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the southern electric system

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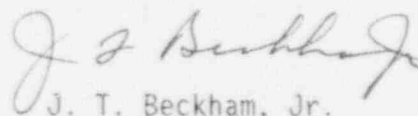
Edwin I. Hatch Nuclear Plant
Semiannual Radioactive Effluent Release Report

Gentlemen:

In accordance with the provisions of Plant Hatch Technical Specifications sections 6.9.1.8 and 6.9.1.9, Georgia Power Company is providing six copies of the Plant Hatch Unit 1 and Unit 2 Semiannual Radioactive Effluent Release Report. This report covers the period of July 1, 1992 through December 31, 1992.

Should you have any questions, please advise.

Sincerely,



J. T. Beckham, Jr.

DMH/cr

Enclosure: Plant E. I. Hatch Unit 1 and Unit 2
Semiannual Radioactive Effluent Release Report

cc: (See next page.)

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U.S. Nuclear Regulatory Commission
February 22, 1993

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GEORGIA POWER COMPANY

PLANT E. I. HATCH
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

JULY 1, 1992 - DECEMBER 31, 1992

PLANT E. I. HATCH
SEMIANNUAL RADIOACTIVE
EFFLUENT RELEASE REPORT

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PLANT E. I. HATCH
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RADIOACTIVE EFFLUENT RELEASE REPORT

1 LIQUID EFFLUENTS

1.1. REGULATORY LIMITS

1. The Technical Specifications presented in this section are for Unit 1. Requirements for Unit 2 are the same as Unit 1; however, the Technical Specification numbers are not the same.

TECHNICAL SPECIFICATIONS

3.14.1 The radioactive liquid effluent monitoring instrumentation channels shown in table 3.14.1-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.15.1 are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with the OFFSITE DOSE CALCULATION MANUAL (ODCM). (Technical Specification Table 3.14.1-1 is included in this section as Table 1-1).

3.15.1.1 The concentration of radioactive material released at any time from the site to UNRESTRICTED AREAS (figure 3.15-1) shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II (column 2) for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to $2.0E-04$ uCi/ml total activity.

3.15.1.2 The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each reactor unit, from the site (figure 3.15-1) shall be limited to:

- a. During any calendar quarter to less than or equal to 1.5 mrem to the total body and to less than or equal to 5 mrem to any organ.
- b. During any calendar year to less than or equal to 3 mrem to the total body and to less than or equal to 10 mrem to any organ.

3.15.1.3 The liquid radwaste treatment system, as described in the ODCM, shall be used to reduce the radioactive materials in liquid wastes prior to their discharge when the projected doses due to the liquid effluent per Unit from the site (figure 3.15-1) when projected over the calendar quarter would exceed 0.18 mrem to the total body or 0.62 mrem to any organ.

3.15.1.4(a) The contents within any outside temporary tank shall be limited to less than or equal to 10 curies, excluding tritium and dissolved or entrained noble gases.

- (a) An outside temporary tank is not surrounded by liners, dikes, or walls that are capable of holding the tank contents and not having tank overflows and drains connected to the liquid radwaste treatment system.

6.9.1.9 states in part: "The Radioactive Effluent Release Report shall include (on a quarterly basis) unplanned releases from the site to unrestricted areas of radioactive materials in gaseous and liquid effluents that were in excess of 1 Ci, excluding dissolved and entrained gases and tritium for liquid effluents, or those in excess of 150 Ci of noble gases or 0.02 Ci of radioiodines for gaseous releases".

TABLE 1-1
TECHNICAL SPECIFICATION
TABLE 3.14.1-1 (SHEET 1 of 2)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

<u>Instrument</u>	<u>Minimum Channels OPERABLE</u>	<u>Applicability</u>	<u>ACTION</u>
1. Gross Radioactivity Monitors Providing Automatic Termina- tion of Release			
Liquid Radwaste Effluent Line	1	(a)	100
2. Gross Radioactivity Monitors not Providing Automatic Termination of Release			
Service Water System Effluent Line	1	(b)	101
3. Flowrate Measure- ment Devices**			
Liquid Radwaste Effluent Line	1	(a)	102
Discharge Canal	1	(b) (a)	102
4. Service Water System to Closed Cooling Water System Differential Pressure	1	At all times	103

**Pump curves may be utilized to estimate flow; in such cases, ACTION statement 102 is not required.

(a) Whenever the radwaste discharge valves are not locked closed.

(b) Whenever the service water system pressure is below the closed cooling water system pressure or differential pressure indication is not available.

TABLE 1-1 (CONTINUED)
TECHNICAL SPECIFICATION
TABLE 3.14.1-1 (SHEET 2 of 2)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

TABLE NOTATIONS

ACTION 100 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may be continued, provided that prior to initiating a release:

- a. At least two independent samples are analyzed in accordance with Specification 4.15.1.1.1.
- b. At least two technically qualified individuals independently verify the release rate calculations and discharge valving.

Otherwise, suspend release of radioactive effluents via this pathway. If the channel remains inoperable for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 101 - With the numbers of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided that once per shift grab samples are collected and analyzed for gross radioactivity (beta or gamma) at a Lower Limit of Detection of at least 10^{-7} uCi/ml. If the channel remains inoperable for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 102 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided the flowrate is estimated at least once per 4 hours during actual releases. If the channel remains inoperable for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 103 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, assure that the service water system effluent system monitor is OPERABLE.

1.2 MAXIMUM PERMISSIBLE CONCENTRATIONS

The MPC values used in determining allowable liquid radwaste release rates and concentrations for principal gamma emitters, I-131, tritium, Sr-89, Sr-90 and Fe-55 are taken from 10CFR Part 20, Appendix B, Table 11, Column 2.

For dissolved or entrained noble gases in liquid radwaste, the MPC is taken from Technical Specification 3.15.1.1 (Unit 1) and 3.11.1.1 (Unit 2) as $2.0E-04$ uCi/ml.

For gross alpha in liquid radwaste, the MPC is taken from 10 CFR Part 20, Appendix B, Note 2.b as $3.0E-08$ uCi/ml.

Further, for all the above radionuclides or categories of radioactivity, the overall MPC fraction is determined in accordance with 10 CFR Part 20, Appendix B, Note 1.

The method whereby the MPC fraction is used to determine release rates and liquid radwaste effluent radiation monitor setpoints is described in Section 1.3 of this report.

1.3 MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

Prior to release of any tank containing liquid radwaste, and following the required recirculation, samples are collected and analyzed in accordance with Technical Specification Tables 4.15.1-1 (Unit 1) and 4.11.1-1 (Unit 2). A sample from each tank planned for release is analyzed for principal gamma emitters, I-131, and dissolved and entrained noble gases by gamma spectrometry. Monthly and quarterly composites are prepared for analysis by extracting aliquots from each sample taken from tanks which are released. Liquid radwaste sample analyses are performed as follows:

<u>Measurement</u>	<u>Frequency</u>	<u>Method</u>
1. Gamma Isotopic	Each Batch	Gamma spectroscopy with computerized data reduction
2. Dissolved or Entrained Noble Gases	Each Batch	Gamma spectroscopy with computerized data reduction

<u>Measurement</u>	<u>Frequency</u>	<u>Method</u>
3. Tritium	Monthly Composite	Distillation and liquid scintillation counting
4. Gross Alpha	Monthly Composite	Gas flow proportional counting
5. Sr-89 and Sr-90	Quarterly Composite	Chemical separation and gas flow proportional counting
6. Fe-55	Quarterly Composite	Chemical separation and low energy photon detector.

Gamma isotopic measurements are performed in-house in the radiochemistry lab using germanium spectrometry. Three germanium detectors are available: a 20% efficient and two 15% efficient intrinsic germanium detectors, with 2.0 FWHM resolution and housed in 4 inch-thick lead shields. A one-liter liquid radwaste sample is poured into a Marinelli beaker in preparation for a 3000 second count. A peak search of the resulting gamma ray spectrum is performed by the computer system. Energy and net count data for all significant peaks are determined, and quantitative reduction or LLD calculations are performed for the nuclides specified in Table Notation e of Technical Specification Tables 4.15.1-1 (Unit 1) and 4.11.1-1 (Unit 2): Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144. The quantitative calculations include corrections for counting time, decay time, sample volume, sample geometry, detector efficiency, baseline counts, and branching ratio. LLD calculations, including the above corrections, are made based on the counts in two standard deviations of the baseline count at the location on the spectrum where a peak for that radionuclide would be located if present.

The radionuclide concentrations determined by gamma spectroscopic analysis of a sample taken from a tank planned for release and the most current sample analysis results available for tritium, gross alpha, Sr-89, Sr-90, and Fe-55 are used along with the corresponding MPC values to determine an MPC fraction for the tank planned for release. This MPC fraction is then used, with appropriate safety factors, along with the expected dilution stream flow to calculate a maximum permissible release rate and a liquid effluent monitor setpoint. The monitor setpoint is calculated to assure that the limits of Technical Specifications 3.15.1.1 (Unit 1) or 3.11.1.1 (Unit 2) are not exceeded.

A monitor reading in excess of the calculated setpoint therefore results in an automatic termination of the liquid radwaste discharge. Liquid effluent discharge is also automatically terminated if the dilution stream flow rate falls below the dilution flow rate used in the setpoint calculations and established as a setpoint on the dilution stream flow monitor.

Radionuclide concentrations, safety factors, dilution stream flow rate, and liquid effluent radiation monitor calibration factor are entered into the computer and a prerelease printout is generated. If the release is not permissible appropriate warnings will be included on the prerelease printout. If the release is permissible it is approved by the Chemistry Foreman on duty. The pertinent information is transferred manually from the prerelease printout to a one-page release permit which is forwarded to Radwaste Operations. When the release is completed the release permit is returned from Radwaste Operations with actual release data included. These data are input to the computer and a post release printout is generated. The post release printout contains actual release rates, actual release concentrations and quantities, actual dilution flow, and calculated doses to an individual.

1.4 *LIQUID EFFLUENT RELEASE DATA

Regulatory Guide 1.21 Tables 2A and 2B are found in this report as Table 1-2a for Unit 1, Table 1-2b for Unit 2 and Table 1-2c for the site; and Table 1-3a for Unit 1, 1-3b for Unit 2, and Table 1-3c for the site.

The values for the four categories of Tables 1-2a and 1-2b, and 1-2c are calculated and the Tables completed as follows:

1. Fission and activation products - The total release values (not including tritium, gases, and alpha) are comprised of the sum of the measured individual radionuclide activities. This sum is for each batch released to the river for the respective

*There were no monitors out of service greater than 30 days and no unplanned releases.

quarter. Percent of applicable limit is determined from a mixed nuclide MPC fraction calculation. The average concentration for each nuclide over all released batches is divided by the corresponding individual MPC value. The sum over all nuclides of the C/MPC ratios times 100 is the percent of applicable limit for effluent releases during the quarter.

2. Tritium - The measured tritium concentrations in the monthly composite samples are used to calculate the total release and average diluted concentration during each period. Average diluted concentration divided by the MPC limit, $3.0\text{E}-03$ uCi/ml, is converted to percent to give the percent of applicable limit.
3. Dissolved and entrained gases - Concentrations of dissolved and entrained gases in liquid effluents are measured by germanium spectroscopy on a one liter sample from each liquid radwaste batch. The average concentration of dissolved or entrained noble gases for all released batches is divided by the MPC value stated in Technical Specifications 3.15.1.1 and 3.11.1.1 ($2.0\text{E}-04$ uCi/ml) to determine the MPC fraction. The result $\times 100$ is the percent of applicable limit for noble gases in liquid effluent releases during the quarter. Radioisotopes of iodine in any form are also determined during the isotopic analysis for each batch; therefore, a separate analysis for possible gaseous forms is not performed because it would not provide additional information.
4. Gross alpha radioactivity - The measured gross alpha concentrations in the monthly composite samples are used to calculate the total release of alpha radioactivity.

Other data pertinent to batch releases of radioactive liquid effluent from both units are as follows:

Number of batch releases:	751
Total time period for batch releases:	77,919 minutes
Maximum time period for a batch release:	287.0 minutes
Average time period for batch releases:	103.8 minutes
Minimum time period for a batch release:	2.0 minutes
Average stream flow during periods of release of liquid effluent into a flowing stream:	11,210 CFS

1.5 RADIOLOGICAL IMPACT ON MAN DUE TO LIQUID RELEASES

Doses to an individual, due to radioactivity in liquid effluent, were calculated in accordance with Technical Specifications 3/4.15.1.2 (Unit 1) and 3/4.11.1.2 (Unit 2) using the methodology presented in the Plant Edwin I. Hatch Offsite Dose Calculation Manual. As required by the above Technical Specifications, doses were calculated separately for Unit 1 and Unit 2. Results are presented in Table 1-4a for Unit 1 and Table 1-4b for Unit 2.

TABLE 1-2a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error (%)
A. Fission and activation products				
1. Total release	Ci	1.75E-02	2.15E-02	4.70E+01
2. Average diluted concentration during period	uCi/ml	1.54E-08	2.52E-08	
3. % of applicable limit	%	3.37E-01	1.46E-01	
B. Tritium				
1. Total release	Ci	6.00E+00	1.15E+01	3.70E+01
2. Average diluted concentration during period	uCi/ml	5.27E-06	1.35E-05	
3. % of applicable limit	%	1.76E-01	4.49E-01	
C. Dissolved and entrained gases				
1. Total release	Ci	5.30E-04	6.43E-04	1.00E+02
2. Average diluted concentration during period	uCi/ml	4.65E-10	7.54E-10	
3. % of applicable limit	%	2.32E-04	3.77E-04	
D. Gross Alpha radioactivity				
1. Total release	Ci	2.95E-07	2.00E-07	1.20E+02
E. Volume of waste (prior to dilution)				
	liters	5.04E+06	4.45E+06	1.00E+01
F. Volume of dilution water used				
	liters	1.14E+09	8.53E+08	1.60E+02

TABLE 1-2b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error (%)
A. Fission and activation products				
1. Total release	Ci	1.24E-01	6.28E-02	4.70E+01
2. Average diluted concentration during period	uCi/ml	1.06E-07	8.79E-08	
3. % of applicable limit	%	1.86E+00	2.07E+00	
B. Tritium				
1. Total release	Ci	7.23E+00	2.66E+00	3.70E+01
2. Average diluted concentration during period	uCi/ml	6.18E-06	3.72E-06	
3. % of applicable limit	%	2.06E-01	1.24E-01	
C. Dissolved and entrained gases				
1. Total release	Ci	5.03E-02	6.38E-03	1.00E+02
2. Average diluted concentration during period	uCi/ml	4.30E-08	8.92E-09	
3. % of applicable limit	%	2.15E-02	4.46E-03	
D. Gross Alpha radioactivity				
1. Total release	Ci	8.26E-07	2.91E-06	1.20E+02
E. Volume of waste (prior to dilution)	liters	5.28E+06	3.15E+06	1.00E+01
F. Volume of dilution water used	liters	1.17E+09	7.15E+08	1.60E+02

TABLE 1-2c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error (%)
A. Fission and activation products				
1. Total release	Ci	1.41E-01	8.43E-02	4.70E+01
2. Average diluted concentration during period	uCi/ml	6.11E-08	5.38E-08	
3. % of applicable limit	%	1.11E+00	1.02E+00	
B. Tritium				
1. Total release	Ci	1.32E+01	1.42E+01	3.70E+01
2. Average diluted concentration during period	uCi/ml	5.73E-06	9.03E-06	
3. % of applicable limit	%	1.91E-01	3.01E-01	
C. Dissolved and entrained gases				
1. Total release	Ci	5.08E-02	7.02E-03	1.00E+02
2. Average diluted concentration during period	uCi/ml	2.20E-08	4.48E-09	
3. % of applicable limit	%	1.10E-02	2.24E-03	
D. Gross Alpha radioactivity				
1. Total release	Ci	1.12E-06	3.11E-06	1.20E+02
E. Volume of waste (prior to dilution)	liters	1.03E+07	7.59E+06	1.00E+01
F. Volume of dilution water used	liters	2.31E+09	1.57E+09	1.60E+02

TABLE 1-3a*
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode**		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
H-3	Ci			6.00E+00	1.15E+01
Fission and activation products:					
Na-24	Ci			7.93E-06	2.05E-05
Cr-51	Ci			5.56E-06	2.60E-04
Mn-54	Ci			2.25E-04	1.63E-04
Fe-59	Ci			0.00E+00	3.89E-06
Co-58	Ci			1.49E-05	2.63E-05
Co-60	Ci			4.55E-03	2.71E-03
Zn-65	Ci			3.37E-03	3.71E-03
As-76	Ci			3.03E-05	6.41E-04
Rb-88	Ci			3.62E-05	0.00E+00
Sr-89	Ci			9.07E-05	0.00E+00
Sr-90	Ci			9.07E-04	0.00E+00
Y-91m	Ci			6.76E-06	7.71E-04
Nb-95	Ci			0.00E+00	3.06E-06
Nb-97	Ci			0.00E+00	3.61E-05
Tc-99m	Ci			2.70E-05	2.79E-05
Sb-125	Ci			3.17E-05	0.00E+00
I-131	Ci			5.60E-05	7.27E-05
I-133	Ci			3.92E-05	1.10E-04
I-134	Ci			4.53E-06	0.00E+00
Cs-134	Ci			7.25E-04	1.35E-03
Cs-136	Ci			2.36E-06	0.00E+00
Cs-137	Ci			5.92E-03	1.16E-02
Cs-138	Ci			1.44E-03	0.00E+00
La-140	Ci			2.03E-05	2.09E-06
Np-239	Ci			2.60E-05	0.00E+00
Zn-69m	Ci			3.83E-06	0.00E+00
Total	Ci			1.75E-02	2.15E-02
Dissolved and entrained gases:					
Kr-87	Ci			1.76E-05	0.00E+00
Kr-88	Ci			0.00E+00	5.11E-06
Xe-133	Ci			5.29E-05	1.38E-04
Xe-135	Ci			4.59E-04	5.00E-04
Total	Ci			5.30E-04	6.43E-04
Gr-Alpha	Ci			2.95E-07	2.00E-07

*Zeros in this table indicate that no radioactivity was present above detectable levels. See Table 1-5 for typical lower limits of detection for liquid sample analyses.

**There are no continuous mode radioactive liquid release pathways at Plant Hatch.

TABLE 1-3b*
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode**		Batch Mode	
		Quarter 3	Quarter 4	Quarter 3	Quarter 4
H-3	Ci			7.23E+00	2.66E+00
Fission and activation products:					
Na-24	Ci			3.12E-03	0.00E+00
Cr-51	Ci			8.40E-04	6.34E-04
Mn-54	Ci			2.34E-04	1.59E-03
Mn-56	Ci			1.69E-05	0.00E+00
Fe-59	Ci			0.00E+00	6.20E-05
Co-58	Ci			2.56E-04	6.57E-04
Co-60	Ci			1.73E-03	1.44E-02
Zn-65	Ci			1.31E-02	2.66E-02
As-76	Ci			3.21E-05	0.00E+00
Rb-88	Ci			2.78E-04	0.00E+00
Sr-89	Ci			8.45E-04	1.95E-04
Sr-90	Ci			1.21E-04	0.00E+00
Sr-91	Ci			1.39E-03	6.87E-06
Sr-92	Ci			3.08E-04	0.00E+00
Y-91m	Ci			2.32E-04	1.47E-05
Zr-95	Ci			0.00E+00	1.42E-05
Nb-95	Ci			0.00E+00	4.75E-05
Mo-99	Ci			1.36E-04	0.00E+00
Tc-99m	Ci			4.05E-03	1.79E-05
Ru-103	Ci			1.58E-06	2.03E-05
Sb-125	Ci			0.00E+00	1.24E-05
I-131	Ci			3.75E-03	3.54E-03
I-132	Ci			4.45E-04	0.00E+00
I-133	Ci			5.91E-03	1.17E-03
I-134	Ci			1.55E-05	0.00E+00
I-135	Ci			4.09E-03	4.23E-04
Cs-134	Ci			1.92E-03	3.01E-03
Cs-136	Ci			1.51E-04	6.00E-06
Cs-137	Ci			2.85E-03	1.01E-02
Cs-138	Ci			7.92E-05	0.00E+00
Ba-139	Ci			5.60E-06	0.00E+00
Ba-140	Ci			5.33E-04	0.00E+00
La-140	Ci			1.01E-03	1.80E-05
Ce-141	Ci			1.20E-05	2.39E-05
Ce-144	Ci			0.00E+00	8.37E-05
Np-239	Ci			7.63E-02	1.48E-04
Zn-69m	Ci			7.34E-06	1.26E-06
Sb-124	Ci			0.00E+00	4.97E-06
Total	Ci			1.24E-01	6.28E-02
Dissolved and entrained gases:					
Kr-85	Ci			8.47E-04	0.00E+00
Xe-131m	Ci			4.50E-04	5.35E-05
Xe-133m	Ci			7.69E-05	1.08E-05
Xe-133	Ci			1.01E-02	1.64E-03
Xe-135m	Ci			7.89E-03	8.24E-04
Xe-135	Ci			3.09E-02	3.85E-03
Ar-41	Ci			0.00E+00	3.75E-06
Total	Ci			5.03E-02	6.38E-03
Gr-Alpha	Ci			8.26E-07	2.91E-06

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 1-5 for typical lower limits of detection for liquid sample analyses.

**There are no continuous mode radioactive liquid release pathways at Plant Hatch.

TABLE 1-3c*
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
LIQUID EFFLUENTS
Page 1 of 2

		Continuous Mode**		Batch Mode	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
H-3	Ci			1.32E+01	1.42E+01
Fission and activation products:					
Na-24	Ci			3.13E-03	2.05E-05
Cr-51	Ci			8.46E-04	8.93E-04
Mn-54	Ci			4.59E-04	1.76E-03
Mn-56	Ci			1.69E-05	0.00E+00
Fe-59	Ci			0.00E+00	6.59E-05
Co-58	Ci			2.71E-04	6.83E-04
Co-60	Ci			6.28E-03	1.71E-02
Zn-65	Ci			1.64E-02	3.03E-02
As-76	Ci			6.24E-05	6.41E-04
Rb-88	Ci			3.15E-04	0.00E+00
Sr-89	Ci			9.35E-04	1.95E-04
Sr-90	Ci			1.03E-03	0.00E+00
Sr-91	Ci			1.39E-03	6.87E-06
Sr-92	Ci			3.08E-04	0.00E+00
Y-91m	Ci			2.39E-04	7.85E-04
Zr-95	Ci			0.00E+00	1.42E-05
Nb-95	Ci			0.00E+00	5.05E-05
Nb-97	Ci			0.00E+00	3.61E-05
Mo-99	Ci			1.36E-04	0.00E+00
Tc-99m	Ci			4.08E-03	4.58E-05
Ru-103	Ci			1.58E-06	2.03E-05
Sb-125	Ci			3.17E-05	1.24E-05
I-131	Ci			3.81E-03	3.61E-03
I-132	Ci			4.45E-04	0.00E+00
I-133	Ci			5.95E-03	1.28E-03
I-134	Ci			2.00E-05	0.00E+00
I-135	Ci			4.09E-03	4.23E-04
Cs-134	Ci			2.65E-03	4.36E-03
Cs-136	Ci			1.54E-04	6.00E-06
Cs-137	Ci			8.77E-03	2.17E-02
Cs-138	Ci			1.52E-03	0.00E+00
Ba-139	Ci			5.60E-06	0.00E+00
Ba-140	Ci			5.33E-04	0.00E+00
La-140	Ci			1.03E-03	2.00E-05
Ce-141	Ci			1.20E-05	2.39E-05
Ce-144	Ci			0.00E+00	8.37E-05
Np-239	Ci			7.63E-02	1.48E-04
Zh-69m	Ci			1.12E-05	1.26E-06
Sb-124	Ci			0.00E+00	4.97E-06
Total	Ci			1.41E-01	8.43E-02

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 1-5 for typical lower limits of detection for liquid sample analyses.

