	---	--	080	28
65,000	---	--	---	--	090	41
70,000	---	--	---	--	100	54
72,000	---	--	---	--	110	46

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on board ship within 30 nautical miles of the tower at Nan Island, Bikini Atoll.
3. Tropopause height was 52,000 ft MSL.
4. The surface air pressure was 14.64 psi, the temperature 27.3°C, the dew point 26.5°F, and the relative humidity 93%.

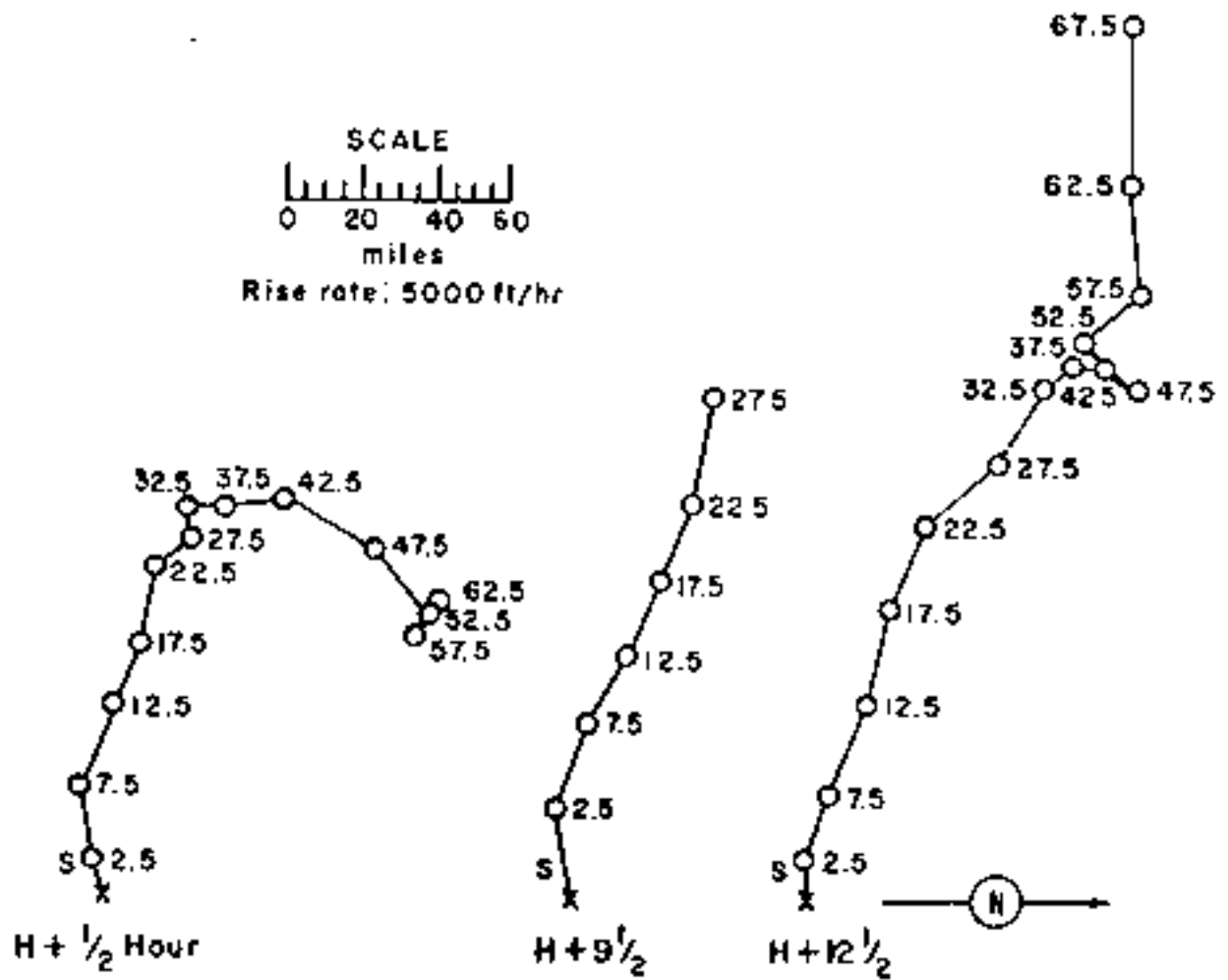


Figure 151. Hodographs for Operation BARTACK I - Hedwood.

OPERATION ISOTACH 1 -

Elder

DATE: 17 June 1953 GMT 2000-14⁰⁰
TIME: 1630 1630

Operator: TASHL

SITE: PPO - Enderby - SW of
Jesse Island Pt. S
nearest edge of island
11° 39' 40" N
166° 13' 48" E
Site elevation: Sea level

HEIGHT OF INSTRUMENT: 0.17 ft.

CLOUD TOP HEIGHT: 0000 ft MSL
CLOUD BOTTOM HEIGHT: 00

TYPE OF WIND AND PLACEMENT:
Surface gust from lake on
water.

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety organization helicopter surveys at H+4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN-PER-10 survey meter modified to read up to 100 c/min. The $t^{-1.2}$ decay approximation was used to extrapolate the H+4 hour dose-rate readings to H+1 hour.

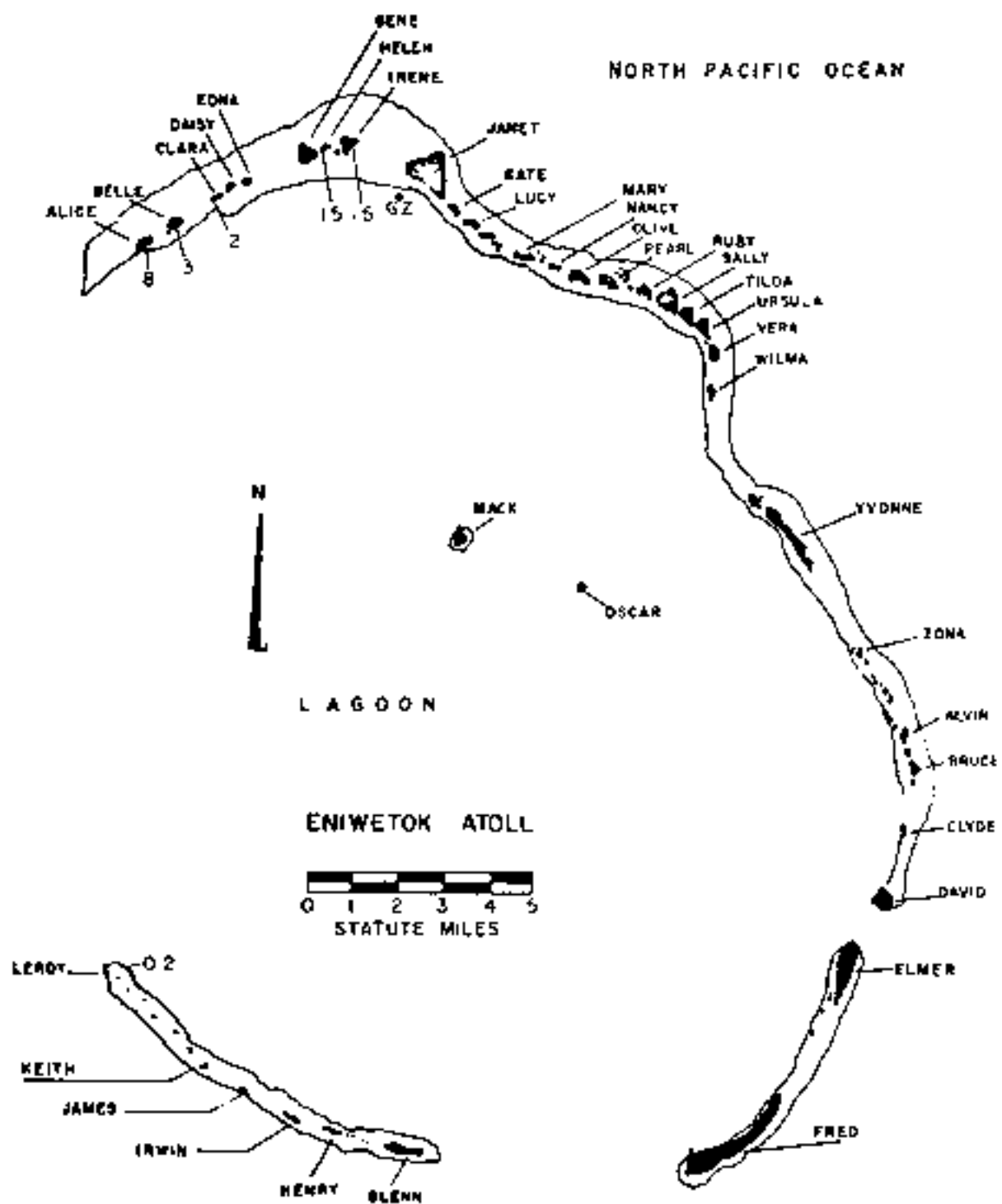


Figure 153. Operation HARDACK I - Elder. Island dose rates in r/hr at H+1 hour.

TABLE 54. ESTIMATED WIND DATA FOR ORBITAL BARRACK 1 -

SLIDES

Altitude (MSL)	H=100 ft		H=55 ft		H=15 ft	
	Dir. degrees	Speed mph	Dir. degrees	Speed mph	Dir. degrees	Speed mph
Surface	090	24	090	17	100	16
1,000	070	26	070	23	110	26
2,000	070	26	090	26	100	26
3,000	070	24	100	24	100	26
4,000	070	27	100	27	100	26
5,000	070	22	100	24	100	26
6,000	100	22	110	24	100	26
7,000	110	23	110	23	100	26
8,000	110	21	110	23	100	26
9,000	130	27	120	26	100	26
10,000	130	27	120	26	100	26
12,000	090	26	100	26	100	26
14,000	090	24	100	27	100	26
15,000	(110)	(17)	(100)	(17)	(100)	(17)
16,000	110	17	100	17	100	26
18,000	110	12	100	17	090	22
20,000	110	10	120	21	(100)	(20)
23,000	110	10	120	17	100	17
25,000	090	11	110	17	100	17
30,000	090	11	180	21	100	26
32,000	---	---	160	20	---	---
35,000	090	15	(160)	(17)	100	21
40,000	100	17	100	17	090	20
45,000	100	19	(110)	(17)	100	21
50,000	180	23	180	23	100	13
53,000	---	---	180	19	---	---
55,000	120	13	(160)	(14)	100	30
60,000	100	24	100	18	110	23
65,000	100	28	---	---	090	27
70,000	060	46	100	48	090	56
75,000	100	47	---	---	090	56
80,000	090	61	090	62	090	61
85,000	090	61	---	---	090	71
90,000	090	73	100	87	090	87
95,000	090	90	---	---	090	90
100,000	---	---	100	105	---	---
105,000	---	---	100	107	---	---
110,000	---	---	100	107	---	---
116,000	---	---	100	90	---	---

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Oriskany weather station.
3. Propagation height was 52,000 ft MSL.
4. The surface air temperature was 14.63 deg F, the temperature 27.4 deg C, the barometric pressure 30.12 in Hg, the wind speed 14 mph, and the relative humidity 73%.

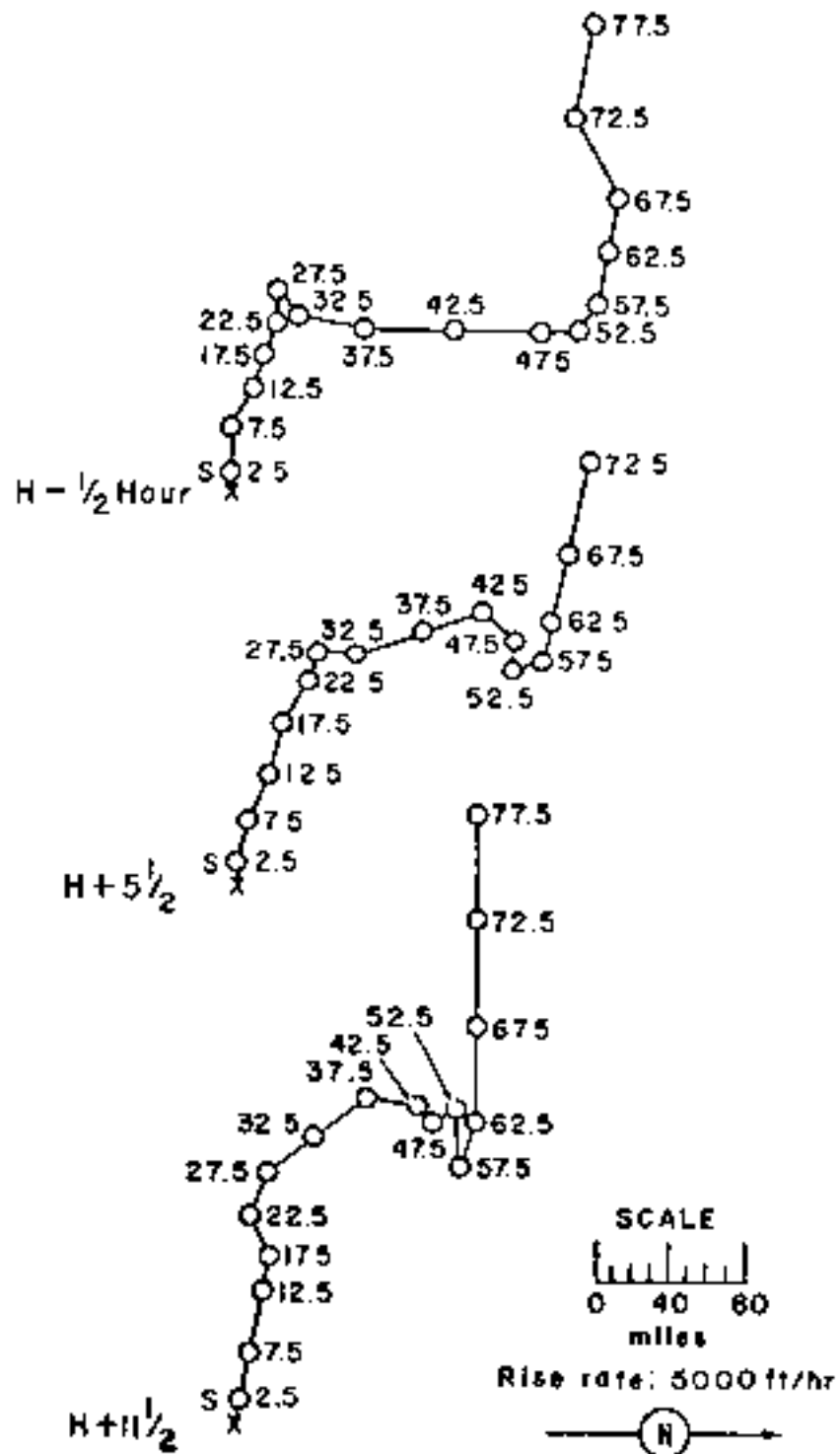


Figure 154. Hodographs for Operation HARDJACK I -

Elder.

OPERATION HARBORACK I -

Out.

PPG Time GMT
DATE: 29 June 1950 10 June 1950
TIME: 0700 1930

TOTAL YIELD: 8.9 Mc

FIREBALL DATA:

Time to top maximum: 130
Time to top minimum: 2.25 sec
Radius at top maximum: 120

CRATER DATA:

Diameter: 4,500 ft
Depth: 163 ft

Sponsor: IAGL

SITE: 113 - Midway - 3 mi
SW of Alton
11° 36' 30" N
162° 05' 00" W
Site elevation: Sea level
Water depth: 12 ft

HEIGHT OF PLUME: 400 ft

TYPE OF SURFACE PARTICLES:
Surface level: 20 to 30% in
water

CLOUDS OR RAINFALL: 1000 ft to 1000
CLOUD EXPOSURE: 100

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety organization helicopter surveys at H+1 hours. The helicopter survey technique called for the pilot either to land the aircraft at a desired spot, so that a ground reading could be obtained or to make a slow pass over the desired spot at an elevation of 50 feet. Readings taken at 50 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PDR-30 survey meter modified to read up to 500 μ /hr. The $t^{1/2}$ decay approximation was used to extrapolate the H+1 hour dose-rate readings to H+1 hour.

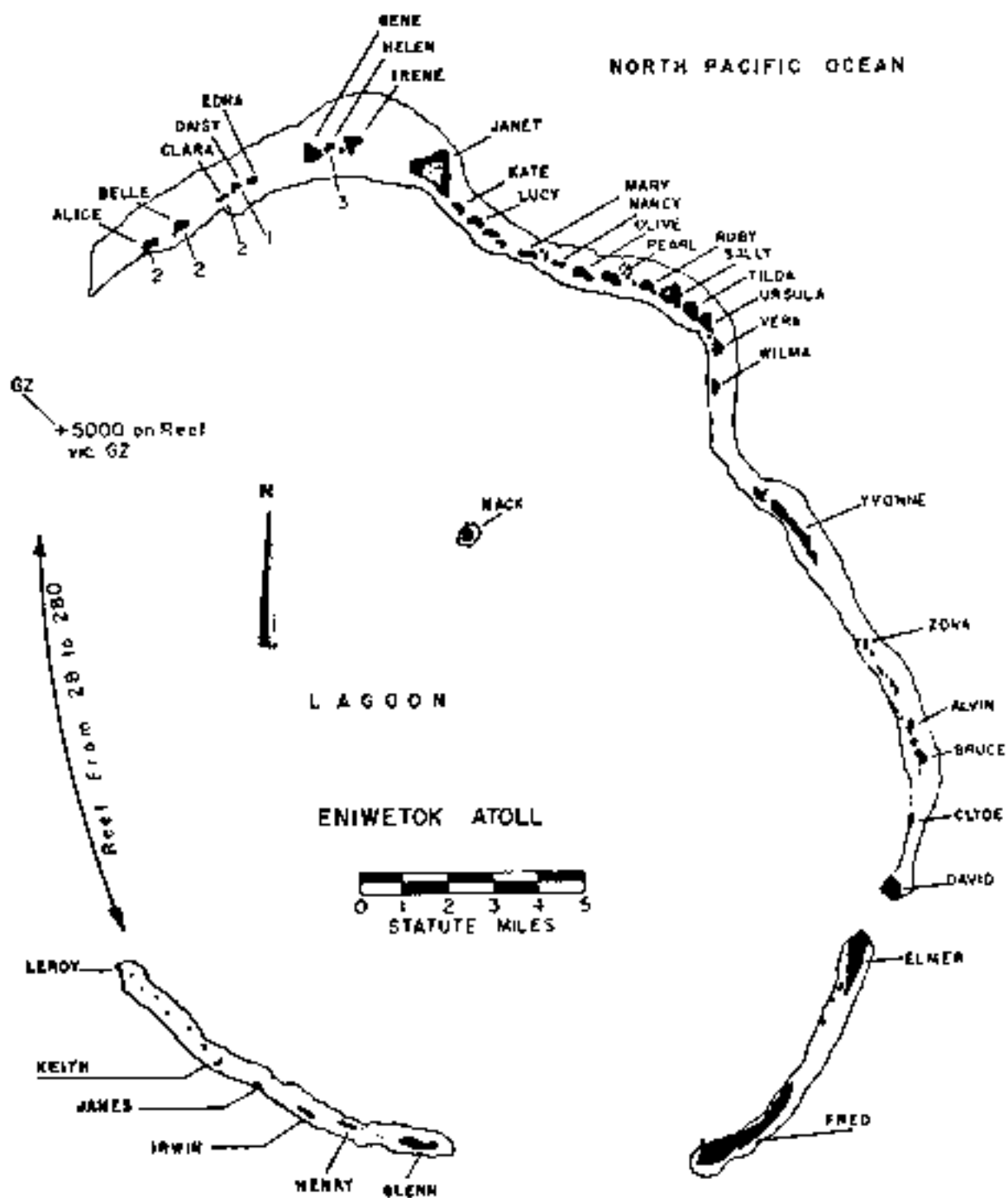


Figure 155. Operation HARDTACK I -
Island dose rates in r/hr at 3+1 hour.

TABLE 55. ENTWINNED WIND DATA FOR ORBITATION PARABOLIC 1 - 048

Altitude (ft.)	Wind Speed		Wind Direction		Wind Turbulence	
	Dir.	Spd.	Dir.	Spd.	Dir.	Spd.
feet	degrees	mph	degrees	mph	degrees	mph
Surface	120	16	090	12	100	22
1,000	090	22	080	17	100	30
2,000	100	24	080	22	100	30
3,000	100	24	080	22	100	28
4,000	100	24	090	20	100	60
5,000	110	22	100	20	100	29
6,000	110	20	110	17	100	14
7,000	120	20	120	17	100	18
8,000	120	20	130	17	100	19
9,000	120	19	130	17	100	17
10,000	120	17	130	17	100	17
12,000	120	16	130	15	100	13
14,000	120	15	150	22	130	12
15,000	(130)	(17)	(150)	(21)	(130)	(10)
16,000	130	17	150	20	130	27
18,000	130	17	150	20	130	27
20,000	130	18	160	20	200	34
23,000	140	17	160	20	170	19
27,000	140	20	150	23	170	19
30,000	140	16	150	27	140	09
35,000	---	---	150	16	---	10
40,000	120	27	110	16	170	11
44,000	160	14	---	---	---	---
45,000	(090)	(14)	090	18	090	17
50,000	090	17	160	21	160	19
55,000	(100)	(17)	070	38	140	18
57,000	110	12	---	---	---	---
60,000	---	---	080	31	080	30
65,000	---	---	090	33	100	35
70,000	---	---	090	43	090	41
75,000	---	---	090	56	090	54
80,000	---	---	100	67	100	67
85,000	---	---	100	97	090	78
90,000	---	---	090	72	090	24
91,000	---	---	090	73	---	---
95,000	---	---	---	---	090	82
100,000	---	---	---	---	090	95
105,000	---	---	---	---	100	106
110,000	---	---	---	---	100	115
114,000	---	---	---	---	090	121

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Entwinck weather station.
3. Tropopause height was 50,000 ft MSL.
4. The surface air pressure was 14.64 psi, the temperature 27.3°C, the dew point 76.5°F, and the relative humidity 87%.

