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**Meteorological, Radiological
& Plant Data Acquisition System**

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Effective Date: December 19, 2006

This procedure excluded from further LI-100 reviews.

IP-EP-510(MRP-DAS)R4.doc

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 FOIA/PA 2011-0181

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Meteorological, Radiological & Plant Data Acquisition System

1.0 PURPOSE

1.1 This procedure describes the methods available to obtain meteorological, Reuter Stokes and selected plant parameter data in the Central Control Rooms (CRs), the Emergency Operating Facility (EOF) and/or the Alternate Emergency Operating Facility (AEOF).

2.0 REFERENCES

NONE

3.0 DEFINITIONS

Meteorological, Radiological & Plant Data Acquisition System (MRP.DAS) – system that provides meteorological, radiological and certain plant parameter data i.e.: R-27, R-25/26, VC Pressure and VC Temperature.

4.0 RESPONSIBILITIES

The Unit 2 Control Room (CR) Operators, the Unit 3 Chemistry Technicians and the MRP-DAS Operators are responsible for the implementation of this procedure.

5.0 DETAILS

5.1 Obtaining Meteorological Data:


5.1.1 Primary Methods:

5.1.1.1 Control Room (CR):

- a. USE the meteorological display panel 10-m elevation to obtain wind speed, wind direction and Pasquill Category.

5.1.1.2 Emergency Operations Facility (EOF):

- a. USE the meteorological display panel 10-m elevation to obtain wind speed, wind direction and Pasquill Category.

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5.1.1.3 Alternate Emergency Operations Facility (AEOF):

- a. USE the meteorological data obtained via a personal computer.

5.1.2 Back-up methods:


5.1.2.1 CALL Unit 2 or 3 CR identify yourself and ask for the 10m elevation wind speed, wind direction and Pasquill Category.

5.1.2.2 OBTAIN data from MRP-DAS using a personal computer (Attachment 9.1):

NOTE:

For Unit 3 CR, go to the EPlan folder to access MRP-DAS

- a. Double-click the "**MRP-DAS LIVE DATA Graphics**" shortcut for the "C:\Mrp-das\Graphics" window.
- b. Double-click the "mrp-das.piw" icon for the "PI-ProcessBook -mrp-das.piw [Read Only]" window.
- c. Click the "MRP-DAS" tab for the available selections.
- d. Click; i.e., select one of the following:
 1. "Daily Summary Report"
 2. "Meteorological Data Summary Report"
6 Hour Forecast"
 3. Last 3 hrs and 3hr forecast"
- e. Double click the highlighted selection for the data report.
- f. Read the reports from the display; OR Print the report. Click the "Print" [printer] button on the toolbar at the top of the report window. Click the "**OK**" button on the "Print" window.
- g. Click the "close *window*" button to return to the "MRP-DAS" tab.

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NOTE:

A PI Process Book window may appear with the question "Save changes to ...". Answer by clicking "NO".

- h. Repeat by highlighting other selections as required.
- i. Click the "close *window*" button for all the open windows to return to the desktop.

5.1.2.3 OBTAIN Primary Tower data (Attachments 9.2 or 9.3):


- a. Ensure the personal computer is turned on.

NOTE:

Where applicable, log on using your Network Login name and password. If already logged into a different computer may receive a message stating you do not have authority for dual access, please close this message. The computer will re-boot which takes approximately 2 minutes.

- b. On the main screen double click on "Primary Tower.ht."
- c. The "Connect" box will appear. Check that the phone number is displayed. If not; click on Modify button and enter the number.
- d. Use the default "Your location."
- e. Click on "Dial." The terminal screen will indicate a status of "Connecting", then "Dialing".
- f. Following "login", for the Unit 2 report enter "unit2", for the Unit 3 report enter "ccreof" and hit Return.

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- g. The screen will display the last six sets of meteorological data, including Wind Speed, Pasquill Category, Wind Direction and Temperature ("ccreof" only).
- h. Print the report. Highlight the text of the report. Right-click within the highlighted portion of the report select "Selection" and click "Print".
- i. At the prompt, "Would you like to run this report again, enter "Y" to do so or "Return" to disconnect.
- j. To Exit, click on the X in the top right corner.

