# FAA TECHNICAL CENTER LETTER REPORT



A DATA COLLECTION SYSTEM FOR REMOTE MICROWAVE LANDING SYSTEMS

by

Glenn J. Horton

September 1982

**U. S. DEPARTMENT OF TRANSPORTATION**
**FEDERAL AVIATION ADMINISTRATION**
**TECHNICAL CENTER**
**Atlantic City Airport, N.J. 08405**

## ACKNOWLEDGMENTS

The author wishes to acknowledge Mr. Daniel Penrith, ACT-700, for his dedicated work in the development and debugging of the data collection and data reduction software used in this project.

# INTRODUCTION

## PURPOSE.

The purpose of this project is to collect long-term operational data from three remote Microwave Landing System (MLS) sites. To accomplish this task, a minicomputer-based data collection system was developed and implemented. The data collected in this project will be used as an input to the MLS System Test and Evaluation Program (STEP). This work is being performed under Project #076-320-510.

## BACKGROUND.

With the proposed transition to MLS as the primary FAA landing system, an operational evaluation of MLS must be made. This evaluation will provide for the development of procedures and criteria for complete field implementation. To facilitate this evaluation, the STEP plan was developed. Three of the main objectives of STEP are:

1. To develop the maintenance concept for MLS, including application of a remote maintenance monitoring system (RMMS).

2. To develop a data base on MLS reliability, maintainability, and availability.

3. To develop maintenance procedures and tolerances.

To implement the STEP plan, three airports were selected to have prototype MLS equipment installed. The criteria for selection of these airports were:

1. The potential for both user participation and benefits.

2. The airports should be close to engineering services and support provided by the FAA and the individual contractors.

To provide the means of collecting data from the MLS sites, the data collection system described in this report was developed. This system can:

1. Communicate with the three MLS sites.

2. Collect and store performance data from each site.

The central processor is programmed so the each site can be individually accessed and the requested data can be transferred to the central processor. The RMM systems contained in all three sites were manufactured by different MLS manufacturers, thus the data structures and protocols are all different. For this reason, the central processor software had to provide the necessary flexibility to support the three different formats.

The first section of this report describes the data collection system and the second section discusses the data collection activity.

## DISCUSSION

### SYSTEM OVERVIEW.

The three MLS sites used in this project each include a contractor-developed Remote Maintenance Monitoring System (RMMS). The three sites are a Bendix Basic Narrow MLS at Washington National Airport (DCA), Runway 18; a Texas Instruments Small Community MLS at Philadelphia International Airport (PHL), Runway 17; and a Hazeltine Small Community MLS at Clarksburg Airport (CKB), Runway 21. Each site contains an MLS RMMS Processor (MRP) which is interfaced to the MLS equipment, an auto-answer modem interfaced to the MRP, and a telephone line with a telephone number. A PDP-11/34 minicomputer is located at the FAA Technical Center and acts as the central processor in this project. The central processor periodically polls the three sites via an auto-dial modem. The central processor's software supports the communications protocol for all three sites. The data that is collected from each site is printed out on a line printer and also stored on a magnetic disk cartridge for ease of retrieval. Figure 1 shows the general system configuration.

### SYSTEM DESCRIPTION.

As shown in Figure 1, the MLS data collection system consists of three parts:

1. The MLS RMMS Processor (MRP)

2. The auto-answer modem/telephone line/auto-dial modem communications network.

3. The PDP-11/34 central processor and related peripherals.

The MRP is a microcomputer that accesses the MLS equipment, collects operational and maintenance data, and makes that data available to the central processor. Each MLS site has its own microcomputer and associated software. Each MRP was designed, interfaced, and programmed by the MLS manufacturer. The MRP's purpose is to monitor certain performance parameters of the MLS. This monitoring is accomplished through A/D converters, power level monitors, and other analog circuitry. The data are collected and stored in the MRP's local memory. This data collection process is usually continuous, so current data is always available. If certain parameters are determined to be outside of predefined tolerance limits, alarm messages are generated. These messages are transmitted first during a data transfer, thus giving the maintenance personnel an immediate indication of the status of that site. In addition to outputting data, the MRP can interpret different codes sent by the central processor. These functions can include the setting of the MLS system time and date, changing parameter alarm limits, and the sending and receiving of messages.

The auto-dial modem/telco/auto-answer modem network is the telecommunications link between each MRP and the central processor. The auto-dial modem is connected to and controlled by the central processor. It is also connected to a telephone line, using a standard telephone jack. When data is desired from a specific site, that site's telephone number is output to the modem in serial form. The modem generates the proper signals to "call" that site.

Each MLS site has an assigned telephone number. When that number is dialed, the auto-answer modem at the MLS site "answers" the call by changing the telco signals to indicate that a connection has been made. Also, a signal is sent to the MRP to indicate that communications with the central processor is requested. When the data transfer is complete, the central processor signals the auto-dial modem to "hang-up", thus releasing the connection. This will allow other processors or terminals to access the MRP at that site.

The central processor can be any computer (or terminal) that can access a telephone line and send the proper commands to the MRP. For this project, the central processor is a PDP-11/34 minicomputer. Along with the computer is the auto-dial modem, tape and disk storage units, and a line printer and CRT terminal. The data collection software, written by Technical Center personnel, controls the data transfer process between the MRP and the central processor. The software also controls the storage and printing of the collected data.

The software outputs the 10-digit telephone number of the desired site to the auto-dial modem via an RS-232C port. All communications status lines are monitored and indicated by LED's on the front panel of the modem. If the link between the two modems is completed, the "carrier detect" LED is lit and the data transfer can begin. If the MRP does not complete the link within a specified time, the telephone line is released and the auto-dial modem "hangs-up". When the link is established, the user types in the appropriate codes to request the information desired. The central processor will transfer these codes to the MRP via the communications link. The received data are stored on the magnetic disk cartridge and printed out on the line printer. When the transfer is complete, the user types in the code to terminate the link. The central processor will command the auto-dial modem to "hang-up". When the auto-answer modem senses the change in the telephone line, it will also "hang-up". A list of the data collection commands is given in Table 1. A flow chart of the data collection program is shown in Appendix C. A complete listing of the program is available from the Technical Center.

## MLS RMMS PROCESSOR COMMUNICATIONS.

Each MLS site has its own set of measured parameters available to the central processor. Tables 2, 4 and 5 list the parameters available from each site.

## WASHINGTON NATIONAL AIRPORT COMMUNICATIONS.

The MLS at DCA has two separate MRPs: One for the elevation site equipment and one for azimuth site equipment. The two sites have different sets of parameters available. Both sites communicate with the central processor at 300 baud.

The Washington MRP can accept requests for data in two different formats. The first format uses a two ASCII-character designator for the desired parameter. The user types in the designator followed by a carriage return. The MRP will respond with the header message followed by the parameter information. The header message includes the MRP system time and date, system operational status, and system restart information.

The second format also uses the two character designator, but includes several ASCII control characters. An ASCII "R" character precedes the designator and the ASCII control character "ENQ" (Enquiry) follows the designator. The MRP, when receiving a request in this format, will include several control characters and a block checksum within the output stream. The control character "STX" (Start of Text) will be output preceding the header message, the parameter line, and the data lines. An "ETB" (End of Text Transmission Block) follows the header message, parameter line, and data lines. Following each "ETB" is a binary checksum, which is the sum of all the characters sent between the "STX" and the "ETB". This checksum is included for transmission error-checking purposes. At the end of the data block is an "EOT" (End of Transmission) character. Figure 2 shows an example of both communication formats. The characters inside the block are the ones used to compute the block checksum.

PHILADELPHIA INTERNATIONAL AIRPORT MLS COMMUNICATIONS.

The MLS at PHL is unlike the other two sites. Here the two equipments transfer data to a single communications microcomputer located at the airport. This computer is connected to the auto-answer modem and communicates with the central processor at 300 baud.

The Philadelphia MRP is the most sophisticated of the three remote processors. There are many different data transfer functions. The three functions most frequently used in this program are the "INT" function, the "MON" function, and the "SS" function. The "INT" function requests a listing of all parameters that have been determined to be in an alarm condition since the last request. Included in this listing is the number and descriptor of the alarm parameter, the time and date of the error, and the time and date that the error was corrected. The "MON" function requests the current values for all the important parameters. Included in this listing is the number and descriptor of the parameter, the current value, and the high and low limits of that parameter (if applicable). The "SS" function requests the system time and data and the MLS system status. Other functions such as setting of system time and data and initializing the automatic transmission sequence are available. Table 3 lists the functions available from the Philadelphia MRP.

The Philadelphia MRP communicates with the central processor completely in ASCII. The user only need type in the abbreviation of the function requested. At the end of the transfer for that function, the MRP will respond with the ASCII character string "(=)". This string will indicate the end of that function transmission.

CLARKSBURG AIRPORT MLS COMMUNICATIONS.

The MLS at CKB, like the MLS at DCA, has two MRP's: One for the azimuth equipment and one for the elevation equipment. Each MRP has its own dedicated telco line and communicates at 300 baud.

The Clarksburg MRP has two different levels of data transfer available. The first level is an output stream that begins auto matically when the auto-answer modem "answers" a call from the central processor. The data contained in this stream consists of several values representing measured parameters. Also contained in this stream are status values (GO/NOGO) of certain parameters and the condition of certain indicators (ON/OFF) on the control panel. The second level of transfer is one in which the user can request a dump of the MRP's memory. Certain locations of the MRP's memory contain the binary values of measured parameters. These values can give a more meaningful interpretation of the data transferred in the first level. At the end of the first level transfer, the user types in a "*". The MRP will respond with the message "START ADDR -END ADDR". The user then types in the addresses of the memory space desired. The data contained in those addresses are then transmitted to the central processor. It should be noted that the Clarksburg site does not provide an error-checking capability.

All communications with the Clarksburg MRP are done in ASCII at 300 baud. Figure 3 is a sample of the communications with the CKB MRP. This sample printout was obtained using a standard ASCII terminal and an acoustic coupler to provide the communications link.

## SYSTEM PERFORMANCE

### DATA COLLECTION.

The process of collecting data from the three remote MLS sites began in July 1981. The Washington MLS was the first site from which data was collected. The other two sites, Philadelphia and Clarksburg, were not used in the data collection process until September 1981 and November 1981, respectively. Philadelphia was not used until this date because the protocol software was not completed. Clarksburg was not used because the site was not in operation until that time.

Since the start of data collection, two runs of data have been taken each day: One in the morning and one in the afternoon. The data collected during each run are stored on a magnetic disk cartridge and printed out on the line printer. At the end of each month, the data collected during that month is transferred to magnetic tape. This tape is used to generate the monthly listing and the parameter plots as required in the project. Appendix B shows a sample of the daily and monthly listings and a sample of the generated plots.

### ERRORS.

The data runs discussed in this report span the time period of July 1981 to June 1982. During this time period, many data transfer errors were encountered during the data collection process. The bulk of the errors encountered so far can be divided into two categories:

1. A processor error - an error caused by a problem in either the central processor or the MRP.

2. A communications error - an error caused by a problem with either one of the modems or the telephone line.

A typical processor error would be an error in data transfer caused by the MRP sending an incorrect checksum or halting transmission in the middle of the transfer. A typical communications error would be caused by one of the modems disconnecting before the end of a transfer or noise on the telephone line. It should be noted that some of the errors encountered could be of both types, could not be placed in either category, or that an error of one type causes an error of the other type.

The Washington MLS had three distinct errors that occurred more than three times over the entire data collection period. For both Washington sites, there were a total of 795 data collections. The most frequent error was a "REPEAT REQUEST" message being sent by the MRP. This message would be transmitted after the telco link was established and before any request was sent by the central processor. This error appears to be caused by a software problem in the MRP.

This problem could be solved by having the MRP software clear the request input buffer after a transfer is complete. Another frequent error, no response after request, can be caused by several problems. Two reasons could be not having the MRP connected to the modem or the MRP software has "crashed". The third error, no connection, could be caused by bad telephone line conditions or the auto-answer modem is unplugged. Other miscellaneous errors include the site not responding to a request the first time, incorrect control characters being sent and the site "hanging-up" in the middle of the transfer. All of these errors mentioned, except for the no connection error, can be traced back to problems with the MRP.

(It should be noted that since the beginning of the data collection process, both Washington sites have been sending data with a checksum error being detected by the central processor. After careful analysis, the error was determined to be an incorrect checksum being sent by the MRP. Again, this error is attributable to problems with the MRP.)

There was only one error which occurred more than three times in the Philadelphia site. In the 387 data collections attempted, there were only 6 no responses and only once did the site not connect. Recently, (after June 30, 1982 however) the Philadelphia MRP was shutting down the RMM system of the MLS after being dialed from an out-of-state line. This problem was reported to the technician at the site.

The Clarksburg MLS had only one error that occurred over three times in 628 data collections. This error, no site connection, occurred 54 times.

Table 6 contains a list of the signicant errors and the number of times each error occurred for the Washington and Clarksburg sites.

## CONCLUSIONS AND RECOMMENDATIONS

Based upon the performance of the data collection system up to this point in time, the following conclusions can be drawn:

1. The data collection system designed and implemented in this program accomplished its purpose.

2. The RMMS concept is valid as applied to the MLS and in particular, to the MLS sites used in this project.

3. Using the auto-answer/auto-dial modems with a standard telephone line is acceptable for an RMMS application.

4. The modem/telco communications link used in this program contributed a very small percentage of the total number of errors encountered.

The following recommendations are made to aid in the specification of future MLS RMM systems:

1. A standard data and command transfer protocol be established for both the central processor and the MRP.

2. An error-checking capability (binary or CRC-type checksums) be included in the standard protocol.

3. A standard set of commands be defined for both the MRP and the central processor.

4. An auto-reset function be included in the MRP software in case of communication problems during a data transfer.

5. A reset function be provided so that the central processor can reset the MRP.

6. A standard set of parameters for data transfer be established for all MLS equipment. Any additional parameters which are deemed necessary for any indivual site should be handled by a different central processor function.

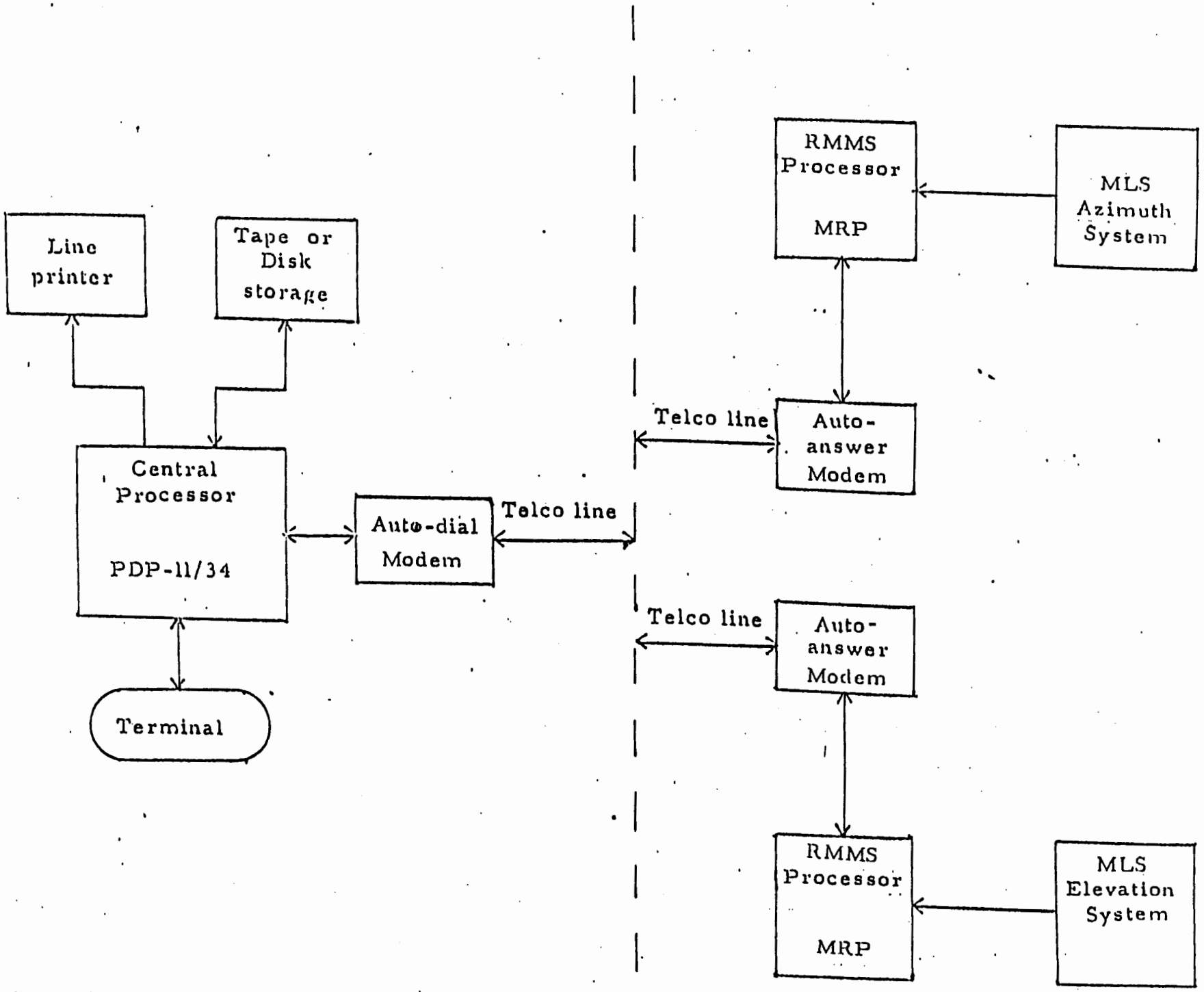



Figure #1 General System Configuration

Figure #2. Washington MRP Communication Protocol Example

1. Data Stream using first format

User Input: 09

```
LF    DATE 001 TIME 2359CRLF
      SYSTEM IS ON AND IN OPERCRLFLF
      RESTRTS - TODAY 000 - YSTRDAY 999          CRLF
LF    09 * FREQUENCY                             CRLF
LF    MEAS = -10. KHZCRLFLF
      LIMS = - 10. AND + 10. KHZCRLFLF
      PREV = + 10. KHZ                           CRLFLF
```

2. Data Stream using second format

User Input: RC9ENQ

```
STX | DATE 001 TIME 2359CRLFLF
    | SYSTEM IS ON AND IN OPERCRLFLF
    | RESTRTS - TODAY 000 - YSTRDAY 999          ETBLRC
STX | 09 * FREQUENCY                             ETBLRC
STX | MEAS = -10. KHZCRLFLF
    | LIMS = - 10. AND + 10. KHZCRLFLF
    | PREV = + 10. KHZ                          ETBLRCEOT
```

Figure #3. Sample Communications with Clarksburg MRP

```
STATION I.D.:    MCKB AZ
PREAMBLE: 001011000100111101001000  DW1: 00011101010100010111000010100000
                  UNITS          DATA          THRESHOLD     OUT-OF-TOL COUNT
PFE               DEG             + .01          13            0
CMN               DEG                .00         13            0
OUTLIER                                          4            0
DPSK PHASE        DEG               0            10            0
FREQ              HZ          5268831            10            0

DPSK. PWR      TX. PWR       DPSK. CD. CK     R. CLR. PWR
  G              G              G               G
S. B. PWR      BSU. CK       S. B. PK. SLL    L. CLR. PWR
  G              G              G               G
+5VDC    +12VDC    +15VDC    -12VDC    -5VDC    -15VDC    -20VDC    -40VDC
  G         G         G         G         G         G         G         G

PANEL LIGHT STATUS:
NORML   AUTO. SHDN   AUTO. SHDN. OVRD   DPSK. CD   DPSK. PWR   FREQ   SBPWR   ANGCD
ON      OFF          OFF                OFF        OFF         OFF    OFF     OFF
LRU LIGHTS:
TRANS   ANT. SW      CONTROL            PHASERS    D. C. PWR   UPS    FLDMON  INTMON
OFF     OFF          OFF                OFF        OFF         OFF    OFF     OFF
END OF MESSAGE


*START ADDR-STOP ADDR
*2009-219A
2009 00 00 00 00 00 08 00
2010 00 00 7F C5 7B 7B C5 7B C1 7A 00 00 00 00 00 00
2020 00 00 00 65 03 00 00 00 00 00 00 0B 12 3F 00 00
2030 00 00 00 E6 01 00 00 01 00 01 00 00 00 5F 65 50
2040 00 00 00 75 1A 00 00 00 00 01 00 00 00 FE FE 00
2050 00 00 00 00 FE 02 00 FF 00 05 00 02 00 FE 00 00
2060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
2070 00 00 00 05 03 0B 00 57 20 07 00 02 01 01 1A 0F
2080 00 00 00 01 00 FF FF 03 00 07 00 01 00 00 00 FF
2090 FF 04 00 00 00 FF FF 03 00 07 00 02 00 01 00 00
20A0 00 05 00 01 00 FE FF 03 00 07 00 01 00 01 00 00
20B0 00 05 00 00 00 03 00 00 00 FF FF 03 00 07 00 02
20C0 00 01 00 00 00 03 00 00 00 FE FF 04 00 07 00 01
20D0 00 00 00 00 00 05 00 02 00 FE FF 04 00 06 00 01
20E0 00 00 00 00 00 05 00 02 00 FE FF 03 00 07 00 01
20F0 00 00 00 00 00 04 00 02 00 FE FF 03 00 07 00 02
2100 00 00 00 00 00 04 00 01 00 FF FF 02 00 06 00 02
2110 00 06 00 01 00 01 00 00 00 05 00 00 00 FE FF 03
2120 00 07 00 01 00 01 00 00 00 05 00 02 00 FE FF 03
2130 00 07 00 03 00 00 00 00 00 05 00 02 00 FE FF 00
2140 00 00 00 00 00 00 00 00 00 00 00 00 00 16 01 94
2150 00 25 21 BB 00 FE 00 FF FF 00 00 00 00 00 00 00
2160 D4 E4 46 6D 00 00 00 00 75 00 ED 1A B0 0D 00 00
2170 FE 00 00 00 00 00 00 00 00 00 00 00 00 00 0F 05
2180 00 00 00 00 00 00 13 CF 12 00 00 00 E1 00 6B 1A
2190 68 1B 00 19 00 14 00 6F 00 00 00

*START ADDR-STOP ADDR
*
```

Table #1. PDP-11/34 Data Collection Commands

| Command Letter | Message to Terminal | Description |
|---|---|---|
| D | "Site # = " | Requests specific site # to be dialed. Selects telephone number and protocol to be used. |
| E | None | Ends execution of data collection program. Closes open data files storage disk, disconnects auto-dial modem, and prints out rest of printer buffer. |
| F | "Output RT-11 File Name, Max. 10 Chars. XXXXX X.XXX" | Opens a data file on the storage disk for incoming data. File is assigned name typed in by the user. |
| G | None | Outputs contents of printer buffer to line printer. |
| J | None | Closes all open data files. Prevents any unwanted data from being stored on that file. |
| Q | None | Commands auto-dial modem to disconnect from telco line. |
| R | "Site Request # " | Request data transfer code to be sent to the MRP. |

Table #2. Washington MLS Measured Parameters

| Azimuth Equipment | | Elevation Equipment | |
|---|---|---|---|
| Number | Parameter | Number | Parameter |
| 00 | Beam Accuracy | 00 | Beam Accuracy |
| 01 | Test Pulse Accuracy | | |
| 02 | Beam ERP | 02 | Beam ERP |
| 03 | Ident ERP | 03 | Ident ERP |
| | | 04 | SLS, Upper ERP |
| 05 | SLS Left ERP | | |
| 06 | SLS Right ERP | | |
| 07 | Preamble | 07 | Preamble |
| | | 08 | Sustem Timing |
| 09 | Frequency | 09 | Frequency |
| 10 | Antenna Switch | 10 | Antenna Switch |
| 11 | Scan Modulation | 11 | Scan Modulation |
| 12 | Scan Continuity | 12 | Scan Continuity |
| 13 | DME Reply | | |
| 14 | Monitor Timing | 14 | Monitor Timing |
| 15 | Basic Data 1 | | |
| | | 16 | Small Community AZ |
| 17 | Aux. Data | | |
| 18 | Power Out TWTA | 18 | Power Out TWTA |
| 19 | Power Out EXCTR | 19 | Power Out EXCTR |
| 20 | Data Input | | |
| | | 21 | Small Community EL |
| 22 | Phase Modulation | 22 | Phase Modulation |
| 23 | AM Modulation | 23 | AM Modulation |
| 27 | Temp. Electronics | 27 | Temp. Electronics |
| 28 | Temp. Antenna | 28 | Temp. Antenna |
| 29 | Data Link | 29 | Data Link |
| 30 | Local Control Panel | 30 | Local Control Panel |
| 31 | Antenna +5 Volts | 31 | Antenna +5 Volts |
| 32 | Antenna -40 Volts | 32 | Antenna -40 Volts |
| 33 | Antenna +24 Volts | 33 | Antenna +24 Volts |
| 34 | Electronics +5 Volts | 34 | Electronics +5 Volts |
| 35 | Electronics +15 Volts | 35 | Electronics +15 Volts |
| 36 | Electronics -15 Volts | 36 | Electronics -15 Volts |
| 37 | Electronics +20 Volts | 37 | Electronics +20 Volts |
| 38 | Monitor +5 Volts (1) | 38 | Monitor +5 Volts (1) |
| 39 | Monitor +5 Volts (2) | 39 | Monitor +5 Volts (2) |
| 40 | Monitor +15 Volts | 40 | Monitor +15 Volts |
| 41 | Monitor -15 Volts | 41 | Monitor +15 Volts |
| 88 | Parameter List | 88 | Parameter List |
| 99 | All Parameters and Limits | 99 | All Parameters and Limits |

