ARLV-351-26

U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Environmental Research Laboratories

# WEATHER PREDICTIONS AND SURFACE RADIATION ESTIMATES FOR THE CANNIKIN EVENT

Final Report

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## DISCLAIMER

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## ABSTRACT

For CANNIKIN, event-oriented forecasts of winds, weather, vertical atmospheric stability, and air trajectories were presented to the Test Manager and his Advisory Panel in frequent formal and informal briefings beginning at D-8 days. Because the possible, though unlikely, release of radioactivity into the atmosphere was recognized, estimates of potential radiation effects were also presented during the briefings.

Concurrent with arrival of the nuclear device, routine weather forecasts for the Amchitka area were issued twice daily to aid in planning preparatory activities and for use in case of a nuclear accident.

On D-Day, intensive surveillance of changing meteorological conditions at the surface and aloft throughout the western Aleutian Islands was maintained by means of frequent weather observations at Shemya, Amchitka, and Adak. The Test Manager and his Advisory Panel were kept informed of the interpretation of these observations starting with the final readiness briefing and continuing throughout the day. D-Day meteorological data are included in the report.

Three surface wind towers were installed and instrumented on Amchitka Island. A 24-hour weather observing station equipped to take upper-air soundings (wind, temperature, pressure, and humidity) as well as surface observations was in operation at the Northwest Camp for ten weeks preceding the event. Communications facilities were acquired for receiving large-scale meteorological data and forecasts for the North Pacific Ocean area from the major forecast centers.

# CHAPTER 1 INTRODUCTION

## 1.1 Background

The National Oceanic and Atmospheric Administration (NOAA) by agreement with the Atomic Energy Commission's Nevada Operations Office (AEC/NV) is responsible for providing all meteorological support that the Test Manager, NV, requires to conduct nuclear tests safely at the Nevada Test Site (NTS). This NOAA responsibility, which extends to nuclear tests conducted at off-NTS locations, is met by its Air Resources Laboratory-Las Vegas (ARL-LV) under the Office of the Assistant Manager for Operations, Nevada Operations Office (AMO/NV).

ARL-LV is organized and staffed to provide specialized meteorological services for the nuclear testing Safety Program as well as to improve, through continuing research, weather predictions and radiation estimates. Data acquisition and electronics maintenance are functions of the Field Operations Branch. Weather forecasting, computer services, and climatological studies are performed by the Meteorological Predictions and Research Branch; and the Radiation Estimates and Research Branch is responsible for making radiation estimates. Additional services are provided by the Programs and Administration Branch.

## 1.2 Objectives

ARL-LV objectives in support of the CANNIKIN event were as follows:

1. Provide and interpret climatological data required by the project participants for pre-event planning and preparation.

2. Provide preliminary estimates of potential radiation levels requested by various participants for the preparation of technical and safety plans.

3. Provide regular weather observations and forecasts during the pre-event operational period.

4. Provide event-related meteorological observations and data essential to the Safety Program.

5. Provide weather and air-trajectory forecasts and operational radiation estimates to the Test Manager and his Advisory Panel.

6. Document the state of the atmosphere in the vicinity of Amchitka Island at and subsequent to the time of detonation.

7. Analyze observed meteorological data and radiological data (if above background) in order to document the radiation pattern, compare the observed radiation levels with those estimated, and examine the applicability of the ARL-LV radiation-estimation technique used for the CANNIKIN event.

8. Provide weather observing and forecasting service to the Test Manager's representative during any post-shot re-entry program.

9. Provide required post-shot analyses, appropriate records, and reports.

# CHAPTER 2 WEATHER OBSERVATIONS AND PREDICTIONS

## 2.1 Data Requirements and Sources

### 2.1.1 Data Requirements--Safety Program

Data for the Safety Program were collected to aid in the meteorological predictions and to document the state of the atmosphere at H-Hour. Documentation was continued during a post-shot period sufficient to provide ample data for correlation with radiological measurements in the unlikely occurrence of an uncontrolled release of radioactive material.

Data collected for the purpose of making weather predictions ranged from teletype weather resumes from the Alaska Region National Weather Service Forecast Center to local surface observations. All were subject to selective interpretation by the Weather Briefer in assessing the forecast problem and predicting the various weather elements for shot-time.

Documentation of the state of the atmosphere at and near Amchitka was accomplished through a small network of instruments. Wind information obtained from surface wind towers and upper-wind soundings was used to produce wind-flow analyses and air-parcel trajectories. Vertical temperature profiles were obtained from radiosonde observations.

Following the final readiness briefing, data were interpreted by the Weather and Radiation Briefers in order to keep the Test Manager and his Advisory Panel advised concerning meteorological aspects of the Safety Program.

Weather parameters pertinent to the test included:

1. Vertical profiles of wind and temperature in the layer through which any released radioactive material might be expected to rise.

2. Time and spatial variation of wind direction and speed at the surface and aloft within the general test area.

3. Air-flow patterns (streamlines) and air trajectories at various levels from the surface through the layer of concern.

4. Significant cloudiness and precipitation in the general area and downwind.

2.1.2 Data Requirements--Technical Programs

The Test Group Director and others required daily forecasts and surface weather observations for routine site operations and for final preparations in the bioenvironmental programs. Sea, surf, and swell forecasts were of particular interest to the small ships operating near Amchitka in support of the test.

2.1.3 Data Sources--International Meteorological Network

The sources of large-scale meteorological data available to the weather forecasters included:

1. Weather Facsimile, Intra-Alaska Circuit--by radio from Anchorage via Adak.

2. Weather Teletype, Service A--by radio from Anchorage via Adak.

3. Weather Teletype, Service C--by radio from Anchorage via Adak.

4. Weather Teletype, Synoptic Broadcasts, Tokyo--by radio receiver in the HF Communications Facility.

5. Weather Satellite Pictures--by radio from Adak, Alaska.

The only fixed weather observing stations within 500 miles of Amchitka are at Shemya (297°/~200 n mi) and Adak (083°/~160 n mi). There are only widely scattered reports from transient surface ships. Weather

satellite pictures were required to augment the sparse and irregular data in the area.

Arrangements were made for special D-Day upper-wind soundings by the National Weather Service Office at Shemya and by the U. S. Navy at Adak. The data were received at the CP by telephone and teletype.

2.1.4 Data Sources--ARL-LV Instrumentation

Instrumentation established by ARL-LV consisted of surface weather instruments, surface wind towers, an upper-wind and temperature sounding station, and a weather satellite ground receiving station. Data from these sources augmented the large-scale data.

Surface Instrumentation. Maximum and minimum thermometers were housed in a standard instrument shelter at the Control Point (CP) Weather Station.

Hourly humidity data were obtained at the CP Weather Station, using a standard sling psychrometer.

A standard microbarograph and a precision aneroid barometer were used to record atmospheric pressure.

Surface wind towers were located near surface ground zero (SGZ), in the Main Camp area, and at the Northwest Camp. The SGZ wind data were telemetered by hardwire to a recorder in the CP Timing and Firing Trailer, while data from the other two towers were radiotelemetered to the CP Weather Station.

Wind towers and sensors were also installed on Rat, Semisopochnoi, and Amatignak Islands. The data from these stations were radiotelemetered to the CP Weather Station. Wind sensors and towers on these islands were

extensively damaged during violent storms just prior to D-Day and data were not available from them. Repairs were impossible within available time and transportation facilities.

Rawinsonde Observations. A Ground Meteorological Device (GMD) located at the CP upper-air complex was used to track balloon-borne radiosonde instruments to measure vertical profiles of temperature, pressure, humidity, and winds.

## 2.2 Operations

### 2.2.1 Pre-Event Operations

Planning for meteorological support of underground events at Amchitka Island began in the fall of 1966. A site climatology, prepared and issued in October 1967, was based on long-term data available from earlier periods when Amchitka was a military base. Operational meteorological support was provided during September and October 1969 for the MILROW event, after which ARL-LV equipment was returned to the NTS.

ARL-LV meteorological support plans and logistic support requirements and a Preliminary Effects Evaluation Report for CANNIKIN were submitted to NV in June 1970. Event-related cost estimates were submitted in August 1970. Support plans, logistic requirements, and cost estimates were updated as necessary to meet changes in program plans and schedules.

Communications requirements were identified in December 1970. The procurement of weather satellite ground receiving equipment for use on CANNIKIN was initiated in January 1971. Meteorological equipment and supplies were assembled during April and May 1971 and shipped to Amchitka.

ARL-LV electronics technicians arrived at Amchitka on August 11, 1971, to set up and check out equipment and instrumentation on Amchitka and to install equipment on the neighboring islands.

Operational support was initiated on August 26, 1971, with a 24-hour schedule of surface weather observations; four-a-day upper-air soundings of temperature, pressure, humidity, and wind; and routine twice-daily site weather forecasts.

2.2.2 Event-Oriented Operations

On D-Day, the normal schedule of upper-air observations was expanded to provide a complete sounding every three hours. Three-hourly rawinsonde observations were also made at Shemya and Adak, Alaska.

2.2.3 Post-Event Operations

Hourly surface weather observations were continued through D+2 days, after which operational meteorological support was terminated.

ARL-LV support of post-shot re-entry for CANNIKIN was limited to providing wind sensors at the drillback pad with a recorder in the access-control trailer. The wind system was installed by an ARL-LV electronics technician and maintained by personnel of the Eberline Instrument Corporation.

At the request of Radiological Operations Division, NV, ARL-LV meteorologists were on call to provide assistance from the forecast office in Las Vegas in the unlikely event of a release of radioactivity during CANNIKIN re-entry. Current weather information for the entire North Pacific Ocean area is maintained regularly at the Las Vegas office. Low-altitude air-trajectory forecasts for Amchitka are received twice daily

from the National Meteorological Center.

## 2.3 Results

### 2.3.1 Weather Observations

D-Day meteorological data are included as Appendix A.

### 2.3.2 Weather Briefings

Forecasts of pertinent meteorological parameters were presented to the Test Manager and, following their arrival on-island, members of his Advisory Panel. Formal and informal readiness briefings were presented as follows:

| | |
|---|---|
| October 15, 1971 | 0600 BDT* |
| October 15, 1971 | 1500 BDT |
| October 26, 1971 | 1500 BDT |
| October 27, 1971 | 0600 BDT |
| October 28, 1971 | 0900 BDT |
| November 2, 1971 | 1330 BST** |
| November 3, 1971 | 1600 BST |
| November 4, 1971 | 2000 BST |
| November 5, 1971 | 1500 BST |
| November 6, 1971 | 0400 BST |

Briefings during October were scheduled by the Test Manager according to operational requirements such as ship and aircraft "dry runs" and island evacuation rehearsals.

The D-1 and D-Day presentations follow:

D-1 November 5, 1971 1500 BST

(Briefing charts are included as Figures 1 through 5.)

The surface weather chart for 0700 BST today has a deepening low-pressure area southeast of the Kamchatka Peninsula. This storm is moving northeastward at 35 knots. The low-pressure area in northeast Siberia is

