

ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND WS--ETC F/6 4/2  
193040 GSRS, MISSILE NUMBER 1097, ROUND NUMBER V-89, 19 NOVEMBE--ETC(U)  
NOV 79

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ATMOSPHERIC SCIENCE DATA REPORT

REPORT NO. 1000  
SERIAL NO. 1  
15 November 1979

White Sands Meteorological Team

ATMOSPHERIC SCIENCES LABORATORY  
WHITE SANDS MISSILE RANGE, NEW MEXICO

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| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)                                                                                                                                               |                       |                                                                              |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>Meteorological data gathered for the launching of the 19304D GSRS,<br>Missile Number 1097, Round Number V-89 are presented in tabular form. |                       |                                                                              |

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## INTRODUCTION

19304D GSRS, Missile Number 1097, Round Number V-89,  
was launched from LC-33, White Sands Missile Range (WSMR), New Mexico,  
at 1415 MST on 19 Nov 79. The scheduled launch time was  
1400.

## DISCUSSION

Meteorological data were recorded and reduced by the White Sands Meteorological Team, Atmospheric Sciences Laboratory (ASL), White Sands Missile Range, New Mexico. The data were obtained by the following methods:

### 1. Observations

#### a. Surface

(1) Standard surface observations to include pressure, temperature ( $^{\circ}\text{C}$ ), relative humidity, dew point ( $^{\circ}\text{C}$ ), density ( $\text{gm/m}^3$ ), Wind direction and speed, and cloud cover were made at the LC-33 Met Site at T-0 minutes.

(2) Anemometer data were provided from existing pole-mounted and tower-mounted anemometers at LC-33. Monitor of wind speed and direction from one anemometer was also provided in the launch control room.

#### b. Upper Air

(1) Low level wind data were obtained from RAPTS T-9 pibal observation at:

#### SITE AND ALTITUDE

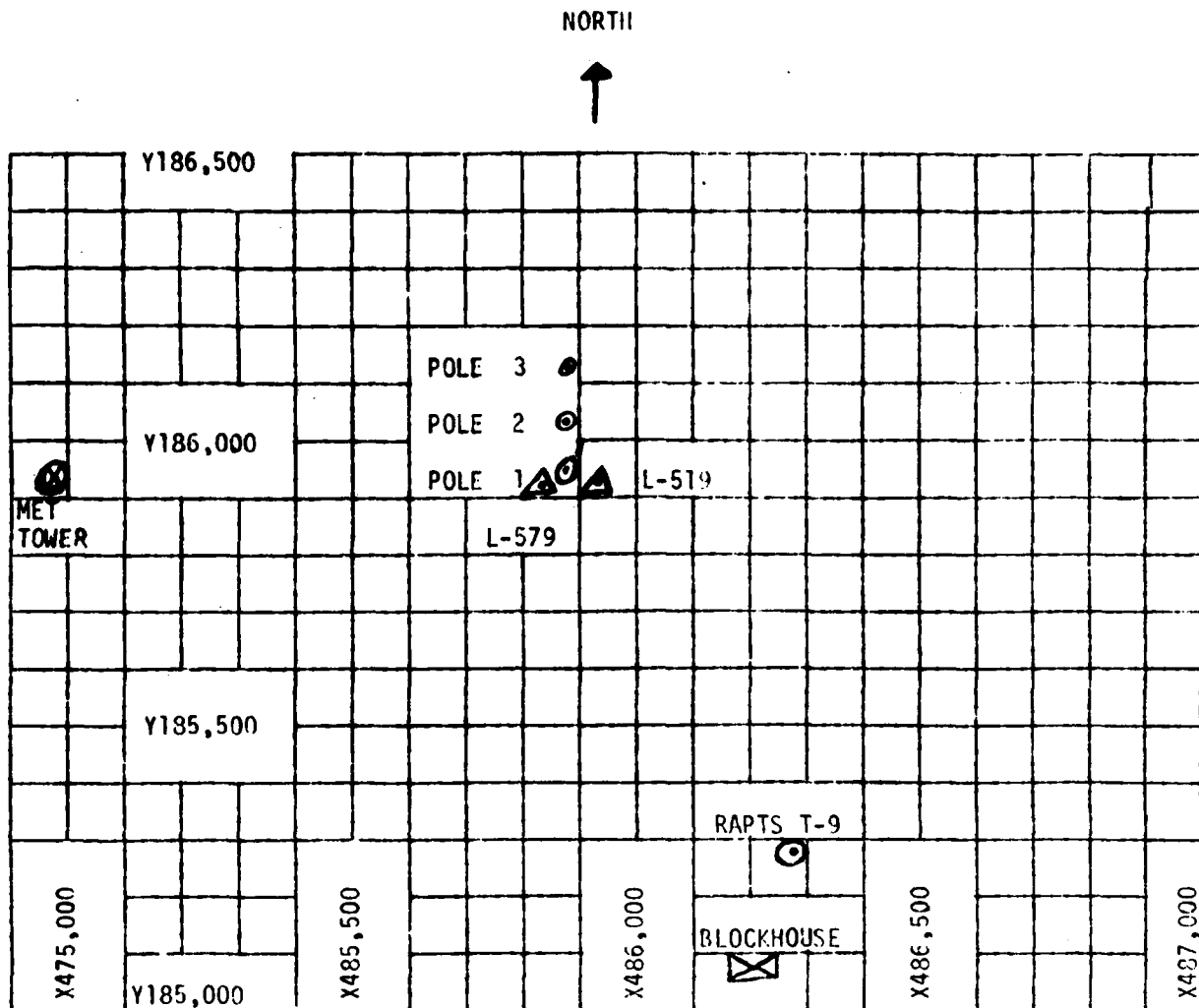
|       |     |
|-------|-----|
| LC-33 | 2km |
| Nick  | 2km |

(2) Air structure data (rawinsonde) were collected at the following Met Sites. Data were collected from surface to 78,000 feet in 500-foot increments.

#### SITE AND TIME

|     |          |
|-----|----------|
| SMR | 1400 MST |
|-----|----------|





1. MET TOWER - 4 Bendix Model T-20 Anemometers at 12 ft, 62 ft, 102 ft, and 202 ft with E/A recorders.
2. POLE ANEMOMETER - Bendix Model T-120 with E/A recorders.
  - (a) Pole #1 - 38.7 ft.
  - (b) Pole #2 - 53.0 ft.
  - (c) Pole #3 - 83.6 ft.
3. RAPTS T-9 Radar Automatic Pilot-Balloon Tracking System T-9 Radar.

