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February 26, 1991

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ELV-02555
0847

Docket Nos. 50-424
50-425

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

In accordance with requirements of the Vogtle Electric Generating Plant Unit 1 and Unit 2 Technical Specifications, Section 6.8.1.4, please find enclosed the Semiannual Radioactive Effluent Release Report for July 1, 1990 through December 31, 1990. Six copies are provided for your use. Two copies of this report are being provided to the NRC Region II office.

Sincerely,

W. G. Hairston, III

WGH,III/JLL/gm

Enclosure

xc: Georgia Power Company
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GEOPGIA POWER COMPANY

VOGTLE ELECTRIC GENERATING PLANT - UNITS 1 AND 2
NRC DOCKET NOS. 50-424 AND 50-425
FACILITY OPERATING LICENSE NOS. NPF-68 AND NPF-81

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

FOR

JULY 1, 1990 TO DECEMBER 31, 1990

VOGTLE ELECTRIC GENERATING PLANT

SEMIANNUAL REPORT

PLANT RADIOACTIVE EFFLUENT RELEASES

1412A

VOGTLE ELECTRIC GENERATING PLANT

SEMIANNUAL REPORT

RADIOACTIVE EFFLUENT RELEASE REPORT

LIST OF TABLES

TABLE	LIST OF TABLES	PAGE

1.0 Liquid Effluents

1.1 Regulatory Limits/Technical Specifications

The Technical Specifications (T/S) presented in this subsection are for the site.

1.1.1 Effluent Radiation Monitoring System

The radioactive liquid effluent monitoring instrumentation channels shown in T/S Table 3.3-9 shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits of Specification 3.11.1.1 are not exceeded. The ALARM/TRIP Setpoints of these channels shall be determined and adjusted in accordance with the methodology and parameters in the OFF-SITE DOSE CALCULATION MANUAL (ODCM). Technical Specification Table 3.3-9 is included in this subsection as Table 1-1.

1.1.2 Concentration Limits

3.11.1.1

The concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS (See Figure 5.1-1 and 5.1-2 of Technical Specifications) 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-4 microcurie/ml total activity.

1.1.3 Dose Limits

3.11.1.2

The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each unit, to UNRESTRICTED AREAS (see Figure 5.1-1 and 5.1-2 of Techical Specifications), shall be limited:

a. During any calendar quarter to less than or equal to 1.5 mrems to the whole body and to less than or equal to 5 mrems to any organ, and

b. During any calendar year to less than or equal to 3 mrems to the whole body and to less than or equal to 10 mrems to any organ.

1.1.4 Liquid Processing

3.11.1.3

The Liquid Radwaste Treatment System shall be OPERABLE and appropriate portions of the system shall be used to reduce releases of radioactivity when the projected doses due to the liquid effluent, from each unit, to UNRESTRICTED AREAS (See Figure 5.1-1 and 5.1-2 of the Technical Specifications) would exceed 0.06 mrem to the whole body or 0.2 mrem to any organ in a 31-day period.

1.1.5 Outside Temporary Tanks

3.11.1.4

The quantity of radioactive material contained in each outside temporary tank shall be limited to less than or equal to 10 curies, excluding tritium and dissolved or entrained noble gases.

1.1.6 Reporting of Semiannual Releases (Unplanned)

6.8.1.4 states in part:

The Semiannual Radioactive Effluent Release Reports shall include a list and description of unplanned releases from the site to UNRESTRICTED AREAS of radioactive materials in gaseous and liquid effluents made during the reporting period.

TABLE 1-1

(FROM TECHNICAL SPECIFICATIONS)

(TABLE 3.3-9)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

	INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
1.	Radioactivity Monitors Providing Alarm and Automatic Termination of Release		
a.	Liquid Radwaste Effluent Line (RE-0018)	1	37
b.	Steam Generator Blowdown Effluent Line - (RE-0021)	1	38
c.	Turbine Bldg. (Floor Drains) Sumps Effluent Line (RE-0848)	1	38
2.	Radioactivity Monitors Providing Alarm But Not Providing Automatic Termination of Release		
a.	Nuclear Service Cooling Water System Effluent Line (RE-0020A & B)	1	39
3.	Flow Rate Measurement Devices		
a.	Liquid Radwaste Effluent Line (FT-0018)	1	40
b.	Steam Generator Blowdown Effluent Line (FT-0021)	1	40
c.	Flow to Blowdown Sump (AFQI-7620, FR-7620, pen 1) (common)	1	40

TABLE 1-1 (CONTINUED)

ACTION STATEMENTS

ACTION 37 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Specification 4.11.1.1.1, and

b. At least two technically qualified members of the facility staff independently verify the release rate calculations and discharge line valving.

Otherwise, suspend release of radioactivity effluents via this pathway.

ACTION 38 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 analyzed for radioactivity at a lower limit of detection of no more than 10^{-7} microcurie/ml:

a. At least once per 12 hours when the specific activity of the secondary coolant is greater than 0.01 microcurie/gram DOSE EQUIVALENT I-131, or

b. At least once per 24 hours when the specific activity of the secondary coolant is less than or equal to 0.01 microcurie/gram DOSE EQUIVALENT I-131.

ACTION 39 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided that, at least once per 12 hours, grab samples are collected and analyzed for radioactivity at a lower limit of detection of no more than 10^{-7} microcurie/ml.

ACTION 40 With the number of channels OPERABLE less than required by the Minimum Channel OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours during actual releases. Pump performance curves generated in place may be used to estimate flow.

1.2 Maximum Permissible Concentration (MPC)

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 10 CFR Part 20, Appendix B, Table II, Column 2.

For dissolved or entrained noble gases in liquid radwaste, the MPC is obtained from Technical Specifications 3.11.1.1 as 2E-04 uCi/ml total activity.

For gross alpha in liquid radwaste, the MPC is obtained from 10 CFR Part 20, Appendix B, Note 2.d 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 Subsection 1.4 of this report.

1.3 Measurements and Approximations of Total Radioactivity

Prior to release of any tank containing liquid radwaste, and following the required recirculations, samples are collected and analyzed in accordance with Technical Specification Table 4.11-1. 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:

	MEASUREMENT	FREQUENCY	METHOD
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
3.	Tritium	Monthly Composite	Distillation and liquid scintillation counting
4.	Gross Alpha	Monthly Composite	Gas flow proportional counting

	MEASUREMENT	FREQUENCY	METHOD
5.	Sr-89 and Sr-90	Quarterly Composite	Chemical separation and gas flow proportional or scintillation counting
6.	Fe-55	Quarterly Composite	Chemical separation and liquid scintillation counting

Gamma isotopic measurements are performed in-house in the radiochemistry lab using germanium spectrometry. This consists of four high purity germanium detectors with resolution of 1.80 keV or lower. The detectors are shielded by four inches of lead. A liquid radwaste sample is poured into a graduated cylinder to measure out one liter of sample which is then poured into a bottle or into a 1 liter marinelli in preparation for a 2000-4000 second count. A peak search of the resulting gamma ray spectrum is performed by the computer system. Energy and net count data of all significant peaks are determined, and a quantitative reduction or MDA calculation is performed. The procedure ensures that the LLD's are met for the nuclides specified in Table Notation 3 of Technical Specification Table 4.11-1: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144. The quantitative calculations, corrections for counting time, decay time, sample volume, sample geometry, detector efficiency, baseline counts, branching ratio, and MDA calculations, are made based on the counts at the location on the spectrum where the peak for that radionuclide would be located, if present.

