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A Preliminary Report of [redacted] (Seminole)
ROP-99 21 July 1956
Issued as 5519-JFE

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OPERATION REDWING

A PRELIMINARY REPORT

OF

DELETED (SEMINOLE)

Submitted by Task Group 7.1

5519JFE

21 JULY 1956

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CONTENTS

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INTRODUCTION

This is a preliminary report, and therefore, does not give either complete or final results of the work of the various projects. No information on the construction of the device is included, in order that the classification may be kept to Secret Restricted Data.

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[redacted]

PART I

GENERAL INFORMATION

Observed Weather at Shot Time

Fig. O-1 - Eniwetok Atoll Map

Fig. O-2 - Bogon Island, Scientific Stations and Zero Point

Fig. O-3 - Pre-Shot Photo

Fig. O-4 - Post-Shot Photo

Fig. O-5 - RadSafe Survey, H + 3

Fig. O-6 - RadSafe Survey, D + 1

Fig. O-7 - RadSafe Survey, D + 2

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ENIWETOK OBSERVED WEATHER FOR 6 JUNE 1956
AT DETONATION TIME 1255M

Sea Level Pressure	1010.5 mbs
Free Air Surface Temperature	86.9°F
Wet Bulb Temperature	79.2°F
Dew Point Temperature	76.5°F
Relative Humidity	71.0%
Surface Wind	095° at 11 knots
Visibility	Over 10 Miles

CLOUDS

2/10 cumulus; bases estimated at 1500 ft, tops estimated below 4000 ft.

1/10 stratocumulus; bases estimated at 3500 ft, tops below 4000 ft.

No middle clouds.

7/10 cirrostratus; estimated at 30,000 ft; very thin (all transparent).

AREA WEATHER SUMMARY FROM AIRCRAFT REPORTS

Small scattered cumulus in area 100 miles to the east and as far north and south as the eye could see from 8,000 ft. Tops seemed to increase near Eniwetok to 3500 - 4000 ft. and total 3/8 sky coverage outside lagoon. No towering cumulus observed. Appeared to be a line of scattered cumulus about 15 miles north of the atoll with tops rising to 6 - 8,000 ft. No showers observed.

STATE OF SEA

Ocean Side : Wave heights 4 feet, period 6 seconds, direction 090°.

Lagoon Side: Wave heights about 1 foot.

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[redacted]

ENIWETOK UPPER AIR SOUNDING (060000Z)

Pressure (Millibars)	Height (Feet)	Temperature (°C)	Dew Point (°C)
1000	340	27.5	22.2
850	4,980	18.2	10.8
700	10,360	09.2	-02.2
600	14,510	02.2	-14.5
500	19,260	-07.5	-20.2
400	24,870	-17.5	-31.2
347	28,281	-24.5	-37.8
300	31,740	-33.2	M
200	40,660	-54.8	M
150	46,510	-68.5	M
112	52,165	-76.0	M
100	54,310	-74.0	M
63	63,320	-69.0	M
50	67,900	-60.5	M
25	82,244	-53.1	M
20	87,106	-45.2	M
10	102,546	-39.2	M

WINDS ALOFT (060000Z)

Height (Feet)	Direction (Degrees)	Speed (Knots)	Height (Feet)	Direction (Degrees)	Speed (Knots)
1,000	090	14	34,000	250	21
2,000	090	14	35,000	250	20
3,000	090	16	36,000	250	19
4,000	090	16	38,000	250	19
5,000	090	16	40,000	240	17
6,000	100	13	42,500	250	22
7,000	100	09	45,000	250	22
8,000	100	09	47,500	260	21
9,000	090	11	50,000	260	16
10,000	090	12	52,500	250	10
12,000	090	10	55,000	360	04
14,000	090	04	57,500	110	06
16,000	100	04	60,000	090	11
18,000	110	02	65,000	090	23
20,000	040	07	70,000	070	39
22,000	310	06	75,000	090	52
24,000	240	06	80,000	090	55
25,000	230	08	85,000	100	65
26,000	240	07	90,000	100	67
28,000	270	08	95,000	100	70
30,000	250	12	100,000	100	59
32,000	230	18			