**There are no continuous mode radioactive liquid release pathways at Plant Hatch.

TABLE 1-3c*
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
LIQUID EFFLUENTS
Page 2 of 2

		Continuous Mode**		Batch Mode	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
Dissolved and entrained gases:					
Kr-85	Ci			8.47E-04	0.00E+00
Kr-87	Ci			1.76E-05	0.00E+00
Kr-88	Ci			0.00E+00	5.11E-06
Xe-131m	Ci			4.50E-04	5.35E-05
Xe-133m	Ci			7.69E-05	1.08E-05
Xe-133	Ci			1.01E-02	1.78E-03
Xe-135m	Ci			7.89E-03	8.24E-04
Xe-135	Ci			3.14E-02	4.35E-03
Ar-41	Ci			0.00E+00	3.75E-06
Total	Ci			5.08E-02	7.02E-03
Gr-Alpha	Ci			1.12E-06	3.11E-06

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 1-5 for typical lower limits of detection for liquid sample analyses.

**There are no continuous mode radioactive liquid release pathways at Plant Hatch.

TABLE 1-4a
E. I. HATCH NUCLEAR PLANT - Unit 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
INDIVIDUAL DOSES DUE TO LIQUID RELEASES

Cumulative Doses per Quarter

Organ	Tech Spec Limit	Unit	Quarter 3	% of Tech Spec Limit	Quarter 4	% of Tech Spec Limit
Bone	5.0	mrem	2.31E-02	4.63E-01	4.80E-02	9.59E-01
Liver	5.0	mrem	3.19E-02	6.38E-01	7.06E-02	1.41E+00
TBody	1.5	mrem	2.20E-02	1.47E+00	4.76E-02	3.18E+00
Thyroid	5.0	mrem	3.65E-04	7.30E-03	5.38E-04	1.08E-02
Kidney	5.0	mrem	1.11E-02	2.22E-01	2.43E-02	4.86E-01
Lung	5.0	mrem	3.46E-03	6.91E-02	7.80E-03	1.56E-01
GILLI	5.0	mrem	3.63E-03	7.26E-02	3.75E-03	7.51E-02

Cumulative Doses This Year

Organ	Tech Spec Limit	Unit	Quarters 1,2,3,& 4	% of Tech Spec Limit
Bone	10.0	mrem	1.83E-01	1.83E+00
Liver	10.0	mrem	2.70E-01	2.70E+00
TBody	3.0	mrem	1.84E-01	6.12E+00
Thyroid	10.0	mrem	3.23E-03	3.23E-02
Kidney	10.0	mrem	9.33E-02	9.33E-01
Lung	10.0	mrem	2.96E-02	2.96E-01
GILLI	10.0	mrem	2.28E-02	2.28E-01

TABLE 1-4b
E. I. HATCH NUCLEAR PLANT - Unit 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
INDIVIDUAL DOSES DUE TO LIQUID RELEASES

Cumulative Doses per Quarter

Organ	Tech Spec Limit	Unit	Quarter 3	% of Tech Spec Limit	Quarter 4	% of Tech Spec Limit
Bone	5.0	mrem	2.03E-02	4.06E-01	5.22E-02	1.04E+00
Liver	5.0	mrem	3.69E-02	7.37E-01	8.72E-02	1.74E+00
TBody	1.5	mrem	2.57E-02	1.71E+00	5.94E-02	3.96E+00
Thyroid	5.0	mrem	2.95E-02	5.89E-01	2.71E-02	5.42E-01
Kidney	5.0	mrem	1.42E-02	2.85E-01	3.25E-02	6.50E-01
Lung	5.0	mrem	3.26E-03	6.52E-02	8.57E-03	1.71E-01
GILLI	5.0	mrem	6.57E-03	1.31E-01	1.62E-02	3.24E-01

Cumulative Doses This Year

Organ	Tech Spec Limit	Unit	Quarters 1, 2, 3, & 4	% of Tech Spec Limit
Bone	10.0	mrem	1.16E-01	1.16E+00
Liver	10.0	mrem	2.03E-01	2.03E+00
TBody	3.0	mrem	1.41E-01	4.70E+00
Thyroid	10.0	mrem	1.51E-01	1.51E+00
Kidney	10.0	mrem	7.60E-02	7.60E-01
Lung	10.0	mrem	1.98E-02	1.98E-01
GILLI	10.0	mrem	3.84E-02	3.84E-01

TABLE 1-5
LOWER LIMITS OF DETECTION - LIQUID SAMPLE ANALYSES

The values in this table represent apriori lower limits of detection (LLD) which are typically achieved in laboratory analyses of liquid radwaste samples.

<u>RADIONUCLIDE</u>	<u>LLD (uCi/ml)</u>
Mn-54	5.38E-08
Fe-59	7.78E-08
Co-58	4.67E-08
Co-60	4.78E-08
Zn-65	1.31E-07
Mo-99	5.10E-07*
Cs-134	7.18E-08
Cs-137	6.05E-08
Ce-141	1.41E-07
Ce-144	6.30E-07*
I-131	6.51E-08
Xe-135	8.45E-08
Fe-55	2.00E-06
Sr-89	5.00E-08
Sr-90	5.00E-08
H-3	1.00E-05

*In accordance with Technical Specification Tables 4.15.1-1 (Unit 1) and 4.11.1-1 (Unit 2), Table Notation b, the permissible Lower Limit of Detection may be increased inversely proportional to the magnitude of the gamma yield. However, the LLD determined in this manner must not exceed 10 percent of the Maximum Permissible Concentration (MPC) value specified in 10 CFR20, Appendix B, Table II (Column 2).

2 GASEOUS EFFLUENTS

2.1 REGULATORY LIMITS

The Technical Specifications presented in this section are for Unit 1. Requirements for Unit 2 are the same as for Unit 1; however, the Technical Specification numbers are not the same.

TECHNICAL SPECIFICATIONS

3.14.2 The radioactive gaseous effluent monitoring instrumentation channels shown in table 3.14.2-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.15.2.1 (a) are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with the ODCM. (Technical Specification Table 3.14.2-1 is included in this section as Table 2-1).

3.15.2.1 The dose rate at any time in the UNRESTRICTED AREAS (figure 3.15-1) due to radioactive materials released in gaseous effluents from the site shall be limited to the following values:

- a. The dose rate limit for noble gases shall be less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin.
- b. The dose rate limit for I-131, I-133, tritium, and for all radioactive materials in particulate form and radionuclides other than noble gases with half-lives greater than 8 days shall be less than or equal to 1500 mrem/year to any organ.

3.15.2.2 The air dose in UNRESTRICTED AREAS (figure 3.15-1) due to noble gases released in gaseous effluents from each reactor unit shall be limited to the following:

- a. During any calendar quarter, to less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation.
- b. During any calendar year, to less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation.

3.15.2.3 The dose to any organ of a MEMBER OF THE PUBLIC from I-131, I-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released to UNRESTRICTED AREAS (figure 3.15-1) from each reactor unit shall be limited to the following:

- a. During any calendar quarter to less than or equal to 7.5 mrem to any organ.
- b. During any calendar year to less than or equal to 15 mrem to any organ.

3.15.2.4 The GASEOUS RADWASTE TREATMENT SYSTEM as described in the ODCM shall be in operation. (This Technical Specification applies whenever the main condenser air ejector system is in operation.)

4.15.2.4 GASEOUS RADWASTE TREATMENT SYSTEM operability shall be demonstrated by administrative controls which assure that the offgas treatment system is not bypassed.

3.15.2.5 The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrem to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrem.

(With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Specifications 3.15.1.2(a), 3.15.1.2(b), 3.15.2.2.(a), 3.15.2.2(b), 3.15.2.3(a), or 3.15.2.3(b), calculations shall be made including direct radiation contributions from the reactor units and from outside storage tanks to determine whether the above limits of Specification 3.15.2.5 have been exceeded.)

3.15.2.6 The concentration of hydrogen downstream of the recombiners in the main condenser offgas treatment system shall be limited to less than or equal to 4 percent by volume.

3.15.2.7 The gross gamma radioactivity rate of the noble gases Xe-133, Xe-135, Xe-138, Kr-85m, Kr-87, and Kr-88 measured at the main condenser evacuation system pretreatment monitor station shall be limited to less than or equal to 240,000 uCi/second.

6.9.1.9 states in part:

"The Radioactive Effluent Release Report shall include (on a quarterly basis) unplanned releases from the site to unrestricted areas of radioactive materials in gaseous and liquid effluents that were in excess of 1 Ci, excluding dissolved and entrained gases and tritium for liquid effluents, or those in excess of 150 Ci of noble gases or 0.02 Ci of radioiodines for gaseous releases."

TABLE 3.14.2-1 (SHEET 1 OF 4)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>Instrument</u>	<u>Minimum Channels OPERABLE</u>	<u>Applicability</u>	<u>Parameter</u>	<u>ACTION</u>
1. Main Condenser Offgas Treatment System Explosive Gas Monitoring System				
Hydrogen Monitor	(1)	**	% Hydrogen	106
2. Reactor Building Vent Stack Monitoring System				
a. Noble Gas Activity Monitor	(1)	*	Radioactivity Rate Measurement +	105
b. Iodine Sampler Cartridge	(1)	*	Verify Presence of Cartridge	107
c. Particulate Sampler Filter	(1)	*	Verify Presence of Filter	107
d. Effluent System Flowrate Measurement Device	(1)	*	System Flowrate Measurement	104
e. Sampler Flowrate Measurement Device	(1)	*	Sampler Flowrate Measurement	104
3. Recombiner Building Ventilation Monitoring System				
a. Noble Gas Activity Monitor	(1)	*	Radioactivity Rate Measurement +	105
b. Iodine Sampler Cartridge	(1)	*	Verify Presence of Cartridge	107
c. Particulate Sampler Filter	(1)	*	Verify Presence of Filter	107
d. Sampler Flowrate Measurement Device	(1)	*	Sampler Flowrate Measurement	104

TABLE 2-1 (Sheet 1 of 4)

TABLE 3.14.2-1 (SHEET 2 OF 4)
RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>Instrument</u>	<u>Minimum Channels Operable</u>	<u>Applicability</u>	<u>Parameter</u>	<u>Action</u>
4. Main Stack Monitoring System				
a. Noble Gas Activity Monitor	(1)	*	Radioactivity Rate Measurement	105
b. Iodine Sampler Cartridge	(1)	*	Verify Presence of Cartridge	107
c. Particulate Sampler Filter	(1)	*	Verify Presence of Filter	107
d. Effluent System Flowrate Measuring Devices	(1)	*	System Flowrate Measurement	104
e. Sampler Flowrate Measuring Device	(1)	*	Sampler Flowrate Measurement	104
5. Condenser Offgas Pretreatment Monitor				
Noble Gas Activity Monitor	(1)	***	Radioactivity Rate Measurement	105

TABLE 3.14.2-1 (SHEET 3 OF 4)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

Table Notations

+Monitor must be capable of responding to a Lower Limit of Detection of 1×10^{-4} $\mu\text{Ci/ml}$.

*During releases via this pathway.

**During main condenser offgas treatment system operation.

***During operation of the main condenser air ejector.

ACTION 104 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided the flowrate is estimated at least once per 4 hours.

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 105 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided grab samples are taken daily and analyzed daily for gross activity within 24 hours. With the number of main stack monitoring system channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, without delay suspend drywell purge.

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 106 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, operation of the main condenser offgas treatment system may continue provided:

- (a) Gas samples are collected once per 4 hours and analyzed within the ensuing 4 hours, or
- (b) Using a temporary hydrogen analyzer installed in the offgas system line downstream of the recombiner, hydrogen concentration readings are taken and logged every 4 hours.

TABLE 3.14.2-1 (SHEET 4 OF 4)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATIONTable Notations (Continued)

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 107 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided samples are continuously collected with auxiliary sampling equipment for periods on the order of 7 days and analyzed within 48 hours after the end of the sampling period.

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 108 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, release to the environment may continue for up to 72 hours provided:

- a. The offgas system is not bypassed, and
- b. The offgas post-treatment monitor (D11-K615) or the main stack monitor (D11-K600) is OPERABLE.

Otherwise, be in at least HOT STANDBY within 12 hours.

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

Waste gas release at Plant Hatch is confined to four paths: main stack (also called the offgas vent), Unit 1 reactor building vent; Unit 2 reactor building vent, and the recombiner building vent. Each of these four paths is continuously monitored for gaseous radioactivity. Each is equipped with an integrating-type sample collection device for collecting particulates and iodines. Sample collection is in accordance with Technical Specification Tables 4.15.2-1 (Unit 1) and 4.11.2-1 (Unit 2). Unless required more frequently under certain circumstances specified in Table Notations to the above mentioned tables, samples are collected as follows:

1. Noble gas samples are collected by grab sampling monthly.
2. Tritium samples are collected by grab sampling monthly.
3. Radioiodine samples are collected by pulling the sample stream through a charcoal cartridge over a 7-day period.
4. Particulates are collected by pulling the sample stream through a particulate filter over a 7-day period.
5. The 7-day particulate filters above are analyzed for gross alpha activity.
6. Quarterly composite samples are prepared from the particulate filters collected over the previous quarter and the quarterly composite sample is analyzed for Sr-89 and Sr-90.

Sample analyses results and release flow rates from the four release points form the basis for calculating released quantities of radionuclide-specific radioactivity, dose rates associated with gaseous releases, and cumulative doses for the current quarter and year. This task is normally performed with computer assistance.

The noble gas grab sample analysis results are used along with maximum expected release flow rates from each of the four vents to calculate monitor setpoints for the gaseous effluent monitors serving the four release points, to assure that the limits of Technical Specifications 3.15.2.1.a (Unit 1) or 3.11.2.1.a (Unit 2) are not exceeded. Calculation of monitor setpoints is described in the Plant Hatch ODCM.

With each release period released radioactivity, dose rates, and cumulative doses are calculated. Cumulative dose results are tabulated along with percent of Technical Specification limits (3.15.2.2 and 3.15.2.3 (Unit 1); 3.11.2.2 and 3.11.2.3 (Unit 2) for each release, for the current quarter and year.

After each calendar quarter (13 weeks) a summary of waste gas releases from the four vents is compiled for preparation of the Semiannual Effluent Release Report required by Technical Specifications 6.9.1.8 and 6.9.1.9 and described in NRC Regulatory Guide 1.21.

The methods for determining released quantities of radioactivity, dose rates and cumulative doses are as follows:

1. FISSION AND ACTIVATION GAS

The radionuclide-specific released radioactivity is determined from sample analyses results collected as described above and average release flow rates over the period represented by the collected sample.

Instantaneous dose rates due to noble gases and due to radioiodines, tritium, and particulates are calculated (with computer assistance). Calculated dose rates are compared to the dose rate limits specified in 3.15.2.1.a (Unit 1) and 3.11.2.1.a (Unit 2) for noble gases; and 3.15.2.1.b (Unit 1) and 3.11.2.1.b (Unit 2) for radioiodine, tritium, and particulates. Dose rate calculation methodology is presented in the Plant Hatch ODCM.

Beta and gamma air doses due to noble gases are calculated for the location in the unrestricted area with the potential for the highest exposure due to gaseous releases. Air doses are calculated for each release period and cumulative totals are kept for each unit for the current calendar quarter and year. Cumulative air doses are compared to the dose limits specified in Technical Specifications 3.15.2.2 (Unit 1) and 3.11.2.2 (Unit 2). Current percent of technical specification limits are shown on the printout for each release period. Air dose calculation methodology is presented in the Plant Hatch ODCM.

2. RADIOIODINE, TRITIUM, AND PARTICULATE RELEASES

Released quantities of radioiodines are determined from the weekly samples and release flow rates for the four release points. Radioiodine concentrations are determined by gamma spectroscopy.

Released quantities of particulates are determined from the weekly (filter) samples and release flow rates for the four release points. Gamma spectroscopy is used to quantify concentrations of principal gamma emitters.

After each calendar quarter the particulate filters from each vent are combined, fused, and strontium separation is performed. Since sample flows and vent flows are almost constant over each quarterly period the filters from each vent can be dissolved together. Decay corrections are made back to the middle of the quarterly collection period. Where significant Sr-89 or Sr-90 is not detected, LLD's are calculated. Strontium concentrations are input to the composite file of the computer to be used in release, dose rate and individual dose calculations.

Tritium samples are obtained monthly from each vent by passing the sample stream through a cold trap. The grams of water vapor/cubic foot gas is measured upstream of the cold trap in order to alleviate the difficulties in determining water vapor collection efficiencies. The tritium samples are analyzed by an independent laboratory and results are furnished in uCi/ml of water. The tritium concentration in water is converted to tritium concentration in air and this value is input into the composite file of the computer to be used in release, dose rate, and individual dose calculations.

Dose rates due to radioiodine, tritium, and particulates are calculated for a hypothetical child, exposed to the inhalation pathway, at the location in the unrestricted area where the potential dose rate is expected to be the highest. Dose rates are calculated for each release point, for each release period, and the total dose rate from all four release points are compared to the dose rate limits specified in Technical Specifications 3.15.2.1.b (Unit 1) or 3.11.2.1.b (Unit 2).

Individual doses due to radioiodine, tritium, and particulates are calculated for the critical receptor, which is described in the Plant Hatch ODCM. Individual doses are calculated for each release period and cumulative totals are kept for each unit for the current calendar quarter and year. Cumulative individual doses are compared to the dose limits specified in Technical Specifications 3.15.2.3 (Unit 1) and 3.11.2.3 (Unit 2). Current percent of technical specification limits are shown on the printout for each release period.

3. GROSS ALPHA RELEASE

The gross alpha release is computed each month by counting the particulate filters each week for gross alpha activity in a gas flow proportional counter. The four or five weeks' numbers are then recorded on a data sheet and the activity is summed at the end of the month. The summed activity is then divided by the total monthly volume to determine the concentration. This concentration is input to the composite file of the computer and is used for release calculations.

4. ERROR ESTIMATES

Regulatory Guide 1.21 requires that estimated total error in analysis techniques be reported. These estimates are required for the total fission and activation gas release, total I-131 release, total particulates with half-lives greater than 8-day release, and total tritium release.

"The total or maximum error associated with the effluent measurement will include the cumulative errors resulting from the total operation of sampling and measurement. Because it may be very difficult to assign error terms for each parameter affecting the final measurement, detailed statistical evaluation of error are not suggested. The objective should be to obtain an overall estimate of the error associated with measurements of radioactive materials released in liquid and gaseous effluents and solid waste."

Estimated errors are based on errors in counting equipment calibration, counting statistics, vent flow rates, vent sample flow rates, non-steady release rates, chemical yield factors, and sample losses for such items as charcoal cartridges.

- (1) Fission and Activation Total Release was calculated from sample analysis results and release point flow rates.

Statistical Error	60%
Counting Equipment Calibration	10%
Vent Flow Rates	10%
Non-Steady Release Rates	20%
	100%

- (2) I-131 Release was calculated from each weekly sample:

Statistical Error	60%
Counting Equipment Calibration	10%
Vent Flow Rates	10%
Vent Sample Flow Rates	10%
Non-Steady Release Rates	10%
Losses From Charcoal Cartridge	10%
	110%

- (3) Particulates with half-lives greater than 8 days release was calculated from sample analysis results and release point flow rates.

Statistical Error at LLD concentration	60%
Counting Equipment Calibration	10%
Vent Flow Rates	10%
Vent Sample Flow Rates	10%
Non-Steady Release Rates	10%
	100%

- (4) Total Tritium Release was dominated by the reactor building vent tritium release; hence, the larger statistical errors of the off-gas vent and recombiner building vent tritium releases do not affect the error in the total tritium release:

Water Vapor in Sample Stream Determination	20%
Vent Flow Rates	10%
Counting Calibration and Statistics	10%
Non-Steady Release	50%
	90%

2.3 *GASEOUS EFFLUENT RELEASE DATA

Regulatory Guide 1.21 Tables 1A, 1B, and 1C are found in this report as Table 2-2a for Unit 1, 2-2b for Unit 2, and Table 2-2c for site; and Table 3-3a for Unit 1, Table 3-3b for Unit 2 and Table 3-3c for site; and Table 2-4a for Unit 1, Table 2-4b for Unit 2, and Table 2-4c for site. Data are presented on a quarterly basis as required by Regulatory Guide 1.21.

To complete Tables 2-2a-c, total release for each of the four categories (fission and activation gases; iodines; particulates; and tritium) was divided by the number of seconds in the quarter to obtain a release rate in uCi/second for each category.

However, the applicable Technical Specification limits are not in terms of release rate in uCi/second but in terms of dose rate in mrem/year, as presented in Technical Specifications 3.15.2.1 (Unit 1) and 3.11.2.1 (Unit 2). Noble gases are limited as specified in 3.15.2.1.a and 3.11.2.1.a. The other three categories (tritium, radioiodines, and particulates) are limited as a group as specified in 3.15.2.1.b and 3.11.2.1.b. Further the limits specified in Technical Specifications 3.15.2.1 and 3.11.2.1 are site limits, not unit limits. Dose rates due to noble gas releases and due to radioiodine, tritium, and particulates are presented in Table 2-5 along with percent of technical specification limits.

Gross alpha radioactivity is reported in Tables 2-2a, 2-2b, and 2-2c as curies released in each quarter.

Limits for cumulative beta and gamma air doses, due to noble gases, are specified in Technical Specifications 3.15.2.2 (Unit 1) and 3.11.2.2 (Unit 2). These limits are unit limits. Cumulative air doses are presented in Tables 2-6a and 2-6b, along with percent of technical specification limits.