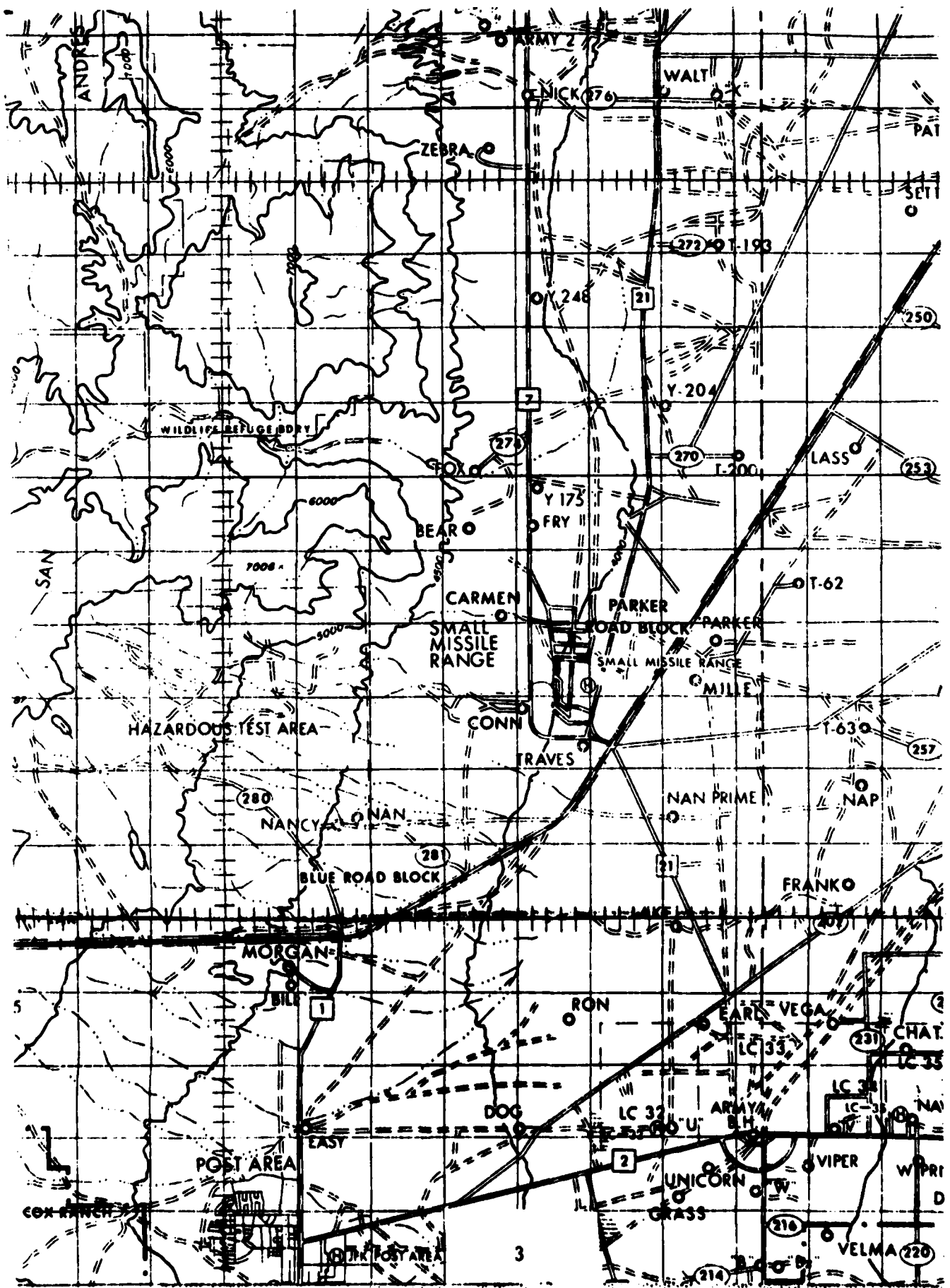


TABLE 1. Surface Observations taken at 1415 MST,  
19 November 1979, at LC-33, 19304D GSRS,  
Missile Number 1097, Round Number V-89.

|                   |         |                   |
|-------------------|---------|-------------------|
| ELEVATION         | 3977.30 | FT/MSL            |
| PRESSURE          | 875.4   | MBS               |
| TEMPERATURE       | 21.0    | °C                |
| RELATIVE HUMIDITY | 31      | %                 |
| DEW POINT         | 3.3     | °C                |
| DENSITY           | 1037    | GM/M <sup>3</sup> |
| WIND SPEED        | 16      | KTS               |
| WIND DIRECTION    | 193     | DEGREES           |
| CLOUD COVER       | 5       | Cu                |
| CLOUD COVER       | 2       | C1                |

TABLE 2

LC-33 FIXED POLE ANEMOMETER MEASURED WINDS

| POLE #1<br>X485,874.29<br>Y185,958.90<br>H4018.74<br>38.7 ft. AGL |            |              | POLE #2<br>X485,874.93<br>Y186,012.00<br>H4033.57<br>53.0 ft. AGL |            |              | POLE #3<br>X485,877.29<br>Y186,116.06<br>H4063.92<br>83.6 ft. AGL |            |              |
|-------------------------------------------------------------------|------------|--------------|-------------------------------------------------------------------|------------|--------------|-------------------------------------------------------------------|------------|--------------|
| T-TIME<br>SEC                                                     | DIR<br>DEG | SPEED<br>KTS | T-TIME<br>SEC                                                     | DIR<br>DEG | SPEED<br>KTS | T-TIME<br>SEC                                                     | DIR<br>DEG | SPEED<br>KTS |
| -30                                                               | 188        | 11           | -30                                                               | 191        | 09           | -30                                                               | 180        | 13           |
| -20                                                               | 193        | 13           | -20                                                               | 193        | 11           | -20                                                               | 192        | 11           |
| -10                                                               | 196        | 15           | -10                                                               | 206        | 13           | -10                                                               | 191        | 13           |
| 0.0                                                               | 193        | 17           | 0.0                                                               | 209        | 14           | 0.0                                                               | 189        | 16           |
| +10                                                               | 203        | 13           | +10                                                               | 192        | 10           | +10                                                               | 192        | 12           |