* BDT - Bering Daylight Time
** BST - Bering Standard Time

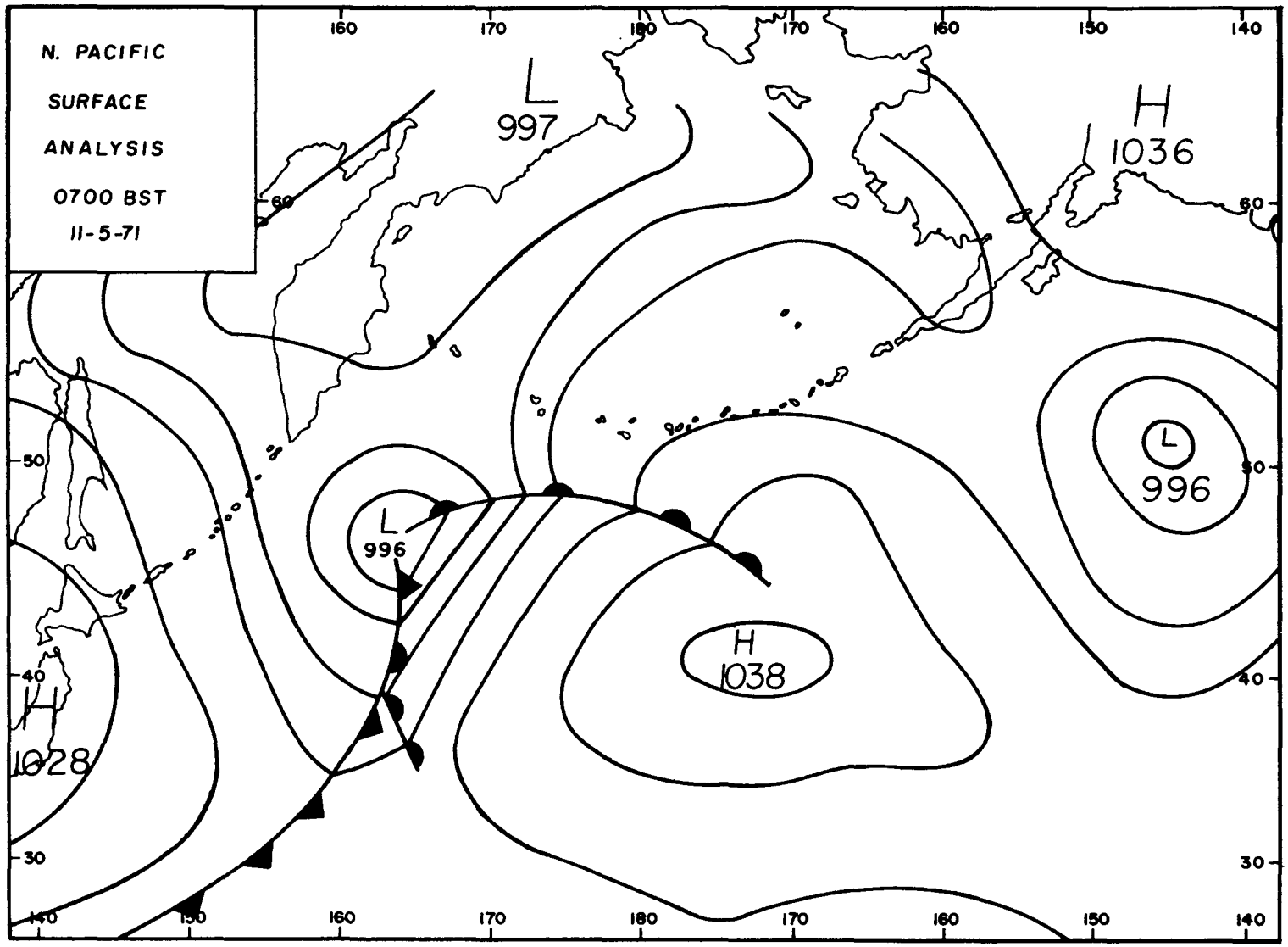



*Figure 1. North Pacific Surface Weather Analysis, 0700 BST, November 5, 1971.*

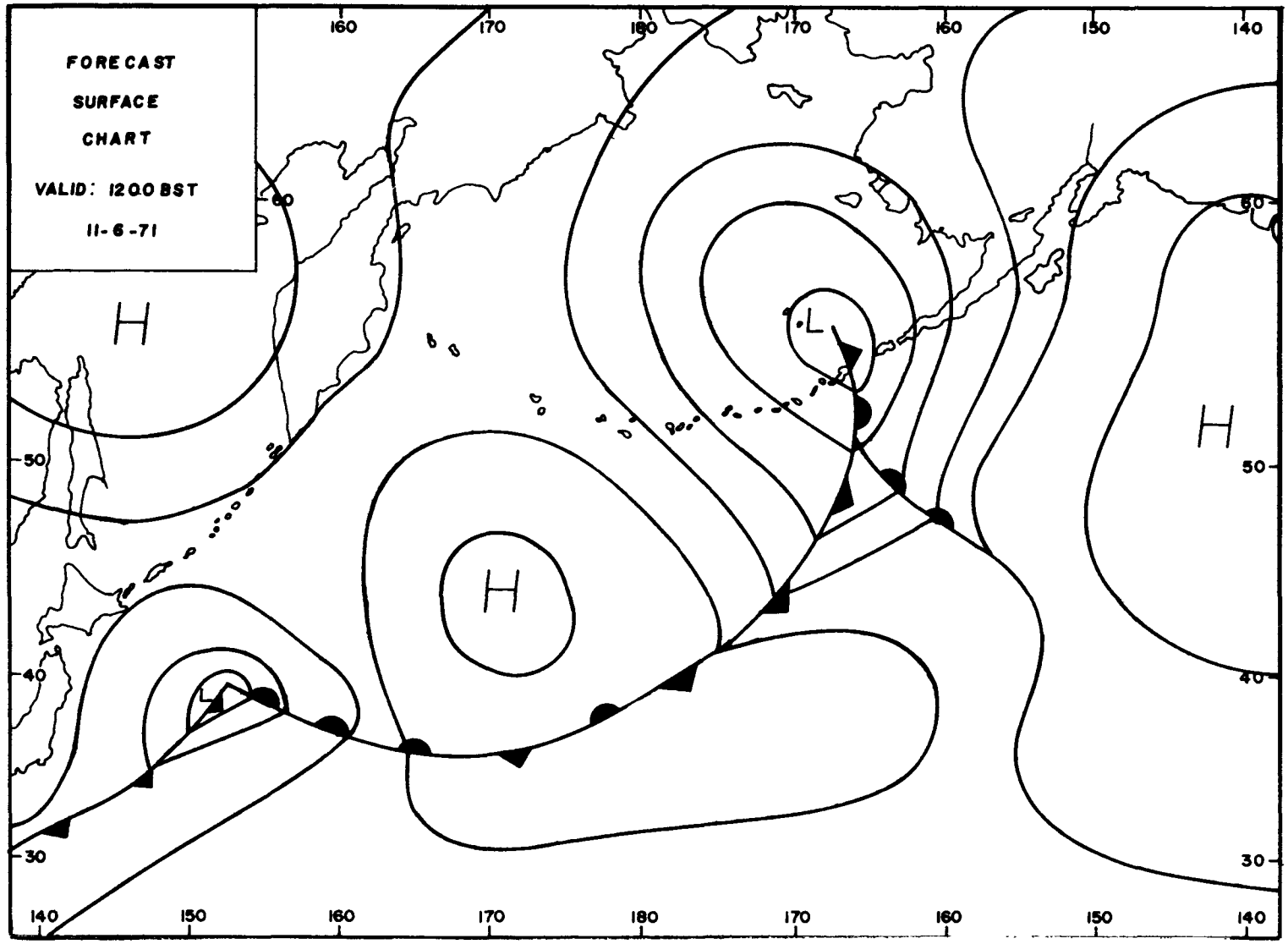



*Figure 2. North Pacific Surface Weather Forecast Chart, Presented at 1500 BST, November 5, 1971.*

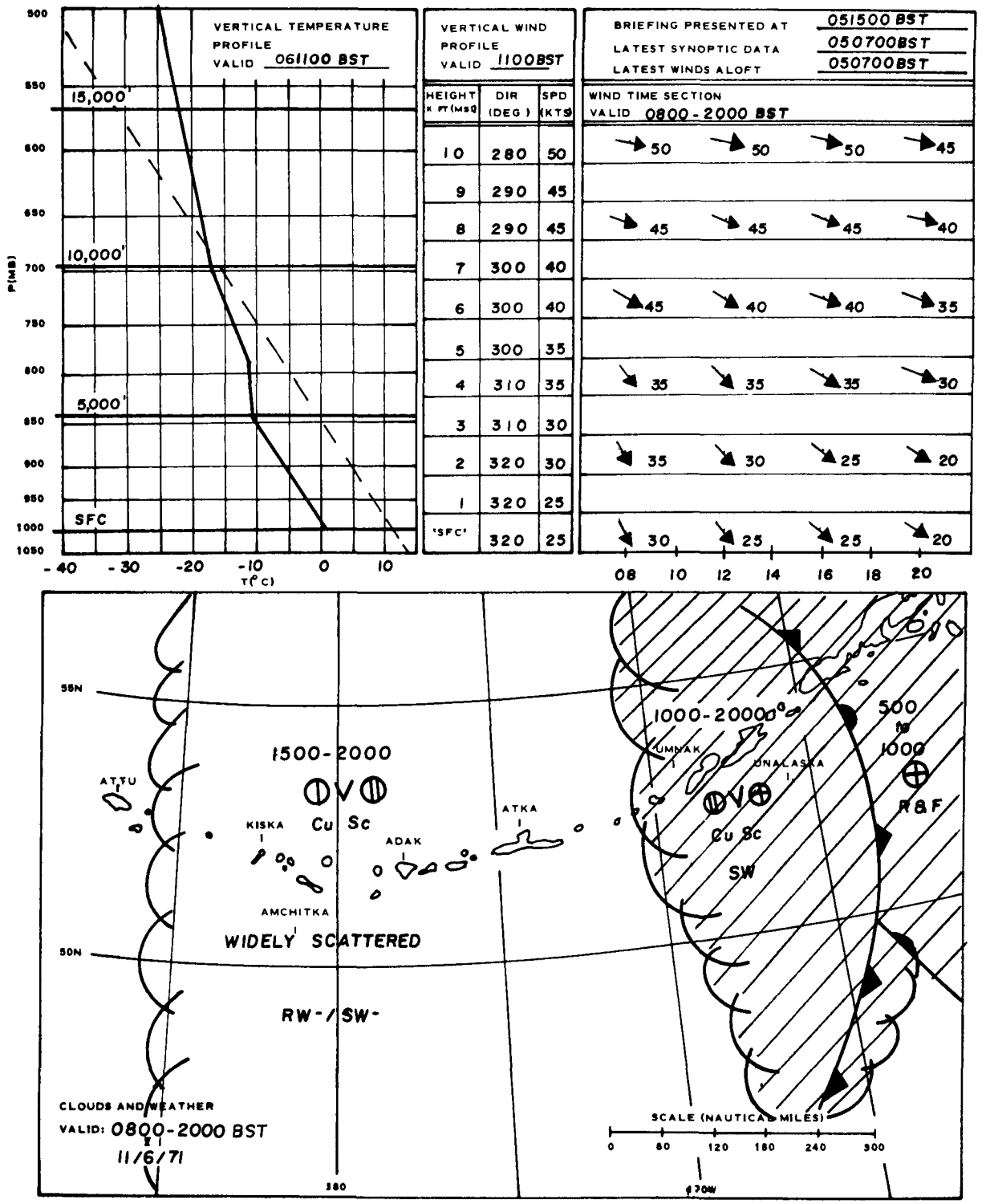



*Figure 3. Composite Briefing Chart, Presented at 1500 BST, November 5, 1971.*

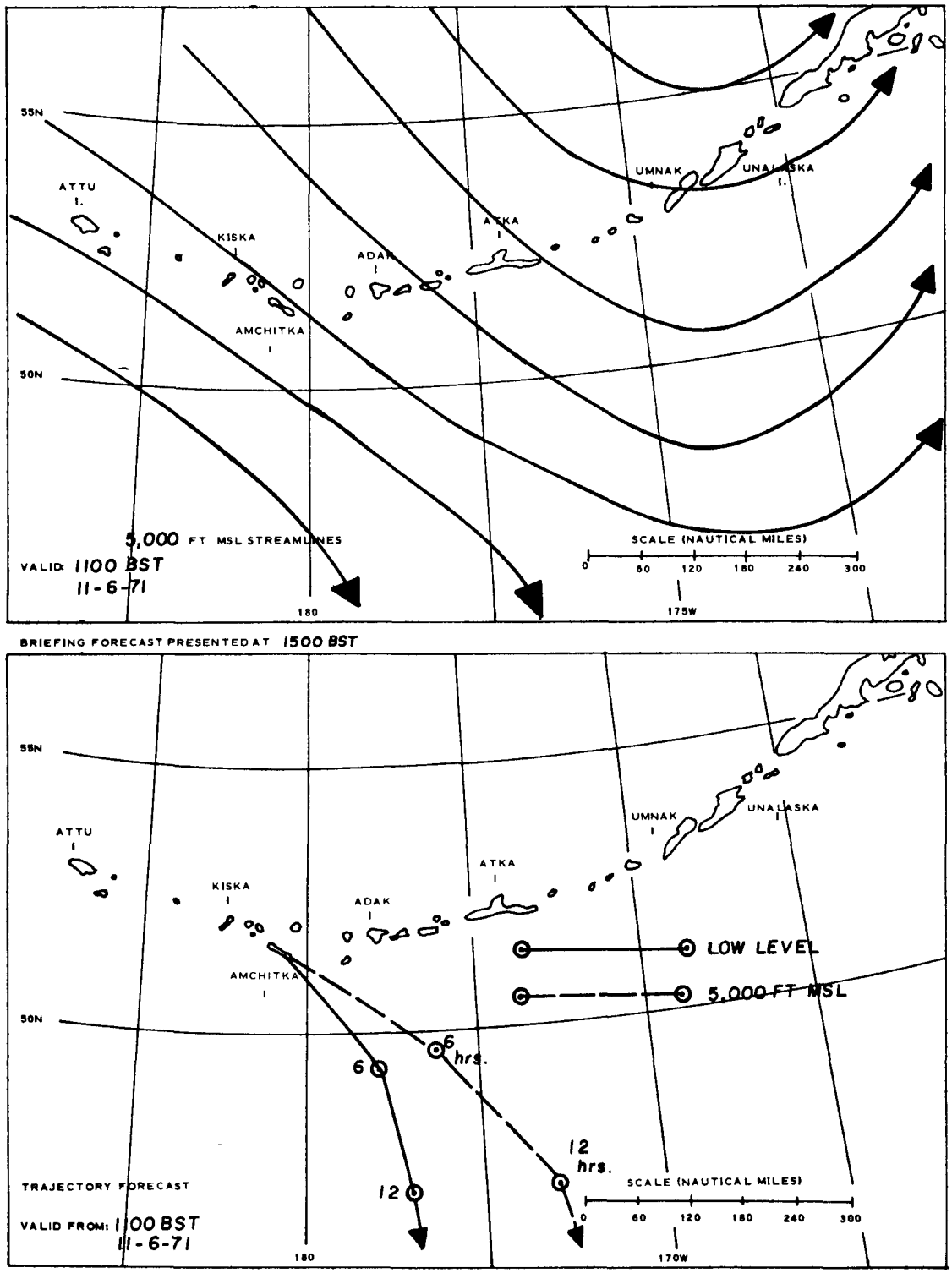



*Figure 4. Streamlines and Trajectory Forecast Chart, Presented at 1500 BST, November 5, 1971.*