Tritium, Gross Alpha, Sr-89, Sr-90 and Fe-55 are, in some cases, performed off-site rather than in-house to more efficiently use plant technicians.

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 a MPC fraction for the tank planned for release. This MPC fraction is then used, with appropriate safety factors, along with the minimum assured dilution stream flow to calculate maximum permissible release rate and a liquid effluent monitor setpoint. The monitor setpoint is calculated to assure that the limits of Technical Specification 3.11.1.1 are not exceeded.

A monitor reading in excess of the calculated setpoint 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 minimum assured 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 calibrations are entered into the computer and a pre-release printout is generated. If the release is not permissible, appropriate warnings will be included on the computer screen. If the release is permissible, it is approved by the Chemistry Foreman on duty and sent to the Operations Department for approval and processing. When the release is completed, the necessary data from the release (ex., release volume) is transferred from the Operations Department to the Chemistry Department. 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 and Table 1-3a for Unit 1, Tables 1-2b and 1-3b for Unit 2.

1.4.1 Methodology

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

1.4.1.1 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 quarter.

1.4.1.2 Tritium

The measured tritium concentrations in the monthly composite samples are used to calculate the total release and average diluted concentration during each period.

1.4.1.3 Dissolved and entrained gases

Concentrations of dissolved and entrained gases in liquid effluents are measured by germanium spectroscopy on each one liter sample for each liquid radwaste batch. 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.

1.4.1.4 Gross alpha radioactivity

The measured gross alpha concentrations in the monthly composite samples are used to calculate the total release of alpha radioactivity.

1.4.1.5 Total Error Measurement

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 is not suggested. The objective should be to obtain an overall estimate of the error associated with measurements of radioactive materials released in liquid effluents.

Estimated errors are based on errors in counting equipment calibration, counting statistics, dilution flow rates, sample and tank flow rates.

1.4.1.5.1 Fission and activation total release was calculated from sample analysis results and release point flow rates.

Sampling and statistical error	10%
Counting Equipment Calibration	10%
Tank Volumes and System Flow Rates	20%
TOTAL ERROR	40%

1.4.1.5.2 Total tritium release was calculated from sample analysis results and release point volumes.

Tank volumes and system flow rate	20%
Sampling and statistical errors	10%
Counting equipment calibration	10%
TOTAL ERROR	40%

1.4.1.5.3 Dissolved and entrained gases were calculated from sample analysis results and release point volumes.

Tank Volumes and system flow rate	20%
Sampling and statistical error	20%
Counting equipment calibration	10%
TOTAL ERROR	50%

1.4.1.5.4 Gross alpha radioactivity was calculated from sample analysis results and release point volumes.

Tank volumes and system flowrates	20%
Sampling and statistical error	10%
Counting Equipment calibration	10%
Compositing sample error	5%
TOTAL ERROR	45%

1.4.1.5.5 Volume of waste prior to dilution was calculated from level indicators on the tanks and pump discharge flow rates and times.

Level indicator error	10%
Operator interpretation of gauge	10%
TOTAL ERROR	20%

1.4.1.5.6 Volume of dilution water used was calculated from flow rate indicators and pump discharge flow rates and times.

Flow rate indicator error	10%
Operator interpretation of gauge	10%
TOTAL ERROR	20%

1.4.2 Batch Release Data

Other data pertinent to batch releases of radioactive liquid effluent are listed in Table 1-6a for Unit 1, and Table 1-6b for Unit 2.

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 Specification 3/4.11.1.2 using the methodology presented in the Plant Vogtle Offsite Dose Calculation Manual. Results are presented in Table 1-4a for Unit 1 and 1-4b for Unit 2. This is submitted as required by section 6.8.1.4 of Technical Specifications.

1.6 Abnormal Releases

1.6.1 Itemization of the Location/Source of the Unplanned Releases

1.6.1.1 There were three unplanned releases for this report period.

Unplanned release from Unit 2 Waste Gas Decay Tank # 5

On October 26, 1990, I&C performed a calibration on Unit 2 Waste Gas Hyrogen monitor. Upon instructions from Operations, Chemistry sampled and analyzed for hydrogen which agreed with the hydrogen monitor reading. On October 28, 1990, the gas compressor tripped. At this time it was found that valve 2-1902-U6-713 was open. After closing the valve, a sample was taken to determine the activity in the tank for initiating an unplanned monitored release permit. The pressure drop was from 74 psig to 40 psig. The ten minute averages on both 2-RE-013 and 2-RE-12442 for the periods October 25 - October 29, 1990, were investigated. All were below the detectable limit. The release permit 290141-G did not exceed any dose or activity limits.

Unplanned liquid release from Unit 2 Reactor Water Storage Tank

Due to heavy rain on October 12, 1990, water entered the Unit 2 RWST valve room through (1) interconnecting drains between the moat and the valve room (2) leaks in the roof, and (3) a leak in pipe penetration between the moat and valve room. Water from the roof overflowed a carboy used by Chemistry to collect flush water from sampling. This water presumably contained water identical to RWST water, and thus the room and moat were contaminated. This water flowed through an opening in the floor to the NSCW tunnel. Subsequently, the water in the NSCW tunnel/sump and much of the water from the moat was pumped to the Turbine building drain system. Some of the water leaked out of the moat from an imperfection in the moat wall onto the ground and flowed into a storm drain, to Retention Pond # 1, and then to the River. Samples have been taken regularly from October 10, 1990 to October 14, 1990. Based on these samples and the area of the spill, the radioactivity released to the environment was calculated. No dose or release limits were exceeded. This was used in permit 290196-L to calculate the doses to the public.

Unplanned Liquid Release from Unit 2 Steam Generator

On September 19, 1990, the Steam Generator Blowdown (SGBD) System was removed from service for maintenance and the SGBD effluent line radiation monitor 2RE-0021 was valved out and isolated without a Limiting Condition for Operation (LCO) tracking sheet being initiated.

On September 27, 1990, a portion of the SGBD was restored to service in order to drain Steam Generator (SG) # 3. However, 2RE-0021 was not restored to service and a violation of TS Table 3.3-9 Action 38, occurred when the SG contents were released to the Savannah River (via the Waste Water Retention Basin) and no grab samples were taken. Action 38 provides for liquid effluent releases in the event of an inoperable radiation monitor on the condition that grab samples are taken and appropriately analyzed for radioactivity. On October 1, 1990, a similar release occurred when SG # 4 was drained.

On October 20, 1990, a monthly alignment check was being performed on the 2RE-0021 radiation monitor skid when personnel discovered the closed inlet valve which had isolated 2RE-0021. The Shift Supervisor (SS) was notified and a LCO tracking sheet was initiated.

The last samples taken from the SG's prior to draining and the first samples taken after refilling indicated that there were no primary to secondary leaks in the Vogtle Electric Generating Plant SG's. In addition, there was no primary water in the SG's during this period. As a result, there was no radioactive effluent released when the SG's were drained. Based on this consideration, there was no adverse effect on plant safety or public health and safety as result of this event.

1.7 River Flow

1.7.1 The average flow rate of the Savannah River for this Semiannual Effluent Report period was obtained from the Clark Hill Dam Corp of Engineers Office. The average flow rate is 5937 cubic feet/sec.