9

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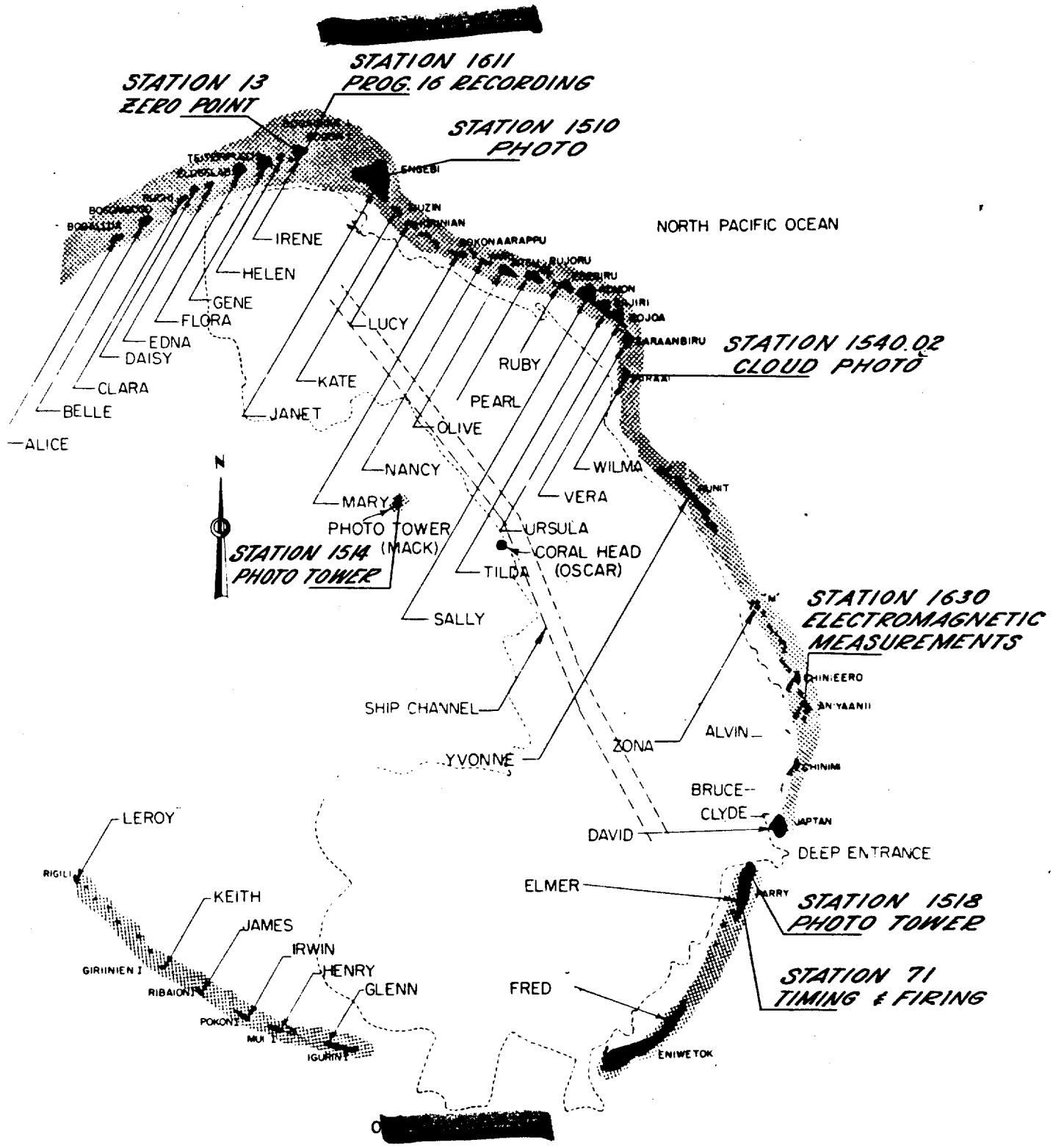

