

# SHELL DEVELOPMENT COMPANY

A DIVISION OF SHELL OIL COMPANY

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BELLAIRE  
RESEARCH CENTER

December 2, 1977

U. S. Geological Survey #77825  
Conservation Division, MS 620  
National Center  
12201 Sunrise Valley Drive  
Reston, Virginia 22092  
M/F: John Gregory

Gentlemen:

We are pleased to welcome the U. S. Geological Survey as a Participant in the 1977 Phase of the Ocean Current Measuring Program. The following reports describing the Program are enclosed:


1. Forristall, G. Z. (1973), Ocean Current Measuring Program: Corrections to Current Meter Data, Memorandum Report, May.
2. Forristall, G. Z. (1973), Ocean Current Measuring Program: Station Configurations, Memorandum Report, October.
3. Hamilton, R. C. (1973), Ocean Current Measuring Program: Report on Electronics System, Memorandum Report, May.

In addition, we have enclosed the Program Status Report for June and July, 1977. The status report for August through October, and the storm report for Hurricanes Anita and Babe are in preparation. We would like to remind you that by the terms of the OCMP Agreement, data and reports from the 1977 Phase are proprietary to the Participants until June 1, 1981.

Since the Program now has 7 Participants, the cost sharing formula in Paragraph (2) of the Attachment C of the OCMP Agreement comes into play, and the cost of your participation is \$7,500. An invoice for this amount will be sent to the USGS Branch of Financial Management.

We appreciate your support of this research program. If you have any questions, please contact Dr. George Z. Forristall at (713) 663-2404.

Very truly yours,

  
K. R. Jordan, Manager  
Production Operations  
Research Department

Enclosures

*Noted  
this det  
1-23-78*

**OCEAN CURRENT MEASURING PROGRAM**

**STATUS REPORT**

**JUNE AND JULY 1977**

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## OCEAN CURRENT MEASURING PROGRAM STATUS REPORT

### I. INTRODUCTION

This is the twenty-seventh of the periodic reports mentioned in Attachment "B", paragraphs 1 and 2 of the OCMP agreement. It covers the status of the measuring stations from May 13, 1977, to August 16, 1977, and discusses system improvements and repairs made during that time span. The charts included in this report are not intended to be a data source as the scales are nominal and the automatic-calibration data cannot be read accurately off the compressed records. The charts are useful for determining which sections of data might be of interest. Those sections of data which are of interest can then be obtained in a more readily usable form.

### II. GENERAL INFORMATION

Information pertinent to the interpretation of this status report is given in this section. Detailed information on the overall instrumentation system is contained in "OCMP: Station Configurations" by George Z. Forristall, and, "OCMP: Report on Electronic System" by R. C. Hamilton.

The two stations of OCMP are numbered as follows:

| <u>Station Number</u> | <u>Location</u>    |
|-----------------------|--------------------|
| 2                     | Eugene Island 331A |
| 3                     | South Pass 62C     |

The former station No. 1 is not operational for the 1977 season, but the station numbering has been left the same as in previous years to reduce confusion. The current meters at all stations are numbered from the top (nearest the surface) meter downward. The meters are aligned so that the x-channel measures true north-south current speed and the y-channel measures true east-west current speed. Currents setting toward the north and toward the east give positive outputs.

The current meter depths at stations 2 and 3 given in reports written before August 1975 are incorrect. The correct depths of all meters are given below in feet.

| Station | Meter | Depth Below Top of Wave Staff | Nominal Depth Below MGL |
|---------|-------|-------------------------------|-------------------------|
| 2       | 1     | 55                            | 12                      |
|         | 2     | 90                            | 47                      |
|         | 3     | 145                           | 103                     |
|         | 4     | 220                           | 177                     |
| 3       | 1     | 65                            | 15                      |
|         | 2     | 124                           | 74                      |
|         | 3     | 202                           | 152                     |
|         | 4     | 302                           | 252                     |

However, from May 26 to July 11, the meters at station 3 were at nonstandard depths, as noted in the next section. Each station contains two seven-channel FM magnetic tape recorders. The recorder designated "Current" contains data from current meters 1, 2, and 3, plus time. The recorder designated "Weather" contains wind, wave, barometric pressure, and time data. Additionally, the "Weather" recorders contain data from current meter No. 4. Each data tape is given a number which appears on the Magnetic Tape Register and on the compressed time scale chart. When requesting data, the tape number, time and date of interest, data required, and details of the time and amplitude scales required should be included in the request.

At the beginning of each compressed time scale chart included with this report is a header which contains the "nominal" calibration for each channel. This same "nominal" calibration is listed on the Magnetic Tape Registers, and it will differ slightly from the actual calibration in most instances. The calibration values marked "Automatic-Calibration" on the compressed time scale charts are contained in the Automatic-Calibration sheets in Section VII of this report.

Channel seven of all recorders contain the time signal which consists of a negative pulse every minute and a positive pulse every hour. The clock also triggers the automatic-calibration circuit once every 24 hours. The automatic-calibration circuit is triggered manually at the start and end of the tapes to synchronize the station clock with absolute time.

### III. SUMMARY OF STATION OPERATION

The OCMP stations had been turned off at the end of 1976. The current meters were returned to March-McBirney, Inc., where they were repaired as necessary, recalibrated, and covered with a new layer of No-Foul. In May of 1977, the refurbished current meters were installed at OCMP stations 2 and 3, and the stations were made operational again with few problems. All the instrumentation has functioned correctly except as noted below.