TABLE 3

LC-33 METEOROLOGICAL TOWER ANEMOMETER MEASURED WINDS (202 FT TOWER)

| LEVEL #1, 12 FEET<br>X484,982.64, Y185,057.73, H3983.00 (base) |         |           | LEVEL #2, 62 FEET<br>X484,982.64, Y185,057.73, H3983.00 (base) |         |           |
|----------------------------------------------------------------|---------|-----------|----------------------------------------------------------------|---------|-----------|
| T-TIME SEC                                                     | DIR DEG | SPEED KTS | T-TIME SEC                                                     | DIR DEG | SPEED KTS |
| -30                                                            | 178     | 07        | -30                                                            | 190     | 09        |
| -20                                                            | 175     | 07        | -20                                                            | 185     | 12        |
| -10                                                            | 176     | 12        | -10                                                            | 187     | 12        |
| 0.0                                                            | MISG    | MISG      | 0.0                                                            | 180     | 15        |
| +10                                                            | 178     | 10        | +10                                                            | 179     | 13        |

| LEVEL #3, 102 FEET<br>X484,982.64, Y185,057.73, H3983.00 (base) |         |           | LEVEL #4, 202 FEET<br>X484,982, Y185,057.73, H3983.00 (base) |         |           |
|-----------------------------------------------------------------|---------|-----------|--------------------------------------------------------------|---------|-----------|
| T-TIME SEC                                                      | DIR DEG | SPEED KTS | T-TIME SEC                                                   | DIR DEG | SPEED KTS |
| -30                                                             | 186     | 10        | -30                                                          | 177     | 18        |
| -20                                                             | 188     | 11        | -20                                                          | 180     | 17        |
| -10                                                             | 183     | 11        | -10                                                          | 177     | 17        |
| 0.0                                                             | 180     | 13        | 0.0                                                          | 177     | 17        |
| +10                                                             | 180     | 12        | +10                                                          | 177     | 16        |

### PILOT BALLOON MEASURED WIND DATA

TABLE 4

RELEASED FROM LC-33

DATE 19 November 1979

TIME 1350 MST

## TRACKER

COORDINATES (WSTM)

**X= 486,037.24**

$$Y = 182,350.16$$

H= 3977.30

NOTE: WIND DIRECTIONS ARE REFERENCED TO TRUE NORTH

HEIGHTS ARE METERS AGL XX OR FEET AGL     .

[illegible][illegible][illegible]

## PILOT BALLOON MEASURED WIND DATA

**TABLE 5**

RELEASED FROM LC-33 DATE 19 November 1979 TIME 1415 MST

TRACKER COORDINATES (WSTM) X= 486,037.24 Y= 182,350.16 H= 3977.30

NOTE: WIND DIRECTIONS ARE REFERENCED TO TRUE NORTH

HEIGHTS ARE METERS AGL XX OR FEET AGL .

[illegible][illegible][illegible]

### PILOT BALLOON MEASURED WIND DATA

TABLE 6

RELEASED FROM Nick Site DATE 19 November 1979 TIME 1351 MST

TRACKER COORDINATES (WSTM) X= 470,734.56 Y= 255,775.64 H= 4126.57

NOTE: WIND DIRECTIONS ARE REFERENCED TO TRUE NORTH

HEIGHTS ARE METERS AGLXX OR FEET AGL .

[illegible][illegible][illegible]

## PILOT BALLOON MEASURED WIND DATA

TABLE 7

RELEASED FROM Nick Site DATE 19 November 1979 TIME 1415 MST

TRACKER COORDINATES (WSTM) X= 470, 734.56 Y= 255,775.64 H= 4126.57

NOTE: WIND DIRECTIONS ARE REFERENCED TO TRUE NORTH

HEIGHTS ARE METERS AGL yy OR FEET AGL     .

[illegible][illegible][illegible]



STATION ALTITUDE 3997.30 FEET MSL  
19 NOV. 79 1400 HRS MST  
ASCENSION I.O. 378

SIGNIFICANT LEVEL DATA  
3230060378  
S M R  
TABLE 8

GEODETTIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

| PRESSURE GEOMETRIC<br>ALTITUDE<br>MILLIBARS MSL FEET | TEMPERATURE    |                        | REL. HUM.<br>PERCENT |
|------------------------------------------------------|----------------|------------------------|----------------------|
|                                                      | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |
| 875.0                                                | 3997.3         | 19.5                   | 35.0                 |
| 850.0                                                | 4811.4         | 16.1                   | 44.0                 |
| 761.8                                                | 7820.8         | 6.9                    | 53.0                 |
| 751.0                                                | 8206.0         | 5.0                    | 64.0                 |
| 700.0                                                | 10033.0        | .8                     | 80.0                 |
| 679.6                                                | 10862.9        | -5                     | 70.0                 |
| 660.6                                                | 11606.0        | -2.4                   | 70.0                 |
| 651.2                                                | 11920.0        | -2.7                   | 45.0                 |
| 641.6                                                | 12366.1        | -1.1                   | 18.0                 |
| 623.2                                                | 13129.2        | -2.1                   | 18.0                 |
| 570.2                                                | 15427.1        | -7.4                   | 19.0                 |
| 528.6                                                | 17348.3        | -12.4                  | 23.0                 |
| 500.0                                                | 18737.9        | -15.3                  | 20.0                 |
| 489.2                                                | 19279.8        | -15.8                  | 21.0                 |
| 409.6                                                | 23596.0        | -26.1                  | 36.0                 |
| 400.0                                                | 24160.2        | -26.7                  | 71.0                 |
| 396.4                                                | 24374.7        | -27.3                  | 73.0                 |
| 383.4                                                | 25163.0        | -28.6                  | 59.0                 |
| 370.6                                                | 25959.5        | -31.1                  | 67.0                 |
| 352.2                                                | 27141.8        | -33.6                  | 50.0                 |
| 322.6                                                | 29150.0        | -38.2                  | 47.0                 |
| 317.2                                                | 29531.8        | -39.0                  | 55.0                 |
| 306.0                                                | 30343.0        | -39.3                  | 62.0                 |
| 300.0                                                | 30768.6        | -40.3                  | 59.0                 |
| 279.4                                                | 32375.2        | -43.5                  | 47.0                 |
| 259.0                                                | 34809.2        | -48.9                  | 55.0                 |
| 239.8                                                | 35706.4        | -50.9                  | 47.0                 |
| 217.2                                                | 37823.0        | -50.9                  | 55.0                 |
| 200.0                                                | 39565.8        | -54.1                  | 47.0                 |
| 184.2                                                | 41310.6        | -57.9                  | 55.0                 |
| 172.4                                                | 42685.3        | -58.2                  | 47.0                 |
| 153.6                                                | 45061.6        | -61.8                  | 55.0                 |
| 150.0                                                | 45545.6        | -61.8                  | 47.0                 |
| 146.4                                                | 46041.7        | -61.6                  | 55.0                 |
| 132.6                                                | 48052.6        | -64.1                  | 47.0                 |
| 115.8                                                | 50781.9        | -65.1                  | 55.0                 |
| 107.3                                                | 52328.4        | -61.3                  | 47.0                 |
| 100.0                                                | 53765.1        | -63.0                  | 55.0                 |
| 79.2                                                 | 58501.1        | -63.1                  | 47.0                 |
| 71.3                                                 | 60609.0        | -69.3                  | 55.0                 |