5.1.2.4 Obtain Unit 2 Primary Data Logger data (Attachment 9.4)

CAUTION:

Except for testing, connect a remote terminal to this data logger only when all other sources of Primary Tower data are inaccessible. The MRP-DAS is deprived of data for the duration of the connection.

- a. Ensure the personal computer is turned on.

NOTE:

Where applicable, log on using your Network Login name and password. If already logged into a different computer you may receive a message stating you do not have authority for dual access, please close this message. The computer will re-boot which takes approximately 2 minutes.




- b. On the main screen double click on ...U2 Pri Data Log...
- c. The "Connect" box will appear. Check if the phone number (b)(7)(F) is displayed. If not, click on Modify button and enter the number.
- d. Use the default "Your location:"
- e. Click on "Dial." The terminal screen will indicate a status of "Connecting", then "Dialing".

NOTE:

The connection to the data logger is complete; i.e., ready for command, and the modem pointer is set to the most recent output array (25 data point storage locations each) or 15-minute period at the first asterisk "***".

- f. Push "**ENTER**" as necessary to display the first asterisk.
- g. Type "[no.] **B**" **AND** push "**ENTER**". Type "[no.]" as the number of 15-minute periods back the modem pointer is set and the report will begin.
- h. Type "[no.] **D**" **AND** push "**ENTER**". Type "[no.]" as the number of 15-minute periods forward from where the modem pointer is set to where the report will end and the pointer reset.
- i. Click the "**Disconnect**" button on the active window toolbar.
- j. Read the report from the display; **OR**
- k. Print the report. Highlight the text of the report; i.e., "4B... A1 L+10090. C0833... A1 L+10190. C5531...". Right-click within the highlighted portion of the report. Click "**Print**". Click "**OK**".
- l. Close the window **AND** disconnect. Click the "**close window**" button. Click the "**YES**" button to return to "Hyper Terminal".

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5.1.2.5 OBTAIN data from the Backup Tower (Attachment 9.5):

CAUTION

Except for testing, connect a remote terminal to this data logger only when all other sources of Primary and Backup Tower data are inaccessible. The MRP-DAS is deprived of data for the duration of the connection.


5.1.2.5.1 Ensure the personal computer is turned on.

NOTE:

Where applicable, log on using your Network Login name and password. If already logged into a different computer you may receive a message stating you do not have authority for dual access, please close this message. The computer will re-boot which takes approximately 2 minutes.

1. A "Connect" box will appear. Check the following information:
2. If the phone number (b)(7)(F) is not displayed, then Click on Modify button and enter this number.
3. If you receive: Your Location then use the default location.
4. Click on "Dial". The terminal screen will indicate a status of "Connecting", then "Dialing".
5. When connected, hit Return 4 times; (4 asterisks should appear).
6. Type the number of 15-minute records desired counting back from now followed by B (i.e., 4B). Press Return.
7. Type the number of records desired again followed by D (i.e., 4D). Press Return.

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8. The report will appear on the computer screen as data strings (Attachment 9.4, "Example Backup Tower...").
9. Print the report. Highlight the text of the report. Right-click within the highlighted portion of the report. Click "Print". Click "OK".

5.1.2.6 OBTAIN data from Offsite Agencies

- a. Use the emergency telephone list to locate the offsite agencies phone numbers.
- b. ACCUWEATHER -- use personal computer to log on to offsite agencies web Select ACCUWEATHER: www.accuweather.com and ENTER "Buchanan, NY" OR "10511". Click "My Local Page, Hourly Forecasts".
- c. National Weather Service (NWS) Select National Weather Service: www.nws.noaa.gov and ENTER "Buchanan, NY" for "Local Forecast, City, St". Click "GO".