Table 1-2a
Georgia Power Company

Vogtle Electric Generating Plant U-1

SEMIANNUAL SUMMATION OF ALL RELEASES BY QUARTER
ALL LIQUID EFFLUENTS
Unit: 1
Starting : 1-Jul-1990 Ending : 31-Dec-1990

TYPE OF EFFLUENT	UNITS	QUARTER 3	QUARTER 4	EST. TOT ERROR %
A. FISSION & ACTIVATION PRODUCTS				
1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	CURIES	1.488E-01	1.045E-01	40
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	3.159E-07	4.408E-08	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
B. TRITIUM				
1. TOTAL RELEASE	CURIES	1.974E+02	1.886E+02	40
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	4.189E-04	7.955E-05	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
C. DISSOLVED AND ENTRAINED GASES				
1. TOTAL RELEASE	CURIES	1.738E-02	2.316E-02	50
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	3.688E-08	9.767E-09	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
D. GROSS ALPHA RADIOACTIVITY				
1. TOTAL RELEASE	CURIES	*0E0	*0E0	45
E. WASTE VOL RELEASED(PRE-DILUTION)	LIT	1.525E+06	1.813E+06	20
F. VOLUME OF DILUTION WATER USED	LIT	4.697E+08	2.369E+09	20

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

Table 1-2b
Georgia Power Company

Vogtle Electric Generating Plant U-2

SEMIANNUAL SUMMATION OF ALL RELEASES BY QUARTER
ALL LIQUID EFFLUENTS
Unit: 2
Starting : 1-Jul-1990 Ending : 31-Dec-1990

TYPE OF EFFLUENT	UNITS	QUARTER 3	QUARTER 4	EST. TOT ERROR %
A. FISSION & ACTIVATION PRODUCTS				
1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	CURIES	8.145E-02	8.176E-02	40
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	1.017E-08	1.942E-07	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
B. TRITIUM				
1. TOTAL RELEASE	CURIES	1.903E+02	7.074E+01	40
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	2.378E-04	1.680E-04	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
C. DISSOLVED AND ENTRAINED GASES				
1. TOTAL RELEASE	CURIES	1.152E-02	2.636E-03	50
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	1.439E-08	6.260E-09	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
D. GROSS ALPHA RADIOACTIVITY				
1. TOTAL RELEASE	CURIES	*0E0	*0E0	45
E. WASTE VOL RELEASED(PRE-DILUTION)	LIT	2.295E+06	9.512E+05	20
F. VOLUME OF DILUTION WATER USED	LIT	7.979E+08	4.201E+08	20

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

Table 1-2c
Georgia Power Company

Vogtle Electric Generating Plant

SEMIANNUAL SUMMATION OF ALL RELEASES BY QUARTER
ALL LIQUID EFFLUENTS
SITE
Starting : 1-Jul-1990 Ending : 31-Dec-1990

TYPE OF EFFLUENT	UNITS	QUARTER 3	QUARTER 4	EST. TOT ERROR %
A. FISSION & ACTIVATION PRODUCTS				
1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	CURIES	2.303E-01	1.863E-01	40
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	1.811E-07	6.672E-08	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
B. TRITIUM				
1. TOTAL RELEASE	CURIES	3.877E+02	2.593E+02	40
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	3.048E-04	9.289E-05	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
C. DISSOLVED AND ENTRAINED GASES				
1. TOTAL RELEASE	CURIES	2.890E-02	2.579E-02	50
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ML	2.273E-08	9.240E-09	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
D. GROSS ALPHA RADIOACTIVITY				
1. TOTAL RELEASE	CURIES	*0E0	*0E0	45
E. WASTE VOL RELEASED(PRE-DILUTION)	LIT	3.820E+06	2.764E+06	20
F. VOLUME OF DILUTION WATER USED	LIT	1.268E+09	2.789E+09	20

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

Table 1-3a

REPORT CATEGORY : SEMIANNUAL LIQUID CONTINUOUS AND BATCH RELEASES
: TOTALS FOR EACH NUCLIDE RELEASED, UNIT 1
TYPE OF ACTIVITY : ALL RADIONUCLIDES
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4 YEAR 1990

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
AG-110M	CURIES	0.00E+00	0.00E+00	5.57E-05	0.00E+00
AR-41	CURIES	0.00E+00	0.00E+00	3.54E-06	0.00E+00
BE-7	CURIES	0.00E+00	0.00E+00	1.02E-06	0.00E+00
CO-57	CURIES	0.00E+00	0.00E+00	1.30E-04	2.59E-04
CO-58	CURIES	0.00E+00	0.00E+00	2.56E-02	5.38E-02
CO-60	CURIES	0.00E+00	0.00E+00	3.06E-03	5.41E-03
CR-51	CURIES	0.00E+00	0.00E+00	7.75E-04	4.12E-03
CS-134	CURIES	0.00E+00	0.00E+00	1.63E-06	1.85E-05
CS-137	CURIES	0.00E+00	0.00E+00	5.88E-06	2.48E-05
FE-55	CURIES	0.00E+00	0.00E+00	9.13E-02	2.28E-02
FE-59	CURIES	0.00E+00	0.00E+00	6.71E-04	1.10E-03
G-ALPHA	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
H-3	CURIES	0.00E+00	0.00E+00	1.97E+02	1.88E+02
I-131	CURIES	0.00E+00	0.00E+00	2.40E-04	7.32E-03
I-133	CURIES	0.00E+00	0.00E+00	7.61E-06	4.99E-06
LA-140	CURIES	0.00E+00	0.00E+00	6.85E-06	1.82E-05
MN-54	CURIES	0.00E+00	0.00E+00	1.04E-03	1.84E-03
NA-24	CURIES	0.00E+00	0.00E+00	2.54E-05	7.20E-06
NB-95	CURIES	0.00E+00	0.00E+00	1.56E-03	1.22E-03
NB-97	CURIES	0.00E+00	0.00E+00	6.94E-05	0.00E+00
SB-122	CURIES	0.00E+00	0.00E+00	5.03E-03	0.00E+00
SB-124	CURIES	0.00E+00	0.00E+00	4.52E-04	6.98E-04
SB-125	CURIES	0.00E+00	0.00E+00	2.50E-02	5.11E-03
SN-113	CURIES	0.00E+00	0.00E+00	3.34E-06	6.49E-05
SR-89	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
SR-90	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
SR-92	CURIES	0.00E+00	0.00E+00	1.18E-05	2.70E-06
TC-99M	CURIES	0.00E+00	0.00E+00	1.44E-06	3.23E-05
XE-131M	CURIES	0.00E+00	0.00E+00	0.00E+00	9.25E-05
XE-133	CURIES	0.00E+00	0.00E+00	1.73E-02	2.27E-02
XE-133M	CURIES	0.00E+00	0.00E+00	0.00E+00	2.63E-05
XE-135	CURIES	0.00E+00	0.00E+00	7.64E-05	3.49E-04
Y-92	CURIES	0.00E+00	0.00E+00	0.00E+00	5.66E-05
ZN-65	CURIES	0.00E+00	0.00E+00	3.10E-06	1.09E-05
ZR-95	CURIES	0.00E+00	0.00E+00	4.27E-05	5.07E-04
TOTAL FOR PERIOD	CURIES	0.00E+00	0.00E+00	1.97E+02	1.88E+02