GEODETIC COORDINATES  
 32.48034 LAT DEG  
 106.42307 LON DEG

SIGNIFICANT LEVEL DATA  
 3230060378  
 S M R

TABLE 8 (cont)

STATION ALTITUDE 3997.30 FEET MSL  
 19 NOV. 79  
 ASCENSION NO. 378

| PRESSURE GEOMETRIC<br>ALTITUDE<br>MILLIBARS MSL FEET | TEMPERATURE    |                        | REL. HUM.<br>PERCENT |
|------------------------------------------------------|----------------|------------------------|----------------------|
|                                                      | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |
| 70.0 60974.4                                         | -67.3          |                        |                      |
| 62.0 63424.7                                         | -61.5          |                        |                      |
| 52.2 66362.8                                         | -59.7          |                        |                      |
| 50.0 67849.7                                         | -60.9          |                        |                      |
| 45.8 69645.2                                         | -62.5          |                        |                      |
| 37.8 73601.9                                         | -58.0          |                        |                      |
| 30.0 78417.6                                         | -58.0          |                        |                      |

UPPER AIR DATA  
3230060378  
S M R  
TABLE 9

STATION ALTITUDE 3997.30 FEET MSL  
19 NOV. 79 1400 HRS MST  
ASCENSION NO. 378

GEODETIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|----------------------------|--------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              |                            | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 3997.3                            | 875.0                 | 19.5           | 3.6                    | 35.0                 | 1038.0                       | 667.6                      | 190.0                    | 15.9           | 1.000266                  |
| 4000.0                            | 874.9                 | 19.5           | 3.7                    | 35.0                 | 1036.0                       | 667.6                      | 190.0                    | 15.9           | 1.000266                  |
| 4500.0                            | 859.5                 | 17.4           | 3.9                    | 40.6                 | 1026.8                       | 665.2                      | 189.1                    | 16.6           | 1.000265                  |
| 5000.0                            | 844.2                 | 15.5           | 3.5                    | 44.6                 | 1015.2                       | 663.1                      | 188.3                    | 17.2           | 1.000262                  |
| 5500.0                            | 829.0                 | 14.0           | 2.6                    | 46.1                 | 1002.3                       | 661.3                      | 187.5                    | 17.8           | 1.000257                  |
| 6000.0                            | 814.0                 | 12.5           | 1.6                    | 47.6                 | 989.7                        | 659.4                      | 186.0                    | 18.5           | 1.000252                  |
| 6500.0                            | 799.3                 | 10.9           | .7                     | 49.1                 | 977.2                        | 657.6                      | 189.6                    | 18.4           | 1.000248                  |
| 7000.0                            | 784.9                 | 9.4            | -.3                    | 50.5                 | 964.9                        | 655.8                      | 194.8                    | 17.9           | 1.000243                  |
| 7500.0                            | 770.7                 | 7.9            | -1.3                   | 52.0                 | 952.8                        | 654.0                      | 200.4                    | 17.8           | 1.000239                  |
| 8000.0                            | 756.8                 | 6.5            | -1.1                   | 58.1                 | 940.1                        | 652.4                      | 207.4                    | 19.1           | 1.000237                  |
| 8500.0                            | 742.8                 | 5.2            | -.5                    | 66.5                 | 926.9                        | 650.9                      | 212.2                    | 20.3           | 1.000235                  |
| 9000.0                            | 729.0                 | 3.8            | -1.0                   | 70.8                 | 914.3                        | 649.3                      | 215.5                    | 21.2           | 1.000232                  |
| 9500.0                            | 715.5                 | 2.4            | -1.5                   | 75.0                 | 901.9                        | 647.6                      | 218.0                    | 21.4           | 1.000228                  |
| 10000.0                           | 702.2                 | 1.0            | -2.1                   | 79.3                 | 889.7                        | 646.0                      | 221.1                    | 22.2           | 1.000225                  |
| 10500.0                           | 689.0                 | .1             | -3.8                   | 74.7                 | 876.2                        | 644.8                      | 223.4                    | 24.5           | 1.000219                  |
| 11000.0                           | 676.1                 | -.9            | -5.6                   | 70.0                 | 863.0                        | 643.6                      | 224.4                    | 28.6           | 1.000213                  |
| 11500.0                           | 663.3                 | -2.1           | -6.8                   | 70.0                 | 850.8                        | 642.0                      | 224.0                    | 33.8           | 1.000208                  |