#### A. Station No. 2 (EI331A)

1. The station became operational again on May 13, 1977.
2. From May 13 to June 22, the calibration signal recorded from current meter 3X was intermittently too low. The reduced span probably also affected the signal from the current meter, although it is difficult to tell because of the weak currents at this depth.
3. Current meter 3Y has been growing increasingly more noisy since its installation. The cause of the noise has not yet been determined, but any data from current meter 3 should be viewed with suspicion.
4. From May 19 to June 22, all channels on the weather recorder had severe high frequency noise problems. It may be possible to recover much of the data by filtering the noise. It now appears that the noise was caused by nearly frozen bearings on the recorder capstan.
5. The O-ring drive belt on the current recorder was broken from May 29 until June 7 and again from August 1 to August 16.

B. Station No. 3 (SP62C)

1. The station became operational again on May 26, 1977.
2. Shortly after installation, the cable to the probe of current meter 1 failed. The current meter string was then raised so that current meter 2 was at the depth normally occupied by current meter 1. Until July 11, the current meters were thus at the following non standard depths:

| Meter | Depth below top of wave staff | Nominal depth below MGL |
|-------|-------------------------------|-------------------------|
| 1     | missing                       | 15                      |
| 2     | 65                            | 15                      |
| 3     | 143                           | 93                      |
| 4     | 243                           | 193                     |

3. Throughout this period, the wave staff suffered numerous level shifts. The proper calibration can in most instances be recovered through judicious use of the automatic calibration records.
4. Until June 21, the wind direction was recording at only about one-quarter of its proper span. The proper calibration could probably be recovered by using the north (0 ) to north (360 ) swings of direction.
5. From June 21 to June 28, channel 2, 6, and 7 of the current recorder were noisy from unknown causes.
6. From July 20 to August 16, the clock signal was occasionally missing from the weather tape.
7. From July 29 to August 7, the current tape was off the record heads.

IV, SYSTEM IMPROVEMENTS AND REPAIRS

The major accomplishments during this reporting period was the installation of the refurbished current meters. Work performed during visits to the stations is described below.

A. Station No. 2 (EI331A)

1. May 11-13, 1977. The refurbished current meters and cables were installed. A new Sola constant voltage transformer was installed to replace the one that had burned out in January. The record switch on the current recorder was cleaned, and the fuse in the battery charger replaced.
2. June 7, 1977. The broken O-ring drive belt in the current recorder was replaced. During the repair, the Mylar drive belt in the recorder broke and also had to be replaced.
3. June 22, 1977. The noisy weather recorder was replaced. The input plug on the current recorder was cleaned to prevent signal loss.
4. July 19, 1977. An intermittent short which was preventing the standby battery from becoming fully charged was repaired.
5. August 16, 1977. Another broken O-ring drive belt on the current recorder was replaced.

B. Station No. 3 (SP62C)

1. May 24-26, 1977. The refurbished current meters and cables were installed. As noted above, the cable to current meter 1 failed shortly after installation, so the current meter string was raised to put current meter 2 in the position normally occupied by current meter 1, and current meter 1 was removed. The failed control board in the Voltage Regulated Transformer/Rectifier (VRTR) was replaced. We attempted to repair the wind direction problem by rewiring the plug to the Aerovane, but were not successful.
2. June 21, 1977. The wind direction problem was repaired by patching a worn spot in the cable to the Aerovane and replacing an op amp in the Aerovane power supply. The wave staff power supply was adjusted to correct the signal level from the transducer. A new clock battery was installed.
3. July 11, 1977. Current meter 1 and its repaired cable were installed.
4. July 20, 1977. An op amp in the wave staff power supply was replaced in an effort to correct the frequent level shifts from the transducer. The gearbox in the current recorder was



replaced since its bearings appeared to be failing.

5. August 16, 1977. No repairs were necessary.

V. CURRENT METER STATUS

At this time all current meters are working perfectly with the exception of current meter 3 at EI331A. The Y axis of that meter has been growing increasingly noisy since its installation. Electrical checks made on the probe and cable from the surface show none of the problems usually associated with such noise, and replacement shows the fault does not lie in the electronics chassis. Data from this meter should be used with extreme caution.

George Z. Forristall

OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company  
Houston, Texas

AUTOMATIC CALIBRATION DATA-WEATHER AND CURRENT

STATION SP 62C (#3)

DATE 5 12 6 177

1236

(INITIAL AUTO-CALIBRAT)

WEATHER TAPE NO. 354W

|                |     |             |         |      |                 |         |
|----------------|-----|-------------|---------|------|-----------------|---------|
| WAVE HEIGHT    | LOW | <u>78.3</u> | ft      | HIGH | <u>-12.5</u>    | ft      |
| WIND SPEED     | LOW | <u>0</u>    | mph     | HIGH | <u>95.8</u>     | mph     |
| WIND DIRECTION | LOW | <u>360</u>  | deg.    | HIGH | <u>-6.5</u>     | deg.    |
| BAROMETER      | LOW | <u>26.0</u> | in. Hg. | HIGH | <u>30.75</u>    | in. Hg. |
| CURRENT 4X     | LOW | <u>0</u>    | fps     | HIGH | <u>10.0 (N)</u> | fps     |
| CURRENT 4Y     | LOW | <u>0</u>    | fps     | HIGH | <u>10.0 (E)</u> | fps     |

CURRENT TAPE NO. 354C

|            |     |          |     |      |                 |     |
|------------|-----|----------|-----|------|-----------------|-----|
| CURRENT 3X | LOW | <u>0</u> | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 3Y | LOW | <u>0</u> | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 2X | LOW | <u>0</u> | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 2Y | LOW | <u>0</u> | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 1X | LOW | <u>0</u> | fps | HIGH | <u>N/A</u>      | fps |
| CURRENT 1Y | LOW | <u>0</u> | fps | HIGH | <u>N/A</u>      | fps |

COMMENTS: CM #1 was not installed. CM #2  
was raised to #1's normal depth.

OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company  
Houston, Texas

AUTOMATIC CALIBRATION DATA-WEATHER AND CURRENT

STATION SP62C (#3)

DATE 6/21/77

1255

(INITIAL AUTO-CALIBRATION)

WEATHER TAPE NO. 355W

|                |     |             |         |      |                 |         |
|----------------|-----|-------------|---------|------|-----------------|---------|
| WAVE HEIGHT    | LOW | <u>78.6</u> | ft      | HIGH | <u>3.2</u>      | ft      |
| WIND SPEED     | LOW | 0           | mph     | HIGH | <u>95.8</u>     | mph     |
| WIND DIRECTION | LOW | <u>360</u>  | deg.    | HIGH | <u>-4.3</u>     | deg.    |
| BAROMETER      | LOW | 26.0        | in. Hg. | HIGH | <u>30.73</u>    | in. Hg. |
| CURRENT 4X     | LOW | 0           | fps     | HIGH | <u>10.0 (N)</u> | fps     |
| CURRENT 4Y     | LOW | 0           | fps     | HIGH | <u>10.0 (E)</u> | fps     |

CURRENT TAPE NO. 355C

|            |     |   |     |      |                 |     |
|------------|-----|---|-----|------|-----------------|-----|
| CURRENT 3X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 3Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 2X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 2Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 1X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 1Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |

COMMENTS: CM #1 installed and system lowered to the proper depth.

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OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company  
Houston, Texas

AUTOMATIC CALIBRATION DATA-WEATHER AND CURRENT

STATION SP62C (#3)

DATE 7/20/77

0953

(INITIAL AUTO-CALIBRATION)

WEATHER TAPE NO. 356W

|                |     |             |         |      |                 |         |
|----------------|-----|-------------|---------|------|-----------------|---------|
| WAVE HEIGHT    | LOW | <u>78.6</u> | ft      | HIGH | <u>1.6</u>      | ft      |
| WIND SPEED     | LOW | <u>0</u>    | mph     | HIGH | <u>95.9</u>     | mph     |
| WIND DIRECTION | LOW | <u>360</u>  | deg.    | HIGH | <u>-36</u>      | deg.    |
| BAROMETER      | LOW | <u>26.0</u> | in. Hg. | HIGH | <u>30.70</u>    | in. Hg. |
| CURRENT 4X     | LOW | <u>0</u>    | fps     | HIGH | <u>10.0 (N)</u> | fps     |
| CURRENT 4Y     | LOW | <u>0</u>    | fps     | HIGH | <u>10.0 (E)</u> | fps     |

CURRENT TAPE NO. 356C

|            |     |          |     |      |                 |     |
|------------|-----|----------|-----|------|-----------------|-----|
| CURRENT 3X | LOW | <u>0</u> | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 3Y | LOW | <u>0</u> | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 2X | LOW | <u>0</u> | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 2Y | LOW | <u>0</u> | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 1X | LOW | <u>0</u> | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 1Y | LOW | <u>0</u> | fps | HIGH | <u>10.0 (E)</u> | fps |

COMMENTS: \_\_\_\_\_

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OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company  
Houston, Texas

AUTOMATIC CALIBRATION DATA-WEATHER AND CURRENT

STATION ET 331 (#2)

DATE 5/13/77

0923

(INITIAL AUTO-CALIBRATION)

WEATHER TAPE NO. 258W

|                |     |             |         |      |                 |         |
|----------------|-----|-------------|---------|------|-----------------|---------|
| WAVE HEIGHT    | LOW | <u>78.3</u> | ft      | HIGH | <u>7.8</u>      | ft      |
| WIND SPEED     | LOW | 0           | mph     | HIGH | <u>101.1</u>    | mph     |
| WIND DIRECTION | LOW | <u>0</u>    | deg.    | HIGH | <u>303.1</u>    | deg.    |
| BAROMETER      | LOW | 26.0        | in. Hg. | HIGH | <u>30.90</u>    | in. Hg. |
| CURRENT 4X     | LOW | 0           | fps     | HIGH | <u>10.0 (N)</u> | fps     |
| CURRENT 4Y     | LOW | 0           | fps     | HIGH | <u>10.0 (E)</u> | fps     |

CURRENT TAPE NO. 258C

|            |     |   |     |      |                 |     |
|------------|-----|---|-----|------|-----------------|-----|
| CURRENT 3X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 3Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 2X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 2Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 1X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 1Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |

COMMENTS:

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OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company

Houston, Texas

AUTOMATIC CALIBRATION DATA-WEATHER AND CURRENT

STATION ET 331 (#2)

DATE 617 177

1345

(INITIAL AUTO-CALIBRATION)