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

Table 1-3b

REPORT CATEGORY : SEMIANNUAL LIQUID CONTINUOUS AND BATCH RELEASES
: TOTALS FOR EACH NUCLIDE RELEASED, UNIT 2

TYPE OF ACTIVITY : ALL RADIONUCLIDES

REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4 YEAR 1990

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
AG-110M	CURIES	0.00E+00	0.00E+00	3.72E-05	0.00E+00
AR-41	CURIES	0.00E+00	0.00E+00	5.49E-05	0.00E+00
BE-7	CURIES	0.00E+00	0.00E+00	3.78E-04	1.08E-04
CO-57	CURIES	0.00E+00	0.00E+00	1.47E-04	2.03E-04
CO-58	CURIES	0.00E+00	1.39E-06	3.88E-02	6.01E-02
CO-60	CURIES	0.00E+00	0.00E+00	3.02E-03	3.42E-03
CR-51	CURIES	0.00E+00	0.00E+00	2.24E-03	8.64E-03
CS-137	CURIES	0.00E+00	1.68E-07	1.69E-06	1.39E-03
FE-55	CURIES	0.00E+00	0.00E+00	1.68E-02	6.08E-03
FE-59	CURIES	0.00E+00	0.00E+00	6.45E-04	3.95E-04
G-ALPHA	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
H-3	CURIES	0.00E+00	3.69E-03	1.90E+02	7.07E+01
HF-181	CURIES	0.00E+00	0.00E+00	0.00E+00	2.06E-06
I-131	CURIES	0.00E+00	0.00E+00	9.71E-04	7.69E-06
I-133	CURIES	0.00E+00	0.00E+00	2.18E-04	0.00E+00
KR-88	CURIES	0.00E+00	0.00E+00	2.55E-05	0.00E+00
LA-140	CURIES	0.00E+00	0.00E+00	4.48E-05	1.74E-05
MN-54	CURIES	0.00E+00	0.00E+00	1.41E-03	7.75E-04
NA-24	CURIES	0.00E+00	0.00E+00	4.01E-05	0.00E+00
NB-95	CURIES	0.00E+00	0.00E+00	5.48E-04	9.58E-04
NB-97	CURIES	0.00E+00	0.00E+00	8.49E-05	0.00E+00
SB-124	CURIES	0.00E+00	0.00E+00	8.89E-04	1.04E-04
SB-125	CURIES	0.00E+00	1.21E-06	1.46E-02	2.09E-04
SN-113	CURIES	0.00E+00	0.00E+00	3.86E-04	1.50E-04
SR-89	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
SR-90	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
SR-92	CURIES	0.00E+00	0.00E+00	1.19E-05	0.00E+00
TC-99M	CURIES	0.00E+00	0.00E+00	7.53E-06	0.00E+00
XE-131M	CURIES	0.00E+00	0.00E+00	3.13E-04	0.00E+00
XE-133	CURIES	0.00E+00	0.00E+00	1.02E-02	2.56E-03
XE-135	CURIES	0.00E+00	0.00E+00	9.36E-04	7.40E-05
ZN-95	CURIES	0.00E+00	0.00E+00	1.98E-05	0.00E+00
ZR-95	CURIES	0.00E+00	0.00E+00	2.66E-04	5.06E-04
TOTAL FOR PERIOD	CURIES	0.00E+00	3.69E-03	1.90E+02	7.08E+01

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

Table 1-3c

REPORT CATEGORY : SEMIANNUAL LIQUID CONTINUOUS AND BATCH RELEASES
: TOTALS FOR EACH NUCLIDE RELEASED, SITE

TYPE OF ACTIVITY : ALL RADIONUCLIDES

REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4 YEAR 1990

		CONTINUOUS RELEASES		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
AG-110M	CURIES	0.00E+00	0.00E+00	9.29E-05	0.00E+00
AR-41	CURIES	0.00E+00	0.00E+00	5.84E-05	0.00E+00
BE-7	CURIES	0.00E+00	0.00E+00	3.79E-04	1.08E-04
CO-57	CURIES	0.00E+00	0.00E+00	2.77E-04	4.62E-04
CO-58	CURIES	0.00E+00	1.39E-06	6.44E-04	1.14E-01
CO-60	CURIES	0.00E+00	0.00E+00	6.08E-03	8.83E-03
CR-51	CURIES	0.00E+00	0.00E+00	3.01E-03	1.28E-02
CS-134	CURIES	0.00E+00	0.00E+00	1.63E-06	1.85E-05
CS-137	CURIES	0.00E+00	1.68E-07	7.57E-06	3.87E-05
FE-55	CURIES	0.00E+00	0.00E+00	1.08E-01	2.88E-02
FE-59	CURIES	0.00E+00	0.00E+00	1.32E-03	1.50E-03
G-ALPHA	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
H-3	CURIES	0.00E+00	3.69E-03	3.87E+02	2.59E+02
HF-181	CURIES	0.00E+00	0.00E+00	0.00E+00	2.06E-06
I-131	CURIES	0.00E+00	0.00E+00	1.21E-03	7.33E-03
I-133	CURIES	0.00E+00	0.00E+00	2.26E-04	4.99E-06
KR-88	CURIES	0.00E+00	0.00E+00	2.55E-05	0.00E+00
LA140	CURIES	0.00E+00	0.00E+00	5.17E-05	3.56E-05
MN-54	CURIES	0.00E+00	0.00E+00	2.45E-03	2.62E-03
NA-24	CURIES	0.00E+00	0.00E+00	6.55E-05	7.20E-06
NB-95	CURIES	0.00E+00	0.00E+00	2.21E-03	2.18E-03
NB-97	CURIES	0.00E+00	0.00E+00	1.54E-04	0.00E+00
SB-122	CURIES	0.00E+00	0.00E+00	5.03E-03	0.00E+00
SB-124	CURIES	0.00E+00	0.00E+00	1.34E-03	8.02E-04
SB-125	CURIES	0.00E+00	1.21E-06	3.96E-02	5.32E-03
SN-113	CURIES	0.00E+00	0.00E+00	3.89E-04	2.15E-04
SR-89	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
SR-90	CURIES	0.00E+00	0.00E+00	*0E0	*0E0
SR-92	CURIES	0.00E+00	0.00E+00	2.37E-05	2.70E-06
TC-99M	CURIES	0.00E+00	0.00E+00	1.10E-05	3.28E-05
XE-131M	CURIES	0.00E+00	0.00E+00	3.13E-04	9.25E-05
XE-133	CURIES	0.00E+00	0.00E+00	2.72E-02	2.52E-02
XE-133M	CURIES	0.00E+00	0.00E+00	0.00E+00	2.63E-05
XE-135	CURIES	0.00E+00	0.00E+00	1.01E-03	4.23E-04
Y-92	CURIES	0.00E+00	0.00E+00	0.00E+00	5.66E-05
ZN-65	CURIES	0.00E+00	0.00E+00	2.29E-05	1.09E-05
ZR-95	CURIES	0.00E+00	0.00E+00	3.09E-04	1.01E-03
TOTAL FOR PERIOD	CURIES	0.00E+00	3.69E-03	3.87E+02	2.59E+02

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

TABLE 1-4A

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
INDIVIDUAL DOSES DUE TO LIQUID RELEASES

July 1, 1990 Through December 31, 1990
UNIT 1

Cumulative Dose Per Quarter

Organ	Tech Spec Limit	Units	Quarter 3	% of Tech Limit	Quarter 4	% of Tech Limit
Bone	5.0	mrem	1.19E-03	2.38E-02	6.24E-04	1.25E-02
Liver	5.0	mrem	5.43E-03	1.09E-01	6.11E-03	1.22E-01
T. Body	1.5	mrem	5.22E-03	3.48E-01	5.89E-03	3.93E-01
Thyroid	5.0	mrem	5.13E-03	1.03E-01	1.67E-02	3.34E-01
Kidney	5.0	mrem	4.82E-03	9.64E-02	5.38E-03	1.08E-01
Lung	5.0	mrem	6.42E-02	1.28E+00	1.56E-02	3.12E-01
GI-LLI	5.0	mrem	1.23E-02	2.46E-01	1.01E-02	2.02E-01