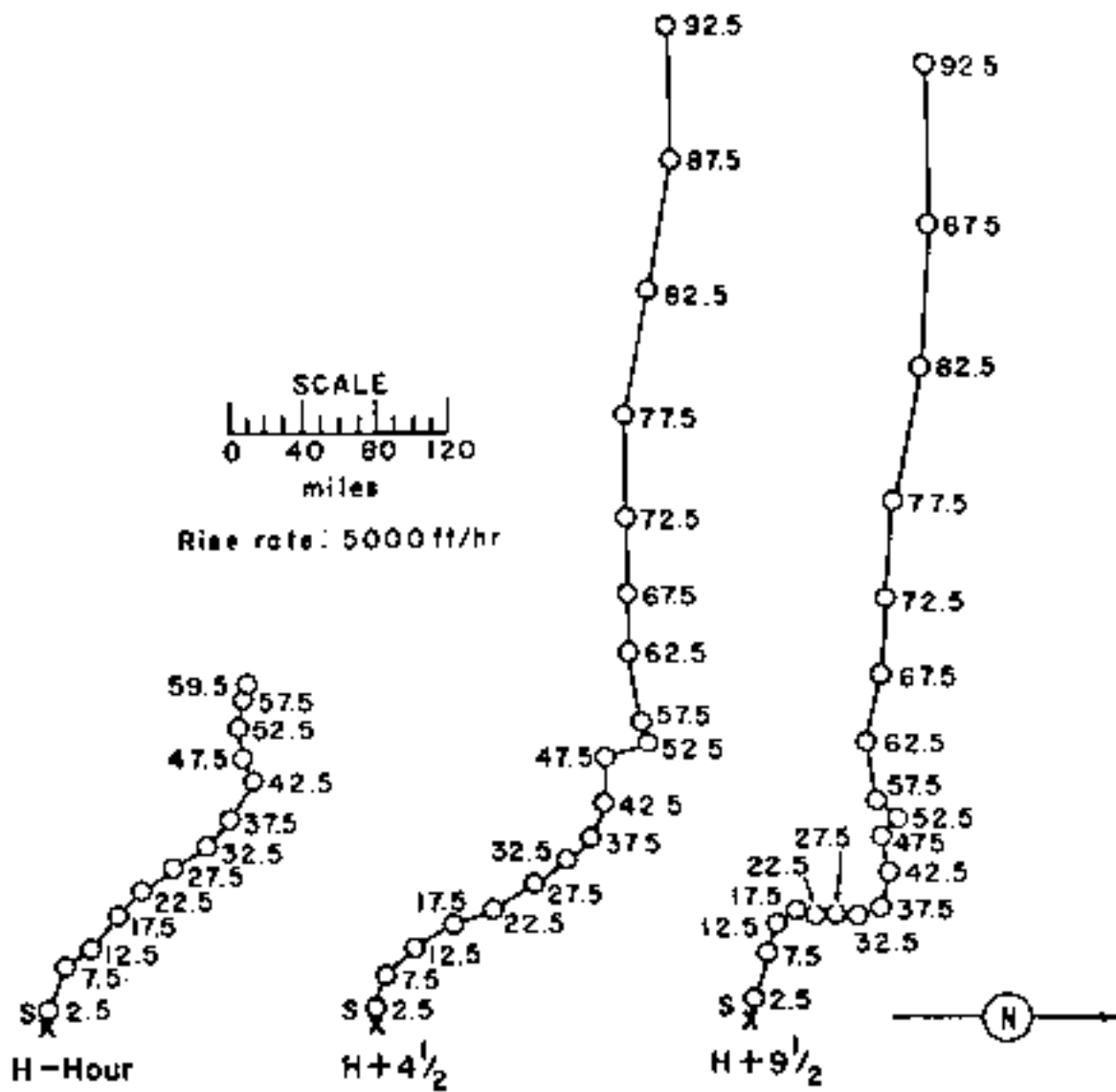


Figure 156. Hodographs for Operation BARDEACK I -

Out.

OPERATION WINDYBROCK I -

Hickory

DATE: 17 June 1953
TIME: 1200

GMT:
17 June 1953
2400

Sponsor: USCR.

SITE: 140 - Hickory - Off shore
end of Yarn
11° 29' 0" N
169° 21' 0" W
Site elevation: Sea level

HEIGHT OF PLANT: 1000 ft

TYPE OF PLANT AND PLACEMENT:
Surface plant from Yarn
water

CLOUD DEPTH: 1000 ft MSL
CLOUD BASE: 1000 ft MSL

CRASH DATA: 0 ft wind speed

REMARKS:

Only individual island dose rates are available. These were obtained from helicopter surveys made by the Radiological Safety organization at H+4 hours. The helicopter survey technique relies for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PDR-30 survey meter modified to read up to 100 r/hr. The $t^{-1/2}$ decay approximation was used to extrapolate the H+4 hour dose-rate readings to H+1 hour.

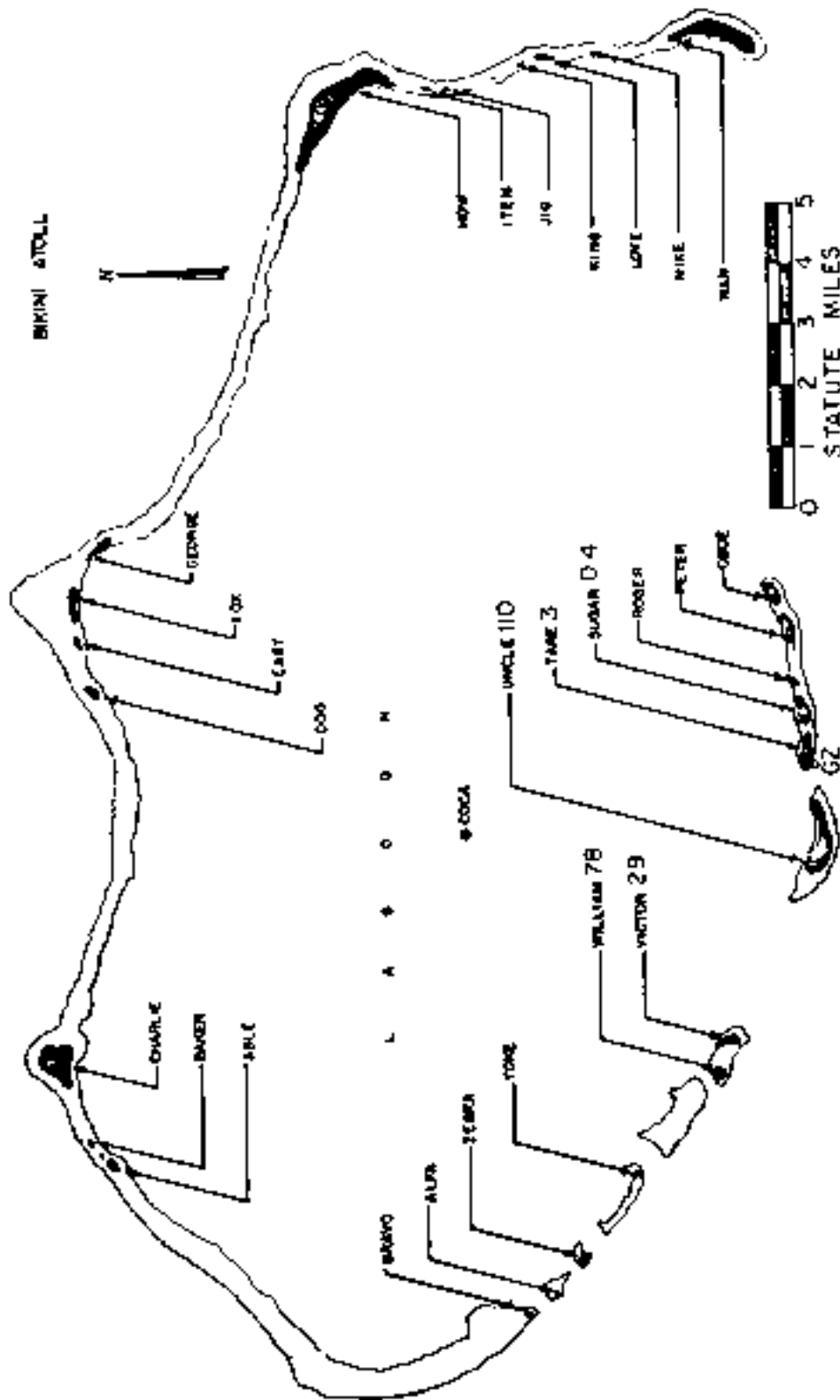


Figure 157. Operations on BIKINI I - Slickory.
Island dose rates in $\mu\text{R/hr}$ at H+1 hour.

TABLE 56 BIKINI WIND DATA FOR OPERATION HARDBACK I - HICKORY

Altitude (MSL) Feet	E-Wind		E+U Wind		E+U Wind	
	Dir degrees	Speed kph	Dir degrees	Speed kph	Dir degrees	Speed kph
Surface	090	09	090	23	080	17
1,000	080	23	080	26	080	27
2,000	060	23	080	36	080	24
3,000	090	24	080	36	080	23
4,000	090	24	090	16	080	19
5,000	090	24	090	31	070	20
6,000	090	21	080	29	060	21
7,000	090	22	090	24	060	21
8,000	090	20	090	22	070	16
9,000	090	17	080	15	090	21
10,000	100	18	070	12	090	20
12,000	100	14	070	13	070	21
14,000	110	15	070	14	070	21
15,000	(110)	(17)	(070)	(15)	(070)	(21)
16,000	100	20	060	23	070	24
18,000	110	21	040	15	060	22
20,000	130	12	040	16	030	11
23,000	130	09	030	06	040	09
25,000	160	06	---	--	010	10
30,000	Calm	Calm	010	07	050	07
35,000	160	05	100	08	110	12
40,000	---	--	110	09	070	08
45,000	---	--	040	20	090	10
50,000	---	--	140	10	060	03
55,000	---	--	350	12	350	25
60,000	---	--	070	40	080	25
65,000	---	--	120	25	090	18
70,000	---	--	070	41	080	60
72,000	---	--	060	41	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on tower only within 30 nautical miles of the tower at Nan Island, Bikini Atoll.
3. Tropopause height was 51,000 ft MSL.
4. The surface air pressure was 14.06 psi, the temperature 27.5°C, the dew point 81.3°F, and the relative humidity 81%.

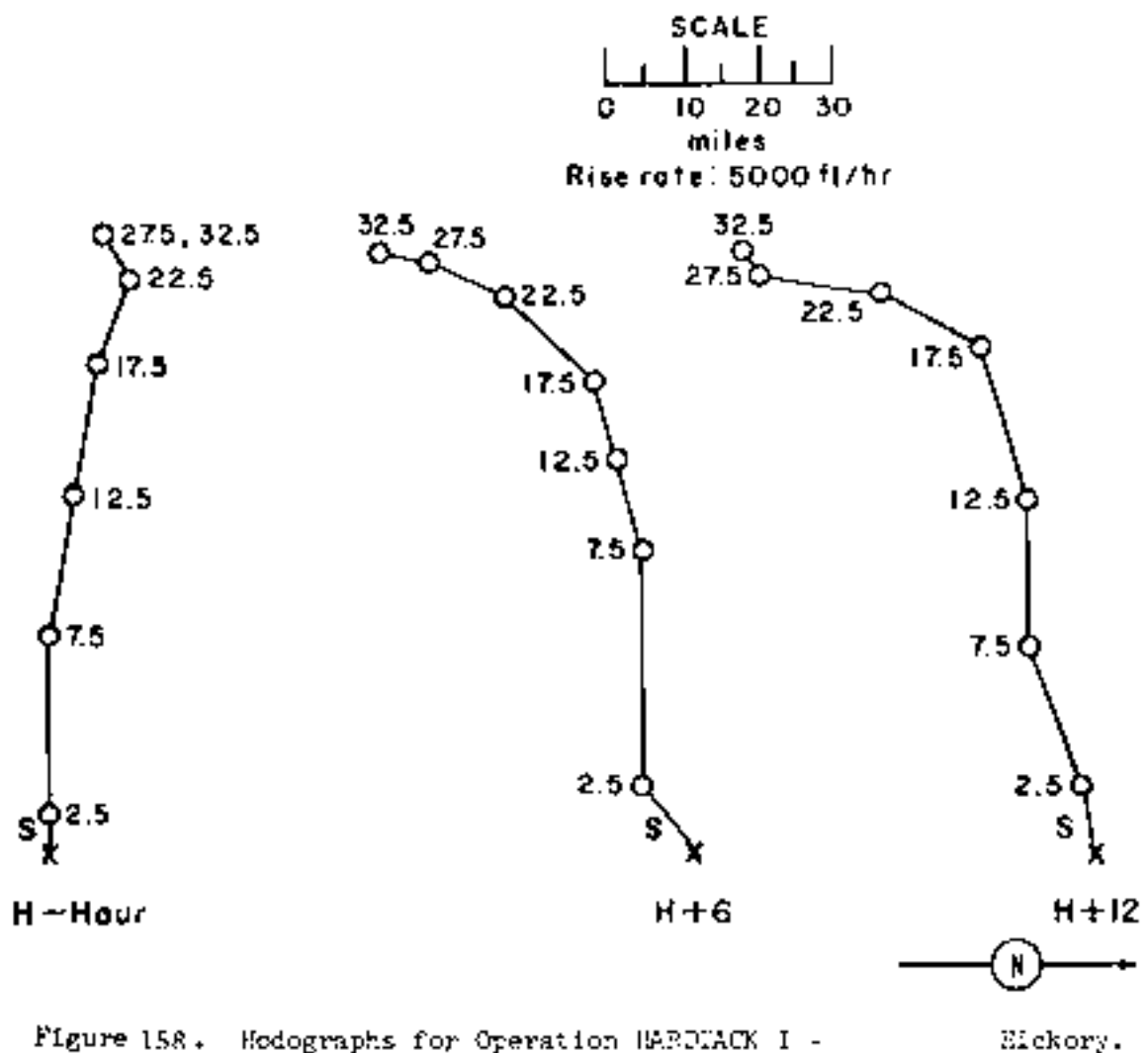


Figure 158. Hodographs for Operation BARBUCK I -

OPERATION BARBUCK 1 -

Osprey

	<u>REG TIME</u>	<u>GMT</u>
<u>DATE:</u>	2 July 1953	7 July 1953
<u>TIME:</u>	0630	1830

Specimen: LASH

SITE: 190 - latitude - 1 mi
west of Yeung
11° 32' 32" N
106° 01' 03" E
Site elevation: sea level.

REGION OF DEPOSIT: 100-10

TYPE OF SURFACE OR DEPOSIT:
Surface: 100-100
on water

CLOUD TO BE TAKEN: 100-100
CLOUD NUMBER: 100

REMARKS:

Only individual counts were made on one spot. There were 10 stations from Radiological Safety Organization helicopter survey at H+1 hour. The helicopter survey technique consisted of the pilot either to land the aircraft at the desired spot, or just a ground probe could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial survey was the AN/PID-39 survey meter modified to read up to 100 c/hr. The $t_{1/2}$ decay approximation was used to extrapolate the H+1 hour decay-rate readings to H+1 hour.

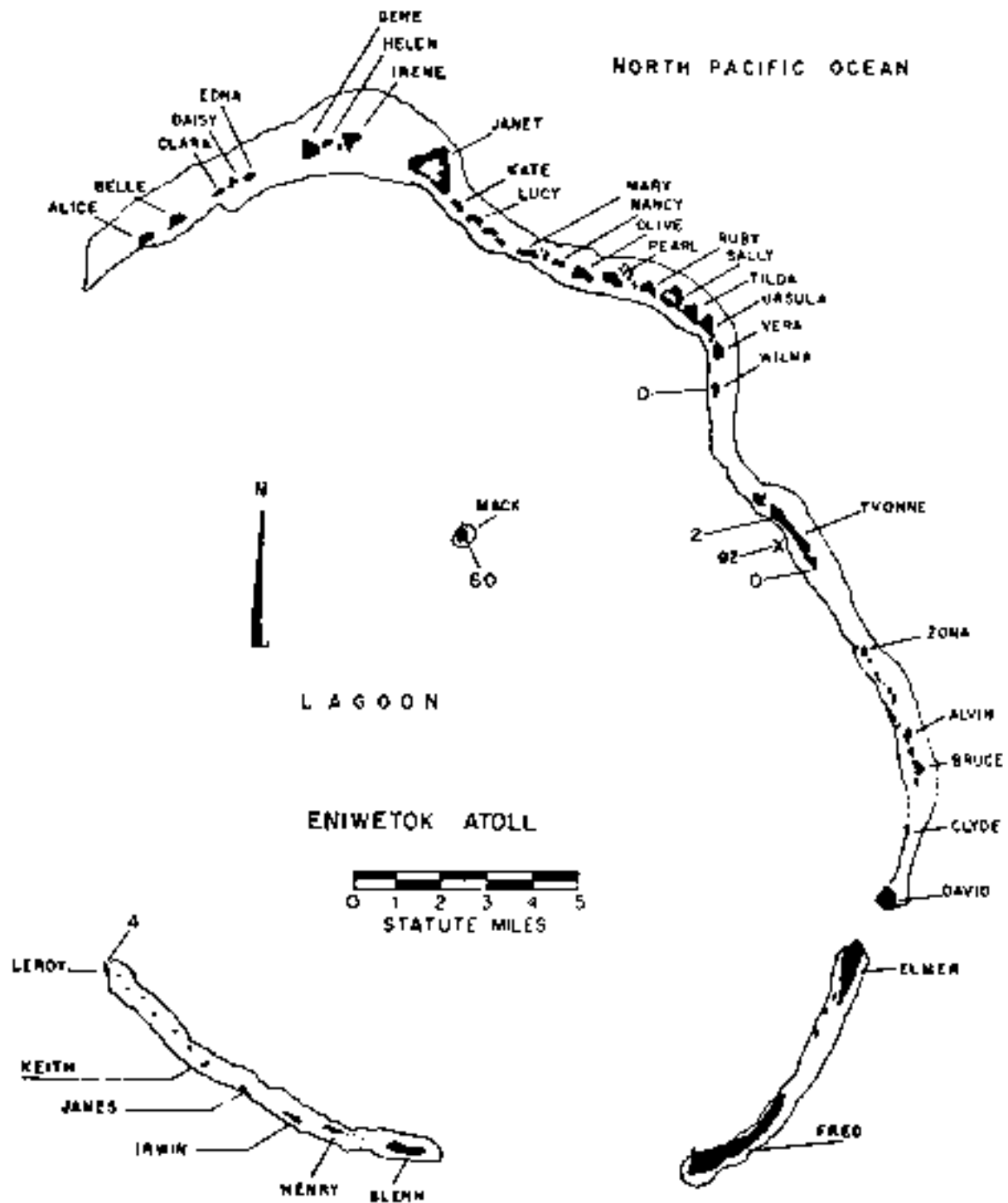


Figure 159. Operation HARDTACK I - Sequoia. Island dose rates in r/hr at H+1 hour.

TABLE 57. ESTIMATED WIND DATA FOR OPERATION WAREHOUSE 1 -

012001A

Altitude (MSL)	0000 hour		0600 hours		0900 hours	
	Dir	Speed	Dir	Speed	Dir	Speed
feet	degrees	mph	degrees	mph	degrees	mph
Surface	100	14	080	15	090	18
1,000	090	20	090	13	090	23
2,000	090	22	090	22	090	24
3,000	100	22	100	22	090	24
4,000	100	20	100	22	090	23
5,000	100	23	100	24	090	22
6,000	100	22	100	20	100	20
7,000	100	22	090	17	100	17
8,000	100	24	100	15	100	15
9,000	100	21	110	14	100	14
10,000	100	15	110	16	100	16
12,000	110	20	110	16	090	15
14,000	120	14	130	14	130	08
15,000	(120)	(13)	(130)	(13)	(130)	(09)
16,000	120	10	130	13	130	12
18,000	010	07	100	13	120	10
20,000	010	13	080	07	130	05
23,000	010	23	010	18	040	16
25,000	340	12	340	22	020	07
30,000	010	15	030	10	320	09
35,000	020	18	020	16	020	07
40,000	010	28	300	21	010	17
45,000	020	36	010	29	010	21
50,000	210	20	340	22	300	17
55,000	010	18	310	12	050	05
60,000	080	14	100	22	110	13
65,000	100	29	100	30	080	29
70,000	090	39	090	45	090	42
75,000	100	55	100	47	100	57
80,000	090	55	090	54	090	67
85,000	100	72	100	70	090	75
90,000	090	68	100	80	090	76
95,000	090	90	090	90	090	83
100,000	090	98	---	--	090	100
105,000	100	98	---	--	090	109
110,000	---	--	---	--	090	79
112,000	---	--	---	--	100	82

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Prineville weather station.
3. Tropopause height was 52,000 ft MSL.
4. The surface air pressure was 34.51 psi, the temperature 27.2°C, the dew point 83.5°F, and the relative humidity 76%.

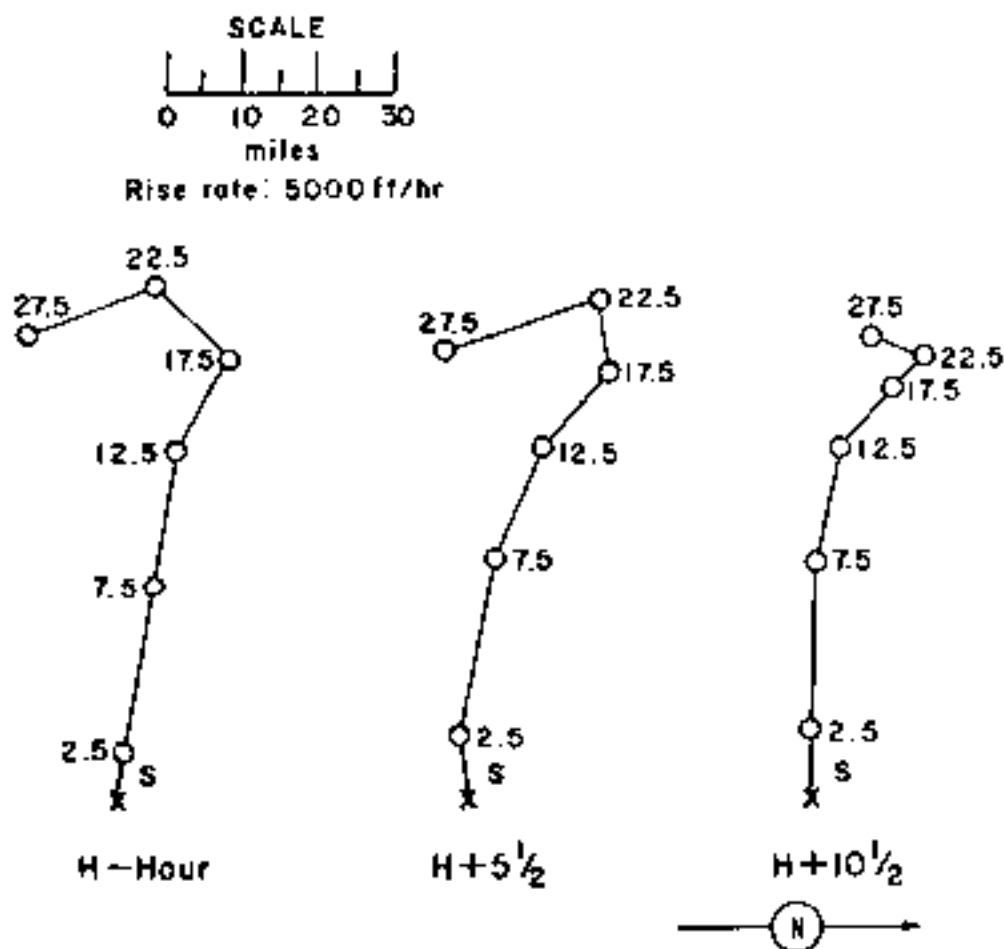


Figure 163. Hodographs for Operation HARTACK I - Sequoia.