Eniwetok Atoll Map

FIG 0-1

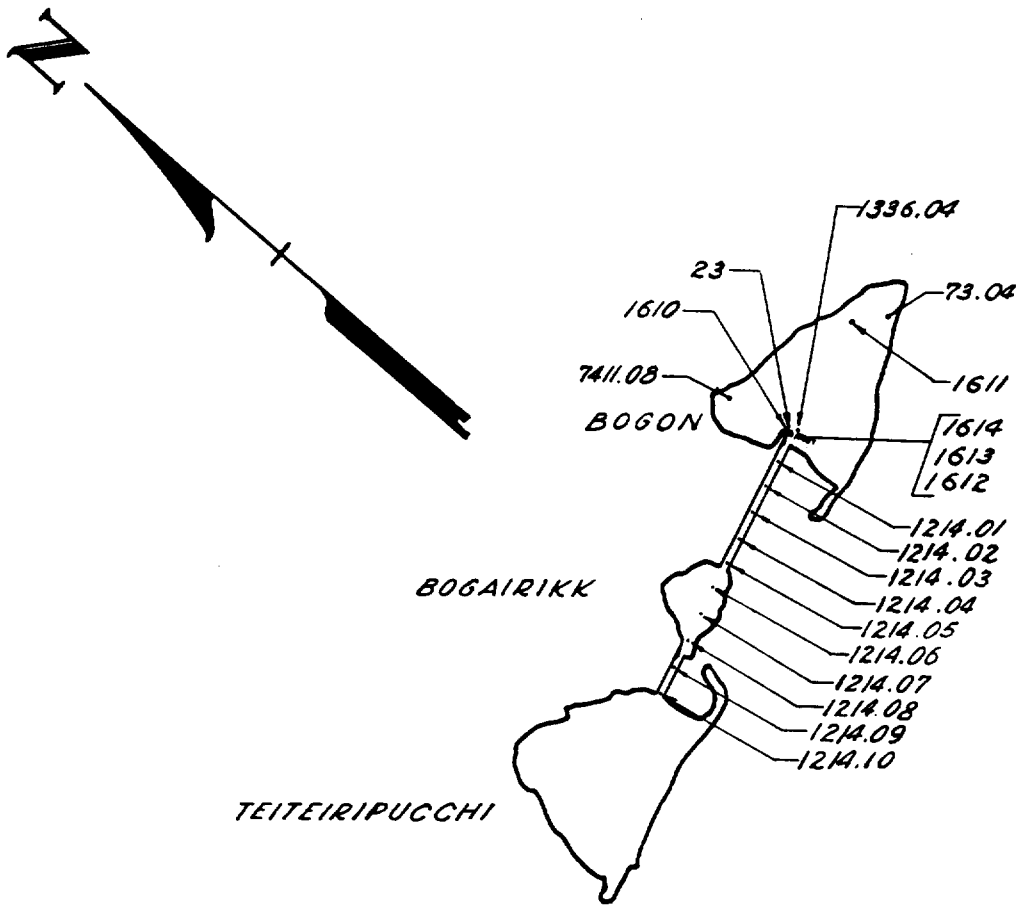

Fig. O-2 - Bogon Island, Scientific Stations and Zero Point

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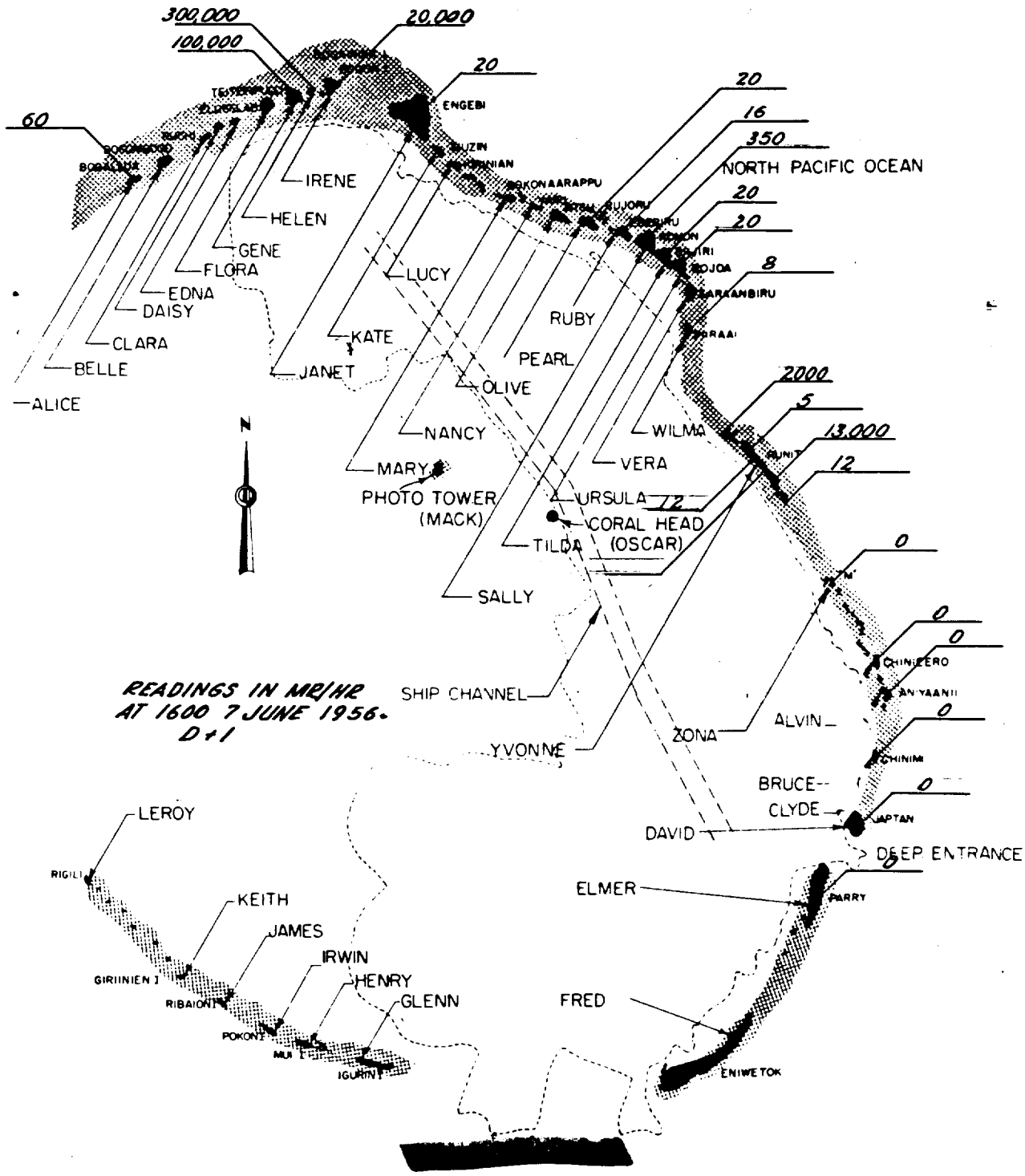