| 12000.0                           | 650.7                 | -2.6           | -13.3                  | 43.6                 | 836.8                        | 641.2                      | 224.7                    | 36.9           | 1.000198                  |
| 12500.0                           | 638.4                 | -1.3           | -22.5                  | 18.0                 | 817.5                        | 642.6                      | 225.9                    | 38.4           | 1.000187                  |
| 13000.0                           | 626.3                 | -1.9           | -23.0                  | 16.0                 | 804.0                        | 641.8                      | 226.9                    | 39.5           | 1.000184                  |
| 13500.0                           | 614.3                 | -3.0           | -23.8                  | 18.2                 | 791.6                        | 640.5                      | 227.7                    | 40.3           | 1.000181                  |
| 14000.0                           | 602.6                 | -4.1           | -24.6                  | 18.4                 | 779.8                        | 639.2                      | 228.2                    | 41.3           | 1.000178                  |
| 14500.0                           | 591.0                 | -5.3           | -25.4                  | 18.6                 | 768.2                        | 637.8                      | 226.7                    | 43.4           | 1.000175                  |
| 15000.0                           | 579.7                 | -6.4           | -26.3                  | 19.8                 | 756.8                        | 636.4                      | 225.3                    | 45.7           | 1.000172                  |
| 15500.0                           | 568.6                 | -7.6           | -27.1                  | 19.2                 | 745.5                        | 635.0                      | 223.5                    | 47.7           | 1.000170                  |
| 16000.0                           | 557.5                 | -8.9           | -27.6                  | 20.2                 | 734.6                        | 633.4                      | 220.1                    | 49.4           | 1.000167                  |
| 16500.0                           | 546.6                 | -10.2          | -29.2                  | 21.2                 | 723.8                        | 631.9                      | 217.0                    | 51.1           | 1.000164                  |
| 17000.0                           | 535.9                 | -11.5          | -28.8                  | 22.3                 | 713.2                        | 630.3                      | 214.9                    | 51.4           | 1.000162                  |
| 17500.0                           | 525.4                 | -12.7          | -29.6                  | 22.7                 | 702.5                        | 628.8                      | 213.5                    | 51.8           | 1.000159                  |
| 18000.0                           | 515.0                 | -13.8          | -31.0                  | 21.6                 | 691.4                        | 627.5                      | 214.5                    | 52.2           | 1.000157                  |
| 18500.0                           | 504.8                 | -14.8          | -32.4                  | 20.5                 | 680.5                        | 626.3                      | 215.6                    | 52.3           | 1.000154                  |
| 19000.0                           | 494.7                 | -15.5          | -33.1                  | 20.5                 | 669.9                        | 625.4                      | 216.8                    | 52.2           | 1.000151                  |
| 19500.0                           | 484.8                 | -16.3          | -33.1                  | 21.8                 | 657.4                        | 624.4                      | 216.9                    | 51.0           | 1.000149                  |
| 20000.0                           | 474.9                 | -17.3          | -33.4                  | 21.5                 | 647.0                        | 623.0                      | 216.7                    | 49.6           | 1.000146                  |
| 20500.0                           | 465.2                 | -18.7          | -33.7                  | 25.2                 | 636.8                        | 621.5                      | 217.9                    | 48.8           | 1.000144                  |
| 21000.0                           | 455.8                 | -19.9          | -34.0                  | 27.0                 | 626.8                        | 620.0                      | 219.4                    | 48.0           | 1.000142                  |
| 21500.0                           | 446.5                 | -21.1          | -34.5                  | 28.7                 | 616.9                        | 618.6                      | 222.1                    | 49.0           | 1.000139                  |
| 22000.0                           | 437.4                 | -22.3          | -34.9                  | 30.5                 | 607.3                        | 617.1                      | 225.0                    | 50.6           | 1.000137                  |
| 22500.0                           | 428.5                 | -23.5          | -35.4                  | 32.2                 | 597.7                        | 615.6                      | 227.2                    | 52.4           | 1.000135                  |
| 23000.0                           | 419.8                 | -24.7          | -36.0                  | 33.9                 | 588.4                        | 614.2                      | 228.4                    | 54.6           | 1.000133                  |