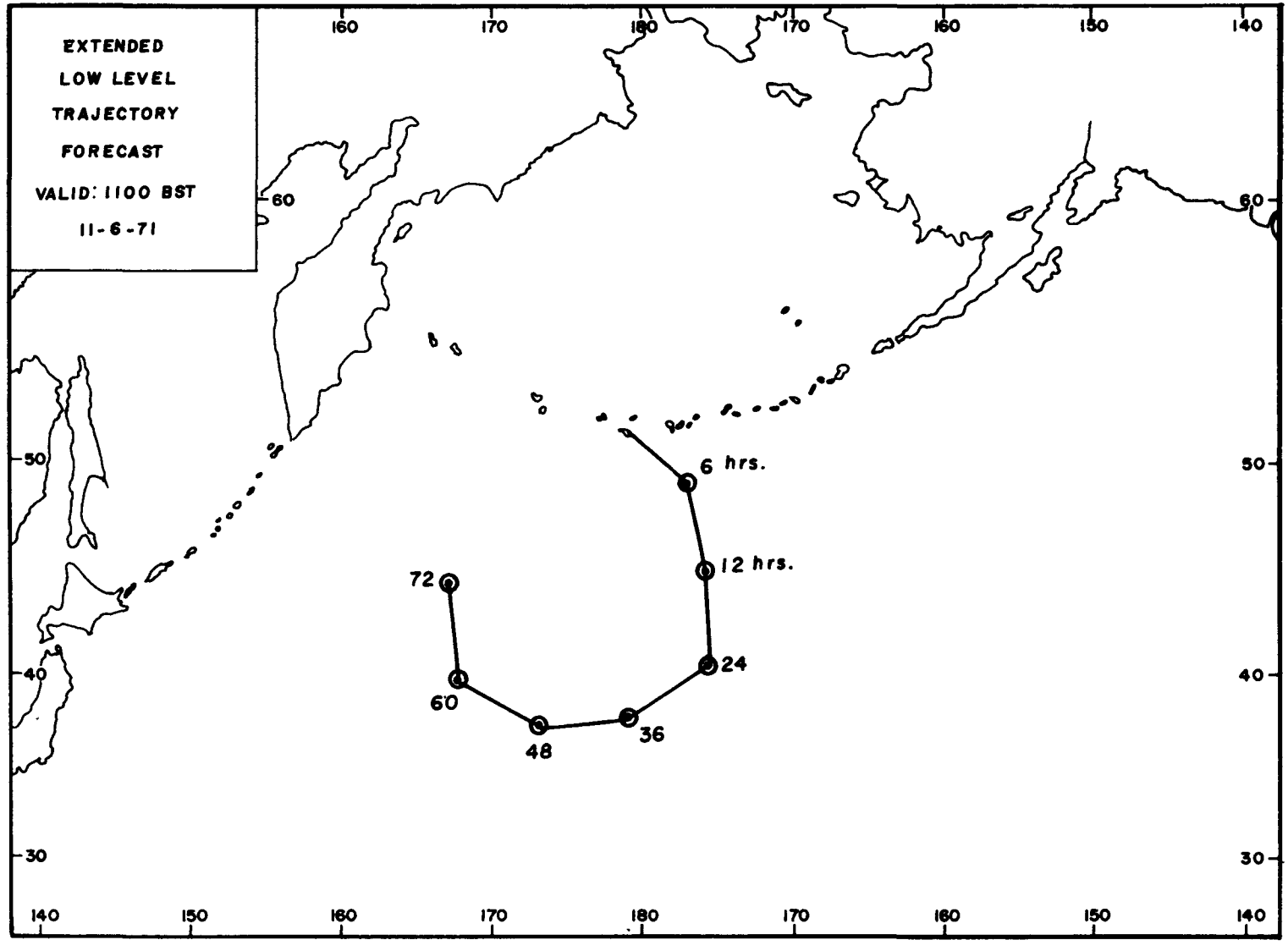



*Figure 5. Extended Low-Level Trajectory Forecast Chart, Presented at 1500 BST, November 5, 1971.*

nearly stationary and is filling.

The low southeast of Kamchatka is forecast to continue its 35-knot speed of advance and to be centered near the Pribilof Islands by noon tomorrow, with an occluded frontal system extending southward from just east of the low center and crossing the Aleutians near the east end of the Chain. A ridge of high pressure, expected to develop to the west of the low, will produce northwesterly winds at the surface and aloft in the western Aleutians. (Forecast surface charts represent expected weather patterns, without pressure values.)

The forecast vertical temperature structure valid at 1100 BST tomorrow indicates a neutrally stable lapse rate to near 5000 ft MSL with stable air above that level.

We expect scattered to broken low clouds in the local area tomorrow with bases near 1500-2000 ft MSL. Widely scattered rain or snow showers are likely in the general area.

Air trajectories throughout the layer of concern will be toward the southeast, curving southward downwind.

The extended low-level air-trajectory forecast indicates recurving of the trajectory toward the west near 40°N, then recurving northward near 170°E to a position some 600 n mi southwest of Amchitka at H+72 hours.

D-Day November 6, 1971 0400 BST

(Briefing charts are included as Figures 6 through 10.)

There are no significant changes from yesterday's forecast.

The movement of the storm which was southeast of Kamchatka

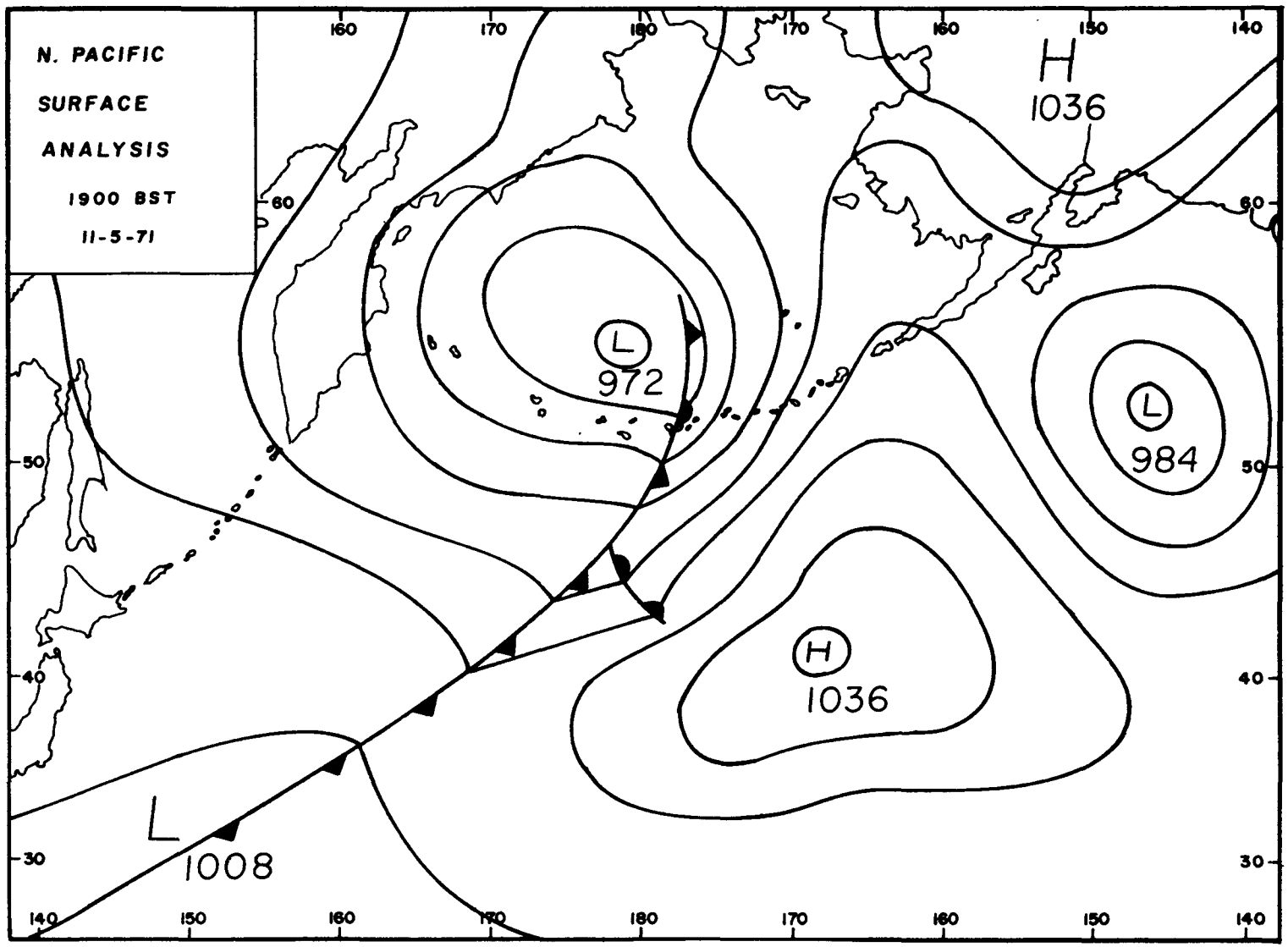



*Figure 6. North Pacific Surface Weather Analysis, 1900 BST, November 5, 1971.*

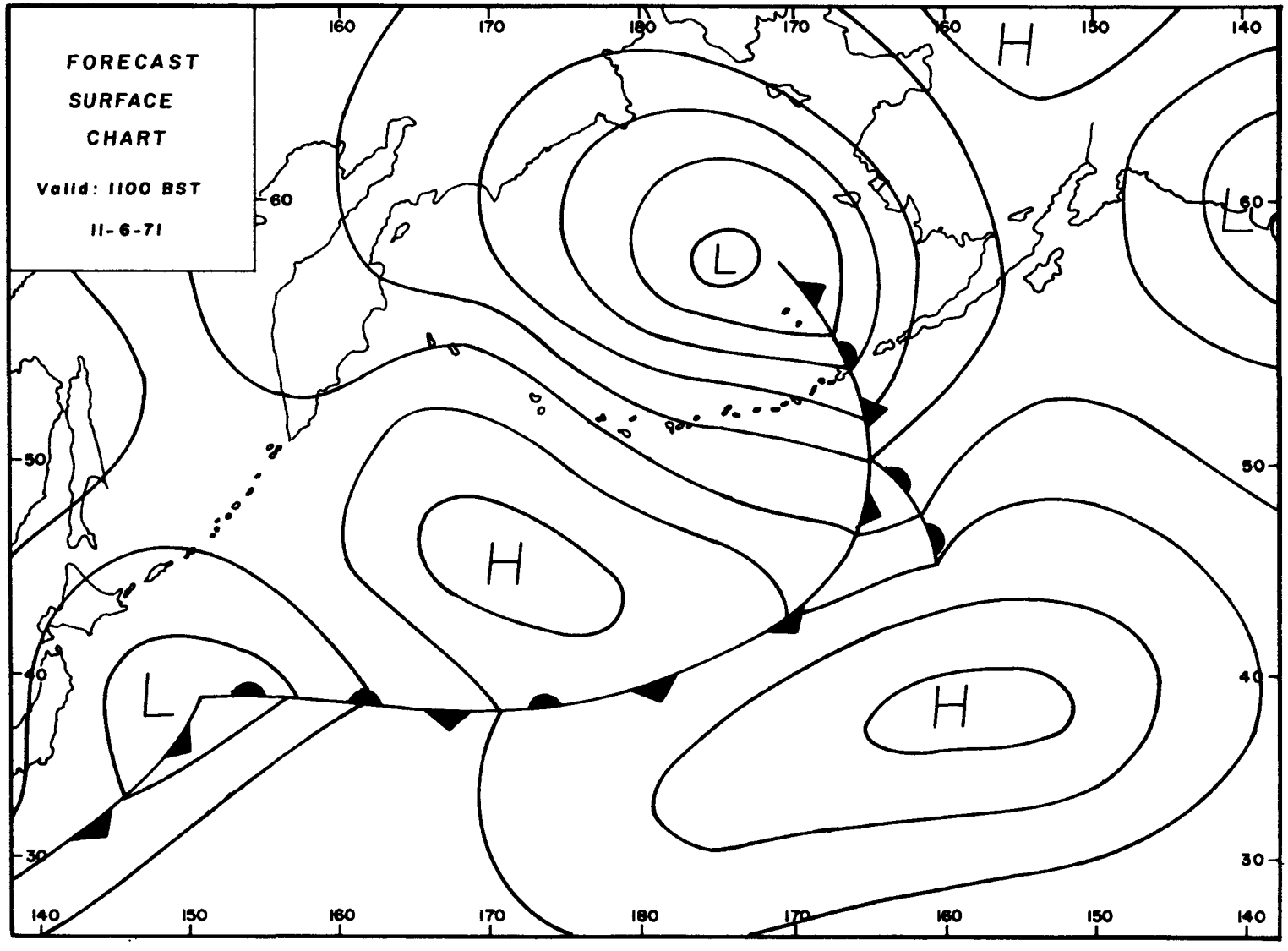



*Figure 7. North Pacific Surface Weather Forecast Chart, Presented at 0400 BST, November 6, 1971.*