Fig. O-6 - RadSafe Survey, D + 1

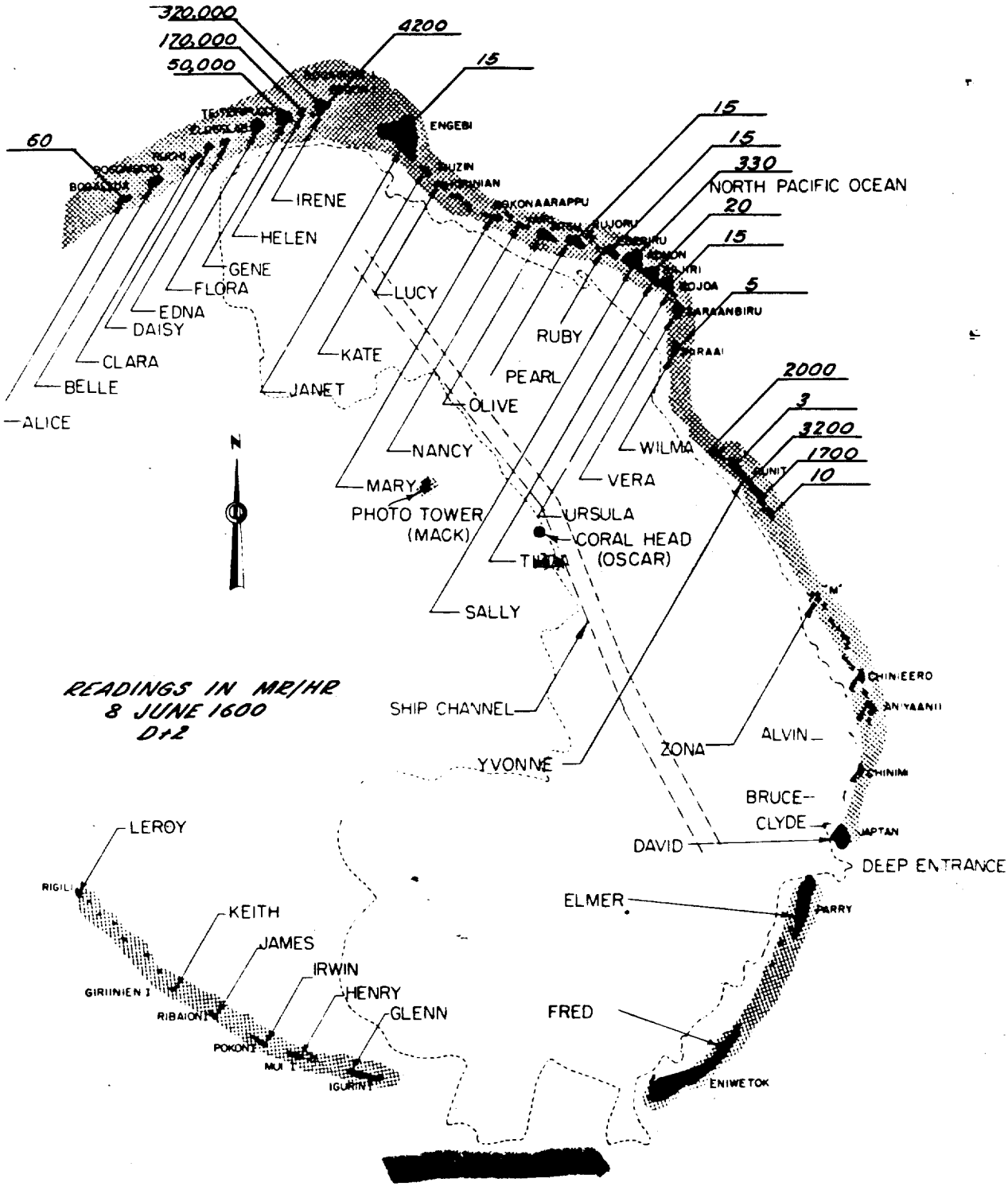

Fig. O-7 - RadSafe Survey, D + 2

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PART II

TASK UNIT 3

DOD PROGRAMS

K D Coleman

Col. K. D. Coleman
CTU-3

[redacted]

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DELETED (SEMINOLE)

Project 1.3 - Shock Photography - J. Petes

OBJECTIVES

To study free air peak overpressures by means of direct shock photography.

To analyze the photographic results for possible surface interaction and the surface-dependent parameters.

INSTRUMENTATION

Direct shock photography, without smoke trail fiducials, was used.

RESULTS

The cameras operated successfully, but no results are available at this time.

[redacted]

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Project 1.8 - Crater Measurements - F. E. Deeds

OBJECTIVE

The objective of this project is to obtain measurements of the physical characteristics (radius, depth and average profile of the crater produced by the detonation of atomic weapons at the surface of the ground.

INSTRUMENTATION OR TECHNIQUES

Preshot Survey: Rays extending from ground zero and 60 d apart were surveyed to a distance greater than any expected cr radius. The elevations ranged from 2 to 11 feet above the dat plane (6 inches below mean low water springs) with the greater of them being about 7 feet. Uncontrolled **stereoptic** aerial pho were taken of the shot area.

Postshot Survey: Aerial photographs were taken in order the diameter of the crater could be measured by the use of ste equipment.

At H ≠ 1 one pass was made at an altitude of 1350 feet. of a malfunction of the camera no further runs were made that D ≠ 1 three other passes were made at altitudes of 1495, 1475, feet. A requirement for making lead line soundings along thre (with a minimum of ten soundings each) has been placed with Ho Narver.

RESULTS

The postshot aerial photographs were studied and it was f the crater was not symmetrical. It had vented in a Northern d

[redacted]

(toward the Pacific Ocean) and Western direction (along the causeway). Ground zero was positioned on the photographs and a measurement of the radius was taken in an Eastern direction, resulting in an estimated distance of 270 feet. It is believed that this is the best representative dimension in that it was taken in a direction where the land mass prior to the shot was undisturbed.