STATION ALTITUDE 3997.30 FEET MSL  
19 NOV. 79  
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UPPER AIR DATA  
3230060378  
S M R  
TABLE 9 (cont)

GEODETIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

| GEOMETRIC ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR DEGREES<br>CENTIGRADE | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | DIRECTION<br>DEGREES (TN) | WIND DATA<br>SPEED<br>KNOTS | INDEX<br>OF<br>REFRACTION |
|--------------------------------|-----------------------|------------------------------------------|----------------------|------------------------------|----------------------------|---------------------------|-----------------------------|---------------------------|
| 43500.0                        | 411.2                 | -25.9                                    | 35.7                 | 579.2                        | 612.7                      | 229.0                     | 56.8                        | 1.000131                  |
| 24000.0                        | 402.7                 | -26.5                                    | 61.1                 | 568.6                        | 611.9                      | 229.9                     | 57.2                        | 1.000129                  |
| 24500.0                        | 394.5                 | -27.5                                    | 70.8                 | 559.0                        | 610.7                      | 229.9                     | 57.1                        | 1.000127                  |
| 25000.0                        | 386.1                 | -28.3                                    | 61.9                 | 549.1                        | 609.7                      | 229.9                     | 57.0                        | 1.000125                  |
| 25500.0                        | 377.9                 | -29.7                                    | 62.4                 | 540.5                        | 608.0                      | 229.7                     | 56.7                        | 1.000122                  |
| 26000.0                        | 370.0                 | -31.2                                    | 65.4                 | 532.5                        | 606.1                      | 229.6                     | 57.2                        | 1.000121                  |
| 26500.0                        | 362.1                 | -32.2                                    | 59.2                 | 523.4                        | 604.7                      | 229.5                     | 59.6                        | 1.000118                  |
| 27000.0                        | 354.4                 | -33.3                                    | 52.0                 | 514.6                        | 603.4                      | 229.5                     | 61.9                        | 1.000116                  |
| 27500.0                        | 346.7                 | -34.4                                    | 49.5                 | 505.9                        | 602.0                      | 229.7                     | 64.2                        | 1.000114                  |
| 28000.0                        | 339.2                 | -35.6                                    | 48.7                 | 497.3                        | 600.5                      | 230.1                     | 66.2                        | 1.000112                  |
| 28500.0                        | 331.9                 | -36.7                                    | 48.0                 | 488.9                        | 599.1                      | 230.9                     | 67.7                        | 1.000110                  |
| 29000.0                        | 324.7                 | -37.9                                    | 47.2                 | 480.7                        | 597.6                      | 231.9                     | 69.2                        | 1.000108                  |
| 29500.0                        | 317.6                 | -38.9                                    | 54.3                 | 472.4                        | 596.3                      | 233.4                     | 70.8                        | 1.000106                  |
| 30000.0                        | 310.7                 | -39.2                                    | 59.0                 | 462.5                        | 595.0                      | 234.5                     | 72.5                        | 1.000104                  |
| 30500.0                        | 303.9                 | -39.7                                    | 60.9                 | 453.3                        | 593.3                      | 235.3                     | 74.5                        | 1.000102                  |
| 31000.0                        | 297.2                 | -40.7                                    | 57.4                 | 445.4                        | 594.0                      | 236.2                     | 76.6                        | 1.000100                  |
| 31500.0                        | 290.6                 | -41.7                                    | 53.5                 | 437.4                        | 592.7                      | 237.0                     | 78.8                        | 1.000098                  |
| 32000.0                        | 284.1                 | -42.7                                    | 49.8                 | 429.6                        | 591.4                      | 238.5                     | 81.0                        | 1.000096                  |
| 32500.0                        | 277.8                 | -43.8                                    | 44.6**               | 421.9                        | 590.0                      | 240.4                     | 83.2                        | 1.000094                  |
| 33000.0                        | 271.5                 | -44.9                                    | 34.9**               | 414.4                        | 588.6                      | 241.8                     | 85.7                        | 1.000093                  |
| 33500.0                        | 265.4                 | -46.0                                    | 25.3**               | 407.0                        | 587.2                      | 242.9                     | 88.3                        | 1.000091                  |
| 34000.0                        | 259.4                 | -47.1                                    | 15.6**               | 399.8                        | 585.7                      | 242.4                     | 91.2                        | 1.000089                  |
| 34500.0                        | 253.5                 | -48.2                                    | 6.0**                | 392.7                        | 584.3                      | 241.6                     | 94.2                        | 1.000087                  |
| 35000.0                        | 247.8                 | -49.3                                    |                      | 385.7                        | 582.8                      | 240.6                     | 93.3                        | 1.000086                  |
| 35500.0                        | 242.1                 | -50.4                                    |                      | 378.7                        | 581.4                      | 239.7                     | 91.7                        | 1.000084                  |
| 36000.0                        | 236.5                 | -50.9                                    |                      | 370.8                        | 580.8                      | 239.5                     | 85.2                        | 1.000083                  |
| 36500.0                        | 231.1                 | -50.9                                    |                      | 362.2                        | 580.8                      | 239.5                     | 78.8                        | 1.000081                  |
| 37000.0                        | 225.8                 | -50.9                                    |                      | 353.9                        | 580.8                      | 240.0                     | 73.2                        | 1.000079                  |
| 37500.0                        | 220.6                 | -50.9                                    |                      | 345.7                        | 580.8                      | 240.6                     | 68.0                        | 1.000077                  |
| 38000.0                        | 215.5                 | -51.2                                    |                      | 338.2                        | 580.4                      | 241.2                     | 64.8                        | 1.000075                  |
| 38500.0                        | 210.5                 | -52.1                                    |                      | 331.7                        | 579.2                      | 242.0                     | 61.7                        | 1.000074                  |
| 39000.0                        | 205.5                 | -53.0                                    |                      | 325.4                        | 578.0                      | 242.5                     | 57.1                        | 1.000072                  |
| 39500.0                        | 200.8                 | -53.9                                    |                      | 319.1                        | 576.8                      | 243.0                     | 52.5                        | 1.000071                  |
| 40000.0                        | 196.1                 | -55.0                                    |                      | 313.1                        | 575.4                      | 242.7                     | 48.6                        | 1.000070                  |
| 40500.0                        | 191.5                 | -56.1                                    |                      | 307.3                        | 573.9                      | 242.2                     | 45.2                        | 1.000068                  |
| 41000.0                        | 187.0                 | -57.2                                    |                      | 301.6                        | 572.5                      | 240.7                     | 46.9                        | 1.000067                  |
| 41500.0                        | 182.5                 | -57.9                                    |                      | 295.5                        | 571.5                      | 239.4                     | 48.9                        | 1.000066                  |
| 42000.0                        | 178.2                 | -58.1                                    |                      | 288.6                        | 571.4                      | 239.0                     | 51.3                        | 1.000064                  |
| 42500.0                        | 173.9                 | -50.2                                    |                      | 281.9                        | 571.2                      | 238.7                     | 54.6                        | 1.000063                  |
| 43000.0                        | 169.8                 | -58.7                                    |                      | 275.8                        | 570.5                      | 238.7                     | 55.9                        | 1.000061                  |

UPPER AIR DATA  
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S M R  
TABLE 9 (cont)