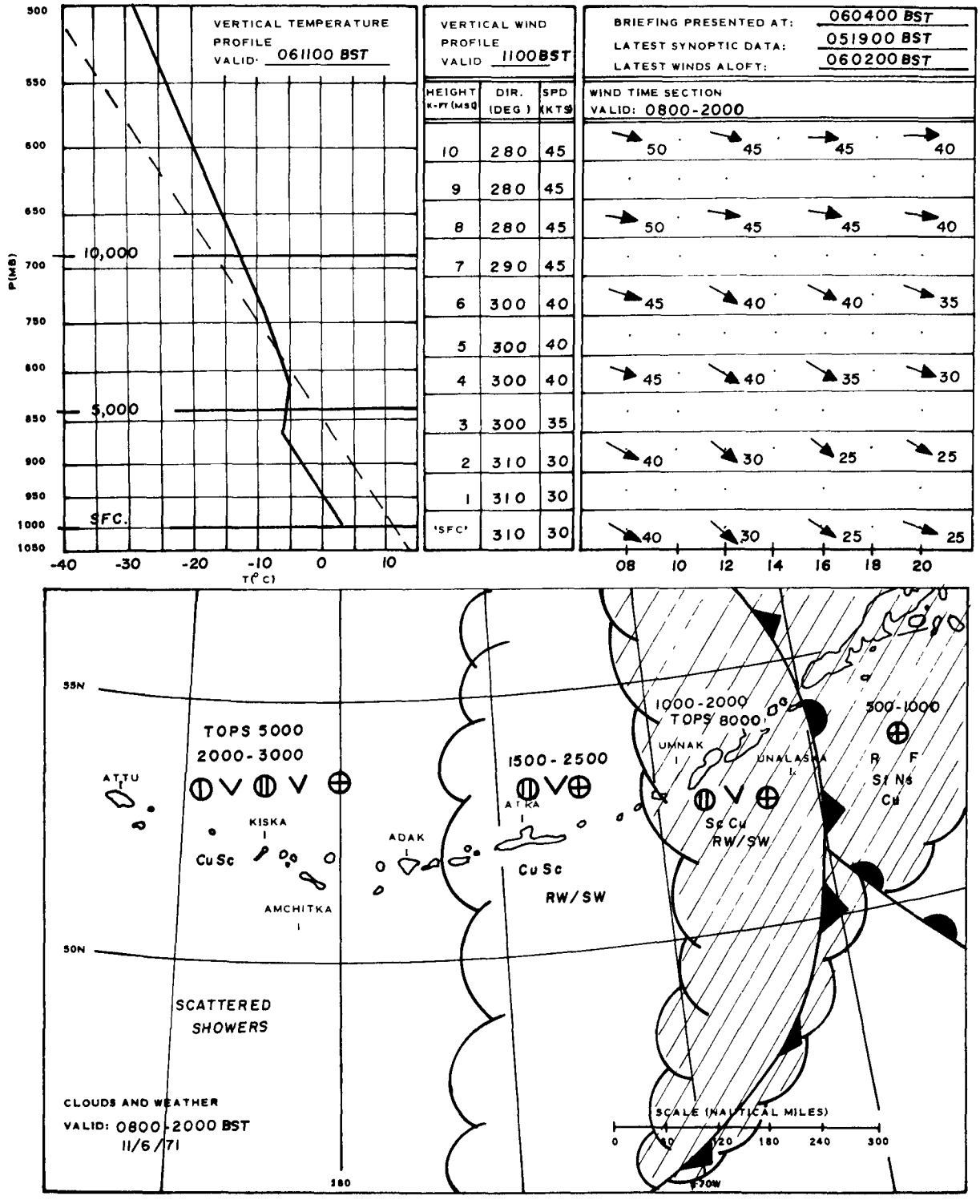



*Figure 8. Composite Briefing Chart, Presented at 0400 BST, November 6, 1971.*

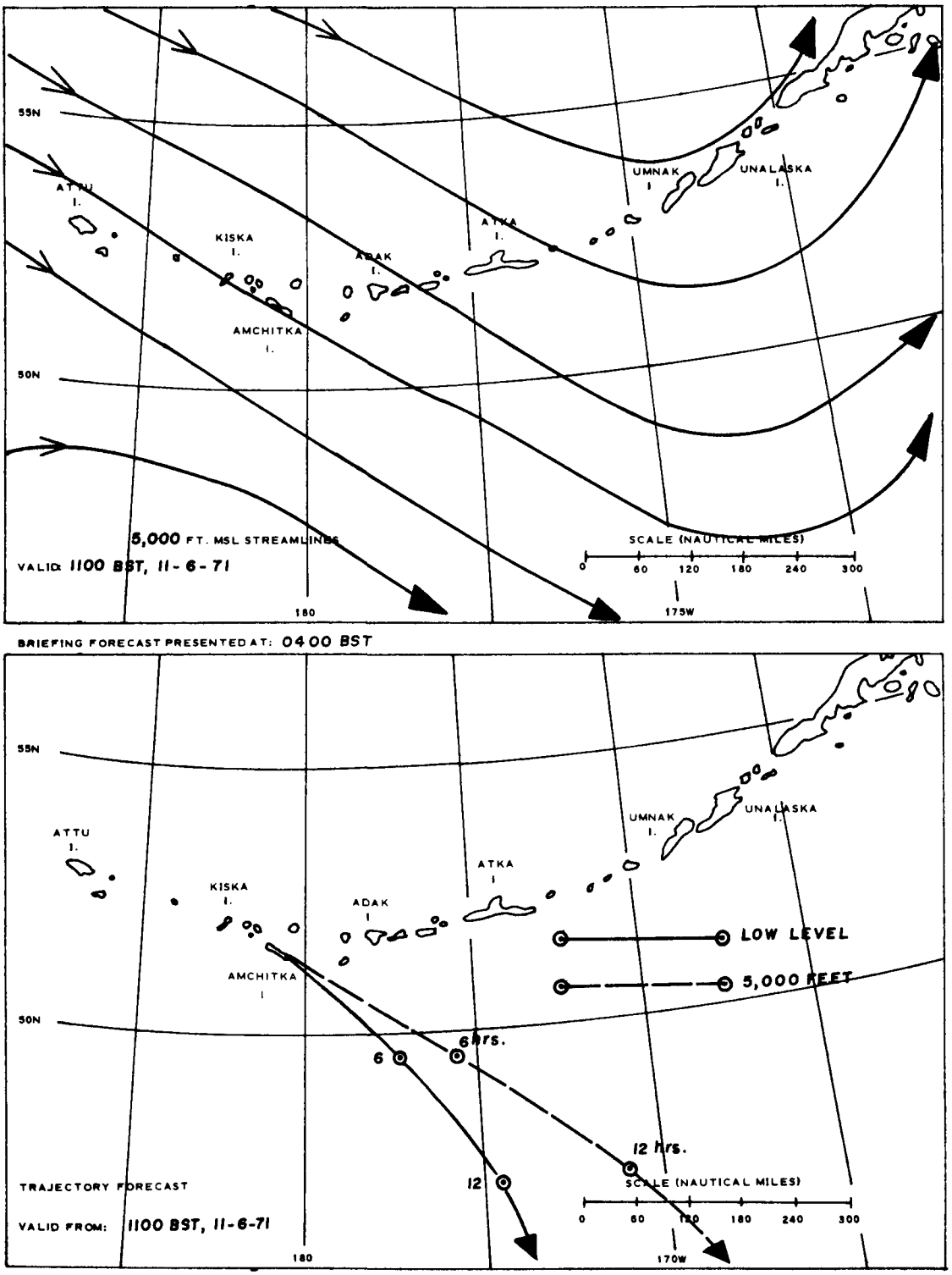



*Figure 9. Streamlines and Trajectory Forecast Chart, Presented at 0400 BST, November 6, 1971.*

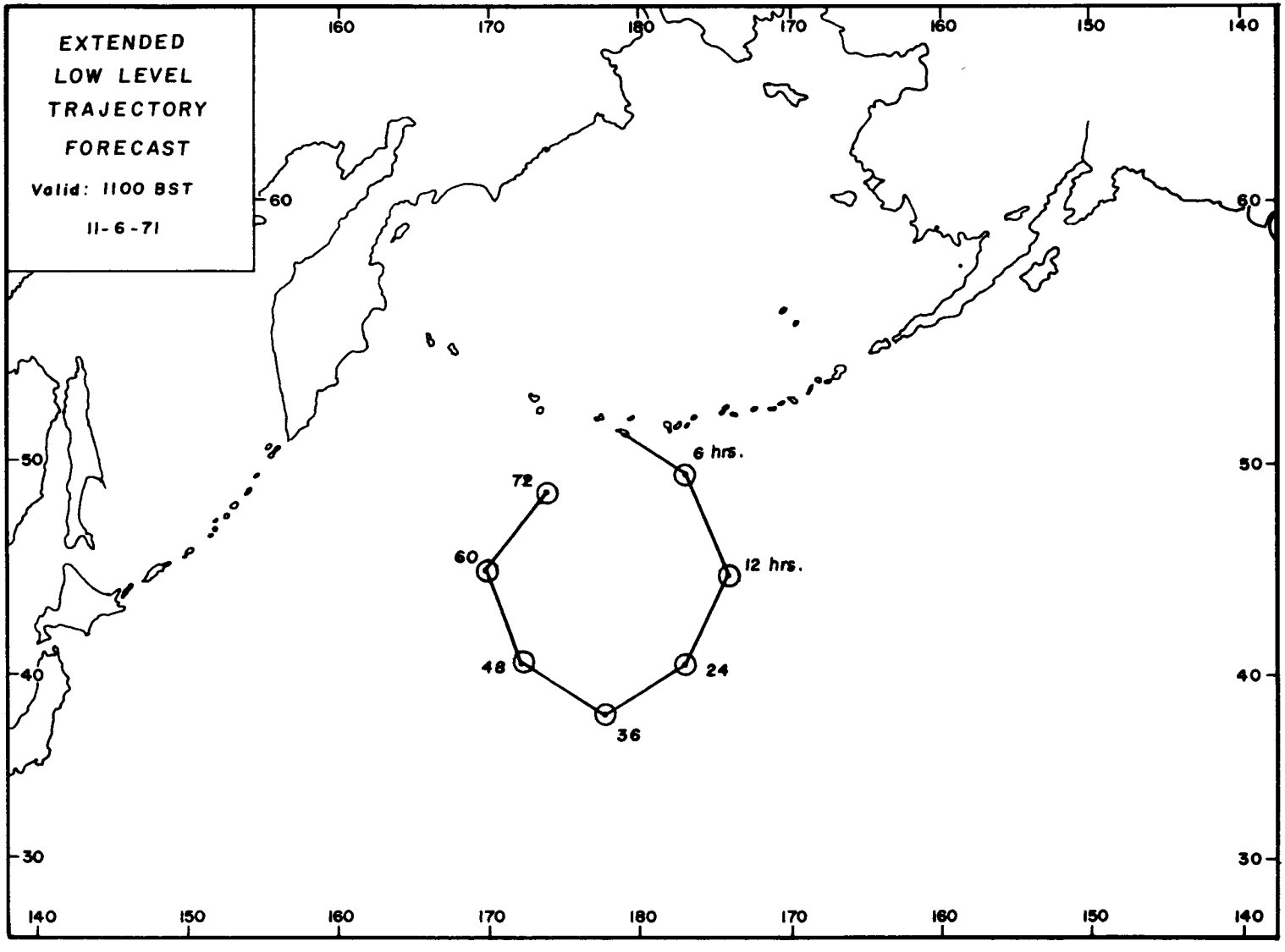



*Figure 10. Extended Low-Level Trajectory Forecast Chart, Presented at 0400 BST, November 6, 1971.*

yesterday has exceeded expectations, and the storm is now forecast to be slightly further east than forecast yesterday. The storm is also somewhat more intense than was expected. Accordingly, low-level winds will be more west-northwesterly than forecast yesterday and slightly stronger.