Table #3. Philadelphia MRP Commands

| Command Code | Operation |
|---|---|
| ? | Print list of functions |
| ALL | Dump Alarm Parameters and Measured parameter values |
| INT | Dump Alarm Parameters |
| MON | Dump Measured Parameter values |
| DC | Dump Parameter Limits |
| PER | Execute Commands in PER buffer at HH,MM,SS interval |
| OCR | Dump Alarm Parameters that have changed since last dump |
| SET | Set time and date |
| RESET | Clear Alarm buffer |
| PEROFF | Cancel PER function |
| OCROFF | Cancel OCR function |
| // | Insert command into PER buffer |
| PB | Print PER buffer |
| PMSET | Set Alarm Limits |
| MASK | Mask Alarm parameters from history |
| PMASK | Print Active Alarm parameters |
| UNMASK | Restore Alarm parameters to history |
| SS | Output System Status |

Table #4. Philadelphia MLS Measured Parameters

| Azimuth Equipment | | Elevation Equipment | |
|---|---|---|---|
| Number | Parameter | Number | Parameter |
| 00 | EXCTR. PWR. Monitor | 00 | EXCTR. PWR. Monitor |
| 01 | MOD. PWR. Monitor | 01 | MOD. PWR. Monitor |
| 02 | 0/180 PWR. Diff. | 03 | 0/180 PWR. Diff. |
| 03 | *SPARE* | | |
| 04 | Scan Antenna FWD. PWR. | 04 | Scan Antenna FWD. PWR. |
| 05 | ID Ant. Forward PWR. | 05 | ID. Ant. Forward PWR. |
| 06 | ID Ant. FWD/REV PWR. Diff. | 06 | ID. Ant. FWD/REV PWR. Diff. |
| 07 | RT. CL. Ant. Forward PWR. | | |
| 08 | RT. CL. FWD/REV PWR. Diff. | | |
| 09 | LT. CL. Ant. Forward PWR. | | |
| 10 | LT. CL. FWD/REV PWR. Diff. | | |
| 11 | LT. CL/SLS FWD. PWR. Diff. | | |
| 12 | Back SLS Ant. Forward PWR. | | |
| 13 | Back SLS FWD/REV PWR. Diff. | | |
| 14 | Single Point Monitor PWR. | 14 | Single Point Monitor PWR. |
| 15 | Eff. Radiated PWR. TO Scan | 15 | Eff. Radiated PWR. TO Scan |
| 16 | Eff. Radiated PWR. FRO Scan | 16 | Eff. Radiated PWR. FRO Scan |
| 17 | Data ACQ Ref. Volt. #3 | 17 | Data ACQ Ref. Volt. #3 |
| 18 | Data ACQ Ref. Volt. #2 | 18 | Data ACQ Ref. Volt. #2 |
| 19 | Data ACQ Ref. Volt. #1 | 19 | Data ACQ Ref. Volt. #1 |
| 20 | Blanked Scan Forward PWR. Mon. | 20 | Blanked Scan Forward PWR. Mon. |
| 21 | Blanked ID. Forward PWR. Mon. | 21 | Blanked ID. Forward PWR. Mon. |
| 22 | Blanked ID. Reverse PWR. Mon. | 22 | Blanked ID. Reverse PWR. Mon |
| 23 | Blanked RT. CL. Forward PWR. Mon. | | |
| 24 | Blanked RT. CL. Reverse PWR. Mon. | | |
| 25 | Blanked LT. CL. Forward PWR. Mon. | | |
| 26 | Blanked LT. CL. Reverse PWR. Mon. | | |
| 27 | Blanked BACK SLS Forward PWR. Mon. | | |
| 28 | Blanked BACK SLS Reverse PWR. Mon. | | |
| 29 | Blanked LT. SLS Reverse PWR. Mon. | | |
| 30 | Blanked Modulator PWR. Mon. | 30 | Blanked Modulator PWR. Mon. |
| 31 | +5V. Power Supply A | 31 | +5V. Power Supply A |
| 32 | +5V. Power Supply B | 32 | +5V. Power Supply B |
| 33 | +5V. Power Supply C | 33 | +5V. Power Supply C |
| 34 | +20V. Power Supply A | 34 | +20V. Power Supply A |
| 35 | +20V. Power Supply B | 35 | +20V. Power Supply B |
| 36 | +28V. Power Supply A | 36 | +28V. Power Supply A |
| 37 | +28V. Power Supply B | 37 | +28V. Power Supply B |
| 38 | -20V. Power Supply A | 38 | -20V. Power Supply A |
| 39 | -20V. Power Supppy B | 39 | -20V. Power Supply B |
| 40 | Channel Frequency Error | 40 | Channel Frequency Error |
| 41 | FM Prealarm Angle Error | 41 | FM Prealarm Angle Error |
| 42 | FM Alarm Angle Error | 42 | FM Alarm Angle Error |

Table #5. Clarksburg Measured Parameters and Conversion Factors

Elevation Equipment

| | Data | Memory Location | Actual Limits | | Data Scale Factor | |
|---|---|---|---|---|---|---|
| 1. | PFE | 2166 | +/-.15 deg. | | Unity | LSB=.01 deg. |
| 2. | CMN | 2009 | +/-.03 deg. | | Unity | LSB=.01 deg. |
| 3. | Power Supplies | | | | | LSB=.0391 V. |
| | +5V | 2013 | 5.5 | 4.5 | 1 | |
| | +12V | 2014 | 13.0 | 11.0 | .6677 | |
| | +15V | 2015 | 16.0 | 14.0 | .3333 | |
| | -5V | 200E | -5.5 | -4.5 | 1 | |
| | -12V | 200F | -13.0 | -11.0 | .6677 | |
| | -15V | 2010 | -16.0 | -14.0 | .3333 | |
| | -20V | 2011 | -21.7 | -18.5 | .24938 | |
| | -40V | 2012 | -44.9 | -35.9 | .1992 | |
| 4. | SBM ERP | 2190 | -5 dB | | GO/NOGO | |
| 5. | SID ERP | 204A | -5 dB | | 1=NOGO | |
| | | 204B | | | | |
| 6. | Up. Clr. Pulse | 204E | -5 dB | | | |
| 7. | Xmtr. Pwr. | 21B9 | -3 dB | | | |
| 8. | Frequency | 2036-2038 | +/-20 Khz | | .001041833 LSB=1 Hz. | |

Azimuth Equipment

| | Data | Memory Location | Actual Limits | | Data Scale Factor | |
|---|---|---|---|---|---|---|
| 1. | PFE | 214E | +/-.20 deg. | | Unity | LSB=.01 deg. |
| 2. | CMN | 2009 | +/-.03 deg. | | Unity | LSB=.01 deg. |
| 3. | Power Supplies | | | | | LSB=.0391 V. |
| | +5V | 2017 | +5.5 | +4.5 | 1 | |
| | +12V | 2018 | +13.0 | +11.0 | .6677 | |
| | +15V | 2019 | +16.0 | +14.0 | .3333 | |
| | -5V | 2012 | -5.5 | -4.5 | 1 | |
| | -12V | 2013 | -13.0 | -11.0 | .6677 | |
| | -15V | 2014 | -16.0 | -14.0 | .3333 | |
| | -20V | 2015 | -21.7 | -18.5 | .24938 | |
| | -40V | 2016 | -44.9 | -35.9 | .1992 | |
| 4. | SBM ERP | 2177 | -5 dB | | GO/NOGO | |
| 5. | SID ERP | 204D | -5 dB | | 1=NOGO | |
| | | 204E | | | | |
| 6. | Rt. Clr. Pulse | 2170 | -5 dB | | | |
| | Up. Clr. Pulse | 204E | -5 dB | | | |
| 7. | Lt. Clr. Pulse | 2054 | -5 dB | | | |
| 8. | Xmtr. Pwr. | 219A | -3 dB | | | |
| 9. | Frequency | 2036-2039 | +/-20 kHz | | .001041833 LSB=1 Hz. | |

Table #6. Data Collection Errors

Washington Elevation Site

| Error # | July 1981 | Aug. 1981 | Sep. 1981 | Oct. 1981 | Nov. 1981 | Dec. 1981 | Jan. 1982 | Feb. 1982 | Mar. 1982 | Apr. 1982 | May 1982 | June 1982 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 4 | 4 | | 12 | 13 | 2 | 5 | | 16 | 7 | 6 | 69 |
| 2 | | 9 | | | | 1 | | | 4 | 1 | 2 | 6 | 23 |
| 3 | | 1 | 1 | | | | | 2 | | | | 8 | 12 |
| # of Collections | 41 | 32 | 41 | 41 | 36 | 42 | 36 | 37 | 39 | 44 | 39 | 27 | 525 |

Washington Azimuth Site

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 4 | 2 | 4 | 1 | 13 | | 3 | 7 | 14 | 7 | 3 | 58 |
| 2 | | 4 | 8 | 6 | 12 | 2 | 18 | 9 | 8 | 13 | 14 | 10 | 94 |
| 3 | 2 | | 2 | | 10 | 2 | 5 | 6 | 3 | | | 11 | 41 |
| # of Collections | 42 | 36 | 28 | 31 | 12 | 38 | 14 | 27 | 36 | 33 | 23 | 20 | 340 |

Clarksburg Elevation Site

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | | | | | 2 | 5 | 15 | 1 | | 1 | 1 | 1 | 26 |
| # of Collections | | | | | 35 | 42 | 38 | 34 | 44 | 42 | 38 | 43 | 316 |

Clarksburg Azimuth Site

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | | | | | 1 | 11 | 13 | | 3 | | | | 28 |
| # of Collections | | | | | 34 | 40 | 38 | 34 | 43 | 43 | 37 | 43 | 312 |

Error Legend:

1 -> When site connects, MRP sends "REPEAT REQUEST" message
2 -> Site does not respond to any requests
3 -> Site does not connect

# APPENDIX A

The following is a sample of the man/machine communications between the user and the PDP-11/34 data collection software. The central processors operating system prompt is a "." and the data collection programs prompt is a "?". The name of the program used to collect the data is "MLS". All user input is underlined. Refer to Table #1 for a description of the data collection functions.

The sample run in this example was taken in the afternoon of July 6, 1982. Each data file is designated in the following manner:

S MM DD T.M YY

where

S = Site Code
- W = Washington
- P = Philadelphia
- C = Clarksburg

MM = 2-digit representation of the month ex: 07 -> July

DD = 2-digit representation of the day

T = Time-of-Day ex: A -> A.M. P -> P.M.

YY = 2-digit representation of the year ex: 82 -> 1982

for example: W0706A.M82 would be the file name for the elevation site data taken on the morning of July 6, 1982.

(Note: At the time of this sample run, a problem with the Washington sites was discovered. A checksum error was being detected when one of the parameters was transmitted. This error led to the request for parameter #41 to be collected into a separate data file. Also, the elevation site data and azimuth site data were being stored in separate files. The elevation data files have the time-of-day in the position indicated in the above example. The azimuth data files have the time-of data after the site code.)

```
.R MLS

?F

OUTPUT RT-11 FILE NAME, MAX.  10 CHARS. , XXXXXX. XXX
W0706F.M82

?D
SITE # = 1

?R
SITE REQUEST # 99

?J

?F
OUTPUT RT-11 FILE NAME, MAX.  10 CHARS. , XXXXXX. XXX
W20706.M82

?D
SITE # = 1

?R
SITE REQUEST # 41

?Q

?J

?F
OUTPUT RT-11 FILE NAME, MAX.  10 CHARS. , XXXXXX. XXX
WP0706.M82

?D
SITE # = 2

?R
SITE REQUEST = 99

?J

?F
OUTPUT RT-11 FILE NAME, MAX.  10 CHARS. , XXXXXX. XXX
W60706.M82

?D
SITE # = 2

?R
SITE REQUEST # 41

?Q

?J
```

```
?F
OUTPUT RT-11 FILE NAME, MAX.  10 CHARS. , XXXXXX.XXX
P0706F M82

?D
SITE # = 3

?

**RMMS Terminal On.   07/06/82/187   12:33:44

?R
SITE REQUEST # INT

?

**DONE

?R
SITE REUQEST # MON

?R
SITE REQUEST # **MSG:HAVE A NICE DAY

?

** COMMAND OK.

** DELIVERED

?Q

?J
```

```
?F
OUTPUT RT-11 FILE NAME, MAX  10 CHARS , XXXXXX.XXX
COTO6P M82

?D
SITE # = 4

?G

?R
SITE REQUEST # *

?R
SITE REQUEST * 1

?G

?D
SITE # = 5

?G

?R
SITE REQUEST # *

?R
SITE REQUEST # 2

?G

?E
```

APPENDIX B

This appendix contains representative samples of the daily and monthly listings and samples of the parameter plots as requested by ARD-320.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| WE0007-MAY-8215:35:27 | 127 | 1533:07 | ON | OPER 000 000 | +0.012 | -0.071 | +0.071 | +0.012 | BEAM ACCURACY |
| WE0207-MAY-8215:35:27 | 127 | 1533:07 | ON | OPER 000 000 | + 0.2 | - 3.0 | | + 0.4 | BEAM ERP |
| WE0307-MAY-8215:35:27 | 127 | 1533:07 | ON | OPER 000 000 | - 0.3 | - 3.0 | | - 0.3 | IDENT ERP |
| WE0407-MAY-8215:35:27 | 127 | 1533:07 | ON | OPER 000 000 | - 0.3 | - 3.0 | | - 0.3 | SLS, UPPER ERP |
| WE0707-MAY-8215:35:34 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | PREAMBLE |
| WE0807-MAY-8215:35:34 | 127 | 1533:07 | ON | OPER 000 000 | 0. | 100. | | 0. | SYSTEM TIMING |
| WE0907-MAY-8215:35:34 | 127 | 1533:07 | ON | OPER 000 000 | - 4. | - 10. | + 10. | + 2. | FREQUENCY |
| WE1007-MAY-8215:35:34 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | ANTENNA SWITCH |
| WE1107-MAY-8215:35:38 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | SCAN MOD |
| WE1207-MAY-8215:35:38 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | SCAN CONT |
| WE1407-MAY-8215:35:38 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | MONITOR TIMING |
| WE1607-MAY-8215:35:41 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | BASIC DATA 2 |
| WE1807-MAY-8215:35:41 | 127 | 1533:07 | ON | OPER 000 000 | - 0.5 | - 2.0 | | - 0.5 | PWR OUT, TWTA |
| WE1907-MAY-8215:35:41 | 127 | 1533:07 | ON | OPER 000 000 | + 0.0 | - 2.0 | | + 0.0 | PWR OUT, EXCTR |
| WE2107-MAY-8215:35:41 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | SYNC SIGNAL PRESENCE |
| WE2207-MAY-8215:35:45 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | PHASE MOD |
| WE2307-MAY-8215:35:45 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | AM. MOD |
| WE2707-MAY-8215:35:45 | 127 | 1533:07 | ON | OPER 000 000 | + 27. | - 10. | + 50. | + 27. | TEMP ELECTRONICS |
| WE2807-MAY-8215:35:45 | 127 | 1533:07 | ON | OPER 000 000 | + 37. | - 10. | + 50. | + 37. | TEMP ANTENNA |
| WE2907-MAY-8215:35:49 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | DATA LINK |
| WE3007-MAY-8215:35:49 | 127 | 1533:07 | ON | OPER 000 000 | GO | | | GO | LOCAL CONTROL PANEL |
| WE3107-MAY-8215:35:49 | 127 | 1533:07 | ON | OPER 000 000 | +4.91 | +4.75 | +5.25 | +4.91 | ANTENNA +5 VOLTS |
| WE3207-MAY-8215:35:49 | 127 | 1533:07 | ON | OPER 000 000 | -39.6 | -35.0 | -45.0 | -39.6 | ANTENNA -40 VOLTS |
| WE3307-MAY-8215:35:53 | 127 | 1533:07 | ON | OPER 000 000 | +23.9 | +20.0 | +28.0 | +23.5 | ANTENNA +24 VOLTS |
| WE3407-MAY-8215:35:53 | 127 | 1533:07 | ON | OPER 000 000 | +4.96 | +4.75 | +5.25 | +4.91 | ELECTRONICS +5 VOLTS |
| WE3507-MAY-8215:35:53 | 127 | 1533:07 | ON | OPER 000 000 | +14.9 | +14.3 | +15.8 | +14.9 | ELECTRONICS +15 VOLTS |
| WE3607-MAY-8215:35:53 | 127 | 1533:07 | ON | OPER 000 000 | -14.7 | -14.3 | -15.8 | -14.7 | ELECTRONICS -15 VOLTS |
| WE3707-MAY-8215:35:57 | 127 | 1533:07 | ON | OPER 000 000 | +19.8 | +19.0 | +21.0 | +19.8 | ELECTRONICS +20 VOLTS |
| WE3807-MAY-8215:35:57 | 127 | 1533:07 | ON | OPER 000 000 | +4.91 | +4.75 | +5.25 | +4.91 | MONITOR +5 VOLTS (1) |
| WE3907-MAY-8215:35:58 | 127 | 1533:07 | ON | OPER 000 000 | +4.85 | +4.75 | +5.25 | +4.85 | MONITOR +5 VOLTS (2) |
| WE4007-MAY-8215:35:58 | 127 | 1533:07 | ON | OPER 000 000 | +15.0 | +14.3 | +15.8 | +15.0 | MONITOR +15 VOLTS |
| WE4107-MAY-8215:36:01 | 127 | 1533:07 | ON | OPER 000 000 | -15.0 | -14.7 | -15.3 | -15.0 | MONITOR -15 VOLTS |

```
WA0007-MAY-8215:39:34 127  1537:39  ON  OPER 005 000 -0.016  -0.130  +0.130  -0.014 BEAM ACCURACY
WA0207-MAY-8215:39:39 127  1537:39  ON  OPER 005 000 + 0.5   - 3.0           + 0.5  BEAM ERP
WA0307-MAY-8215:39:39 127  1537:39  ON  OPER 005 000 - 0.6   - 3.0           - 0.6  IDENT ERP
WA0507-MAY-8215:39:39 127  1537:39  ON  OPER 005 000 - 0.7   - 3.0           - 0.7  SLS LEFT ERP
WA0607-MAY-8215:39:39 127  1537:39  ON  OPER 005 000 - 0.9   - 3.0           - 0.9  SLS RIGHT ERP
WA0707-MAY-8215:39:43 127  1537:39  ON  OPER 005 000   GO                      GO   PREAMBLE
WA0907-MAY-8215:39:43 127  1537:39  ON  OPER 005 000 +  6.   - 10.  + 10.    +  6.  FREQUENCY
WA1007-MAY-8215:39:43 127  1537:39  ON  OPER 005 000   GO                      GO   ANTENNA SWITCH
WA1107-MAY-8215:39:44 127  1537:39  ON  OPER 005 000   GO                      GO   SCAN MOD
WA1207-MAY-8215:39:47 127  1537:39  ON  OPER 005 000   GO                      GO   SCAN CONT
WA1307-MAY-8215:39:48 127  1537:39  ON  OPER 005 000   GO                      GO   DME REPLY
WA1407-MAY-8215:39:48 127  1537:39  ON  OPER 005 000   GO                      GO   MONITOR TIMING
WA1507-MAY-8215:39:48 127  1537:39  ON  OPER 005 000   GO                      GO   BASIC DATA 1
WA1707-MAY-8215:39:52 127  1537:39  ON  OPER 005 000   GO                    NOGO   AUX DATA
WA1807-MAY-8215:39:52 127  1537:39  ON  OPER 005 000 - 0.5   - 2.0           - 0.5  PWR OUT TWTA
WA1907-MAY-8215:39:52 127  1537:39  ON  OPER 005 000 - 1.5   - 2.0           - 1.5  PWR OUT EXCTR
WA2007-MAY-8215:39:55 127  1537:39  ON  OPER 005 000   GO                      GO   DATA INPUT
WA2207-MAY-8215:39:55 127  1537:39  ON  OPER 005 000   GO                      GO   PHASE MOD
WA2307-MAY-8215:39:55 127  1537:39  ON  OPER 005 000   GO                      GO   AM MOD
WA2707-MAY-8215:39:55 127  1537:39  ON  OPER 005 000 + 23.   - 10.  + 50.    + 23.  TEMP ELECTRONICS
WA2807-MAY-8215:39:59 127  1537:39  ON  OPER 005 000 + 31.   - 10.  + 50.    + 31.  TEMP ANTENNA
WA2907-MAY-8215:39:59 127  1537:39  ON  OPER 005 000   GO                      GO   DATA LINK
WA3007-MAY-8215:39:59 127  1537:39  ON  OPER 005 000   GO                      GO   LOCAL CONTROL PANEL
WA3107-MAY-8215:39:59 127  1537:39  ON  OPER 005 000 +4.91   +4.75  +5.25    +4.91  ANTENNA +5 VOLTS
WA3207-MAY-8215:40:03 127  1537:39  ON  OPER 005 000 -40.4   -35.0  -45.0    -40.4  ANTENNA -40 VOLTS
WA3307-MAY-8215:40:03 127  1537:39  ON  OPER 005 000 +24.5   +20.0  +28.0    +24.5  ANTENNA +24 VOLTS
WA3407-MAY-8215:40:03 127  1537:39  ON  OPER 005 000 +5.01   +4.75  +5.25    +5.01  ELECTRONICS +5 VOLTS
WA3507-MAY-8215:40:03 127  1537:39  ON  OPER 005 000 +15.0   +14.3  +15.8    +15.0  ELECTRONICS +15 VOLTS
WA3607-MAY-8215:40:07 127  1537:39  ON  OPER 005 000 -14.9   -14.3  -15.8    -14.9  ELECTRONICS -15 VOLTS
WA3707-MAY-8215:40:07 127  1537:39  ON  OPER 005 000 +20.0   +19.0  +21.0    +20.0  ELECTRONICS +20 VOLTS
WA3807-MAY-8215:40:07 127  1537:39  ON  OPER 005 000 +4.91   +4.75  +5.25    +4.91  MONITOR +5 VOLTS (1)
WA3907-MAY-8215:40:07 127  1537:39  ON  OPER 005 000 +5.01   +4.75  +5.25    +5.06  MONITOR +5 VOLTS (2)
WA4007-MAY-8215:40:11 127  1537:39  ON  OPER 005 000 +15.0   +14.7  +15.3    +15.0  MONITOR +15 VOLTS
WA4107-MAY-8215:40:11 127  1537:39  ON  OPER 005 000 -15.0   -14.7  -15.3    -15.0  MONITOR -15 VOLTS
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PA00807-APR-8215:50:0309715:51:40NORMAMAINT | IOP | 000 | | | 04/07/82ANALOG MULTIPLEX COMPARATO | | 001 |
| PE00807-APR-8215:50:1009715:51:45SHUTD | IA | 003 | | | 04/07/82ANALOG MULTIPLEX COMPARATO | | 001 |
| PA00 07-APR-8215:53:2909715:52:20NORMAMAINT | P | 13.4 | 11.5 | --- | EXCITER POWER MONITOR | | 001 |
| PE00 07-APR-8215:53:2909715:52:20SHUTD | P | 13.9 | 11.5 | --- | EXCITER POWER MONITOR | | 001 |
| PA01 07-APR-8215:53:3309715:52:20NORMAMAINT | P | 9.1 | 5.0 | 12.0 | MODULATOR POWER MONITOR | | 001 |
| PE01 07-APR-8215:53:3309715:52:20SHUTD | P | 7.2 | 5.0 | 12.0 | MODULATOR POWER MONITOR | | 001 |
| PA02 07-APR-8215:53:3309715:52:20NORMAMAINT | P | 0.0 | 0.5 | 0.5 | 0/180 POWER DIFFERENCE | | 001 |
| PE02 07-APR-8215:53:3309715:52:20SHUTD | P | 0.0 | 0.5 | 0.5 | 0/180 POWER DIFFERENCE | | 001 |
| PA04 07-APR-8215:53:3709715:52:20NORMAMAINT | P | 41.4 | 39.2 | --- | SCAN ANTENNA FWD POWER | | 001 |
| PE04 07-APR-8215:53:3709715:52:20SHUTD | P | 44.3 | 39.2 | --- | SCAN ANTENNA FWD POWER | | 001 |
| PA05 07-APR-8215:53:3709715:52:20NORMAMAINT | P | 41.9 | 39.2 | --- | ID ANT FORWARD POWER | | 001 |
| PE05 07-APR-8215:53:3709715:52:20SHUTD | P | 42.4 | 39.2 | --- | ID ANT FORWARD POWER | | 001 |
| PA06 07-APR-8215:53:4109715:52:20NORMAMAINT | P | 21.2 | 9.5 | --- | ID ANT FWD/REV PWR DIFF. | | 001 |
| PE06 07-APR-8215:53:4109715:52:20SHUTD | P | 21.1 | 9.5 | --- | ID ANT FWD/REV PWR DIFF. | | 001 |
| PA07 07-APR-8215:53:4109715:52:20NORMAMAINT | P | 40.0 | 38.3 | --- | RT CL ANTENNA FWD POWER | | 001 |
| PA08 07-APR-8215:53:4109715:52:20NORMAMAINT | P | 19.4 | 9.5 | --- | RT CL FWD/REV POWER DIFF. | | 001 |
| PA09 07-APR-8215:53:4509715:52:20NORMAMAINT | P | 40.0 | 38.3 | --- | LT CL ANTENNA FWD POWER | | 001 |
| PA10 07-APR-8215:53:4509715:52:20NORMAMAINT | P | 15.9 | 9.5 | --- | LT CL FWD/REV POWER DIFF. | | 001 |
| PA11 07-APR-8215:53:4509715:52:20NORMAMAINT | P | 3.0 | 1.0 | 5.0 | LT CL/SLS FWD POWER DIFF. | | 001 |
| PA12 07-APR-8215:53:4809715:52:20NORMAMAINT | P | 41.3 | 38.6 | --- | BACK SLS ANT FWD POWER | | 001 |
| PA13 07-APR-8215:53:4809715:52:20NORMAMAINT | P | 13.0 | 9.5 | --- | BACK SLS FWD/REV PWR DIFF | | 001 |
| PA14 07-APR-8215:53:4809715:52:20NORMAMAINT | P | 6.8 | 0.1 | --- | SINGLE POINT MON POWER | | 001 |
| PE14 07-APR-8215:53:4809715:52:20SHUTD | P | 6.1 | 2.3 | --- | SINGLE POINT MON POWER | | 001 |
| PA15 07-APR-8215:53:5209715:52:20NORMAMAINT | P | 1181 | 266 | --- | EFF RADIATED PWR TO SCAN | | 001 |
| PE15 07-APR-8215:53:5209715:52:20SHUTD | P | 1122 | 216 | --- | EFF RADIATED PWR TO SCAN | | 001 |
| PA16 07-APR-8215:53:5209715:52:20NORMAMAINT | P | 1198 | 266 | --- | EFF RADIATED PWR FRO SCAN | | 001 |
| PE16 07-APR-8215:53:5309715:52:20SHUTD | P | 1102 | 216 | --- | EFF RADIATED PWR FRO SCAN | | 001 |
| PA17 07-APR-8215:53:5609715:52:20NORMAMAINT | P | 4.72 | 4.66 | 4.74 | DATA ACQ REFERENCE VOLT #3 | | 001 |
| PE17 07-APR-8215:53:5609715:52:20SHUTD | P | 4.72 | 4.66 | 4.74 | DATA ACQ REFERENCE VOLT #3 | | 001 |
| PA18 07-APR-8215:53:5709715:52:20NORMAMAINT | P | 3.66 | 3.62 | 3.70 | DATA ACQ REFERENCE VOLT #2 | | 001 |
| PE18 07-APR-8215:53:5709715:52:20SHUTD | P | 3.68 | 3.62 | 3.70 | DATA ACQ REFERENCE VOLT #2 | | 001 |
| PA19 07-APR-8215:54:0109715:52:20NORMAMAINT | P | 1.02 | 1.00 | 1.08 | DATA ACQ REFERENCE VOLT #1 | | 001 |
| PE19 07-APR-8215:54:0109715:52:20SHUTD | P | 1.02 | 1.00 | 1.08 | DATA ACQ REFERENCE VOLT #1 | | 001 |
| PA20 07-APR-8215:54:0109715:52:20NORMAMAINT | P | 0.00 | --- | 1.20 | BLANKED SCAN FWD POWER MON | | 001 |
| PE20 07-APR-8215:54:0109715:52:20SHUTD | P | 0.00 | --- | 1.20 | BLANKED SCAN FWD POWER MON | | 001 |
| PA21 07-APR-8215:54:0509715:52:20NORMAMAINT | P | 0.00 | --- | 1.20 | BLANKED ID FWD POWER MON. | | 001 |
| PE21 07-APR-8215:54:0509715:52:20SHUTD | P | 0.00 | --- | 1.20 | BLANKED ID FWD POWER MON. | | 001 |
| PA22 07-APR-8215:54:0509715:52:20NORMAMAINT | P | 0.00 | --- | 0.30 | BLANKED ID REV POWER MON. | | 001 |
| PE22 07-APR-8215:54:0509715:52:20SHUTD | P | 0.28 | --- | 0.30 | BLANKED ID REV POWER MON. | | 001 |
| PA23 07-APR-8215:54:0909715:52:20NORMAMAINT | P | 0.00 | --- | 1.20 | BLANKED RT CL FWD PWR MON | | 001 |
| PA24 07-APR-8215:54:0909715:52:20NORMAMAINT | P | 0.00 | --- | 0.30 | BLANKED RT CL REV PWR MON | | 001 |
| PA25 07-APR-8215:54:0909715:52:20NORMAMAINT | P | 0.00 | --- | 1.20 | BLANKED LT CL FWD PWR MON | | 001 |
| PA26 07-APR-8215:54:0909715:52:20NORMAMAINT | P | 0.00 | --- | 0.30 | BLANKED LT CL REV PWR MON | | 001 |
| PA27 07-APR-8215:54:1309715:52:20NORMAMAINT | P | 0.00 | --- | 1.20 | BLANKED BK SLS FWD PWR MON | | 001 |
| PA28 07-APR-8215:54:1309715:52:20NORMAMAINT | P | 0.00 | --- | 0.30 | BLANKED BK SLS REV PWR MON | | 001 |
| PA29 07-APR-8215:54:1309715:52:20NORMAMAINT | P | 0.00 | --- | 0.30 | BLANKED LT SLS REV PWR MON | | 001 |
| PA30 07-APR-8215:54:1309715:52:20NORMAMAINT | P | 0.08 | --- | 2.00 | BLANKED MODULATOR PWR MON | | 001 |
| PE30 07-APR-8215:54:1709715:52:20SHUTD | P | 0.00 | --- | 2.00 | BLANKED MODULATOR PWR MON | | 001 |
| PA31 07-APR-8215:54:1709715:52:20NORMAMAINT | P | 5.36 | --- | --- | +5V POWER SUPPLY A | | 001 |
| PE31 07-APR-8215:54:1709715:52:20SHUTD | P | 5.20 | --- | --- | +5V POWER SUPPLY A | | 001 |
| PA32 07-APR-8215:54:2009715:52:20NORMAMAINT | P | 5.32 | --- | --- | +5V POWER SUPPLY B | | 001 |
| PE32 07-APR-8215:54:2009715:52:20SHUTD | P | 5.44 | --- | --- | +5V POWER SUPPLY B | | 001 |
| PA33 07-APR-8215:54:2009715:52:20NORMAMAINT | P | 5.36 | --- | --- | +5V POWER SUPPLY C | | 001 |
| PE33 07-APR-8215:54:2009715:52:20SHUTD | P | 5.04 | --- | --- | +5V POWER SUPPLY C | | 001 |
| PA34 07-APR-8215:54:2409715:52:20NORMAMAINT | P | 20.02 | --- | --- | +20V POWER SUPPLY A | | 001 |
| PE34 07-APR-8215:54:2409715:52:20SHUTD | P | 20.44 | --- | --- | +20V POWER SUPPLY A | | 001 |
| PA35 07-APR-8215:54:2409715:52:20NORMAMAINT | P | 20.30 | --- | --- | +20V POWER SUPPLY B | | 001 |
| PA36 07-APR-8215:54:2509715:52:20NORMAMAINT | P | 28.64 | --- | --- | +28V POWER SUPPLY A | | 001 |
| PE36 07-APR-8215:54:2809715:52:20SHUTD | P | 30.24 | --- | --- | +28V POWER SUPPLY A | | 001 |
| PA37 07-APR-8215:54:2809715:52:20NORMAMAINT | P | 0.00 | --- | --- | +28V POWER SUPPLY B | | 001 |
| PE37 07-APR-8215:54:2909715:52:20SHUTD | P | 0.00 | --- | --- | +28V POWER SUPPLY B | | 001 |

| | | | | | | |
|---|---|---|---|---|---|---|
| PA38 | 07-APR-8215:54:2909715:52:20NORMAMAINT | P -20.44 | --- | --- | -20V POWER SUPPLY A | 001 |
| PE38 | 07-APR-8215:54:3309715:52:20SHUTD | P -20.58 | --- | --- | -20V POWER SUPPLY A | 001 |
| PA39 | 07-APR-8215:54:3309715:52:20NORMAMAINT | P -17.92 | --- | --- | -20V POWER SUPPLY B | 001 |
| PA40 | 07-APR-8215:54:3309715:52:20NORMAMAINT | P -1406 | 10547 | 10547 | CHANNEL FREQUENCY ERROR | 001 |
| PE40 | 07-APR-8215:54:3309715:52:20SHUTD | P 3516 | 10547 | 10547 | CHANNEL FREQUENCY ERROR | 001 |
| PA41 | 07-APR-8215:54:3709715:52:20NORMAMAINT | P0.00456 | 0.05729 | 0.05729 | FM PREALARM ANGLE ERROR | 001 |
| PE41 | 07-APR-8215:54:3709715:52:20SHUTD | P0.00456 | 0.04427 | 0.04427 | FM PREALARM ANGLE ERROR | 001 |
| PA42 | 07-APR-8215:54:3709715:52:20NORMAMAINT | P0.01042 | 0.08724 | 0.08724 | FM ALARM ANGLE ERROR | 001 |
| PE42 | 07-APR-8215:54:3709715:52:20SHUTD | P0.01172 | 0.05599 | 0.05599 | FM ALARM ANGLE ERROR | 001 |