*There were no monitors out of service greater than 30 days and no unplanned releases.

Limits for cumulative individual doses, due to radioiodine, tritium, and particulates, are specified in Technical Specifications 3.15.2.3 (Unit 1) and 3.11.2.3 (Unit 2). These limits are also unit limits. Cumulative individual doses are presented in Tables 2-7a and 2-7b, with percent of technical specification limits.

2.4 RADIOLOGICAL IMPACT DUE TO GASEOUS RELEASES

Dose rates due to noble gas releases were calculated for the site in accordance with Technical Specifications 3/4.15.2.1.a (Unit 1) and 3/4.11.2.1.a (Unit 2). Results are presented in Table 2-5. Dose rates due to radioiodine, tritium, and particulates in gaseous releases were calculated in accordance with Technical Specifications 3/4.15.2.1.b (Unit 1) and 3/4.11.2.1.b (Unit 2). These results are also in Table 2-5.

Cumulative air doses due to noble gas releases were calculated for each unit in accordance with Technical Specification 3/4.15.2.2 (Unit 1) and 3/4.11.2.2 (Unit 2). These results are presented in Table 2-6a for Unit 1 and Table 2-6b for Unit 2..

Cumulative doses to an individual due to radioiodine, tritium, and particulates were calculated for each unit in accordance with Technical Specifications 3/4.15.2.3 (Unit 1) and 3/4.11.2.3 (Unit 2). These results are presented in Table 2-7a for Unit 1 and Table 2-7b for Unit 2.

Dose rates and doses were calculated using the methodology presented in the Plant Hatch Offsite Dose Calculation Manual.

TABLE 2-2a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error (%)

A. Fission and Activation Gases				
1. Total Release	Ci	1.54E+02	1.05E+02	1.00E+02
2. Average Release Rate For Period	uCi/sec	1.95E+01	1.41E+01	
*3. % of Tech Spec Limit	%			
B. Iodines				
1. Total Iodine-131	Ci	1.46E-02	1.76E-03	1.10E+02
2. Average Release Rate For Period	uCi/sec	1.85E-03	2.37E-04	
*3. % of Tech Spec Limit	%			
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	1.04E-03	2.64E-04	1.00E+02
2. Average Release Rate For Period	uCi/sec	1.33E-04	3.56E-05	
*3. % of Tech Spec Limit	%			
4. Gross Alpha Radioactivity	Ci	3.26E-07	1.82E-06	
D. Tritium				
1. Total	Ci	5.27E+00	4.88E+00	9.00E+01
2. Average Release Rate For Period	uCi/sec	6.70E-01	6.56E-01	
*3. % of Tech Spec Limit	%			

*Technical Specification limits are in terms of dose rate (mrem/yr) and dose (mrem). See Tables 2-5, 2-6a, 2-6b, 2-7a, and 2-7b.

TABLE 2-2b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error (%)

A. Fission and Activation Gases				
1. Total Release	Ci	2.67E+02	1.08E+02	1.00E+02
2. Average Release Rate For Period	uCi/sec	3.40E+01	1.46E+01	
*3. % of Tech Spec Limit	%			
B. Iodines				
1. Total Iodine-131	Ci	2.73E-03	1.13E-03	1.10E+02
2. Average Release Rate For Period	uCi/sec	3.47E-04	1.52E-04	
*3. % of Tech Spec Limit	%			
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	9.95E-04	2.14E-04	1.00E+02
2. Average Release Rate For Period	uCi/sec	1.26E-04	2.88E-05	
*3. % of Tech Spec Limit	%			
4. Gross Alpha Radioactivity	Ci	6.49E-07	1.59E-06	
D. Tritium				
1. Total	Ci	8.69E+00	6.57E+00	9.00E+01
2. Average Release Rate For Period	uCi/sec	1.11E+00	8.85E-01	
*3. % of Tech Spec Limit	%			

*Technical Specification limits are in terms of dose rate (mrem/yr) and dose (mrem). See Tables 2-5, 2-6a, 2-6b, 2-7a, and 2-7b.

TABLE 2-2c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error (%)

A. Fission and Activation Gases				
1. Total Release	Ci	4.21E+02	2.13E+02	1.00E+02
2. Average Release Rate For Period	uCi/sec	5.36E+01	2.87E+01	
*3. % of Tech Spec Limit	%			
B. Iodines				
1. Total Iodine-131	Ci	1.73E-02	2.89E-03	1.10E+02
2. Average Release Rate For Period	uCi/sec	2.20E-03	3.89E-04	
*3. % of Tech Spec Limit	%			
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	2.04E-03	4.79E-04	1.00E+02
2. Average Release Rate For Period	uCi/sec	2.59E-04	6.44E-05	
*3. % of Tech Spec Limit	%			
4. Gross Alpha Radioactivity	Ci	9.75E-07	3.41E-06	
D. Tritium				
1. Total	Ci	1.40E+01	1.14E+01	9.00E+01
2. Average Release Rate For Period	uCi/sec	1.78E+00	1.54E+00	
*3. % of Tech Spec Limit	%			

*Technical Specification limits are in terms of dose rate (mrem/yr) and dose (mrem). See Tables 2-5, 2-6a, 2-6b, 2-7a, and 2-7b.

TABLE 2-3a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - ELEVATED RELEASES*

		Continuous Mode		Batch Mode**	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission Gases					
Kr-85m	Ci	1.13E+00	5.04E-01		
Kr-87	Ci	8.43E+00	3.79E+00		
Kr-88	Ci	3.23E+00	0.00E+00		
Xe-133	Ci	9.14E-01	2.86E+00		
Xe-135m	Ci	2.15E+01	1.82E+01		
Xe-135	Ci	9.49E+00	8.13E+00		
Xe-138	Ci	8.29E+01	4.58E+01		
Total For Period	Ci	1.28E+02	7.93E+01		
2. Iodines					
I-131	Ci	1.43E-02	1.69E-03		
I-133	Ci	3.30E-03	4.75E-03		
I-135	Ci	3.46E-03	3.15E-03		
Total For Period	Ci	2.11E-02	9.59E-03		
3. Particulates					
Mn-54	Ci	0.00E+00	2.21E-07		
Co-60	Ci	0.00E+00	1.05E-06		
Zn-65	Ci	0.00E+00	1.12E-06		
Sr-89	Ci	0.00E+00	1.19E-05		
Sr-90	Ci	0.00E+00	3.49E-08		
Cs-137	Ci	2.53E-07	2.03E-07		
Ba-140	Ci	6.05E-05	3.58E-05		
La-140	Ci	1.21E-04	5.86E-05		
I-131	Ci	8.46E-06	2.28E-06		
Total For Period	Ci	1.90E-04	1.11E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-3b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - ELEVATED RELEASES*

		Continuous Mode		Batch Mode**	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission Gases					
Kr-85m	Ci	6.37E-01	3.65E-01		
Kr-87	Ci	6.22E+00	2.77E+00		
Kr-88	Ci	9.68E-01	0.00E+00		
Xe-133	Ci	4.65E-01	1.03E-01		
Xe-135m	Ci	2.09E+01	1.14E+01		
Xe-135	Ci	5.97E+00	2.98E+00		
Xe-138	Ci	8.29E+01	3.48E+01		
Total For Period	Ci	1.18E+02	5.24E+01		
2. Iodines					
I-131	Ci	6.97E-04	6.74E-04		
I-133	Ci	2.38E-03	2.44E-03		
I-135	Ci	3.38E-03	1.39E-03		
Total For Period	Ci	6.46E-03	4.50E-03		
3. Particulates					
Zn-65	Ci	0.00E+00	9.21E-08		
Sr-89	Ci	0.00E+00	3.12E-06		
Sr-90	Ci	0.00E+00	9.17E-09		
Cs-137	Ci	1.75E-07	1.56E-07		
Ba-140	Ci	5.73E-05	1.92E-05		
La-140	Ci	1.13E-04	3.42E-05		
I-131	Ci	7.47E-08	4.67E-07		
Total For Period	Ci	1.71E-04	5.73E-05		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-3c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - ELEVATED RELEASES*

		Continuous Mode		Batch Mode**	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission Gases					
Kr-85m	Ci	1.77E+00	8.69E-01		
Kr-87	Ci	1.46E+01	6.56E+00		
Kr-88	Ci	4.20E+00	0.00E+00		
Xe-133	Ci	1.38E+00	2.96E+00		
Xe-135m	Ci	4.24E+01	2.96E+01		
Xe-135	Ci	1.55E+01	1.11E+01		
Xe-138	Ci	1.66E+02	8.06E+01		
Total For Period	Ci	2.46E+02	1.32E+02		
2. Iodines					
I-131	Ci	1.50E-02	2.36E-03		
I-133	Ci	5.68E-03	7.19E-03		
I-135	Ci	6.84E-03	4.54E-03		
Total For Period	Ci	2.75E-02	1.41E-02		
3. Particulates					
Mn-54	Ci	0.00E+00	2.21E-07		
Co-60	Ci	0.00E+00	1.05E-06		
Zn-65	Ci	0.00E+00	1.21E-06		
Sr-89	Ci	0.00E+00	1.50E-05		
Sr-90	Ci	0.00E+00	4.41E-08		
Cs-137	Ci	4.28E-07	3.59E-07		
Ba-140	Ci	1.18E-04	5.50E-05		
La-140	Ci	2.34E-04	9.28E-05		
I-131	Ci	8.54E-06	2.75E-06		
Total For Period	Ci	3.61E-04	1.68E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-4a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES*

		Continuous Mode		Batch Mode**	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission Gases					
Xe-133	Ci	1.59E+01	1.58E+01		
Xe-135	Ci	1.01E+01	1.00E+01		
Total For Period	Ci	2.60E+01	2.58E+01		
2. Iodines					
I-131	Ci	2.48E-04	7.22E-05		
I-133	Ci	1.07E-03	2.96E-04		
I-135	Ci	8.43E-04	0.00E+00		
Total For Period	Ci	2.16E-03	3.68E-04		
3. Particulates					
Cr-51	Ci	1.44E-05	0.00E+00		
Mn-54	Ci	1.35E-06	0.00E+00		
Co-58	Ci	3.82E-06	0.00E+00		
Co-60	Ci	1.35E-05	2.07E-06		
Zn-65	Ci	6.15E-04	1.42E-04		
Sr-89	Ci	5.10E-05	4.23E-06		
Sr-90	Ci	2.45E-07	1.42E-09		
Cs-137	Ci	0.00E+00	3.14E-06		
Ba-140	Ci	4.88E-05	1.90E-06		
La-140	Ci	1.00E-04	0.00E+00		
I-131	Ci	6.18E-06	4.41E-07		
Total For Period	Ci	8.55E-04	1.53E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-4b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES*

		Continuous Mode		Batch Mode**	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission Gases					
Kr-85m	Ci	3.29E+00	0.00E+00		
Kr-87	Ci	1.12E+01	0.00E+00		
Xe-135m	Ci	1.91E+01	1.42E+01		
Xe-135	Ci	6.72E+01	4.18E+01		
Xe-138	Ci	4.85E+01	0.00E+00		
Total For Period	Ci	1.49E+02	5.60E+01		
2. Iodines					
I-131	Ci	2.03E-03	4.55E-04		
I-133	Ci	8.27E-03	1.17E-03		
I-135	Ci	1.34E-02	1.87E-03		
Total For Period	Ci	2.37E-02	3.50E-03		
3. Particulates					
Co-60	Ci	0.00E+00	4.25E-07		
Zn-65	Ci	1.70E-06	5.99E-06		
Sr-89	Ci	2.20E-04	3.74E-05		
Sr-90	Ci	6.46E-07	1.08E-07		
Cs-137	Ci	4.58E-07	5.03E-07		
Ba-140	Ci	1.92E-04	3.89E-05		
La-140	Ci	3.38E-04	6.08E-05		
Ce-141	Ci	4.34E-06	0.00E+00		
I-131	Ci	6.67E-05	1.26E-05		
Total For Period	Ci	8.24E-04	1.57E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-4c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES*

		Continuous Mode		Batch Mode**	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission Gases					
Kr-85m	Ci	3.29E+00	0.00E+00		
Kr-87	Ci	1.12E+01	0.00E+00		
Xe-133	Ci	1.59E+01	1.58E+01		
Xe-135m	Ci	1.91E+01	1.42E+01		
Xe-135	Ci	7.73E+01	5.18E+01		
Xe-138	Ci	4.85E+01	0.00E+00		
Total For Period	Ci	1.75E+02	8.18E+01		
2. Iodines					
I-131	Ci	2.28E-03	5.27E-04		
I-133	Ci	9.34E-03	1.47E-03		
I-135	Ci	1.42E-02	1.87E-03		
Total For Period	Ci	2.58E-02	3.86E-03		
3. Particulates					
Cr-51	Ci	1.44E-05	0.00E+00		
Mn-54	Ci	1.35E-06	0.00E+00		
Co-58	Ci	3.82E-06	0.00E+00		
Co-60	Ci	1.35E-05	2.50E-06		
Zn-65	Ci	6.17E-04	1.48E-04		
Sr-89	Ci	2.71E-04	4.16E-05		
Sr-90	Ci	8.91E-07	1.09E-07		
Cs-137	Ci	4.58E-07	3.65E-06		
Ba-140	Ci	2.41E-04	4.08E-05		
La-140	Ci	4.38E-04	6.08E-05		
Ce-141	Ci	4.34E-06	0.00E+00		
I-131	Ci	7.29E-05	1.31E-05		
Total For Period	Ci	1.68E-03	3.10E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

Table 2-5
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
GASSEOUS EFFLUENTS - DOSE RATES

Dose Rates Due to Noble Gases

Organ	Tech Spec Limit	Unit	Quarter 3	% of Tech Spec Limit	Quarter 4	% of Tech Spec Limit
TBody	500	mrem/yr	7.64E-01	1.53E-01	1.69E-01	3.38E-02
Skin	3000	mrem/yr	1.40E+00	4.65E-02	3.27E-01	1.09E-02

Dose Rates Due to Radioiodine, Tritium, and Particulates

Organ	Tech Spec Limit	Unit	Quarter 3	% of Tech Spec Limit	Quarter 4	% of Tech Spec Limit
Bone	1500	mrem/yr	6.03E-04	4.02E-05	1.12E-04	7.47E-06
Liver	1500	mrem/yr	1.64E-02	1.09E-03	1.33E-02	8.89E-04
TBody	1500	mrem/yr	1.62E-02	1.08E-03	1.33E-02	8.86E-04
Thyroid	1500	mrem/yr	9.50E-02	6.34E-03	2.96E-02	1.97E-03
Kidney	1500	mrem/yr	1.66E-02	1.10E-03	1.34E-02	8.91E-04
Lung	1500	mrem/yr	1.79E-02	1.19E-03	1.36E-02	9.09E-04
GILLI	1500	mrem/yr	1.62E-02	1.08E-03	1.33E-02	8.86E-04

TABLE 2-6a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
AIR DOSES DUE TO NOBLE GAS RELEASES

Cumulative Doses per Quarter

Type of Radi- ation	Tech Spec Limit	Unit	Quarter 3	% of Tech Spec Limit	Quarter 4	% of Tech Spec Limit
Gamma	5.0	mrads	8.79E-03	1.76E-01	7.77E-03	1.55E-01
Beta	10.0	mrads	1.17E-02	1.17E-01	1.13E-02	1.13E-01

Cumulative Doses This Year

Type of Radi- ation	Tech Spec Limit	Unit	Quarters 1,2,3,& 4	% of Tech Spec Limit
Gamma	10.0	mrads	3.14E-02	3.14E-01
Beta	20.0	mrads	4.02E-02	2.01E-01

TABLE 2-6b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
AIR DOSES DUE TO NOBLE GAS RELEASES

Cumulative Doses per Quarter

Type of Radi- ation	Tech Spec Limit	Unit	Quarter 3	% of Tech Spec Limit	Quarter 4	% of Tech Spec Limit
Gamma	5.0	mrads	1.91E-01	3.83E+00	3.48E-02	6.96E-01
Beta	10.0	mrads	1.42E-01	1.42E+00	3.03E-02	3.03E-01

Cumulative Doses This Year

Type of Radi- ation	Tech Spec Limit	Unit	Quarters 1,2,3,& 4	% of Tech Spec Limit
Gamma	10.0	mrads	2.67E-01	2.67E+00
Beta	20.0	mrads	2.35E-01	1.18E+00

TABLE 2-7a
E. I. HATCH NUCLEAR PLANT - Unit 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
INDIVIDUAL DOSES DUE TO RADIOIODINE, TRITIUM,
AND PARTICULATES IN GASEOUS RELEASES

Cumulative Doses per Quarter

Organ	Tech Spec Limit	Unit	Quarter 3	% of Tech Spec Limit	Quarter 4	% of Tech Spec Limit
Bone	7.5	mrem	1.08E-03	1.44E-02	1.89E-04	2.52E-03
Liver	7.5	mrem	3.26E-03	4.35E-02	2.32E-03	3.10E-02
TBody	7.5	mrem	3.11E-03	4.15E-02	2.27E-03	3.02E-02
Thyroid	7.5	mrem	3.73E-02	4.98E-01	7.21E-03	9.61E-02
Kidney	7.5	mrem	3.19E-03	4.25E-02	2.29E-03	3.05E-02
Lung	7.5	mrem	2.87E-03	3.82E-02	2.22E-03	2.96E-02
GILLI	7.5	mrem	2.89E-03	3.85E-02	2.22E-03	2.96E-02

Cumulative Doses This Year

Organ	Tech Spec Limit	Unit	Quarters 1, 2, 3, & 4	% of Tech Spec Limit
Bone	15.0	mrem	2.47E-03	1.65E-02
Liver	15.0	mrem	1.09E-02	7.26E-02
TBody	15.0	mrem	1.04E-02	6.95E-02
Thyroid	15.0	mrem	7.20E-02	4.80E-01
Kidney	15.0	mrem	1.06E-02	7.05E-02
Lung	15.0	mrem	9.84E-03	6.56E-02
GILLI	15.0	mrem	9.86E-03	6.57E-02

TABLE 2-7b
E. I. HATCH NUCLEAR PLANT - Unit 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1992
INDIVIDUAL DOSES DUE TO RADIOIODINE, TRITIUM,
AND PARTICULATES IN GASEOUS RELEASES

Cumulative Doses per Quarter

Organ	Tech Spec Limit	Unit	Quarter 3	% of Tech Spec Limit	Quarter 4	% of Tech Spec Limit
Bone	7.5	mrem	2.62E-03	3.50E-02	4.69E-04	6.25E-03
Liver	7.5	mrem	4.51E-03	6.02E-02	3.32E-03	4.43E-02
TBody	7.5	mrem	4.58E-03	6.10E-02	3.33E-03	4.44E-02
Thyroid	7.5	mrem	4.13E-02	5.51E-01	1.23E-02	1.64E-01
Kidney	7.5	mrem	4.59E-03	6.12E-02	3.34E-03	4.45E-02
Lung	7.5	mrem	4.48E-03	5.97E-02	3.31E-03	4.41E-02
GILLI	7.5	mrem	4.52E-03	6.02E-02	3.31E-03	4.42E-02

Cumulative Doses This Year

Organ	Tech Spec Limit	Unit	Quarters 1,2,3,& 4	% of Tech Spec Limit
Bone	15.0	mrem	3.75E-03	2.50E-02
Liver	15.0	mrem	1.59E-02	1.06E-01
TBody	15.0	mrem	8.83E-02	5.89E-01
Thyroid	15.0	mrem	9.43E-02	6.29E-01
Kidney	15.0	mrem	1.61E-02	1.07E-01
Lung	15.0	mrem	1.58E-02	1.05E-01
GILLI	15.0	mrem	1.58E-02	1.06E-01

TABLE 2-8
LOWER LIMITS OF DETECTION - GASEOUS SAMPLE ANALYSES

The values in this table represent apriori lower limits of detection (LLD) which are typically achieved in laboratory analyses of gaseous radwaste samples.

<u>RADIONUCLIDE</u>	<u>LLD (uCi/ml)</u>
Kr-87	1.31E-07
Kr-88	2.10E-07
Xe-133	1.62E-07
Xe-133m	6.07E-08
Xe-135	5.77E-08
Xe-138	2.85E-06
I-131	4.37E-14
I-133	6.16E-13
Mn-54	2.78E-14
Fe-59	4.62E-14
Co-58	2.46E-14
Co-60	2.88E-14
Zn-65	7.51E-14
Mo-99	6.02E-13
Cs-134	3.64E-14
Cs-137	2.88E-14
Ce-141	4.94E-14
Ce-144	2.02E-13
Sr-89	1.00E-11
Sr-90	1.00E-11
H-3	1.00E-06

3. SOLID WASTE

3.1 REGULATORY REQUIREMENTS

The Technical Specifications presented in this section are for Unit 1. Requirements for Unit 2 are the same as for Unit 1; however, the Technical Specification numbers are not the same.

TECHNICAL SPECIFICATIONS

3.15.3.1 The solid radwaste system shall be used in accordance with the PROCESS CONTROL PROGRAM to provide for the SOLIDIFICATION of wet solid wastes and for the SOLIDIFICATION and packaging of other radioactive wastes, as required, to ensure the meeting of the requirements of 10 CFR Part 20 and of 10 CFR Part 71 prior to shipment of radioactive wastes from the site.

6.9.1.9 states in part:

The Radioactive Effluent Release Report shall include the following information for each type of solid waste shipped offsite during the report period:

- a. Container volume
- b. Total curie quantity (specify whether determined by measurement or estimate)
- c. Principal radionuclides (specify whether determined by measurement or estimate)
- d. Type of waste, e.g., spent resin, compacted dry waste, evaporator bottoms
- e. Type of container, e.g., LSA, type A, type B, large quantity
- f. Solidification agent, e.g., cement.

3.2 SOLID WASTE DATA

Regulatory guide 1.21 Table 3 is found in this report as Table 3-la. and 3-lb.