STATION ALTITUDE 3997.30 FEET NSL  
19 NOV. 79  
ASCENSION NO. 378

GEODETIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

| GEOMETRIC ALTITUDE<br>NSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR DEGREES | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA<br>DIRECTION<br>DEGREES(TN) | WIND DATA<br>SPEED<br>KNOTS | INDEX<br>OF<br>REFRACTION |
|--------------------------------|-----------------------|----------------------------|----------------------|------------------------------|----------------------------|---------------------------------------|-----------------------------|---------------------------|
| 43500.0                        | 165.7                 | -59.4                      |                      | 270.1                        | 569.5                      | 238.7                                 | 57.1                        | 1.000060                  |
| 44000.0                        | 161.7                 | -60.2                      |                      | 264.6                        | 569.5                      | 237.6                                 | 56.3                        | 1.000059                  |
| 44500.0                        | 157.8                 | -60.9                      |                      | 259.1                        | 567.5                      | 236.4                                 | 55.4                        | 1.000058                  |
| 45000.0                        | 154.1                 | -61.7                      |                      | 253.8                        | 566.5                      | 234.6                                 | 53.4                        | 1.000057                  |
| 45500.0                        | 150.3                 | -61.8                      |                      | 247.8                        | 566.4                      | 232.4                                 | 51.1                        | 1.000055                  |
| 46000.0                        | 146.7                 | -61.6                      |                      | 241.6                        | 566.6                      | 230.4                                 | 49.4                        | 1.000054                  |
| 46500.0                        | 143.1                 | -62.2                      |                      | 236.3                        | 565.9                      | 228.4                                 | 48.2                        | 1.000053                  |
| 47000.0                        | 139.7                 | -62.8                      |                      | 231.3                        | 565.0                      | 227.2                                 | 47.2                        | 1.000052                  |
| 47500.0                        | 136.5                 | -63.4                      |                      | 226.3                        | 564.2                      | 227.1                                 | 46.7                        | 1.000050                  |
| 48000.0                        | 132.9                 | -64.0                      |                      | 221.5                        | 563.4                      | 227.5                                 | 46.4                        | 1.000049                  |
| 48500.0                        | 129.7                 | -64.3                      |                      | 216.3                        | 563.1                      | 229.8                                 | 46.9                        | 1.000048                  |
| 49000.0                        | 126.5                 | -64.4                      |                      | 211.2                        | 562.8                      | 232.0                                 | 47.6                        | 1.000047                  |
| 49500.0                        | 123.4                 | -64.6                      |                      | 206.2                        | 562.6                      | 233.5                                 | 49.5                        | 1.000046                  |
| 50000.0                        | 120.4                 | -64.8                      |                      | 201.3                        | 562.3                      | 234.9                                 | 51.5                        | 1.000045                  |
| 50500.0                        | 117.4                 | -65.0                      |                      | 196.5                        | 562.1                      | 235.0                                 | 52.2                        | 1.000044                  |
| 51000.0                        | 114.5                 | -64.6                      |                      | 191.3                        | 562.7                      | 235.1                                 | 52.8                        | 1.000043                  |
| 51500.0                        | 111.5                 | -63.3                      |                      | 185.6                        | 564.3                      | 235.5                                 | 51.8                        | 1.000041                  |
| 52000.0                        | 109.1                 | -62.1                      |                      | 180.0                        | 566.0                      | 235.5                                 | 50.5                        | 1.000040                  |
| 52500.0                        | 106.4                 | -61.5                      |                      | 175.1                        | 566.8                      | 236.0                                 | 48.1                        | 1.000039                  |
| 53000.0                        | 103.8                 | -62.1                      |                      | 171.4                        | 566.0                      | 236.6                                 | 45.5                        | 1.000038                  |
| 53500.0                        | 101.3                 | -62.7                      |                      | 167.7                        | 565.2                      | 237.7                                 | 41.7                        | 1.000037                  |
| 54000.0                        | 98.8                  | -63.0                      |                      | 163.9                        | 564.7                      | 239.3                                 | 37.4                        | 1.000036                  |
| 54500.0                        | 96.4                  | -63.0                      |                      | 159.9                        | 564.7                      | 241.4                                 | 33.7                        | 1.000036                  |
| 55000.0                        | 94.1                  | -63.0                      |                      | 156.0                        | 564.7                      | 244.0                                 | 30.3                        | 1.000035                  |
| 55500.0                        | 91.6                  | -63.0                      |                      | 152.2                        | 564.7                      | 247.2                                 | 27.6                        | 1.000034                  |
| 56000.0                        | 89.6                  | -63.0                      |                      | 148.5                        | 564.7                      | 250.6                                 | 25.7                        | 1.000033                  |
| 56500.0                        | 87.4                  | -63.1                      |                      | 144.9                        | 564.7                      | 253.6                                 | 24.4                        | 1.000032                  |
| 57000.0                        | 85.3                  | -63.1                      |                      | 141.4                        | 564.7                      | 253.8                                 | 24.3                        | 1.000031                  |
| 57500.0                        | 83.2                  | -63.1                      |                      | 138.0                        | 564.6                      | 253.3                                 | 24.3                        | 1.000031                  |
| 58000.0                        | 81.2                  | -63.1                      |                      | 134.6                        | 564.6                      | 249.3                                 | 24.6                        | 1.000030                  |
| 58500.0                        | 79.2                  | -63.1                      |                      | 131.4                        | 564.6                      | 245.4                                 | 25.0                        | 1.000029                  |
| 59000.0                        | 77.3                  | -64.3                      |                      | 128.9                        | 563.0                      | 242.3                                 | 24.5                        | 1.000029                  |
| 59500.0                        | 75.4                  | -65.6                      |                      | 126.5                        | 561.3                      | 239.3                                 | 23.6                        | 1.000028                  |
| 60000.0                        | 73.5                  | -66.8                      |                      | 124.1                        | 559.6                      | 236.2                                 | 22.6                        | 1.000028                  |
| 60500.0                        | 71.7                  | -68.0                      |                      | 121.8                        | 558.0                      | 233.7                                 | 20.8                        | 1.000027                  |
| 61000.0                        | 69.9                  | -67.2                      |                      | 118.3                        | 559.0                      | 230.6                                 | 19.0                        | 1.000026                  |
| 61500.0                        | 68.2                  | -66.1                      |                      | 114.7                        | 560.5                      | 226.3                                 | 17.0                        | 1.000026                  |
| 62000.0                        | 66.5                  | -64.8                      |                      | 111.3                        | 562.2                      | 220.3                                 | 15.1                        | 1.000025                  |
| 62500.0                        | 64.9                  | -63.7                      |                      | 107.9                        | 563.8                      | 213.2                                 | 13.5                        | 1.000024                  |
| 63000.0                        | 63.3                  | -62.5                      |                      | 104.7                        | 565.4                      | 209.4                                 | 12.5                        | 1.000023                  |

UPPER AIR DATA  
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STATION ALTITUDE 3997.30 FEET MSL  
19 NOV. 79 1400 HRS MST  
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GEODETIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

TABLE 9 (cont)