5.2 Obtaining Reuter Stokes and Selected Plant Parameter Data


- 5.2.1 Double-click the "MRP-DAS LIVE DATA Graphics" shortcut for the "C:\Mrp-das\Graphics" window.
- 5.2.2 Double-click the "mrp-das.piw" icon for the "PI-ProcessBook -mrp-das.piw [Read Only]" window.
- 5.2.3 Click the "MRP-DAS" tab for the available selections.
- 5.2.4 Click; i.e., highlight one of the select
 - 5.2.4.1 To obtain the Reuter Stokes Data, click the 5 mile radius
 - 5.2.4.2 To obtain the Plant Parameter Data, click either the Unit 2 Plant Parameter or Unit3 Plant Parameter Data selection.

6.0 INTERFACES

IP-EP-310, Dose Assessment

7.0 RECORDS

NONE

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8.0 REQUIREMENTS AND COMMITMENT CROSS-REFERENCE

NONE

9.0 ATTACHMENTS

9.1 EXAMPLE: MRP-DAS METEOROLOGICAL DATA REPORT

9.2 EXAMPLE: PRIMARY TOWER METEOROLOGICAL DATA, UNIT 3 REPORT

9.3 EXAMPLE: PRIMARY TOWER METEOROLOGICAL DATA, UNIT 2 REPORT

9.4 EXAMPLE: UNIT 2 PRIMARY DATA LOGGER REPORT

9.5 EXAMPLE: BACKUP TOWER DATA LOGGER REPORT

9.6 PASQUILL CATEGORY vs TEMPERATURE CHANGE at GROUND LEVEL
(60m – 10m)

9.7 Estimation of Pasquill Category

9.8 DISCUSSION



Attachment 9.1

EXAMPLE: MRP-DAS METEOROLOGICAL DATA REPORT

Sheet 1 of 1

NOTE:

All "9s" in a data field indicates the data was not collected.

*** DAILY SUMMARY REPORT ***

*** DATE: 05/29/2002 07:10 ***

TIME *** MET TOWER DATA (M/S, DEG FROM, F) ***
HRMN (EST) SPD10M SPD60M DIR10M DIR60M DT60 DT122 PC

0700 2.2 3.3 2 15 -1.2 -2.1 D

*** UNIT #2 PLANT PARAMETER DATA ***

VC P948A (PSIG)	VC P948B (PSIG)	VC T1203 (F)	VC R-25 (R/HR)	VC R-26 (R/HR)	VENT R-27 (UCI/SEC)
-2	.0	1.02E+02	<=1.00E+00	<=1.00E+00	2.53E+02

*** UNIT #3 PLANT PARAMETER DATA ***

CONT (PSIG)	CONT (F)	DOME (R/HR)	RAD VENT (UCI/SEC)
-.1	94	<=1.0E+00	1.0E+01

*** ATMOSPHERIC DISPERSION ***


SITE BOUNDARY	DIST= .6 MILES XU/Q (1/M2)	2 MILES XU/Q (1/M2)	5 MILES XU/Q (1/M2)	10 MILES XU/Q (1/M2)
	1.0E-04	1.9E-05	5.1E-06	2.1E-06

*** OFFSITE MONITOR DATA ***

MON NO SECTOR	1 N	2 NNE	3 NE	4 ENE	5 E	6 ESE	7 SE	8 SSE
RAD (MR/HR)	3.4E-03	6.9E-03	6.8E-03	7.0E-03	6.3E-03	7.3E-03	7.9E-03	7.4E-03
MON NO SECTOR	9 S	10 SSW	11 SW	12 WSW	13 W	14 WNW	15 NW	16 NNW
RAD (MRHR)	8.5E-03	6.0E-03	5.9E-03	8.5E-03	1.1E-02	6.5E-03	7.0E-03	8.4E-03

*** METEOROLOGICAL FORECAST ***

HOUR	SPEED (MPH)	DIRECTION (FROM)	RAIN	STABILITY
17 0	5.8	130	YES	D
18 0	4.9	50	YES	D
19 0	4.5	30	YES	D
20 0	4.0	0	YES	D
21 0	3.6	350	NO	D
22 0	3.6	340	NO	D

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Attachment 9.2

EXAMPLE: PRIMARY TOWER METEOROLOGICAL DATA, UNIT 3 REPORT

Sheet 1 of 1

Dial: (b)(7)(F)

(You may need to dial "1" or "9" before the telephone number to achieve a connection).