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1992

July 1, 1992 - December 31, 1992

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
FOR UNITS I AND II

TABLE 3-1A

FORM TITLE: REG GUIDE 1.21 EFFLUENT AND WASTE DISPOSAL
SEMIANNUAL REPORT OF SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
PERIOD COVERED: FROM 7/1/92 TO 12/31/92 FOR UNIT: 1 & 2

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

1. TYPE OF WASTE	UNIT	6 month period	Est. Total ERROR%
a. Spent resins, filter sludges, evaporator bottoms, etc.	M3	1.18E+02	
	CI	1.14E+03	1.0E+01
b. Dry compressible waste, contaminated equip. etc.	M3	1.15E+02	
	CI	9.48E+00	2.0E+01
c. Irradiated components, control rods, Recirc Pump Internals	M3	4.88E+00	
	CI	3.63E+04	1.0E+01
d. Control Rod Drive Filters	M3		
	CI		
e. Other (describe) equip. etc.	M3		
	CI		

2. Estimate of major nuclide composition (by type of waste)

ISOTOPE	PERCENT	CURIES
A: Zn-65	6.30E+01	7.18E+02
Fe-55	2.98E+00	3.40E+01
Co-60	1.19E+01	1.36E+02
Cs-137	2.66E+00	3.03E+01
OTHER	1.95E+01	2.22E+02
B: Zn-65	1.37E+01	1.30E+00
Fe-55	4.08E+01	3.87E+00
Co-60	3.34E+01	3.17E+00
Cs-137	3.34E+00	3.17E-01
OTHER	8.76E+00	8.30E-01
C: Zn-65	0.00E+00	0.00E+00
Fe-55	4.53E+01	1.64E+04
Co-60	4.96E+01	1.80E+04
Cs-137	0.00E+00	0.00E+00
OTHER	5.10E+00	1.85E+03
D: Zn-65		
Fe-55		
Co-60		
Cs-137		
OTHER		
E: Zn-65		
Fe-55		
Co-60		
Cs-137		
OTHER		

3. Solid Waste Disposition

Number of Shipments 27 Mode of Transportation TRACTOR TRAILER Destination BARNWELL

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments Mode of Transportation Destination

NONE

NONE

NONE

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1992
 July 1, 1992 - December 31, 1992
 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
 FOR UNITS I AND II

TABLE 3-1B

FORM TITLE: UNIT 1 AND 2 TECH SPEC 6.9.1.9 EFFLUENT AND WASTE
DISPOSAL SEMIANNUAL REPORT OF SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

PERIOD COVERED FROM: 7-1-92 TO 12-31-92 FOR UNIT 1&2

TYPE OF WASTE	CURIE QUANTITY DETERMINED	PRINCIPLE NUCLIDES DETERMINED	BURIAL CONTAINER DESCRIPTION	NUMBER CONTAINERS SHIPPED	VOLUME CONTAINER CUBIC FT	TYPE SHIPMENT CONTAINER	SOLIDIFICATION AGENT
DEWATERED RESINS	972.5 MEASURED	Zn65, Co60 Fe55 MEASURED	HIGH INTEGRITY CONTAINER	6	132.4	TYPE A and TYPE B CASK 10-142 and 14-210	N/A
DEWATERED RESINS	167.5 MEASURED	Zn65, Co60 Cs137, Fe55 MEASURED	HIGH INTEGRITY CONTAINER	17	202.1	TYPE A CASK 14-210	N/A
DAW (DRY) (ACTIVE) (WASTE) *	9.48 MEASURED	Zn65, Co60 Cs137, Fe55 MEASURED	STRONG TIGHT CONTAINER B-25 BOXES	42	95	STRONG TIGHT CONTAINERS B-25 BOXES	N/A
IRRADIATED COMPONENTS CUBES	36300 MEASURED	Co60 Fe55 MEASURED	STEEL CONTAINER	3	57.4	TYPE B CASK CNSI-3-55	N/A

* CONTAINS TOTAL VOLUME SHIPPED FROM VENDORS AS WELL AS PLANT

4 CHANGES TO THE PLANT HATCH ODCM AND PCP

There were no changes for this period.

5. METEOROLOGY

In accordance with Technical Specification 6.9.1.9, the annual summary of meteorological data collected at Plant Hatch over 1992 is presented in this section.

5.1 1992 Meteorological Data

- Attachment 1 Joint Frequency Tables of Wind Speed and Wind Direction 10m vs Delta Temperature 60-10m.
- Attachment 2 Joint Frequency Tables of Wind Speed and Wind Direction 60m vs Delta Temperature 60-10m.
- Attachment 3 Joint Frequency Tables of Wind Speed and Wind Direction 100m vs Delta Temperature 100-10m.
- Attachment 4 Wind Roses from 10m (Seasonal and Annual).
- Attachment 5 Wind Roses from 60m (Seasonal and Annual).
- Attachment 6 Wind Roses from 100m (Seasonal and Annual).
- Attachment 7 Wind Roses from 23m Backup (Seasonal and Annual).
- Attachment 8 Percent Data Recovery by Parameter and for Pertinent Composite Parameters for 1991.
- Attachment 9 Plots of Monthly Averages and Averages of Daily Extremes of Ambient Temperature and Dew Point Temperature.
- Attachment 10 Daily, Monthly, and Annual Precipitation for the Period of January through December 1991.
- Attachment 11 Descriptive Paragraph Comparing 1992 with Previous Years.

ATTACHMENT 1. PLANT HATCH JOINT FREQUENCY TABLES OF WIND SPEED
AND WIND DIRECTION 10m VS DELTA TEMPERATURE 60-10m
JANUARY 1, 1992 THROUGH DECEMBER 31, 1992

GROUPS AT EACH WIND SPEED AND DIRECTION

RECEPTION OF RECORD = 92010101-92123124

PERIOD OF RECORD 9 DT/DZ
STABILITY CLASS. 9

STABILITY CLASS: H DIR:Z
SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60-
ELEVATION:

WIND DIRECTION	WIND SPEED(MPH)							TOTAL
	1-3	4-7	8-12	13-18	19-24	>24		
N	6	35	5	0	0	0	46	
NNE	7	38	5	0	0	0	50	
NE	9	152	10	0	0	0	171	
ENE	9	80	3	0	0	0	92	
E	9	47	1	0	0	0	57	
ESE	9	42	1	0	0	0	52	
SE	15	41	4	0	0	0	60	
SSE	10	36	1	0	0	0	47	
S	9	51	7	0	0	0	67	
SSW	16	64	1	0	0	0	81	
SW	13	93	13	0	0	0	119	
WSW	23	117	9	0	0	0	149	
W	13	142	15	0	0	0	170	
WNW	14	124	37	0	0	0	175	
NW	11	117	15	0	0	0	143	
NNW	8	55	12	0	0	0	75	
TOTAL	181	1234	139	0	0	0	1554	

PERIODS OF CALM(HOURS):	0
VARIABLE DIRECTION	756
HOURS OF MISSING DATA:	31

ATTACHMENT 1 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: B DT/DZ

ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	10	1	0	0	0	15
NNE	7	11	0	0	0	0	18
NE	5	34	2	0	0	0	41
ENE	7	21	0	0	0	0	28
E	4	11	0	0	0	0	15
ESE	3	10	0	0	0	0	13
SE	4	5	2	0	0	0	11
SSE	2	7	1	0	0	0	10
S	7	13	1	0	0	0	21
SSW	6	8	1	0	0	0	15
SW	6	19	1	0	0	0	26
WSW	11	12	3	0	0	0	26
W	8	27	2	0	0	0	37
WNW	8	16	3	0	0	0	27
NW	6	31	4	0	0	0	41
NNW	4	27	4	0	0	0	35
TOTAL	92	262	25	0	0	0	379

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 232

HOURS OF MISSING DATA: 31

ATTACHMENT 1 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: C DT/DZ
 ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60-

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	17	2	0	0	0	23
NNE	3	9	0	0	0	0	12
NE	7	32	2	0	0	0	41
ENE	11	15	0	0	0	0	26
E	4	8	1	0	0	0	13
ESE	3	5	1	0	0	0	9
SE	7	7	0	0	0	0	14
SSE	9	9	3	0	0	0	21
S	2	11	2	0	0	0	15
SSW	6	4	3	0	0	0	13
SW	11	13	2	0	0	0	26
WSW	15	17	3	0	0	0	35
W	8	16	4	0	0	0	28
WNW	10	16	2	0	0	0	28
NW	11	24	1	0	0	0	36
NNW	7	12	2	0	0	0	21
TOTAL	118	215	28	0	0	0	361

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 239

HOURS OF MISSING DATA: 31

ATTACHMENT 1 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: D DT/DZ

ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60-

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	32	64	20	0	0	0	116
NNE	40	78	4	0	0	0	122
NE	79	266	13	0	0	0	358
ENE	54	91	2	0	0	0	147
E	56	26	0	0	0	0	82
ESE	46	47	0	0	0	0	93
SE	46	55	1	0	0	0	102
SSE	33	43	2	0	0	0	78
S	36	67	16	0	0	0	119
SSW	28	71	4	0	0	0	103
SW	46	44	3	0	0	0	93
WSW	51	57	4	0	0	0	112
W	47	87	6	0	0	0	140
WNW	53	71	16	0	0	0	140
NW	39	88	10	0	0	0	137
NNW	35	82	4	0	0	0	121
TOTAL	721	1237	105	0	0	0	2063

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 1399

HOURS OF MISSING DATA: 31

ATTACHMENT 1 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: E DT/DZ

ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	25	25	0	0	0	0	50
NNE	43	30	1	0	0	0	74
NE	142	129	3	0	0	0	274
ENE	92	28	0	0	0	0	120
E	69	22	0	0	0	0	91
ESE	105	31	1	0	0	0	137
SE	140	51	2	0	0	0	193
SSE	117	78	4	0	0	0	199
S	115	79	5	0	0	0	199
SSW	160	67	3	0	0	0	230
SW	197	72	4	0	0	0	273
WSW	138	55	1	0	0	0	194
W	111	51	2	0	0	0	164
WNW	92	40	2	0	0	0	134
NW	52	41	1	0	0	0	94
NNW	30	51	1	0	0	0	82
TOTAL	1628	850	30	0	0	0	2508
PERIODS OF CALM(HOURS):	0						
VARIABLE DIRECTION 1933							
HOURS OF MISSING DATA:	31						

HOURS AT EACH WIND SPEED AND DIRECTION
 PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: F DT/DZ
 ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60-

WIND DIRECTION	WIND SPEED(MPH)						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	15	1	0	0	0	0	16
NNE	21	2	2	0	0	0	25
NE	77	18	0	0	0	0	95
ENE	51	4	0	0	0	0	55
E	30	1	0	0	0	0	31
ESE	35	0	0	0	0	0	35
SE	35	2	0	0	0	0	37
SSE	28	2	0	0	0	0	30
S	65	8	0	0	0	0	73
SSW	73	5	0	0	0	0	78
SW	137	8	0	0	0	0	145
WSW	135	1	0	0	0	0	136
W	103	6	0	0	0	0	109
WNW	55	8	0	0	0	0	63
NW	52	9	0	0	0	0	61
NNW	23	14	0	0	0	0	37
TOTAL	935	89	2	0	0	0	1026

PERIODS OF CALM(HOURS): 0
 VARIABLE DIRECTION 665
 HOURS OF MISSING DATA: 31

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: G DT/OZ
 ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60-

WIND DIRECTION	WIND SPEED (MPH)								>24 TOTAL
	1-3	4-7	8-12	13-18	19-24				
N	5	0	0	0	0	0	0	0	5
NNE	8	0	0	0	0	0	0	0	8
NE	17	0	0	0	0	0	0	0	17
ENE	14	0	0	0	0	0	0	0	14
E	14	0	0	0	0	0	0	0	14
ESE	11	1	0	0	0	0	0	0	12
SE	9	0	0	0	0	0	0	0	9
SSE	9	0	0	0	0	0	0	0	9
S	38	0	0	0	0	0	0	0	38
SSW	128	2	0	0	0	0	0	0	130
SW	193	1	0	0	0	0	0	0	194
WSW	209	2	0	0	0	0	0	0	211
W	128	1	0	0	0	0	0	0	129
WNW	37	0	0	0	0	0	0	0	37
NW	18	0	0	0	0	0	0	0	18
NNW	15	2	0	0	0	0	0	0	17
TOTAL	853	9	0	0	0	0	0	0	862

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 327

HOURS OF MISSING DATA: 31

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: ALL DT/DZ

ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	91	152	28	0	0	0	271
NNE	129	168	12	0	0	0	309
NE	336	631	30	0	0	0	997
ENE	238	239	5	0	0	0	482
E	186	115	2	0	0	0	303
ESE	212	136	3	0	0	0	351
SE	256	161	9	0	0	0	426
SSE	208	175	11	0	0	0	394
S	272	229	31	0	0	0	532
SSW	417	221	12	0	0	0	650
SW	603	250	23	0	0	0	876
WSW	582	261	20	0	0	0	863
W	418	330	29	0	0	0	777
WNW	269	275	60	0	0	0	604
NW	189	310	31	0	0	0	530
NNW	122	243	23	0	0	0	388
TOTAL	4528	3896	329	0	0	0	8753

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 5551

HOURS OF MISSING DATA: 31

ATTACHMENT 2. PLANT HATCH JOINT FREQUENCY TABLES OF WIND SPEED
AND WIND DIRECTION 60m VS DELTA TEMPERATURE 60-10m
JANUARY 1, 1992 THROUGH DECEMBER 31, 1992

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: A DT/DZ

ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	17	16	3	0	0	37
NNE	6	10	14	6	0	0	36
NE	1	48	82	32	0	0	163
ENE	5	51	65	16	0	0	137
E	0	33	21	7	1	0	62
ESE	5	24	11	6	0	0	46
SE	3	24	18	3	0	0	48
SSE	0	24	9	3	0	0	36
S	3	24	28	7	0	0	62
SSW	1	40	22	1	0	0	64
SW	4	43	41	24	4	0	116
WSW	5	42	64	26	2	1	140
W	6	68	112	36	8	1	231
WNW	2	50	84	44	10	0	190
NW	6	44	45	16	0	0	111
NNW	5	39	22	6	0	0	72
TOTAL	53	581	654	236	25	2	1551

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 184

HOURS OF MISSING DATA: 35

ATTACHMENT 2 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: 8 DT/DZ
 ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60-

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	8	4	2	0	0	17
NNE	2	7	2	0	0	0	11
NE	1	16	18	6	0	0	41
ENE	2	18	10	1	0	0	31
E	0	9	14	2	0	0	25
ESE	0	4	3	1	0	0	8
SE	0	2	3	3	0	0	8
SSE	2	5	3	0	1	0	11
S	1	12	4	3	0	0	20
SSW	0	3	6	1	0	0	10
SW	2	14	6	5	1	0	28
WSW	2	9	10	3	2	0	26
W	2	14	15	11	1	0	43
WNW	3	18	8	4	3	0	36
NW	3	15	17	7	0	0	42
NNW	2	12	7	1	0	0	22
TOTAL	25	166	130	50	8	0	379

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 73

HOURS OF MISSING DATA: 35

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: C DT/DZ
 ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	3	4	3	0	0	12
NNE	1	4	2	2	0	0	9
NE	1	10	23	7	0	0	41
ENE	2	19	5	3	0	0	29
E	3	5	7	2	1	0	18
ESE	3	7	2	3	0	0	15
SE	2	4	4	0	0	0	10
SSE	3	2	4	4	0	0	13
S	3	8	5	4	0	0	20
SSW	1	7	2	4	0	0	14
SW	4	6	4	3	1	0	18
WSW	2	15	13	3	1	0	34
W	4	12	18	5	4	0	43
WNW	4	18	7	3	1	0	33
NW	0	12	8	4	0	0	24
NNW	3	12	11	2	0	0	28
TOTAL	38	144	119	52	8	0	361

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 92

HOURS OF MISSING DATA: 35

ATTACHMENT 2 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: D DT/DZ
 ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	16	51	24	4	0	102
NNE	14	22	39	13	1	0	89
NE	10	50	189	85	6	0	340
ENE	14	68	93	23	2	0	200
E	8	70	63	14	0	0	155
ESE	5	34	52	6	0	0	97
SE	8	34	23	2	0	0	67
SSE	7	18	23	10	0	0	58
S	8	30	44	24	0	0	106
SSW	3	19	48	21	0	0	91
SW	6	30	40	14	1	0	91
WSW	4	35	36	14	3	0	92
W	7	40	86	43	4	0	180
WNW	8	51	64	34	7	0	164
NW	9	39	44	15	0	0	107
NNW	8	39	68	9	0	0	124
TOTAL	126	595	963	351	28	0	2063

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 190

HOURS OF MISSING DATA: 35

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: E DT/DZ
 ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	13	28	6	0	0	54
NNE	5	22	42	23	2	0	94
NE	5	31	149	41	2	0	228
ENE	7	43	76	9	0	0	135
E	5	61	106	7	0	1	180
ESE	8	41	94	8	0	0	151
SE	8	88	77	7	0	0	180
SSE	4	59	113	24	2	0	202
S	12	49	119	26	2	1	209
SSW	7	60	123	25	1	0	216
SW	3	47	121	37	4	0	212
WSW	7	39	104	31	3	0	184
W	6	33	102	28	1	0	170
WNW	6	37	87	19	1	0	150
NW	2	17	49	7	0	0	75
NNW	1	14	43	9	0	0	67
TOTAL	93	654	1433	307	18	2	2507

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 79

HOURS OF MISSING DATA: 35

ATTACHMENT 2 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: F DT/DZ

ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	5	16	5	0	0	30
NNE	7	9	8	2	0	0	26
NE	0	3	42	26	0	0	76
ENE	2	9	46	8	0	0	65
E	2	10	27	0	0	0	39
ESE	1	17	29	0	0	0	47
SE	1	36	20	0	0	0	57
SSE	2	24	25	2	0	0	53
S	3	15	46	6	0	0	70
SSW	0	15	29	9	0	0	53
SW	2	12	48	22	0	0	84
WSW	6	9	84	20	0	0	119
W	1	16	73	14	0	0	104
WNW	1	10	59	12	0	0	82
NW	2	10	34	6	0	0	52
NNW	3	15	45	6	0	0	69
TOTAL	37	220	631	138	0	0	1026

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 33

HOURS OF MISSING DATA: 35

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 920101-92123124
STABILITY CLASS: 6 DT/DZ
ELEVATION: SPD60M DIR60M LAPSE:DT60-

WIND SPEED(MPH)

WIND DIRECTION	1-3						>24 TOTAL		
	1-3	4-7	8-12	13-18	19-24	>24	TOTAL		
N	2	12	13	3	0	0	30		
NNE	4	10	3	0	0	0	17		
NE	6	10	15	2	0	0	33		
ENE	6	5	18	2	0	0	31		
E	3	10	9	1	0	0	23		
ESE	3	20	17	0	0	0	40		
SE	7	23	11	0	0	0	41		
SSE	3	8	11	4	0	0	26		
S	4	20	23	4	0	0	51		
SSW	7	19	32	6	0	0	64		
SW	3	20	56	21	0	0	100		
WSW	7	23	47	9	0	0	86		
W	5	28	82	8	0	0	123		
WNW	2	12	64	4	0	0	82		
NNW	6	22	27	2	0	0	57		
NNW	3	26	28	1	0	0	58		
TOTAL	71	268	456	67	0	0	862		

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 32
HOURS OF MISSING DATA: 35

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: ALL DT/DZ

ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60-

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	26	74	132	46	4	0	282
NNE	39	84	110	46	3	0	282
NE	24	173	518	199	8	0	922
ENE	38	213	313	62	2	0	628
E	21	198	247	33	2	1	502
ESE	25	147	208	24	0	0	404
SE	29	211	156	15	0	0	411
SSE	21	140	188	47	3	0	399
S	34	158	269	74	2	1	538
SSW	19	163	262	67	1	0	512
SW	24	172	316	126	11	0	649
WSW	33	172	358	106	11	1	681
W	31	211	488	145	18	1	894
WNW	26	196	373	120	22	0	737
NW	28	159	224	57	0	0	468
NNW	25	157	224	34	0	0	440
TOTAL	443	2628	4386	1201	87	4	8749

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 683

HOURS OF MISSING DATA: 35

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SP100M DIRECTION:DI100M LAPSE:DT100-

WIND DIRECTION	WIND SPEED (MPH)							TOTAL
	1-3	4-7	8-12	13-18	19-24	>24		
N	0	2	6	1	0	0	0	9
NNE	0	2	3	4	0	0	0	9
NE	0	9	39	13	1	0	0	62
ENE	0	8	25	11	0	0	0	44
E	0	6	7	4	0	0	0	17
ESE	0	6	6	2	1	0	0	15
SE	1	8	4	2	0	0	0	15
SSE	0	4	4	2	0	0	0	10
S	3	2	4	3	0	0	0	9
SSW	0	3	10	1	0	0	0	14
SW	0	4	12	13	5	1	1	35
WSW	0	1	24	22	3	0	0	50
W	0	8	20	12	2	3	0	45
WNW	0	2	16	34	4	0	0	56
NW	0	3	8	9	0	0	0	20
NNW	0	7	5	0	0	0	0	12
TOTAL	1	75	193	133	16	4	422	

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PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 14
HOURS OF MISSING DATA: 161
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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: B DT/DZ

ELEVATION: SPEED:SP100M DIRECTION:D100M LAPSE:DT100-

WIND SPEED (MPH)									
WIND DIRECTION									
1-3	4-7	8-12	13-18	19-24	>24 TOTAL				
N	0	3	6	0	0	0	0	0	9
NNE	0	7	6	0	0	0	0	0	20
NE	0	11	22	16	1	0	0	0	50
ENE	1	11	15	7	0	0	0	0	34
E	0	9	5	4	0	0	0	0	18
ESE	0	8	4	0	0	0	0	0	12
SE	1	9	8	1	0	0	0	0	19
SSE	1	6	3	1	0	0	0	0	11
S	0	5	8	3	0	0	0	0	16
SSW	0	11	13	0	0	0	0	0	24
SW	0	15	11	6	1	0	0	0	30
WSW	0	8	25	13	0	1	1	1	47
W	0	13	27	16	5	1	1	1	62
WNW	0	6	32	15	7	1	1	1	61
NW	0	10	12	3	0	0	0	0	25
NNW	0	12	8	5	0	0	0	0	25
TOTAL	3	144	206	96	14	3	466		

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 41

HOURS OF MISSING DATA: 161

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: C DT/DZ
 ELEVATION: SPEED:SP100M DIRECTION:DI100M LAPSE:DT100-

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	8	9	0	0	0	18
NNE	0	6	2	3	0	0	11
NE	2	21	23	10	0	0	56
ENE	1	26	19	7	0	0	53
E	0	8	6	2	0	0	16
ESE	3	8	1	1	0	0	13
SE	1	6	5	0	0	0	12
SSE	1	4	6	1	0	0	12
S	0	10	5	2	0	0	17
SSW	2	15	6	0	0	0	23
SW	1	11	8	3	1	0	24
WSW	3	12	21	9	1	1	47
W	4	20	33	16	3	0	76
WNW	0	17	26	6	3	1	53
NW	0	17	18	7	0	0	42
NNW	1	9	7	2	0	0	19

TOTAL	20	198	195	69	8	2	492
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PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 64