WEATHER TAPE NO. 259W

|                |     |             |         |      |                 |         |
|----------------|-----|-------------|---------|------|-----------------|---------|
| WAVE HEIGHT    | LOW | <u>77.9</u> | ft      | HIGH | <u>7.2</u>      | ft      |
| WIND SPEED     | LOW | 0           | mph     | HIGH | <u>10.1</u>     | mph     |
| WIND DIRECTION | LOW | 0           | deg.    | HIGH | <u>304.4</u>    | deg.    |
| BAROMETER      | LOW | 26.0        | in. Hg. | HIGH | <u>30.92</u>    | in. Hg. |
| CURRENT 4X     | LOW | 0           | fps     | HIGH | <u>10.0 (N)</u> | fps     |
| CURRENT 4Y     | LOW | 0           | fps     | HIGH | <u>10.0 (E)</u> | fps     |

CURRENT TAPE NO. 259C

|            |     |   |     |      |                 |     |
|------------|-----|---|-----|------|-----------------|-----|
| CURRENT 3X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 3Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 2X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 2Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 1X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 1Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |

COMMENTS:

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OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company

Houston, Texas

AUTOMATIC CALIBRATION DATA-WEATHER AND CURRENT

STATION ET 331 (#2)

DATE 6/22/77

1125

(INITIAL AUTO-CALIBRATION)

WEATHER TAPE NO. 260W

|                |     |             |         |      |                 |         |
|----------------|-----|-------------|---------|------|-----------------|---------|
| WAVE HEIGHT    | LOW | <u>78.2</u> | ft      | HIGH | <u>8.8</u>      | ft      |
| WIND SPEED     | LOW | 0           | mph     | HIGH | <u>101.1</u>    | mph     |
| WIND DIRECTION | LOW | 0           | deg.    | HIGH | <u>303.1</u>    | deg.    |
| BAROMETER      | LOW | 26.0        | in. Hg. | HIGH | <u>30.88</u>    | in. Hg. |
| CURRENT 4X     | LOW | 0           | fps     | HIGH | <u>10.0 (N)</u> | fps     |
| CURRENT 4Y     | LOW | 0           | fps     | HIGH | <u>10.0 (E)</u> | fps     |

CURRENT TAPE NO. 260C

|            |     |   |     |      |                 |     |
|------------|-----|---|-----|------|-----------------|-----|
| CURRENT 3X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 3Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 2X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 2Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 1X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 1Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |

COMMENTS:

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OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company

Houston, Texas

AUTOMATIC CALIBRATION DATA-WEATHER AND CURRENT

STATION ET 331 (#2)

DATE 7/19/77 1215 (INITIAL AUTO-CALIBRATION)

WEATHER TAPE NO. 261W

|                |     |             |         |      |                 |         |
|----------------|-----|-------------|---------|------|-----------------|---------|
| WAVE HEIGHT    | LOW | <u>78.2</u> | ft      | HIGH | <u>7.8</u>      | ft      |
| WIND SPEED     | LOW | 0           | mph     | HIGH | <u>101.1</u>    | mph     |
| WIND DIRECTION | LOW | 0           | deg.    | HIGH | <u>303.1</u>    | deg.    |
| BAROMETER      | LOW | 26.0        | in. Hg. | HIGH | <u>30.87</u>    | in. Hg. |
| CURRENT 4X     | LOW | 0           | fps     | HIGH | <u>10.0 (N)</u> | fps     |
| CURRENT 4Y     | LOW | 0           | fps     | HIGH | <u>10.0 (E)</u> | fps     |

CURRENT TAPE NO. 261C

|            |     |   |     |      |                 |     |
|------------|-----|---|-----|------|-----------------|-----|
| CURRENT 3X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 3Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 2X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 2Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |
| CURRENT 1X | LOW | 0 | fps | HIGH | <u>10.0 (N)</u> | fps |
| CURRENT 1Y | LOW | 0 | fps | HIGH | <u>10.0 (E)</u> | fps |

COMMENTS:

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OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company

Houston, Texas

MAGNETIC TAPE REGISTER-WEATHER

STATION SP 62 C TAPE ON 5/26/77 1236  
 TAPE NO. 354 W TAPE OFF 6/21/77 0845

| CHANNEL | SENSOR         | NOMINAL FM TAPE ALIGNMENT*  |              |                              |
|---------|----------------|-----------------------------|--------------|------------------------------|
|         |                | -40 percent<br><i>CREST</i> | Center       | +40 percent<br><i>TROUGH</i> |
| 1       | Wave Height    | <u>80</u> ft                | <u>40</u> ft | 0 ft                         |
| 2       | Wind Speed     | 0 mph                       | 100 mph      | 200 mph                      |
| 3       | Wind Direction | 360 deg.                    | 180 deg.     | 0 deg.                       |
| 4       | Barometer      | 26.0 in. Hg.                | 28.5 in. Hg. | 31.0 in. Hg.                 |
| 5       | Current 4X     | <u>10(S)</u> fps            | 0 fps        | <u>10(N)</u> fps             |
| 6       | Current 4Y     | <u>10(W)</u> fps            | 0 fps        | <u>10(E)</u> fps             |
| 7       | Time Signal    | minutes                     |              | hours                        |

GENERAL COMMENTS: Tape was complete and quite good  
except for decreased span on wind direction

WAVE HEIGHT: Complete record with four level shifts:  
~ 1600 and 2330 6/3 and ~ 0100 and 0936 5/28.

WIND SPEED: Complete record.

WIND DIRECTION: Complete record with ~ 1/4 span. Direction  
is questionable.

BAROMETRIC PRESSURE: Complete record.

CURRENT METER 4X: Complete record.

CURRENT METER 4Y: Complete record.