OPERATION LAUNCH 1 -

Cedar

DATE: PPG Time GMT
3 July 1953 0 July 1953
TIME: 0730 1730

Sponsor: UCRL

SITE: ICG - Bikini - CW of
Charlie, 3/4 mi from
the island
Site elevation: Sea level

HEIGHT OF INSTRUMENT: 10.75 ft

TYPE OF INSTRUMENT:
Surface count rate tube
on water

CLOUD TOP HEIGHT: 1,000 ft
CLOUD BOT. HEIGHT: 500 ft

REMARKS:

Only individual island dose rates are available. These were obtained from Radiological Safety Organization helicopter surveys at 184 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a side pass over the desired spot at an elevation of 20 feet. Readings taken at 20 feet were multiplied by a factor of 2.0 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/PBE-30 survey meter modified to read up to 100 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the 184 hour dose-rate readings to H+1 hour.

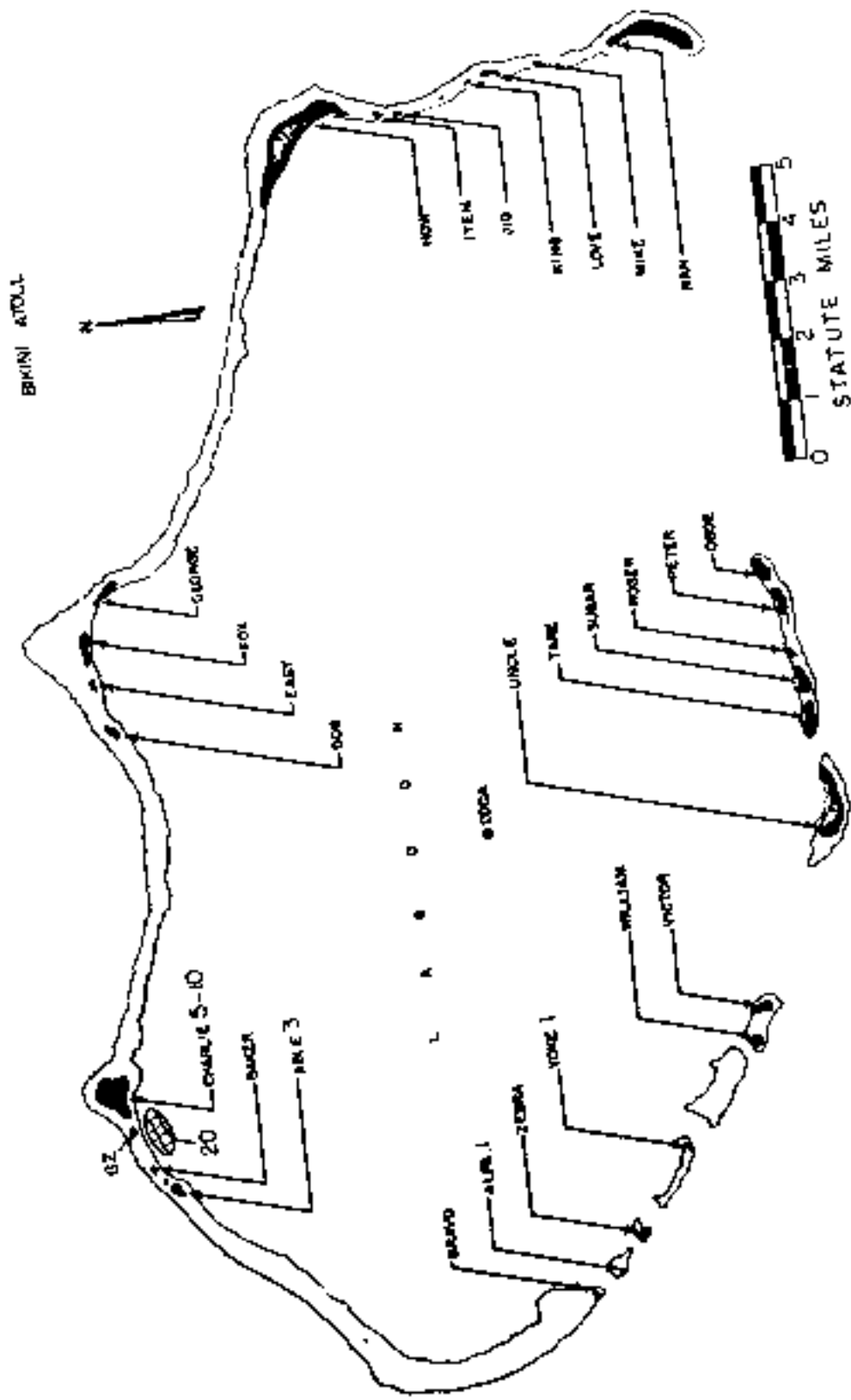


Figure 161. Operation HARDTACK I - Island dose routes in r/hr at 2+1 hour. Cedar.

TABLE 58. INDEXED WIND DATA AND ORIENTATION (BASED ON 1 -

CREAM

Altitude (Feet)	Wind Speed		Wind Direction		Wind Gust	
	Direction	Spd.	Direction	Spd.	Direction	Spd.
Surface	080	15	090	16	090	18
1,000	080	16	100	17	080	22
2,000	080	29	100	23	090	31
3,000	110	30	080	18	080	26
4,000	110	29	100	25	100	28
5,000	110	26	090	25	100	26
6,000	110	24	080	24	100	25
7,000	110	24	080	23	090	24
8,000	110	23	080	22	100	22
9,000	---	23	090	22	110	21
10,000	080	18	090	20	100	26
12,000	080	16	090	11	100	21
14,000	080	13	090	11	090	21
15,000	(080)	(13)	(090)	(11)	(090)	(13)
16,000	080	13	090	11	100	20
18,000	080	13	090	11	090	19
20,000	080	12	080	09.0	090	20
23,000	080	11	080	09.0	090	19
25,000	(080)	(11)	---	10	100	17
30,000	080	11	090	11	090	16
35,000	080	11	090	11	090	17
40,000	080	10	090	11	090	15
45,000	080	17	090	19	090	30
50,000	080	16	220	16	230	11
53,000	---	---	090	18	---	---
55,000	080	20	---	---	290	09
60,000	080	22	---	---	100	26
65,000	080	28	---	---	100	31

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken on board ship within 30 nautical miles of the Tower at Nan Island, Bikini Atoll.
3. Tropopause height was 51,000 ft MSL.
4. The surface sea pressure was 1014.4 psf, the temperature 23.4°C, the dew point 16.5°F, and the relative humidity 70%.

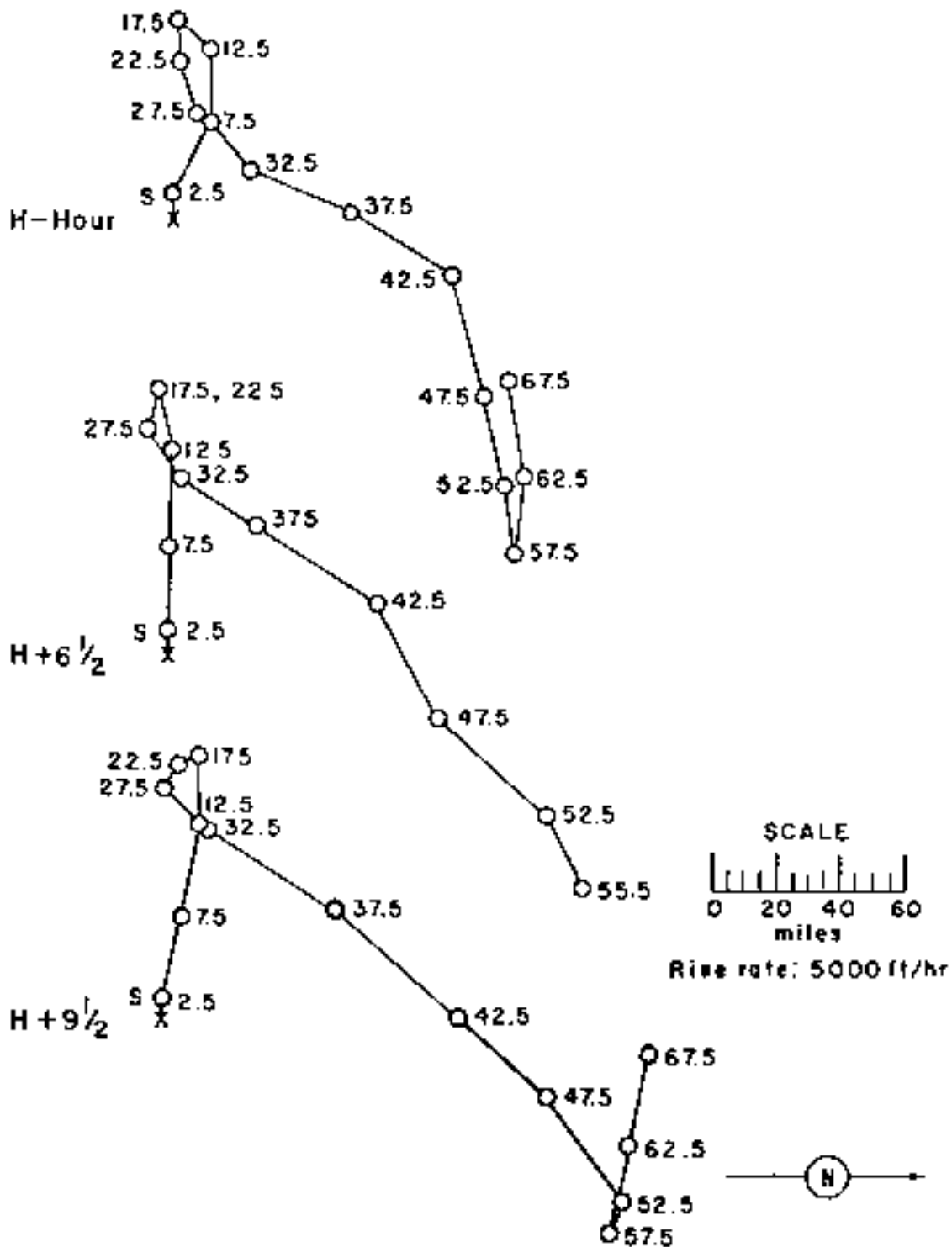


Figure 162. Hodographs for Operation HARTACK I -

Cedar.

OPERATION NUMBER: 2 -

Page 41

	<u>PTC Title</u>	<u>DATE</u>
<u>DATE:</u>	6 July 1953	July 1953
<u>TYPE:</u>	Open	Open

Sponsor: USNR

STUDY: PTC - Evaluation of the
Jettison of 1000 lb. of
cargo of Island (111-111)
1) 30' 30" N
162° 18' 30" W

HEIGHT OF ENERGY: 1000 ft

TYPE OF TEST AND LOCATION:
Weather from 1000 ft
on water

CLOUD TOP HEIGHT: 1000 ft
CLOUD BASE HEIGHT: 1000 ft

REMARKS:

Only individual 1-hour decay rates were available. These were obtained from Radiological Safety Organization, helicopter surveys at 1000 ft. The helicopter survey technique called for the pilot either to turn the aircraft at the desired spot, to take a ground reading, or to obtain, or to make a time pass over the desired spot at an altitude of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial survey was the AN/PDR-99 survey meter modified to read up to 100 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the 1-hour decay rate readings to 101 hours.

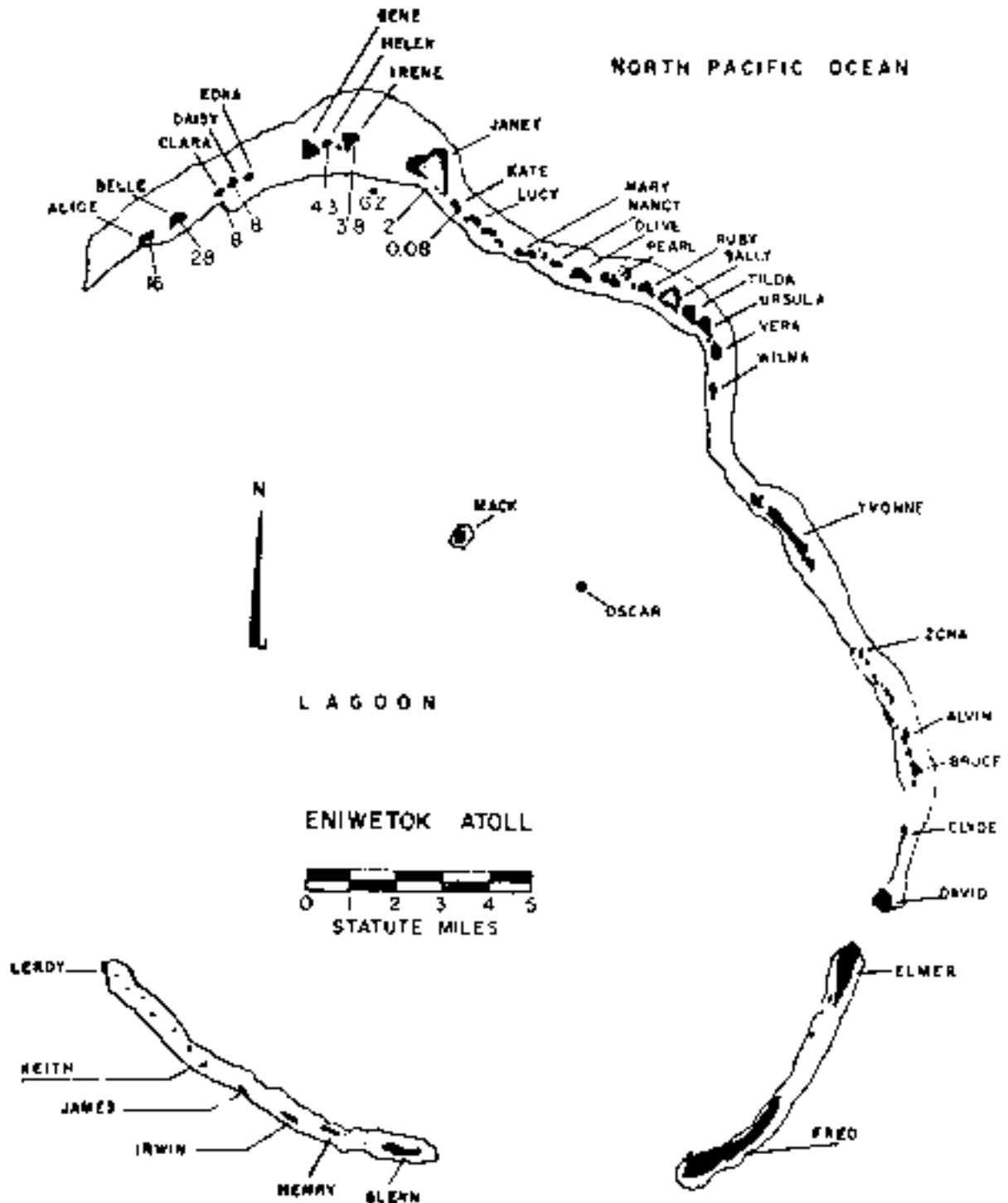


Figure 163. Operation HARDTACK I - Dogwood. Island dose rates in r/hr at 1 hour.

TABLE 59. ENTRUCK WIND DATA FOR OPERATION WARDACK 1 -

D064500

Altitude (MO.)	1st hour		1st hour		2nd hour	
	Dir	Speed	Dir	Speed	Dir	Speed
feet	degrees	mph	degrees	mph	degrees	mph
Surface	090	15	090	19	080	16
1,000	080	20	050	17	080	16
2,000	080	24	090	20	070	18
3,000	090	25	160	17	070	21
4,000	090	24	160	15	080	21
5,000	090	20	100	15	060	16
6,000	090	17	160	15	050	14
7,000	080	20	100	14	070	15
8,000	080	17	080	14	090	15
9,000	070	18	090	17	080	14
10,000	080	20	090	17	070	14
12,000	100	16	090	18	100	14
14,000	100	14	100	20	120	17
15,000	(100)	(17)	(100)	(20)	(130)	(17)
16,000	100	21	110	22	110	17
18,000	100	22	110	21	120	22
20,000	100	18	110	17	120	20
23,000	100	22	100	21	110	24
25,000	100	22	070	24	100	25
30,000	100	21	080	30	140	20
35,000	130	18	160	18	160	21
40,000	190	35	180	20	160	25
45,000	210	40	200	29	140	30
50,000	230	25	200	21	240	15
55,000	290	17	160	09	240	05
60,000	030	10	090	18	080	20
65,000	050	22	090	24	---	--
70,000	050	44	090	38	---	--
75,000	050	40	100	50	---	--
80,000	---	--	100	54	---	--
85,000	---	--	100	59	---	--
90,000	---	--	090	76	---	--
95,000	---	--	100	92	---	--
100,000	---	--	100	101	---	--
105,000	---	--	090	234	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the ENTRUCK weather station.
3. Tropopause height was 52,000 ft MSL.
4. The surface air pressure was 14.63 psi, the temperature 27.4°C, the dew point 77°F, and the relative humidity 85%.

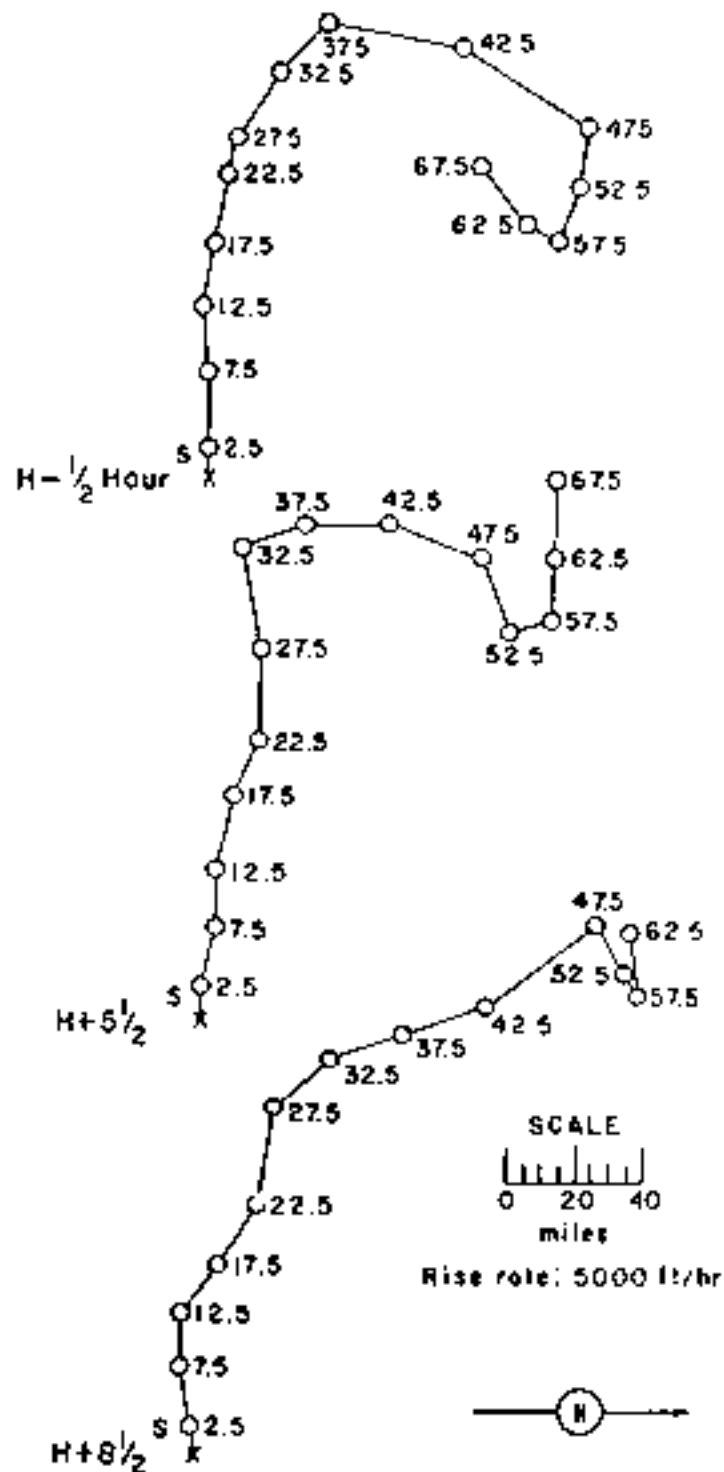


Figure 164. Hodographs for Operation HARDTACK I -

Jagwood.

OPERATION HARDACK I -

Poplar

DATE: FFG Date: GMT
12 July 1966 11 July 1966
TIME: 0100 0350

Sponsor: JCFE.

SITE: 100 x 100 ft - NW of
Charlie, 17,000 ft from
the nearest edge of forest:
11° 41' 13" N
105° 15' 13" E
Site elevation: Sea level

HEIGHT OF MEAS: 11,000 ft

TYPE OF GASET AND PLACEMENT:
Surface level, 100 ft above
water level, etc.

CLOUD FOR HEIGHT: > 11,000 ft MSL
CLOUD BOTTOM HEIGHT: 10,000 ft MSL

REMARKS:

Only individual island dose rates are available. These were obtained from the Radiological Safety Organization helicopter surveys at H+4 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 50 feet. Readings taken at 50 feet were multiplied by a factor of 1.2 in order to obtain a reasonable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AN/EDM-77 survey meter modified to read up to 500 r/hr. The 1.12 decay approximation was used to extrapolate the H+4 hour dose rate readings to H+0 hours.