HOURS OF MISSING DATA: 161

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: 0 DT/DZ

ELEVATION: SPEED:SP100M DIRECTION:DI100M LAPSE:DT100-

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	24	42	59	10	0	138
NNE	8	20	38	45	5	1	117
NE	7	56	142	169	15	1	390
ENE	15	68	85	47	0	0	215
E	3	47	63	37	5	0	155
ESE	5	31	40	18	0	0	94
SE	9	33	29	3	0	0	74
SSE	9	23	23	19	3	0	77
S	11	33	55	36	8	0	143
SSW	7	22	45	33	5	0	112
SW	14	43	48	34	9	1	149
WSW	2	53	60	34	10	1	160
W	10	55	88	84	18	1	256
WNW	6	49	82	59	17	4	217
NW	15	49	52	35	6	0	157
NNW	10	33	64	14	1	0	122
TOTAL	134	639	956	726	112	9	2576

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 265

HOURS OF MISSING DATA: 161

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: E DT/DZ
 ELEVATION: SPEED:SP100M DIRECTION:DI100M LAPSE:DT100-

WIND DIRECTION	WIND SPEED (MPH)								TOTAL
	1-3	4-7	8-12	13-18	19-24	>24			
N	1	10	14	31	1	0	57		
NNE	5	19	41	47	17	0	129		
NE	8	20	80	154	13	1	276		
ENE	4	36	86	67	8	1	202		
E	4	34	85	86	2	0	211		
ESE	7	27	69	62	1	0	166		
SE	5	73	103	28	1	0	210		
SSE	4	23	79	100	9	2	217		
S	3	34	94	97	13	2	248		
SSW	5	23	72	106	12	1	219		
SW	6	31	80	109	16	1	243		
WSW	3	10	78	82	13	1	187		
W	4	18	58	102	12	1	195		
WNW	2	21	44	95	4	0	166		
NW	3	16	37	42	1	0	99		
NNW	3	8	22	32	3	0	68		
TOTAL	67	403	1042	1240	131	10	2893		

PERIODS OF CALM(HOURS): 0
 VARIABLE DIRECTION 56
 HOURS OF MISSING DATA: 161

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: F DT/DZ
 ELEVATION: SPEED:SP100M DIRECTION:DI100M LAPSE:DT100-

WIND SPEED (MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	7	11	18	2	0	44
NNE	3	5	6	4	3	0	21
NE	0	8	9	43	6	0	66
ENE	1	13	10	46	9	0	79
E	2	10	20	18	0	1	51
ESE	1	9	17	15	0	0	42
SE	3	20	24	12	0	0	59
SSE	0	11	35	22	4	0	72
S	2	7	22	25	8	0	64
SSW	3	12	20	26	8	0	69
SW	1	10	19	38	19	0	87
WSW	3	7	26	58	19	0	113
W	1	7	17	72	10	0	107
WNW	1	7	17	49	11	0	85
NW	1	4	22	42	1	0	70
NNW	1	8	18	33	4	0	64

TOTAL	29	145	293	521	104	1	1093
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PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 27

HOURS OF MISSING DATA: 161

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124

STABILITY CLASS: 6 DT/DZ

ELEVATION: SPEED:SP100M DIRECTION:DI100M LAPSE:DT100-

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	6	12	7	0	0	26
NNE	0	16	16	2	1	0	35
NE	2	6	8	6	0	0	22
ENE	0	4	7	7	0	0	18
E	1	4	5	9	1	0	20
ESE	1	5	9	3	0	0	18
SE	2	23	11	4	1	0	41
SSE	0	11	10	13	1	0	35
S	1	10	19	12	4	0	46
SSW	1	12	14	8	5	0	40
SW	6	13	19	22	10	0	70
WSW	4	7	28	25	11	0	75
W	2	9	29	35	2	0	77
WNW	4	11	31	27	4	0	77
NW	0	11	18	15	3	0	47
NNW	5	7	18	4	0	0	34
TOTAL	30	155	254	199	43	0	681

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 11

HOURS OF MISSING DATA: 161

ATTACHMENT 3 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101-92123124
 STABILITY CLASS: ALL DT/DZ
 ELEVATION: SPEED:SP100M DIRECTION:DI100M LAPSE:DT100-

WIND SPEED(MPH)

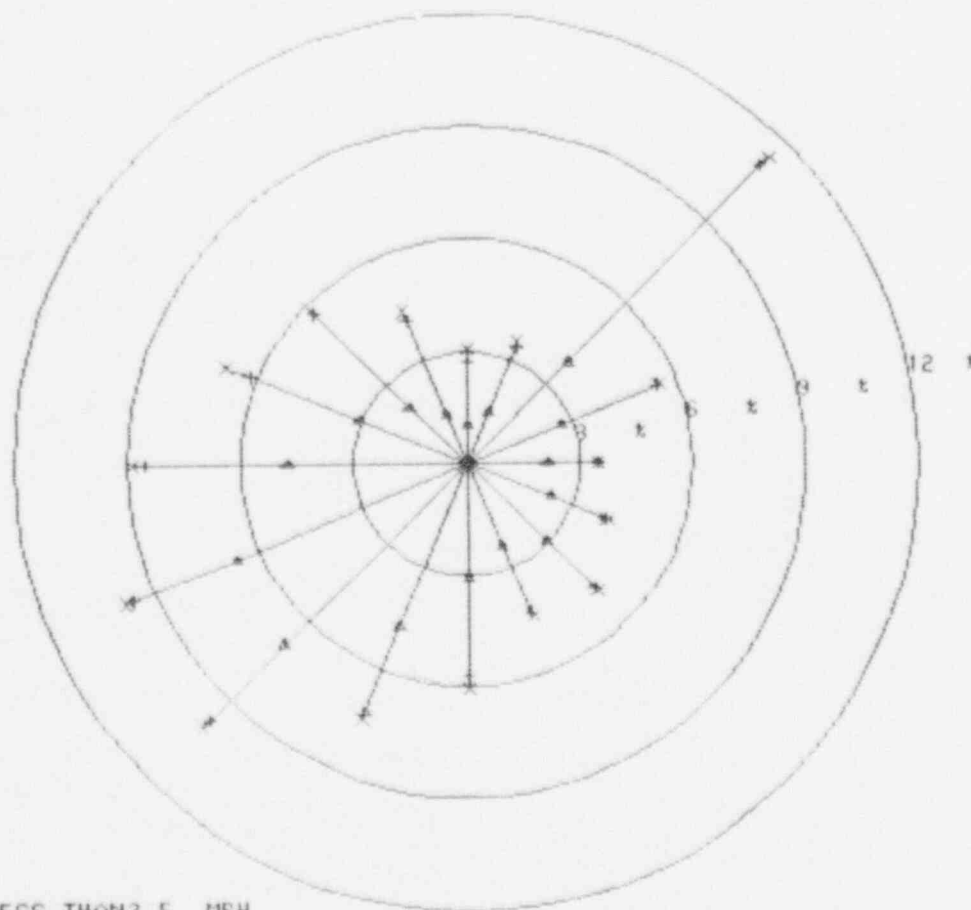
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	60	100	116	13	0	301
NNE	16	75	113	111	26	1	342
NE	19	131	323	411	36	2	922
ENE	22	166	247	192	17	1	645
E	10	113	191	160	8	1	488
ESE	17	94	146	101	2	0	360
SE	22	172	184	50	2	0	430
SSE	15	82	160	158	17	2	434
S	17	101	207	178	38	2	543
SSW	13	98	180	174	30	1	501
SW	28	127	197	225	61	3	641
WSW	15	93	262	243	57	4	679
W	21	130	272	337	52	6	818
WNW	13	113	248	285	50	6	715
NW	19	110	167	153	11	0	460
NNW	20	84	142	90	8	0	344
TOTAL	284	1759	3139	2984	428	29	8623

PERIODS OF CALM(HOURS): 0

VARIABLE DIRECTION 478

HOURS OF MISSING DATA: 161

ATTACHMENT 4a. PLANT HATCH 10m METEOROLOGICAL TOWER WIND ROSE
JANUARY 1, 1992 THROUGH DECEMBER 31, 1992



WIND ROSE
(WINDS FROM)
N
↑

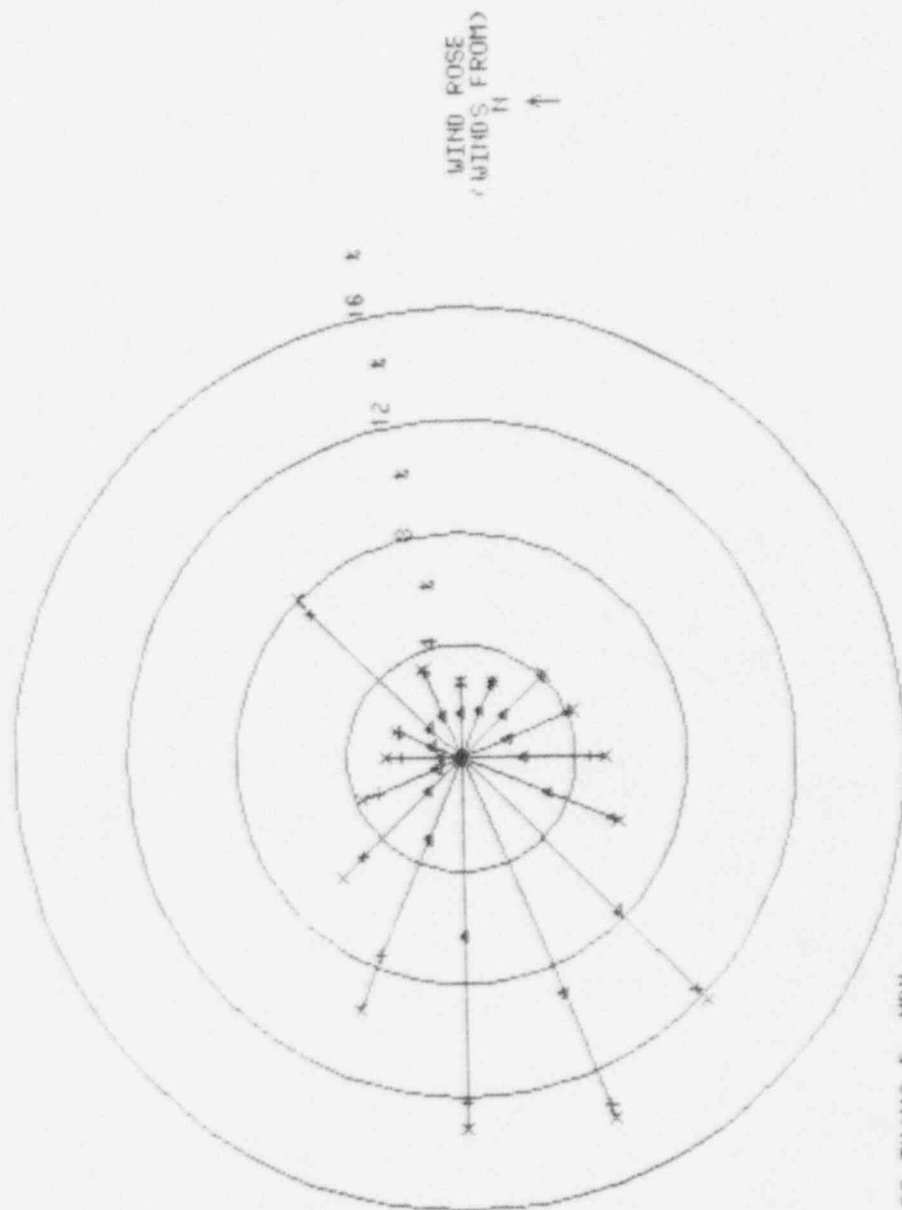
- ▲ WIND SPEED LESS THAN 3.5 MPH
- △ WIND SPEED LESS THAN 7.5 MPH
- × WIND SPEED LESS THAN 12.5 MPH
- ◆ WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 13:48

ATTACHMENT 4b. PLANT HATCH 10m METEOROLOGICAL TOWER WIND ROSE
JANUARY 1, 1992 THROUGH MARCH 31, 1992



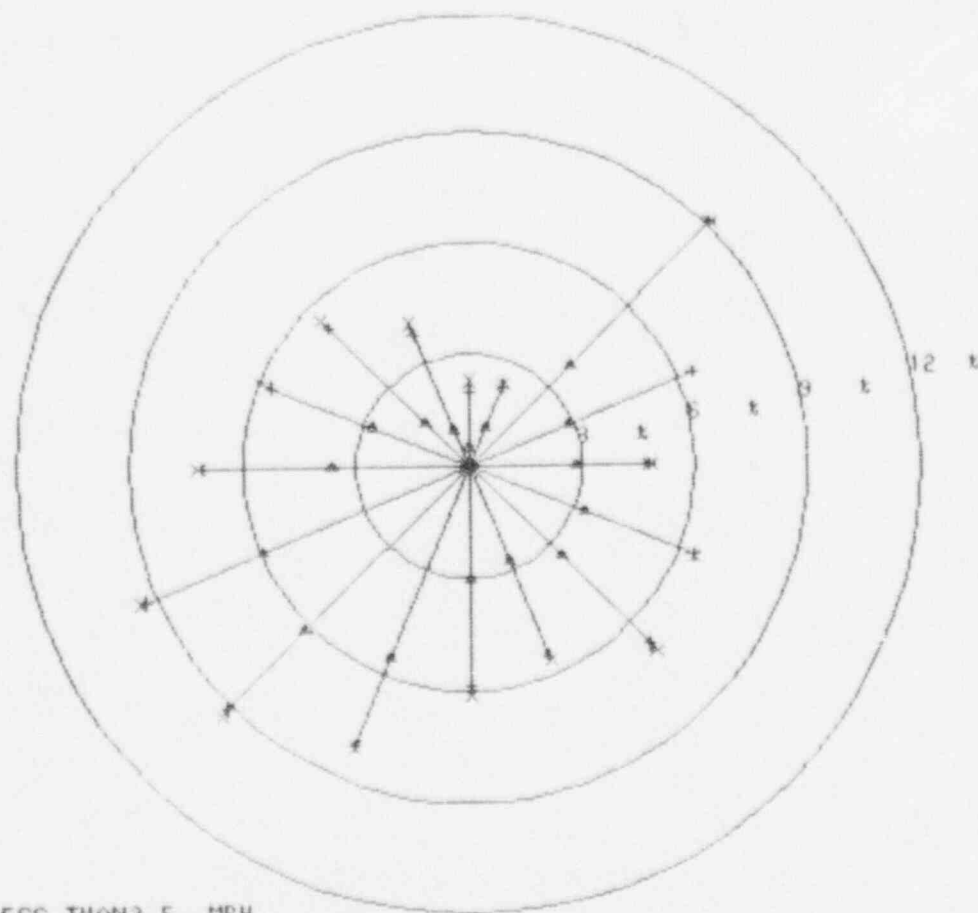
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- × WIND SPEED LESS THAN 12.5 MPH
- ◆ WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 13:58

ATTACHMENT 4c. PLANT HATCH 10m METEOROLOGICAL TOWER WIND ROSE
APRIL 1, 1992 THROUGH JUNE 30, 1992



WIND ROSE
(WINDS FROM)
N
↑

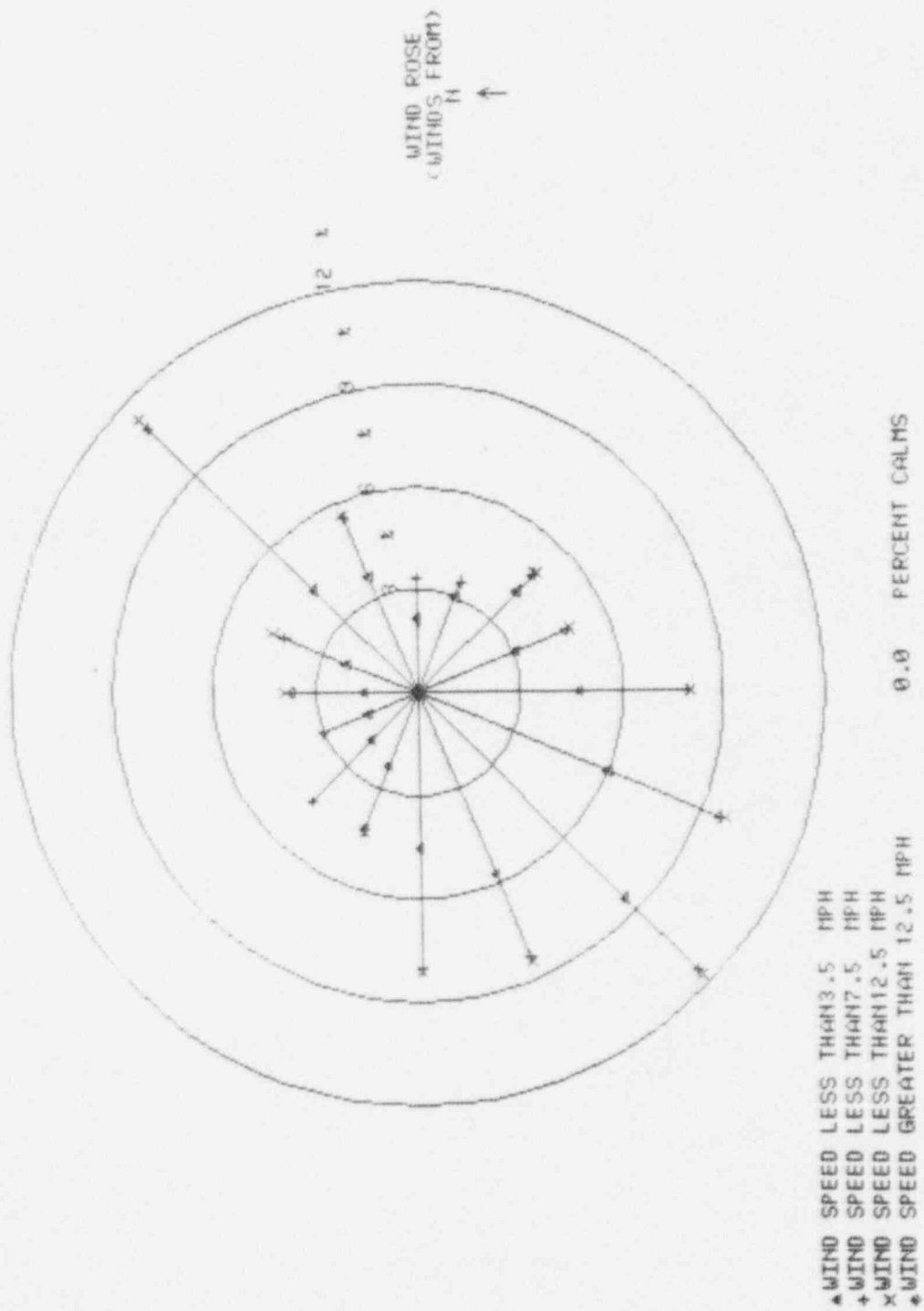
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

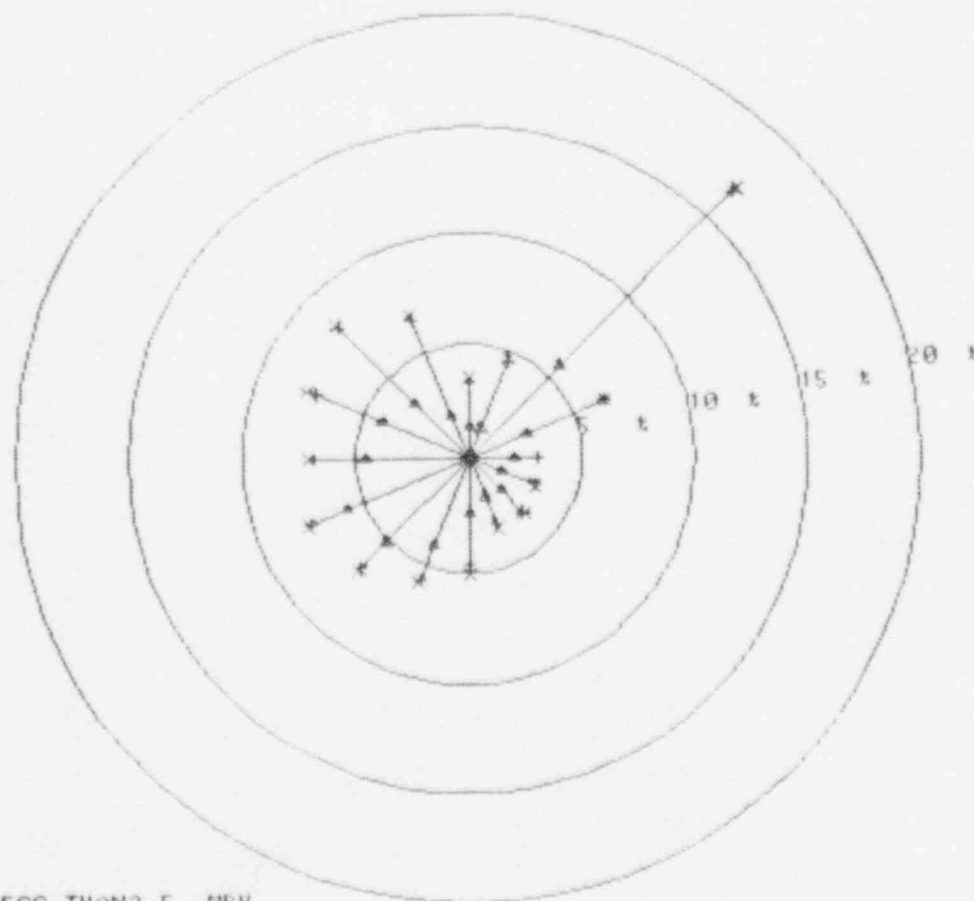
SITE: PLANT HATCH

02/03/93 14:01

ATTACHMENT 4d. PLANT HATCH 10m METEOROLOGICAL TOWER WIND ROSE
JULY 1, 1992 THROUGH SEPTEMBER 30, 1992



ATTACHMENT 4e. PLANT HATCH 10m METEOROLOGICAL TOWER WIND ROSE
OCTOBER 1, 1992 THROUGH DECEMBER 31, 1992



WIND ROSE
(WINDS FROM)
N
↑

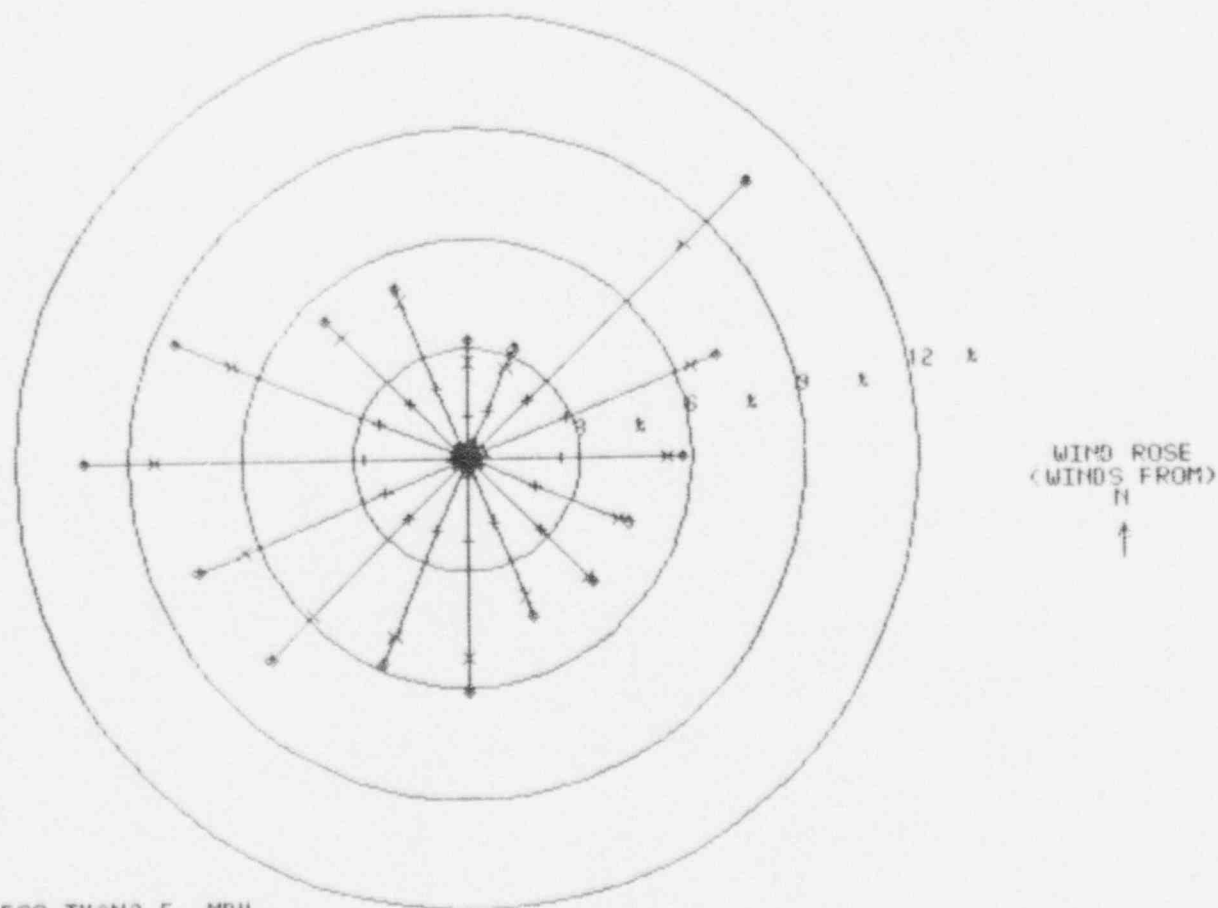
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- ◆ WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:06