TIME SIGNAL: Complete check and AUTO-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

SHELL DEVELOPMENT COMPANY

Houston, Texas

MAGNETIC TAPE REGISTER-CURRENT

STATION SP 62C TAPE ON 5/26/77 1236  
 TAPE NO. 354C TAPE OFF 6/2/77 0845

| CHANNEL | SENSOR      | NOMINAL FM TAPE ALIGNMENT* |        |                     |
|---------|-------------|----------------------------|--------|---------------------|
|         |             | -40 percent                | Center | +40 percent         |
| 1       | Current 3X  | <u>10.0 (S) fps</u>        | 0 fps  | <u>10.0 (N) fps</u> |
| 2       | Current 3Y  | <u>10.0 (W) fps</u>        | 0 fps  | <u>10.0 (E) fps</u> |
| 3       | Current 2X  | <u>10.0 (S) fps</u>        | 0 fps  | <u>10.0 (N) fps</u> |
| 4       | Current 2Y  | <u>10.0 (W) fps</u>        | 0 fps  | <u>10.0 (E) fps</u> |
| 5       | Current 1X  | <u>10.0 (S) fps</u>        | 0 fps  | <u>10.0 (N) fps</u> |
| 6       | Current 1Y  | <u>10.0 (W) fps</u>        | 0 fps  | <u>10.0 (E) fps</u> |
| 7       | Time Signal | minutes                    | 0      | hours               |

GENERAL COMMENTS: Complete tape with good data. No. CM1, CM2 at normal CM1 depth

CURRENT METER 3X: Complete record.

CURRENT METER 3Y: Complete record. Noise spikes on data for first four days.

CURRENT METER 2X: Complete record.

CURRENT METER 2Y: Complete record.

CURRENT METER 1X: NOT INSTALLED.

CURRENT METER 1Y: NOT INSTALLED.

TIME SIGNAL: No problems. Complete clock and AUTO CALIBRATION.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company

Houston, Texas

MAGNETIC TAPE REGISTER-WEATHER

STATION SP 62C (#3) TAPE ON 6/21/77 1255  
 TAPE NO. 355W TAPE OFF 7/20/77 0814

| CHANNEL | SENSOR         | NOMINAL FM TAPE ALIGNMENT* |              |                         |
|---------|----------------|----------------------------|--------------|-------------------------|
|         |                | -40 percent<br>(CREST)     | Center       | +40 percent<br>(TROUGH) |
| 1       | Wave Height    | <u>80</u> ft               | <u>40</u> ft | 0 ft                    |
| 2       | Wind Speed     | 0 mph                      | 100 mph      | 200 mph                 |
| 3       | Wind Direction | 360 deg.                   | 180 deg.     | 0 deg.                  |
| 4       | Barometer      | 26.0 in. Hg.               | 28.5 in. Hg. | 31.0 in. Hg.            |
| 5       | Current 4X     | <u>20(S)</u> fps           | 0 fps        | <u>20(W)</u> fps        |
| 6       | Current 4Y     | <u>20(W)</u> fps           | 0 fps        | <u>20(E)</u> fps        |
| 7       | Time Signal    | minutes                    |              | hours                   |

GENERAL COMMENTS: Complete tape. Wave has 10 level shifts. Clock lost for two short period.

WAVE HEIGHT: Complete record. Level shifts at: 21130 6/30, 21900 7/1, 2215 7/2, 21000 7/9, 21200 7/9, 22000 7/9, 20400 7/10, 21830 7/10, 21400 7/10, 21230 7/11

WIND SPEED: Complete record.

WIND DIRECTION: Complete record.

BAROMETRIC PRESSURE: Complete record.

CURRENT METER 4X: Complete record. Meter depth changed on 7/11.

CURRENT METER 4Y: Complete record. Meter depth changed on 7/11.

TIME SIGNAL: Complete clock except from 21400 to 21700 6/21 and from 21900 7/11 to 21630 7/12. Complete AUTO-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

SHELL DEVELOPMENT COMPANY

Houston, Texas

MAGNETIC TAPE REGISTER-CURRENT

STATION SP62C (#3) TAPE ON 6/21/77 1125  
 TAPE NO. 355C TAPE OFF 7/20/77 0814

| CHANNEL | SENSOR      | NOMINAL FM TAPE ALIGNMENT* |        |                   |
|---------|-------------|----------------------------|--------|-------------------|
|         |             | -40 percent                | Center | +40 percent       |
| 1       | Current 3X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 2       | Current 3Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 3       | Current 2X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 4       | Current 2Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 5       | Current 1X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 6       | Current 1Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 7       | Time Signal | minutes                    | 0      | hours             |

GENERAL COMMENTS: Complete tape. Channels 2, 6 + 7 contain intermittent noise to 6/28. CM #1 installed 7/11.

CURRENT METER 3X: Complete record.

CURRENT METER 3Y: Complete record. Data contain intermittent noise and dropouts until 6/28.

CURRENT METER 2X: Complete record.

CURRENT METER 2Y: Complete record.

CURRENT METER 1X: Complete record.

CURRENT METER 1Y: Complete record. Data contain some intermittent noise and dropouts until 6/28.