```
CEH  07-APR-8215:56:43ELEVATION STATION0010110100001100000000000 0001110101111000011000001100000
CEP  07-APR-8215:56:48FFE                  + .00  13     0
CEP  07-APR-8215:56:48CMN                    .00  13     0
CEP  07-APR-8215:56:48OUTLIER                      4     0
CEP  07-APR-8215:56:48DPSK PHASE             0     10     0
CEP  07-APR-8215:56:52FREQ             5268827     10     0
CED  07-APR-8215:56:52DPSK.PWR          G
CED  07-APR-8215:56:52TX.PWR            G
CED  07-APR-8215:56:55DPSK.CD.CK        G
CED  07-APR-8215:56:55S.B.PWR           G
CED  07-APR-8215:56:55BSU.CK            G
CED  07-APR-8215:56:55S.B.PK.SLL        G
CED  07-APR-8215:56:59UP SLS PWR        G
CED  07-APR-8215:56:59+5VDC              G
CED  07-APR-8215:56:59+12VDC             G
CED  07-APR-8215:56:59+15VDC             G
CED  07-APR-8215:57:03-12VDC             G
CED  07-APR-8215:57:03-5VDC              G
CED  07-APR-8215:57:03-15VDC             G
CED  07-APR-8215:57:03-20VDC             G
CED  07-APR-8215:57:07-40VDC             G
CEFL 07-APR-8215:57:07NORML            ON
CEFL 07-APR-8215:57:07AUTO.SHDN        OFF
CEFL 07-APR-8215:57:07AUTO.SHDN.OVRDOFF
CEFL 07-APR-8215:57:11DPSK.CD          OFF
CEFL 07-APR-8215:57:11DPSK.PWR         OFF
CEFL 07-APR-8215:57:11FREQ             OFF
CEFL 07-APR-8215:57:11SBPWR            OFF
CEFL 07-APR-8215:57:15ANGCD            OFF
CEFL 07-APR-8215:57:15SYNC             OFF
CELL 07-APR-8215:57:15TRANS            OFF
CELL 07-APR-8215:57:15ANT.SW           OFF
CELL 07-APR-8215:57:19CONTROL          OFF
CELL 07-APR-8215:57:19PHASERS          OFF
CELL 07-APR-8215:57:19D.C.PWR          OFF
CELL 07-APR-8215:57:20BSU              OFF
CELL 07-APR-8215:57:23FLDMON           OFF
CELL 07-APR-8215:57:23INTMON           OFF
CE  107-APR-8215:58:29FFE (DEG.)                0.00000      -0.150   0.150
CE  207-APR-8215:58:30CMN (DEG.)                0.00000      -0.030   0.030
CE  307-APR-8215:58:33+5V                       5.20030       5.500   4.500
CE  407-APR-8215:58:34+12V                     12.06194      13.000  11.000
CE  507-APR-8215:58:34+15V                     15.60246      16.000  14.000
CE  607-APR-8215:58:37-5V                      -5.16120      -5.500  -4.500
CE  707-APR-8215:58:37-12V                    -12.17904     -13.000 -11.000
CE  807-APR-8215:58:37-15V                    -15.60246     -16.000 -14.000
CE  907-APR-8215:58:37-20V                    -20.22576     -21.700 -18.500
CE 1007-APR-8215:58:41-40V                    -40.63102     -44.900 -35.700
CE 1107-APR-8215:58:41ESN ERP (DB)           GO              -5.000
CE 1207-APR-8215:58:41STD ERP (DB)           NOGO            -5.000
CE 1307-APR-8215:58:41UPPER CLR PULSE (DB)   NOGO            -5.000
CE 1407-APR-8215:58:45MTR PWR (DB)           NOGO            -3.000
CE 1507-APR-8215:58:45FREQUENCY (HZ)          6172.0018     -20000.   20000.
```