Indian Point Nuclear Station

Meteorological Data System

CCREOF Report

Tue Dec 14 10:47:23 EST 1999

Meteorological data

10 meter Elevation

TIME (EST)	WIND SPEED (MPH)	PAS CAT (FROM)	WIND DIR	TEMP (F)
+915.00	+7.2371	+4.0000	+12.221	+37.497
+930.00	+6.1625	+4.0000	+85909	+37.848
+945.00	+5.4943	+4.0000	+14.319	+38.095
+1000.0	+7.1415	+4.0000	+19.885	+38.751
+1015.0	+6.7935	+4.0000	+23.504	+39.072
+1030.0	+6.3646	+4.0000	+25.942	+39.208

NOTE: Pasquill +1 = A, +2 = B, +3 = C, +4 = D, +5 = E, +6 = F, +7 = G

* mph. x .45 = m/sec

EX 7F

Attachment 9.3

EXAMPLE: PRIMARY TOWER METEOROLOGICAL DATA, UNIT 2 REPORT

Sheet 1 of 1

Dial: (b)(7)(F)

(You may need to dial "1" or "9" before the telephone number to achieve a connection).

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Entergy Northeast
Indian Point Entergy Center
Primary Meteorological Tower Data
Unit 3 Hp-9000, Unit 2 Report

Tue Jul 9 16:03:34 EDT 2002

Meteorological data

TIME (EST)	122mWD (From)	122mWS (m/s)	122mPC (1-7/A-G)	60mWD (From)	60mWS (m/s)	10mWD (From)	10mWS (m/s)	10mPC (1-7/A-G)
1345	96	1.7	4	118	1.8	105	1.2	3
1400	20	1.4	4	38	1.4	35	1.0	4
1415	278	1.3	4	250	1.6	283	1.0	4
1430	245	1.9	4	263	1.8	232	1.2	4
1445	245	2.6	4	273	2.1	254	1.2	4
1500	221	4.2	4	247	3.1	243	1.5	4

NOTE: Pasquill +1 = A, +2 = B, +3 = C, +4 = D, +5 = E, +6 = F, +7 = G

Would you like to run this Again (Y, N) [Default is NO]



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Attachment 9.4

EXAMPLE: UNIT 2 PRIMARY DATA LOGGER REPORT

Sheet 1 of 1

Dial: (b)(7)(F)

NOTES:

- 1) All "9s" in a data field indicates the data was not collected.
- 2) Pasquill category is based on the horizontal wind direction, STANDARD DEVIATION, (Sigma Theta).
- 3) Units of measure for each data logger are not all the same.

*4B

A1 L+2476.0 C0842

*4D


01+0181.	02+2002.	03+113.0	04+1045.	05+238.5	06+09.44	07+351.2	08+13.62
09+355.6	10+24.58	11+08.10	12+07.08	13+3.539	14-1.576	15-1.307	16-1.908
17+07.38	18-5.280	19+1.000	20+3.000	21+5000.	22+0.000	23+0.000	24+0.000
25+0.000							
01+0181.	02+2002.	03+113.0	04+1100.	05+327.2	06+16.91	07+352.0	08+19.33
09+356.0	10+30.31	11+09.44	12+08.08	13+3.819	14-1.724	15-1.363	16-2.172
17+07.77	18-5.011	19+1.000	20+2.000	21+5000.	22+0.000	23+0.000	24+0.000
25+0.000							
01+0181.	02+2002.	03+113.0	04+1115.	05+305.6	06+09.34	07+328.7	08+12.32
09+316.5	10+38.14	11+07.44	12+6.673	13+2.385	14-1.882	15-1.341	16-2.553
17+08.08	18-5.002	19+1.000	20+2.000	21+5000.	22+0.000	23+0.000	24+0.000
25+0.000							
01+0181.	02+2002.	03+113.0	04+1130.	05+330.6	06+10.65	07+354.4	08+16.59
09+354.0	10+24.01	11+07.31	12+6.678	13+3.554	14-1.582	15-1.368	16-1.847
17+07.99	18-5.124	19+2.000	20+3.000	21+5000.	22+0.000	23+0.000	24+0.000
25+0.000							