No lead line soundings have been taken because of residual radiation too high to permit entry.

CONCLUSIONS

No conclusions can be drawn at this time in that the data requirements have not been fulfilled.

[redacted]

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Project 1.9 - Water Wave Studies - L. W. Kidd

Studies of water wave action generated by nuclear devices are made at relatively close ranges and at several distant island stations by Project 1.9. For this shot, the lagoon station only was active.

Negative results were obtained.

[redacted]

[redacted]

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Project 2.64 - Fallout Location and Delineation by Aerial Survey -

R. Graveson

OBJECTIVE

To evaluate the attenuation of radiation in air.

DESCRIPTION AND EXPERIMENTAL PROCEDURES

A portable gamma spectrum analyzer was mounted in a helicopter.

The helicopter was to hover at altitudes of 1000, 800, 600, 400, 200, 100, and if possible 50 feet over the surface of an island, open sea water about 1 mile from land and the lagoon about 1 mile from land. At each position a spectrum was to be taken.

RESULTS

An inverter failed shortly after reaching the area of interest and no spectra were obtained.

Total gamma intensity measurements were obtained by making passes over Engebi (Janet) and the lagoon to the west of Engebi (Janet) at the planned altitudes. This data is being evaluated.

[redacted]

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Project 6.1 - Accurate Location of Electromagnetic Pulse Source -

E. A. Lewis

OBJECTIVE

To utilize the electromagnetic signal originating from nuclear weapon detonations to determine ground zero of detonation. Secondarily to obtain the yield data that is available in the bomb pulse.

PROCEDURE

Location of ground zero is made by use of inverse Loran principle. The exact time the bomb pulse is received at various stations is recorded. The exact time difference in receipt of the electromagnetic pulse between two stations will be used to determine a hyperbolic curve which runs through ground zero. The point of intersection of two or more curves determines ground zero.

There are two systems. One of the systems is known as the long base line system and the other, the short base line system. Each system has two sets of stations. The long base line has one set of stations located in the Hawaiian Islands (Midway, Palmyra and Maui) with synchronizing antenna station at Haiku, Maui, and the other set of stations in the States (Harlingen, Texas; Blytheville, Arkansas; Kinross, Michigan and Rome, New York) with synchronizing antenna station at Cape Fear, North Carolina. The short base lines have one set of stations located in the Hawaiian area (Kona, Hawaii; Papa, Hawaii; and Red Hill, Maui) the other set in California (Pittsburg, Woodland, and Maryville).

[redacted]

23

[redacted]

RESULTS

Short base line.

Hawaii. Kona net equipment was in operation at all 3 stations but no evidence of receipt of electromagnetic pulse signal of field strength calculated for this event.

California. Woodland net did not receive time change alert message in time to have equipment operating for this event.

Long base line.

Hawaii. At Lahaina and Palmyra station, equipment was in operation but no evidence of receipt of electromagnetic pulse signal of field strength calculated for this event. Midway station did not receive time change alert message in time to have equipment in operation.

Stateside. Harlingen AFB Texas net did not recive time change alert message in time to have equipment for this event.

Griffiss AFB New York equipment was operating at time of detonation.

CONCLUSIONS

No conclusions can be made until further information is received from data reduction and interpretation.

[redacted]

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Project 6.3 - Effects of an Atomic Explosion on the Ionosphere -

M. Hawn

OBJECTIVE

The objective of Project 6.3 is to obtain data on the effects of high yield nuclear explosions on the Ionosphere. Principally, to investigate the area of absorption, probably due to the high altitude radioactive particles, and to study the effect of orientation relative to the earth's magnetic field on F2 layer effects.

INSTRUMENTATION

The system comprises:

Two Ionosphere recorders, type C-2, operating on pulse transmission, installed in 6 ton trailer vans, one located at Rongerik Atoll and one located at Kusaie in the Caroline Islands.

One Ionosphere recorder, type C-3, operating on pulse transmission, installed in a C-97 plane based at Eniwetok Island.

RESULTS

No observable effect upon the ionosphere was detected on SEMINOLE.

[redacted]

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Project 6.5 - Analysis of the Electromagnetic Pulse Produced by a Nuclear Explosion - C. J. Cng

OBJECTIVE

The objective of Project 6.5 is to obtain waveforms of the electromagnetic radiation for all the detonations during Operation REDWING. This data is to be used in connection with a continuing study relating the waveform parameters to the height and yield of the detonation.

INSTRUMENTATION

Two identical stations are used to record data, one at Eniwetok and one at Kwajalein.

The instrumentation consists of a wide-band receiver with separate outputs connected to each of the three oscilloscopes. Mounted on each oscilloscope is a Polaroid Land Camera for recording the transient display.

RESULTS

No data was obtained for SEMINOLE due to the shielding of the device. Triggers were obtained but the traces observed showed no results. The electromagnetic pulse from the device was attenuated severely and the data if obtained would be useless as correlation between yield and field strength.