```
CAH  07-APR-8216:00:26MCKB AZ          00101100010011110100100O 000111010101000101110000101000000
CAP  07-APR-8216:00:26PFE                + .03  13      0
CAP  07-APR-8216:00:30CMN                  .00  13      0
CAP  07-APR-8216:00:30OUTLIER                    4      0
CAP  07-APR-8216:00:30DPSK PHASE          0      10      0
CAP  07-APR-8216:00:33FREQ          5268833      10      0
CAD  07-APR-8216:00:34DPSK.PWR       G
CAD  07-APR-8216:00:34TX.PWR         G
CAD  07-APR-8216:00:34DPSK.CD.CK     G
CAD  07-APR-8216:00:38R.CLR.PWR      G
CAD  07-APR-8216:00:38S.B.PWR        G
CAD  07-APR-8216:00:38BSU.CK         G
CAD  07-APR-8216:00:38S.B.PK.SLL     G
CAD  07-APR-8216:00:42L.CLR.PWR      G
CAD  07-APR-8216:00:42+5VDC           G
CAD  07-APR-8216:00:42+12VDC          G
CAD  07-APR-8216:00:42+15VDC          G
CAD  07-APR-8216:00:46-12VDC          G
CAD  07-APR-8216:00:46-5VDC           G
CAD  07-APR-8216:00:46-15VDC          G
CAD  07-APR-8216:00:46-20VDC          G
CAD  07-APR-8216:00:50-40VDC          G
CAPL 07-APR-8216:00:50NORML         ON
CAPL 07-APR-8216:00:50AUTO.SHDN     OFF
CAPL 07-APR-8216:00:50AUTO.SHDN.OVRDOFF
CAPL 07-APR-8216:00:54DPSK.CD       OFF
CAPL 07-APR-8216:00:54DPSK.PWR      OFF
CAPL 07-APR-8216:00:54FREQ          OFF
CAPL 07-APR-8216:00:54SBFWR         OFF
CAPL 07-APR-8216:00:58ANGCD         OFF
CALL 07-APR-8216:00:58TRANS         OFF
CALL 07-APR-8216:00:58ANT.SW        OFF
CALL 07-APR-8216:00:58CONTROL       OFF
CALL 07-APR-8216:01:02PHASERS       OFF
CALL 07-APR-8216:01:02D.C.PWR       OFF
CALL 07-APR-8216:01:02UFS           OFF
CALL 07-APR-8216:01:02FLDMON        OFF
CALL 07-APR-8216:01:06INTMON        OFF
CA   107-APR-8216:02:24PFE (DEG.)              0.03000      -0.200   0.200
CA   207-APR-8216:02:24CMN (DEG.)              0.00000      -0.030   0.030
CA   307-APR-8216:02:27+5V                     4.80930       5.500   4.500
CA   407-APR-8216:02:27+12V                   11.30075      13.000  11.000
CA   507-APR-8216:02:27+15V                   14.42934      16.000  14.000
CA   607-APR-8216:02:27-5V                    -4.96570      -5.500  -4.500
CA   707-APR-8216:02:31-12V                  -11.53496     -13.000 -11.000
CA   807-APR-8216:02:31-15V                  -14.42934     -16.000 -14.000
CA   907-APR-8216:02:31-20V                  -19.28503     -21.700 -18.500
CA  1007-APR-8216:02:31-40V                  -38.66817     -44.900 -35.900
CA  1107-APR-8216:02:35SBM ERP (DB)         GO                -5.000
CA  1207-APR-8216:02:35SID ERP (DB)         NOGO              -5.000
CA  1307-APR-8216:02:35RGHT CLR PULSE (DB)  NOGO              -5.000
CA  1407-APR-8216:02:35UPPER CLR PULSE (DB) NOGO              -5.000
CA  1507-APR-8216:02:39LFT CLR PULSE (DB)   NOGO              -5.000
CA  1607-APR-8216:02:39XMTR PWR (DB)        GO                -3.000
CA  1707-APR-8216:02:39FREQUENCY (HZ)            1.3335     -20000.  20000.
```

HIPSTON ELEVATION SITE
ITOR DATE 148 MONITOR TIME 1534:27
TEM IS ON AND IN OPER

DATA RECORDED AND PROCESSED BY THE
FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT, N.J. 08405

| EN | HEADER | DATE COL. | TIME COL. | MEAN/MEAS | LOW LIMIT | HIGH LIMIT | PREV. MEAN/MEAS |
|---|---|---|---|---|---|---|---|
| 0 | BEAM ACCURACY | 28-MAY-92 | 15:39:22 | +0.012 | -0.071 | +0.071 | +0.012 |
| 2 | BEAM ERR | 28-MAY-92 | 15:38:22 | + 0.2 | - 3.0 | | + 0.2 |
| 3 | IDENT ERR | 28-MAY-92 | 15:39:22 | - 0.4 | - 3.0 | | - 0.4 |
| 4 | SLS, UPPER ERR | 28-MAY-92 | 15:38:28 | - 0.2 | - 3.0 | | - 0.3 |
| 7 | PREAMBLE | 28-MAY-92 | 15:39:28 | GO | | | GO |
| 8 | SYSTEM TIMING | 28-MAY-92 | 15:31:28 | 0. | TOD. | | 0. |
| 9 | FREQUENCY | 28-MAY-92 | 15:39:29 | - 4. | - 10. | + 11. | - 6. |
| 0 | ANTENNA SWITCH | 28-MAY-92 | 15:38:32 | GO | | | GO |
| 1 | SCAN MOD | 28-MAY-92 | 15:38:33 | GO | | | GO |
| 2 | SCAN CONT | 28-MAY-92 | 15:38:33 | GO | | | GO |
| 4 | MONITOR TIMING | 28-MAY-92 | 15:38:36 | GO | | | GO |
| 5 | BASIC DATA 2 | 28-MAY-92 | 15:39:36 | GO | | | GO |
| 8 | PWR OUT, TOTA | 28-MAY-92 | 15:38:36 | + 0.0 | - 2.0 | | + 0.0 |
| 9 | PWR OUT, ELCTR | 28-MAY-92 | 15:38:36 | + 0.0 | - 2.0 | | + 0.0 |
| 1 | SYNC SIGNAL PRESENCE | 28-MAY-92 | 15:38:40 | GO | | | GO |
| 2 | PHASE MOD | 28-MAY-92 | 15:38:40 | GO | | | GO |
| 3 | AM MOD | 28-MAY-92 | 15:38:40 | GO | | | GO |
| 7 | TEMP ELECTRONICS | 28-MAY-92 | 15:38:40 | + 30. | - 10. | + 51. | + 30. |
| 1 | TEMP ANTENNA | 28-MAY-92 | 15:38:44 | + 27. | - 10. | + 51. | + 27. |
| 0 | DATA LINK | 28-MAY-92 | 15:38:44 | GO | | | GO |
| 0 | LOCAL CONTROL PANEL | 28-MAY-92 | 15:38:44 | GO | | | GO |
| | ANTENNA +5 VOLTS | 28-MAY-92 | 15:38:44 | +4.91 | +4.75 | +5.25 | +4.91 |
| | ANTENNA -40 VOLTS | 28-MAY-92 | 15:38:48 | -39.6 | -35.0 | -45.0 | -39.6 |
| | ANTENNA +24 VOLTS | 28-MAY-92 | 15:39:48 | +23.5 | +20.1 | +28.0 | +23.5 |
| | ELECTRONICS +5 VOLTS | 28-MAY-92 | 15:38:48 | +4.91 | +4.75 | +5.25 | +4.91 |
| | ELECTRONICS +15 VOLTS | 28-MAY-92 | 15:38:48 | +14.9 | +14.3 | +15.8 | +15.0 |
| | ELECTRONICS -15 VOLTS | 28-MAY-92 | 15:38:52 | -14.7 | -14.3 | -15.8 | -14.9 |
| | ELECTRONICS +20 VOLTS | 28-MAY-92 | 15:38:52 | +19.8 | +19.3 | +21.0 | +19.9 |
| | MONITOR +5 VOLTS (1) | 28-MAY-92 | 15:38:52 | +4.85 | +4.75 | +5.25 | +4.91 |