| GEOMETRIC ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR DEGREES<br>CENTIGRADE | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA<br>DIRECTION<br>DEGREES (TN) | SPEED<br>KNOTS | INDEX<br>OF<br>REFRACTION |
|--------------------------------|-----------------------|------------------------------------------|----------------------|------------------------------|----------------------------|----------------------------------------|----------------|---------------------------|
| 63500.0                        | 61.8                  | -61.5                                    |                      | 101.7                        | 566.8                      | 204.9                                  | 11.6           | 1.000023                  |
| 64000.0                        | 60.3                  | -61.2                                    |                      | 99.1                         | 567.2                      | 206.4                                  | 10.4           | 1.000022                  |
| 64500.0                        | 58.8                  | -61.0                                    |                      | 96.6                         | 567.5                      | 210.6                                  | 9.1            | 1.000022                  |
| 65000.0                        | 57.4                  | -60.7                                    |                      | 94.2                         | 567.8                      | 217.1                                  | 8.0            | 1.000021                  |
| 65500.0                        | 56.0                  | -60.4                                    |                      | 91.8                         | 568.2                      | 226.7                                  | 7.1            | 1.000020                  |
| 66000.0                        | 54.7                  | -60.2                                    |                      | 89.5                         | 568.5                      | 238.0                                  | 6.5            | 1.000020                  |
| 66500.0                        | 53.4                  | -59.9                                    |                      | 87.2                         | 568.9                      | 236.2                                  | 6.7            | 1.000019                  |
| 67000.0                        | 52.1                  | -59.8                                    |                      | 85.1                         | 569.1                      | 234.5                                  | 6.9            | 1.000019                  |
| 67500.0                        | 50.9                  | -60.4                                    |                      | 83.3                         | 568.2                      | 233.4                                  | 7.0            | 1.000019                  |
| 68000.0                        | 49.6                  | -61.0                                    |                      | 81.5                         | 567.4                      | 232.9                                  | 7.1            | 1.000018                  |
| 68500.0                        | 48.4                  | -61.5                                    |                      | 79.7                         | 566.8                      | 232.4                                  | 7.2            | 1.000018                  |
| 69000.0                        | 47.3                  | -61.9                                    |                      | 78.0                         | 566.2                      | 241.8                                  | 7.1            | 1.000017                  |
| 69500.0                        | 46.1                  | -62.4                                    |                      | 76.2                         | 565.6                      | 251.7                                  | 7.3            | 1.000017                  |
| 70000.0                        | 45.0                  | -62.1                                    |                      | 74.3                         | 566.0                      | 258.9                                  | 7.7            | 1.000017                  |
| 70500.0                        | 43.9                  | -61.5                                    |                      | 72.3                         | 566.7                      | 262.1                                  | 8.4            | 1.000016                  |
| 71000.0                        | 42.9                  | -61.0                                    |                      | 70.4                         | 567.5                      | 264.8                                  | 9.1            | 1.000016                  |
| 71500.0                        | 41.9                  | -60.4                                    |                      | 68.5                         | 568.3                      | 263.9                                  | 9.0            | 1.000015                  |
| 72000.0                        | 40.9                  | -59.8                                    |                      | 66.7                         | 569.0                      | 262.2                                  | 8.7            | 1.000015                  |
| 72500.0                        | 39.9                  | -59.3                                    |                      | 64.9                         | 569.8                      | 261.8                                  | 8.1            | 1.000014                  |
| 73000.0                        | 38.9                  | -58.7                                    |                      | 63.2                         | 570.5                      | 269.1                                  | 6.0            | 1.000014                  |
| 73500.0                        | 38.0                  | -58.1                                    |                      | 61.5                         | 571.3                      | 263.7                                  | 4.0            | 1.000014                  |
| 74000.0                        | 37.1                  | -58.0                                    |                      | 60.0                         | 571.4                      | 315.4                                  | 2.3            | 1.000013                  |
| 74500.0                        | 36.2                  | -58.0                                    |                      | 58.6                         | 571.4                      | 27.5                                   | 2.2            | 1.000013                  |
| 75000.0                        | 35.3                  | -58.0                                    |                      | 57.2                         | 571.4                      | 58.0                                   | 4.2            | 1.000013                  |
| 75500.0                        | 34.5                  | -58.0                                    |                      | 55.9                         | 571.4                      | 79.6                                   | 5.5            | 1.000012                  |
| 76000.0                        | 33.7                  | -58.0                                    |                      | 54.6                         | 571.4                      | 94.0                                   | 7.1            | 1.000012                  |
| 76500.0                        | 32.9                  | -58.0                                    |                      | 53.3                         | 571.4                      |                                        |                | 1.000012                  |
| 77000.0                        | 32.1                  | -58.0                                    |                      | 52.0                         | 571.4                      |                                        |                | 1.000012                  |
| 77500.0                        | 31.4                  | -58.0                                    |                      | 50.8                         | 571.4                      |                                        |                | 1.000011                  |
| 78000.0                        | 30.6                  | -58.0                                    |                      | 49.6                         | 571.4                      |                                        |                | 1.000011                  |

STATION ALTITUDE 3997.30 FEET MSL  
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MANDATORY LEVELS  
3230060378  
S M R  
TABLE 10

GEODETIC COORDINATES  
32.46034 LAT DEG  
106.42307 LON DEG

| PRESSURE GEOPOTENTIAL<br>MILLIBARS | FEET   | TEMPERATURE<br>AIR DEGREES<br>CENTIGRADE | REL. HUM.<br>PERCENT | WIND DATA                |                |
|------------------------------------|--------|------------------------------------------|----------------------|--------------------------|----------------|
|                                    |        |                                          |                      | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |
| 850.0                              | 4808.  | 16.1                                     | 3.9                  | 44.                      | 168.6          |
| 800.0                              | 6484.  | 11.0                                     | .7                   | 49.                      | 18.4           |
| 750.0                              | 8235.  | 5.9                                      | -.3                  | 64.                      | 189.4          |
| 700.0                              | 10073. | .8                                       | -2.2                 | 80.                      | 210.2          |
| 650.0                              | 12015. | -2.5                                     | -13.7                | 42.                      | 221.6          |
| 600.0                              | 14099. | -4.4                                     | -24.8                | 16.                      | 224.7          |
| 550.0                              | 16326. | -9.8                                     | -28.0                | 21.                      | 227.8          |
| 500.0                              | 18712. | -15.3                                    | -33.1                | 20.                      | 217.9          |
| 450.0                              | 21299. | -20.6                                    | -34.3                | 26.                      | 216.2          |
| 400.0                              | 24120. | -26.7                                    | -30.3                | 71.                      | 221.1          |
| 350.0                              | 27237. | -33.9                                    | -40.7                | 50.                      | 229.9          |
| 300.0                              | 30728. | -40.3                                    | -45.2                | 59.                      | 229.6          |
| 250.0                              | 34734. | -48.9                                    |                      |                          | 235.7          |
| 200.0                              | 39491. | -54.1                                    |                      |                          | 75.6           |
| 175.0                              | 42258. | -58.1                                    |                      |                          | 93.7           |
| 150.0                              | 45424. | -61.8                                    |                      |                          | 243.0          |
| 125.0                              | 49103. | -64.5                                    |                      |                          | 238.8          |
| 100.0                              | 53600. | -63.0                                    |                      |                          | 53.9           |
| 80.0                               | 58105. | -63.1                                    |                      |                          | 51.0           |
| 70.0                               | 60757. | -67.3                                    |                      |                          | 48.4           |
| 60.0                               | 63859. | -61.2                                    |                      |                          | 39.6           |
| 50.0                               | 67596. | -60.9                                    |                      |                          | 24.8           |
| 40.0                               | 72141. | -59.3                                    |                      |                          | 19.2           |
| 30.0                               | 78065. | -58.0                                    |                      |                          | 10.2           |
|                                    |        |                                          |                      |                          | 7.1            |
|                                    |        |                                          |                      |                          | 8.5            |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.