Cumulative Dose Per Year

Organ	Tech Spec Limit	Units	Year to Date	% of Tech Spec Limit
Bone	10.0	mrem	6.92E-03	6.92E-02
Liver	10.0	mrem	1.96E-02	1.96E-01
T. Body	3.0	mrem	1.78E-02	5.95E-01
Thyroid	10.0	mrem	2.84E-02	2.84E-01
Kidney	10.0	mrem	2.01E-02	2.01E-01
Lung	10.0	mrem	2.04E-01	2.04E+00
GI-LLI	10.0	mrem	6.99E-02	6.99E-01

TABLE 1-4b

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
INDIVIDUAL DOSES DUE TO LIQUID RELEASES
July 1, 1990 Through December 31, 1990
UNIT 2

Cumulative Dose Per Quarter

Organ	Tech Spec Limit	Units	Quarter 3	% of Tech Limit	Quarter 4	% of Tech Limit
Bone	5.0	mrem	4.03E-04	8.06E-03	6.58E-03	1.32E-01
Liver	5.0	mrem	5.72E-03	1.14E-01	1.08E-02	2.17E-01
T. Body	1.5	mrem	5.75E-03	3.83E-01	8.02E-03	5.35E-01
Thyroid	5.0	mrem	7.31E-03	1.46E-01	7.78E-03	1.55E-01
Kidney	5.0	mrem	5.47E-03	1.09E-01	1.82E-03	3.65E-02
Lung	5.0	mrem	3.99E-02	7.98E-01	1.75E-02	3.50E-01
GI-LLI	5.0	mrem	1.19E-02	2.38E-01	9.60E-03	1.92E-01

Cumulative Dose Per Year

Organ	Tech Spec Limit	Units	Year to Date	% of Tech Spec Limit
Bone	10.0	mrem	7.84E-03	7.84E-02
Liver	10.0	mrem	3.01E-02	3.01E-01
T. Body	3.0	mrem	2.69E-02	8.97E-01
Thyroid	10.0	mrem	2.83E-02	2.83E-01
Kidney	10.0	mrem	2.00E-02	2.00E-01
Lung	10.0	mrem	8.53E-02	8.53E-01
GI-LLI	10.0	mrem	4.33E-02	4.33E-01

TABLE 1-5 (Page 1 of 2)

LOWER LIMITS OF DETECTION - LIQUID SAMPLE ANALYSES

VOGTLE ELECTRIC GENERATING PLANT
(July 1, 1990 Through December 31, 1990)

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

RADIONUCLIDE	LLD	UNITS
Mn-54	2.73E-08	uCi/ml
Fe-59	8.33E-08	uCi/ml
Co-58	3.78E-08	uCi/ml
Co-60	6.76E-08	uCi/ml
Zn-65	1.32E-07	uCi/ml
Mo-99	4.31 07	uCi/ml
Cs-134	3.06E-08	uCi/ml
Cs-137	4.51E-08	uCi/ml
Ce-141	6.99E-08	uCi/ml
Ce-144	2.95E-07	uCi/ml
I-131	5.97E-08	uCi/ml
Xe-133	9.11E-08	uCi/ml
Xe-135	4.27E-08	uCi/ml
Fe-55	1.00E-06	uCi/ml
Sr-89	5.00E-08	uCi/ml
Sr-90	7.00E-09	uCi/ml
H-3	2.00E-06	uCi/ml
Gross Alpha	7.00E-08	uCi/ml

TABLE 1-5 (Page 2 of 2)

LOWER LIMITS OF DETECTION - LIQUID SAMPLE ANALYSES

VOGTLE ELECTRIC GENERATING PLANT
July 1, 1990 Through December 31, 1990

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

RADIONUCLIDE	LLD	UNITS
Au-198	3.47E-08	uCi/ml
Ba-140	1.16E-07	uCi/ml
Be-7	3.49E-07	uCi/ml
Co-57	3.35E-08	uCi/ml
Cr-51	4.24E-07	uCi/ml
Cs-138	5.37E-08	uCi/ml
I-133	7.17E-08	uCi/ml
I-135	2.05E-07	uCi/ml
La-140	8.21E-08	uCi/ml
Mn-56	2.39E-07	uCi/ml
Na-24	7.22E-08	uCi/ml
Nb-95	6.67E-08	uCi/ml
Nb-97	7.17E-08	uCi/ml
Np-239	1.62E-07	uCi/ml
Ru-106	5.24E-07	uCi/ml
Sb-122	5.53E-08	uCi/ml
Tc-99m	2.90E-08	uCi/ml
Te-132	3.59E-08	uCi/ml
W-187	2.09E-07	uCi/ml
Xe-131m	2.75E-07	uCi/ml
Xe-133m	3.86E-07	uCi/ml
Zr-95	9.03E-08	uCi/ml
Zr-97	4.13E-08	uCi/ml
Sb-124	9.47E-08	uCi/ml

Table 1-6a

Georgia Power Company

Vogtle Electric Generating Plant U-1

BATCH RELEASE SUMMARY OF ALL RELEASES

Starting : 1-Jul-1990 Ending : 31-Dec-1990

LIQUID RELEASES

NUMBER OF RELEASES	:	134	
TOTAL TIME FOR ALL RELEASES	:	16177.00	MINUTES
MAXIMUM TIME FOR A RELEASE	:	886.00	MINUTES
AVERAGE TIME FOR A RELEASE	:	120.72	MINUTES
MINIMUM TIME FOR A RELEASE	:	2.00	MINUTES
AVERAGE STREAM FLOW	:	54.53	GPM

GASEOUS RELEASES

NUMBER OF RELEASES	:	107	
TOTAL TIME FOR ALL RELEASES	:	27048.00	MINUTES
MAXIMUM TIME FOR A RELEASE	:	7325.00	MINUTES
AVERAGE TIME FOR A RELEASE	:	252.79	MINUTES
MINIMUM TIME FOR A RELEASE	:	2.00	MINUTES

Table 1-6b

Georgia Power Company

Vogtle Electric Generating Plant U-2

BATCH RELEASE SUMMARY OF ALL RELEASES

Starting : 1-Jul-1990 Ending : 31-Dec-1990

LIQUID RELEASES

NUMBER OF RELEASES	:	117	
TOTAL TIME FOR ALL RELEASES	:	13514.00	MINUTES
MAXIMUM TIME FOR A RELEASE	:	542.00	MINUTES
AVERAGE TIME FOR A RELEASE	:	115.50	MINUTES
MINIMUM TIME FOR A RELEASE	:	4.00	MINUTES
AVERAGE STREAM FLOW	:	62.32	GPM

GASEOUS RELEASES

NUMBER OF RELEASES	:	68	
TOTAL TIME FOR ALL RELEASES	:	121060.00	MINUTES
MAXIMUM TIME FOR A RELEASE	:	10279.00	MINUTES
AVERAGE TIME FOR A RELEASE	:	1780.29	MINUTES
MINIMUM TIME FOR A RELEASE	:	4.00	MINUTES

2.0 Gaseous Effluents

2.1 REGULATORY LIMITS/TECHNICAL SPECIFICATIONS

The Technical Specifications presented in this section are for Unit 1 and Unit 2. The instrumentation required may be found in Table 2-1 of this report.

2.1.1 Process Effluent Monitoring System

3.3.3.10

The radioactive gaseous effluent monitoring instrumentation channels shown in Table 3.3-10 shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits of Specifications 3.11.2.1a and 3.11.2.5 are not exceeded. The Alarm/Trip Setpoints of these channels meeting Specification 3.11.2.1a shall be determined and adjusted in accordance with the methodology and parameters in the ODCM.