| | MONITOR +5 VOLTS (2) | 28-MAY-92 | 15:38:52 | +4.85 | +4.75 | +5.25 | +4.85 |
| | MONITOR +15 VOLTS | 28-MAY-92 | 15:38:56 | +15.0 | +14.3 | +15.8 | +15.0 |
| | MONITOR -15 VOLTS | 28-MAY-92 | 15:38:56 | -15.0 | -14.7 | -15.3 | -14.8 |

WASHINGTON AZIMUTH SITE
MONITOR DATE 146 MONITOR TIME 1532:50
SYSTEM IS ON AND IN OPER

DATA RECORDED AND PROCESSED BY THE
FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT,N.J. 08405

| ITEM | HEADER | DATE COL. | TIME COL. | MEAN/MEAS | LOW LIMIT | HIGH LIMIT | PREV. MEAN/MEAS |
|---|---|---|---|---|---|---|---|
| 0 | BEAM ACCURACY | 28-MAY-82 | 15:41:54 | -0.036 | -0.133 | +0.133 | -0.036 |
| 2 | BEAM ERR | 28-MAY-82 | 15:41:54 | + 0.7 | - 3.0 | | + 0.7 |
| 3 | IDENT ERR | 28-MAY-82 | 15:41:54 | - 0.6 | - 3.0 | | - 0.6 |
| 5 | SLS LEFT ERR | 28-MAY-82 | 15:41:54 | - 0.7 | - 3.0 | | - 0.7 |
| 6 | SLS RIGHT ERR | 28-MAY-82 | 15:41:58 | - 0.7 | - 3.0 | | - 0.7 |
| 7 | PREAMBLE | 28-MAY-82 | 15:41:58 | GO | | | GO |
| 9 | FREQUENCY | 28-MAY-82 | 15:41:58 | + 6. | - 10. | + 13. | + 6. |
| 10 | ANTENNA SWITCH | 28-MAY-82 | 15:41:58 | GO | | | GO |
| 11 | SCAN MOD | 28-MAY-82 | 15:42:02 | GO | | | GO |
| 12 | SCAN CONT | 28-MAY-82 | 15:42:02 | GO | | | GO |
| 13 | DME REPLY | 28-MAY-82 | 15:42:02 | GO | | | GO |
| 14 | MONITOR TIMING | 28-MAY-82 | 15:42:02 | GO | | | GO |
| 15 | BASIC DATA 1 | 28-MAY-82 | 15:42:06 | GO | | | GO |
| 17 | AUX DATA | 28-MAY-82 | 15:42:06 | GO | | | GO |
| 18 | PWR OUT TWTA | 28-MAY-82 | 15:42:06 | - 0.5 | - 2.0 | | - 0.5 |
| 19 | PWR OUT EXCTR | 28-MAY-82 | 15:42:06 | - 1.5 | - 2.0 | | - 1.5 |
| 20 | DATA INPUT | 28-MAY-82 | 15:42:10 | GO | | | GO |
| 22 | PHASE MOD | 28-MAY-82 | 15:42:10 | GO | | | GO |
| 23 | AM MOD | 28-MAY-82 | 15:42:10 | GO | | | GO |
| 27 | TEMP ELECTRONICS | 28-MAY-82 | 15:42:10 | + 19. | - 10. | + 53. | + 19. |
| 28 | TEMP ANTENNA | 28-MAY-82 | 15:42:14 | + 31. | - 10. | + 53. | + 31. |
| 29 | DATA LINK | 28-MAY-82 | 15:42:14 | GO | | | GO |
| 30 | LOCAL CONTROL PANEL | 28-MAY-82 | 15:42:14 | GO | | | GO |
| 31 | ANTENNA +5 VOLTS | 28-MAY-82 | 15:42:15 | +4.91 | +4.75 | +5.25 | +4.91 |
| 32 | ANTENNA -40 VOLTS | 28-MAY-82 | 15:42:18 | -40.4 | -35.0 | -45.0 | -40.4 |
| 33 | ANTENNA +24 VOLTS | 28-MAY-82 | 15:42:19 | +24.5 | +20.0 | +23.3 | +24.5 |
| 34 | ELECTRONICS +5 VOLTS | 28-MAY-82 | 15:42:19 | +5.01 | +4.75 | +5.25 | +5.01 |
| 35 | ELECTRONICS +15 VOLTS | 28-MAY-82 | 15:42:22 | +15.0 | +14.3 | +15.3 | +15.0 |
| 36 | ELECTRONICS -15 VOLTS | 28-MAY-82 | 15:42:22 | -14.7 | -14.3 | -15.8 | -14.7 |
| 37 | ELECTRONICS +20 VOLTS | 28-MAY-82 | 15:42:22 | +20.0 | +19.3 | +21.0 | +20.0 |
| 38 | MONITOR +5 VOLTS (1) | 28-MAY-82 | 15:42:22 | +4.91 | +4.75 | +5.25 | +4.91 |
| 39 | MONITOR +5 VOLTS (2) | 28-MAY-82 | 15:42:24 | +5.01 | +4.75 | +5.25 | +5.01 |
| 40 | MONITOR +15 VOLTS | 28-MAY-82 | 15:42:26 | +15.0 | +14.7 | +15.3 | +15.0 |
| 41 | MONITOR -15 VOLTS | 28-MAY-82 | 15:42:26 | -15.0 | -14.7 | -15.3 | -15.0 |

MONITOR DATE 85

FAA TECHNICAL CENTER

| ITEM | HEADER | DATE COL. | TIME COL. | MON. TIME | VALUE | LOW LIMIT | HIGH LIMIT | CAT |
|---|---|---|---|---|---|---|---|---|
| 1 | MODULATOR POWER MONITOR | 05-APR-82 | 08:25:10 | 08:26:42 | 7.1 | 5.0 | 10.0 | |
| 4 | SCAN ANTENNA FWD POWER | 05-APR-82 | 08:25:14 | 08:26:42 | 44.2 | 39.2 | --- | |
| 6 | ID ANT FWD/REV PWR DIFF. | 05-APR-82 | 08:25:18 | 08:26:42 | 22.4 | 9.5 | --- | |
| 15 | EFF RADIATED PWR TO SCAN | 05-APR-82 | 08:27:46 | 08:26:42 | 1143 | 216 | --- | |
| 17 | DATA ACQ REFERENCE VOLT #3 | 05-APR-82 | 08:27:50 | 08:26:42 | 4.70 | 4.66 | 4.74 | |
| 18 | DATA ACQ REFERENCE VOLT #2 | 05-APR-82 | 08:27:54 | 08:26:42 | 3.66 | 3.62 | 3.70 | |
| 19 | DATA ACQ REFERENCE VOLT #1 | 05-APR-82 | 08:27:54 | 08:26:42 | 1.04 | 1.00 | 1.08 | |
| 21 | BLANKED ID FWD POWER MON. | 05-APR-82 | 08:27:58 | 08:26:42 | 0.00 | --- | 1.20 | |
| 30 | BLANKED MODULATOR PWR MON | 05-APR-82 | 08:28:10 | 08:26:42 | 0.00 | --- | 2.00 | |
| 32 | +5V POWER SUPPLY B | 05-APR-82 | 08:28:14 | 08:26:42 | 5.40 | --- | --- | |
| 34 | +20V POWER SUPPLY A | 05-APR-82 | 08:28:18 | 08:26:42 | 20.32 | --- | --- | |
| 37 | +28V POWER SUPPLY B | 05-APR-82 | 08:28:26 | 08:26:42 | 0.00 | --- | --- | |
| 40 | CHANNEL FREQUENCY ERROR | 05-APR-82 | 08:28:30 | 08:26:42 | 3516 | 10547 | 10547 | |
| 42 | FM ALARM ANGLE ERROR | 05-APR-82 | 08:28:34 | 08:26:42 | 0.00716 | 0.05599 | 0.05599 | |

MONITOR DATE 81

BAD PAR. = BAD PARITY

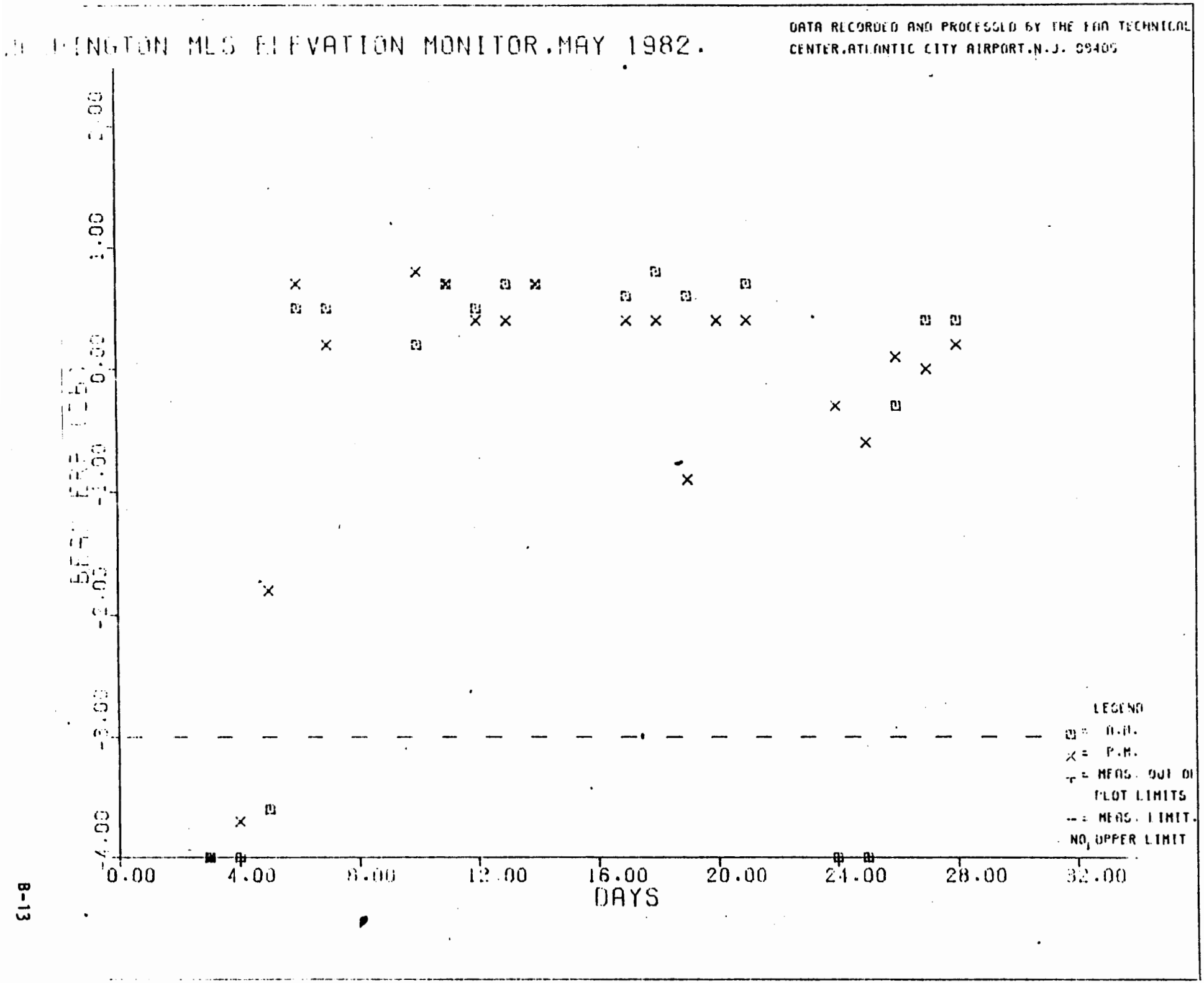
| ITEM | HEADER | DATE COL. | TIME COL. | MON. TIME | VALUE | LOW LIMIT | HIGH LIMIT | CNT |
|---|---|---|---|---|---|---|---|---|
| 1 | MODULATOR POWER MONITOR | 31-APR-82 | 08:38:52 | 08:37:10 | 5.1 | 5.0 | 12.0 | |
| 4 | SCAN ANTENNA FWD POWER | 31-APR-82 | 08:39:32 | 08:37:10 | 41.3 | 35.2 | --- | |
| 6 | ID ANT FWD/REV PWR DIFF. | 31-APR-82 | 08:39:39 | 08:37:10 | 19.4 | 9.5 | --- | |
| 8 | RT CL FWD/REV POWER DIFF. | 31-APR-82 | 08:39:39 | 08:37:10 | 19.4 | 9.5 | --- | |
| 10 | LT CL FWD/REV POWER DIFF. | 31-APR-82 | 08:39:43 | 08:37:10 | 19.0 | 9.5 | --- | |
| 12 | BACK SLS ANT FWD POWER | 31-APR-82 | 08:39:43 | 08:37:10 | 41.3 | 35.6 | --- | |
| 14 | SINGLE POINT MON POWER | 31-APR-82 | 08:39:47 | 08:37:10 | 6.3 | 0.1 | --- | |
| 16 | EFF RADIATED PWR FRO SCAN | 31-APR-82 | 08:39:52 | 08:37:10 | 1148 | 266 | --- | |