ATTACHMENT 5a. PLANT HATCH 60m METEOROLOGICAL TOWER WIND ROSE
JANUARY 1, 1992 THROUGH DECEMBER 31, 1992



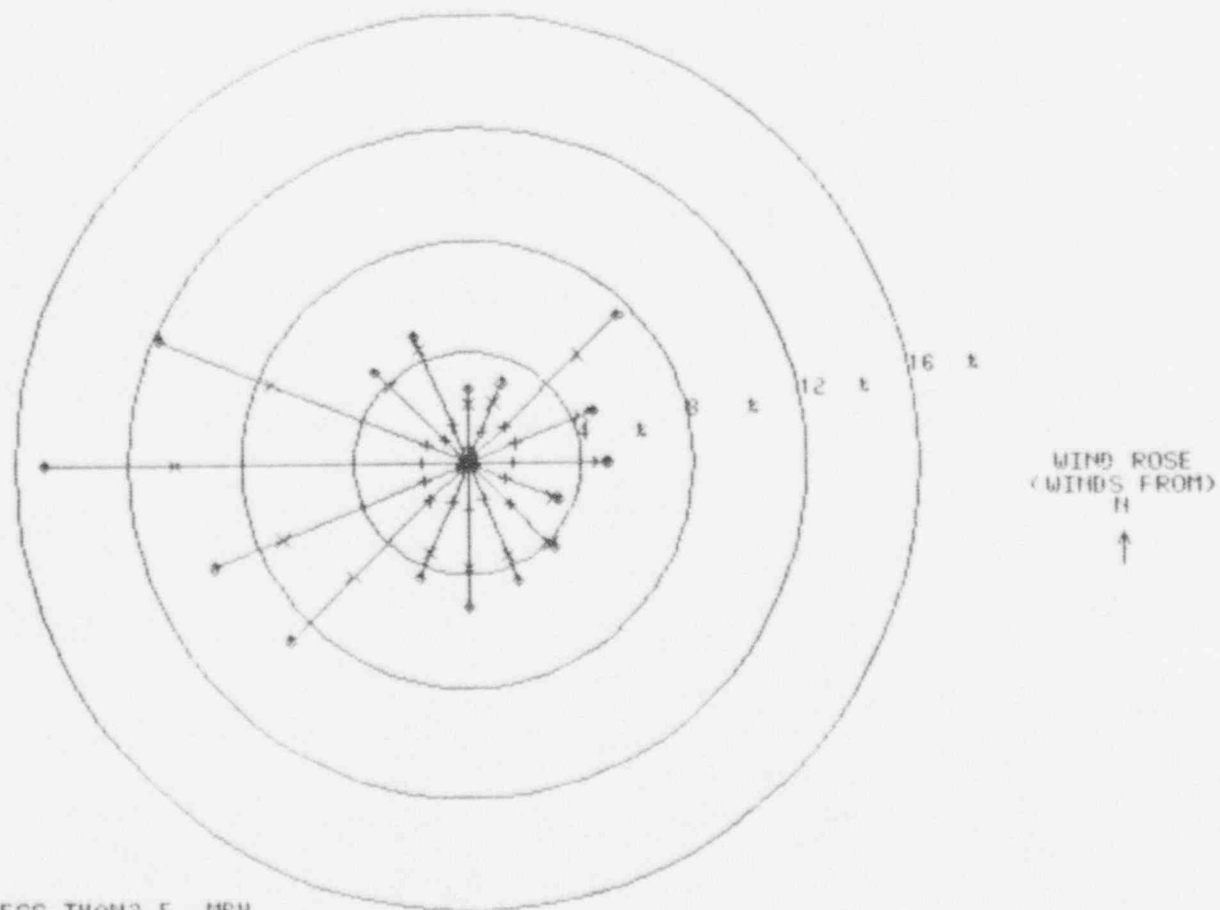
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- × WIND SPEED LESS THAN 12.5 MPH
- * WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 13:53

ATTACHMENT 5b. PLANT HATCH 60m METEOROLOGICAL TOWER WIND ROSE
JANUARY 1, 1992 THROUGH MARCH 31, 1992



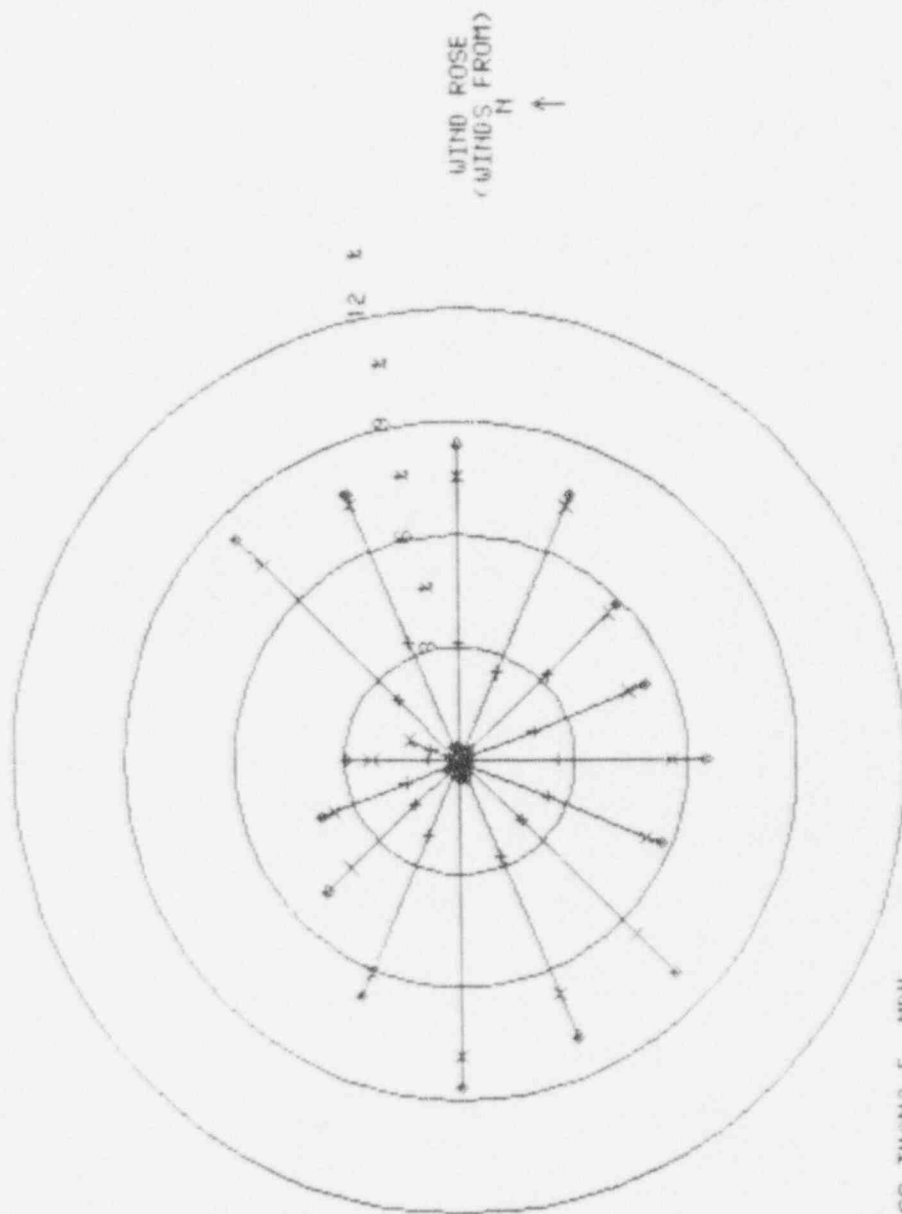
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 13:59

ATTACHMENT 5c. PLANT HATCH 60m METEOROLOGICAL TOWER WIND ROSE
APRIL 1, 1992 THROUGH JUNE 30, 1992



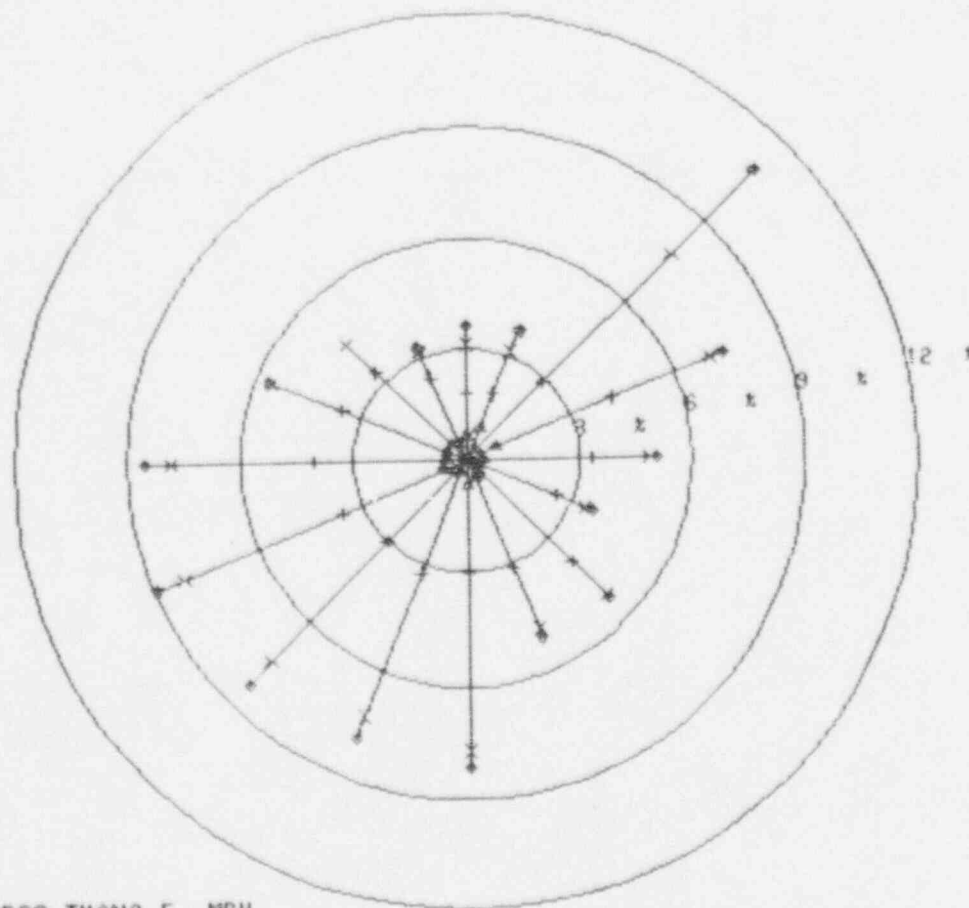
- WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALCS

02/03/93 14:01

SITE: PLANT HATCH

ATTACHMENT 5d. PLANT HATCH 60m METEOROLOGICAL TOWER WIND ROSE
JULY 1, 1992 THROUGH SEPTEMBER 30, 1992



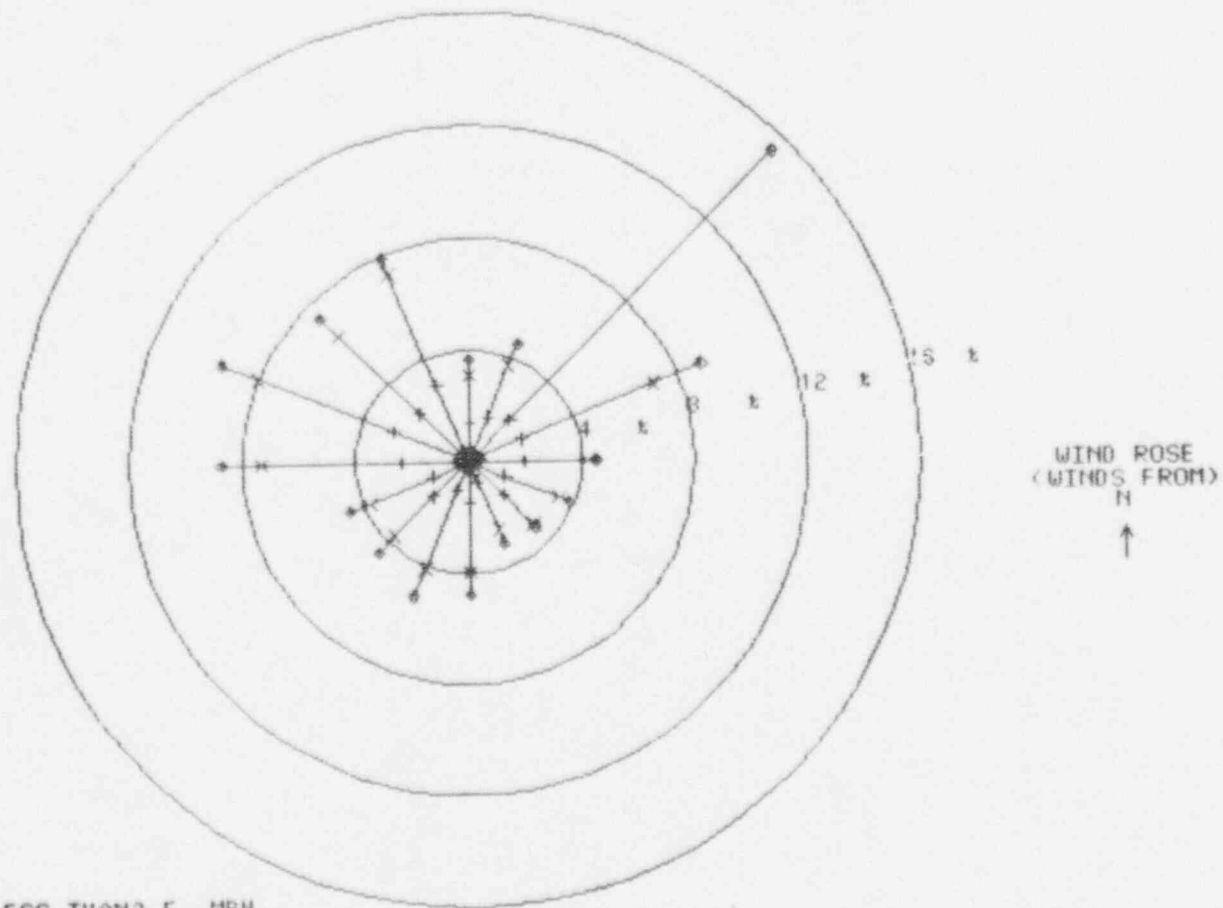
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- × WIND SPEED LESS THAN 12.5 MPH
- WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:04

ATTACHMENT 5e. PLANT HATCH 60m METEOROLOGICAL TOWER WIND ROSE
OCTOBER 1, 1992 THROUGH DECEMBER 31, 1992



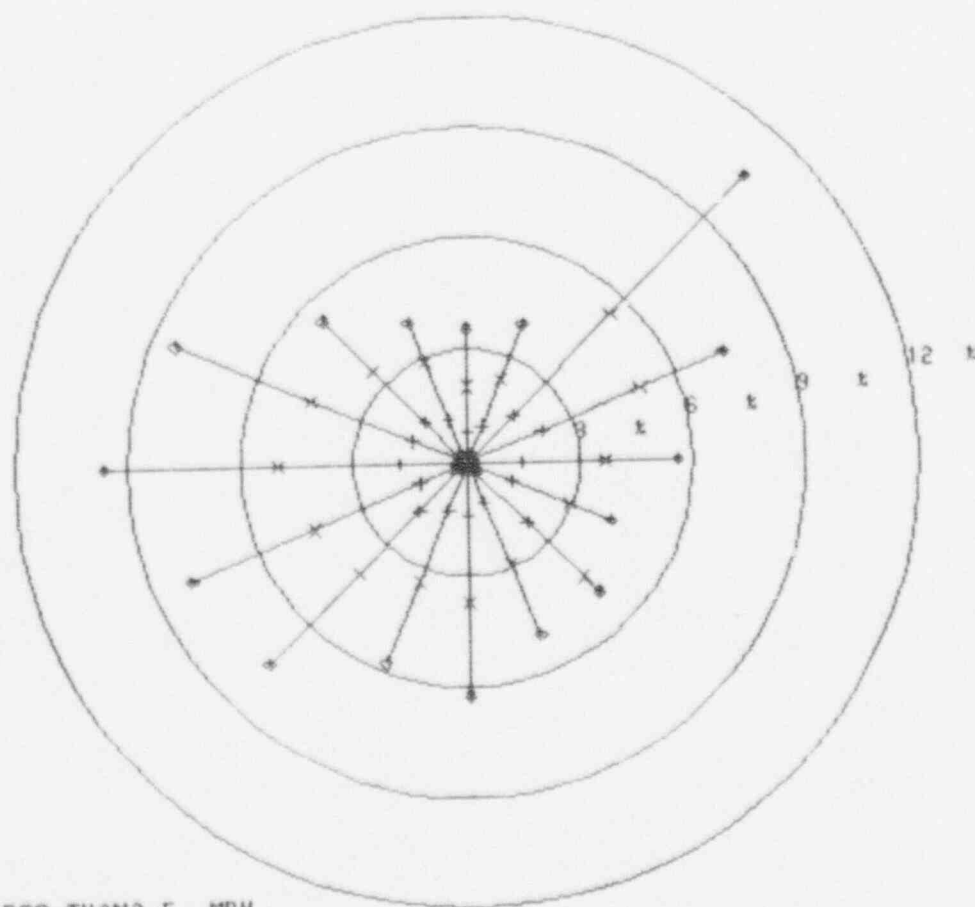
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- × WIND SPEED LESS THAN 12.5 MPH
- ◆ WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:07

ATTACHMENT 6a. PLANT HATCH 100m METEOROLOGICAL TOWER WIND ROSE
JANUARY 1, 1992 THROUGH DECEMBER 31, 1992



WIND ROSE
(WINDS FROM)
N
↑

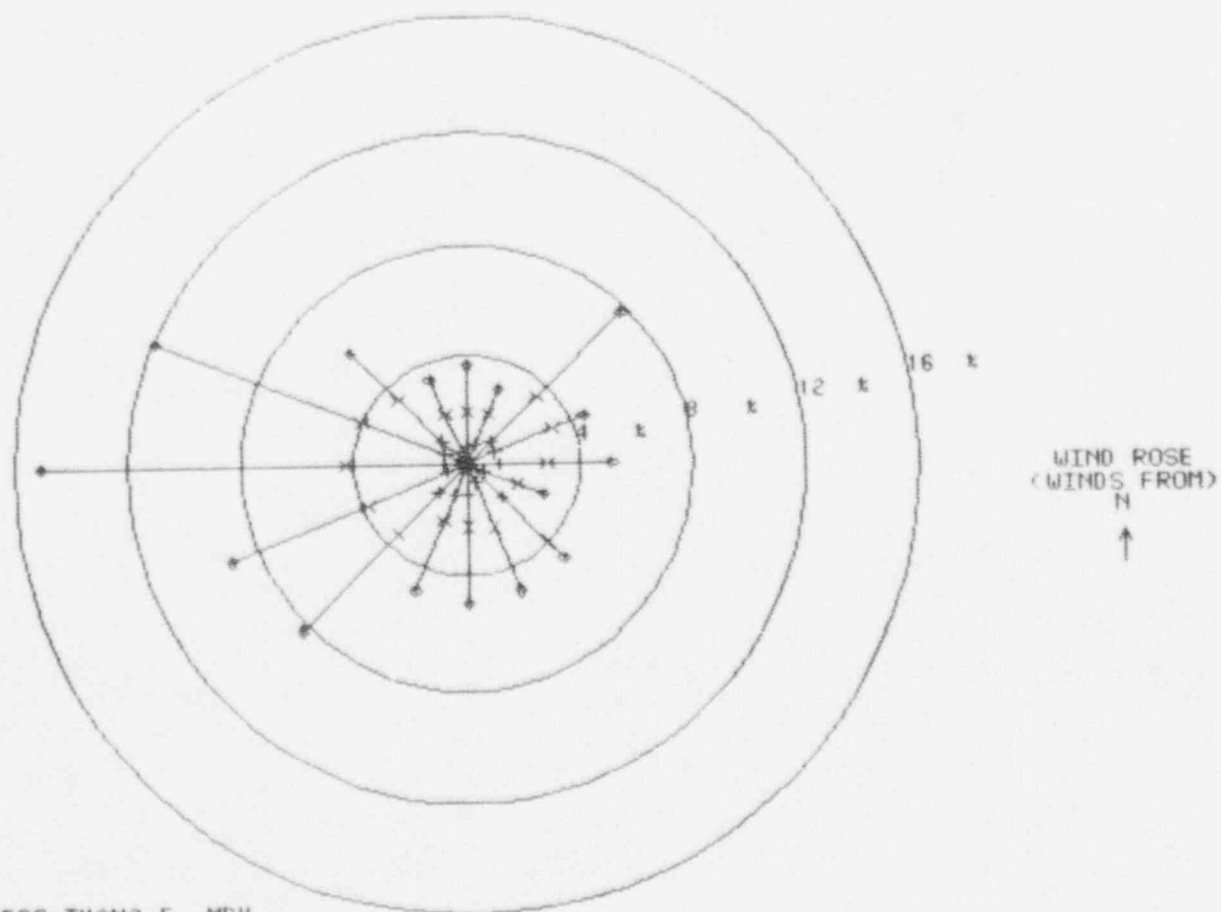
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 13:55