2.1.2 Dose Rate Limit

3.11.2.1

The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY (see Figures 5.1-1 and 5.1-2) shall be limited to the following:

a. For noble gases: Less than or equal to 500 mrem/yr to the whole body and less than or equal to 3000 mrems/yr to the skin, and

b. For Iodine-131, for Iodine-133, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to 1500 mrems/yr to any organ.

2.1.3 Air Dose Due to Noble Gas

3.11.2.2

The air dose due to noble gases released in gaseous effluents, from each unit, to areas at and beyond the SITE BOUNDARY (see Figures 5.1-1 and 5.1-2) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 5 mrads for gamma radiation and less than or equal to 10 mrads for beta radiation, and

b. During any calendar year: Less than or equal to 10 mrads for gamma radiation and less than or equal to 20 mrads for beta radiation.

2.1.4 Dose to Any Organ

3.11.2.3

The dose to a MEMBER OF THE PUBLIC from Iodine-131, Iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from each unit, to areas at and beyond the SITE BOUNDARY (see Figures 5.1-1 and 5.1-2 of the Technical Specifications) shall be limited to the following:

a. During any calendar quarter: less than or equal to 7.5 mrems to any organ and,

b. During any calendar year: Less than or equal to 15 mrems to any organ.

2.1.5 Ventilation Exhaust Treatment System and Gaseous Waste Processing System

3.11.2.4

The VENTILATION EXHAUST TREATMENT SYSTEM and the GASEOUS WASTE PROCESSING SYSTEM shall be OPERABLE and appropriate portions of these systems shall be used to reduce releases of radioactivity when the projected doses in 31 days due to gaseous effluent releases, from each unit, to areas at and beyond the SITE BOUNDARY (See Figures 5.1-1 and 5.1-2 of the Technical Specifications) would exceed:

a. 0.2 mrad to air from gamma radiation, or

b. 0.4 mrad to air from beta radiation, or

c. 0.3 mrem to any organ of a MEMBER OF THE PUBLIC.

2.1.6 Explosive Gas Mixture

3.11.2.5

The concentration of oxygen in the GASEOUS WASTE PROCESSING SYSTEM shall be limited to less than or equal to 2% by volume whenever the hydrogen concentration exceeds 4% by volume.

2.1.7 Activity in Gas Decay Tanks

3.11.2.6

The quantity of radioactivity contained in each gas decay tank shall be limited to less than or equal to 2.0E5 curies of noble gases (considered as Xe-133 equivalent).

2.1.8 Total Fuel Cycle Dose Commitment

3.11.4

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 mrems to the whole body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrems.

APPLICABILITY ACTION:

At all times

a. With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Specifications 3.11.1.2a, 3.11.1.2b, 3.11.2.2a, 3.11.2.2b, 3.11.2.3a, or 3.11.2.3b, calculations shall be made including direct radiation contributions from the unit (including out ide storage tanks etc.) to determine whether the above limits of specification 3.11.4 have been exceeded.

6.8.1.4 States in part:

The Semiannual Radioactive Effluent Release Report to be submitted within 60 days after January 1 of each year shall also include an assessment of radiation doses to the likely most exposed MEMBER OF THE PUBLIC from reactor releases and other uranium fuel cycle sources within 8 km, including doses from primary effluent pathways and direct radiation for the previous calendar year to show conformance with 40 CFR part 190, "Environmental Radiation Protection Standards for Nuclear Power Operation." Accep able methods for calculating the dose contribution from l'quid and gaseous effluents are given in Regulatory Guide .109, Rev. 1, October 1977.

2.1.9 Reporting of Semiannual Releases (Unplanned)

6.8.1.4 states in part:

The Semiannual Radioactive Effluent Release Reports shall include a list and description of unplanned releases from the site to UNRESTRICTED AREAS of radioactive materials in gaseous and liquid effluents made during the reporting period.

VEGP unplanned releases are described in section 1.6 of this report.

TABLE 2-1 (Sheet 1 of 4)
(From Technical Specifications)
(TABLE 3.3-10)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
1. GASEOUS WASTE PROCESSING			
a. Noble Gas Activity Monitor-Providing Alarm and Automatic Termination of Release (ARE-0014) Common	1	***	45
b. Effluent System Flow Rate Measuring Device (AFT-0014) Common	1	***	46
2. GASEOUS WASTE PROCESSING SYSTEM - Explosive Gas Monitoring System			
a. Hydrogen Monitor	1/recombiner	**	50
b. Oxygen Monitor	2/recombiner	**	49
3. CONDENSER AIR EJECTOR AND STEAM PACKING EXHAUSTER SYSTEM			
a. Noble Gas Activity Monitor (RE-12839C)	1	***	47
b. Iodine Sampler (RE-12839B)	1	***	51
c. Particulate Sampler (RE-12839A)	1	***	51
d. Flow Rate Monitor (FT-12839) (FIS-12862)#	1	***	46
e. Sampler Flow Rate Monitor (FI-13211)	1	***	46

TABLE 2-1 (Sheet 2 of 4)
(From Technical Specifications)
(TABLE 3.3-10)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENTS	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
4. PLANT VENT			
a. Noble Gas Activity Monitor (RE-12442C or RE-12444C)	1	*	47, 48
b. Iodine Sampler/Monitor (RE-12442B or RE-12444B)	1	*	51
c. Particulate Sampler/ Monitor (RE-12442A or RE-12444A)	1	*	51
d. Flow Rate Monitor (FT-12442)	1	*	46
e. Sampler Flow Rate Monitor (FI-12442 or FI-12444)	1	*	46

TABLE NOTATIONS

* At all times.
** During GASEOUS WASTE PROCESSING SYSTEM operation
*** During radioactive releases via this pathway
# During Emergency Filtration

TABLE 2-1 (Sheet 3 of 4)
(FROM TECHNICAL SPECIFICATONS)
TABLE 3.3-10

ACTION STATEMENTS

ACTION 45 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, the contents of the tank(s) may be released to the environment provided that prior to initiating the release:

a. At least two independent samples of the tank's contents are analyzed, and

b. At least two technically qualified members of the facility staff independently verify the release rate calculations and discharge valve lineup.

Otherwise, suspend release of radioactive effluents via this pathway.

ACTION 46 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours.

ACTION 47 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 at least once per 12 hours and these samples are analyzed for radioactivity within 24 hours.

ACTION 48 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, immediately suspend containment PURGING of radioactive effluents via this pathway.

ACTION 49 a. With the outlet oxygen monitor channel inoperable, operation of the system may continue provided grab samples are taken and analyzed at least once per 24 hours and the oxygen concentration remains less than 1 percent.

b. With the inlet oxygen monitor inoperable, operation may continue if the inlet hydrogen monitor is OPERABLE.

TABLE 2-1 (Sheet 4 of 4)
FROM TECHNICAL SPECIFICATIONS
TABLE 3.3-10

TABLE NOTATIONS (Continued)

c. With both oxygen channels or both of the inlet oxygen and inlet hydrogen monitors inoperable, suspend oxygen supply to the recombiner. Addition of waste gas to the system may continue provided grab samples are taken and analyzed at least once per 4 hours during degassing operations or at least once per 24 hours during other operations and the oxygen concentration remains less than 1 percent.

ACTION 50 With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, suspend oxygen supply to the recombiner. Addition of waste gas to the system may continue provided grab samples are taken and analyzed at least once per 4 hours during degassing operation or at least once per 24 hours during other operations and the oxygen concentration remains less than 1 percent.