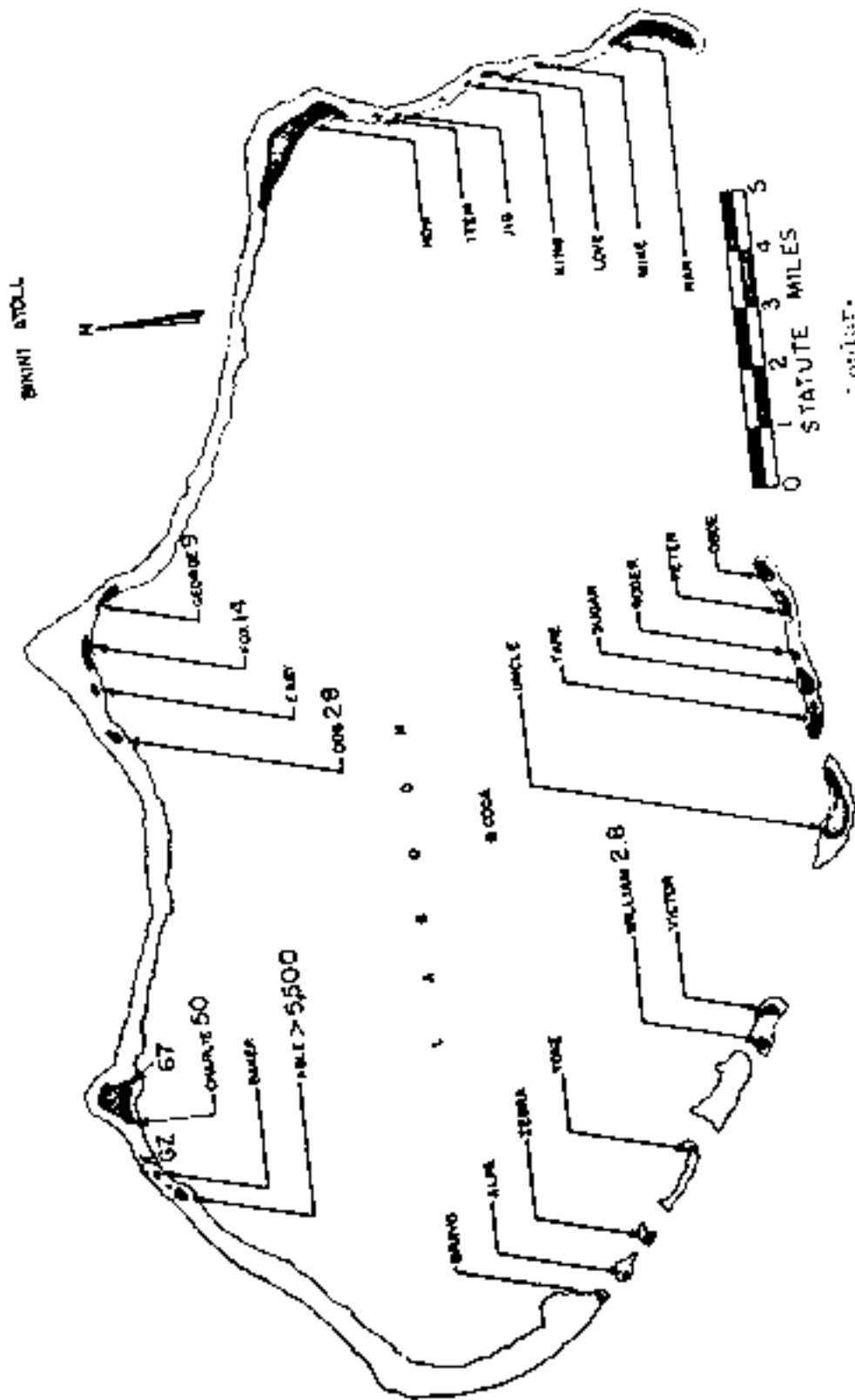


Figure 168. Johnston Atoll. Island names and distances in statute miles.

TABLE 40 BIKINI WIND DATA FOR CORRELATION APPENDIX 7 -

1952M

Altitude (ft)	P ₁ (ft)		P ₂ (ft)	
	Dir. degrees	Spd. mph	Dir. degrees	Spd. mph
Surface	060	14	070	18
1,000	070	22	070	21
2,000	060	24	060	24
3,000	060	27	070	27
4,000	060	31	080	30
5,000	050	30	070	31
6,000	060	31	070	31
7,000	070	28	080	32
8,000	070	29	080	30
9,000	070	27	070	31
10,000	060	27	070	30
12,000	060	27	070	28
14,000	100	27	070	27
15,000	(100)	(27)	(070)	(27)
16,000	100	24	070	24
18,000	100	23	100	25
20,000	100	22	100	26
23,000	090	22	100	25
25,000	080	20	100	24
30,000	---	--	090	23
35,000	---	--	090	18
40,000	---	--	090	17
45,000	---	--	130	14
50,000	---	--	210	11
55,000	---	--	180	12
60,000	---	--	090	25
65,000	---	--	090	24
70,000	---	--	090	36
72,000	---	--	080	47

NOTES:

1. Numbers in parentheses are estimated values.
2. Weather observations were made using the standard rawinsonde system on Nan Island (Bikini Atoll) adjacent to the Gun Tower. Additional data was taken on board destroyers.
3. Tropopause height was 15,000 ft MSL.
4. The surface air pressure was 14.62 psi, the temperature 27.9°C, the dew point 21.3°F, and the relative humidity 88%.

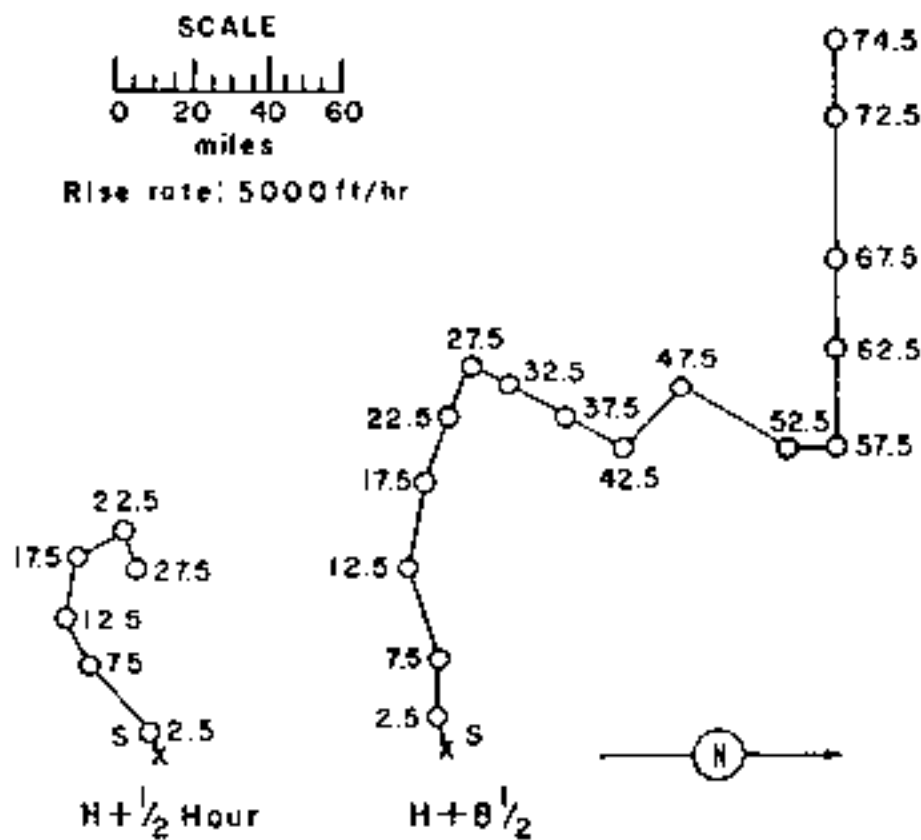


Figure 166. Hodographs for Operation HARBLOCK I - Poplar.

OPERATION SANDSACK I

Continued

DATE: 19 July 1968 0600
TIME: 1000

Sponsor: USCG

SITE: 113 - Indivok - GP
Yvonne
11° 33' 00" N
160° 31' 00" E
Site elevation: Sea level

HEIGHT OF MOUNT: 00 ft

CLOUD TOP HEIGHT: 00
CLOUD BASE HEIGHT: 00

TYPE OF WIND AND DIRECTION:
Surface wind from land
on water

REMARKS:
No pellets.

OPERATION BACKLOG 1-

Kanonia

	<u>PPG Date</u>	<u>GMT</u>
<u>INCR:</u>	16 July 1958	17 July 1958
<u>TIME:</u>	1200	2300

Sponsor: IACI.

SITE: PPG - Kanonia - 11,000 ft
W of Iveshoe
11° 33' N
168° 19' 33" W
Site elevation: Sea level

HEIGHT OF PPG: 11,000 ft

TYPE OF WEATHER AND WINDSPEED:
Overcast, light rain, calm to
water

CLOUD TO WEATHER: 10,000 ft MSL
CLOUD BASE: 10,000

RESULTS:

Only individual island dose rates are available. These were obtained from Radiological Safety Organization helicopter surveys at Ika Kona. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Boulder, Canada, 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground readings. The basic instrument used in the aerial surveys was the AN/118-33 survey meter modified to read up to 300 r/hr. The $t^{-1.2}$ decay approximation was used to extrapolate the H+1 hour dose-rate readings to H+1 hour.

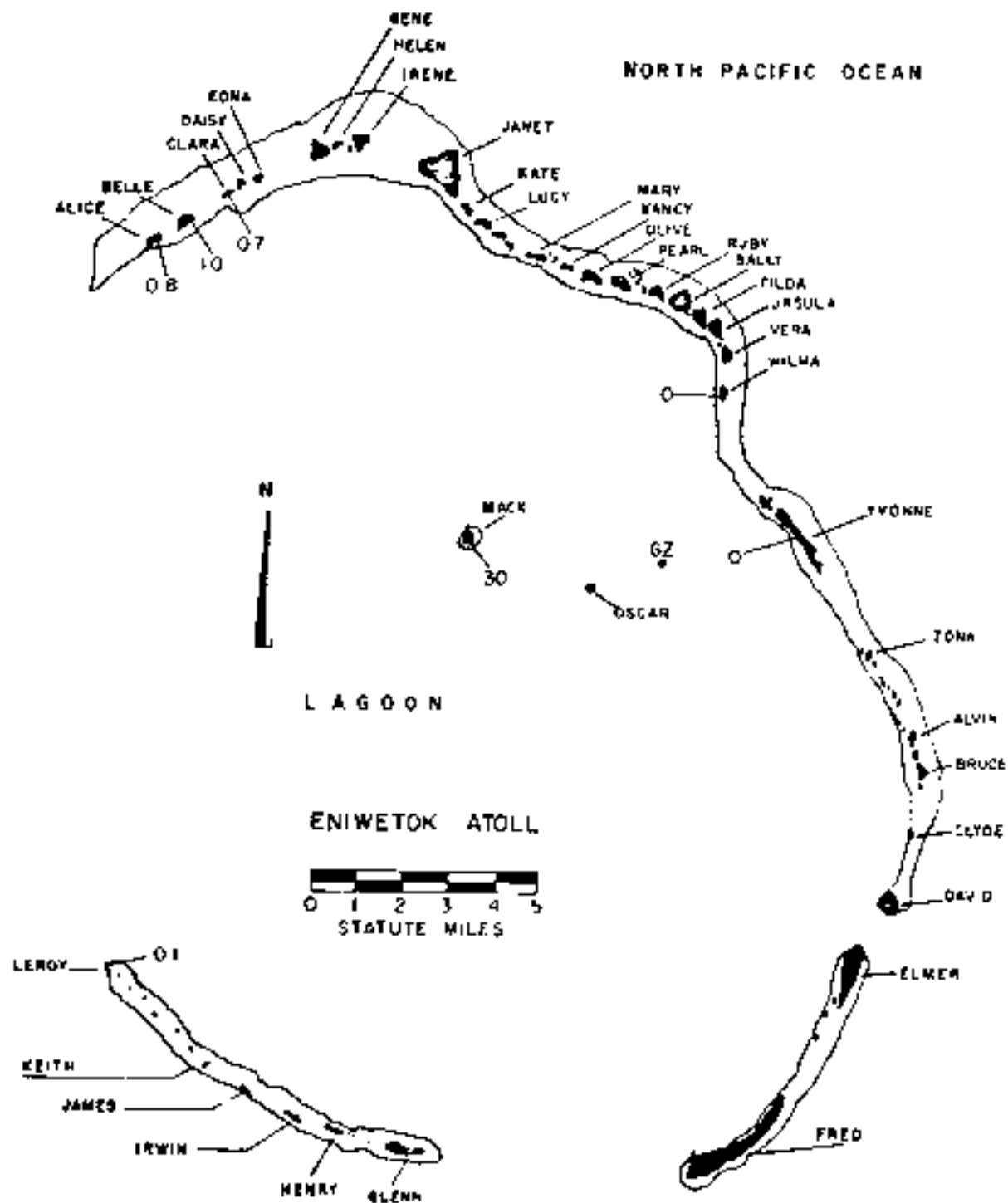


Figure 16". Operation HARTACK I - Pisonia.
Island dose rates in r/hr at H+1 hour.

TABLE 61 SNOWPACK WIND DATA FOR HARDWARE I -

PICONTA

Altitude (MCL)	F*F Data		H*G Data		I*J Data	
	Dir	Wind	Dir	Wind	Dir	Wind
feet	degrees	mph	degrees	mph	degrees	mph
Surface	Calc	Calc	330	09	070	14
1,000	150	09	090	09	070	22
2,000	170	10	090	09	070	29
3,000	160	14	090	12	080	27
4,000	140	17	100	13	090	25
5,000	130	14	120	14	110	18
6,000	130	12	140	16	120	14
7,000	130	15	150	17	130	10
8,000	100	10	150	18	120	10
9,000	120	08	150	20	110	14
10,000	120	13	150	17	120	18
12,000	110	12	130	13	110	14
14,000	100	09	100	12	090	14
15,000	(100)	(09)	(090)	(12)	(090)	(14)
16,000	090	07	070	15	070	14
18,000	120	17	110	05	090	10
20,000	120	14	120	02	100	07
23,000	090	18	090	14	140	07
25,000	060	15	090	17	120	12
30,000	060	22	060	11	090	07
35,000	090	21	040	17	090	07
40,000	070	09	090	12	090	09
45,000	040	20	040	06	040	06
50,000	090	12	090	15	130	10
55,000	100	12	210	05	130	12
60,000	120	22	120	30	110	20
65,000	090	31	090	39	090	44
70,000	090	52	090	38	090	47
75,000	090	55	100	51	090	54
80,000	090	57	100	61	090	76
85,000	100	68	090	78	090	80
90,000	090	82	090	87	---	--
95,000	090	75	090	98	---	--
100,000	090	97	090	83	---	--
101,000	---	--	090	76	---	--
105,000	090	101	---	--	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Piconta weather station.
3. The surface air pressure was 14.67 psi, the temperature 20.8°C, the dew point 74.7°F, and the relative humidity 53%.

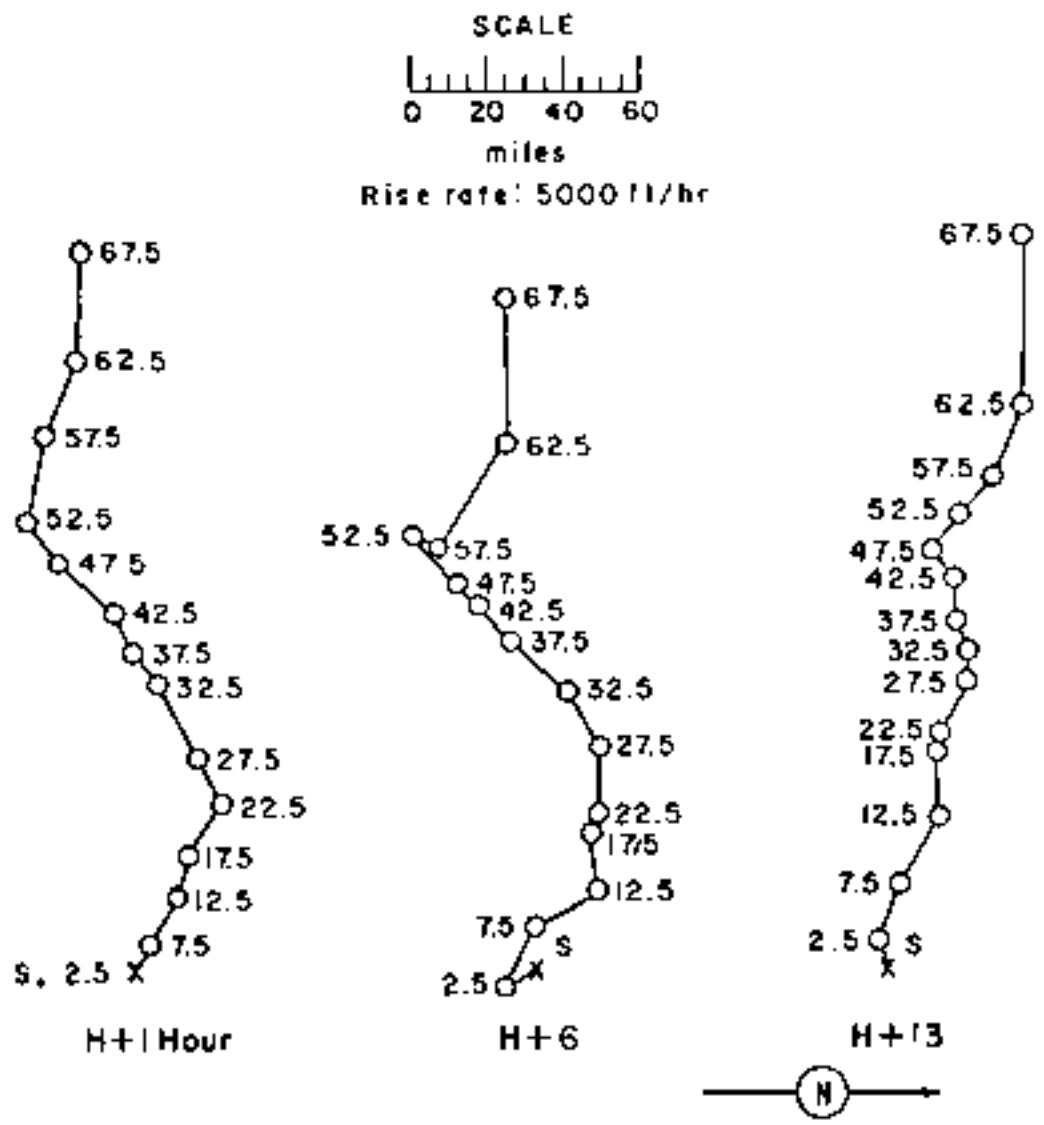


Figure 169. Hodographs for Operation BARSTOCK I - Mission.

OPERATION BARNDACK : -

Juniper

	<u>PGC Time:</u>	<u>GMT</u>
<u>DATE:</u>	27 July 1978	27 July 1978
<u>TIME:</u>	1700	0400

Sponsor: UCRL

SITE: H3 - Bldg. - 4,000 ft.
from west end of Run-
11° 29' 40" N
167° 22' 01" W
Site elevation: Sea level

HEIGHT OF MOUNT: 10,000 ft

TYPE OF MOUNT AND ELECTRONIC:
Surface based, non-carry
on water

CLOUD TOP HEIGHT: 40,000 ft MSL
CLOUD BASE HEIGHT: 20,000 ft MSL

REMARKS:

Only individual labeled dose rates are used at 0.1 Hr. Data are obtained from Radiological Safety Organization helicopter surveys at 0.1 Hr. Data. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, so that a ground reading could be obtained, or to make a slow pass over the desired spot at an elevation of 25 feet. Readings taken at 25 feet were multiplied by a factor of 2 in order to obtain a reasonable approximation of the true ground reading. The latter instrument used in the aerial surveys was the AMBERR-90 survey meter modified to read up to 500 r/hr. The $t^{1/2}$ decay approximation was used to extrapolate the 11+ hour dose-rate readings to 1+ hour.

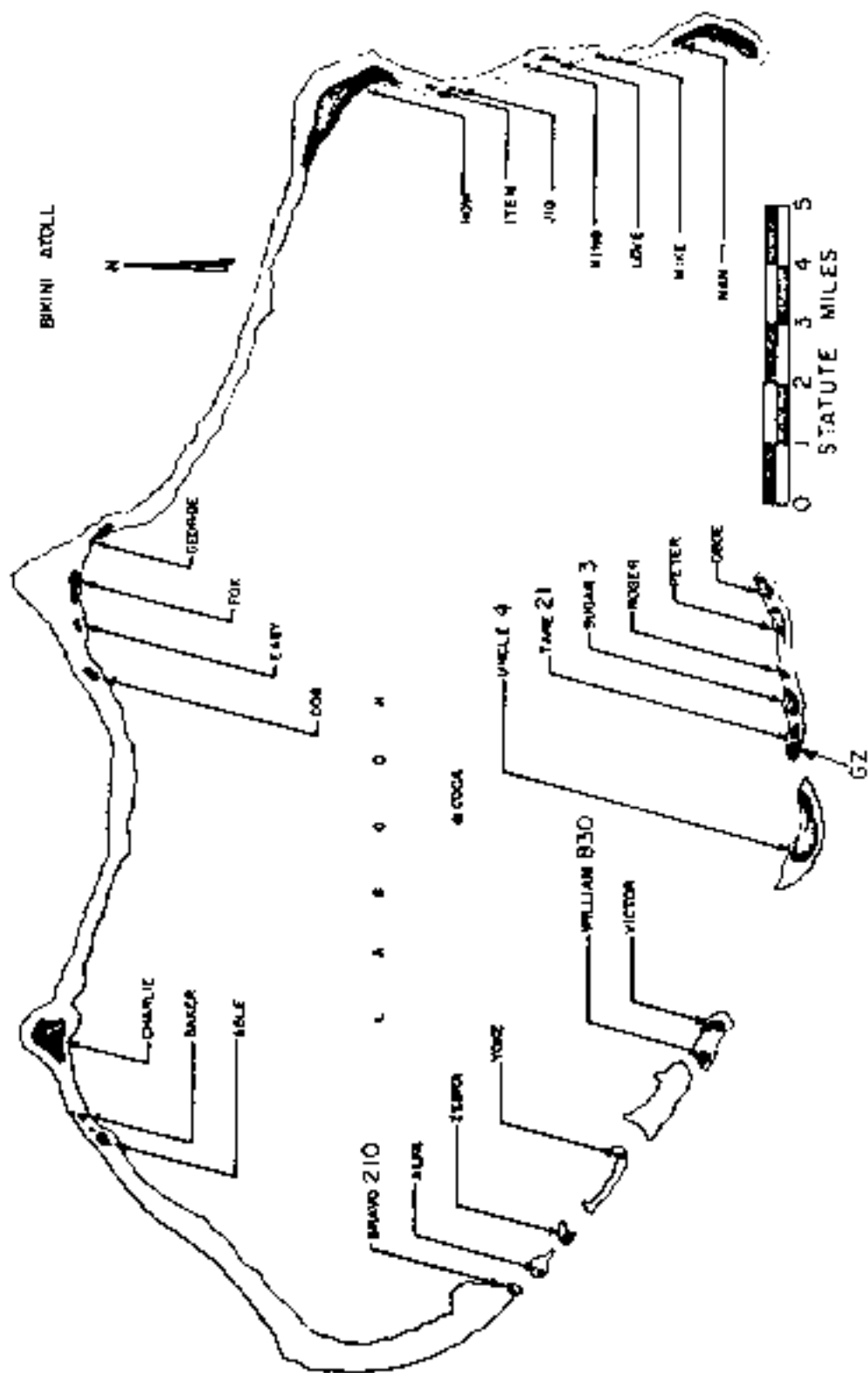


Figure 100. Operation Bockscar B-29 Superfortresses at Bikini Atoll, 1945.