ATTACHMENT 6b. PLANT HATCH 100m METEOROLOGICAL TOWER WIND ROSE
JANUARY 1, 1992 THROUGH MARCH 31, 1992



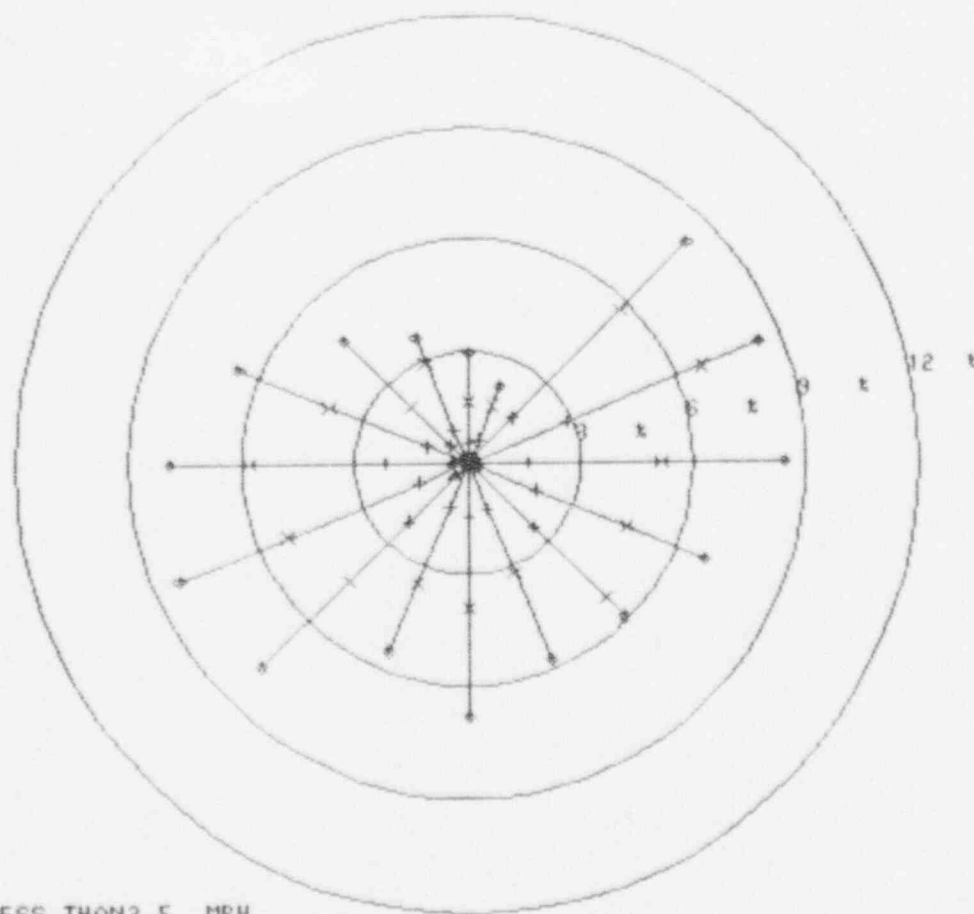
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- * WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 13:59

ATTACHMENT 6c. PLANT HATCH 100m METEOROLOGICAL TOWER WIND ROSE
APRIL 1, 1992 THROUGH JUNE 30, 1992



WIND ROSE
(WINDS FROM)
N
↑

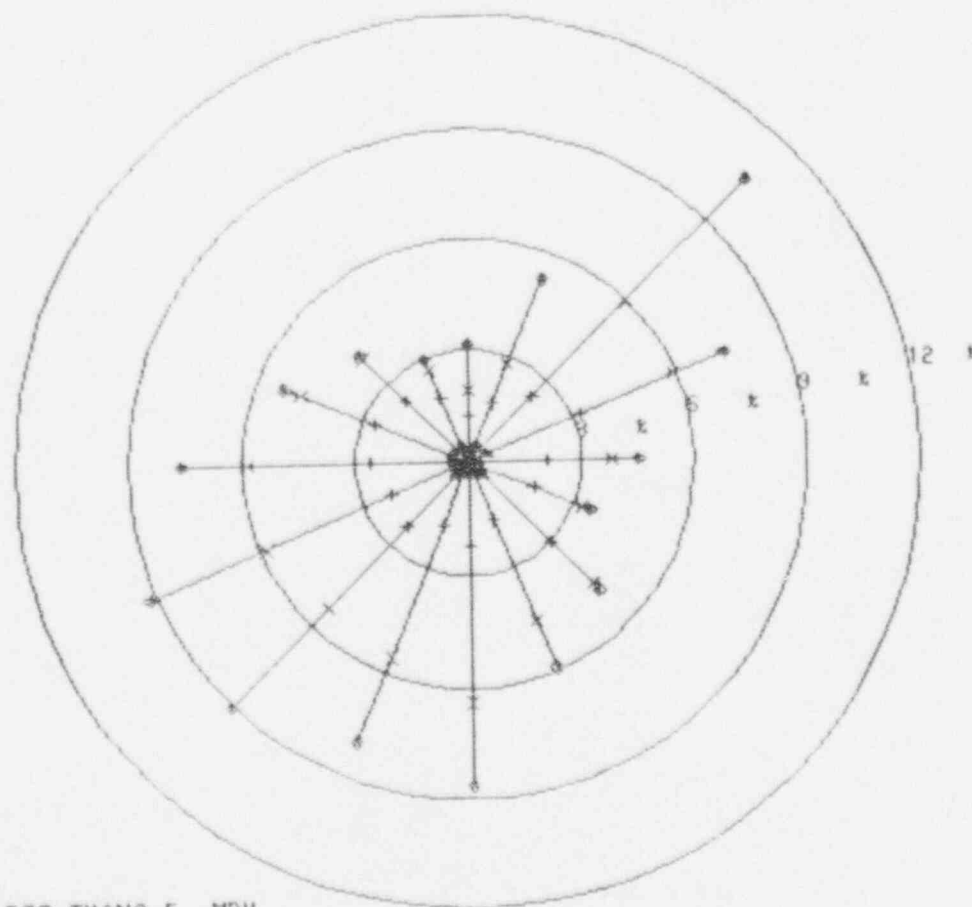
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- × WIND SPEED LESS THAN 12.5 MPH
- WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:02

ATTACHMENT 6d. PLANT HATCH 100m METEOROLOGICAL TOWER WIND ROSE
JULY 1, 1992 THROUGH SEPTEMBER 30, 1992



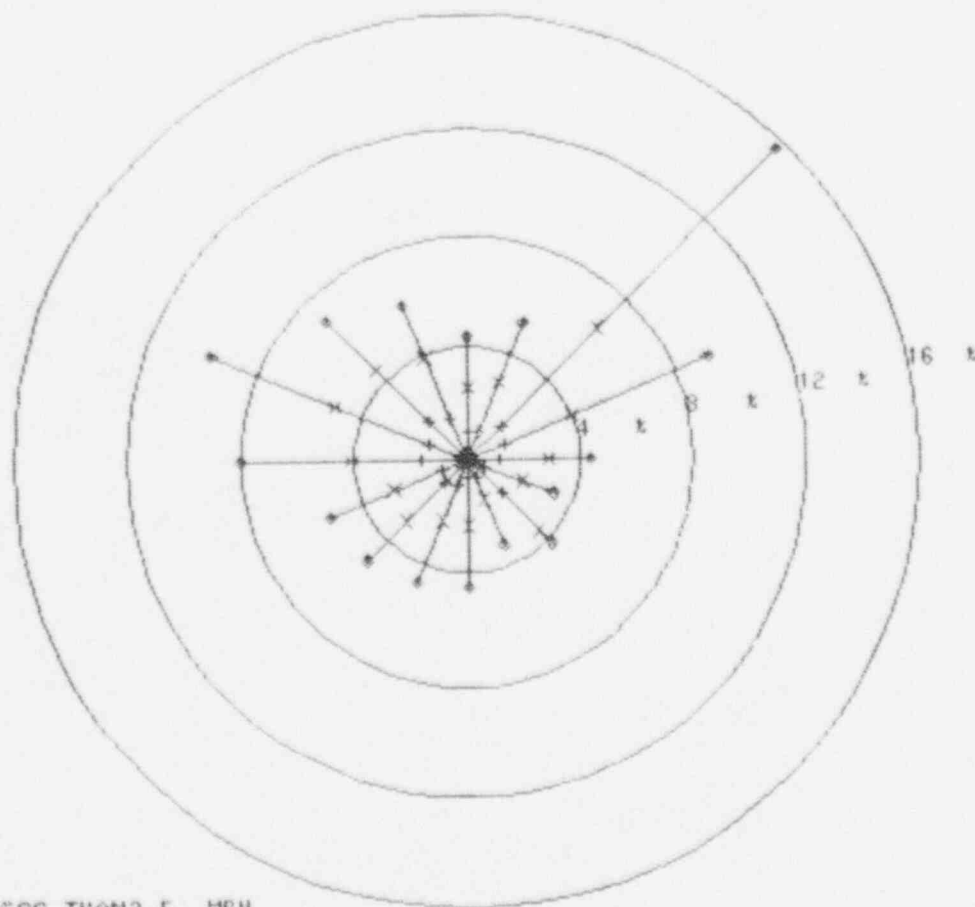
- WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- * WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:05

ATTACHMENT 6e. PLANT HATCH 100m METEOROLOGICAL TOWER WIND ROSE
OCTOBER 1, 1992 THROUGH DECEMBER 31, 1992



WIND ROSE
(WINDS FROM)
N
↑

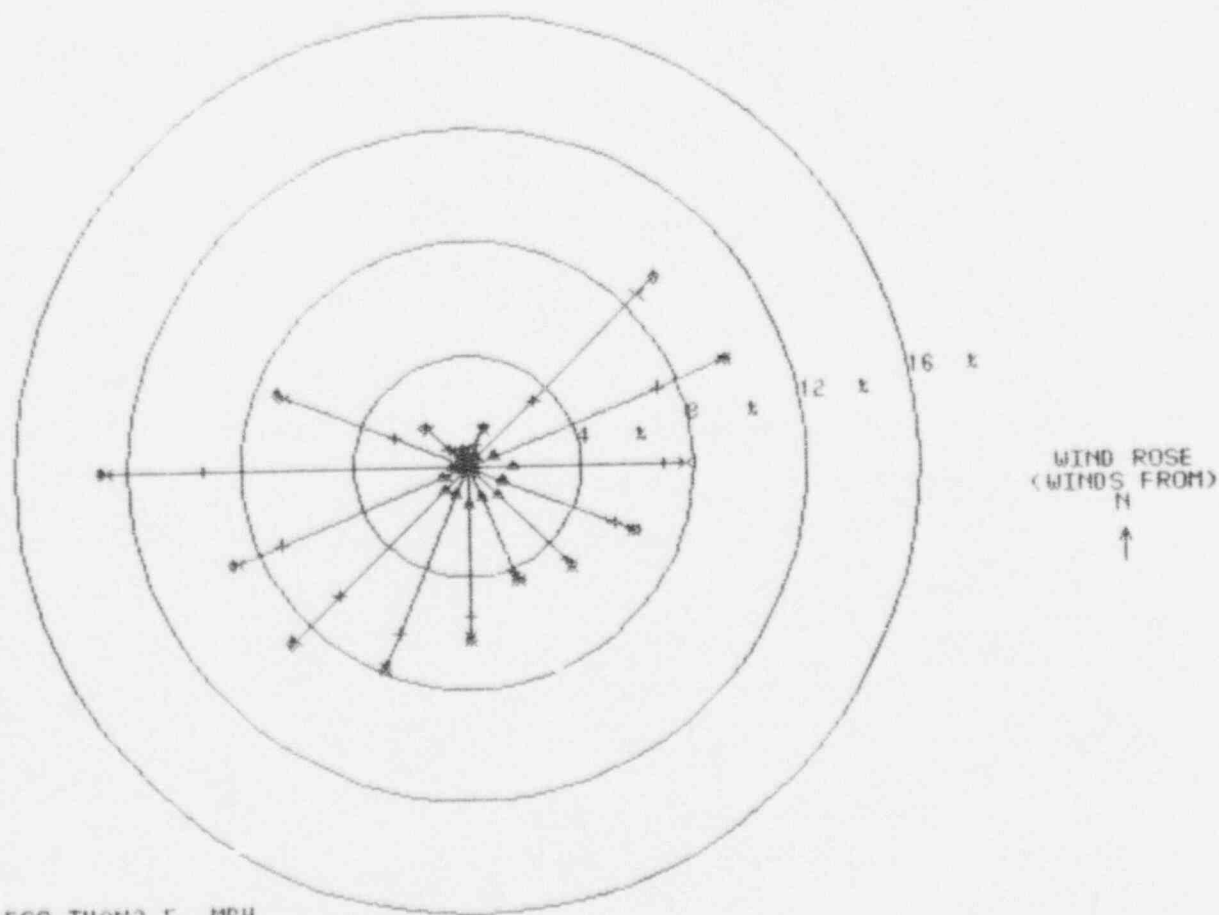
- WIND SPEED LESS THAN 3.5 MPH
- Δ WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- WIND SPEED GREATER THAN 12.5 MPH

0.8 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:07

ATTACHMENT 7a. PLANT HATCH 23m BACKUP METEOROLOGICAL TOWER WIND ROSE
JANUARY 1, 1992 THROUGH DECEMBER 31, 1992



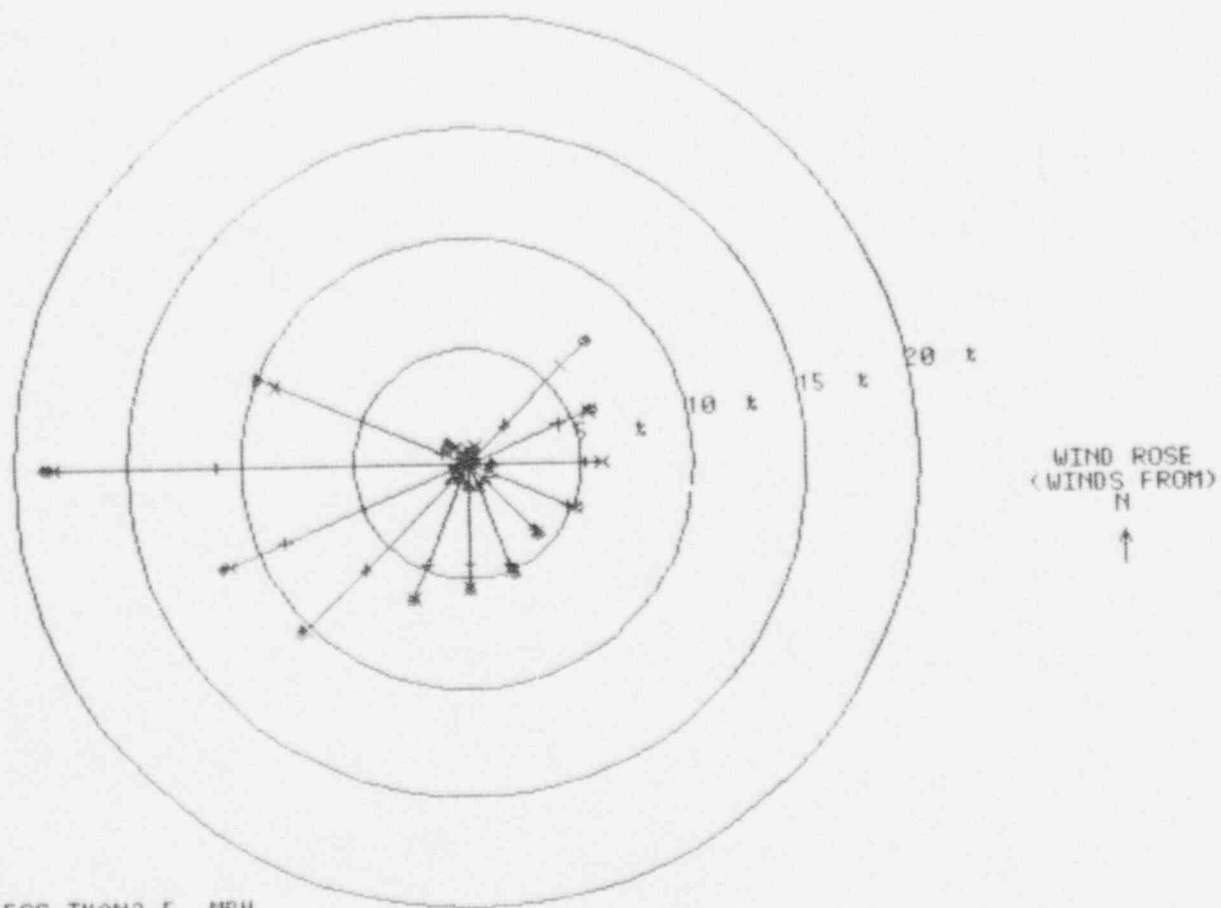
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- ◆ WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 13:56

ATTACHMENT 7b. PLANT HATCH 23m BACKUP METEOROLOGICAL TOWER WIND ROSE
JANUARY 1, 1992 THROUGH MARCH 31, 1992



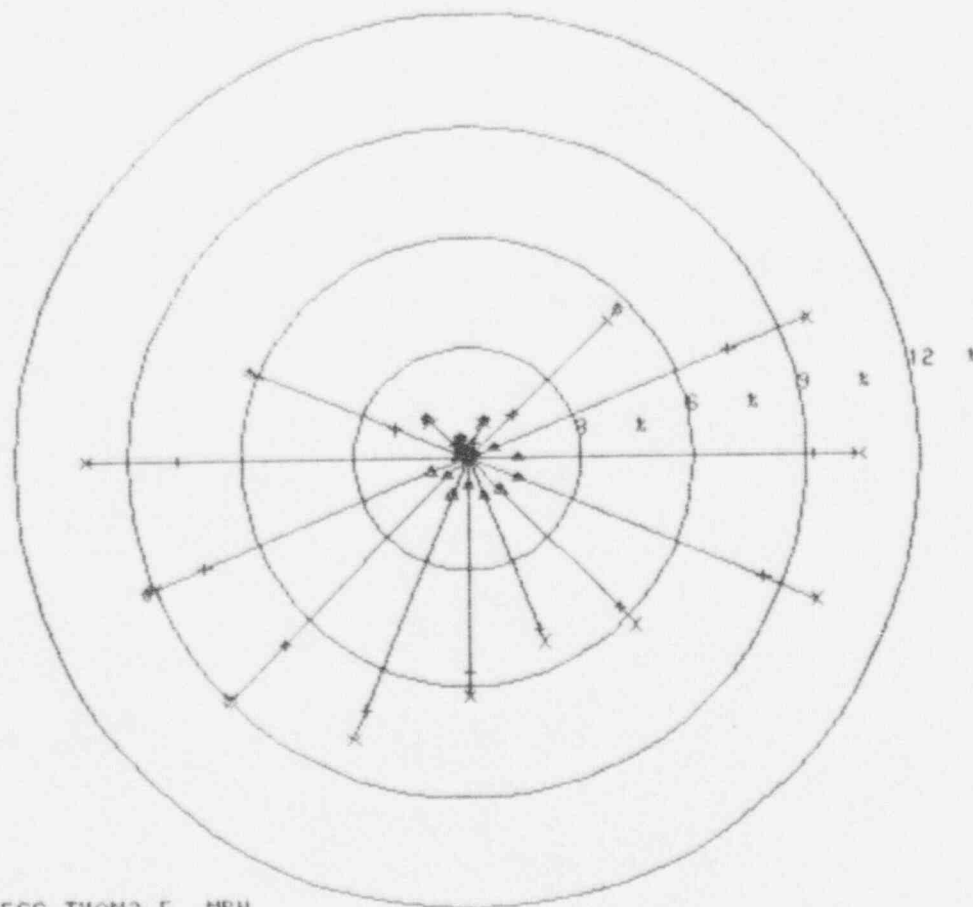
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- * WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:00

ATTACHMENT 7c. PLANT HATCH 23m BACKUP METEOROLOGICAL TOWER WIND ROSE
APRIL 1, 1992 THROUGH JUNE 30, 1992



WIND ROSE
(WINDS FROM)