A1 L+2576.0 C5492

LEGEND:

- 01 OUTPUT ARRAY ID (Data Point ID + Data Point)
- 02 YEAR
- 03 JULIAN DATE
- 04 TIME (EST)
- 05 AVERAGE WIND DIRECTION 122M (Degrees from)
- 06 STANDARD DEVIATION (Sigma Theta) OF WIND DIRECTION 122M (Degrees)
- 07 AVERAGE WIND DIRECTION 60M (Degrees from)
- 08 STANDARD DEVIATION (Sigma Theta) OF WIND DIRECTION 60M (Degrees)
- 09 AVERAGE WIND DIRECTION 10M (Degrees from)
- 10 STANDARD DEVIATION (Sigma Theta) OF WIND DIRECTION 10M (Degrees)
- 11 AVERAGE WIND SPEED 122M (m/sec)
- 12 AVERAGE WIND SPEED 60M (m/sec)
- 13 AVERAGE WIND SPEED 10M (m/sec)
- 14 AVERAGE TEMPERATURE GRADIENT 122-10M (°C/100m)
- 15 AVERAGE TEMPERATURE GRADIENT 122-60M (°C/100m)
- 16 AVERAGE TEMPERATURE GRADIENT 60-10M (°C/100m)
- 17 AVERAGE TEMPERATURE 10M (°C)
- 18 AVERAGE DEW POINT 10M (°C)
- 19 PRECIPITATION (mm)
- 20 PASQUILL CATEGORY (Ground; 1-7 = A-G)
- 21 PASQUILL CATEGORY (Elevated; 1-7 = A-G)

EX 7F

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Attachment 9.5

EXAMPLE: BACKUP TOWER DATA LOGGER REPORT

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(b)(7)(F)

(You may need to dial "1" or "9" before the telephone number to achieve a connection).

*4B

A1 L+3610.0 c0833

*4D

01+0001. 02+1999. 03+348.0 04+1000. 05+19.29 06+28.03 07+2.640 08+1.000

09+0.000

01+0001. 02+1999. 03+348.0 04+1015. 05+21.41 06+23.09 07+2.996 08+1.000

09+0.000

01+0001. 02+1999. 03+348.0 04+1030. 05+28.34 06+23.50 07+2.556 08+1.000

09+0.000


01+0001. 02+1999. 03+348.0 04+1045. 05+26.02 06+17.77 07+3.151 08+2.000

09+0.000

Channel

- 1 = ID
- 2 = Year
- 3 = Julian Date
- 4 = Time (EST) of Data Acquisition
- 5 = Average Wind Direction 10M (Degrees from)
- 6 = Standard Deviation (Sigma Theta) of wind direction 10M (Degrees)
- 7 = Average Wind Speed 10M (m/sec)
- 8 = Pasquill Category 10M (1-7=A-G), i.e.:
 - 1 = Pasquill A
 - 2 = Pasquill B
 - 3 = Pasquill C
 - 4 = Pasquill D
 - 5 = Pasquill E
 - 6 = Pasquill F
 - 7 = Pasquill G
- 9 = Calm Wind Speed Flag 10M (0.000=OK, 4.000=calm)

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Attachment 9.6

PASQUILL CATEGORY

Vs

TEMPERATURE CHANGE at GROUND LEVEL (60m - 10m)

Sheet 1 of 1

PASQUILL CATEGORY	TEMPERATURE CHANGE (°F)
A	<-1.74
B	-1.74 to <-1.56
C	-1.56 to <-1.37
D	-1.37 to <-0.46
E	-0.46 to <+1.37
F	+1.37 to ≤+3.66
G	>+3.66

Attachment 9.7

Estimation of Pasquill Category

Sheet 1 of 1

Use this addendum to determine the Pasquill Category in the absence of both measured vertical temperature differences AND the standard deviation (sigma theta) for horizontal wind direction.


<u>DEFINITION OF PASQUILL STABILITY CATEGORY</u>	
<u>PASQUILL CATEGORY</u>	<u>STABILITY CONDITIONS</u>
A	Extremely unstable
B	Moderately unstable
C	Slightly unstable
D	Neutral
E	Slightly stable
F	Moderately stable
G	Extremely stable

Pasquill category can be estimated by observing or estimating the time of day, solar radiation, cloudiness, and wind speed.