TABLE 6-2 BIKINI WIND DATA FOR ORBITATION MISSION 1 - JUNE 1968

Altitude (ft.)	Direction		Speed		Gusts	Frequency
	Frequency	Mean	Frequency	Mean		
Surface	0%	46	100	39	110	57
1,000	0%	38	100	76	110	13
2,000	0%	20	100	16	100	14
3,000	100	21	110	17	100	14
4,000	100	31	110	17	100	14
5,000	100	40	110	17	100	15
6,000	110	18	110	18	100	17
7,000	110	16	100	20	110	20
8,000	110	13	090	18	100	18
9,000	110	07	090	17	100	15
10,000	110	10	080	16	100	15
12,000	110	13	090	16	100	11
14,000	110	17	090	11	100	11
15,000	(100)	(10)	(100)	(11)	(100)	(10)
16,000	100	14	100	11	100	14
18,000	100	11	100	11	100	13
20,000	100	18	110	18	100	17
23,000	100	21	100	10	100	10
25,000	100	22	100	11	100	19
30,000	100	15	100	07	090	16
35,000	100	18	100	07	100	17
40,000	100	12	110	4	100	11
45,000	100	10	100	11	100	13
50,000	100	12	100	11	100	19
55,000	090	07	100	03	100	07
60,000	100	11	100	06	100	16
65,000	100	14	080	10	---	---
70,000	100	48	080	18	---	---
75,000	090	51	090	41	---	---
80,000	080	63	080	63	---	---
85,000	090	67	090	79	---	---
90,000	090	67	090	98	---	---
95,000	080	76	070	121	---	---
100,000	090	78	---	---	---	---
105,000	070	80	---	---	---	---

NOTES:

1. Numbers in parentheses are estimated values.
2. Weather observations were made using the standard rawinsonde system on New Island (Bikini Atoll) adjacent to the Nam Tower. Additional data was taken on board destroyers.
3. Tropopause height was 51,000 ft. MSL.
4. The surface air pressure was 14.64 psi, the temperature 30.8°C, the dew point 73.9°F, and the relative humidity 76%.

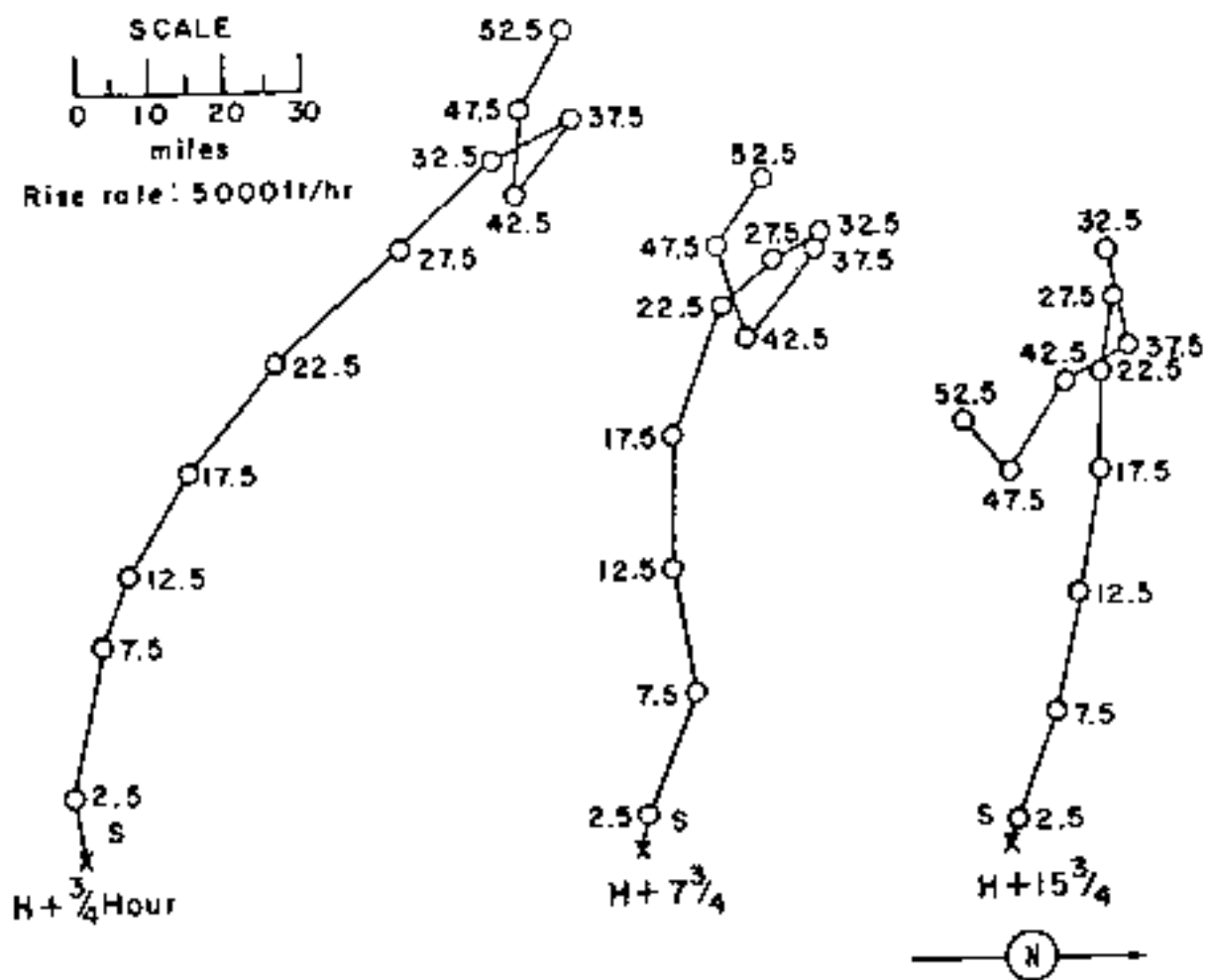


Figure 170. Hodographs for Operation BARDAGE 1 -

Juniper.

OPERATION WARDPACK I -

OLIVE

FIG TIME: _____ GMS _____
DATE: 27 July 1958 0700-0800
TIME: 0730 0820

Species: UCML

SITE: JFG - Elevation - 100' W of
Forest, 100' N of
the base of ridge of
ridge (Sta. 100)
10° 30' 00" N
110° 10' 00" W
Site elev. 100' (Sta. 100)

HEIGHT OF POINT: 100'

CLOUDS AT 1000 FT: 100% to 100%
CLOUDS AT 500 FT: 100% to 100%

TYPE OF MEASUREMENTS:
Direct, indirect, and
indirect

REMARKS:

Only individual data rates are available. These were obtained from Radiometer direct visualization and rate measurements of 110 hours. The Radiometer survey is unique in that the meter either to land the aircraft at the desired spot or that a ground reading could be obtained, or to measure at a point where a large spot of ground was 100 feet. Readings taken at all points were multiplied by a factor of 2 in order to obtain a more reliable approximation of the true ground reading. The basic instrument used in the aerial surveys was the AM/100-yy survey meter modified to read up to 500 cph. The $t^{1/2}$ decay approximation was used to extrapolate the 110-hour discrete readings to 600 hours.

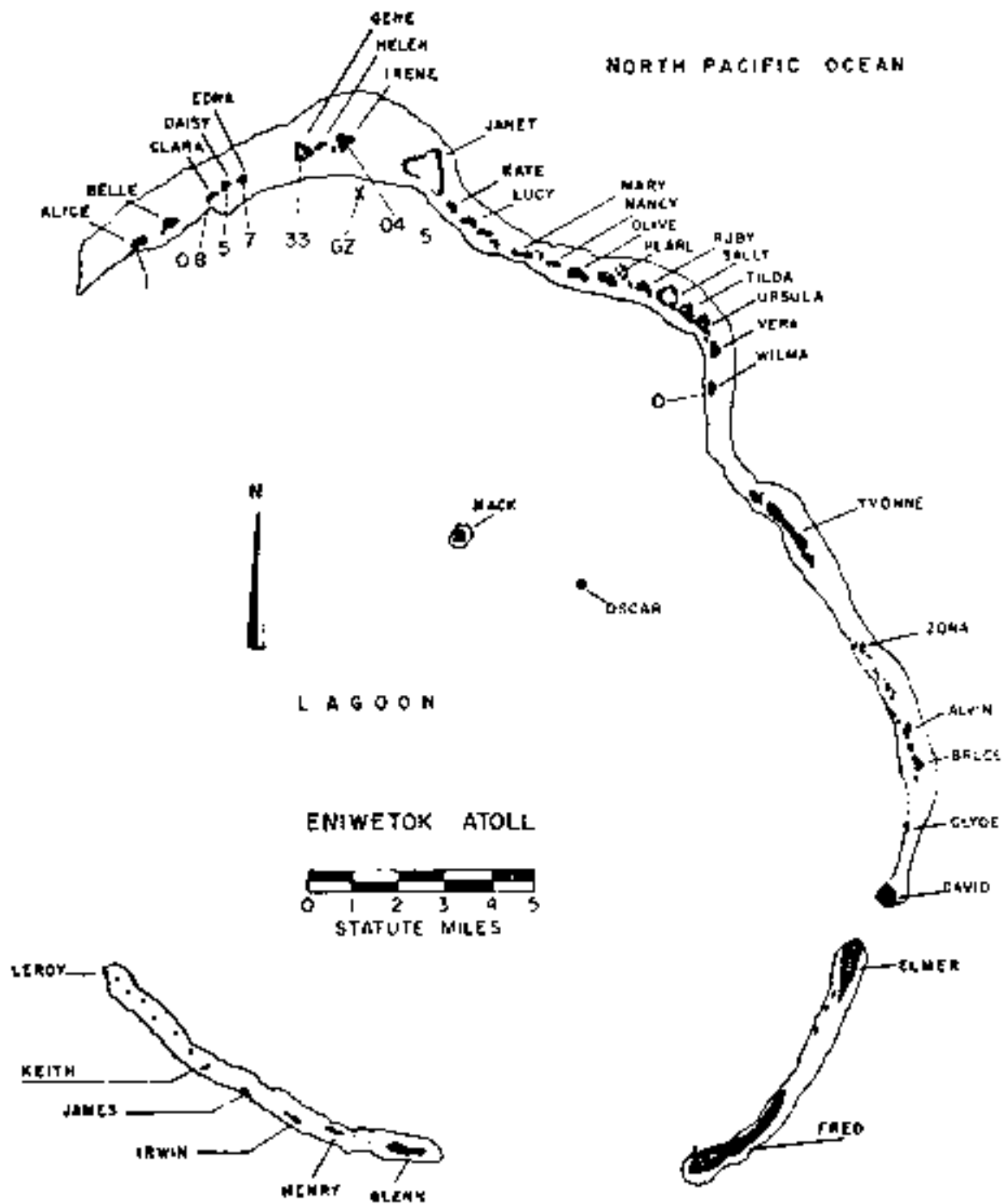


Figure 171. Operation HARDTACK I - Olive.
Island dose rates in r/hr at 10:00 hour.

TABLE 63 KINETIC WIND DATA FOR OPERATION BARTOCK 1 -

OZONE

Altitude (MFL)	H=23:00		H=23:30		H=00:00		H=00:30	
	U _z	W _z	U _z	W _z	U _z	W _z	U _z	W _z
Feet	m/sec	kph	m/sec	kph	m/sec	kph	m/sec	kph
Surface	31	18	23	18	13	18	16	21
1,000	13	25	13	21	12	20	16	15
2,000	13	32	13	29	12	24	15	17
3,000	13	29	13	28	12	22	15	21
4,000	13	26	14	24	12	21	15	21
5,000	13	25	14	24	12	21	16	21
6,000	13	24	14	24	12	22	16	20
7,000	12	29	13	28	12	25	16	17
8,000	12	29	13	28	12	28	14	17
9,000	12	25	13	25	12	24	14	16
10,000	12	23	13	23	12	22	14	15
12,000	11	23	12	23	12	22	14	20
14,000	12	24	12	24	12	24	13	20
15,000	---	---	(12)	(23)	(12)	(22)	(14)	(21)
16,000	12	23	12	22	12	23	14	18
18,000	---	---	---	---	12	23	14	20
20,000	12	21	14	21	12	25	13	20
23,000	12	17	14	17	12	17	13	20
25,000	12	24	14	18	12	18	13	18
30,000	12	21	15	18	12	18	12	14
35,000	12	17	18	17	12	17	11	13
40,000	12	18	19	18	12	18	11	13
45,000	12	19	19	18	12	18	11	13
50,000	12	21	19	17	12	17	11	12
55,000	12	17	20	17	12	16	11	12
60,000	12	18	20	18	12	17	11	12
65,000	---	15	20	17	12	17	11	12
70,000	---	---	---	---	11	18	11	12
75,000	---	---	---	---	09	12	11	12
80,000	---	---	---	---	10	10	11	12
85,000	---	---	---	---	10	11	11	12
90,000	---	---	---	---	09	12	11	12
95,000	---	---	---	---	---	---	11	12

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Spherox weather station.
3. Tropopause height was 48,000 ft MSL.
4. H-hour values were interpolated from H+2½ hours and H+3½ hours data.
5. The surface static pressure was 14.64 psi, the temperature 26.4°C, the dew point 10°F, and the relative humidity 8%.

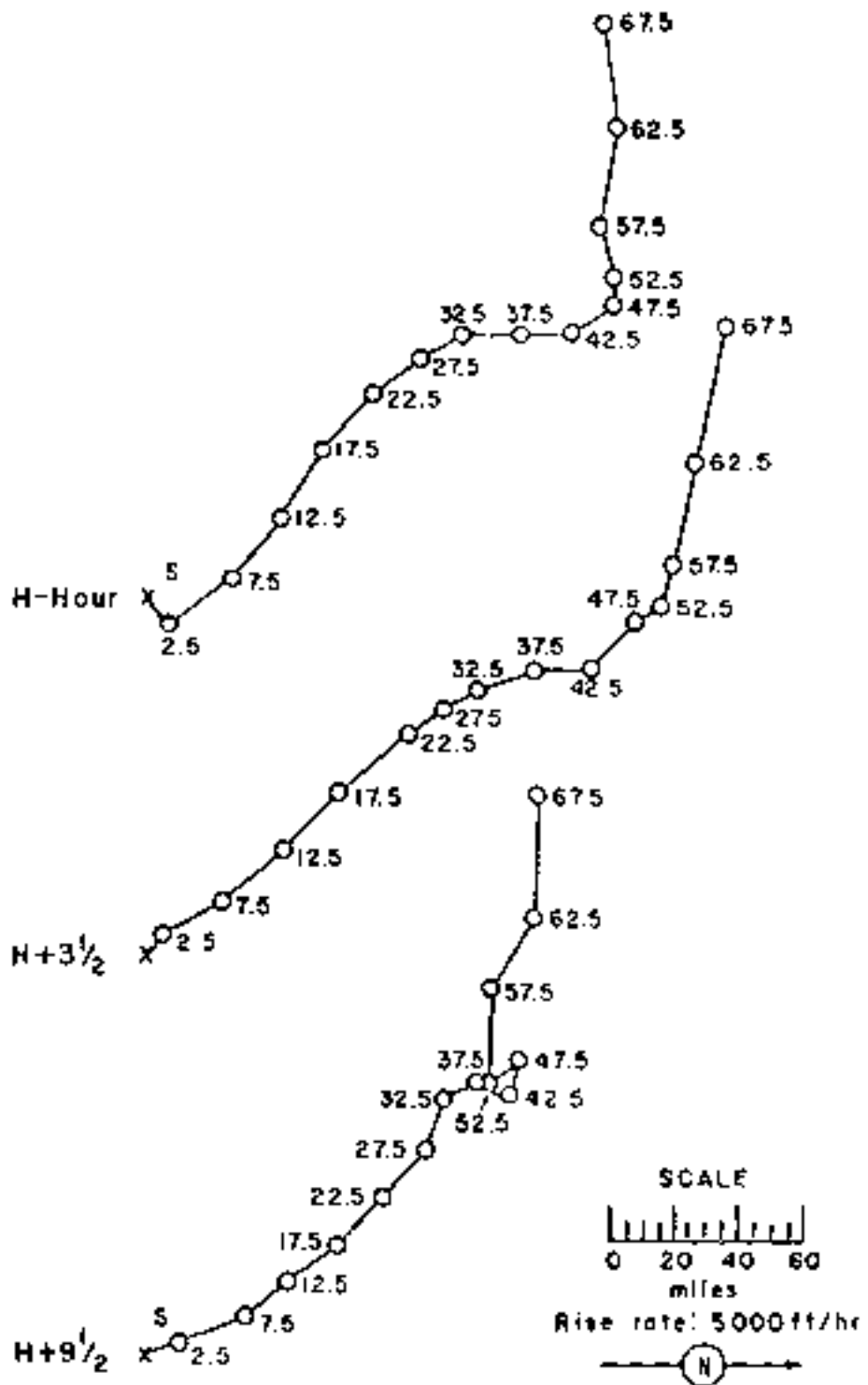


Figure 177. Hodographs for Operation WARDJACK I - Olive.

OPERATION RESONANCE I -

Pine

	FFD (hr)	FFD
<u>DATE:</u>	11/25/68	11/25/68
<u>TIME:</u>	12:00	12:00

Specimen: 3031

NOTE: FFD - 11/25/68 - 12:00
 County, Wash. State
 Project: 11/25/68
 11/25/68
 11/25/68
 Date when first dose level

REASON FOR EXPOSURE: 11/25/68

TYPE OF PARTICULATE:
 11/25/68
 11/25/68

CLASSIFICATION: 11/25/68DEMAN 11

Only individual dose rate data available from the field were obtained from the health and safety organization monitoring survey at H41 hours. The helicopter survey technique called for the pilot either to land the aircraft at the desired spot, collect a ground reading and then fly at an altitude of 2000 feet, or to collect spot at an altitude of 2000 feet. Ground readings of 15 feet were multiplied by a factor of 2 to obtain an altitude reading of 30 feet relative to the ground plane. The instrument used in the aerial survey was the AM/100-10 survey meter modified to read up to 100 r/hr. The $t^{1/2}$ decay approximation was used to extrapolate the H41 hour dose-rate readings to H40 hours.

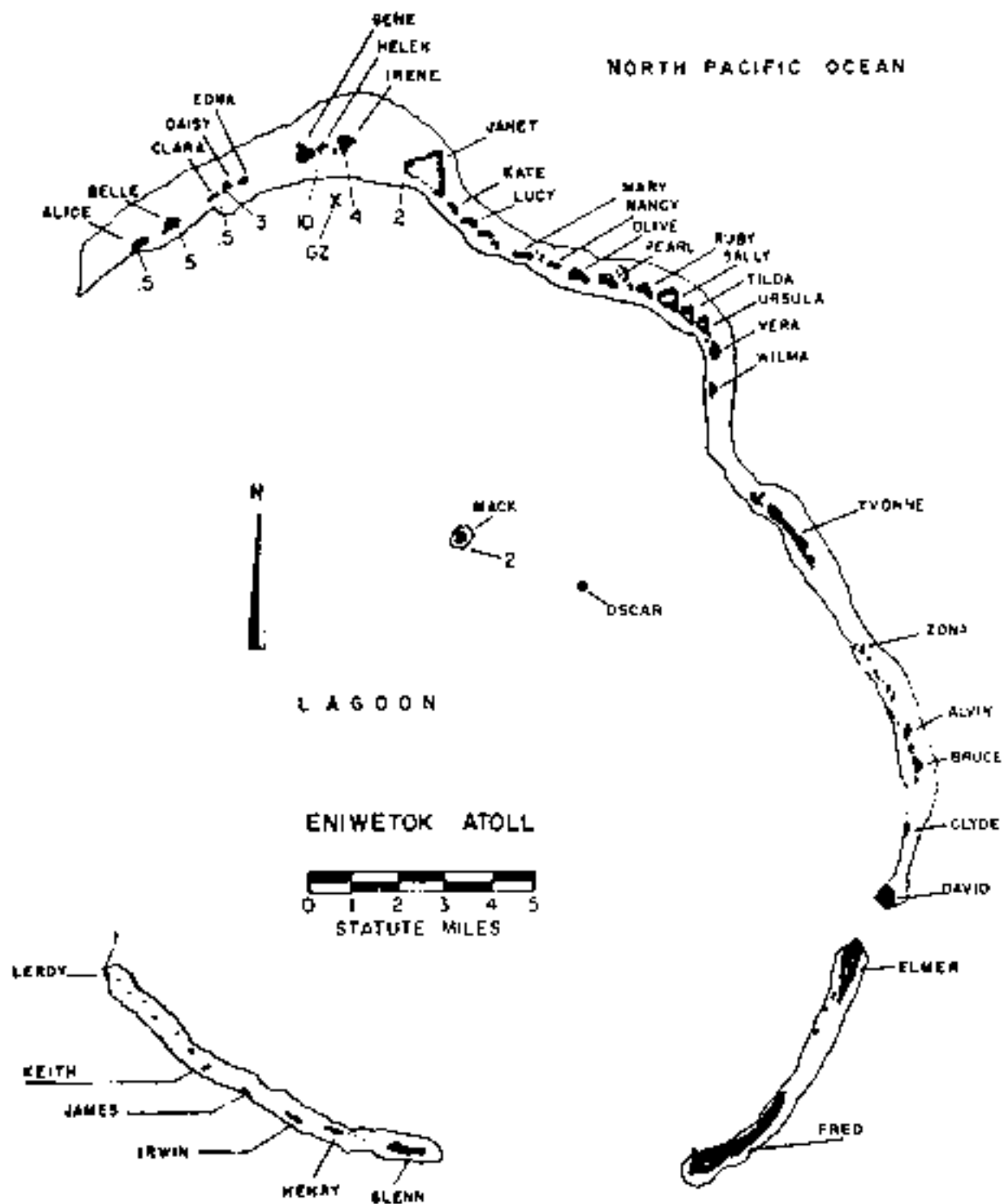


Figure 173. Operation BARISACK I - Pine Island close rates in v/hr at H+1 hour.

TABLE 64. HIGHER WIND DATA FOR OPERATIONS HARPICOM I -

FOUR

Altitude (M.L.)	Wind speed		Wind direction		Wind gust	
	Per direction	High	Per direction	High	Per direction	High
Surface	200	18	230	12	200	05
1,000	210	17	---	--	190	08
2,000	200	17	---	--	240	07
3,000	200	17	---	--	240	12
4,000	200	17	---	--	280	13
5,000	200	18	280	07	210	13
6,000	190	12	180	09	220	13
7,000	170	05	170	10	220	13
8,000	200	05	170	09	210	12
9,000	200	05	180	10	200	12
10,000	200	05	180	10	200	12
12,000	170	05	180	08	190	10
14,000	170	06	170	07	200	10
15,000	(140)	(07)	(140)	(07)	(210)	(07)
16,000	130	05	160	06	220	08
18,000	80	05	190	07	Caln.	Caln.
20,000	170	08	190	05	120	07
23,000	140	13	150	07	120	07
25,000	170	17	200	14	150	19
30,000	160	26	190	18	150	18
35,000	170	24	190	20	120	20
40,000	190	16	140	21	150	26
45,000	200	14	150	20	120	33
50,000	170	16	170	19	180	25
55,000	170	14	130	14	120	15
60,000	080	23	090	21	130	23
65,000	090	41	---	--	---	--
70,000	100	48	---	--	---	--
75,000	100	59	---	--	---	--
80,000	100	69	---	--	---	--
85,000	100	81	---	--	---	--
90,000	100	91	100	68	---	--
95,000	---	--	100	70	---	--
98,000	100	90	---	--	---	--
100,000	100	99	---	--	---	--
105,000	100	240	---	--	---	--
110,000	100	126	---	--	---	--
115,000	100	232	---	--	---	--

NOTES:

1. Numbers in parentheses are estimated values.
2. Wind data was taken by the Saksator weather station.
3. Tropopause height was 52,000 ft MSL.
4. The surface air pressure was 14.00 psi, the temperature 26.1°C, the dew point 17.5°F, and the relative humidity 61%.