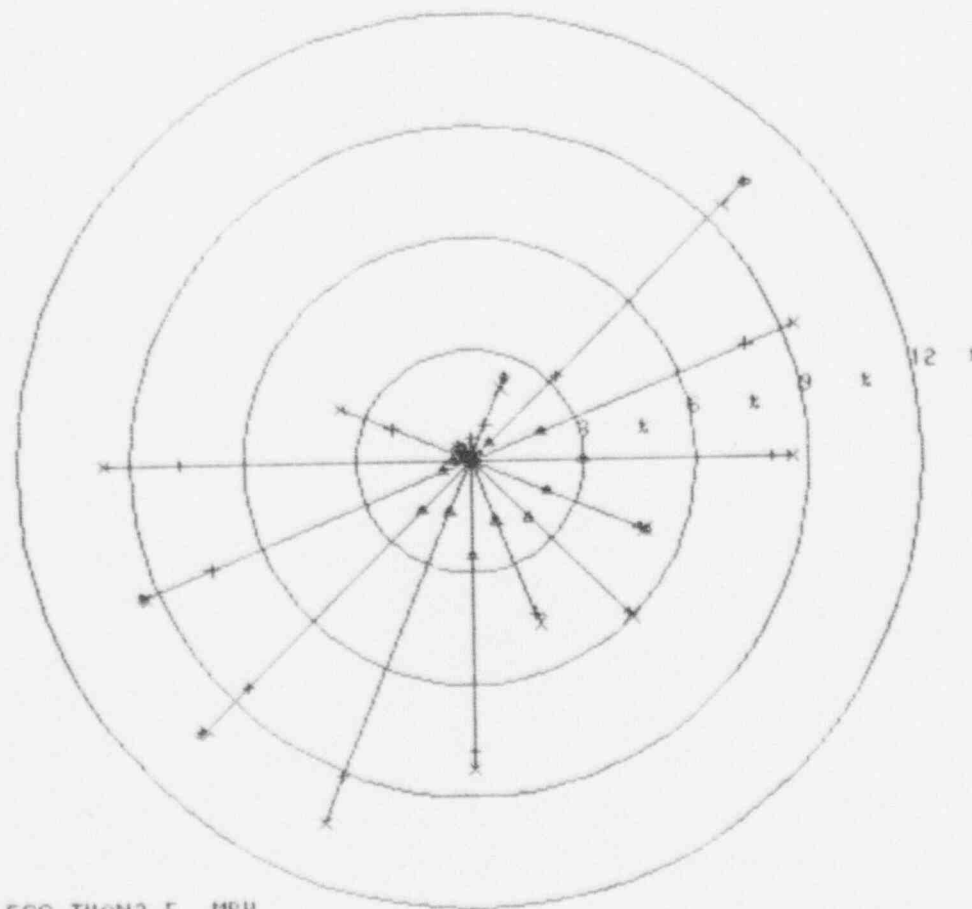
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- ◆ WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:03

ATTACHMENT 7d. PLANT HATCH 23m BACKUP METEOROLOGICAL TOWER WIND ROSE
JULY 1, 1992 THROUGH SEPTEMBER 30, 1992



WIND ROSE
(WINDS FROM)

N



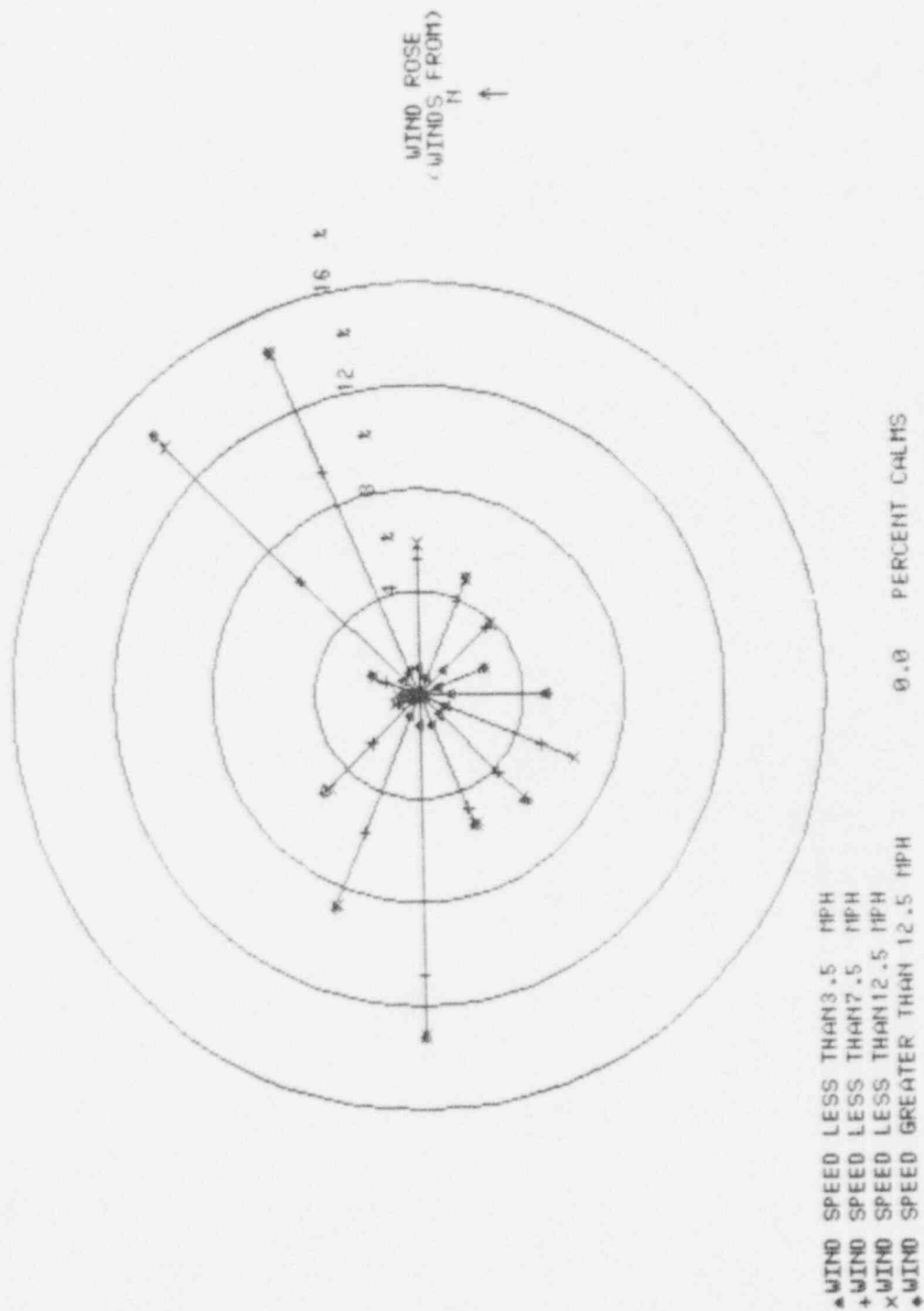
- ▲ WIND SPEED LESS THAN 3.5 MPH
- + WIND SPEED LESS THAN 7.5 MPH
- x WIND SPEED LESS THAN 12.5 MPH
- WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT HATCH

02/03/93 14:05

ATTACHMENT 7-3. PLANT HATCH 23m BACKUP METEOROLOGICAL TOWER WIND ROSE
OCTOBER 1, 1992 THROUGH DECEMBER 31, 1992



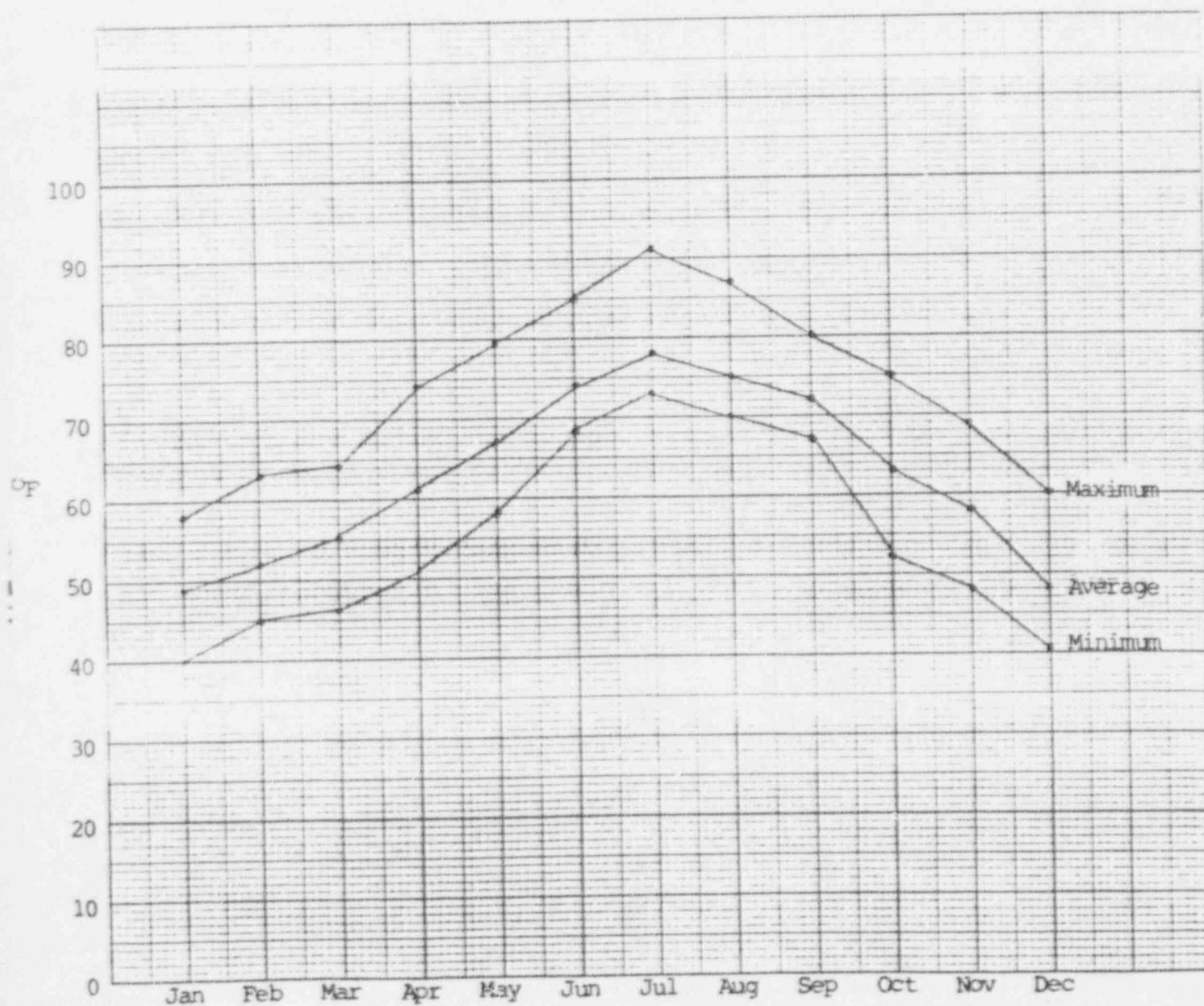
02/03/93 14:08

SITE: PLANT HATCH

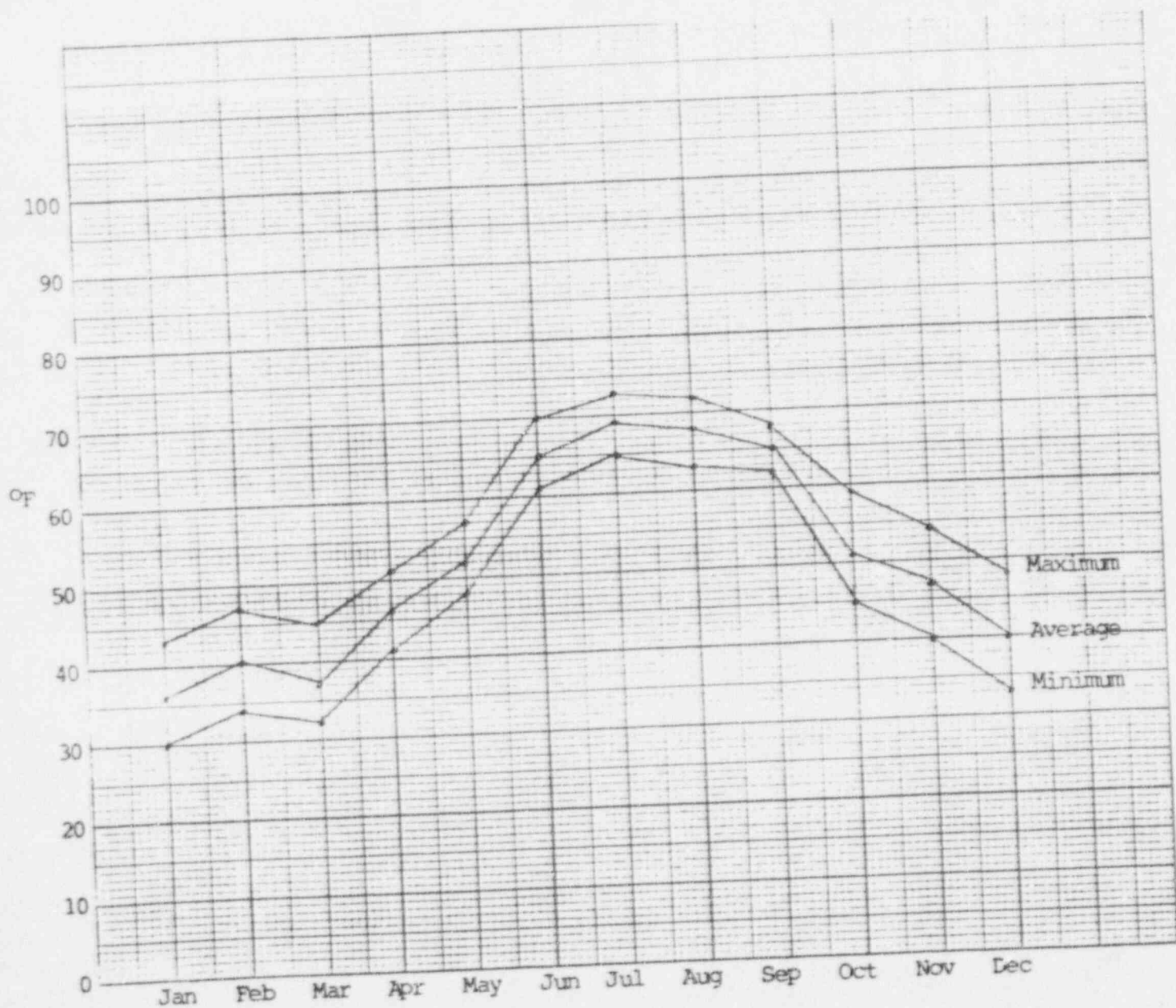
ATTACHMENT 8. PLANT HATCH METEOROLOGICAL TOWER 1992 DATA RECOVERY
(PRIMARY AND BACKUP TOWERS)

Parameter	Recovery (Percent)
Wind Speed 10m	99.7
Wind Speed 60m	99.7
Wind Speed 100m	99.4
Wind Speed 23m (Backup)	98.4
Wind Direction 10m	99.7
Wind Direction 60m	99.7
Wind Direction 100m	99.7
Wind Direction 23m (Backup)	95.7
Delta Temperature 60-10m	99.7
Delta Temperature 100-10m	98.2
Delta Temperature 45-10m (Backup)	97.4
Temperature 10m	99.7
Dew Point Temperature 10m	98.3
Temperature 23m	98.2
Rainfall	99.8
Composite	
Wind Speed and Direction 10m, Delta Temperature 60-10m	99.7
Wind Speed and Direction 60m, Delta Temperature 60-10m	99.6
Wind Speed and Direction 100m, Delta Temperature 100-10m	98.2
Wind Speed and Direction 23m, Delta Temperature 45-10m	94.7

ATTACHMENT 9. PLANT HATCH MONTHLY AVERAGE AND AVERAGE
OF THE DAILY EXTREMES OF AMBIENT TEMPERATURE 10m
JANUARY 1, 1992 THROUGH DECEMBER 31, 1992



ATTACHMENT 9. PLANT HATCH MONTHLY AVERAGE AND AVERAGE
OF THE DAILY EXTREMES OF DEW POINT TEMPERATURE 10m
JANUARY 1, 1992 THROUGH DECEMBER 31, 1992



0349L020593

ATTACHMENT 10

PLANT HATCH DAILY AND MONTHLY AND ANNUAL PRECIPITATION TOTALS
January 1, 1992 through December 31, 1992

Month	Precipitation (Inches)	Month	Precipitation (Inches)
<u>January</u>		<u>April</u>	
1	0.04	7	1.36
2	0.31	8	0.68
3	0.73	11	1.02
9	0.06	20	0.31
13	2.82	21	0.81
14	0.18	22	<u>0.24</u>
18	0.24		4.42
19	0.76		
23	0.87	<u>May</u>	
24	0.01	6	0.01
27	0.01	13	0.38
28	1.67	15	0.08
29	0.44	16	0.01
30	0.38	25	0.02
31	<u>0.01</u>	28	0.71
	8.53	29	0.70
		30	0.72
		31	<u>0.01</u>
<u>February</u>			2.64
5	0.02		
6	2.03	<u>June</u>	
14	0.01	3	0.50
15	0.23	4	0.20
16	0.07	8	0.71
17	1.10	9	0.15
18	0.13	11	0.60
19	0.01	12	0.03
22	0.11	13	0.01
23	0.41	14	1.04
24	0.11	23	0.24
25	<u>0.05</u>	25	0.08
	4.28	26	0.04
		27	0.09
<u>March</u>		28	0.01
5	0.05	30	<u>0.02</u>
6	0.18		3.72
7	0.02		
10	0.27		
19	0.99		
23	0.02		
25	0.48		
26	0.57		
30	1.62		
31	<u>0.01</u>		
	4.21		

PLANT HATCH DAILY AND MONTHLY AND ANNUAL PRECIPITATION TOTALS (continued)

Month	Precipitation (Inches)	Month	Precipitation (Inches)
<u>July</u>		<u>September</u>	
1	0.51	3	0.26
2	0.01	4	0.41
3	0.07	5	1.04
4	0.01	7	0.01
5	0.01	9	0.04
16	0.11	10	0.02
17	0.02	11	0.08
21	0.01	12	0.02
22	0.77	23	0.01
23	0.27	27	0.22
	<u>1.79</u>	28	0.01
			2.12
<u>August</u>		<u>October</u>	
2	0.24	3	1.46
3	1.24	4	0.85
5	0.65	5	0.02
6	2.10	8	0.85
7	0.05		3.18
9	0.03	<u>November</u>	
12	0.06	5	0.24
13	0.37	6	0.04
14	1.57	13	0.25
15	2.63	21	1.51
16	1.03	22	0.07
17	0.09	23	0.04
18	0.03	24	0.22
19	0.27	25	1.08
20	0.01	26	0.48
21	1.00	27	0.34
23	0.01		4.27
24	0.01	<u>December</u>	
25	0.07	7	0.22
26	0.04	10	1.12
27	0.08	17	0.16
28	0.07	27	0.10
	<u>11.65</u>	28	0.01
			1.61

Annual Total 52.43 Inches

ATTACHMENT 11. PLANT HATCH 1992 METEOROLOGICAL SUMMARY

The overall meteorological data collection in 1992 at Plant Hatch was the best ever. Over 98% of the data was collected using the site DRDT computer. The computer functioned continuously throughout the year with the exception of a problem in early January. During two periods when computer data were not available, data were digitized from strip charts.

There were very few problems with the Hatch meteorological instrumentation during 1992. The most significant problem occurred with the primary temperature system which was out-of-service from July 29, 1992 until August 2, 1992. Data from the backup tower were used to replace the primary temperature and delta temperature (60-10m). The only other problem that lasted more than a few hours was a problem with the wind direction on the backup tower that was out-of-service from August 3, 1992 until August 10, 1992.

The table below summarizes the data collection over the past five years. Since the computer was installed at the end of 1989, the data collection has steadily improved. The 1992 data recovery for all parameters was the highest ever achieved at better than 99%.

	1988	1989	1990	1991	1992	5-Yr
Wind Speed 10m	98.5	96.7	98.6	99.3	99.7	98.6
Wind Speed 60m	93.4	83.9	98.6	89.8	99.7	93.1
Wind Speed 100m	98.0	92.8	95.2	99.6	99.4	97.0
Wind Direction 10m	99.3	98.4	98.7	99.4	99.7	99.1
Wind Direction 60m	93.9	83.8	97.0	95.9	99.7	94.1
Wind Direction 100m	98.2	97.6	78.4	94.4	99.7	93.7
Delta Temperature 60-10m	98.9	93.2	98.2	99.4	99.7	97.9
Delta Temperature 100-10m	96.3	92.2	98.3	99.3	98.2	96.9
Temperature 10m	99.4	98.2	96.4	99.3	99.7	98.6
Dew Point 10m	99.4	91.2	98.6	99.5	98.3	97.4
Precipitation	94.2	91.6	98.7	99.4	99.8	96.7
<u>Composite</u>						
WS, WD 10m, DT 60-10	97.2	90.0	98.2	99.2	99.7	96.9
WS, WD 60m, DT 60-10	91.3	77.8	96.6	89.2	99.6	90.9
WS, WD 100m, DT 100-10	93.6	85.6	73.1	94.4	98.2	89.0

The joint frequency tables of wind speed and direction versus delta temperature are shown in Attachments 1, 2 and 3. The table below summarizes the last five years of operation of the 100m tower. The table uses the wind speed and direction from the 10m level versus the delta temperature between 60 and 10 meters.

ATTACHMENT 11 (continued)

The 1992 joint frequency data continues to show the trend towards more unstable hours, with 1992 having the highest percentage of "A" stability over the last 5 years. There was also a decrease in the percentage of hours with "G" stability down to about 10%. The change in these frequencies can be attributed to normal year-to-year climatic and calibration variations and also in the case of the decrease in stable hours to the continued increase in cloudy nights that will not allow for the radiational cooling necessary for "G" stability.

Plant Hatch Stability Classification

Stability Group	Percent Stability					5-Year Average
	1988	1989	1990	1991	1992	
A	12.2	11.8	16.3	14.3	17.8	14.5
B	4.0	4.0	4.7	5.1	4.3	4.4
C	3.1	3.3	3.9	4.6	4.1	3.8
D	18.4	22.0	19.1	24.7	23.6	21.6
E	31.8	33.1	29.3	31.0	28.7	30.8
F	15.3	12.8	12.8	9.8	11.7	12.4
G	15.2	13.0	13.9	10.5	9.8	12.5
Total Hours	8541	7886	8604	8692	8753	

The wind roses shown in Attachments 4 through 7 show very good agreement between levels on the primary tower and general agreement with the 23m backup tower. The peak wind direction, as in most previous years, is from the northeast on the primary tower and from the west on the backup tower. The secondary peaks also correspond well between levels and previous years being from the southwest to west on the primary tower and from the northeast on the backup tower. The winds are generally from the west in winter and from the northeast in the summer months. The spring and fall are transition periods with less pattern to the winds.

The ambient and dew point temperature plots are found in Attachment 9. The ambient temperature data generally shows cooler conditions than in recent years with the exception of July which was about average. This cooler trend can again be attributed to the increase in rainfall and, therefore, cloudy days. The dew point temperature agrees quite well with previous years with the continuation of a slight cooling trend.

ATTACHMENT 11 (continued)

The precipitation totals (daily, monthly and annual) are shown in Attachment 10. The total for the year was 52.43 inches which was about five inches less than 1992 but considerable more than most years. The average annual precipitation for the Plant Hatch area should be between 45 and 50 inches.