## 2.4 Discussion

### 2.4.1 Weather Description and Forecast Verification

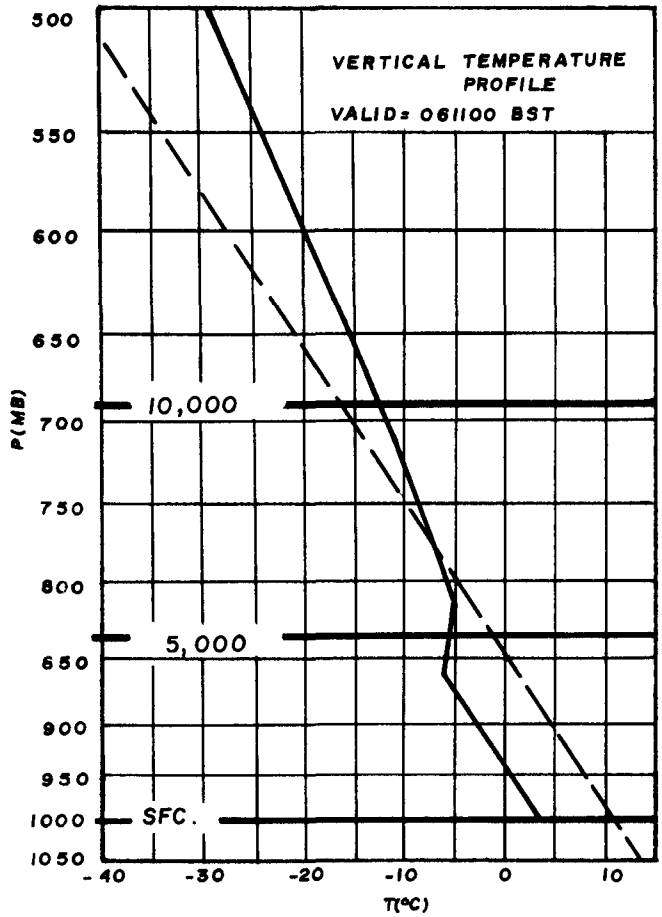
D-1 day weather at Amchitka was characterized by a violent storm that produced hurricane-force winds, rain, and fog. Precipitation totalled 0.47 inch, and wind gusts exceeded 80 knots. Sea level pressure fell from a value of 1020.7 mb at midnight to a low of 975.1 mb at 1730 BST. Wind damage was extensive.

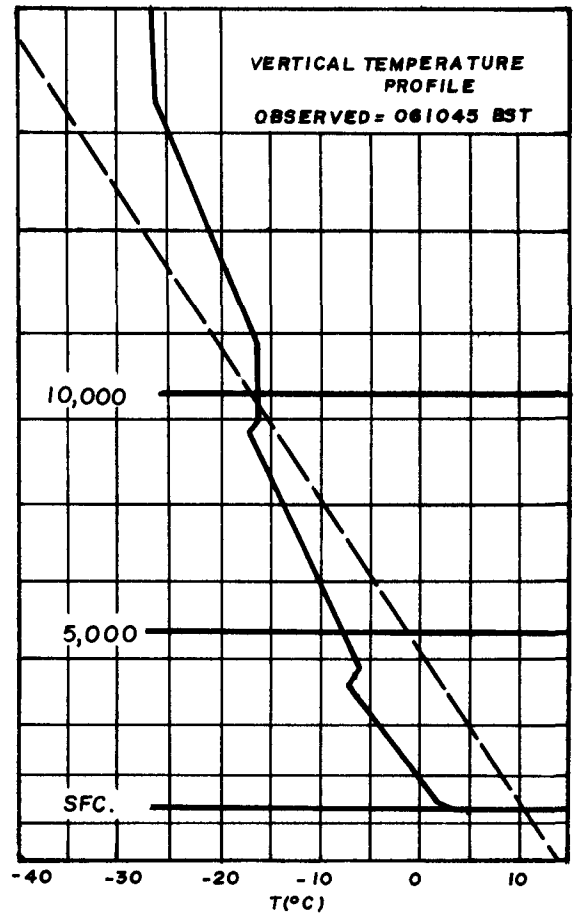
By the morning of D-Day, the storm was centered near the Pribilof Islands and fair weather prevailed in the western Aleutian Islands. Skies were mostly clear and horizontal visibility was unrestricted.

Surface winds and low-level winds aloft were from the west-northwest at speeds of 30-40 knots.

The weather forecasts were generally accurate. D-Day sky conditions and visibility were somewhat better than had been expected. Figure 11 permits a comparison of forecast and observed vertical profiles of temperature and wind.

Figure 12 includes copies of the atmospheric pressure trace recorded during the D-1 major storm and a satellite cloud picture taken at 1130 BST, 30 minutes after CANNIKIN zero-time. The pressure fell rapidly from a high of 29.51 inches of mercury at 2230 on November 4, to a low of 28.16 inches at 1730 on November 5, then rose to 29.31 inches




| Height K-ft(MSL) | DIR. (DEG.) | SPD (KTS) |
|---|---|---|
| 10 | 280 | 45 |
| 9 | 280 | 45 |
| 8 | 280 | 45 |
| 7 | 290 | 45 |
| 6 | 300 | 40 |
| 5 | 300 | 40 |
| 4 | 300 | 40 |
| 3 | 300 | 35 |
| 2 | 310 | 30 |
| 1 | 310 | 30 |
| SFC. | 310 | 30 |

D-DAY FORECAST

| Height K-FT(MSL) | DIR. (DEG.) | SPD (KTS) |
|---|---|---|
| 10 | 285 | 63 |
| 9 | 290 | 56 |
| 8 | 290 | 50 |
| 7 | 295 | 48 |
| 6 | 300 | 46 |
| 5 | 305 | 43 |
| 4 | 300 | 39 |
| 3 | 300 | 37 |
| 2 | 300 | 37 |
| 1 | 285 | 31 |
| SFC. | 300 | 34 |

OBSERVED

*Figure 11. Forecast and Observed Vertical Temperature and Wind Profiles.*

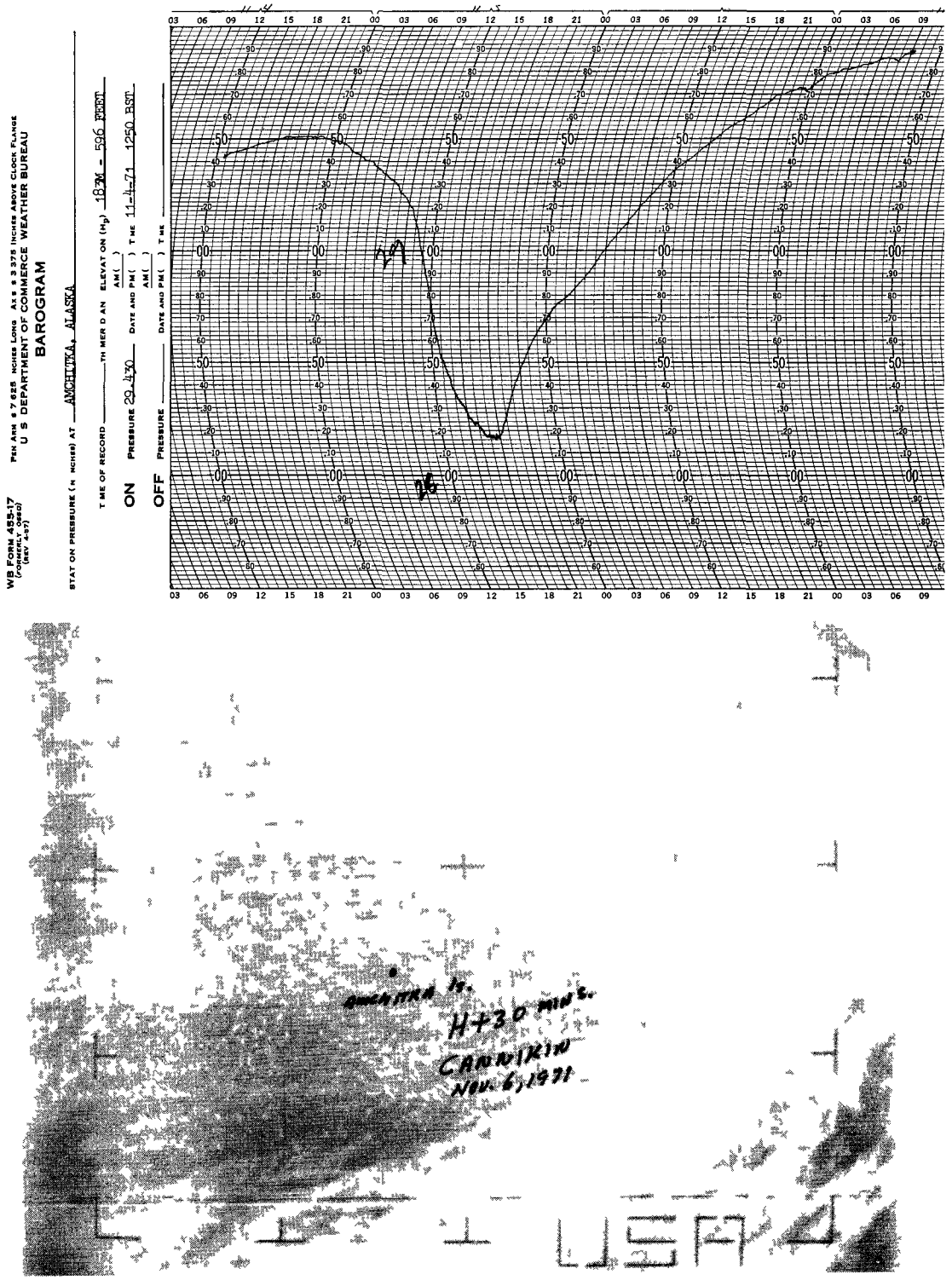



*Figure 12. Atmospheric Pressure Trace and H+30 Minute Satellite Cloud Picture.*

by CANNIKIN zero-time. The satellite cloud picture, taken by the ESSA 8 spacecraft at an approximate altitude of 800 n mi, shows the vortex of the storm far to the northeast of Amchitka. The storm's frontal zone is clearly indicated by the broad band of clouds in the lower right portion of the picture. Amchitka is under nearly clear skies.

2.4.2 General Comments

Classical "text book" weather forecasting principles are normally applicable in the upper-mid-latitude ocean areas where there are no strong surface-temperature gradients and no significant terrain effects. This enables meteorologists to prepare reasonably accurate weather forecasts by charting positions of the large-scale pressure systems and, with the aid of the forecast centers, predicting their movement. Forecasting the movement of pressure systems is relatively easy when the progression of storms is regular--without significant instances of retardation or acceleration. During the CANNIKIN event, the progression of storms was very irregular, making the forecast problem more difficult. However, the general excellence of the National Weather Service computer-prepared forecast charts for the North Pacific, together with the capability of direct readout of weather satellite pictures at Amchitka, resulted in the same relative degree of success in the weather predictions as during the MILROW event. The satellite pictures, in particular, were of incalculable value to the weather forecasting effort by offsetting the sparsity of weather observations in the North Pacific Ocean.

# CHAPTER 3 RADIATION ESTIMATES

## 3.1 Procedure

### 3.1.1 Pre-Event Planning

In May 1970, preliminary estimates of potential radiation exposures were prepared for the Office of Effects Evaluation, NV, for inclusion in the "CANNIKIN Effects Evaluation Report." In October 1970, probability of fallout occurrence over the Base Camp region and the associated center-line exposure estimates for the fall season (September-November) were prepared for the Test Manager. Also in October 1970, estimates of potential aircraft exposures as functions of horizontal distance from SGZ and aircraft altitude were prepared for the Operations Support Division, NV. Estimates of potential radiation exposures based on revised source-term data were prepared, in August 1971, and provided to the Test Manager and Office of Effects Evaluation, NV, and to the Test Sciences Department, Sandia Laboratory. Later in August 1971, D+4- and D+5-day 30-minute fallout exposure estimates for a distance corresponding to that of the Northwest Camp were prepared for the Test Manager, the Director of Control Point Operations, and the Radiological Operations Division, NV.

The various preliminary radiation exposure estimates were prepared for a range of meteorological conditions, using an analog-scaling technique. Device-related data were provided by the Lawrence Livermore Laboratory (LLL). Final selection of the technique best suited for the estimation of potential radiation exposure levels was coordinated with the LLL and the Test Manager.

### 3.1.2 Event-Oriented Support

Estimates of potential radiation exposure levels were made using the analog-scaling technique. The NTS prompt massive-venting model was selected as the scaling analog. The meteorological parameters required as input to this method are:

1. The height above terrain to which the potential effluent cloud will rise.

2. The angular shear in the winds-aloft hodograph through the cloud layer.

3. The mean wind speed in the cloud layer.

Prior to a scheduled readiness briefing, the weather forecast prepared by the Weather Briefer was utilized by the Radiation Briefer to estimate the above parameters and their temporal and spatial variability.

At the readiness briefings, the Radiation Briefer presented the following information:

1. The estimated fallout sector, hotline orientation, and arrival times of the main portion of the potential debris cloud.

2. Curves of potential external-gamma exposure during cloud passage and deposition infinite exposure along the hotline as functions of distance from SGZ.

### 3.1.3 Radiation Analysis

Post-event responsibilities assigned to the RERB include the evaluation and analysis of radiological data to document the observed radiation pattern, to obtain empirical information for improving radiation estimates, and to provide additional analogs for future events.