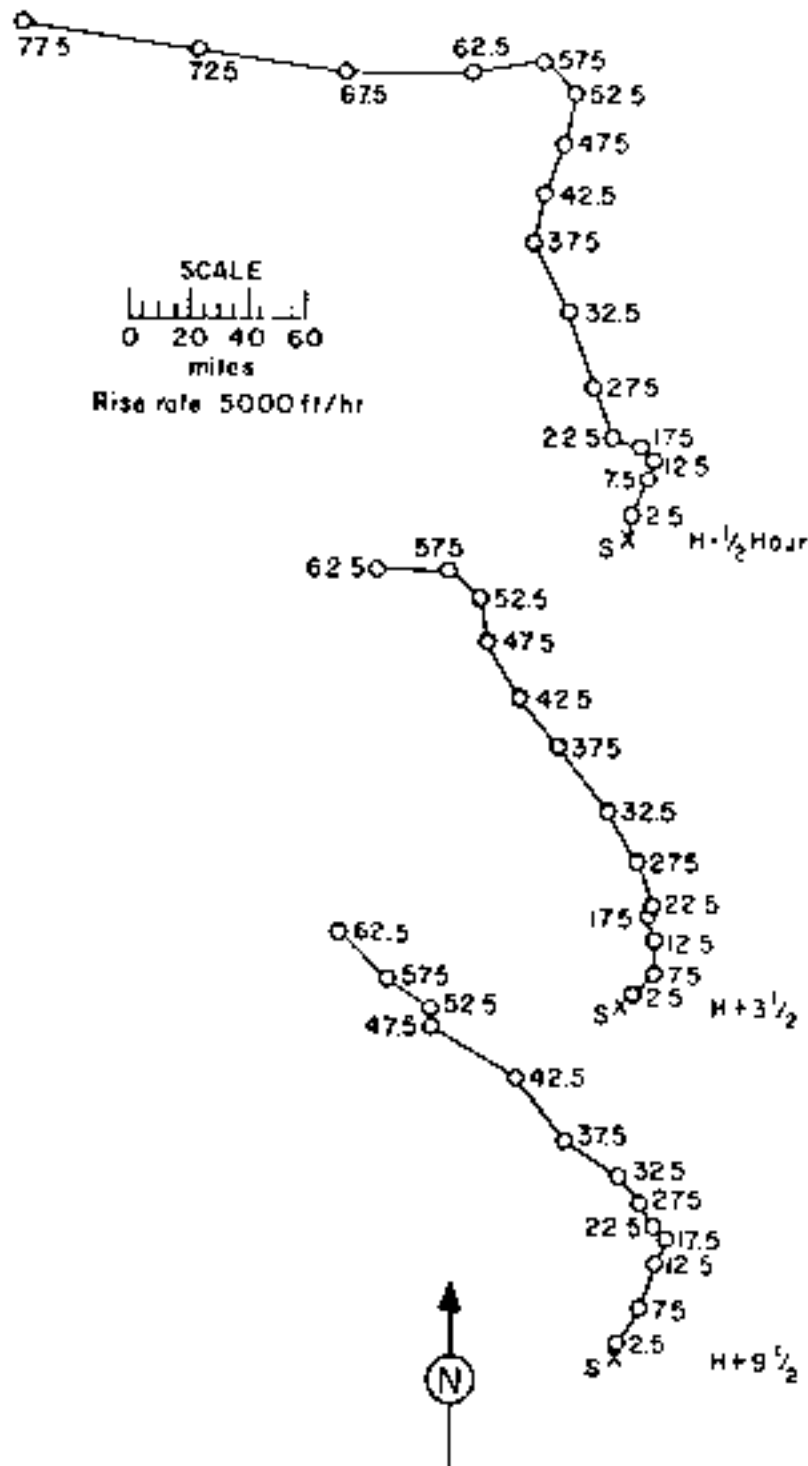


Figure 174. Hodographs for Operation HARDLACK I -

Pine.

OBSERVATION BALLOONAGE 1 -

Table

	<u>WFO Class</u>	<u>QC</u>
<u>DATE:</u>	7 July 1958	21 July 1958
<u>TIME:</u>	12	1630

Species: DOD

STATION: Hqs - 3 miles S. from
169° 30' 0" W
169° 30' 0" W

HEIGHT OF WFO: 10000 ft

TYPE OF OBSERVATION:

Hgt. of cloud base: 10000 ft
End time of obs: 1630
visibility: 3 miles S. from

REMARKS:

No birds observed

CLOUD TOP HEIGHT: 10000

CLOUD BASE HEIGHT: 10000

OSHA 31001 REFERENCE 1 -

210000

	<u>PERIOD:</u>	<u>DATE:</u>
	12/1/77	12/1/77
	12/1	12/1

Spencer 1000 - 100

SITE: 110 - 110000 - 110000
 110 110 110 110
 110 110 110 110
 Site elevation: 110 feet level

HEIGHT OF POINT: 110

TYPE OF MONITORING EQUIPMENT:
 Surface 110 110 110
 on 110 110 110

SIGNATURE: JACOBSON
DATE: 12/1/77

RESULTS:

Only alpha count monitor provided from this deflection. Surface alpha monitor was conducted throughout the area on D and D+1 day with PAC-PC gas-flow proportional alpha counter. 20 counts were taken in counts per minute, corrected for the pulse area, and multiplied by the appropriate shielding factors to compensate for the response of the surface monitor. The 140 line concentration lines shown are the most significant ones, since 3,000 $\mu\text{g}/\text{m}^3$ is the chronic hazard limit and any concentration in excess of 1,000 $\mu\text{g}/\text{m}^3$ requires decontamination. It is interesting to note that in the majority of cases the alpha concentrations in the downwind area were higher on D+1 than on D day.

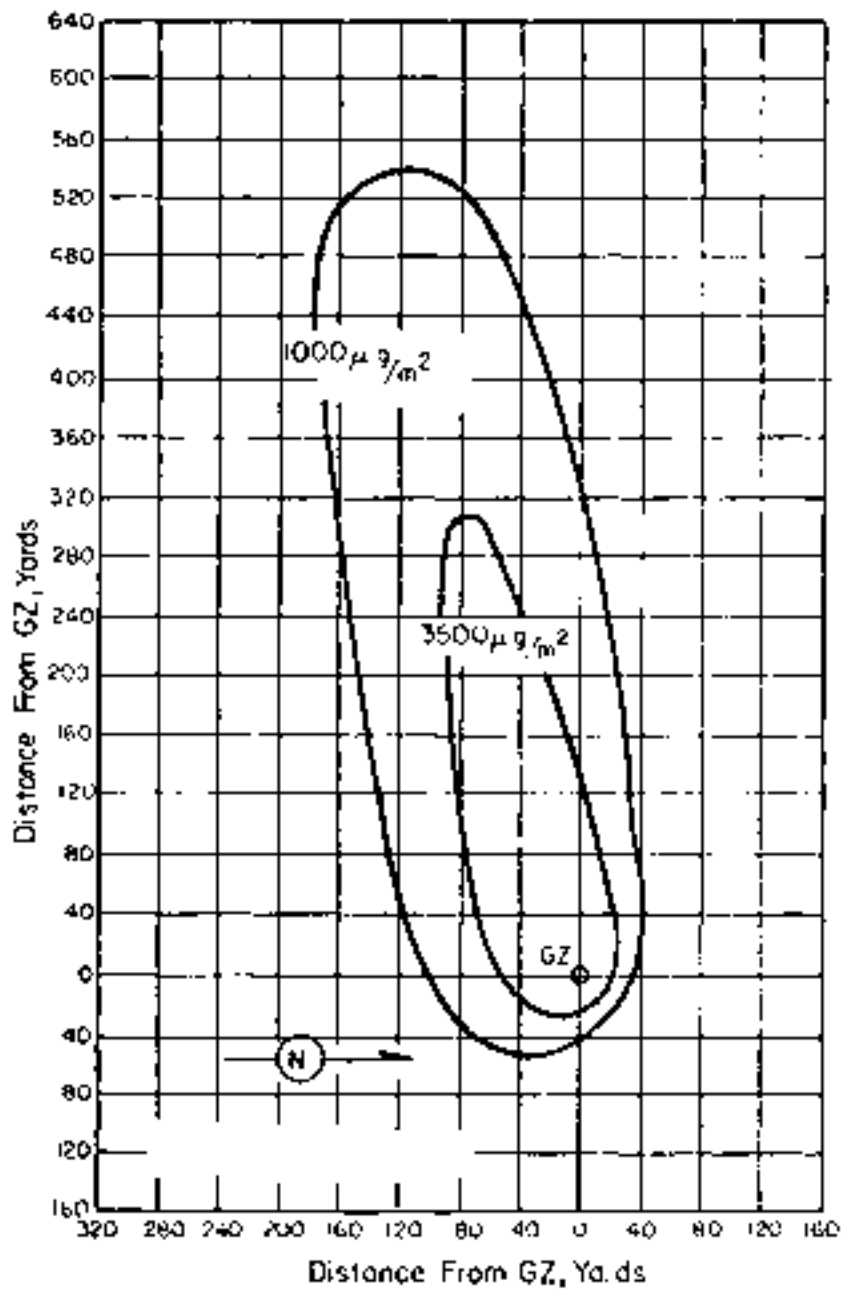


Figure 175. Operation HARDTACK I - Quincy.
Alpha contamination in micrograms per square meter.

TABLE 65 QUANTITY VIBE DATA FOR OPERATING SHIPWAKE 1 -

107102

Altitude (Miles)	Phase	
	Dir	Amplitude
Feet	degrees	ft/s
Surface	000	13
201	070	14
400	070	14
600	070	16
801	040	17

NOTE: Used data furnished by the ship's log and other sources.

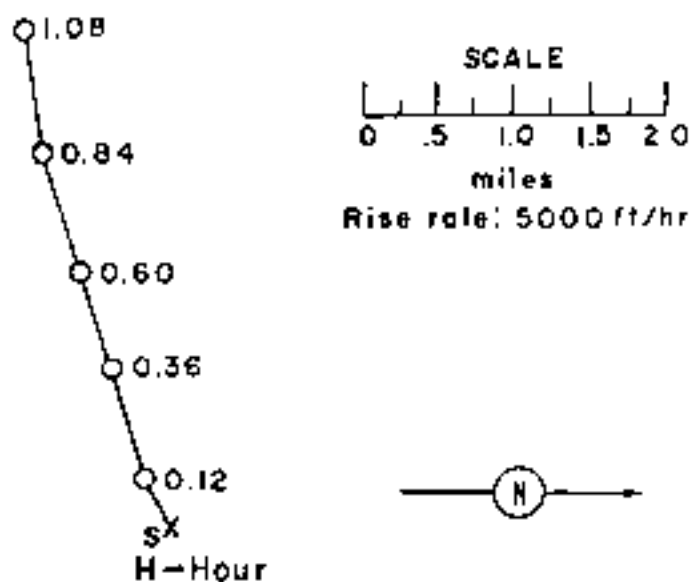


Figure 176. Hodograph for Operating SHIPWAKE 1 -

107102

OPERATION BARBERS 1 -

Oper. No.

	<u>REG TIME</u>	<u>OFF</u>
<u>DATE</u>	11/11/58	11/11/58
<u>TIME</u>	1:00	1:00

Sponsor: 100

DATE 11/11/58
TIME 1:00
OFF 1:00

REGISTRATION

REGISTRATION
 Regular 100
 Regular 100
 Regular 100

DATE 11/11/58
TIME 1:00

REGISTRATION

OPERATION MANUAL 2 -

Fig.

$$\frac{D_{\text{ACT}}}{D_{\text{CAL}}} = \frac{112 \text{ DPM}}{27 \text{ DPM}} = \frac{4.15 \text{ DPM}}{1.00 \text{ DPM}}$$

By use of $^{137}\text{Cs} = 100$:

$$\frac{D_{\text{ACT}}}{D_{\text{CAL}}} = 112 = 100 \left(\frac{1 - e^{-\lambda t}}{1 - e^{-\lambda t_0}} \right) =$$

$$\frac{1 - e^{-\lambda t}}{1 - e^{-\lambda t_0}} = 1.12$$

$$\frac{1 - e^{-\lambda t}}{1 - e^{-\lambda t_0}} = 1.12$$

Site elevation is 100 feet

$$\frac{D_{\text{ACT}}}{D_{\text{CAL}}} = 1.12 \text{ DPM} = 1.12 \text{ DPM}$$

$$\frac{D_{\text{ACT}}}{D_{\text{CAL}}} = \frac{112 \text{ DPM}}{100 \text{ DPM}} = 1.12 \text{ DPM}$$

$$\frac{D_{\text{ACT}}}{D_{\text{CAL}}} = \frac{112 \text{ DPM}}{100 \text{ DPM}} = 1.12 \text{ DPM}$$

REMARKS:

The decay-rate patterns were obtained by ground survey readings made by scientific personnel. Actual decay measurements were used to correct the decay-rate readings to 100 hours. The pattern of the pattern on the island is reliable. This pattern, which is over water is also reliable because it was not based upon free-field x-ray-rate readings but upon calculations made from readings taken on five lures and from samples collected in sticky pads mounted on 25 lures.

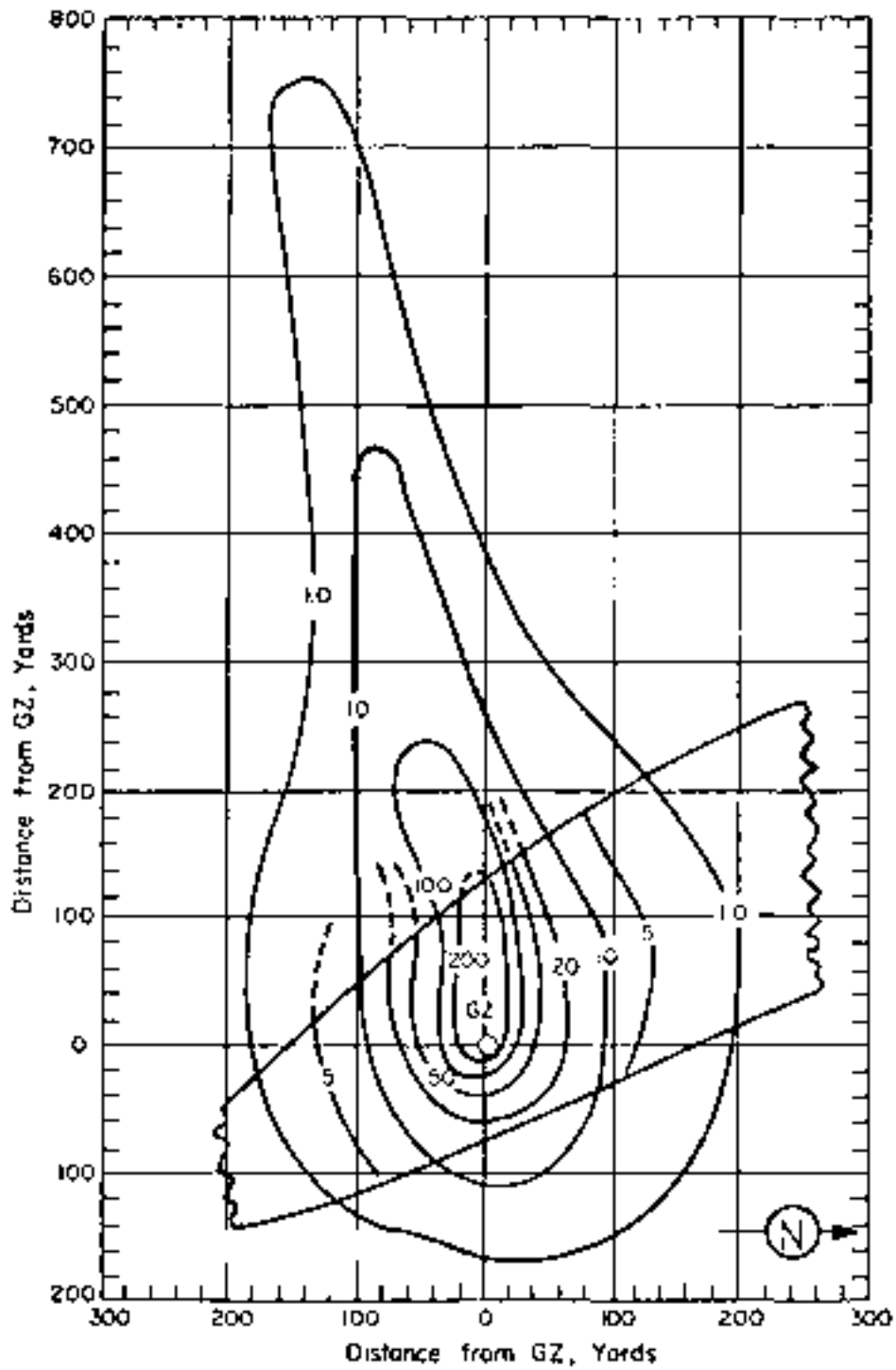


Figure 177. Operation HARTACK I - Fig.
On-site dose rate contours in r/hr at H+1 hour.

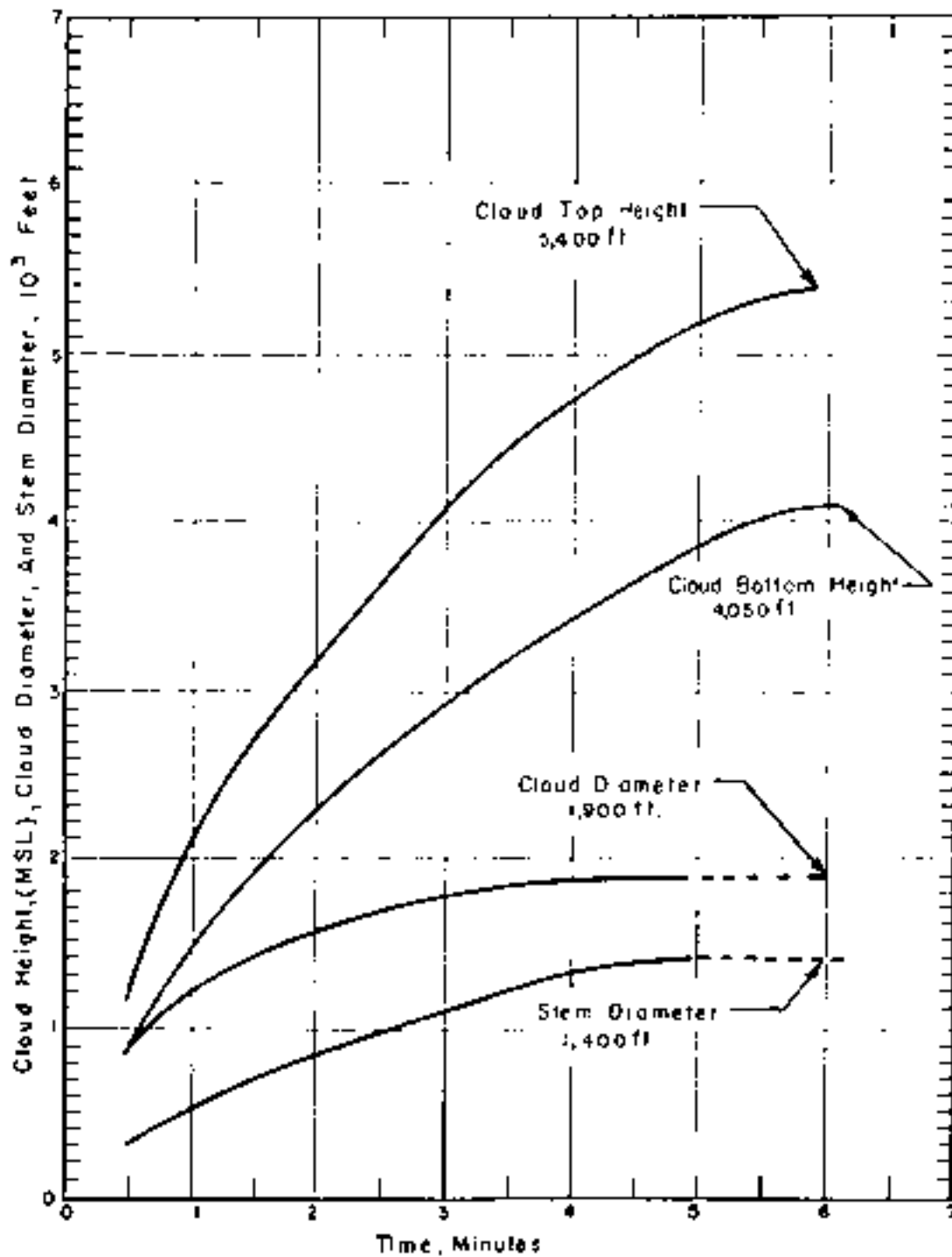


Figure 178. Cloud Dimensions: Operation BARZACK 1 -

Fig.

TABLE 66. EMBROOK WIND DATA FOR OPERATION SANDWICH I -

FIG.

Altitude Range (MSL)	Direction	
	Dir.	Speed
feet	degrees	mph.
0 - 1,000	080	17
1,000 - 2,000	090	19
2,000 - 3,000	100	16
3,000 - 4,000	110	19
4,000 - 5,000	100	18
5,000 - 6,000	100	18
6,000 - 7,000	090	18
7,000 - 8,000	090	21
8,000 - 9,000	090	21
9,000 - 10,000	080	21

- NOTES: 1. Wind data was obtained by the weather stations on Yvonne Island (Kauvotok Atoll) which were located 1,000 yds and 1,500 yds from G7.
2. The surface air pressure was 10.62 psi, the temperature 30°C, the dew point 18° F, and the relative humidity 77%.

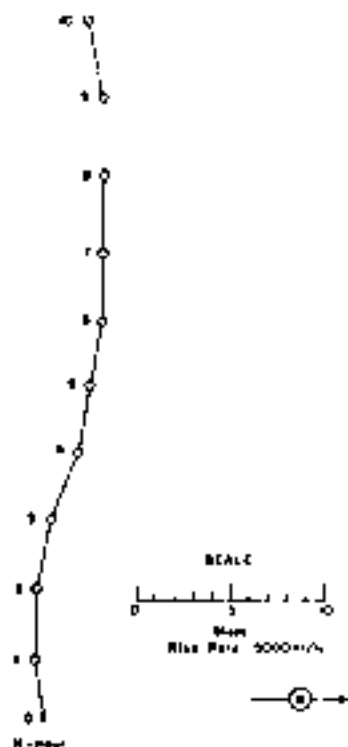


Figure 179. Hodograph for Operation SANDWICH I -

Fig.