TIME SIGNAL: Complete clock and Auto-Corr.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company  
Houston, Texas

MAGNETIC TAPE REGISTER-WEATHER

STATION SP 62C (#3) TAPE ON 7/20/77 0953  
TAPE NO. 356W TAPE OFF 8/16/77 1257

| CHANNEL | SENSOR         | NOMINAL FM TAPE ALIGNMENT*  |              |                              |
|---------|----------------|-----------------------------|--------------|------------------------------|
|         |                | -40 percent<br><i>CREST</i> | Center       | +40 percent<br><i>TROUGH</i> |
| 1       | Wave Height    | <u>80</u> ft                | <u>40</u> ft | 0 ft                         |
| 2       | Wind Speed     | 0 mph                       | 100 mph      | 200 mph                      |
| 3       | Wind Direction | 360 deg.                    | 180 deg.     | 0 deg.                       |
| 4       | Barometer      | 26.0 in. Hg.                | 28.5 in. Hg. | 31.0 in. Hg.                 |
| 5       | Current 4X     | <u>10 (S)</u> fps           | 0 fps        | <u>10 (N)</u> fps            |
| 6       | Current 4Y     | <u>10 (W)</u> fps           | 0 fps        | <u>10 (E)</u> fps            |
| 7       | Time Signal    | minutes                     |              | hours                        |

GENERAL COMMENTS: Complete tape. Slight noise on all channels toward end of tape

WAVE HEIGHT: Complete record. Three level shifts: ~2300 7/31, ~2300 8/1, and ~0600 8/2.

WIND SPEED: Complete record.

WIND DIRECTION: Complete record.

BAROMETRIC PRESSURE: Complete record.

CURRENT METER 4X: Complete record.

CURRENT METER 4Y: Complete record.

TIME SIGNAL: Complete clock except from ~1000 to ~1630 7/20 and from ~1300 8/1 to ~1630 8/2. Complete AUTO-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

SHELL DEVELOPMENT COMPANY

Houston, Texas

MAGNETIC TAPE REGISTER-CURRENT

STATION SP 62 C TAPE ON 7/20/77 0953  
 TAPE NO. 356C TAPE OFF 8/16/77 1257

| CHANNEL | SENSOR      | NOMINAL FM TAPE ALIGNMENT* |        |                   |
|---------|-------------|----------------------------|--------|-------------------|
|         |             | -40 percent                | Center | +40 percent       |
| 1       | Current 3X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 2       | Current 3Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 3       | Current 2X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 4       | Current 2Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 5       | Current 1X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 6       | Current 1Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 7       | Time Signal | minutes                    | 0      | hours             |

GENERAL COMMENTS: Tape was complete but was partially off heads from 21345 7/29 to 20410 8/1.

CURRENT METER 3X: Complete except when off heads.

CURRENT METER 3Y: Complete except when off heads.

CURRENT METER 2X: Complete except when off heads.

CURRENT METER 2Y: Complete except when off heads.

CURRENT METER 1X: Complete except when off heads.

CURRENT METER 1Y: Complete except when off heads.

TIME SIGNAL: Complete clock and AUTO-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company  
Houston, Texas

MAGNETIC TAPE REGISTER-WEATHER

STATION FI 331 (#2) TAPE ON 5113177 0923  
TAPE NO. 258 W TAPE OFF 617177 1216

| CHANNEL | SENSOR         | NOMINAL FM TAPE ALIGNMENT*  |                   |                              |
|---------|----------------|-----------------------------|-------------------|------------------------------|
|         |                | -40 percent<br><i>CREST</i> | Center            | +40 percent<br><i>TROUGH</i> |
| 1       | Wave Height    | <u>80</u> ft                | <u>40</u> ft      | 0 ft                         |
| 2       | Wind Speed     | 0 mph                       | 100 mph           | 200 mph                      |
| 3       | Wind Direction | <u>0</u> deg.               | <u>202.5</u> deg. | <u>405</u> deg.              |
| 4       | Barometer      | 26.0 in. Hg.                | 28.5 in. Hg.      | 31.0 in. Hg.                 |
| 5       | Current 4X     | <u>20 (S)</u> fps           | 0 fps             | <u>20 (N)</u> fps            |
| 6       | Current 4Y     | <u>20 (W)</u> fps           | 0 fps             | <u>20 (E)</u> fps            |
| 7       | Time Signal    | minutes                     |                   | hours                        |

GENERAL COMMENTS: Complete tape. Occasional noise all channels to 0100 5/19. After 0100 5/19 noise all channels to end of Tape

WAVE HEIGHT: Complete record.

WIND SPEED: Complete record.

WIND DIRECTION: Complete record.

BAROMETRIC PRESSURE: Complete record.

CURRENT METER 4X: Complete record.

CURRENT METER 4Y: Complete record.

TIME SIGNAL: Complete clock and Avco-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

SHELL DEVELOPMENT COMPANY

Houston, Texas

MAGNETIC TAPE REGISTER-CURRENT

STATION ET 331 (#2) TAPE ON 5113177 0923 :

TAPE NO. 258C TAPE OFF <sup>\*</sup>5129177 20800

<sup>\*</sup> STOPPED DUE TO BROKEN DRIVE BELT  
NOMINAL FM TAPE ALIGNMENT\*

| CHANNEL | SENSOR      | -40 percent       | Center | +40 percent       |
|---------|-------------|-------------------|--------|-------------------|
| 1       | Current 3X  | <u>20 (S) fps</u> | 0 fps  | <u>20 (N) fps</u> |
| 2       | Current 3Y  | <u>20 (W) fps</u> | 0 fps  | <u>20 (E) fps</u> |
| 3       | Current 2X  | <u>20 (S) fps</u> | 0 fps  | <u>20 (N) fps</u> |
| 4       | Current 2Y  | <u>20 (W) fps</u> | 0 fps  | <u>20 (E) fps</u> |
| 5       | Current 1X  | <u>20 (S) fps</u> | 0 fps  | <u>20 (N) fps</u> |
| 6       | Current 1Y  | <u>20 (W) fps</u> | 0 fps  | <u>20 (E) fps</u> |
| 7       | Time Signal | minutes           | 0      | hours             |

GENERAL COMMENTS: Tape stopped due to broken O-ring drive belt.