## 3.2 Results

### 3.2.1 Event-Oriented Support

At the D-9 readiness briefing the fundamental assumptions adopted for deriving radiation estimates for the CANNIKIN event were presented. In essence, these were:

1. The worst credible accident would be one in which radioactive gaseous and particulate debris would be released to the atmosphere through a prompt dynamic venting mechanism analogous to that of the NTS prompt massive venting model.

2. The analog-scaling technique would be the most applicable technique by which radiation estimates could be derived.

3. The NTS prompt massive venting model would be used as the scaling analog.

At the final readiness briefing on event day (H-7 hours), the predicted atmospheric stability and wind structure were discussed and interpreted as the basis for predicting the vertical mixing of the potential nuclear debris cloud, the cloud mean-transport speed, and the delineation of the fallout sector and hotline orientation. It was expected that any dynamically vented material would mix upward to about 4,000 ft above the surface by H+1 hour with little change thereafter. The potential effluent cloud was predicted to move toward the southeast (bearing 125 degrees True) at about 33 mph (29 kt).

The ten-degree shear in the predicted winds-aloft hodograph was expected to remain about the same throughout the day.

The estimated fallout sector, hotline orientation, and hourly positions of the potential main debris cloud through H+5 hours are shown in Figures 13 and 14.

3.2.2 Post-Event Support

The Radiation Briefer remained on site to provide support until he was released by the Test Manager on D+2 days, 8 November 1971.

3.2.3 Radiation Analysis

All post-event radiological data that were acquired indicate that no radiation was released to the atmosphere as a result of the CANNIKIN test, and no radiation analysis was required.

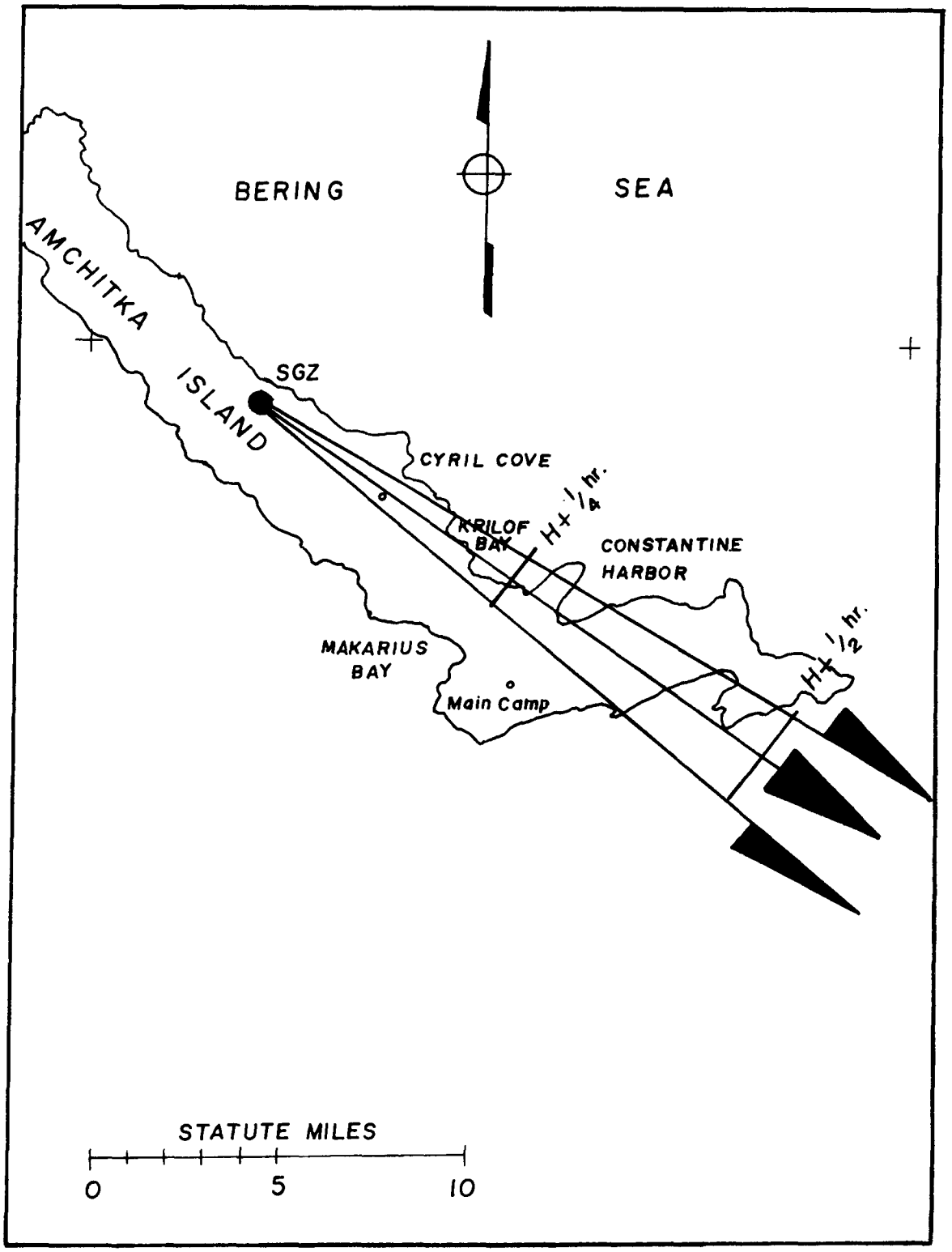



*Figure 13. Fallout Sector Estimate, Presented at 0400 BST, November 6, 1971.*

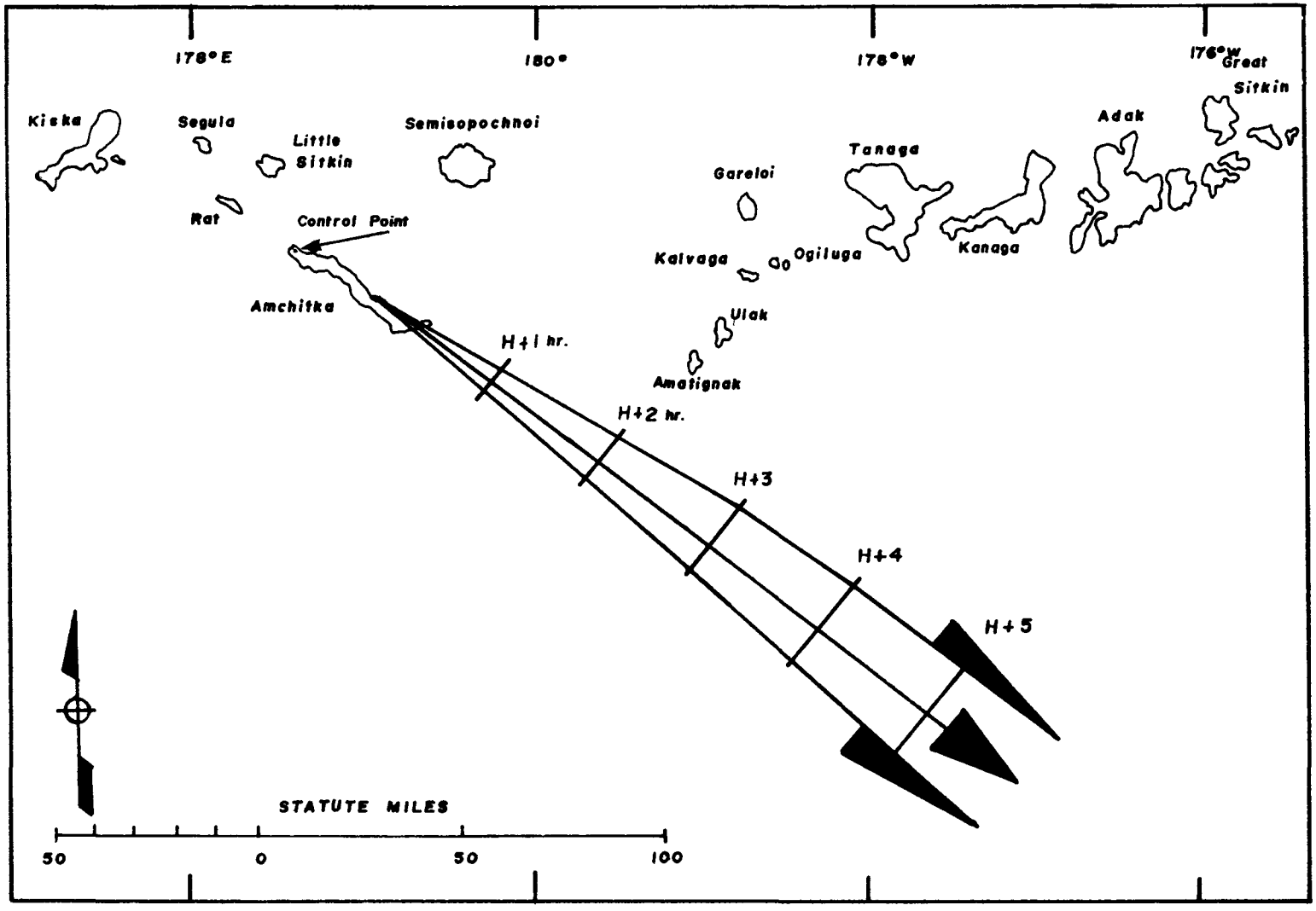



*Figure 14. Extended Fallout Sector Estimate, Presented at 0400 BST, November 6, 1971.*

# CHAPTER 4 CONCLUSION AND RECOMMENDATIONS

## 4.1 Conclusions

All ARL-LV objectives were met. Climatological data provided were sufficient for pre-event planning and preparation. Meteorological observations, data, and forecasts in support of the Safety Program were adequate for the particular weather conditions that occurred during this period. Data might have been inadequate to describe slowly moving, more complex circulations that can occur in this area.

## 4.2 Recommendations

Any future operations at Amchitka (or any other remote location) requiring meteorological support must have weather communications of the excellent quality available during CANNIKIN.

The usefulness of weather satellite pictures to the forecasting effort in remote, data-sparse areas cannot be overemphasized. Thus, the capability of direct readout of the satellites is considered a "must" in such areas.

APPENDIX A

CANNIKIN METEOROLOGICAL DATA

SURFACE OBSERVATION AT : AMCHITKA ISLAND, ALASKA; Elevation 590 ft MSL, 1045 BST, November 6, 1971

| | | |
|---|---|---|
| Sky Condition and Weather | : | 1500 Scattered |
| Cloud Amount and Type | : | 4 Tenths Cumulus |
| Visibility | : | Unrestricted |
| Atmospheric Pressure | : | 991.5 Millibars |
| Temperature | : | 3.9°C |
| Dew Point Temperature | : | 0.1°C |
| Relative Humidity | : | 75% |

UPPER AIR DATA AT : NORTHWEST CAMP CP, AMCHITKA ISLAND, ALASKA, 1045 BST, November 6, 1971

| HEIGHT (Ft MSL) | WIND (Deg/Kts) | PRESSURE (mb) | TEMPERATURE (°C) | DEW POINT (°C) | RELATIVE HUMIDITY (%) |
|---|---|---|---|---|---|
| SFC 590 | 290/28 | 991.5 | 3.9 | 0.1 | 75 |
| 900 | 285/31 | 980 | 2.6 | -6.7 | 50 |
| 1000 | 285/32 | 976 | 2.2 | -6.6 | 52 |
| 1750 | 295/37 | 949 | 0.0 | -7.1 | 59 |
| 2000 | 300/37 | 940 | -0.7 | -6.8 | 63 |
| 3000 | 300/37 | 904 | -3.6 | -7.0 | 77 |
| 3800 | 300/38 | 878 | -5.7 | -7.5 | 86 |
| 4000 | 300/39 | 870 | -6.3 | -12.8 | 60 |
| 4100 | 305/40 | 867 | -6.4 | -14.6 | 52 |
| 4400 | 305/40 | 856 | -5.7 | -19.8 | 32 |
| 4610 | 305/42 | 850 | -6.4 | -20.3 | 32 |
| 5000 | 305/43 | 838 | -7.5 | -20.7 | 34 |
| 6000 | 300/46 | 806 | -9.8 | -21.8 | 37 |
| 7000 | 295/48 | 772 | -12.1 | -23.0 | 40 |
| 7900 | 290/50 | 745 | -14.4 | -24.5 | 42 |
| 8000 | 290/50 | 742 | -14.5 | -24.9 | 41 |
| 9000 | 290/56 | 713 | -16.7 | -32.1 | 23 |
| 9488 | 290/60 | 700 | -15.9 | -34.8 | 18 |
| 10000 | 285/63 | 686 | -15.7 | -34.6 | 18 |
| 10100 | 285/63 | 682 | -15.7 | -34.6 | 18 |
| 10850 | 285/64 | 662 | -15.8 | -34.7 | 18 |
| 11000 | 285/64 | 658 | -16.2 | -35.0 | 18 |
| 12000 | 285/72 | 632 | -18.0 | -36.6 | 18 |
| 13000 | 285/71 | 607 | -19.8 | -37.1 | 20 |
| 13500 | 285/70 | 594 | -20.7 | -38.3 | 19 |

| HEIGHT (Ft MSL) | WIND (Deg/Kts) | PRESSURE (mb) | TEMPERATURE (°C) | DEW POINT (°C) | RELATIVE HUMIDITY (%) |
|---|---|---|---|---|---|
| 14000 | 285/71 | 582 | -21.6 | -39.6 | 18 |
| 15000 | 285/72 | 558 | -23.4 | -40.6 | 19 |
| 16000 | 280/75 | 536 | -25.0 | -42.5 | 18 |
| 16250 | 285/78 | 530 | -25.3 | -41.2 | 19 |
| 17000 | 280/85 | 512 | -25.7 | -42.6 | 19 |
| 17644 | 280/92 | 500 | -26.2 | -43.0 | 19 |
| 18000 | 280/95 | 492 | -26.9 | -43.6 | 19 |
| 19000 | 280/103 | 472 | -28.8 | -45.3 | 19 |
| 20000 | 280/113 | 452 | -30.4 | -46.6 | 19 |
| 21000 | 280/128 | 432 | -32.5 | -48.4 | 19 |
| 22000 | 275/117 | 414 | -34.2 | -49.4 | 20 |
| 22835 | 270/104 | 400 | -35.6 | -50.6 | 20 |