OBSERVATION REPORT -

ARGUS I

	<u>Local Time</u>	<u>GMT</u>
<u>DATE:</u>	27 Aug 1953	01 Aug 1953
<u>TIME:</u>	0000	0000

Speed: 100

DIR: 000° A
 000° E
 000° W

TOTAL WEIGHT: 1-0 kt estimated

HEIGHT OF BURST: ~ 300 miles

EXPLOSION DATA:

Time to max brightness: 02
 Time to last maximum: 03
 Radius at last maximum: 03

TYPE OF BURST AND REASON:
 High altitude burst

CLOUD COVER BEFORE: 00
CLOUD COVER AFTER: 00

REMARKS:

No fallout.

OPERATION ARGUS -

ARGUS II

	<u>Local Time</u>	<u>GMT</u>
<u>DATE:</u>	21 Aug 1953	01 Aug 1953
<u>TIME:</u>	0300	0315

TOTAL TIME: 1-2 hr estimated

PLANNED DATA:

Time to set instruments: 10'
Time to find bearings: 10'
Reading out of instruments: 10'

CLOCK FOR MEASUREMENTS: 10'
CLOCK FOR TIME RECORDS: 10'

REMARKS: No radio

Specimen: 101

SITE: 3 miles W of base
47° 21' N
170° 41' W

HEIGHT OF SITE: - 300 miles

TYPE OF SURFACE OBSERVATIONS:
High water level

OPERATION ARGUS -

ARGUS 111

	<u>Local Time</u>	<u>GMT</u>
<u>DATE:</u>	6 May 64	6 May 1964
<u>TIME:</u>	0.13	0013

TOTAL YIELD: 1-2 kr estimated

FIREBALL DATA:

Time to 1st measurement 03
Time to 2nd measurement 03
Radius at 1st measurement 03

REMARKS: N. call 1st

Spencer: 100

SITE: South Atlantic
49° 50' S
10° 24' W

HORIZON TO 1ST MEAS: ~ 500 miles

TYPE OF STATION AND PLACEMENT:
High altitude observatory

CLOUD OR OBSCURED: 01

CLOUD COVER OR OBSCURED: 03

OPERATION DOMINIC -

Aztec

DATE: LOCAL GMT
 25 Apr 1962 25 Apr 1962
TIME: 0545 1945

SPONSOR: LAGL

SITE: Christmas Island, GZ-10

SITE ELEVATION: Sea level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (free fall), over
Pacific Ocean

OPERATION DOMINIC -

Aztec

DATE: LOCAL GMT
 27 Apr 1962 27 Apr 1962
TIME: 0601 1601

SPONSOR: LAGL

SITE: Christmas Island, GZ-10

SITE ELEVATION: Sea level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (free fall), over Pacific
Ocean

OPERATION DOMINIC -

Arkansas

DATE: LOCAL GMT
 2 May 1962 2 May 1962
TIME: 0801 1801

SPONSOR: LAGL

SITE: Christmas Island, GZ-15

SITE ELEVATION: Sea level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC - Quaker

DATE: LOCT GMT
4 May 1962 4 May 1962
TIME: 0900 1900

SPONSOR: LAGL

SITE: Christmas Island, 02-15

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (free fall), over
Pacific Ocean

OPERATION DOMINIC - Frigate
Bird

DATE: LOCT GMT
6 May 1962 6 May 1962
TIME: 1300 2300

SPONSOR: LRL

SITE: Johnston Island danger area
4° 50' N
169° 49' W

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air, from Polaris missile

OPERATION DOMINIC - Yoken

DATE: LOCT GMT
8 May 1962 8 May 1962
TIME: 0800 1800

SPONSOR: LRL

SITE: Christmas Island, 02-10

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC - Mesilla

LOST
DATE: 9 May 1962
TIME: 0704

GMT
DATE: 9 May 1962
TIME: 1704

SPONSOR: LRL
SITE: Christmas Island, GZ-10
SITE ELEVATION: Sea Level
HEIGHT OF BURST:
TYPE OF BURST AND PLACEMENT:
Air (free fall), over
Pacific Ocean

OPERATION DOMINIC - Meskegon

LOST
DATE: 11 May 1962
TIME: 0537

GMT
DATE: 11 May 1962
TIME: 1537

SPONSOR: LRL
SITE: Christmas Island, GZ-10
SITE ELEVATION: Sea Level
HEIGHT OF BURST:
TYPE OF BURST AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC - Sword
Fish

EST
DATE: 11 May 1962
TIME: 1202

GMT
DATE: 11 May 1962
TIME: 2002

SPONSOR: ESO
SITE: ~400 miles west of San Diego
31° 14.7' ± 0.3' N
124° 13.3' ± 0.3' W
SITE ELEVATION: Sea Level
DEPTH OF BURST:
WATER DEPTH: 17,100 ft
TYPE OF BURST AND PLACEMENT:
Underwater, from anti-
submarine rocket

REMARKS:

Figure 18c illustrates the growth and movement of the pool of radioactivity resulting from the Sword Fish test. The contours from 0-day to 104 days represent readings in $\mu\text{R/hr}$ at 500 feet above the water surface.

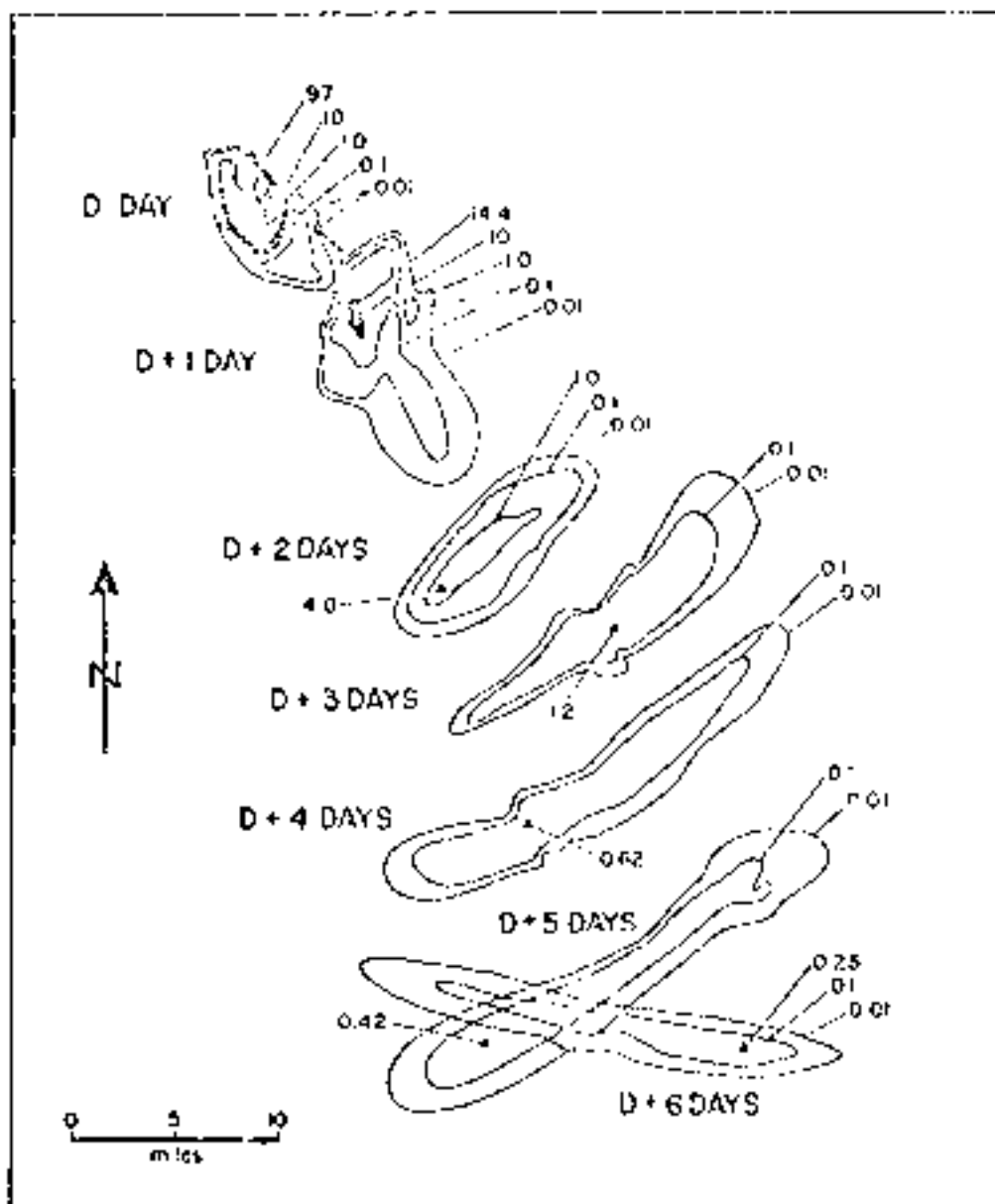


Figure 180 OPERATION DOMINIC - Sword Fish contours showing growth and movement of the pool of radioactivity from D-day to D+6 days. Contour values in mR/hr at the survey aircraft height of 500 feet

OPERATION DOMINIC - Tacno

DATE: 12 May 1962 12 May 1962
TIME: 0402 1702

SPONSOR: LRS.

SITE: Christmas Island, 62-12

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:

Air (free fall) over
Pacific Ocean

OPERATION DOMINIC - Swanee

DATE: 14 May 1962 14 May 1962
TIME: 0521 1521

SPONSOR: LRL

SITE: Christmas Island, 62-10

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:

Air (parachute drop),
over Pacific Ocean

OPERATION DOMINIC - Checco

DATE: 19 May 1962 19 May 1962
TIME: 0536 1536

SPONSOR: LRL

SITE: Christmas Island, 62-10

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:

Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC - Vanuatu

DATE: 1962 GM1
28 May 1962 28 May 1962
TIME: 0600 1608

SPONSOR: LAL

SITE: Christmas Island, GZ-13

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:

Air (parachute) deep over
Pacific Ocean

OPERATION DOMINIC - Vanuatu

DATE: 1962 GM1
27 May 1962 27 May 1962
TIME: 0702 1702

SPONSOR: LAL

SITE: Christmas Island, GZ-10

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:

Air (free fall), over
Pacific Ocean

OPERATION DOMINIC - Vanuatu

DATE: 1962 GM1
8 Jun 1962 8 Jun 1962
TIME: 0702 1702

SPONSOR: LAL

SITE: Christmas Island, GZ-15

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:

Air (free fall), over
Pacific Ocean

OPERATION DOMINIC - Truckee

DATE: LOST GMT
9 Jun 1962 9 Jun 1962
TIME: 0537 1537

SPONSOR: USA

SITE: Christmas Island, GZ-10

SITE ELEVATION: Sea level

HEIGHT OF LOST:

TYPE OF WEAPON AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC - Yeso

DATE: LOST GMT
10 Jun 1962 10 Jun 1962
TIME: 0601 1601

SPONSOR: USA

SITE: Christmas Island, GZ-20

SITE ELEVATION: Sea level

HEIGHT OF LOST:

TYPE OF WEAPON AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC - Harlem

DATE: LOST GMT
12 Jun 1962 12 Jun 1962
TIME: 0537 1537

SPONSOR: USA

SITE: Christmas Island, GZ-17

SITE ELEVATION: Sea level

HEIGHT OF LOST:

TYPE OF WEAPON AND PLACEMENT:
Air (parachute drop) over
Pacific Ocean

OPERATION DOMINIC - Rincisanda

LOCT GMT
DATE: 15 Jun 1962 15 Jun 1962
TIME: 0600 1600

SPONSOR: LANT

SITE: Christmas Island, GZ-17

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (free fall), over
Pacific Ocean

OPERATION DOMINIC - Duleo

LOCT GMT
DATE: 17 Jun 1962 17 Jun 1962
TIME: 0600 1600

SPONSOR: LANT

SITE: Christmas Island, GZ-17

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (free fall), over
Pacific Ocean

OPERATION DOMINIC - Fetti

LOCT GMT
DATE: 19 Jun 1962 19 Jun 1962
TIME: 0501 1501

SPONSOR: LANT

SITE: Christmas Island, GZ-17

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

ORGANISM: POXIVIRUS -

Gladi

DATE: 27 Jan 1967 GMT
TIME: 0700 1700

SPECIES: 1331

SITE: Christmas Island, GZ-10

SITE ELEVATION: Sea level

HEIGHT OF PLANT:

TYPE OF PLANT AND PLACEMENT:
Air (tree fall), over
Pacific Ocean

ORGANISM: POXIVIRUS -

Hiborn

DATE: 27 Jan 1967 GMT
TIME: 0513 1519

SPECIES: 1331

SITE: Christmas Island, GZ-10

SITE ELEVATION: Sea level

HEIGHT OF PLANT:

TYPE OF PLANT AND PLACEMENT:
Air (tree fall, log), over
Pacific Ocean

ORGANISM: POXIVIRUS -

Bluestone

DATE: 30 Jan 1967 GMT
TIME: 0721 1301

SPECIES: 1331

SITE: Christmas Island, GZ-10

SITE ELEVATION: Sea level

HEIGHT OF PLANT:

TYPE OF PLANT AND PLACEMENT:
Air (pole with log), over
Pacific Ocean

OPERATION DOMINIC - Star Fish Prime

LOCF GNT
DATE: 8 Jul 1962 7 Jul 1962
TIME: 2200 0900

TOTAL_YIELD: 1.4 Mt

SPOONER: 100

SITE: Johnston Island
16° 20' 00.42" N
169° 37' 45.27" W

SITE ELEVATION: Sea Level

HEIGHT OF ROCKET: 240 miles

TYPE OF BURST AND PLACEMENT:
High altitude, free ther-
mostatic

REMARKS:

This event was conducted as a part of the Fish Bowl Series.

OPERATION DOMINIC - Sunset

LOCF GNT
DATE: 10 Jul 1962 10 Jul 1962
TIME: 0633 1633

SPOONER: LAST

SITE: Christmas Island, GZ-17

SITE ELEVATION: Sea Level

HEIGHT OF ROCKET:

TYPE OF BURST AND PLACEMENT:
Air (free fall), over
Pacific Ocean

OPERATION DOMINIC -

Pacific

	<u>LOCT</u>	<u>GMT</u>
<u>DATE:</u>	15 Oct 1962	11 Oct 1962
<u>TIME:</u>	0537	1537

SPONSOR: USLSITE: Christmas Island, 02-25SITE ELEVATION: Sea levelHEIGHT OF MAST:

TYPE OF WIND AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC - Androscoquin

	<u>LOCT</u>	<u>GMT</u>
<u>DATE:</u>	2 Oct 1962	2 Oct 1962
<u>TIME:</u>	0517	1617

SPONSOR: USL

SITE: Johnston Island
13° 28.5' S
172° 11.1' W

SITE ELEVATION: Sea levelHEIGHT OF MAST:

TYPE OF WIND AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC - Bumping

	<u>LOCT</u>	<u>GMT</u>
<u>DATE:</u>	6 Oct 1962	6 Oct 1962
<u>TIME:</u>	0502	1602

SPONSOR: USL

SITE: Johnston Island
14° 30' S
168° 15' W

SITE ELEVATION: Sea levelHEIGHT OF MAST:

TYPE OF WIND AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OPERATION DOMINIC -

Class

LOGG GMT
DATE: 18 Oct 1962 18 Oct 1962
TIME: 0501 1601

SPONSOR: LANS

SITE: Johnston Island
14° 32' N
169° 44.7' W

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (free fall), over Pacific
Ocean

OPERATION DOMINIC - Check Mate

LOGG GMT
DATE: 19 Oct 1962 20 Oct 1962
TIME: 2130 0830

SPONSOR: DOD

SITE: Johnston Island
16° 04' 20.57" N
169° 36' 35.95" W

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
High Altitude, from XM-23
Stryd (Sergeant) missile

REMARKS:

This event was conducted as a part of the Fish Bowl Series.

OPERATION DOMINIC - Blue Gill Triple Prime

DATE: TIME:
 LOCAL GMT
25 Oct 1962 26 Oct 1962
2259 0939

SPONSOR: DOD

SITE: Johnston Island
16° 24' 52.83" N
169° 46' 11.15" W

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
High altitude, local horizon

REMARKS:

This event was conducted as part of the List 6001 Series.

OPERATION DOMINIC - Calamity

DATE: TIME:
 LOCAL GMT
27 Oct 1962 27 Oct 1962
0446 1546

SPONSOR: DOD

SITE: Johnston Island
14° 31.1' N
168° 15.6' W

SITE ELEVATION: Sea Level

HEIGHT OF BURST:

TYPE OF BURST AND PLACEMENT:
Air (parachute drop), over
Pacific Ocean

OFFSHORE DOMAINS - Housatonic

DATE: 1962 GMT
30 Oct 1962 30 Oct 1962
TIME: 0501 1601

SPEAKER: GRL

SITE: Johnston Island
13° 25.8' N
173° 12' W

SITE ELEVATION: Sea level

HEIGHT OF BUOY:

TYPE OF WIND AND PLACEMENT:
Air Gunshots - Drop over
Pacific Ocean

OFFSHORE DOMAINS - King Fish

DATE: 1962 GMT
1 Nov 1962 1 Nov 1962
TIME: 0110 1210

SPEAKER: BOB

SITE: Johnston Island
36° 01' 48.61" N
169° 45' 56.62" W

SITE ELEVATION: Sea level

HEIGHT OF BUOY:

TYPE OF WIND AND PLACEMENT:
High altitude, from Thor
missile

REMARKS:

This event was conducted as a part of the Fish Bowl Series.

OPERATION: DOMESTIC - Tight Rope

	<u>LAST</u>	<u>GMT</u>
<u>DATE:</u>	3 Nov 1962	4 Nov 1962
<u>TIME:</u>	2030	0730

SPONSOR: 1603

SITE: Johnson Island
16° 42' 25.72" N
169° 32' 52.66" W

SLURF ELEVATION: 1.5 - Low J

HEIGHT OF SLURF:

TYPE OF TEST AND PLACEMENT:
Fig's addition, from other
Paradea inside

REMARKS:

This event was conducted as a part of the 1st. Bond Series.

APPENDIX A

Announced United States Nuclear Detonations

Yields are listed as: Low (less than 20 kt)
Intermediate (20 to 999 kt inclusive)
Low Megaton (one to several megatons).

Prior to October 1958, testing was conducted on an intermittent basis and each series of tests was designated by a series name, such as OPERATION CROSSROADS. The United States conducted no tests from October 30, 1958 to September 1961. After resumption of testing, tests were conducted year around and were listed by fiscal year. For example, all NTS tests during FY-1962, which ended June 30, 1962, were in the OPERATION NOUGAT series except for four surface tests (Little Feller 1 and 11, Small Boy and Johnny Boy) designated DOMINIC 11, which were a continuation of the DOMINIC I series conducted in the Pacific.

ANNOUNCED UNITED STATES NUCLEAR DEMONSTRATIONS

EVENT NAME	DATE(S)	LOCATION	TYPE	PURPOSE	FIELD RANGE
TRINITY FIRST TEST OF AN A-BOMB	07/16/45	ALAMOGORDO	TOWER	WEAPONS RELATED	19KT
WORLD WAR II FIRST COMBAT USE-HIROSHIMA	08/05/45	JAPAN	AIROROP	COMBAT	13 KT
WORLD WAR II SECOND COMBAT USE-NAGASAKI	08/09/45	JAPAN	AIROROP	COMBAT	23 KT
OPERATION CROSSROADS					
ABLE	06/30/46	ENIETOK	AIROROP	WEAPONS RELATED	23 KT
BAKER	07/24/46	BIKINI	UN	WEAPONS RELATED	23 KT
OPERATION SANDSTONE					
K-RAV	04/16/48	ENIETOK	TOWER	WEAPONS RELATED	37KT
YOKE	04/30/48	ENIETOK	TOWER	WEAPONS RELATED	49KT
ZEBRA	05/14/48	ENIETOK	TOWER	WEAPONS RELATED	18KT
OPERATION RANGER					
ABLE	01/27/51	NTS	AIROROP	WEAPONS RELATED	4KT
BARBARA	01/28/51	NTS	AIROROP	WEAPONS RELATED	8KT
EASY	02/01/51	NTS	AIROROP	WEAPONS RELATED	1KT
BAKER-2	02/02/51	NTS	AIROROP	WEAPONS RELATED	8KT
FOX	02/06/51	NTS	AIROROP	WEAPONS RELATED	22KT
OPERATION GREENHOUSE					
DOG	04/07/51	ENIETOK	TOWER	WEAPONS RELATED	
EASY	04/20/51	ENIETOK	TOWER	WEAPONS RELATED	47KT
GEORGE	04/08/51	ENIETOK	TOWER	WEAPONS RELATED	
ITEM	05/24/51	ENIETOK	TOWER	WEAPONS RELATED	
OPERATION BUSTER-JANGLE					
ABLE	10/22/51	NTS	TOWER	WEAPONS RELATED	LESS THAN 0.1KT
BAKER	10/28/51	NTS	AIROROP	WEAPONS RELATED	3-5KT
CHARLIE	10/30/51	NTS	AIROROP	WEAPONS RELATED	14KT
DOG	11/01/51	HTS	AIROROP	WEAPONS RELATED	21KT
EASY	11/05/51	NTS	AIROROP	WEAPONS RELATED	31KT
SUGAR	11/19/51	NTS	SURFACE	WEAPONS RELATED	1.2KT

ANNOUNCED UNITED STATES NUCLEAR DETONATIONS

EVENT NAME	DATE (GMT)	LOCATION	TYPE	PURPOSE	YIELD RANGE
UNCLE	11/29/51	MTS	CRATER	WEAPONS RELATED	1.2KT
		OPERATION TUMBLER-SUPPER			
ABLE	04/01/52	MTS	AIRDROP	WEAPONS RELATED	1KT
BAKER	04/15/52	MTS	AIRDROP	WEAPONS RELATED	1KT
CHARLIE	04/22/52	MTS	AIRDROP	WEAPONS RELATED	31KT
DOG	05/01/52	MTS	AIRDROP	WEAPONS RELATED	19KT
EASY	05/07/52	MTS	TOWER	WEAPONS RELATED	12KT
FOX	05/25/52	MTS	TOWER	WEAPONS RELATED	11KT
GEORGE	06/01/52	MTS	TOWER	WEAPONS RELATED	15KT
HOW	06/05/52	MTS	TOWER	WEAPONS RELATED	14KT
		OPERATION LYY			
NICK	10/31/52	FRAGMENT	SURFACE	WEAPONS RELATED	10.4MT
		EXPERIMENTAL THERMONUCLEAR DEVICE			
KING	11/15/52	EMITTER	AIRDROP	WEAPONS RELATED	500 KT
		OPERATION UPSHOT-INTEHOLI			
ANNIE	03/17/53	MTS	TOWER	WEAPONS RELATED	15KT
NANCY	03/24/53	MTS	TOWER	WEAPONS RELATED	24KT
RUFH	03/31/53	MTS	TOWER	WEAPONS RELATED	0.2KT
DIXIE	04/06/53	MTS	AIRDROP	WEAPONS RELATED	11KT
RAY	04/11/53	MTS	TOWER	WEAPONS RELATED	0.2KT
BADGER	04/16/53	MTS	TOWER	WEAPONS RELATED	23KT
SIMON	04/25/53	MTS	TOWER	WEAPONS RELATED	43KT
ENDORE	05/06/53	MTS	AIRDROP	WEAPONS RELATED	27KT
MERRY	05/19/53	MTS	TOWER	WEAPONS RELATED	32KT
GRABLE	05/25/53	MTS	GUN	WEAPONS RELATED	15KT
		FIRE FROM 200MM GUN			
CLANK	06/04/53	MTS	AIRDROP	WEAPONS RELATED	61KT
		OPERATION CASTLE			
BRAND	02/28/54	BIRKING	SURFACE	WEAPONS RELATED	15MT
		EXPERIMENTAL THERMONUCLEAR DEVICE			