CM 3X signal partially received. Slight noise all channels.

CURRENT METER 3X: Complete record. Signal only partially received at times.

CURRENT METER 3Y: Complete record.

CURRENT METER 2X: Complete record.

CURRENT METER 2Y: Complete record.

CURRENT METER 1X: Complete record.

CURRENT METER 1Y: Complete record.

TIME SIGNAL: Complete clock and AUTO-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.



OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company

Houston, Texas

MAGNETIC TAPE REGISTER-WEATHER

STATION ET 331A TAPE ON 617177 1345  
 TAPE NO. 259W TAPE OFF 6122177 0906

| CHANNEL | SENSOR         | NOMINAL FM TAPE ALIGNMENT*  |                   |                              |
|---------|----------------|-----------------------------|-------------------|------------------------------|
|         |                | -40 percent<br><i>crest</i> | Center            | +40 percent<br><i>trough</i> |
| 1       | Wave Height    | <u>80</u> ft                | <u>40</u> ft      | 0 ft                         |
| 2       | Wind Speed     | 0 mph                       | 100 mph           | 200 mph                      |
| 3       | Wind Direction | <u>0</u> deg.               | <u>202.5</u> deg. | <u>405</u> deg.              |
| 4       | Barometer      | 26.0 in. Hg.                | 28.5 in. Hg.      | 31.0 in. Hg.                 |
| 5       | Current 4X     | <u>10(S)</u> fps            | 0 fps             | <u>10(N)</u> fps             |
| 6       | Current 4Y     | <u>10(W)</u> fps            | 0 fps             | <u>10(E)</u> fps             |
| 7       | Time Signal    | minutes                     |                   | hours                        |

GENERAL COMMENTS: Complete tape. All channels are very noisy with high frequency noise.

WAVE HEIGHT: Complete record with noise.

WIND SPEED: Complete record with noise.

WIND DIRECTION: Complete record with noise.

BAROMETRIC PRESSURE: Complete record with noise.

CURRENT METER 4X: Complete record with noise.

CURRENT METER 4Y: Complete record with noise.

TIME SIGNAL: Complete clock and AUTO-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

SHELL DEVELOPMENT COMPANY

Houston, Texas

MAGNETIC TAPE REGISTER-CURRENT

STATION ET 331A TAPE ON 617177 1345  
 TAPE NO. 259C TAPE OFF 6122177 0906

| CHANNEL | SENSOR      | NOMINAL FM TAPE ALIGNMENT* |        |                     |
|---------|-------------|----------------------------|--------|---------------------|
|         |             | -40 percent                | Center | +40 percent         |
| 1       | Current 3X  | <u>10.0 (S) fps</u>        | 0 fps  | <u>10.0 (N) fps</u> |
| 2       | Current 3Y  | <u>10.0 (W) fps</u>        | 0 fps  | <u>10.0 (E) fps</u> |
| 3       | Current 2X  | <u>10.0 (S) fps</u>        | 0 fps  | <u>10.0 (N) fps</u> |
| 4       | Current 2Y  | <u>10.0 (W) fps</u>        | 0 fps  | <u>10.0 (E) fps</u> |
| 5       | Current 1X  | <u>10.0 (S) fps</u>        | 0 fps  | <u>10.0 (N) fps</u> |
| 6       | Current 1Y  | <u>10.0 (W) fps</u>        | 0 fps  | <u>10.0 (E) fps</u> |
| 7       | Time Signal | minutes                    | 0      | hours               |

GENERAL COMMENTS: Complete tape. CM 3Y was noisy.

CURRENT METER 3X: Complete record.

CURRENT METER 3Y: Complete record. Data are noisy and may be suspect.

CURRENT METER 2X: Complete record.

CURRENT METER 2Y: Complete record.

CURRENT METER 1X: Complete record.

CURRENT METER 1Y: Complete record.

TIME SIGNAL: Complete clock and AUTO-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company

Houston, Texas

MAGNETIC TAPE REGISTER-WEATHER

STATION FI 331 (#2) TAPE ON 122177 1125

TAPE NO. 260 W TAPE OFF 7119177 1136

| CHANNEL | SENSOR         | NOMINAL FM TAPE ALIGNMENT*  |                   |                              |
|---------|----------------|-----------------------------|-------------------|------------------------------|
|         |                | -40 percent<br><i>CREST</i> | Center            | +40 percent<br><i>TROUGH</i> |
| 1       | Wave Height    | <u>80</u> ft                | <u>40</u> ft      | 0 ft                         |
| 2       | Wind Speed     | 0 mph                       | 100 mph           | 200 mph                      |
| 3       | Wind Direction | <u>0</u> deg.               | <u>202.5</u> deg. | <u>405</u> deg.              |
| 4       | Barometer      | 26.0 in. Hg.                | 28.5 in. Hg.      | 31.0 in. Hg.                 |
| 5       | Current 4X     | <u>20(S)</u> fps            | 0 fps             | <u>20(N)</u> fps             |
| 6       | Current 4Y     | <u>20(W)</u> fps            | 0 fps             | <u>20(E)</u> fps             |
| 7       | Time Signal    | minutes                     |                   | hours                        |

GENERAL COMMENTS: Complete tape. Data are quite good.