CANNIKIN METEOROLOGICAL DATA

SUPPLEMENTARY WINDS ALOFT DATA (Degrees and Knots) : November 6, 1971

Observational Point : AMCHITKA ISLAND, ALASKA (NORTHWEST CAMP)

| | | | | | | |
|---|---|---|---|---|---|---|
| Time of Ob. (BST) | : | 0230 | 0700 | 0835 | 0900 | 1000 |
| Type of Measurement | : | RAWIN | RAWIN | PIBAL | RAWIN | RAWIN |
| H Surface | | 260/30 | 280/30 | 290/30 | 280/30 | 290/30 |
| E 1000 | | 260/39 | 285/33 | 290/36 | 290/25 | 295/31 |
| I 2000 | | 265/54 | 290/49 | 285/47 | 295/34 | 300/38 |
| G 3000 | | 270/55 | 290/58 | 290/42 | 300/37 | 300/45 |
| H 4000 | | 275/58 | 290/54 | 290/40 | 300/40 | 300/49 |
| T 5000 | | 285/56 | 300/52 | 290/55 | 300/47 | 300/49 |
| 6000 | | 280/39 | 295/52 | -- | 300/50 | 300/47 |
| 7000 | | 275/50 | 290/47 | | 295/54 | 295/47 |
| 8000 | | 280/52 | 290/48 | | 290/55 | 290/50 |
| 9000 | | 270/42 | 285/45 | | 290/60 | 285/44 |
| 10000 | | 270/45 | 280/47 | | 290/63 | 290/70 |
| 11000 | | -- | 280/51 | | 290/55 | -- |
| (Ft MSL) 12000 | | 270/58 | -- | | | |
| 13000 | | -- | | | | |
| 14000 | | 270/64 | | | | |
| 15000 | | -- | | | | |
| 16000 | | 270/68 | | | | |
| 17000 | | 275/64 | | | | |

CANNIKIN METEOROLOGICAL DATA

SUPPLEMENTARY WINDS ALOFT DATA (Degrees and Knots) : November 6, 1971

Observational Point : AMCHITKA ISLAND, ALASKA (NORTHWEST CAMP)

| | | Time of Ob. (BST) : | 1045 | 1300 | 1600 | 1900 |
|---|---|---|---|---|---|---|
| | | Type of Measurement : | RAWIN | PIBAL | RAWIN | RAWIN |
| H | Surface | | 290/28 | 280/30 | 300/18 | 290/18 |
| E | 1000 | | 285/32 | 280/32 | 300/20 | 295/20 |
| I | 2000 | | 300/37 | 290/35 | 300/29 | 300/28 |
| G | 3000 | | 300/37 | 300/40 | 300/29 | 295/32 |
| H | 4000 | | 300/39 | 300/48 | 295/32 | 295/35 |
| T | 5000 | | 305/43 | 300/50 | 300/35 | 295/37 |
| | 6000 | | 300/46 | 300/50 | 300/34 | 295/39 |
| | 7000 | | 295/48 | -- | 300/33 | 295/41 |
| (Ft MSL) | 8000 | | 290/50 | | 295/43 | 290/37 |
| | 9000 | | 290/56 | | 300/60 | 285/40 |
| | 10000 | | 285/63 | | 300/77 | 285/47 |

## CANNIKIN METEOROLOGICAL DATA

SUPPLEMENTARY WINDS ALOFT DATA (Degrees and Knots) : November 7, 1971

Observational Point : AMCHITKA ISLAND, ALASKA (NORTHWEST CAMP)

| | | Time of Ob. (BST) : | 0100 | 0700 | 1300 |
|---|---|---|---|---|---|
| | | Type of Measurement : | RAWIN | RAWIN | RAWIN |
| H | Surface | | 270/10 | 240/10 | 240/08 |
| E | 1000 | | 275/13 | 250/13 | 245/08 |
| I | 2000 | | 285/18 | 265/18 | 250/09 |
| G | 3000 | | 290/20 | 270/21 | 250/20 |
| H | 4000 | | 290/21 | 265/23 | 250/21 |
| T | 5000 | | 295/23 | 270/20 | 250/16 |
| | 6000 | | 300/26 | 280/21 | 250/18 |
| | 7000 | | 295/30 | 290/22 | 260/21 |
| | 8000 | | 285/34 | 290/25 | 265/24 |
| | 9000 | | 285/36 | 290/29 | 270/27 |
| | 10000 | | 285/41 | 290/34 | 285/33 |
| | 11000 | | -- | -- | -- |
| (Ft MSL) | 12000 | | 280/48 | 280/50 | 290/42 |
| | 13000 | | -- | -- | -- |
| | 14000 | | 275/50 | 280/60 | 285/65 |
| | 15000 | | -- | -- | -- |
| | 16000 | | 275/62 | 280/63 | 280/74 |
| | 17000 | | -- | -- | -- |
| | 18000 | | 270/52 | 285/76 | 280/76 |
| | 19000 | | -- | -- | -- |
| | 20000 | | 275/62 | 290/85 | 280/69 |

CANNIKIN METEOROLOGICAL DATA

SUPPLEMENTARY WINDS ALOFT DATA (Degrees and Knots) : November 5, 1971

Observational Point : SHEMYA, ALASKA

| | | Time of Ob. (BST) : | 1600 | 2000 | 2200 |
|---|---|---|---|---|---|
| | | Type of Measurement : | RAWIN | RAWIN | RAWIN |
| H | Surface | | 270/08 | 290/34 | 310/22 |
| E | 1000 | | 280/25 | 295/47 | 295/23 |
| I | 2000 | | 290/33 | 300/53 | 290/33 |
| G | 3000 | | 310/34 | 300/53 | 290/46 |
| H | 4000 | | 315/33 | 300/52 | 300/43 |
| T | 5000 | | 320/33 | 300/50 | -- |
| | 6000 | | 320/33 | 300/49 | 300/41 |
| | 7000 | | 310/33 | 300/52 | 300/46 |
| | 8000 | | 305/32 | 300/56 | 300/44 |
| | 9000 | | 300/31 | 295/52 | 285/46 |
| | 10000 | | 280/28 | 295/53 | -- |
| | 11000 | | 275/23 | 290/53 | -- |
| (Ft MSL) | 12000 | | 285/20 | 285/48 | 275/43 |
| | 13000 | | 295/22 | 280/49 | -- |
| | 14000 | | 290/24 | 285/54 | 275/45 |
| | 15000 | | 280/25 | 280/50 | -- |
| | 16000 | | 270/26 | 280/48 | 270/39 |
| | 17000 | | 275/33 | 280/55 | -- |
| | 18000 | | 270/38 | 280/58 | -- |
| | 19000 | | 270/42 | 275/48 | -- |
| | 20000 | | 270/44 | 275/43 | 265/39 |

## CANNIKIN METEOROLOGICAL DATA

SUPPLEMENTARY WINDS ALOFT DATA (Degrees and Knots) : November 6, 1972

Observational Point : SHEMYA, ALASKA

| | | Time of Ob. (BST) : | 0400 | 0700 | 1000 |
|---|---|---|---|---|---|
| | | Type of Measurement : | RAWIN | RAWIN | RAWIN |
| H | Surface | | 310/27 | 310/28 | 280/14 |
| E | 1000 | | 305/43 | 300/31 | 285/19 |
| I | 2000 | | 300/41 | 300/34 | 295/25 |
| G | 3000 | | 300/39 | 305/37 | 300/25 |
| H | 4000 | | 300/37 | 305/41 | 300/24 |
| T | 5000 | | 300/36 | 300/41 | 295/24 |
| | 6000 | | 300/35 | 295/40 | 290/27 |
| | 7000 | | 295/37 | 290/37 | 280/28 |
| | 8000 | | 295/37 | 290/36 | 275/29 |
| | 9000 | | 285/39 | 285/38 | 275/32 |
| | 10000 | | 280/42 | 280/40 | 275/38 |
| | 11000 | | 275/40 | 280/43 | 280/55 |
| (Ft MSL) | 12000 | | 280/39 | 280/46 | 285/52 |
| | 13000 | | 275/40 | 280/52 | 285/65 |
| | 14000 | | 270/44 | 280/57 | 280/70 |
| | 15000 | | 270/45 | 280/57 | 280/70 |
| | 16000 | | 265/45 | 275/59 | 280/68 |
| | 17000 | | 265/50 | 275/63 | 280/77 |
| | 18000 | | 265/53 | 275/66 | 280/82 |
| | 19000 | | 265/58 | 275/69 | -- |
| | 20000 | | 265/62 | 275/76 | -- |

## CANNIKIN METEOROLOGICAL DATA

SUPPLEMENTARY WINDS ALOFT DATA (Degrees and Knots) : November 6, 1971

Observational Point : ADAK, ALASKA

| | | | | |
|---|---|---|---|---|
| Time of Ob. (BST) | | : | 1000 | 1300 |
| Type of Measurement | | : | RAWIN | RAWIN |
| H | Surface | | 270/28 | 270/28 |
| E | 1000 | | -- | -- |
| I | 2000 | | -- | -- |
| G | 3000 | | 280/52 | 280/52 |
| H | 4000 | | 280/58 | 280/58 |
| T | 5000 | | 285/62 | 280/62 |
| | 6000 | | 285/62 | 285/62 |
| | 7000 | | 290/56 | 290/56 |
| (Ft MSL) | 8000 | | 290/51 | 290/49 |
| | 9000 | | 285/52 | 285/52 |
| | 10000 | | 285/58 | 285/54 |

## CANNIKIN METEOROLOGICAL DATA

SUPPLEMENTARY WIND DATA
(Degrees/Knots) : November 6, 1971

| TOWER | | : MAIN CAMP TOWER #8 | SHEMYA, ALASKA | ADAK, ALASKA |
|---|---|---|---|---|
| TOWER Ht. (Ft. Abv.Sfc.) | | : 88' | -- | -- |
| T | 0000 | 270/40 | 310/26 | 230/34 |
| | 0100 | 270/41 | 310/31 | 230/30 |
| I | 0200 | 270/34 | 300/27 | 220/28 |
| | 0300 | 280/32 | 290/16 | 220/28 |
| M | 0400 | 280/31 | 300/27 | -- |
| | 0500 | 290/39 | 310/27 | 240/26 |
| E | 0600 | 300/40 | 310/24 | 240/26 |
| | 0700 | 310/37 | 310/28 | 240/20 |
| | 0800 | 290/36 | 290/18 | 280/32 |
| | 0900 | 310/40 | 290/15 | 270/36 |
| | 1000 | 300/32 | 290/12 | 270/28 |
| | 1100 | 300/35 | 280/16 | 270/30 |
| (BST) | 1200 | 310/28 | 340/14 | 260/24 |
| | 1300 | 310/34 | 280/14 | 290/24 |
| | 1400 | 310/33 | 280/20 | 280/34 |
| | 1500 | 310/30 | 270/20 | -- |
| | 1600 | 310/26 | 290/12 | 280/26 |
| | 1700 | 310/26 | 280/15 | 290/26 |
| | 1800 | 310/32 | 270/14 | 290/20 |
| | 1900 | 310/27 | 300/10 | 280/26 |
| | 2000 | 310/26 | 290/09 | 280/20 |
| | 2100 | 300/22 | 250/26 | 300/20 |
| | 2200 | 300/24 | 250/26 | 290/22 |
| | 2300 | 320/18 | 230/21 | 290/19 |