ANNOUNCED UNITED STATES NUCLEAR DETONATIONS

EVENT NAME	DATE (GMT)	LOCATION	TYPE	PURPOSE	YIELD RANGE
ROMEO	03/26/54	BIKINI	BARGE	WEAPONS RELATED	11 MT
XOOM	04/06/54	BIKINI	SURFACE	WEAPONS RELATED	113 KT
OMEDM	04/25/54	BIKINI	BARGE	WEAPONS RELATED	6.9 MT
YANKEE	05/04/54	BIKINI	BARGE	WEAPONS RELATED	13.5 MT
MCCTAG	05/13/54	ENIWETO	BARGE	WEAPONS RELATED	1.69 MT
		OPERATION TEAPOT			
WASP	02/18/55	NTS	AIRDROP	WEAPONS RELATED	1KT
WOTM	02/22/55	NTS	TOWER	WEAPONS RELATED	2KT
TESLA	03/03/55	NTS	TOWER	WEAPONS RELATED	7KT
TURK	03/07/55	NTS	TOWER	WEAPONS RELATED	43KT
HORNET	03/12/55	NTS	TOWER	WEAPONS RELATED	4KT
SOC	03/22/55	NTS	TOWER	WEAPONS RELATED	6KT
F55	03/23/55	NTS	CENTER	WEAPONS RELATED	1KT
APPLE-1	03/29/55	NTS	TOWER	WEAPONS RELATED	14KT
WASP PRIME	03/29/55	NTS	AIRDROP	WEAPONS RELATED	3KT
HA	04/06/55	NTS	AIRDROP	WEAPONS RELATED	3KT
POST	04/09/55	NTS	TOWER	WEAPONS RELATED	2MT
NET	04/15/55	NTS	TOWER	WEAPONS RELATED	27KT
APPLE-2	05/05/55	NTS	TOWER	WEAPONS RELATED	29KT
ZUCCHINI	05/19/55	NTS	TOWER	WEAPONS RELATED	28KT
		OPERATION NEOMAH			
WIGWAG	05/14/55		UN	WEAPONS RELATED	30KT
		OPERATION HILMING			
MACROSSE	05/04/56	ENIWETO	SURFACE	WEAPONS RELATED	40 MT
CHEMURKEE	05/20/56	BIKINI	AIRDROP	WEAPONS RELATED	SEVERAL MT
		FIRST AIR DROP BY U.S. OF A THERMONUCLEAR WEAPON			
JUNE	05/27/56	BIKINI	SURFACE	WEAPONS RELATED	3.5 MI
YONK	05/27/56	ENIWETO		WEAPONS RELATED	

ANNOUNCED UNITED STATES NUCLEAR DEMONSTRATIONS

EVENT NAME	DATE (GMT)	LOCATION	TYPE	PURPOSE	YIELD RANGE
ERIE	05/30/56	ENINETOK	TOWER	WEAPONS RELATED	
SEMIWOLE	06/06/56	ENINETOK	SURFACE	WEAPONS RELATED	
FLASHHEAD	06/11/56	BIXINI	BARGE	WEAPONS RELATED	
BLACKFOOT	06/11/56	ENINETOK	TOWER	WEAPONS RELATED	
NICKLEPOD	06/13/56	ENINETOK		WEAPONS RELATED	
OSAGE	06/16/56	ENINETOK	AIRBARDP	WEAPONS RELATED	
INCA	06/21/56	ENINETOK		WEAPONS RELATED	
DANDY	06/25/56	BIXINI	BARGE	WEAPONS RELATED	
WOMANK	07/02/56	ENINETOK		WEAPONS RELATED	
APACHE	07/08/56	ENINETOK	BARGE	WEAPONS RELATED	
MAYBIRD	07/18/56	BIXINI	BARGE	WEAPONS RELATED	
VENA	07/20/56	BIXINI	BARGE	WEAPONS RELATED	5 MT
MURON	07/21/56	ENINETOK	BARGE	WEAPONS RELATED	
		OPERATION PLUS808			
BOLZMAN	05/28/51	NTS	TOWER	WEAPONS RELATED	12KT
FRANKLIN	06/02/51	NTS	TOWER	WEAPONS RELATED	140TONS
LASSEW	06/05/51	NTS	BALLOON	WEAPONS RELATED	0.5 PONS
MTLSON	06/16/51	NTS	BALLOON	WEAPONS RELATED	10KT
PRISCILLA	06/24/51	NTS	BALLOON	WEAPONS RELATED	17MT
MOOD	07/05/51	NTS	BALLOON	WEAPONS RELATED	14KT
STARLO	07/15/51	NTS	TOWER	WEAPONS RELATED	11KT
JOHN	07/19/51	NTS	ROCKET	WEAPONS RELATED	ABOUT 2KT
KEPLER	07/24/51	NTS	TOWER	WEAPONS RELATED	10KT
OWENS	07/25/51	NTS	BALLOON	WEAPONS RELATED	9.7KT
STOKES	08/07/51	NTS	BALLOON	WEAPONS RELATED	19KT
SMITH	08/18/51	NTS	TOWER	WEAPONS RELATED	17KT
DOPPLER	08/23/51	NTS	BALLOON	WEAPONS RELATED	11KT

ANNOUNCED UNITED STATES NUCLEAR DETONATIONS

EVENT NAME	DATE/TIME	LOCATION	TYPE	PURPOSE	RANGE
FRANKLIN PRIME	08/30/57	NIS	BALLOON	WEAPONS RELATED	4.7KT
SMORY	08/31/57	NIS	TOWER	WEAPONS RELATED	4.4KT
GALILEO	09/02/57	NIS	TOWER	WEAPONS RELATED	11KT
WHEELER	09/06/57	NIS	BALLOON	WEAPONS RELATED	197 TDNS
LAPLACE	09/08/57	NIS	BALLOON	WEAPONS RELATED	1KT
FIZELU	09/14/57	NIS	TOWER	WEAPONS RELATED	13KT
NEWTON	09/16/57	NTS	BALLOON	WEAPONS RELATED	12KT
RAINIER FIRST TUNNEL EMPLACEMENT	09/19/57	NTS	TUNNEL	WEAPONS RELATED	1.7KT
WHIKEY	09/23/57	NTS	TOWER	WEAPONS RELATED	19KT
CHARLESTON	09/24/57	NIS	BALLOON	WEAPONS RELATED	12KT
MORGAN	10/07/57	NTS	BALLOON	WEAPONS RELATED	5KT
YUCCA	04/26/58	12 DEGREES 37 MIN N-163 DEGREES 01 MIN E	BALLOON	WEAPONS RELATED	
SEPARATION KARDACK I					
CACTUS	05/05/58	ENIETOX	SURFACE	WEAPONS RELATED	1.0 KT
FIN	05/11/58	BEKIMI	BARGE	WEAPONS RELATED	
SUFFERNUT	05/11/58	ENIETOX	BARGE	WEAPONS RELATED	
WON	05/12/58	ENIETOX	SURFACE	WEAPONS RELATED	1.37 MT
MAHOO	05/16/58	ENIETOX	UM	WEAPONS RELATED	
HOLLY	05/20/58	ENIETOX	BARGE	WEAPONS RELATED	
NUTMEG	05/21/58	BEKIMI	BARGE	WEAPONS RELATED	
WILLOWWOOD	05/26/58	ENIETOX	BARGE	WEAPONS RELATED	
MAGNOLIA	05/26/58	ENIETOX	BARGE	WEAPONS RELATED	
ROBBERO	05/30/58	ENIETOX	BARGE	WEAPONS RELATED	
STANMORE	05/31/58	BEKIMI	BARGE	WEAPONS RELATED	
ROSE	06/02/58	ENIETOX	BARGE	WEAPONS RELATED	
UMBRELLA	06/08/58	ENIETOX	UM	WEAPONS RELATED	

ANNOUNCED UNITED STATES NUCLEAR DEMONSTRATIONS

EVENT NAME	DATE (GMT)	LOCATION	TYPE	PURPOSE	YIELD RANGE
MAPLE	06/10/50	BIKINI	BARGE	WEAPONS RELATED	
OSPEW	06/14/50	BIKINI	BARGE	WEAPONS RELATED	
MALMOY	06/14/50	ENINETOK	BARGE	WEAPONS RELATED	
LINDBY	06/18/50	CHIMEFOK	BARGE	WEAPONS RELATED	
REOMDOD	06/22/50	BIKINI	BARGE	WEAPONS RELATED	
CLDR	06/22/50	ENINETOK	BARGE	WEAPONS RELATED	
ONE	06/28/50	ENINETOK	BARGE	WEAPONS RELATED	8.9 MT
HICKORY	06/29/50	BIKINI	BARGE	WEAPONS RELATED	
SEQUOIA	07/01/50	ENINETOK	BARGE	WEAPONS RELATED	
CEDAR	07/02/50	BIKINI	BARGE	WEAPONS RELATED	
ODGWOOD	07/05/50	ENINETOK	BARGE	WEAPONS RELATED	
POPLAR	07/12/50	BIKINI	BARGE	WEAPONS RELATED	
PISOMIA	07/17/50	ENINETOK	BARGE	WEAPONS RELATED	
JUNIPER	07/22/50	BIKINI	BARGE	WEAPONS RELATED	
OLIVE	07/22/50	ENINETOK	BARGE	WEAPONS RELATED	
PINE	07/26/50	ENINETOK	BARGE	WEAPONS RELATED	
YFAR	08/01/50	JOHNSTON ISL AREA	ROCKET	WEAPONS RELATED	MEGATON RANGE
QUINCE	08/06/50	ENINETOK		WEAPONS RELATED	
ORANGE	08/12/50	JOHNSTON ISL AREA	ROCKET	WEAPONS RELATED	MEGATON RANGE
FIG	08/18/50	ENINETOK		WEAPONS RELATED	
ARGUS I	08/27/50	SOUTH ATLANTIC	ROCKET	WEAPONS RELATED	1-7KT
ARGUS II	08/30/50	SOUTH ATLANTIC	ROCKET	WEAPONS RELATED	1-2KT
ARGUS III	09/06/50	SOUTH ATLANTIC	ROCKET	WEAPONS RELATED	1-2KT
EDDY	09/19/50	MIS	BALLOON	WEAPONS RELATED	80 TONS

ANNOUNCED UNITED STATES NUCLEAR DETONATIONS

EVENT NAME	DATE (GCT)	LOCATION	TYPE	PURPOSE	YIELD RANGE
MORA	09/29/50	NTS	BALLOON	WEAPONS RELATED	2KT
TAMALPAIS SLIGHT VENTING	10/08/50	NTS	TUNNEL	WEAPONS RELATED	72 TONS
QUAY	10/10/50	NFS	TOWER	WEAPONS RELATED	79 TONS
LEA	10/13/50	NTS	BALLOON	WEAPONS RELATED	1.4KT
HAMILTON	10/15/50	NFS	TOWER	WEAPONS RELATED	1.2 TONS
LOGAN	10/16/50	NFS	TUNNEL	WEAPONS RELATED	5KT
DOMA ANA	10/16/50	NTS	BALLOON	WEAPONS RELATED	17 TONS
RIO ARRIBA	10/16/50	NFS	TOWER	WEAPONS RELATED	90 TONS
SOCORRO	10/22/50	NFS	BALLOON	WEAPONS RELATED	5KT
MRAUGEL	10/22/50	NFS	BALLOON	WEAPONS RELATED	115 TONS
RUSHMORE	10/22/50	NTS	BALLOON	WEAPONS RELATED	100 TONS
SAHFDRO	10/26/50	NTS	BALLOON	WEAPONS RELATED	4.9KT
DE BACA	10/26/50	NFS	BALLOON	WEAPONS RELATED	2.2KT
EVANS VENTING	10/29/50	NFS	TUNNEL	WEAPONS RELATED	55 TONS
HIMBOLOT	10/29/50	NTS	TOWER	WEAPONS RELATED	7.8 TONS
SANTA FE	10/30/50	NTS	BALLOON	WEAPONS RELATED	1.3KT
BLANCA SLIGHT VENTING	10/30/50	NTS	TUNNEL	WEAPONS RELATED	39KT
OPERATION WOGAT					
AMLER	09/15/61	NFS	TUNNEL	WEAPONS RELATED	2.4KT
SHREK LOW YIELD MEANS LESS THAN 20KT	09/16/61	NFS	SHAFT	WEAPONS RELATED	LOW
CHENA	10/18/61	NFS	TUNNEL	WEAPONS RELATED	LOW
HINK	10/29/61	NFS	SHAFT	WEAPONS RELATED	LOW
FISHER	12/03/61	NFS	SHAFT	WEAPONS RELATED	13.5KT
GNOME MULTIPLE-PURPOSE EXPERIMENT IN SALT-FORMED CAVITY 160-170 FT. DIAMETER 60-80 FT. HIGH	12/10/61	CARLSBAD	SHAFT	PLONSHARE	3.1KT

ANNOUNCED UNITED STATES NUCLEAR DETONATIONS

EVENT NAME	DATE(TC)	LOCATION	TYPE	PURPOSE	YIELD RANGE
MAD	12/13/61	MTS	SHAFT	WEAPONS RELATED	0.4-KT
RINGTAIL	12/17/61	MTS	SHAFT	WEAPONS RELATED	LOW
FEATHER	12/22/61	MTS	TUNNEL	WEAPONS RELATED	LOW
STOAT	01/09/62	MTS	SHAFT	WEAPONS RELATED	4.5-KT
AGOUTI	01/10/62	MTS	SHAFT	WEAPONS RELATED	5.9-KT
DORMOUSE	01/30/62	MTS	SHAFT	WEAPONS RELATED	LOW
STILLWATER	02/09/62	MTS	SHAFT	WEAPONS RELATED	2.7-KT
ARMADILLO	02/09/62	MTS	SHAFT	WEAPONS RELATED	6.5-KT
WARDNA GRANITE	02/15/62	MTS	SHAFT	WEAPONS RELATED	5.9-KT
CHEMCHELLA	02/19/62	MTS	SHAFT	WEAPONS RELATED	1.6-KT
COOSAM	02/19/62	MTS	SHAFT	WEAPONS RELATED	LOW
CIMARRON	02/23/62	MTS	SHAFT	WEAPONS RELATED	11.2-KT
PLATYPUS	02/24/62	MTS	SHAFT	WEAPONS RELATED	LOW
PAMPAS	03/01/62	MTS	SHAFT	JOINT US-UK	LOW
DIMMY BOY CRATER DIAMETER 265 FT. DEPTH 66 FT. IN ORSALT	03/05/62	MTS	CRATER	WEAPONS RELATED	0.42-KT
EMTWE	03/06/62	MTS	SHAFT	WEAPONS RELATED	LOW
BRAZOS	03/08/62	MTS	SHAFT	WEAPONS RELATED	7.6-KT
HOGMOSE	03/15/62	MTS	SHAFT	WEAPONS RELATED	LOW
MOOSIC	03/28/62	MTS	SHAFT	WEAPONS RELATED	3-KT
CHEMCHELLA II	03/31/62	MTS	SHAFT	WEAPONS RELATED	LOW
DORMOUSE II	04/05/62	MTS	SHAFT	WEAPONS RELATED	10-KT
PISSAIC	04/06/62	MTS	SHAFT	WEAPONS RELATED	LOW
MUDSDM	04/12/62	MTS	SHAFT	WEAPONS RELATED	LOW
PLATTE	04/14/62	MTS	TUNNEL	WEAPONS RELATED	1.7-KT
DEFO	04/25/62	MTS	SHAFT	WEAPONS RELATED	LOW

ANNOUNCED UNITED STATES NUCLEAR DETONATIONS

EVENT NAME	DATE (GGT)	LOCATION	TYPE	PURPOSE	YIELD RANGE
1962 PACIFIC TESTS W/HE DESIGNATED (FATHOM COMPLEX)					
MOORE	04/25/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
INTERMEDIATE WEAPNS 20 TO 1000 KI					
AZTEC	04/27/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
BLACK	04/27/62	NTS	SHAFT	WEAPONS RELATED	LOW
ARANSAS	05/02/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	LOW MEGATON
QUESTA	05/04/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
FRIGATE BIRD	05/06/62	CHRISTMAS ISL AREA	MISSILE	WEAPONS RELATED	
HARBURD TH MISSILE LAUNCHED FROM POLARIS SUBMARINE					
PAGA	05/07/62	NTS	SHAFT	WEAPONS RELATED	LOW
YUKON	05/08/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
WESTLA	05/09/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
MUSKOGON	05/11/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
SWORDFISH	05/11/62	EASTERN PACIFIC	UM	WEAPONS RELATED	LOW
ANTISUBMARINE ROCKETS / AIRDROP SYSTEM PROOF TEST					
ENGINO	05/12/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
AIRDYARK	05/12/62	NTS	SHAFT	WEAPONS RELATED	SHORT
SWANEE	05/14/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
EEL	05/19/62	NTS	SHAFT	WEAPONS RELATED	LOW
CHETCO	05/19/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
WHITE	05/25/62	NTS	SHAFT	WEAPONS RELATED	LOW
TAMANA	05/28/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	LOW
WAMBE	05/27/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
PACCOON	06/01/62	NTS	SHAFT	WEAPONS RELATED	LOW
PACORAT	06/06/62	NTS	SHAFT	WEAPONS RELATED	LOW
ALWA	06/08/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
BRUCKEE	06/09/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
YUSO	06/10/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	LOW MEGATON
HARLEM	06/12/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE

ANNOUNCED UNITED STATES NUCLEAR DEMONSTRATIONS

EVENT NAME	DATE LOCAL	LOCATION	TYPE	PURPOSE	YIELD RANGE
DES MOINES	06/13/62	MTS	TUNNEL	WEAPONS RELATED	LOW
RINCÓNADO	06/15/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
DULCE	06/17/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
PELII	06/19/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	LOW
DANAN I	06/21/62	MTS	SHAFT	WEAPONS RELATED	LOW
OTOMI	06/22/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
NICHORN	06/27/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	MEGATON RANGE
MAYMARKER	06/27/62	MTS	SHAFT	WEAPONS RELATED	50KFT
MARSHMALLOW DDD EVENT	06/28/62	MTS	TUNNEL	WEAPONS RELATED	LOW
BLUESTONE	06/30/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	LOW MEGATON
SACRAMENTO	06/30/62	MTS	SHAFT	WEAPONS RELATED	LOW
SEDAN	07/06/62	MTS	CENTER	PLONSHARE	300KT
EXCAVATION EXPERIMENT-CRATER 1200 FT. DEEP 320 FT. DIAMETER-NUCLEAR DEV.					
LITTLE FELLER I SLIGHTLY ABOVE GROUND, DOMINIC II SERIES.	07/07/62	MTS	SURFACE	WEAPONS RELATED	LOW
STARFISH PRIME HIGH ALTITUDE 458 KM	07/09/62	JOHNSTON ISL AREA	ROCKET	WEAPONS RELATED	1.4 MEGATONS
SUNSET	07/10/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
PANLICO	07/11/62	CHRISTMAS ISL AREA	AIRDROP	WEAPONS RELATED	LOW MEGATON
JOHNNY BOY SLIGHTLY ABOVE GROUND, DOMINIC II SERIES.	07/11/62	MTS	SURFACE	WEAPONS RELATED	0.5
MERRIMAC	07/13/62	MTS	SHAFT	WEAPONS RELATED	LOW
SMALL BOY SLIGHTLY ABOVE GROUND, DOMINIC II SERIES.	07/15/62	MTS	SURFACE	WEAPONS RELATED	LOW
LITTLE FELLER II BROAD PARTICIPATION, SLIGHTLY ABOVE GROUND, DOMINIC II SERIES.	07/17/62	MTS	SURFACE	WEAPONS RELATED	LOW
WICKITA	07/27/62	MTS	SHAFT	WEAPONS RELATED	LOW
YORK	08/24/62	MTS	SHAFT	WEAPONS RELATED	LOW
ROBAC	08/24/62	MTS	SHAFT	WEAPONS RELATED	LOW

ANNOUNCED UNITED STATES NUCLEAR DETONATIONS

EVENT NAME	DATE/TIME	LOCATION	TYPE	PURPOSE	YIELD RANGE
HYDRA	09/14/62	MFS	SHIFT	WEAPONS RELATED	LOW
PEBA	09/20/62	MFS	SHIFT	WEAPONS RELATED	LOW
ALLEGHENY	09/29/62	MFS	SHIFT	WEAPONS RELATED	LOW
ANDROSOGGIM	10/02/62	JOHNSTON ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
MISSISSIPPI	10/05/62	MFS	SHIFT	WEAPONS RELATED	110 KT
BUMPING	10/06/62	JOHNSTON ISL AREA	AIRDROP	WEAPONS RELATED	LOW
ROANOKE	10/12/62	MFS	SHIFT	WEAPONS RELATED	LOW
CHARM	10/18/62	JOHNSTON ISL AREA	AIRDROP	WEAPONS RELATED	LOW MEGATON
WANDJICOPY	10/19/62	MFS	SHIFT	WEAPONS RELATED	LOW
CHECKMATE	10/20/62	JOHNSTON ISL AREA	ROCKET	WEAPONS RELATED	LOW
HIGH ALTITUDE - TENS OF KMS					
BLUEGILL 3PRIME	10/26/62	JOHNSTON ISL AREA	ROCKET	WEAPONS RELATED	SUBMEGATON
HIGH ALTITUDE - TENS OF KMS					
SANTEE	10/27/62	MFS	SHIFT	WEAPONS RELATED	LOW
CALAMITY	10/27/62	JOHNSTON ISL AREA	AIRDROP	WEAPONS RELATED	INTERMEDIATE
NOVATONIC	10/30/62	JOHNSTON ISL AREA	AIRDROP	WEAPONS RELATED	MEGATON RANGE
KINGFISH	11/01/62	JOHNSTON ISL AREA	ROCKET	WEAPONS RELATED	SUBMEGATON
HIGH ALTITUDE - TENS OF KMS					
TIGRORPE	11/04/62	JOHNSTON ISL AREA	ROCKET	WEAPONS RELATED	LOW
HIGH ALTITUDE - TENS OF KMS					
AMGOSTIN	11/27/62	MFS	SHIFT	WEAPONS RELATED	LOW
DEVICE DEVELOPMENT					
YFNDRAC	12/07/62	MFS	SHIFT	PLUMSHARE	LOW
WADISON	12/12/62	MFS	TUNNEL	WEAPONS RELATED	LOW
NUMBER	12/12/62	MFS	SHIFT	WEAPONS RELATED	LOW

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