ACTION 51 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via the affected pathway may continue provided samples are continuously collected with auxiliary sampling equipment as required in Table 4.11-2 of the Technical Specifications.

2.2 Release Points of Gaseous Effluents

Gaseous Effluents at Vogtle Electric Generating Plant are currently confined to four paths: plant vents (Unit 1 and Unit 2), and the condenser air ejector and steam packing exhauster systems (Unit 1 and Unit 2).

Waste gas decay tanks are batch releases and the waste gas decay tanks are released through the Unit 1 plant vent. Containment purges are released through their respective plant vents.

2.3 Sample Collection and Analysis

All of the paths can be continuously monitored for gaseous radioactivity. Each is equipped with an integrated-type sample collection device for collecting particulates and iodines. Sample collection is in accordance with Technical Specification Table 4.11-2. During this release period, there were no radioactive releases through the condenser air ejector and steam packing exhauster system vents. 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. Since spent fuel was placed in the spent fuel pool during the first Unit 1 refueling, tritium samples are collected weekly on the Unit 1 and Common Plant Vent.

3. Radioiodine samples are collected from the sample stream through a charcoal cartridge over a 7-day period.

4. Particulates are collected from 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.

Batch Waste Gas Decay Tank releases are analyzed for iodines, particulates and noble gases before each release. In addition, the containment atmosphere is analyzed for tritium on at least a monthly basis.

Sample analyses results and release flow rates from the 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 and analysis (for principal gamma emitters) results are used along with maximum expected release flow rates from each of the vents to calculate monitor setpoints, for the gaseous effluent monitors serving the two release points, to assure that the limits of Technical Specifications 3.11.2.1a are not exceeded. Calculation of monitor setpoints is described in the Vogtle Electric Generating Plant ODCM.

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

After each calendar quarter (13 weeks), a summary of waste gas releases from the two vents and batch processes is compiled for preparation of the Semiannual Radioactive Effluent Release Report required by Technical Specifications 6.8.1.4 and NRC Regulatory Guide 1.21.

2.4 Determination Of Total Quantities of Radioactivity, Dose Rates and Cumulative Doses

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

2.4.1 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 3.11.2.1a for noble gases, and 3.11.2.1b of the Technical Specifications for radioiodine, tritium, and particulates. Dose rate calculation methodology is presented in the 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 calendar quarter and year. Cumulative air doses are compared to the dose limits specified in Technical Specification 3.11.2.2. Current percent of the technical specification limits are shown on the printout for each release period. Air dose calculation methodology is presented in the ODCM.

2.4.2 Radioiodine, Tritium and Particulate Releases

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

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

After each quarter, the particulate filters from each vent are combined, fused, and a strontium separation is performed. If 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 for release dose rate and individual dose calculations.

Tritium samples are obtained at least monthly from each vent by bubbling the sample stream through a water trap. 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 both release points are compared to the dose rate limits specified in Technical Specification 3.11.2.1b.

Individual doses due to radioiodine, tritium and particulates are calculated for the critical receptor, which for Vogtle Electric Generating Plant is a child exposed to the inhalation and ground-plane pathways. 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 Specification 3.11.2.3.

Current percent of technical specification limits are shown on the printout for each release period.

2.4.3 Gross Alpha Release

The gross alpha release is computed each month by counting the particulate filters offsite for each week for gross alpha activity in a 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. This concentration is input to the composite file of the computer and is used for release calculations.

2.5 Gaseous Effluent Release Data

2.5.1 Methodology

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

To complete Table 2-2a and 2-2b, 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 for each quarter. However, the percent of the applicable Technical Specification limits are not applicable because we have no curie limits for gaseous releases. Noble gases are limited as specified in Technical Specification 3.11.2.1a. The other three categories (tritium, radioiodines, and particulates) are limited as a group as specified in Technical Specification 3.11.2.1b. Dose rates due to noble gas releases and due to radioiodine, tritium, and particulates were calculated as Part A of the pre-release and post-release permits on individual permits. No limits were exceeded for this reporting period.

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

Limits for cumulative beta and gamma air doses due to noble gases are specified in Technical Specification 3.11.2.2. Cumulative air doses are presented in Table 2-6a and 2-6b along with percent of technical specification limits.

Limits for cumulative individual doses due to radioiodine, tritium, and particulates, are specified in Technical Specification 3.11.2.3. Cumulative individual doses are presented in Table 2-7a and 2-7b along with percent of technical specification limits.

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.

2.5.1.1 Fission and activation total release was calculated from sample analysis results and release point flow rates.

Sampling and statistical error in counting	10%
Counting equipment calibration	10%
Vent flow rates	10%
Non-steady release rates	20%
TOTAL ERROR	50%

2.5.1.2 I-131 releases were calculated from each weekly sample:

Statistical error in counting	10%
Counting equipment calibration	10%
Vent flow rates	10%
Vent sample flow rates	50%
Non-steady release rates	10%
Losses from charcoal cartridges	10%
TOTAL ERROR	100%

2.5.1.3 Particulates with half lives greater than 8 day releases were calculated from sample analysis results and release point flow rates.

Statistical error at LLD concentration	10%
Counting equipment calibration	10%
Vent flow rates	10%
Vent sample flow rates	50%
Non-steady release rates	10%
TOTAL ERROR	90%

2.5.1.4 Total tritium releases were calculated from sample analysis results and release point flow rates.

Sample collections efficiency in bubble sampler	10%
Vent flow rates	10%
Counting calibration and statistics	10%
Non-steady release rates	10%
TOTAL ERROR	40%

2.5.2 Gaseous Batch Data

Other data pertinent to batch releases of radioactive gaseous effluent from Unit 1 and Unit 2 are listed in Table 1-6a and 1-6b.

The requirement for hourly meteorological data for batch releases will be met if the batch releases are made in a non random manner. If the batch releases are made in a random manner, average annual meteorological parameters will be used for these calculations and the hourly meteorological data will not have to be included in the Semiannual Radioactive Effluent Reports. This methodology is representative for dose calculations and is less susceptible to errors in data management.

This is in accordance with Technical Specification 6.8.1.4, the ODCM, NUREG 0133, and is standard practice in the nuclear industry.

All batch releases were made in a random manner.

2.6 Radiological Impact Due to Gaseous Releases

Dose rates due to noble gas releases were calculated for the site in accordance with Technical Specification 3/4.11.2.1a. Dose rates due to radioiodine, tritium, and particulates in gaseous releases were calculated in accordance with Technical Specification 3/4.11.2.1b.

Instantaneous off-site dose rates were calculated as part of the pre-release and post-release permits on individual releases. No limits were exceeded for this reporting period.

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

Cumulative doses to an individual due to radioiodine, tritium, and particulates were calculated in accordance with Technical Specification 3/4.11.2.3. These results are presented in Tables 2-7a and 2-7b.