| 18 | DATA ACQ REFERENCE VOLT #2 | 31-APR-82 | 08:39:56 | 08:37:10 | 3.66 | 3.62 | 3.70 | |
| 20 | BLANKED SCAN FWD POWER MON | 31-APR-82 | 08:39:00 | 08:37:10 | 0.00 | --- | 1.20 | |
| 22 | BLANKED ID REV POWER MON. | 31-APR-82 | 08:39:04 | 08:37:10 | 0.00 | --- | 0.30 | |
| 24 | BLANKED RT CL REV PWR MON | 31-APR-82 | 08:39:08 | 08:37:10 | 0.00 | --- | 0.30 | |
| 26 | BLANKED LT CL REV PWR MON | 31-APR-82 | 08:39:08 | 08:37:10 | 0.00 | --- | 0.30 | |
| 28 | BLANKED BK SLS REV PWR MON | 31-APR-82 | 08:39:11 | 08:37:10 | 0.00 | --- | 0.30 | |
| 30 | BLANKED MODULATOR PWR MON | 31-APR-82 | 08:39:11 | 08:37:10 | 0.10 | --- | 2.00 | |
| 32 | +5V POWER SUPPLY B | 31-APR-82 | 08:39:15 | 08:37:10 | 5.32 | --- | --- | |
| 34 | +20V POWER SUPPLY A | 31-APR-82 | 08:39:20 | 08:37:10 | 19.86 | --- | --- | |
| 36 | +25V POWER SUPPLY A | 31-APR-82 | 08:39:24 | 08:37:10 | 28.70 | --- | --- | |
| 38 | -20V POWER SUPPLY A | 31-APR-82 | 08:39:28 | 08:37:10 | -20.44 | --- | --- | |
| 40 | CHANNEL FREQUENCY ERROR | 31-APR-82 | 08:39:32 | 08:37:10 | -703 | 10547 | 10547 | |
| 42 | FM ALARM ANGLE ERROR | 31-APR-82 | 08:39:36 | 08:37:10 | 0.05208 | 0.08724 | 0.08724 | |

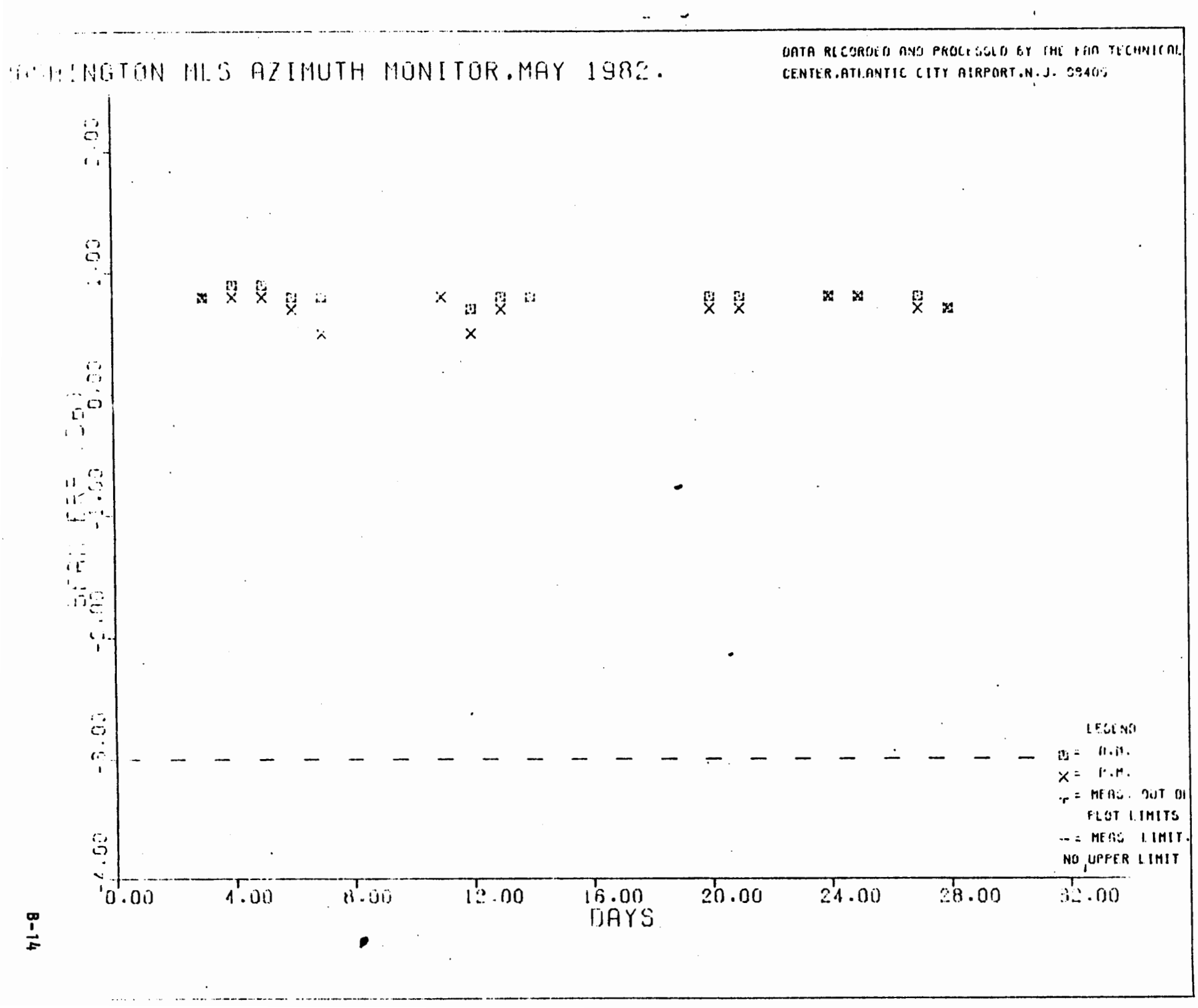
DATA RECORDED AND PROCESSED AT THE
FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT, N.J. 08405

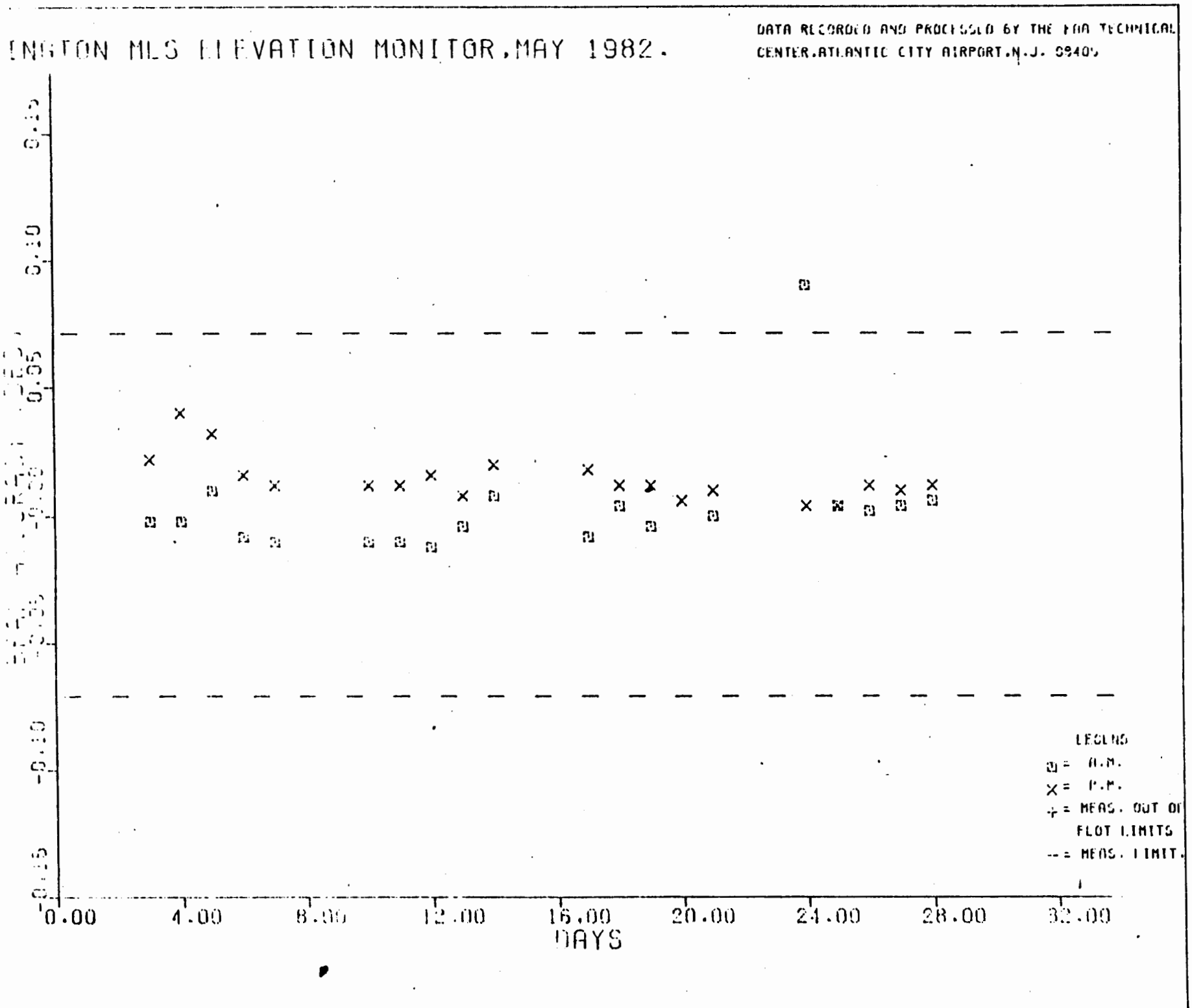
| ITEM | ERROR | DATE | TIME | VALUE | LOW LIMIT | HIGH LIMIT | THRESHOLD | OVERFLOW |
|---|---|---|---|---|---|---|---|---|
| | PFE | 01-APR-82 | 08:41:26 | -.032 | | | 13 | 0 |
| | CMN | 01-APR-82 | 08:41:26 | | | | 13 | 0 |
| | OUTLIER | 01-APR-82 | 08:41:26 | | | | 4 | 0 |
| | PSL PHAS | 01-APR-82 | 08:41:26 | | | | 10 | 0 |
| | FREQ | 01-APR-82 | 08:41:30 | | | | 10 | 0 |
| | DPSK.PWR | 01-APR-82 | 08:41:30 | G | | | | |
| | TX.PWR | 01-APR-82 | 08:41:31 | G | | | | |
| | DPSK.CD.FR | 01-APR-82 | 08:41:31 | G | | | | |
| | S.B.PWR | 01-APR-82 | 08:41:34 | G | | | | |
| | PSL.FR | 01-APR-82 | 08:41:35 | G | | | | |
| | S.B.PK.SLL | 01-APR-82 | 08:41:35 | G | | | | |
| | UP SLS PWR | 01-APR-82 | 08:41:35 | G | | | | |
| | +5VDC | 01-APR-82 | 08:41:39 | G | | | | |
| | +12VDC | 01-APR-82 | 08:41:39 | G | | | | |
| | +15VDC | 01-APR-82 | 08:41:39 | G | | | | |
| | -12VDC | 01-APR-82 | 08:41:39 | G | | | | |
| | -5VDC | 01-APR-82 | 08:41:43 | G | | | | |
| | -15VDC | 01-APR-82 | 08:41:43 | G | | | | |
| | -20VDC | 01-APR-82 | 08:41:43 | G | | | | |
| | -40VDC | 01-APR-82 | 08:41:43 | G | | | | |
| | NORML | 01-APR-82 | 08:41:47 | ON | | | | |
| | AUTO.SHDN | 01-APR-82 | 08:41:47 | OFF | | | | |
| | AUTO.SHDN.OVRD | 01-APR-82 | 08:41:47 | OFF | | | | |
| | DPSK.CD | 01-APR-82 | 08:41:47 | OFF | | | | |
| | DPSK.PWR | 01-APR-82 | 08:41:51 | OFF | | | | |
| | FREQ | 01-APR-82 | 08:41:51 | OFF | | | | |
| | SBPWR | 01-APR-82 | 08:41:51 | OFF | | | | |
| | ANGER | 01-APR-82 | 08:41:51 | OFF | | | | |
| | SYNC | 01-APR-82 | 08:41:55 | OFF | | | | |
| | TRANS | 01-APR-82 | 08:41:55 | OFF | | | | |
| | ANT.SW | 01-APR-82 | 08:41:55 | OFF | | | | |
| | CONTROL | 01-APR-82 | 08:41:58 | OFF | | | | |
| | PHASERS | 01-APR-82 | 08:41:58 | OFF | | | | |
| | D.C.PWR | 01-APR-82 | 08:41:58 | OFF | | | | |
| | BSU | 01-APR-82 | 08:41:58 | OFF | | | | |
| | ELMON | 01-APR-82 | 08:42:02 | OFF | | | | |
| | INTMON | 01-APR-82 | 08:42:02 | OFF | | | | |
| 1 | PFE (DEG.) | 01-APR-82 | 08:43:09 | -0.032000 | -0.150 | 0.150 | | |
| 2 | CMN (DEG.) | 01-APR-82 | 08:43:09 | 0.00000 | -0.030 | 0.030 | | |
| 3 | +5V | 01-APR-82 | 08:43:13 | 5.20030 | 4.500 | 5.500 | | |
| 4 | +12V | 01-APR-82 | 08:43:13 | 12.00338 | 11.000 | 13.000 | | |
| 5 | +15V | 01-APR-82 | 08:43:13 | 15.60246 | 14.000 | 16.000 | | |
| 6 | -5V | 01-APR-82 | 08:43:13 | -5.12210 | -5.500 | -4.500 | | |
| 7 | -12V | 01-APR-82 | 08:43:17 | -12.17904 | -13.000 | -11.000 | | |
| 8 | -15V | 01-APR-82 | 08:43:17 | -15.60246 | -16.000 | -14.000 | | |
| 9 | -20V | 01-APR-82 | 08:43:17 | -20.22576 | -21.700 | -18.500 | | |
| 10 | -40V | 01-APR-82 | 08:43:17 | -40.43474 | -44.900 | -35.900 | | |
| 11 | SUM ERP (DB) | 01-APR-82 | 08:43:21 | GO | -5.000 | | | |
| 12 | SID ERP (DB) | 01-APR-82 | 08:43:21 | NOGO | -5.000 | | | |
| 13 | UPPER CLR PULSE (DB) | 01-APR-82 | 08:43:21 | NOGO | -5.000 | | | |
| 14 | XMTR PWR (DBW) | 01-APR-82 | 08:43:21 | NOGO | -3.000 | | | |
| 15 | FREQUENCY (MHZ) | 01-APR-82 | 08:43:25 | 6240.2794 | -20000. | 20000. | | |

DATA RECEIVED AND PROCESSED BY THE
FAA TECHNICAL CENTER
ATLANTIC CITY AIRPORT, N.J. 08405

| ITEM | HEADER | DATE COL. | TIME COL. | VALUE | LOW LIMIT | HIGH LIMIT | TRIES/CYCLE | OUT-OF-TOL. CNT |
|---|---|---|---|---|---|---|---|---|
| | PFE | 01-APR-82 | 08:45:12 | + .01 | | | 10 | 0 |
| | CMN | 01-APR-82 | 08:45:15 | | | | 10 | 0 |
| | OUTLIER | 01-APR-82 | 08:45:15 | | | | 5 | 0 |
| | DPSK PHASE | 01-APR-82 | 08:45:15 | | | | 10 | 0 |
| | FREQ | 01-APR-82 | 08:45:15 | Stable | | | 10 | 0 |
| | DPSK.PWR | 01-APR-82 | 08:45:19 | G | | | | |
| | TX.PWR | 01-APR-82 | 08:45:19 | G | | | | |
| | DPSK.CE.CK | 01-APR-82 | 08:45:19 | G | | | | |
| | R.CLR.PWR | 01-APR-82 | 08:45:19 | G | | | | |
| | S.B.PWR | 01-APR-82 | 08:45:23 | G | | | | |
| | BSJ.CK | 01-APR-82 | 08:45:23 | G | | | | |
| | S.B.PK.SLL | 01-APR-82 | 08:45:23 | G | | | | |