WAVE HEIGHT: Complete record.

WIND SPEED: Complete record.

WIND DIRECTION: Complete record. Data are noisy when wind is southerly.

BAROMETRIC PRESSURE: Complete record.

CURRENT METER 4X: Complete record.

CURRENT METER 4Y: Complete record.

TIME SIGNAL: Complete clock and AUTO-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

SHELL DEVELOPMENT COMPANY

Houston, Texas

MAGNETIC TAPE REGISTER-CURRENT

STATION EE 331 (#2) TAPE ON 6/22/77 1125  
 TAPE NO. 260C TAPE OFF 7/19/77 1136

| CHANNEL | SENSOR      | NOMINAL FM TAPE ALIGNMENT* |        |                   |
|---------|-------------|----------------------------|--------|-------------------|
|         |             | -40 percent                | Center | +40 percent       |
| 1       | Current 3X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 2       | Current 3Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 3       | Current 2X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 4       | Current 2Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 5       | Current 1X  | <u>20 (S) fps</u>          | 0 fps  | <u>20 (N) fps</u> |
| 6       | Current 1Y  | <u>20 (W) fps</u>          | 0 fps  | <u>20 (E) fps</u> |
| 7       | Time Signal | minutes                    | 0      | hours             |

GENERAL COMMENTS: Complete tape. CM 3X appears to be defective.

CURRENT METER 3X: Complete record.

CURRENT METER 3Y: Complete record. Data are noisy suggesting a meter failure.

CURRENT METER 2X: Complete record.

CURRENT METER 2Y: Complete record.

CURRENT METER 1X: Complete record.

CURRENT METER 1Y: Complete record.

TIME SIGNAL: Complete check and Auto-Cor.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

Shell Development Company

Houston, Texas

MAGNETIC TAPE REGISTER-WEATHER

STATION ET 331 (#2) TAPE ON 7/19/77 1215  
 TAPE NO. 261 W TAPE OFF 8/16/77 0913

| CHANNEL | SENSOR         | NOMINAL FM TAPE ALIGNMENT*  |                   |                   |
|---------|----------------|-----------------------------|-------------------|-------------------|
|         |                | -40 percent<br><i>CREST</i> | Center            | +40 percent       |
| 1       | Wave Height    | <u>80</u> ft                | <u>40</u> ft      | 0 ft              |
| 2       | Wind Speed     | 0 mph                       | 100 mph           | 200 mph           |
| 3       | Wind Direction | <u>0</u> deg.               | <u>202.5</u> deg. | <u>405</u> deg.   |
| 4       | Barometer      | 26.0 in. Hg.                | 28.5 in. Hg.      | 31.0 in. Hg.      |
| 5       | Current 4X     | <u>100(W)</u> fps           | 0 fps             | <u>100(W)</u> fps |
| 6       | Current 4Y     | <u>100(W)</u> fps           | 0 fps             | <u>100(E)</u> fps |
| 7       | Time Signal    | minutes                     |                   | hours             |

GENERAL COMMENTS: Complete record.

WAVE HEIGHT: Complete record.

WIND SPEED: Complete record.

WIND DIRECTION: Complete record.

BAROMETRIC PRESSURE: Complete record.

CURRENT METER 4X: Complete record.

CURRENT METER 4Y: Complete record.

TIME SIGNAL: Complete Clock and Auto-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.

OCEAN CURRENT MEASUREMENT PROGRAM

SHELL DEVELOPMENT COMPANY

Houston, Texas

MAGNETIC TAPE REGISTER-CURRENT

STATION ET 331 (#2) TAPE ON 7/19/77 1215  
 TAPE NO. 261C TAPE OFF 8/16/77 0913  
 (STOPPED ~ 1010 8/1/77)

| CHANNEL | SENSOR      | NOMINAL FM TAPE ALIGNMENT* |        |                   |
|---------|-------------|----------------------------|--------|-------------------|
|         |             | -40 percent                | Center | +40 percent       |
| 1       | Current 3X  | <u>20 (S)</u> fps          | 0 .fps | <u>20 (N)</u> fps |
| 2       | Current 3Y  | <u>20 (W)</u> fps          | 0 fps  | <u>20 (E)</u> fps |
| 3       | Current 2X  | <u>20 (S)</u> fps          | 0 fps  | <u>20 (N)</u> fps |
| 4       | Current 2Y  | <u>20 (W)</u> fps          | 0 fps  | <u>20 (E)</u> fps |
| 5       | Current 1X  | <u>20 (S)</u> fps          | 0 fps  | <u>20 (N)</u> fps |
| 6       | Current 1Y  | <u>20 (W)</u> fps          | 0 fps  | <u>20 (E)</u> fps |
| 7       | Time Signal | minutes                    | 0      | hours             |

GENERAL COMMENTS: Complete tape until ~1010 8/1 when O-ring drive belt broke. Data are all slightly noisy.

CURRENT METER 3X: Complete record.

CURRENT METER 3Y: Complete record, but data are suspect.

CURRENT METER 2X: Complete record.

CURRENT METER 2Y: Complete record.

CURRENT METER 1X: Complete record.

CURRENT METER 1Y: Complete record.

TIME SIGNAL: Complete clock and Auto-CAL.

\* Field tapes recorded at 0.03 ips IRIG FM low density.