[redacted]

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Project 8.5 - Airborne High Resolution Spectral Analysis - R. Zirkind

OBJECTIVE

To determine the spectral characteristics of the radiant power of a 30 - 40 kiloton burst as a function of wavelength and the fireball color temperature as seen from an airborne station. These objectives are to be accomplished by determining the atmospheric attenuation by an independent measurement and correcting the irradiance received at the instrument station aboard the aircraft.

INSTRUMENTATION

The spectral distribution of the radiant power is obtained from a medium quartz Hilger spectrometer. The spectrum is sampled in narrow bands by photocells in the visible region and PbS cells in the infra-red. The electrical signal is then recorded on an Ampex 814 tape recorder, with a resolution time of 150 μsec. The transmission measurement is accomplished by beaming a pulsed light signal of known output and spectral distribution from a fixed point on the ground towards the aircraft. The attenuated beam is received by a detector in the aircraft and recorded on a Heiland recorder. The detector consists of two filtered photomultiplier tubes sampling two spectral regions, (1) .3-.55 microns and (2) .6-1.05 microns. In addition, a quartz filtered calorimeter, 22 degrees field of view, is utilized to measure the approximate radiant exposure received at the spectrometer.

RESULTS

The P2V aircraft aborted at H-30 minutes due to an engine failure. Aircraft and crew returned safely. On SEMINOLE plus 2 days the engine was replaced and aircraft placed in operational readiness condition for the next shot.

[redacted]

PART III

TASK UNIT 1

LASL PROGRAMS

Keith Boyer
Keith Boyer
Advisory Group

Program 10 - Thermal Radiation and Hydrodynamics	H. Hoerlin
Program 11 - Radiochemistry	G. Cowan
Program 12 - External Neutron Measurement and High Energy Gamma Measurement	R. L. Aamodt
Program 13 - Fission Reaction Measurements	J. S. Malik
Program 15 - Photo-Physics	G. L. Felt
Program 16 - Physics & Electronics & Reaction History	B. E. Watt

[redacted]

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DELETED (SEMINOLE)

Project 10.1 - Fireball Hydrodynamic Yield - J. F. Mullaney

L. N. Blumberg & J. F. Mullaney

A preliminary figure for the hydrodynamic yield of DELETED fired as Seminole shot is

12 kilotons,

based largely on the differential method.

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Project 10.2 - Time of Arrival - J. Mullaney

An unsuccessful attempt was made to estimate the yield of the DELETED (Seminole) using hand-held stop-watches at Station 1518, Parry. Time-of-arrival information was also supplied by the Eniwetok microbarograph station of Project 31.1. The data are given in Table 10.2-1

Weather conditions of interest, as observed at Eniwetok, were:

Air temperature, surface: 86.9°F

Relative humidity: 71%

Surface wind: 095 at 11 knots

Sound speed, calculated from these data, was 1153 fps.

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Project 11.1 - Radiochemical Analysis - G. Cowan

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Project 11.2 - Sampling - H. F. Plank
(P. F. Moore)

EQUIPMENT

Six aircraft equipped for cloud sampling [redacted] were used on this mission: "A" flight, Tiger Red One (F-84); "B" flight, Tiger Red Two (F-84); "C" flight, Tiger White One and Two (2-F84's); "D" flight, Hotshot (B-57); control aircraft, Cassidy (B-57).

WEATHER

Cloud cover consisted of 3/8 cumulus to 8,000 feet with occasional higher tops, 3/8 alto-stratus from 12,000 to 18,000 feet plus high thin cirrus above 35,000 feet. The Southerly winds varied from East through South to West at various sampling altitudes but velocities were quite low.

CLOUD DESCRIPTION

The shot was fired in a large hole in the above described cloud cover, so that the bomb cloud was not mingled with or obscured by natural clouds. The cloud rose in a uniform cylinder to 16,000 feet with no mushrooming at the top and considerable prompt fallout of entrained water. By 45 minutes after burst the cloud had separated into three portions; a cloud at 5,000 feet moving West by North, a portion at 10,000 feet moving slowly to the North, and a portion at 15,000 feet moving very slowly toward the Northeast and remaining partially over ground zero. The top of the cloud was about half the altitude that would usually be predicted for a shot of this yield and the base at 5,000 feet was only about $\frac{1}{4}$ the altitude that would be expected.

SAMPLING MISSION

Red One was put through the top portion of the cloud at 14,500 and

[redacted]

[redacted]

15,000 feet and reported cloud radiation intensities about half those usually expected for this time. He was directed to make repeated penetrations through this small upper portion of the cloud until he received his assigned dosage. This was accomplished in 8 passes averaging about 35 seconds each. Red Two was then directed into the middle and thicker piece of cloud at 10,000 feet and reported radiation intensities about double those of the upper portion. White One and Two were then directed into the lower portion of the cloud at 5,000 feet and reported usual radiation intensities although the cloud was thin enough so that the aircraft were visible to Cassidy flying above them throughout their sampling penetrations. Hotshot was held until 30 minutes after Red Two had left the middle portion of the cloud and then directed in at 10,000 feet. He reported average cloud radiation intensities down by a factor of at least five from those reported by Red Two in the same portion of the cloud.