| | L.CLR.PWR | 01-APR-82 | 08:45:24 | G | | | | |
| | +5VDC | 01-APR-82 | 08:45:27 | G | | | | |
| | +12VDC | 01-APR-82 | 08:45:27 | G | | | | |
| | +15VDC | 01-APR-82 | 08:45:28 | G | | | | |
| | -12VDC | 01-APR-82 | 08:45:28 | G | | | | |
| | -5VDC | 01-APR-82 | 08:45:31 | G | | | | |
| | -15VDC | 01-APR-82 | 08:45:31 | G | | | | |
| | -21VDC | 01-APR-82 | 08:45:32 | G | | | | |
| | -40VDC | 01-APR-82 | 08:45:32 | G | | | | |
| | NORML | 01-APR-82 | 08:45:35 | ON | | | | |
| | AUTO.SHDN | 01-APR-82 | 08:45:36 | OFF | | | | |
| | AUTO.SHDN.OVRD | 01-APR-82 | 08:45:36 | OFF | | | | |
| | DPSK.CD | 01-APR-82 | 08:45:36 | OFF | | | | |
| | DPSK.PWR | 01-APR-82 | 08:45:40 | OFF | | | | |
| | FREQ | 01-APR-82 | 08:45:40 | OFF | | | | |
| | SBPWR | 01-APR-82 | 08:45:40 | OFF | | | | |
| | ANGCD | 01-APR-82 | 08:45:43 | OFF | | | | |
| | TRANS | 01-APR-82 | 08:45:43 | OFF | | | | |
| | ANT.SW | 01-APR-82 | 08:45:43 | OFF | | | | |
| | CONTROL | 01-APR-82 | 08:45:43 | OFF | | | | |
| | PHASERS | 01-APR-82 | 08:45:47 | OFF | | | | |
| | D.C.PWR | 01-APR-82 | 08:45:47 | OFF | | | | |
| | UPS | 01-APR-82 | 08:45:47 | OFF | | | | |
| | ELOMON | 01-APR-82 | 08:45:47 | OFF | | | | |
| | INTMON | 01-APR-82 | 08:45:51 | OFF | | | | |
| 1 | PFE (DEG.) | 01-APR-82 | 08:46:49 | 0.01000 | -0.200 | 0.200 | | |
| 2 | CMN (DEG.) | 01-APR-82 | 08:46:49 | 0.01000 | -0.030 | 0.030 | | |
| 3 | +5V | 01-APR-82 | 08:46:49 | 4.80930 | 4.500 | 5.500 | | |
| 4 | +12V | 01-APR-82 | 08:46:53 | 11.18364 | 11.000 | 13.000 | | |
| 5 | +15V | 01-APR-82 | 08:46:53 | 14.19472 | 14.000 | 16.000 | | |
| 6 | -5V | 01-APR-82 | 08:46:53 | -4.96570 | -5.500 | -4.500 | | |
| 7 | -12V | 01-APR-82 | 08:46:53 | -11.53496 | -13.000 | -11.000 | | |
| 8 | -15V | 01-APR-82 | 08:46:57 | -14.42934 | -16.000 | -14.000 | | |
| 9 | -21V | 01-APR-82 | 08:46:57 | -19.28503 | -21.700 | -18.500 | | |
| 10 | -40V | 01-APR-82 | 08:46:57 | -38.66817 | -44.900 | -35.900 | | |
| 11 | SBM ERP (DB) | 01-APR-82 | 08:46:57 | GO | -5.000 | | | |
| 12 | SID ERP (DB) | 01-APR-82 | 08:47:01 | NOGO | -5.000 | | | |
| 13 | RGHT CLR PULSE (DB) | 01-APR-82 | 08:47:01 | NOGO | -5.000 | | | |
| 14 | UPPER CLR PULSE (DB) | 01-APR-82 | 08:47:01 | NOGO | -5.000 | | | |
| 15 | LFT CLR PULSE (DB) | 01-APR-82 | 08:47:01 | NOGO | -5.000 | | | |
| 16 | XMTR PWR (DB) | 01-APR-82 | 08:47:05 | GO | -3.000 | | | |
| 17 | FREQUENCY (HZ) | 01-APR-82 | 08:47:05 | 0.5524 | -20000. | 20000. | | |

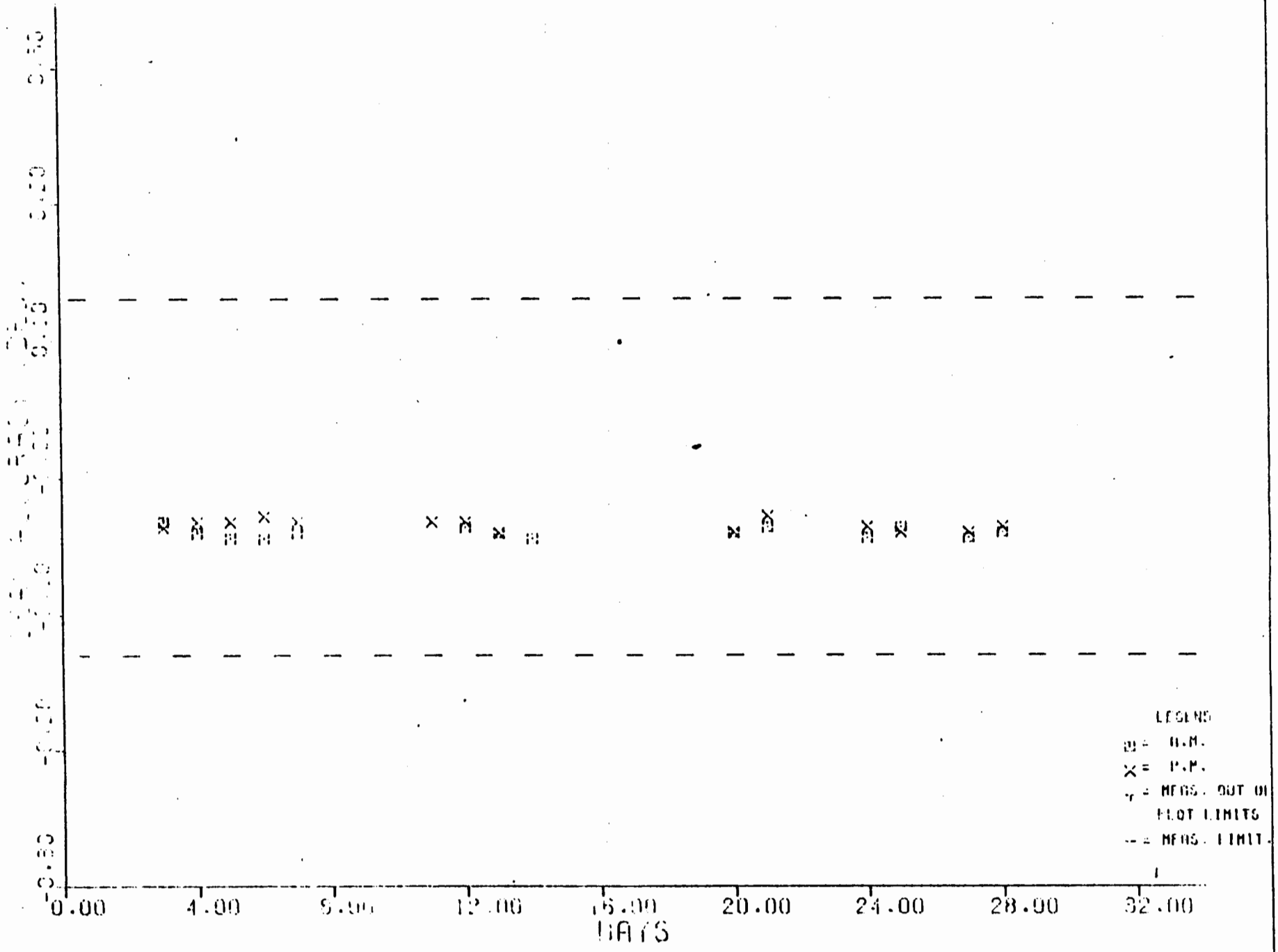

.N PINGTON MLS ELEVATION MONITOR, MAY 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405
DEV FROM REF (DEG)
1.00
0.00
-1.00
-2.00
-3.00
-4.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
A.M.
P.M.
MEAS. OUT OF PLOT LIMITS
MEAS. LIMIT.
NO, UPPER LIMIT

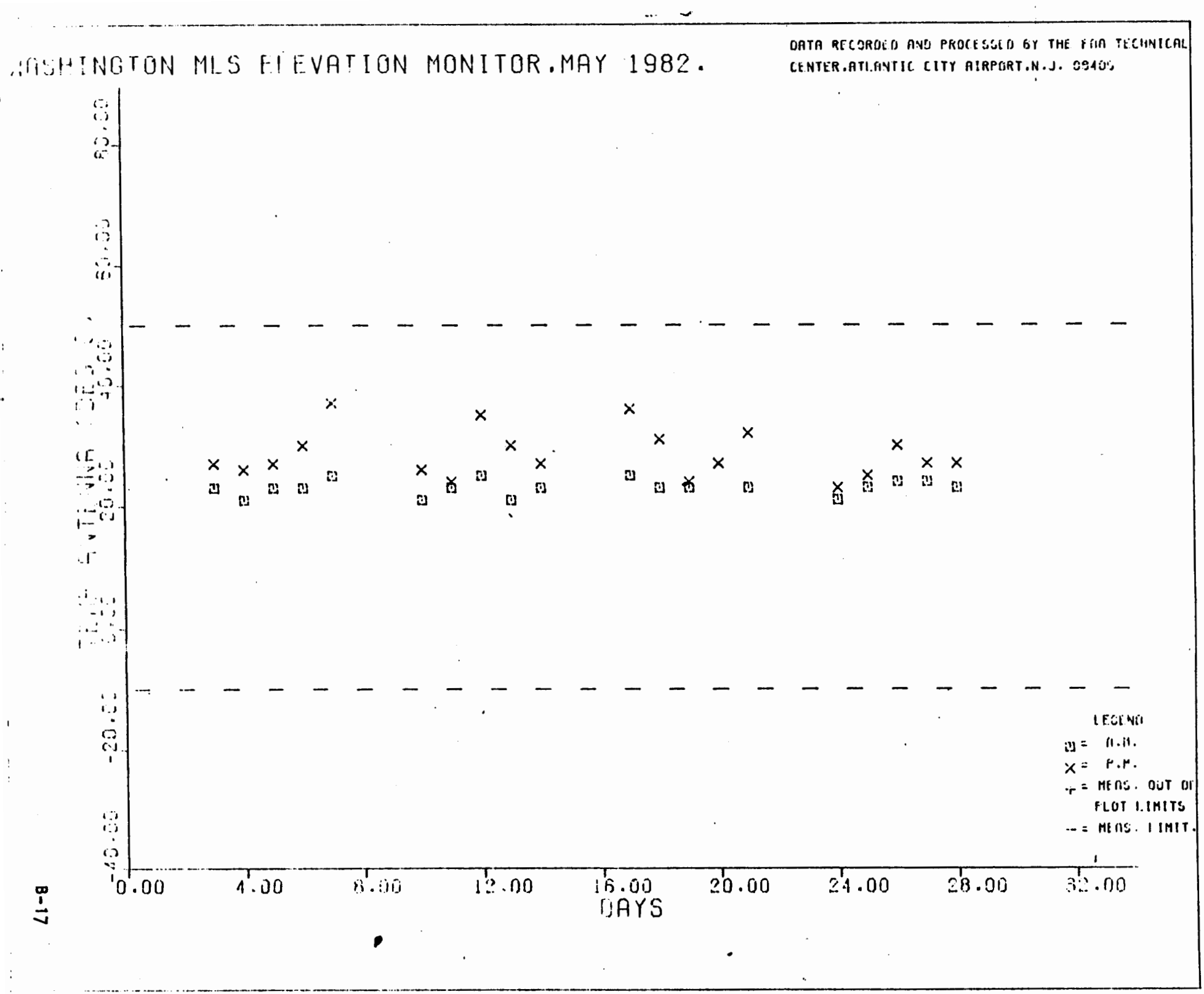

INGTON MLS AZIMUTH MONITOR, MAY 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL
CENTER, ATLANTIC CITY AIRPORT, N.J. 08405
DEG
1.00
0.00
-1.00
-2.00
-3.00
-4.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
= A.M.
X = P.M.
= MEAS. OUT OF PLOT LIMITS
= MEAS. LIMIT. NO UPPER LIMIT

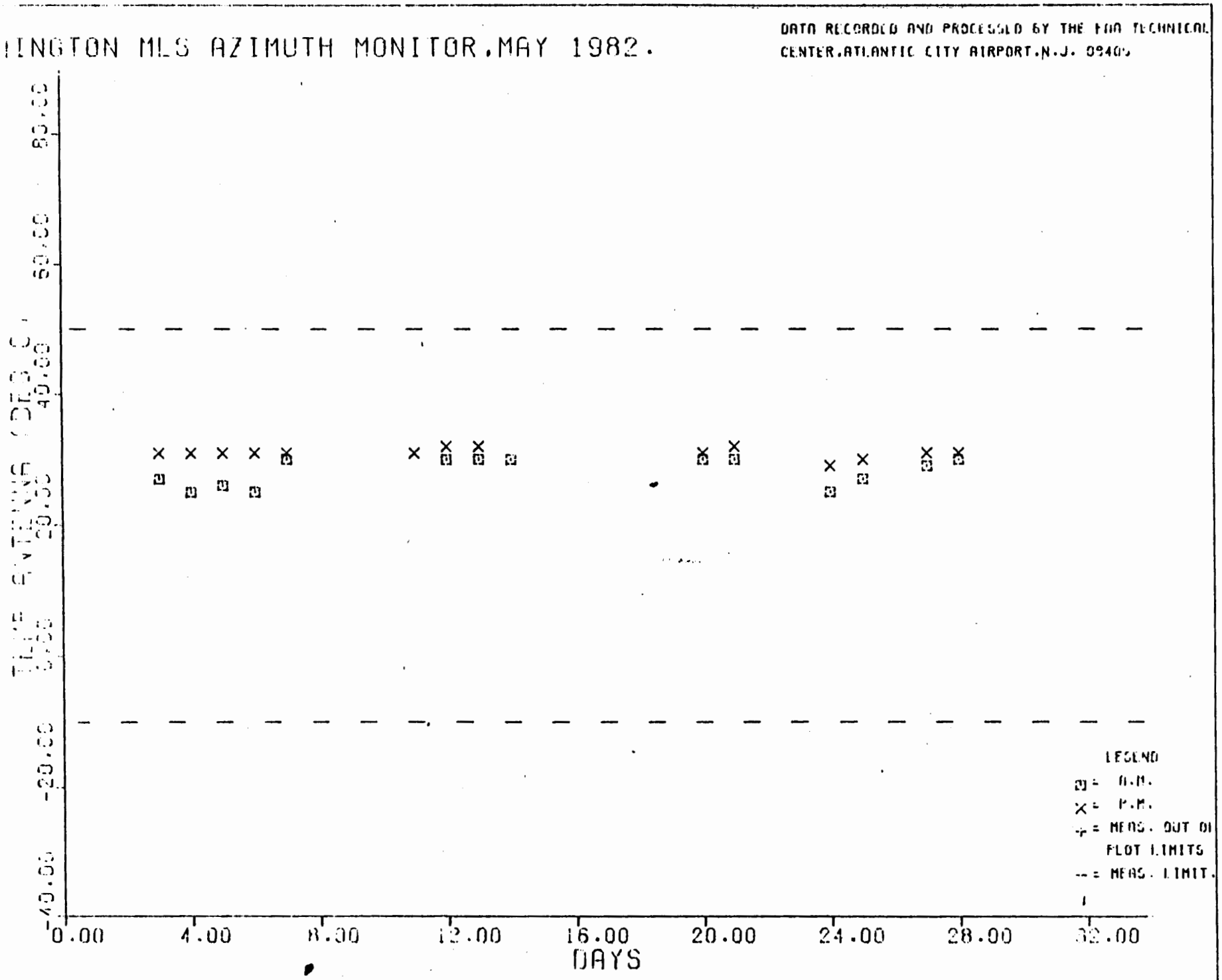

WASHINGTON MLS ELEVATION MONITOR, MAY 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405
0.15
0.10
0.05
-0.05
-0.10
-0.15
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
= A.M.
= P.M.
= MEAS. OUT OF PLOT LIMITS
= MEAS. LIMIT.

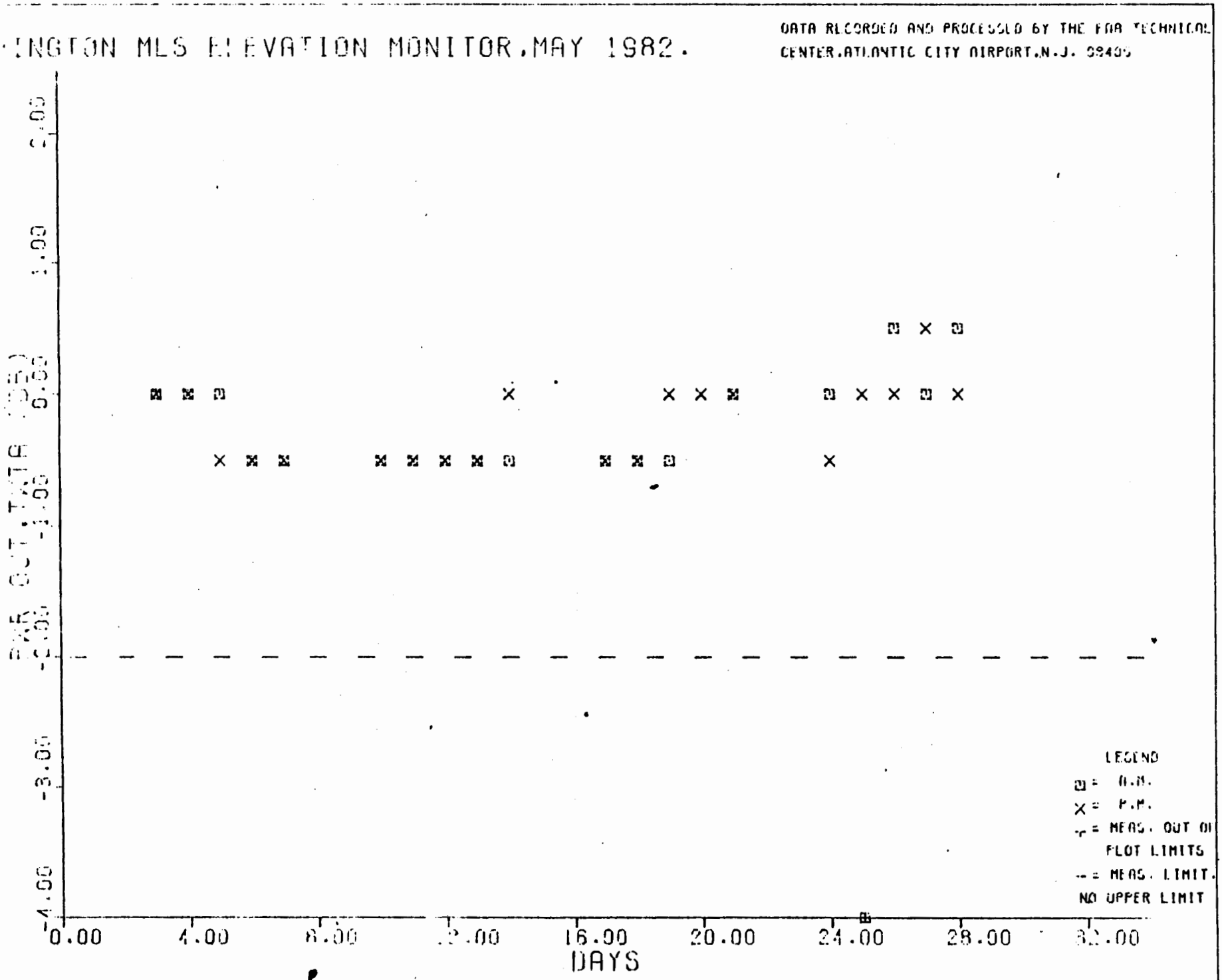
# ...HINGTON MLS AZIMUTH MONITOR, MAY 1982.

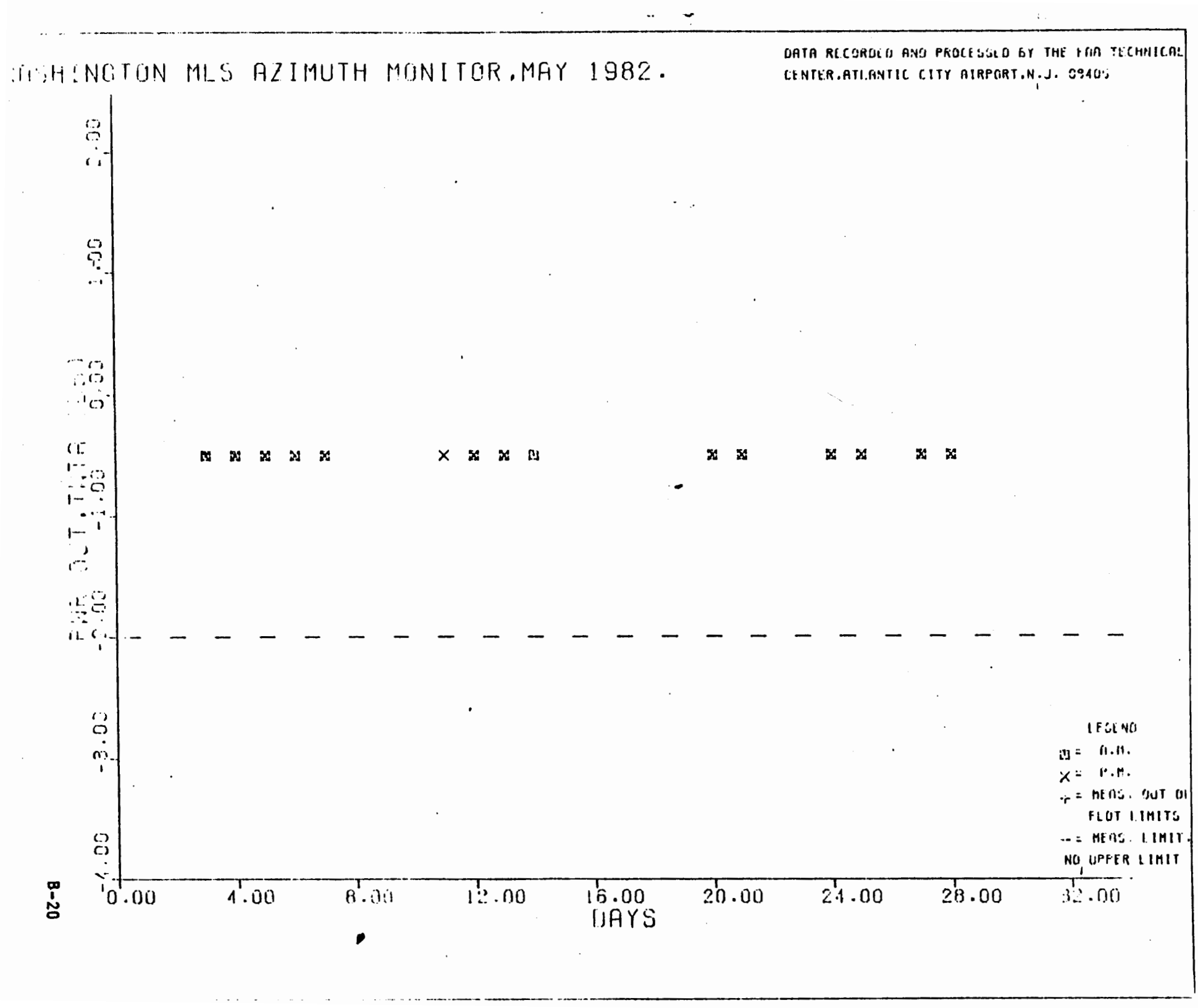
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405




ASHINGTON MLS ELEVATION MONITOR.MAY 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER.ATLANTIC CITY AIRPORT.N.J. 08405
60.00
40.00
20.00
-20.00
-40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
= A.M.
= P.M.
= MEAS. OUT OF PLOT LIMITS
= MEAS. LIMIT.

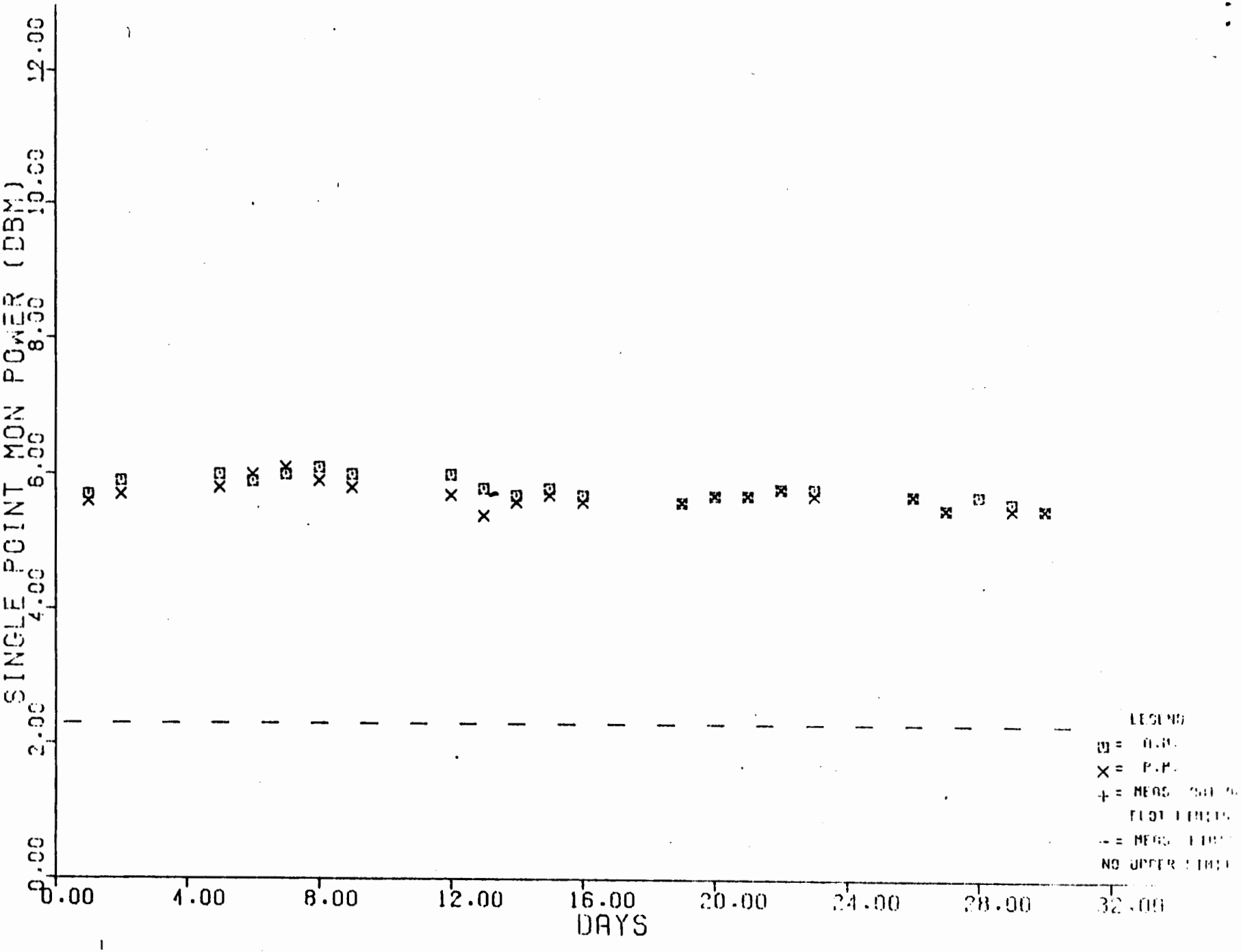

WASHINGTON MLS AZIMUTH MONITOR, MAY 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405
60.00
40.00
20.00
0.00
-20.00
-40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
= A.M.
= P.M.
= MEAS. OUT OF PLOT LIMITS
= MEAS. LIMIT.


DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER,ATLANTIC CITY AIRPORT,N.J. 08405
DAYS
0.00
4.00
16.00
20.00
24.00
28.00
LEGEND
A.M.
P.M.
MEAS. OUT OF PLOT LIMITS
MEAS. LIMIT. NO UPPER LIMIT


:SHINGTON MLS AZIMUTH MONITOR, MAY 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL
CENTER, ATLANTIC CITY AIRPORT, N.J. 08405
FAR OUT, TIME (SEC)
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
= A.M.
X = P.M.
+ = MEAS. OUT OF PLOT LIMITS
-- = MEAS. LIMIT, NO UPPER LIMIT

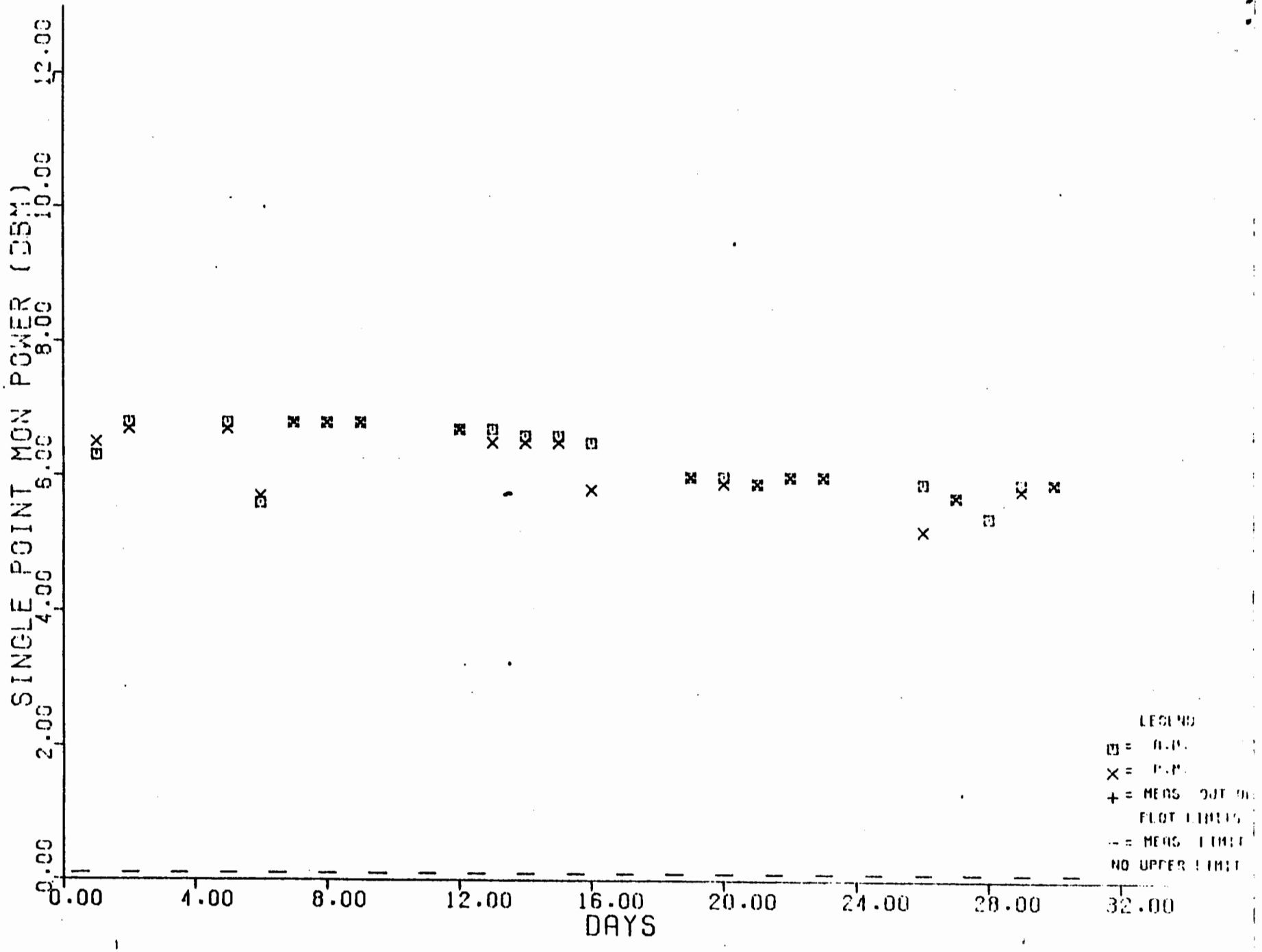
PHILADELPHIA MLS ELEVATION MONITOR, APR. 1982.

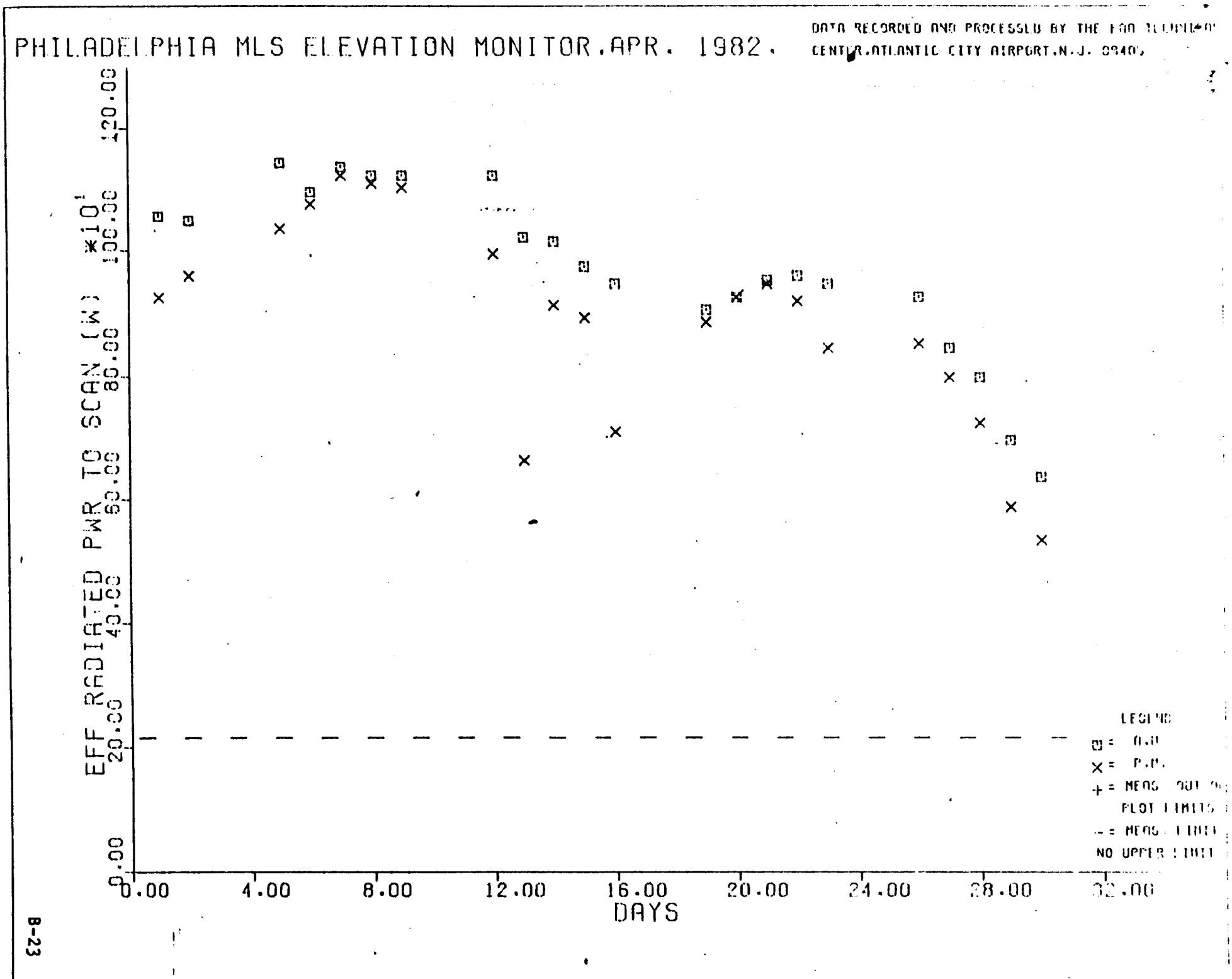
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405



# PHILADELPHIA MLS AZIMUTH MONITOR, APR. 1982.

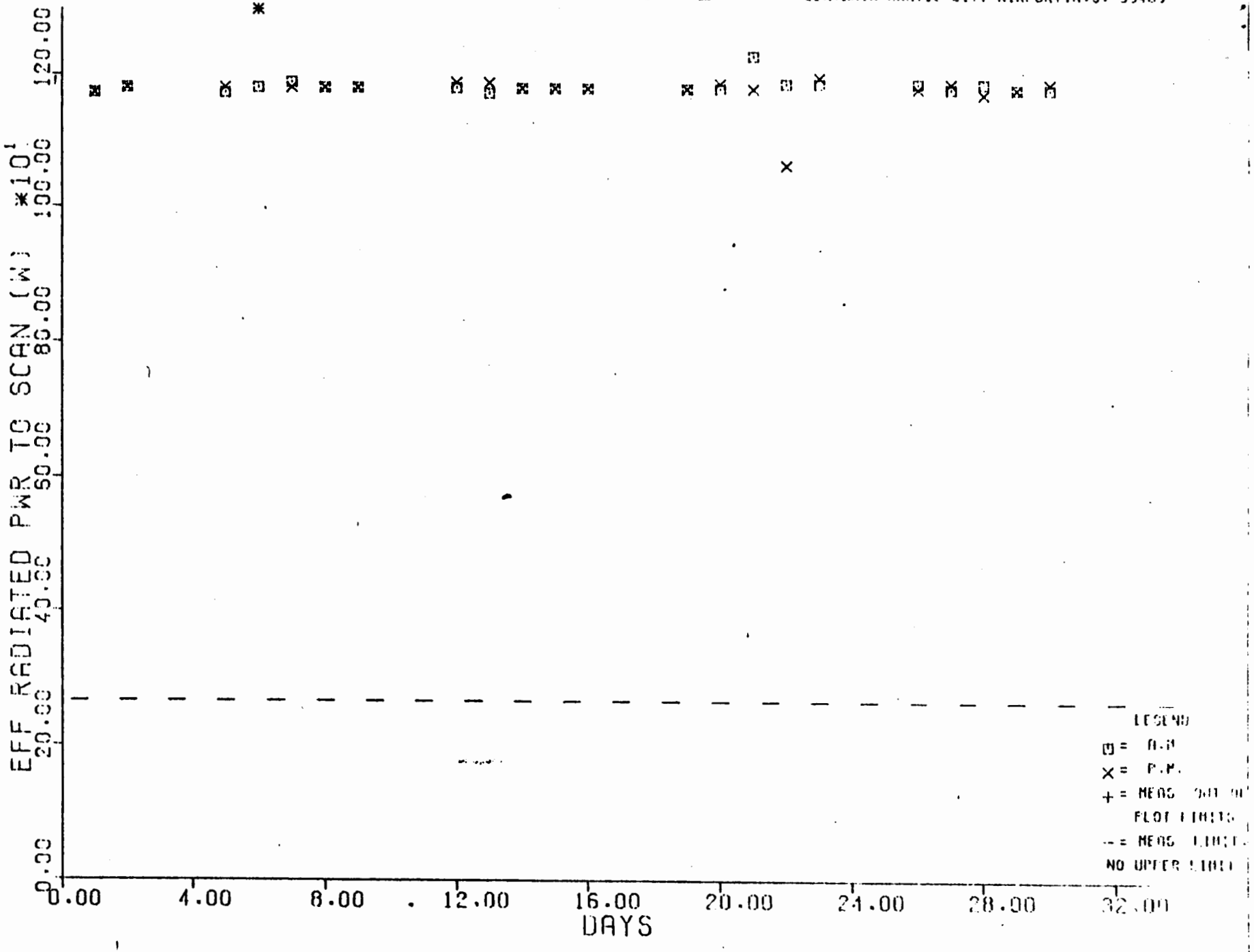
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405




PHILADELPHIA MLS ELEVATION MONITOR.APR. 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL
CENTER.ATLANTIC CITY AIRPORT.N.J. 08405
EFF RADIATED PWR TO SCAN (W) *10¹
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
□ = O.U.
× = P.P.
+ = MEAS OUT OF
PLOT LIMITS
- = MEAS LIMIT
NO UPPER LIMIT