HOURLY WEATHER
November 6, 1971

AMCHITKA, ALASKA (NW CAMP)

| TIME (BST) | Sky Condition | Visibility (mi) | Weather and Obstructions to Vision | Sea Level Pressure (mb) | Temp. (°F) | Dew Point Temp (°F) | Wind Dir. (deg) | Wind Spd. (kt) |
|---|---|---|---|---|---|---|---|---|
| 0000 | Estimated 1500' Ovc.* | 10 | | 994.1 | 41 | 39 | 270 | 40G50** |
| 0100 | Estimated 1500' Ovc. | 10 | | 996.2 | 41 | 39 | 270 | 31G41 |
| 0200 | Estimated 1500' Ovc. | 10 | | 997.7 | 41 | 39 | 280 | 34G44 |
| 0300 | Estimated 1500' Ovc. | 7 | | 999.0 | 40 | 40 | 260 | 31G43 |
| 0400 | Estimated 1500' Bkn. | 7 | | 1000.8 | 40 | 37 | 250 | 36G45 |
| 0500 | 1500' Sctd.<br>14,000' Thin Bkn. | 10 | | 1002.4 | 39 | 37 | 260 | 35G45 |
| 0600 | Estimated 1500' Bkn. | 10 | | 1004.8 | 38 | 36 | 270 | 26G35 |
| 0700 | Estimated 1500' Bkn | 7 | Light rain showers | 1006.8 | 37 | 35 | 270 | 28G38 |
| 0800 | 1500' Sctd.<br>14,000' Sctd. | 10 | | 1008.9 | 37 | 35 | 300 | 25G35 |
| 0900 | 1500' Sctd. | 10 | | 1010.9 | 37 | 33 | 300 | 36 |
| 1000 | 1500' Sctd. | 10 | | 1013.2 | 38 | 31 | 300 | 37 |

* Ovc. - Overcast (More than 9/10 sky cover)
Bkn. - Broken (6/10 - 9/10 sky cover)
Sctd. - Scattered(1/10 - less than 6/10 sky cover)
** G50 - Gusts to 50 knots

24 Hour Precip. (inches) Trace

HOURLY WEATHER AMCHITKA, ALASKA (NW CAMP) (Continued)
November 6, 1971

| TIME (BST) | Sky Condition | Visibility (mi) | Weather and Obstructions to Vision | Sea Level Pressure (mb) | Temp. (°F) | Dew Point Temp (°F) | Wind Dir. (deg) | Wind Spd. (kt) |
|---|---|---|---|---|---|---|---|---|
| 1100 | 1500' Sctd. | 10 | | 1015.6 | 38 | 33 | 300 | 35 |
| 1200 | 2000' Sctd. | 10 | | 1017.0 | 40 | 32 | 300 | 32 |
| 1300 | 2000' Sctd. | 10 | | 1018.2 | 40 | 31 | 300 | 30 |
| 1400 | 2000' Sctd. | 10 | | 1019.4 | 40 | 34 | 310 | 36 |
| 1500 | 2000' Sctd. | 10 | | 1020.8 | 39 | 30 | 310 | 26 |
| 1600 | 2000' Sctd. | 10 | | 1022.1 | 38 | 30 | 310 | 29 |
| 1700 | 1500' Sctd. | 10 | Light snow showers | 1023.4 | 37 | 31 | 310 | 28 |
| 1800 | 1500' Sctd. | 10 | | 1024.6 | 36 | 28 | 310 | 26 |
| 1900 | 1500' Sctd. | 10 | | 1025.8 | 36 | 28 | 310 | 26 |
| 2000 | 1500' Sctd. | 10 | | 1026.9 | 36 | 29 | 300 | 20 |
| 2100 | 1500' Sctd. | 10 | | 1028.3 | 35 | 29 | 300 | 24 |
| 2200 | 1500' Sctd. | 10 | | 1028.8 | 35 | 29 | 300 | 23 |
| 2300 | 1500' Sctd. | 10 | | 1029.5 | 35 | 30 | 310 | 20 |

HOURLY WEATHER (As Available) AMCHITKA, ALASKA (AIRFIELD)
November 6, 1971

| TIME (BST) | Sky Condition | Visibility (mi) | Weather and Obstructions to Vision | Sea Level Pressure (mb) | Temp. (°F) | Dew Point Temp (°F) | Wind Dir. (deg) | Wind Spd. (kt) |
|---|---|---|---|---|---|---|---|---|
| 0000 | Measured 1500' Ovc. | 4 | Very light drizzle<br>Fog | 995.3 | 43 | 39 | 240 | 30G50 |
| 0100 | Measured 1500' Ovc. | 4 | Very light drizzle<br>Fog | 997.1 | 43 | 39 | 240 | 32G48 |
| 0200 | Measured 1000' Ovc. | 6 | Fog | 998.4 | 43 | 39 | 250 | 28G40 |
| 0300 | Measured 1500' Bkn.<br>3000' Ovc. | 6 | Light Drizzle<br>Fog | 999.8 | 43 | 39 | 260 | 26G40 |
| 0400 | Measured 900' Bkn.<br>2500' Ovc. | 6 | Fog | 1000.9 | 42 | 40 | 260 | 25G40 |
| 0500 | Measured 1500' Ovc. | 6 | Light rain<br>Fog | 1002.5 | 42 | 40 | 250 | 25G40 |
| 0600 | 1500' Sctd.<br>3000' Ovc. | 7 | Very light rain | 1004.5 | 41 | 40 | 260 | 25G44 |
| 1500 | 2000' Sctd. | 20 | | 1019.9 | 41 | 30 | 280 | 20G30 |
| 1700 | Measured 2500' Bkn. | 20 | | 1023.3 | 39 | 32 | 290 | 20G30 |
| 1800 | Measured 2500' Bkn. | 20 | | 1024.2 | M | M | 280 | 20G30 |

HOURLY WEATHER
November 6, 1971

ADAK, ALASKA

| TIME (BST) | Sky Condition | Visibility (mi) | Weather and Obstructions to Vision | Sea Level Pressure (mb) | Temp (°F) | Dew Point Temp. (°F) | Wind Dir. (deg) | Wind Spd. (kt) |
|---|---|---|---|---|---|---|---|---|
| 0000 | 600' Sctd.<br>Estimated 1800' Ovc. | 1½ | | 989.4 | 45 | 41 | 230 | 34G45 |
| 0100 | 200' Sctd.<br>Estimated 1000' Ovc. | 3 | Light rain<br>Fog | 991.1 | 45 | 41 | 230 | 30G42 |
| 0200 | Estimated 1000' Ovc. | 6 | Fog | 992.5 | 45 | 41 | 220 | 28G42 |
| 0300 | 200' Sctd.<br>Estimated 1500' Ovc. | 5 | Fog | 993.1 | 45 | 40 | 220 | 28G42 |
| 0400 | Missing | -- | -- | -- | -- | -- | -- | -- |
| 0500 | Estimated 2000' Ovc. | 5 | Fog | 995.7 | 45 | 41 | 240 | 26G35 |
| 0600 | Estimated 2000' Ovc. | 5 | Fog | 997.0 | 44 | 41 | 240 | 26G38 |
| 0700 | Estimated 2500' Ovc. | 7 | | 998.3 | 44 | 42 | 240 | 20G29 |
| 0800 | Estimated 1000' Bkn.<br>2500' Ovc. | 7 | Light rain<br>showers | 1000.3 | 42 | 38 | 280 | 32G41 |
| 0900 | Estimated 1000' Bkn.<br>2500' Ovc. | 7 | Light rain<br>showers | 1002.4 | 42 | 36 | 270 | 36G42 |

HOURLY WEATHER
November 6, 1971

ADAK, ALASKA (Continued)

| TIME (BST) | Sky Condition | Visibility (mi) | Weather and Obstructions to Vision | Sea Level Pressure (mb) | Temp (°F) | Dew Point Temp. (°F) | Wind Dir. (deg) | Wind Spd. (kt) |
|---|---|---|---|---|---|---|---|---|
| 1000 | Estimated 3000' Bkn. | 7 | | 1004.4 | 42 | 35 | 270 | 28G42 |
| 1100 | 1000' Sctd.<br>Estimated 2500' Bkn. | 7 | | 1006.0 | 44 | 35 | 270 | 30G45 |
| 1200 | Estimated 2500' Bkn. | 7 | | 1007.9 | 44 | 35 | 260 | 24 |
| 1300 | Estimated 2500' Bkn. | 3 | Ice pellets | 1009.5 | 43 | 38 | 290 | 24 |
| 1400 | 600' Sctd.<br>Estimated 2500' Bkn. | 5 | Ice pellets | 1011.2 | 40 | 35 | 280 | 34G42 |
| 1500 | Missing | -- | -- | -- | -- | -- | -- | -- |
| 1600 | Estimated 2000' Bkn.<br>7000' Bkn. | 7 | Light rain showers | 1014.2 | 41 | 33 | 280 | 26 |
| 1700 | Estimated 2000' Bkn. | 7 | | 1016.0 | 37 | 32 | 290 | 26G36 |
| 1800 | Estimated 2000' Bkn. | 7 | | 1017.5 | 38 | 30 | 290 | 20 |
| 1900 | Estimated 2500' Bkn. | 7 | | 1019.4 | 39 | 29 | 280 | 26G39 |
| 2000 | 3000' Sctd. | 7 | | 1021.1 | 38 | 29 | 280 | 20G40 |
| 2100 | 3000' Sctd. | 10 | | 1022.2 | 38 | 22 | 300 | 20G37 |
| 2200 | 3000' Sctd. | 10 | | 1024.0 | 39 | 23 | 290 | 22 |
| 2300 | Estimated 3000' Bkn. | 10 | | 1024.1 | 38 | 25 | 290 | 19 |

HOURLY WEATHER
November 6, 1971

SHEMYA, ALASKA

| TIME (BST) | Sky Condition | Visibility (mi) | Weather and Obstructions to Vision | Sea Level Pressure (mb) | Temp. (°F) | Dew Point Temp. (°F) | Wind Dir. (deg) | Wind Spd. (kt) |
|---|---|---|---|---|---|---|---|---|
| 0000 | Measured 1900' Ovc. | 5 | Rain | 995.6 | 40 | 35 | 310 | 26G32 |
| 0100 | Estimated 1500' Ovc. | 7 | | 997.6 | 39 | 33 | 310 | 31G38 |
| 0200 | Measured 1400' Ovc. | 7 | Light rain | 1000.0 | 38 | 33 | 300 | 27G36 |
| 0300 | Measured 1600' Ovc. | 7 | Light rain showers | 1002.0 | 39 | 33 | 290 | 16G25 |
| 0400 | Measured 1300' Bkn. | 7 | Light rain showers | 1003.7 | 38 | 32 | 300 | 27G37 |
| 0500 | 1300' Sctd. | 7 | | 1006.1 | 38 | 30 | 310 | 27G37 |
| 0600 | Measured 2800' Bkn. | 7 | | 1008.1 | 38 | 27 | 310 | 24G31 |
| 0700 | 1500' Sctd. | 7 | | 1009.8 | 38 | 25 | 310 | 28G37 |
| 0800 | 2000' Sctd. | 10 | | 1011.9 | 38 | 26 | 290 | 18G30 |
| 0900 | 1500' Sctd.<br>Estimated 4000' Bkn.<br>20,000' Bkn. | 10 | | 1013.5 | 37 | 25 | 290 | 15G23 |
| 1000 | Missing | -- | | 1015.6 | 36 | 24 | 290 | 12G20 |
| 1100 | 1500' Sctd. | 10 | | 1016.9 | 38 | 26 | 280 | 16 |

HOURLY WEATHER
November 6, 1971

SHEMYA, ALASKA (Continued)

| TIME (BST) | Sky Condition | Visibility (mi) | Weather and Obstructions to Vision | Sea Level Pressure (mb) | Temp. (°F) | Dew Point Temp. (°F) | Wind Dir. (deg) | Wind Spd. (kt) |
|---|---|---|---|---|---|---|---|---|
| 1200 | 1500' Sctd. | 10 | | 1018.6 | 46 | 29 | 340 | 14 |
| 1300 | 1500' Sctd. | 25 | | 1019.3 | 39 | 28 | 280 | 14 |
| 1400 | 2000' Sctd. | 25 | | 1020.3 | 40 | 20 | 280 | 20G29 |
| 1500 | Estimated 2000' Bkn. | 25 | | 1021.3 | 38 | 26 | 270 | 20G29 |
| 1600 | 2000' Sctd.<br>10,000 Sctd. | 20 | | 1022.4 | 38 | 25 | 290 | 12 |
| 1700 | 2000' Sctd.<br>10,000' Sctd.<br>15,000' Sctd. | 20 | | 1023.0 | 38 | 21 | 280 | 15 |
| 1800 | 2000' Sctd. | 25 | | 1023.7 | 38 | 24 | 270 | 14 |
| 1900 | 2000' Sctd. | 7 | | 1025.1 | 37 | 23 | 300 | 10 |
| 2000 | 2000' Sctd. | 7 | | 1025.9 | 36 | 28 | 290 | 09 |
| 2100 | 2000' Sctd. | 7 | | 1026.1 | 39 | 27 | 250 | 26 |
| 2200 | Clear | 7 | | 1026.4 | 40 | 27 | 250 | 26 |
| 2300 | 1500' Sctd. | 7 | | 1026.4 | 40 | 28 | 230 | 21 |

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