NUMBER RATIOS

The number of fissions measured in the samples by radio-chemistry at Los Alamos averaged about 30% of the number predicted at PPG from observati of radiation levels of the sample papers after they were removed from the aircraft. DELETED this discrepancy is believed to be due to a much larger than usual proportion of short-lived activities such as chlorine and sodium in the cloud which tend to buildup pilot dosages without giving the usual proportion of activity remaining on the filter papers when they arriv at Los Alamos. Pilot radiation exposure from aircraft background during return to base was somewhat higher than normal on the middle and lower F-84 but normal for the highest aircraft, Red One, and the latest aircraft, Hots

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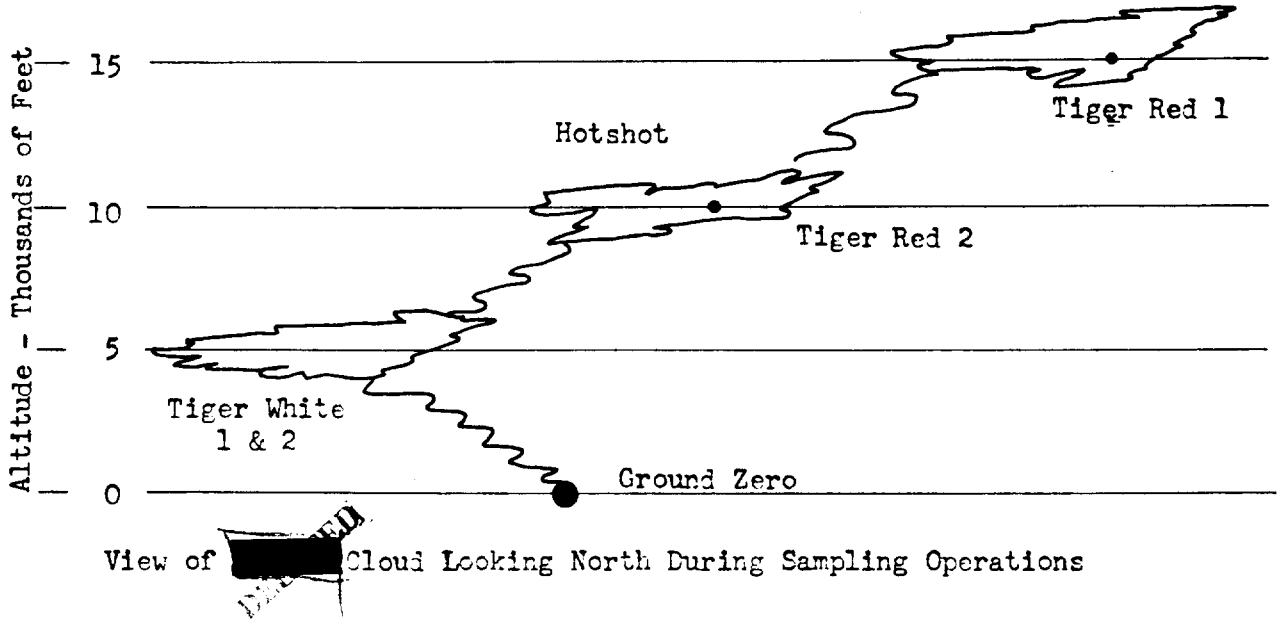

View of [redacted] Cloud Looking North During Sampling Operations

Fig. 11.2-1

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Project 12.1 - Threshold Detectors - W. Biggers

DELETED

[redacted]

DELETED (SEMINOLE)

Project 13.3 - Transit Time and XR Wireless Measurements - D. Henry

J. Malik

Due to equipment failure, no data were received.

[redacted]

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Project 15.1 - EG&G PHOTOGRAPHY - H. Grier

D. J. Barnes

FIREBALL YIELDS

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29

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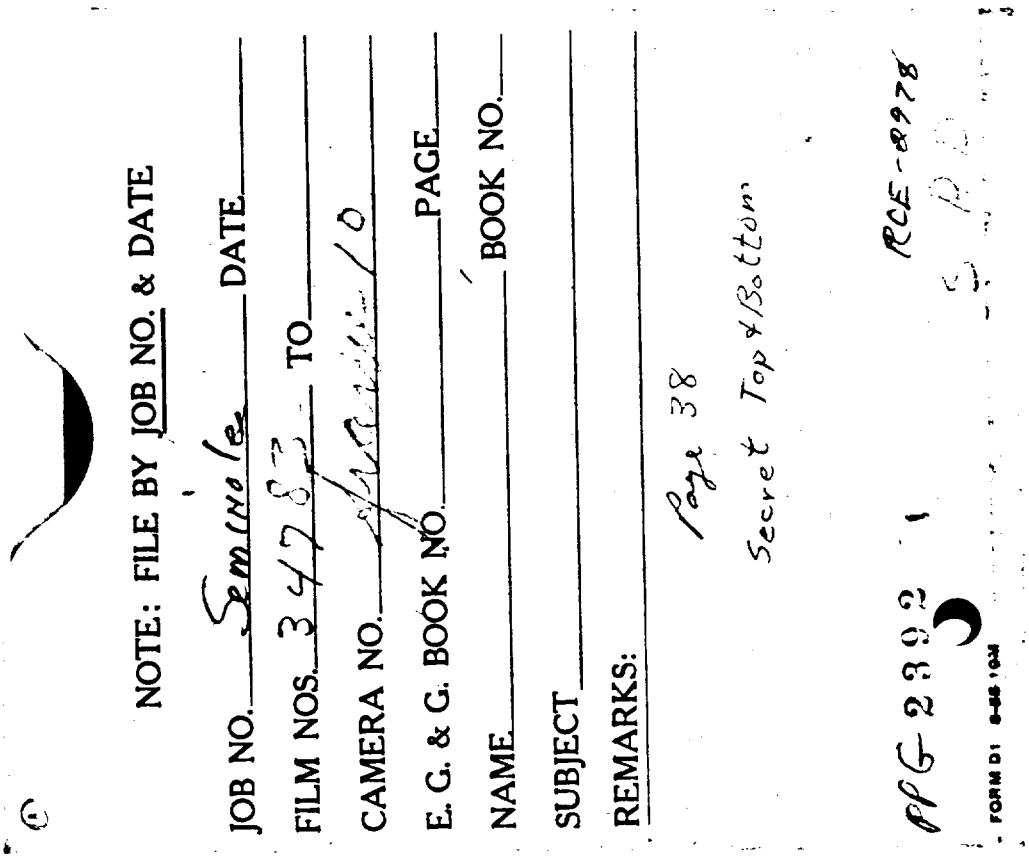