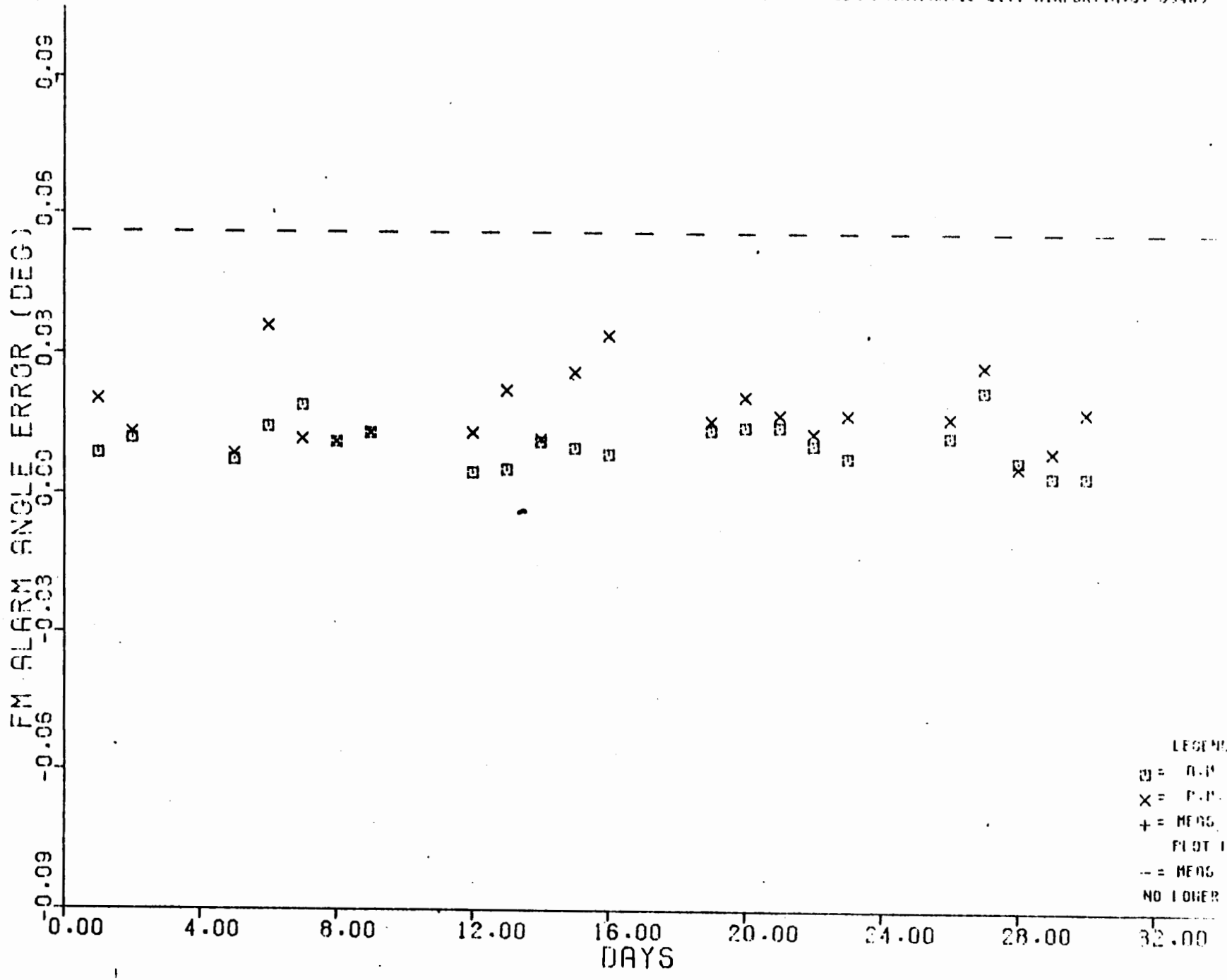
# PHILADELPHIA MLS AZIMUTH MONITOR.APR. 1982.

DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER,ATLANTIC CITY AIRPORT,N.J. 08405



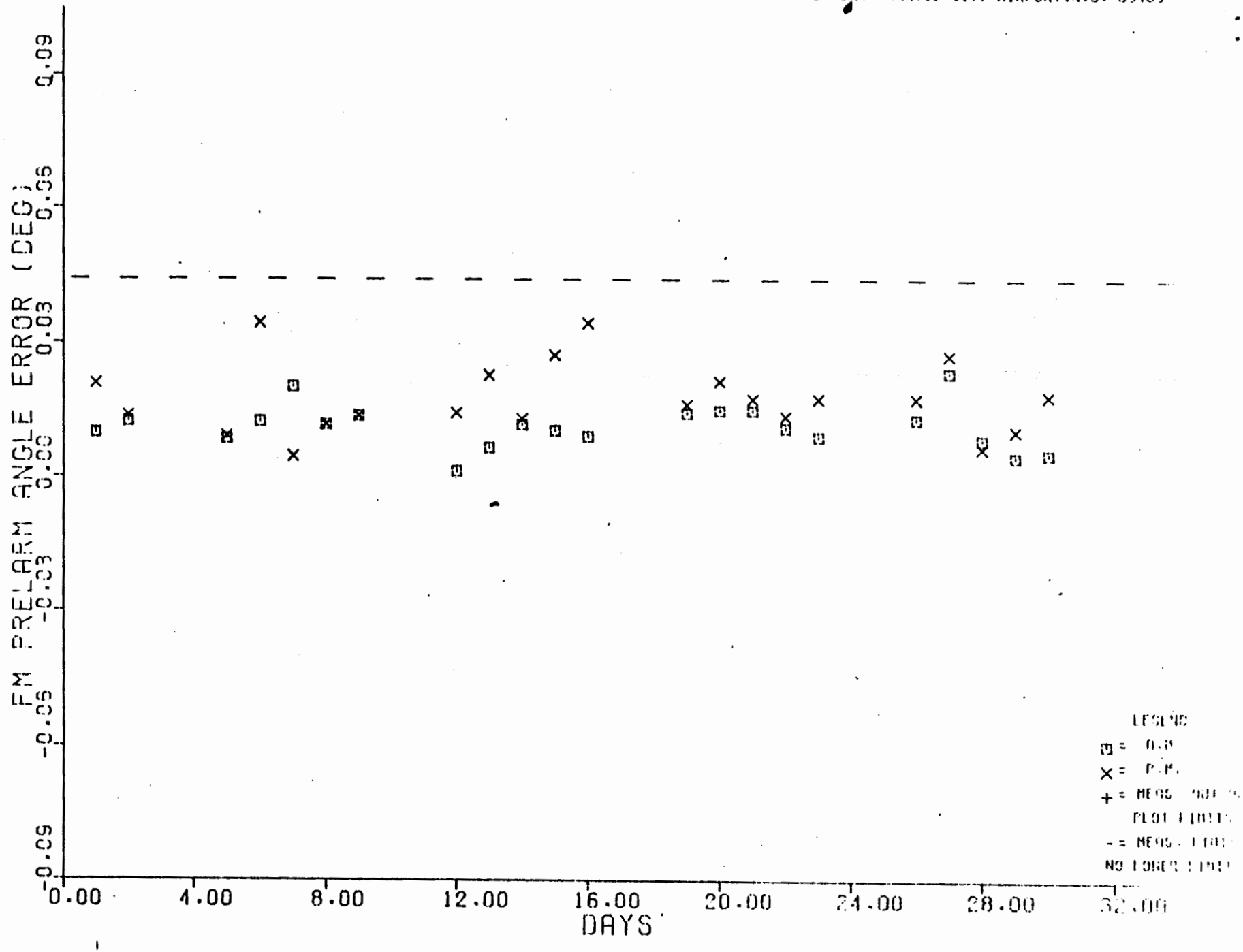
# PHILADELPHIA MLS ELEVATION MONITOR, APR. 1982.

DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405



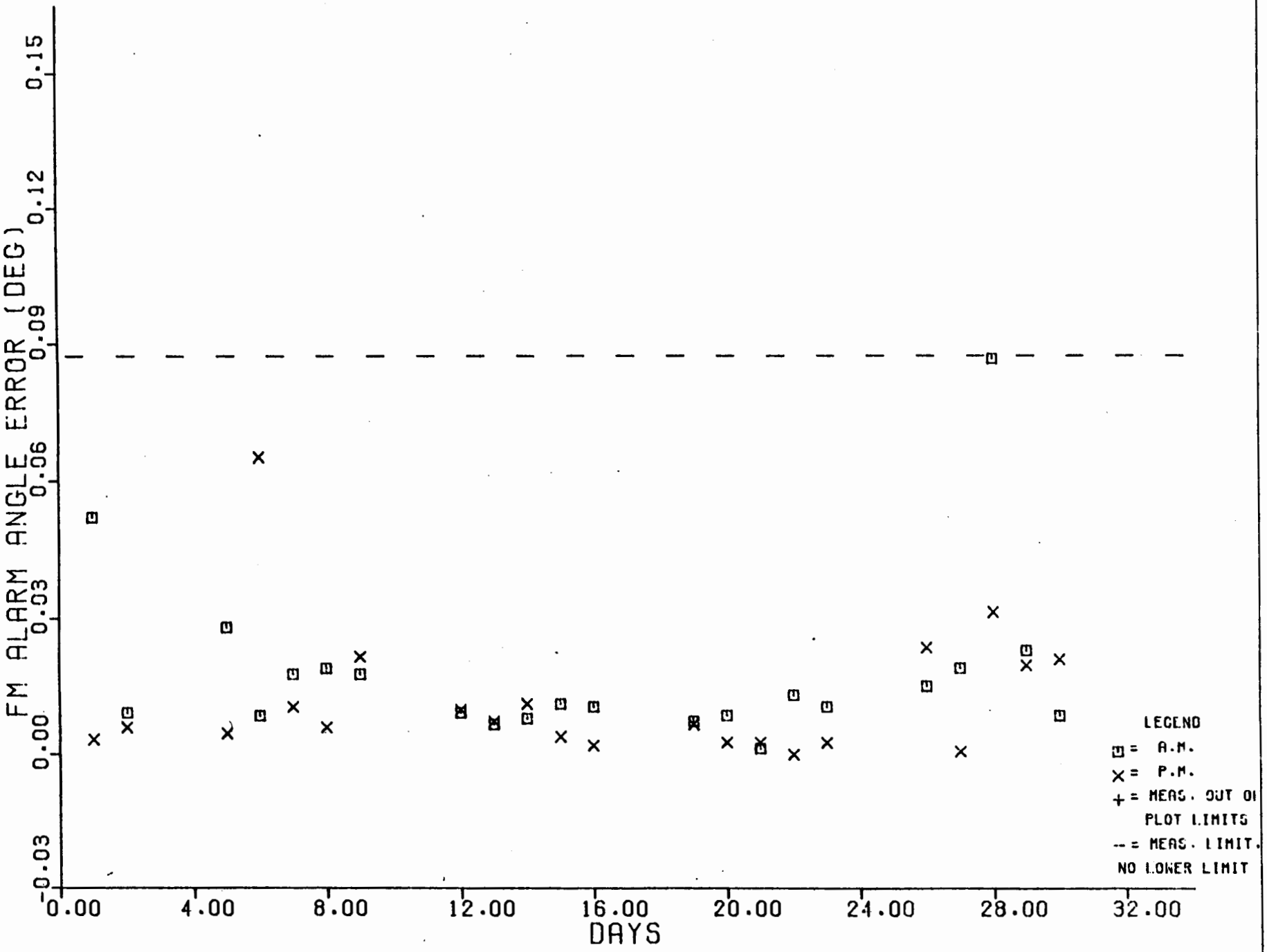
PHILADELPHIA MLS ELEVATION MONITOR, APR. 1982.

DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405



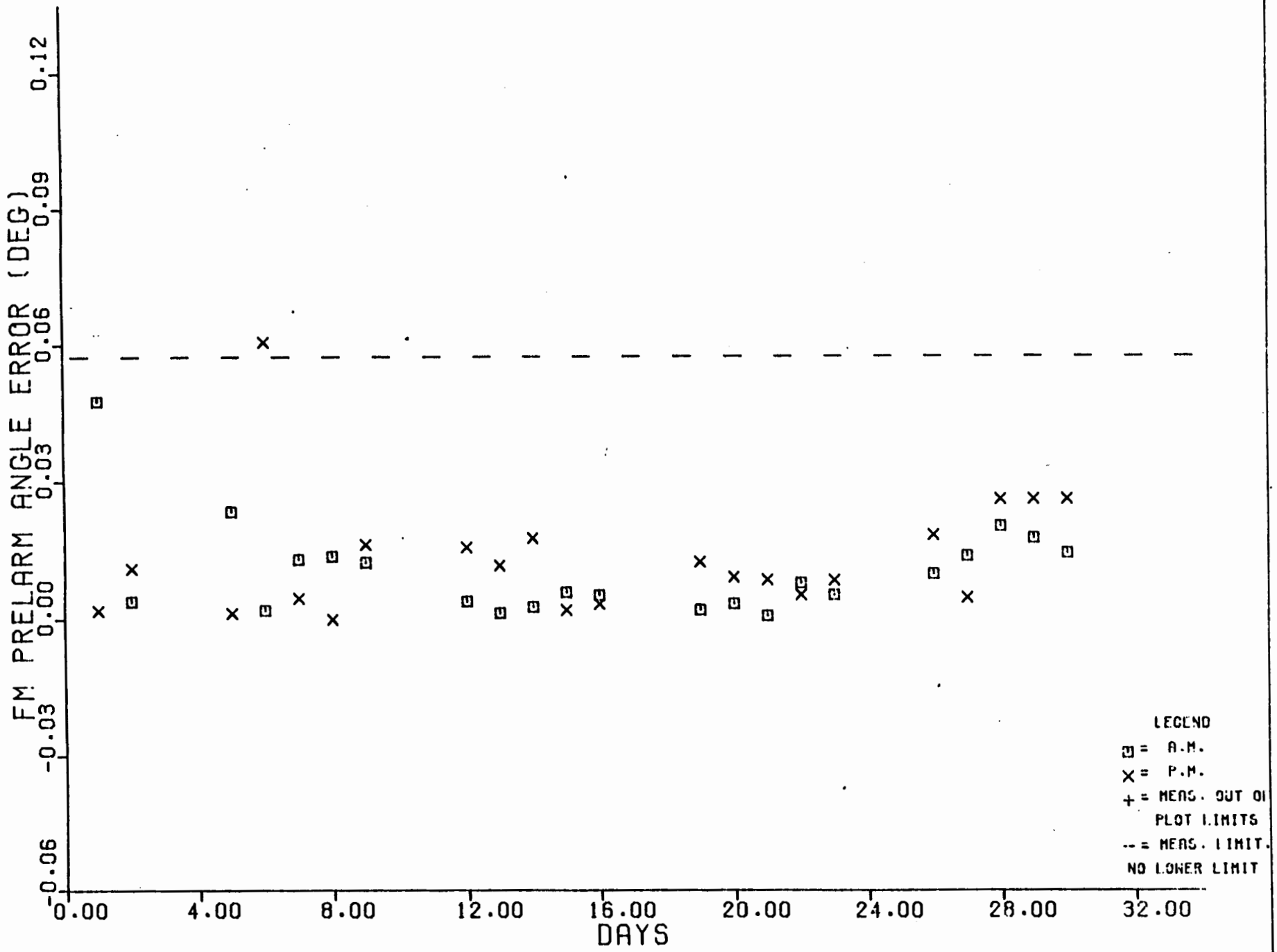
PHILADELPHIA MLS AZIMUTH MONITOR, APR. 1982.

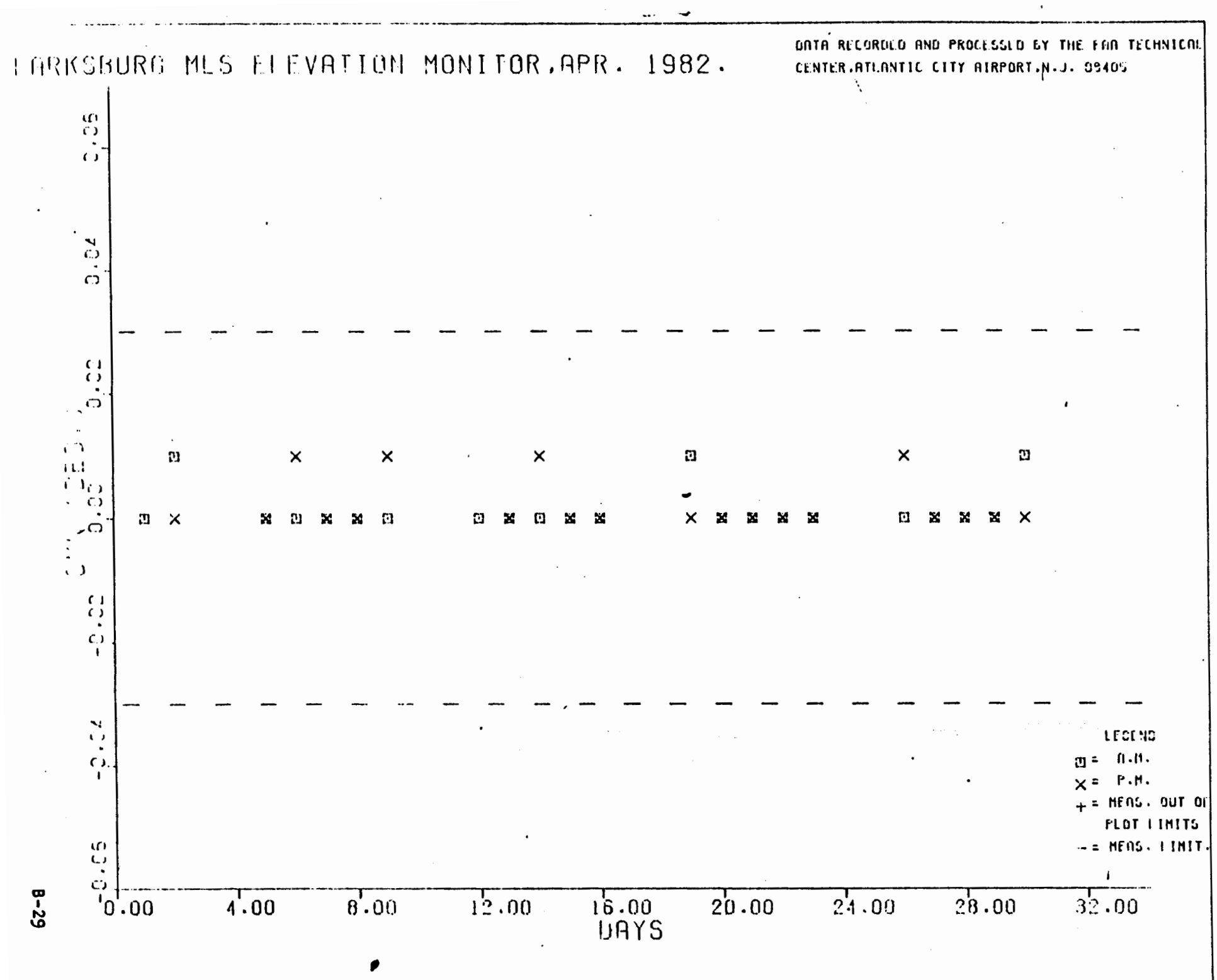
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405

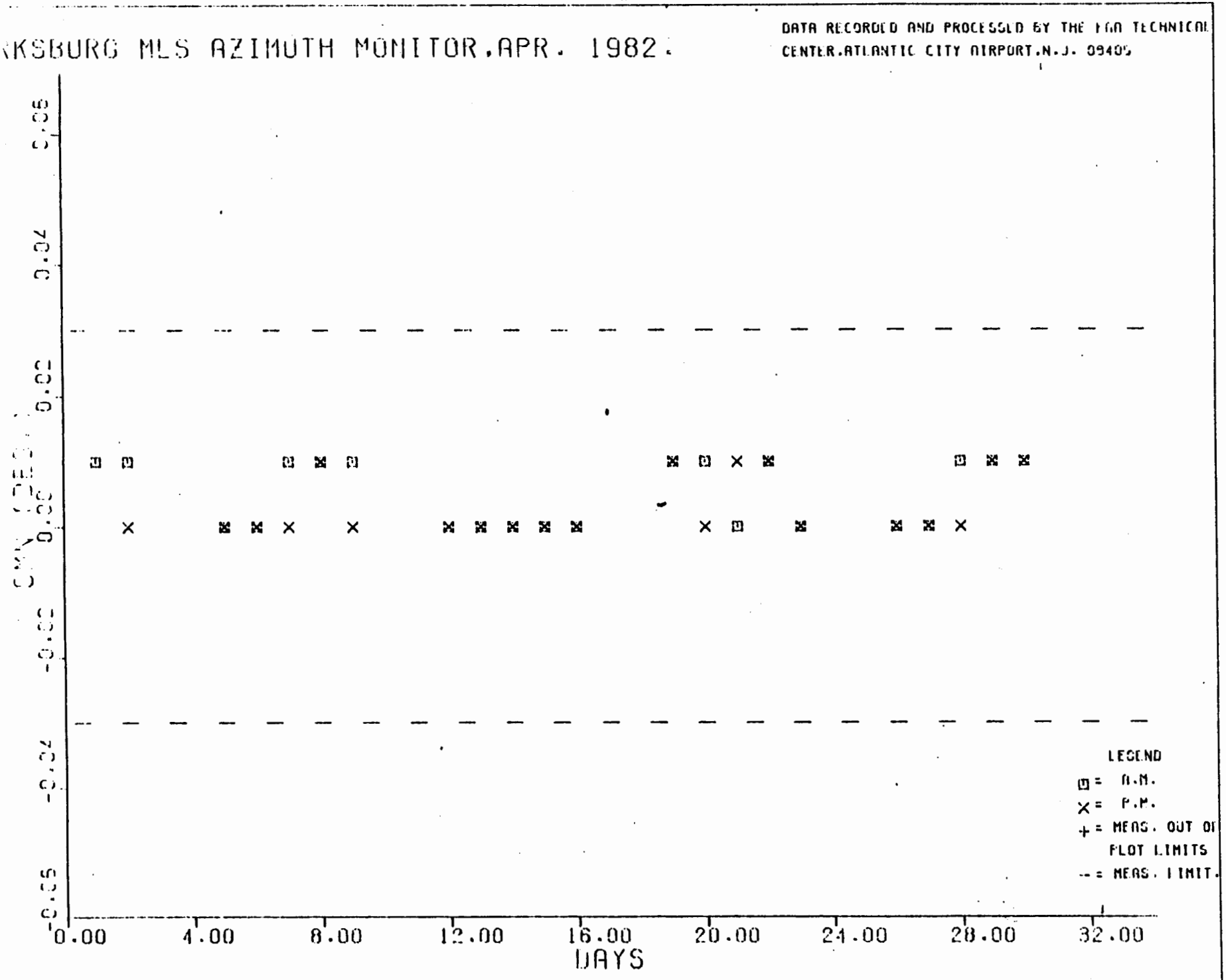


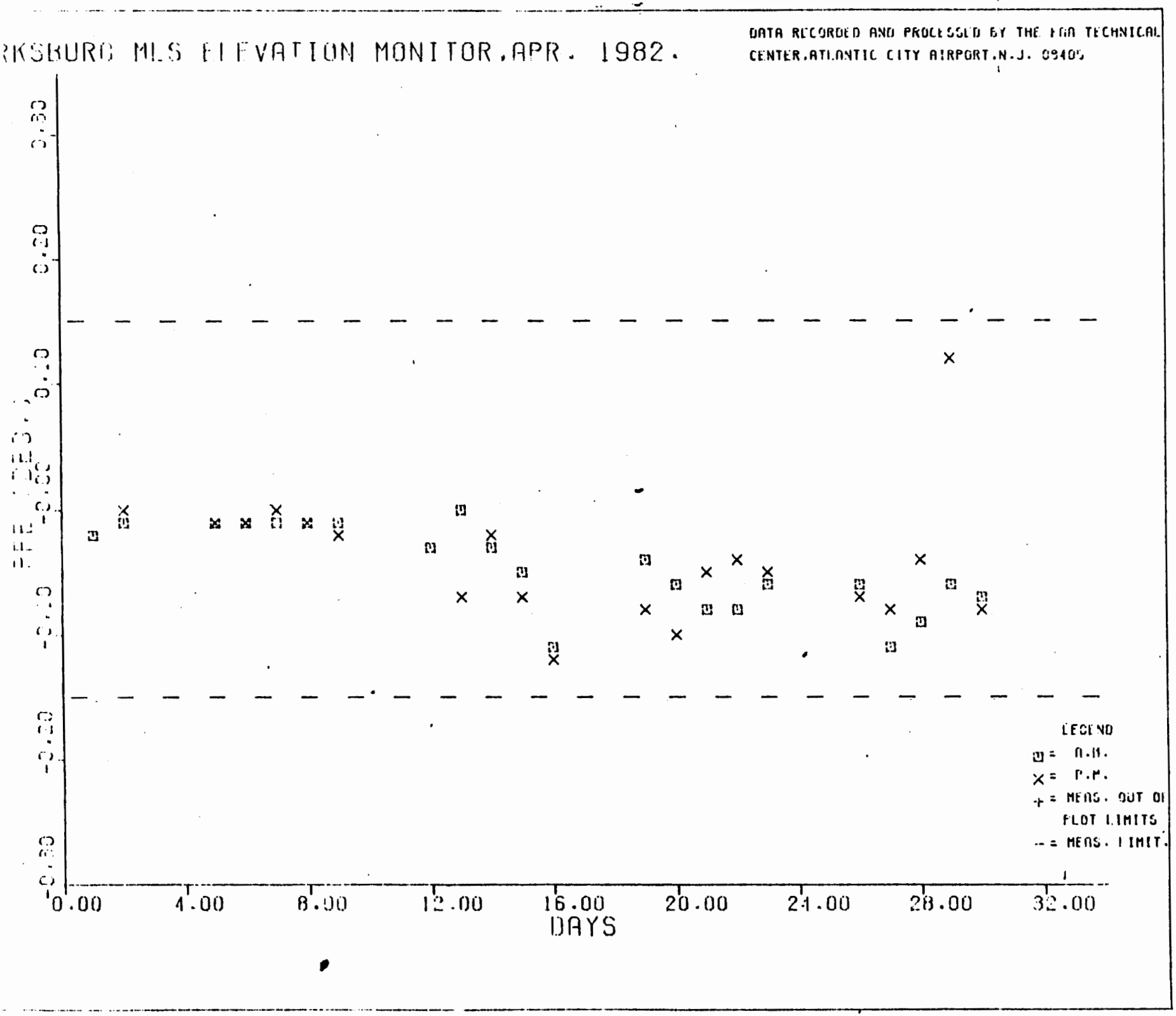
PHILADELPHIA MLS AZIMUTH MONITOR, APR. 1982.

DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405

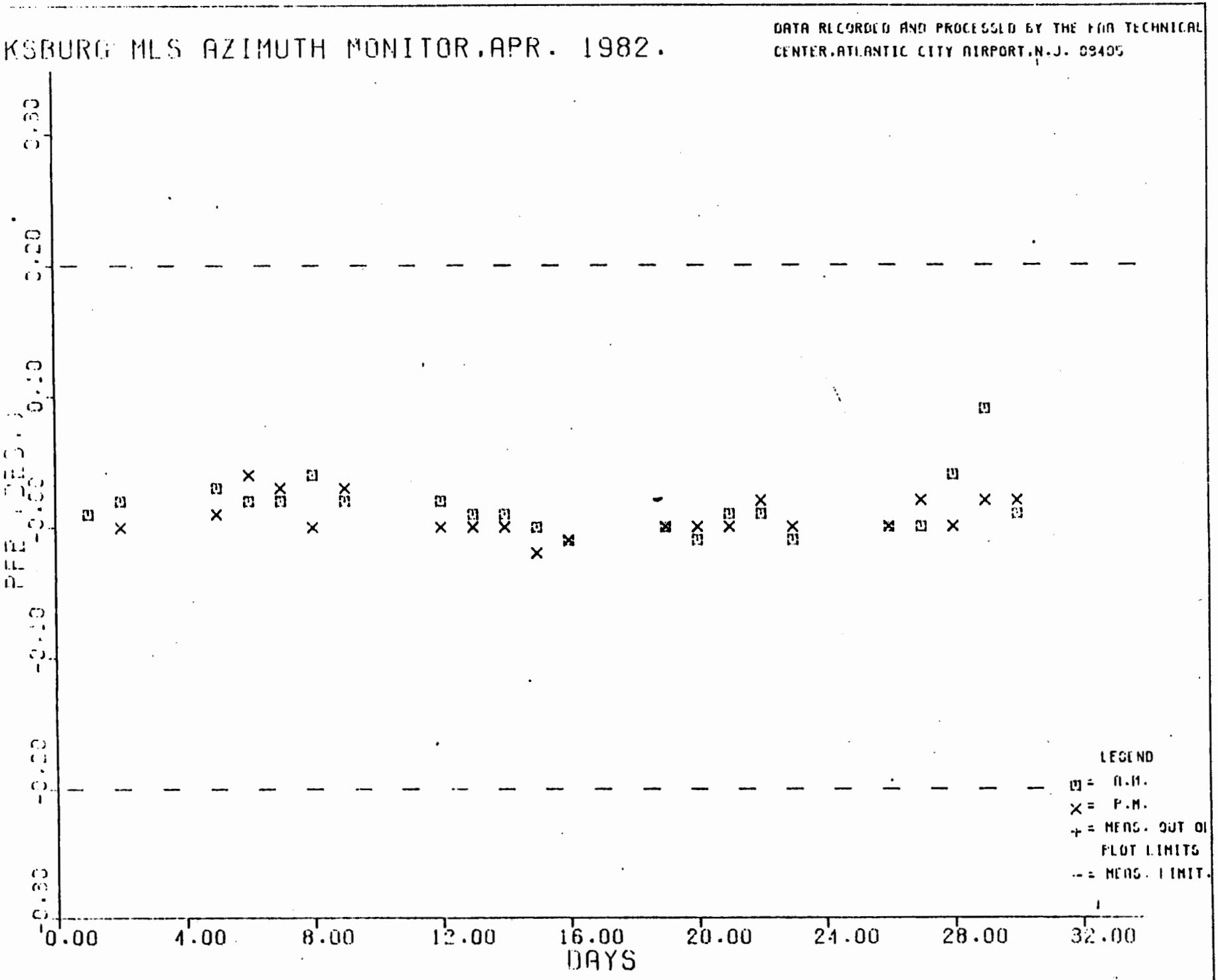



PARKSBURG MLS ELEVATION MONITOR, APR. 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405
0.08
0.04
0.00
-0.04
-0.08
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
□ = A.M.
× = P.M.
+ = MEAS. OUT OF PLOT LIMITS
– = MEAS. LIMIT.


PARKSBURG MLS AZIMUTH MONITOR,APR. 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER,ATLANTIC CITY AIRPORT,N.J. 08405
0.08
0.04
0.00
-0.04
-0.08
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
□ = A.M.
× = P.M.
+ = MEAS. OUT OF PLOT LIMITS
-- = MEAS. LIMIT.

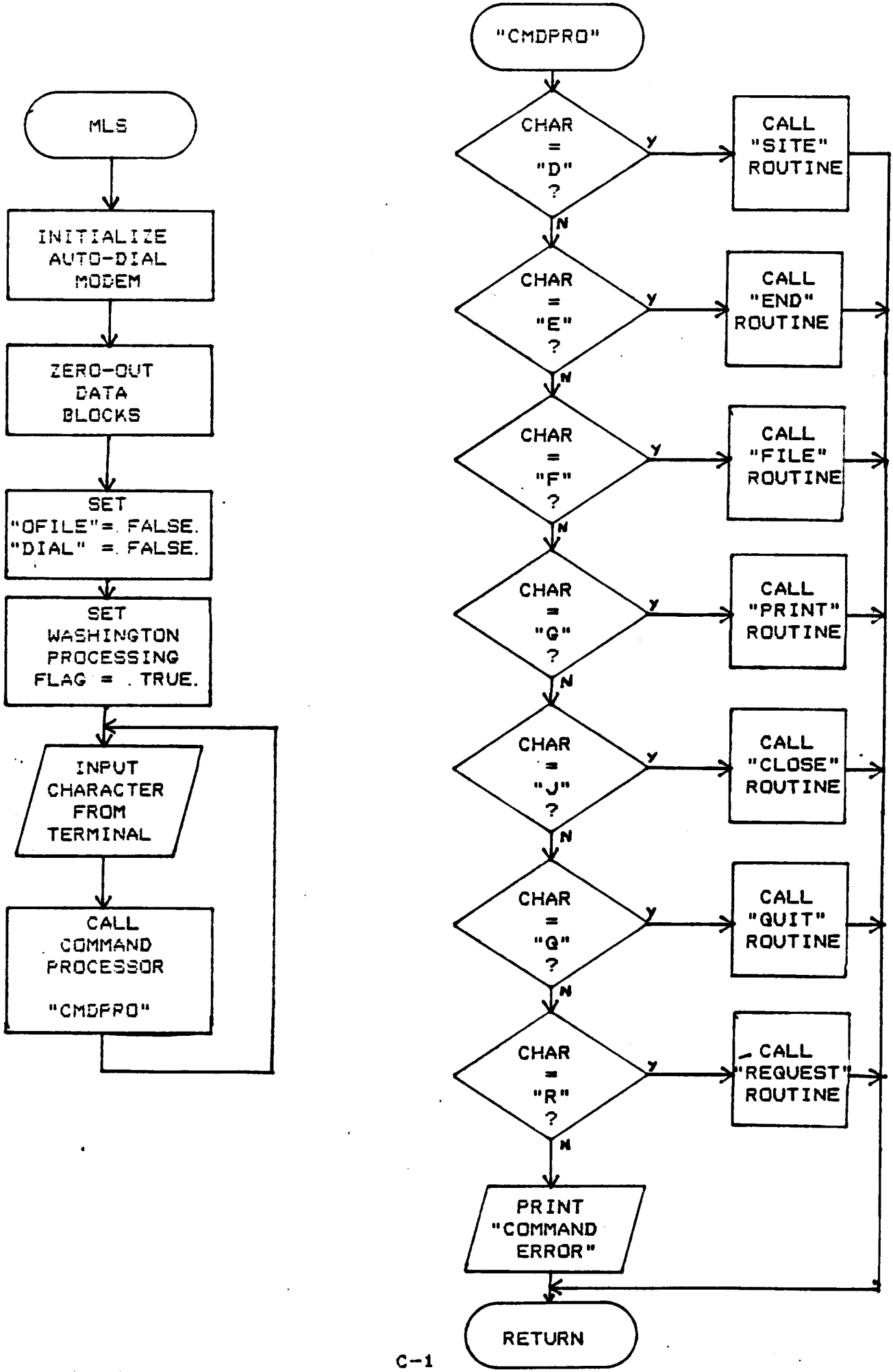


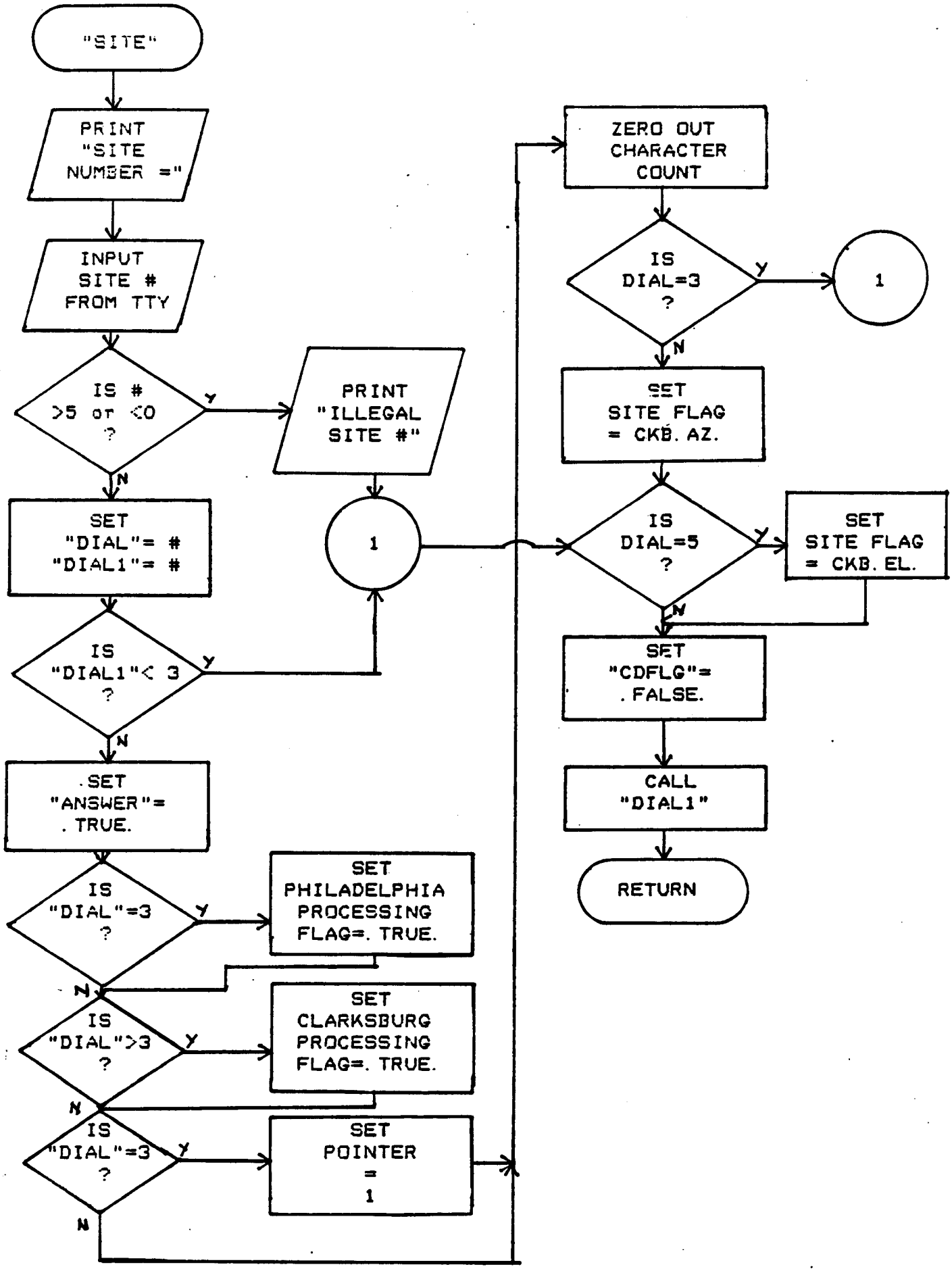

# ...ORKSBURG MLS ELEVATION MONITOR,APR. 1982.

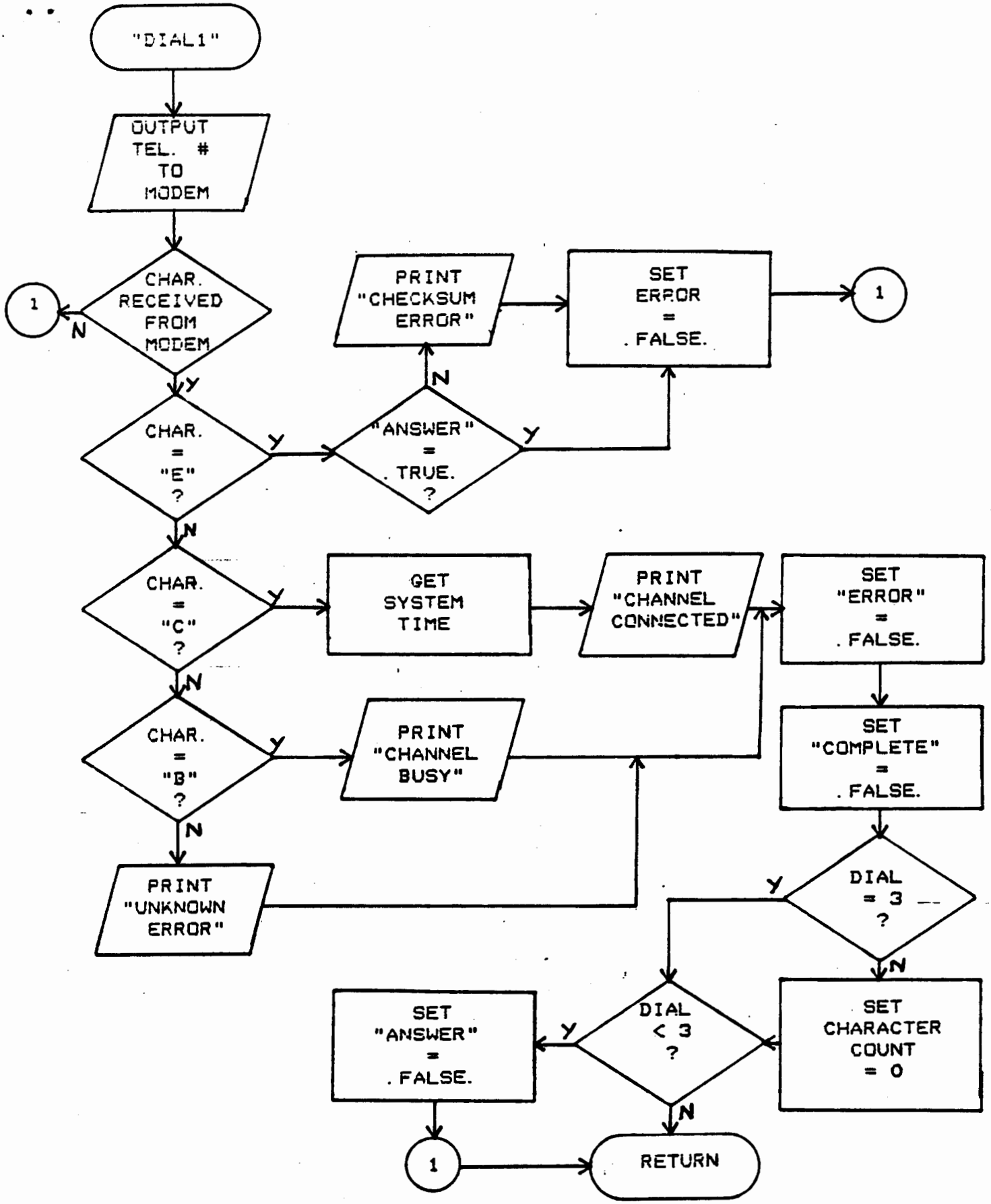

CLARKSBURG MLS AZIMUTH MONITOR, APR. 1982.
DATA RECORDED AND PROCESSED BY THE FAA TECHNICAL CENTER, ATLANTIC CITY AIRPORT, N.J. 08405
DEV. FROM COURSE, DEG.
0.30
0.20
0.10
-0.00
-0.10
-0.20
-0.30
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
DAYS
LEGEND
□ = A.M.
× = P.M.
+ = MEAS. OUT OF PLOT LIMITS
-- = MEAS. LIMIT.

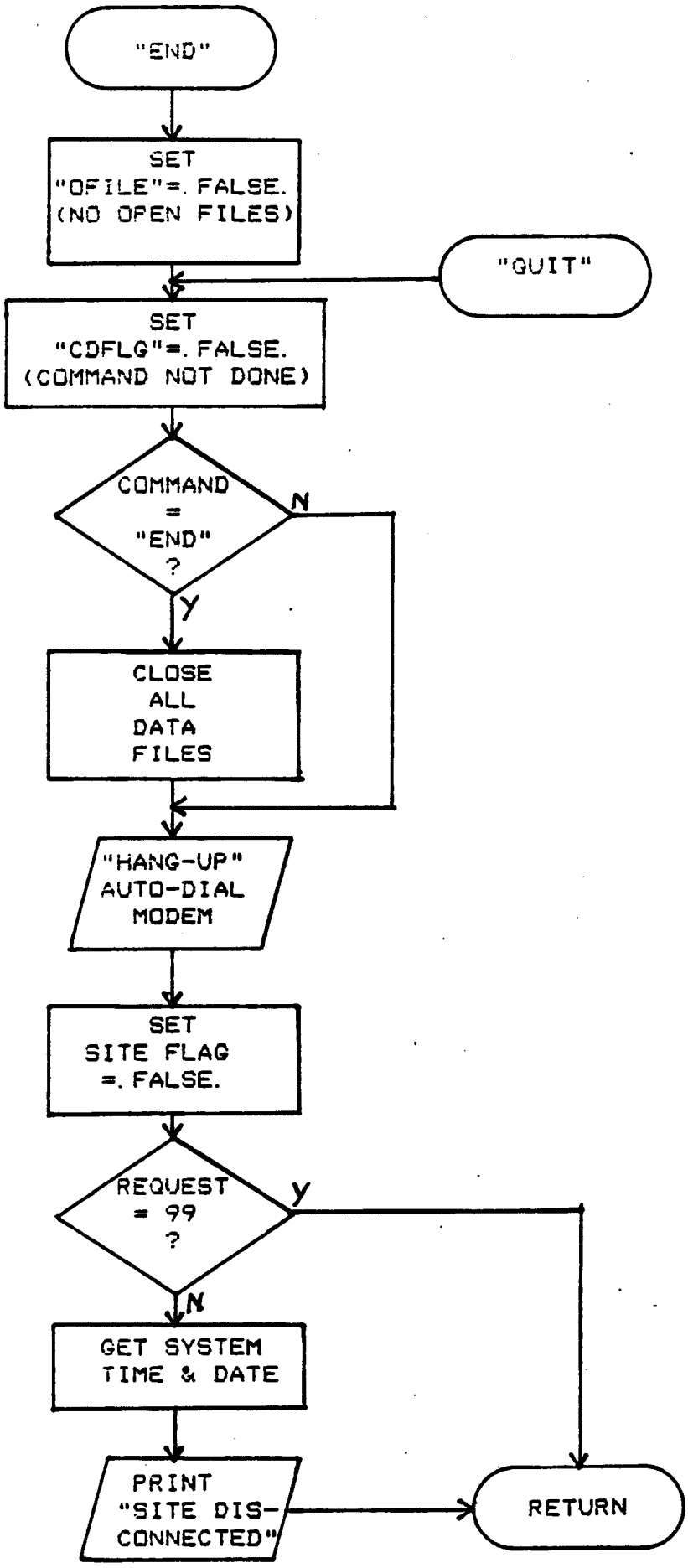
## APPENDIX I

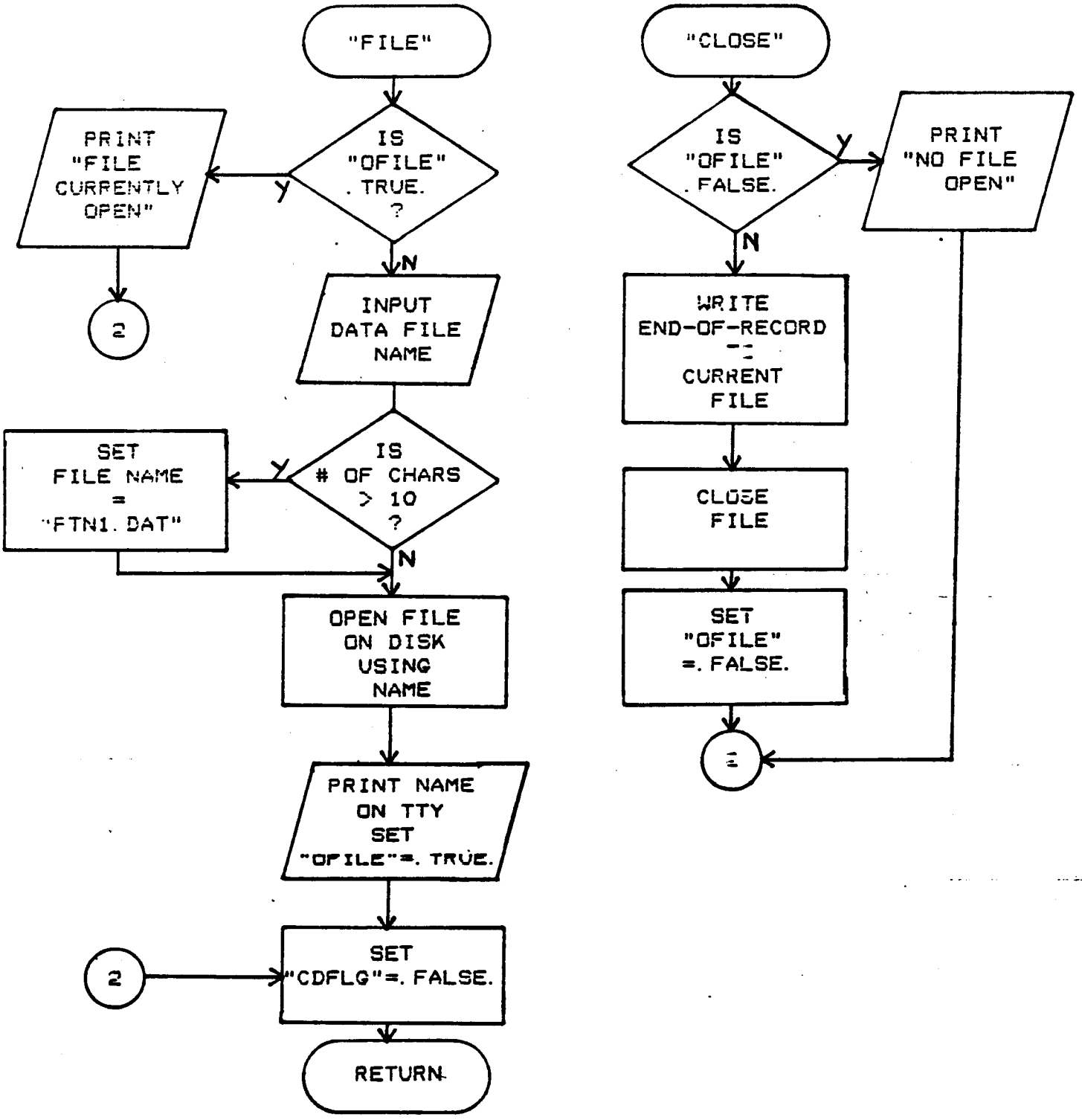
This appendix contains the flow charts of the data collection system software. The title of the program is "MLS".

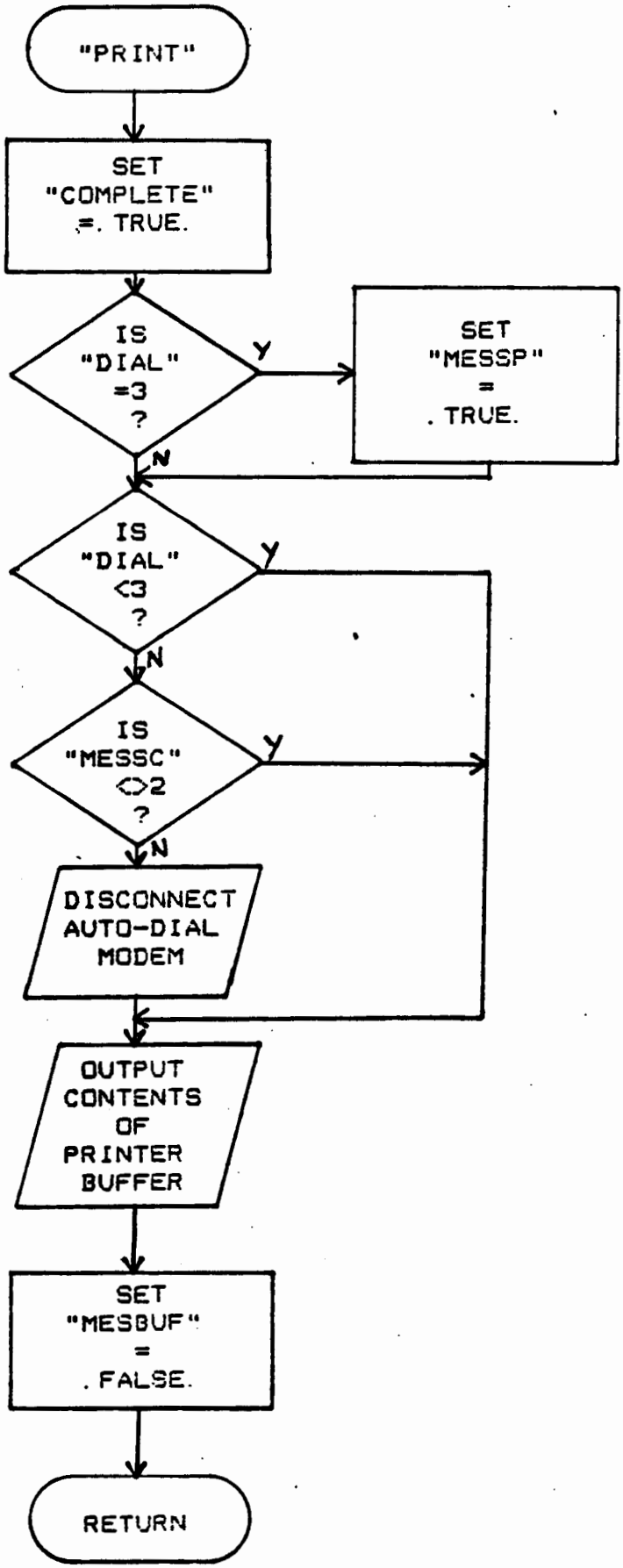

MLS
INITIALIZE AUTO-DIAL MODEM
ZERO-OUT DATA BLOCKS
SET "OFILE" = .FALSE. "DIAL" = .FALSE.
SET WASHINGTON PROCESSING FLAG = .TRUE.
INPUT CHARACTER FROM TERMINAL
CALL COMMAND PROCESSOR "CMDPRO"
"CMDPRO"
CHAR = "D" ?
Y
CALL "SITE" ROUTINE
N
CHAR = "E" ?
Y
CALL "END" ROUTINE
N
CHAR = "F" ?
Y
CALL "FILE" ROUTINE
N
CHAR = "G" ?
Y
CALL "PRINT" ROUTINE
N
CHAR = "J" ?
Y
CALL "CLOSE" ROUTINE
N
CHAR = "Q" ?
Y
CALL "QUIT" ROUTINE
N
CHAR = "R" ?
Y
CALL "REQUEST" ROUTINE
N
PRINT "COMMAND ERROR"
RETURN

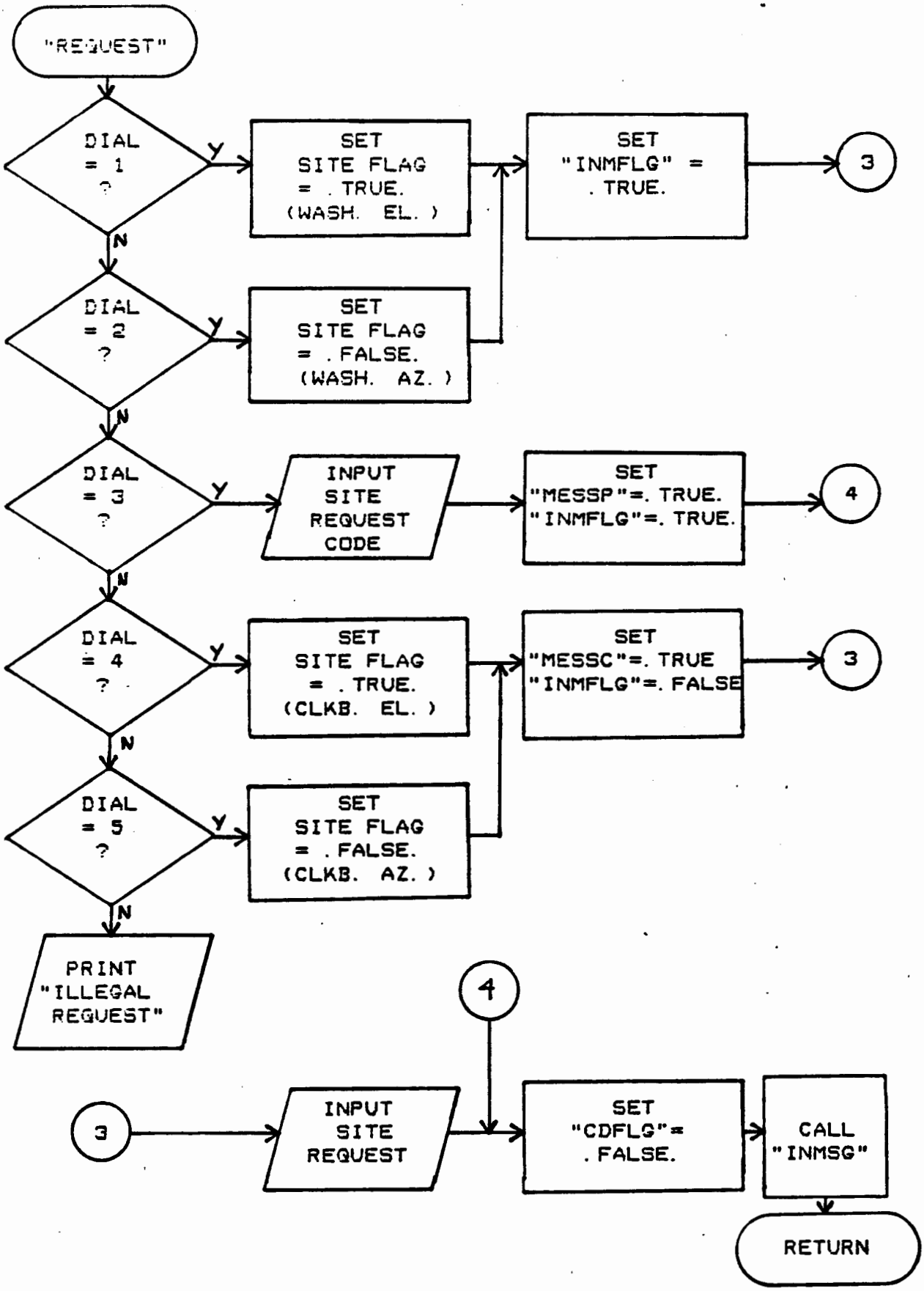

"SITE"
PRINT "SITE NUMBER ="
INPUT SITE # FROM TTY
IS # >5 or <0 ?
Y
PRINT "ILLEGAL SITE #"
N
SET "DIAL"= # "DIAL1"= #
1
IS "DIAL1"< 3 ?
Y
N
SET "ANSWER"= . TRUE.
IS "DIAL"=3 ?
Y
SET PHILADELPHIA PROCESSING FLAG=. TRUE.
N
IS "DIAL">3 ?
Y
SET CLARKSBURG PROCESSING FLAG=. TRUE.
N
IS "DIAL"=3 ?
Y
SET POINTER = 1
N
ZERO OUT CHARACTER COUNT
IS DIAL=3 ?
Y
1
N
SET SITE FLAG = CKB. AZ.
IS DIAL=5 ?
Y
SET SITE FLAG = CKB. EL.
N
SET "CDFLG"= . FALSE.
CALL "DIAL1"
RETURN

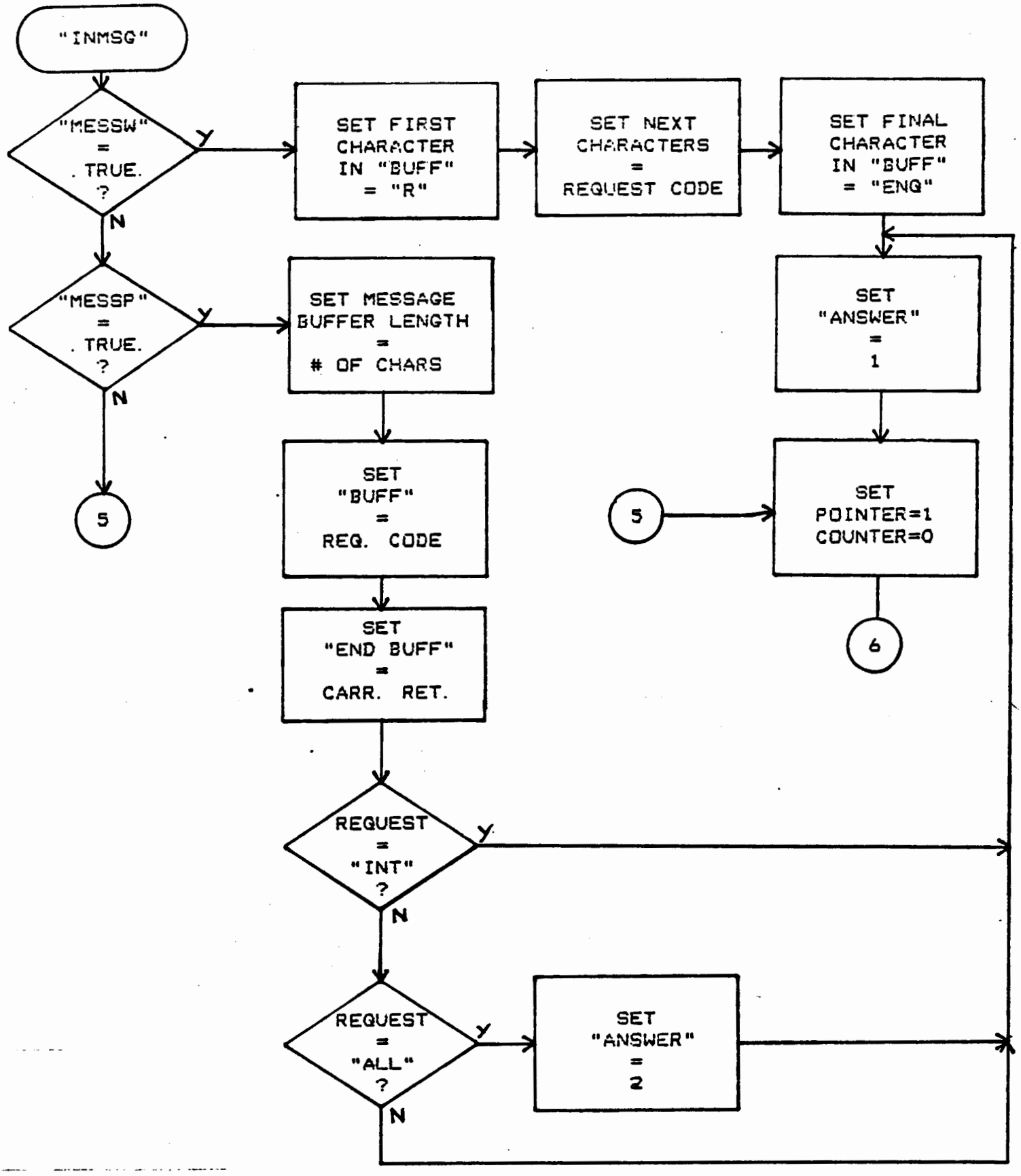

"DIAL1"
OUTPUT TEL. # TO MODEM
CHAR. RECEIVED FROM MODEM
N
1
Y
CHAR. = "E" ?
Y
"ANSWER" = .TRUE. ?
Y
N
PRINT "CHECKSUM ERROR"
SET ERROR = .FALSE.
1
N
CHAR. = "C" ?
Y
GET SYSTEM TIME
PRINT "CHANNEL CONNECTED"
SET "ERROR" = .FALSE.
N
CHAR. = "B" ?
Y
PRINT "CHANNEL BUSY"
SET "COMPLETE" = .FALSE.
N
PRINT "UNKNOWN ERROR"
DIAL = 3 ?
Y
N
SET "ANSWER" = .FALSE.
DIAL < 3 ?
Y
SET CHARACTER COUNT = 0
N
1
RETURN


"END"
SET
"OFILE"=. FALSE.
(NO OPEN FILES)
"QUIT"
SET
"CDFLG"=. FALSE.
(COMMAND NOT DONE)
COMMAND
=
"END"
?
N
Y
CLOSE
ALL
DATA
FILES
"HANG-UP"
AUTO-DIAL
MODEM
SET
SITE FLAG
=. FALSE.
REQUEST
= 99
?
Y
N
GET SYSTEM
TIME & DATE
PRINT
"SITE DIS-
CONNECTED"
RETURN


"FILE"
IS "OFILE" . TRUE. ?
Y
PRINT "FILE CURRENTLY OPEN"
2
N
INPUT DATA FILE NAME
IS # OF CHARS > 10 ?
Y
SET FILE NAME = "FTN1. DAT"
N
OPEN FILE ON DISK USING NAME
PRINT NAME ON TTY SET "OFILE"=. TRUE.
2
SET "CDFLG"=. FALSE.
RETURN
"CLOSE"
IS "OFILE" . FALSE.
Y
PRINT "NO FILE OPEN"
N
WRITE END-OF-RECORD -- CURRENT FILE
CLOSE FILE
SET "OFILE" =. FALSE.
2


"PRINT"
SET "COMPLETE" =. TRUE.
IS "DIAL" =3 ?
Y
SET "MESSP" = . TRUE.
N
IS "DIAL" <3 ?
Y
N
IS "MESSC" <>2 ?
Y
N
DISCONNECT AUTO-DIAL MODEM
OUTPUT CONTENTS OF PRINTER BUFFER
SET "MESBUF" = . FALSE.
RETURN


"REQUEST"
DIAL = 1 ?
Y
SET SITE FLAG = .TRUE. (WASH. EL.)
SET "INMFLG" = .TRUE.
3
N
DIAL = 2 ?
Y
SET SITE FLAG = .FALSE. (WASH. AZ.)
N
DIAL = 3 ?
Y
INPUT SITE REQUEST CODE
SET "MESSP"=.TRUE. "INMFLG"=.TRUE.
4
N
DIAL = 4 ?
Y
SET SITE FLAG = .TRUE. (CLKB. EL.)
SET "MESSC"=.TRUE "INMFLG"=.FALSE
3
N
DIAL = 5 ?
Y
SET SITE FLAG = .FALSE. (CLKB. AZ.)
N
PRINT "ILLEGAL REQUEST"
4
3
INPUT SITE REQUEST
SET "CDFLG"= .FALSE.
CALL "INMSG"
RETURN


"INMSG"
"MESSW" = .TRUE. ?
Y
N
SET FIRST CHARACTER IN "BUFF" = "R"
SET NEXT CHARACTERS = REQUEST CODE
SET FINAL CHARACTER IN "BUFF" = "ENQ"
"MESSP" = .TRUE. ?
Y
N
SET MESSAGE BUFFER LENGTH = # OF CHARS
SET "ANSWER" = 1
5
SET "BUFF" = REQ. CODE
5
SET POINTER=1 COUNTER=0
SET "END BUFF" = CARR. RET.
6
REQUEST = "INT" ?
Y
N
REQUEST = "ALL" ?
Y
N
SET "ANSWER" = 2