<u>KEY TO STABILITY CATEGORIES</u>					
Surface Wind Speed (m/s)	<u>DAYTIME</u>			<u>NIGHT</u>	
	Incoming Solar Radiation (Insolation)			Cloudiness	
	Clear Sky	Partly Cloudy	Overcast	Thinly Overcast or >4/8 Low Cloud	Clear to Partly Cloudy
<2	A	A-B	B	E-F	G
2-3	A-B	B	C	E	F
4-5	B	B-C	C	D	E
5-6	C	C-D	D	D	D
>6	C	D	D	D	D

General Definitions

- Daytime is considered as one hour after sunrise to one hour before sunset.
- Clear sky - less than 20 percent cloud cover.
 - Partly cloudy - 20 to 80 percent cloud cover.
 - Overcast - 80 to 100 percent cloud cover.

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Attachment 9.8


DISCUSSION

Sheet 1 of 2

1. Meteorological data (i.e. wind speed, wind direction AND Pasquill category) are normally available from the following sources:
 - a. Primary Meteorological (Met) Tower Sensors
 - b. Backup Met Tower Sensors
 - c. Backup (Standby) Met Tower Sensors
 - d. Weather Service Contractor
 - e. National Weather Service
 - f. Local Observations

Two data loggers, one for Unit 2 and one for Unit 3, in the Shelter at the base of the Primary Met Tower, process and record data from the sensors. The Unit-2 data logger displays data on a Met Display Panel in the Shelter and distributes its data over telephone lines to the Meteorological, Radiological and Plant Parameter Data Acquisition System (MRP-DAS) computer in the EOF and the Met Display Panels in the Unit 2 CCR and EOF. The Unit-3 data logger data can be displayed on a desktop computer in the Shelter and is distributed to an HP-9000 at Unit-3. As a last resort, should all other sources of Primary Tower data fail, data from both these data loggers is available to a remote terminal by telephone line.

2. A data logger in the enclosure at the base of the Backup Tower processes and records data from the sensors and forwards it over a telephone line to a data logger in the EOF. The data logger in the EOF processes data from the Backup (Standby) Tower, records data from both backup towers, and forwards the data to the MRP-DAS computer and the Video Graphic recorder in the EOF. Backup Tower data is forwarded when it is available and Standby Backup Tower data forwarded when it is not. As a last resort, when all other sources of Backup Tower data are unavailable, data from the data logger at the Backup Tower and the EOF may be available to a remote terminal by telephone line.
3. Forecast wind speed, wind direction, Pasquill category and precipitation data for the site is provided under contract to MRP-DAS. This data is also available via facsimile or voice telephone on request.
4. Data displayed on the Met Display Panel in the Unit 2 CCR is also available from the printer at the back of the Panel. The MRP-DAS computer records and distributes data from the primary data logger to the Met Display Panel in the U3 CCR, the PI-Client terminal in the EOF, and the PI-Client terminals in State and Local Government Emergency Operation Centers. MRP-DAS will substitute backup data for lost primary data normally available to the PI-Client terminals.

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Attachment 9.8

DISCUSSION

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5. MRP-DAS data is available using the "ProcessBook" graphics Meteorological Data Summary and Daily Summary Report at the PI-Client terminal in the EOF and by ~~telephone line to other PI-Client terminals.~~
6. HP-9000 data is available by telephone at remote terminals including those at the AEOF, Unit 2 CCR and EOF.
7. In addition to data provided directly to MRP-DAS, the contractor also provides meteorological data in a report exclusively for the site. This report is available by telephone at remote terminals and includes:
 - a. Meteorological data from National Weather Service (NWS) stations, within fifty miles of Indian Point.
 - b. Surface weather, upper air data AND forecasts for the Indian Point Emergency Planning Zone.
8. Meteorological data is also available from National Weather Service and contractor representatives by telephone voice communication on request.
9. Data is also determined by local weather observations including those in Attachment 9.6 for the Pasquill Category.