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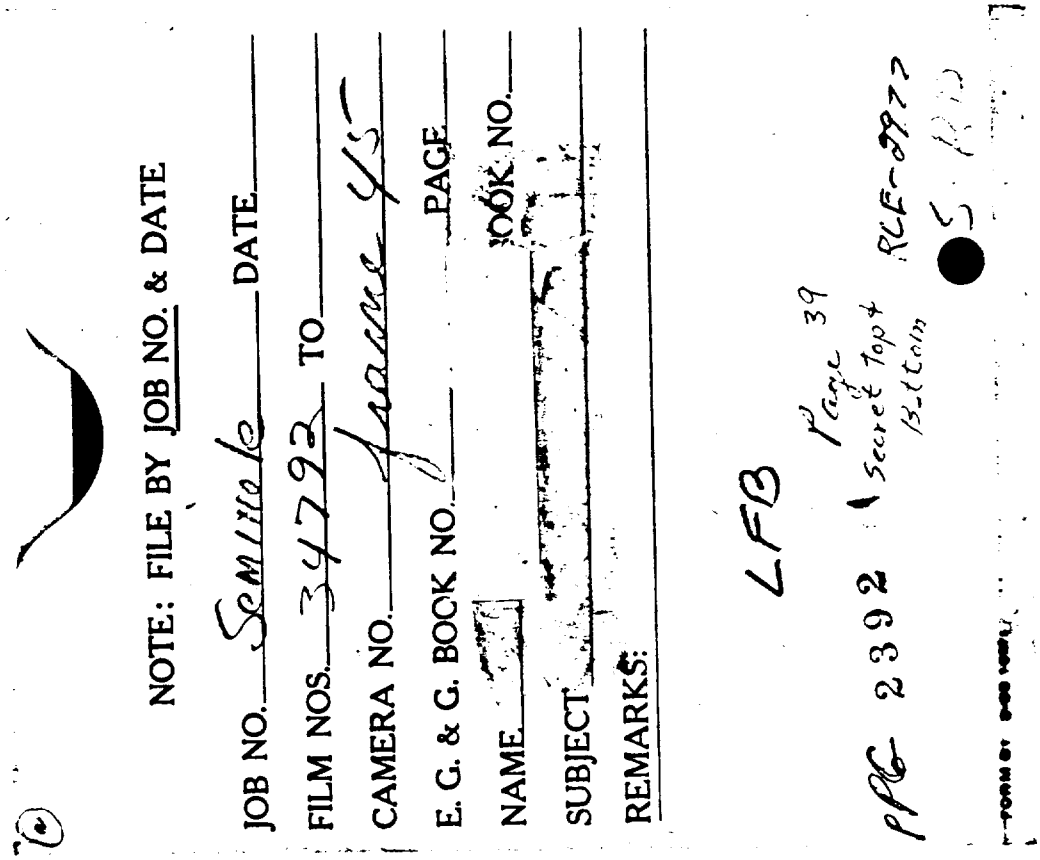

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Projects 16.1 and 16.2 - Special Diagnostic Measurements - B. Watt

B. Watt R. Helm

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Project 16.3 - Electromagnetic Measurements - R. Partridge

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PART IV

TASK UNIT 4

SC PROGRAMS

E L Jenkins

E. L. Jenkins
CTU-4

Program 31 - Microbarography R. Heppelwhite

[redacted]

[redacted]

DELETED (SEMINOLE)

Project 31.1 - Microbarograph - W. A. Gustafson

The purpose of this project was to measure winds in ozone layer of the atmosphere. This was accomplished by measuring at several sites the arrival times of the shock wave reflected from the ozone layer. Five sites were operated: Ujelang, Wotho, Rongerik, Bikini, and Eniwetok. At each site two stations were operated about one mile apart. The difference in arrival times gives the angle of incidence of the shock and information from several stations may be combined to give the winds.

On [redacted] (SEMINOLE) good shot records were obtained from all stations but no temperature and wind vectors are yet available.

[redacted]

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5