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

Table 2-2a

Georgia Power Company
Vogtle Electric Generating Plant

SEMIANNUAL SUMMATION OF ALL RELEASES BY QUARTER
ALL AIRBORNE EFFLUENTS
UNIT: 1
Starting : 1-Jul-1990 Ending : 31-Dec-1990

TYPE OF EFFLUENT	UNITS	QUARTER 3	QUARTER 4	EST. TOT ERROR %
A. FISSION & ACTIVATION PRODUCTS				
1. TOTAL RELEASE	CURIES	1.173E+01	5.755E+01	50
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	1.476E+00	7.241E+00	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
B. RADIOIODINES				
1. TOTAL IODINE-131	CURIES	7.924E-06	3.359E-06	100
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	9.968E-07	4.226E-07	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
C. PARTICULATES				
1. PARTICULATES(HALF-LIVES>8 DAYS)	CURIES	1.657E-05	2.895E-06	90
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	2.085E-06	3.642E-07	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
4. GROSS ALPHA RADIOACTIVITY	CURIES	8.152E-08	1.331E-07	
D. TRITIUM				
1. TOTAL RELEASE	CURIES	4.069E+01	7.706E+01	40
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	5.119E+00	9.695E+00	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

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

Table 2-2b

Georgia Power Company
Vogtle Electric Generating Plant

SEMIANNUAL SUMMATION OF ALL RELEASES BY QUARTER
ALL AIRBORNE EFFLUENTS
UNIT: 2
Starting : 1-Jul-1990 Ending : 31-Dec-1990

TYPE OF EFFLUENT	UNITS	QUARTER 3	QUARTER 4	EST. TOT ERROR %
A. FISSION & ACTIVATION PRODUCTS				
1. TOTAL RELEASE	CURIES	7.225E+00	4.189E+00	50
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	9.089E-01	5.271E-01	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
B. RADIOIODINES				
1. TOTAL IODINE-131	CURIES	4.460E-06	5.480E-07	100
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	5.610E-07	6.894E-08	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
C. PARTICULATES				
1. PARTICULATES(HALF-LIVES>8 DAYS)	CURIES	1.219E-06	3.817E-06	90
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	1.534E-07	4.802E-07	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
4. GROSS ALPHA RADIOACTIVITY	CURIES	5.351E-08	3.888E-08	
D. TRITIUM				
1. TOTAL RELEASE	CURIES	5.082E-01	0.000E+00	40
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	6.393E-02	0.000E+00	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

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

Table 2-2c

Georgia Power Company
Vogtle Electric Generating Plant

SEMIANNUAL SUMMATION OF ALL RELEASES BY QUARTER
ALL AIRBORNE EFFLUENTS
SITE
Starting : 1-Jul-1990 Ending : 31-Dec-1990

TYPE OF EFFLUENT	UNITS	QUARTER 3	QUARTER 4	EST. TOT ERROR %
A. FISSION & ACTIVATION PRODUCTS				
1. TOTAL RELEASE	CURIES	1.896E+01	6.174E+01	50
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	2.385E+00	7.768E+00	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
B. RADIOIODINES				
1. TOTAL IODINE-131	CURIES	1.238E-05	3.908E-06	100
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	1.557E-06	4.916E-07	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
C. PARTICULATES				
1. PARTICULATES(HALF-LIVES>8 DAYS)	CURIES	1.78[illegible]-05	6.690E-06	90
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	2.2[illegible]-06	8.41[illegible]-07	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
4. GROSS ALPHA RADIOACTIVITY	CURIES	1.348E-07	1.719E-07	
D. TRITIUM				
1. TOTAL RELEASE	CURIES	4.119E+01	7.706E+01	40
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/Sec	5.183E+00	9.695E+00	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

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

TABLE 2-3a (Page 1 of 2)
VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - MIXED MODE
July 1, 1990 Through December 31, 1990
UNIT 1

Nuclides Released	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
1. Fission Gases					
Kr-88	Ci	0.00E+00	0.00E+00	0.00E+00	3.88E-03
Kr-85	Ci	0.00E+00	0.00E+00	2.50E-01	0.00E+00
Xe-133	Ci	8.32E+00	1.05E+01	2.78E+00	4.50E+01
Xe-135	Ci	0.00E+00	1.55E-01	2.68E-02	2.92E-01
Ar-41	Ci	0.00E+00	0.00E+00	2.54E-01	7.54E-01
Xe-131m	Ci	0.00E+00	0.00E+00	5.10E-02	4.08E-01
Xe-133m	Ci	0.00E+00	0.00E+00	2.02E-02	4.54E-01
Kr-85m	Ci	0.00E+00	0.00E+00	2.10E-03	3.28E-02
TOTAL FOR PERIOD	Ci	8.3	1.07E+01	3.38E+00	4.69E+01
2. Iodines					
I-131	Ci	7.92E-06	3.36E-06	0.00E+00	0.00E+00
I-133	Ci	1.66E-05	0.00E+00	0.00E+00	0.00E+00
TOTAL FOR PERIOD	Ci	2.45E-05	3.36E-06	0.00E+00	0.00E+00

*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.

TABLE 2-3a (Page 2 of 2)
VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - MIXED MODE
July 1, 1990 Through December 31, 1990
UNIT 1

Nuclides Released	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
3. Particulates**					
58	Ci	1.66E-05	1.70E-06	0.00E+00	0.00E+00
60	Ci	0.00E+00	1.19E-06	0.00E+00	0.00E+00
	Ci	3.72E+01	7.64E+01	3.38E+00	6.22E-01
ha	Ci	8.14E-08	1.33E-07	0.00E+00	0.00E+00
AL FOR PERIOD	Ci	3.72E+01	7.64E+01	3.38E+00	6.22E-01

*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.

** Half lives greater than 8 days.

TABLE 2-3b (Page 1 of 2)
VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - MIXED MODE
July 1, 1990 Through December 31, 1990
UNIT 2

Nuclides Released	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
1. Fission Gases					
Kr-85	Ci	0.00E+00	0.00E+00	0.00E+00	2.74E-04
Kr-85m	Ci	0.00E+00	5.66E-02	4.76E-03	0.00E+00
Xe-133	Ci	3.38E+00	2.86E+00	9.78E-01	9.72E-01
Xe-135	Ci	9.60E-01	9.04E-02	1.92E-01	2.62E-02
Ar-41	Ci	0.00E+00	0.00E+00	1.71E+00	1.84E-01
Xe-131m	Ci	0.00E+00	0.00E+00	0.00E+00	3.08E-05
TOTAL FOR PERIOD	Ci	4.34E+00	3.01E+00	2.88E+00	1.18E+00
2. Iodines					
I-131	Ci	4.46E-06	5.48E-07	0.00E+00	0.00E+00
I-133	Ci	1.71E-05	0.00E+00	0.00E+00	0.00E+00
TOTAL FOR PERIOD	Ci	2.16E-05	5.48E-07	0.00E+00	0.00E+00

*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.

TABLE 2-3b (Page 2 of 2)
VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - MIXED MODE
July 1, 1990 Through December 31, 1990
UNIT 2

Nuclides Released	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
3. Particulates**					
Co-58	Ci	1.22E-06	3.80E-06	0.00E+00	0.00E+00
H- 3	Ci	0.00E+00	0.00E+00	5.08E-01	0.00E+00
G-Alpha	Ci	5.34E-08	3.89E-08	0.00E+00	0.00E+00
TOTAL FOR PERIOD	Ci	1.27E-06	3.84E-06	5.08E-01	0.00E+00

*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.

** Half lives greater than 8 days.

TABLE 2-3c (Page 1 of 2)

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - MIXED MODE
July 1, 1990 Through December 31, 1990
Site

Nuclides Released	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
1. Fission Gases	Ci				
Kr-88	Ci	0.00E+00	0.00E+00	0.00E+00	3.88E-03
Kr-85m	Ci	0.00E+00	5.66E-02	6.86E-03	3.28E-02
Kr-85	Ci	0.00E+00	0.00E+00	2.50E-01	2.74E-04
Xe-133	Ci	1.17E+01	1.34E+01	3.76E+00	4.60E+01
Xe-135	Ci	9.60E-01	2.45E-01	2.19E-01	3.18E-01
Ar-41	Ci	0.00E+00	0.00E+00	1.96E+00	9.38E-01
Xe-131m	Ci	0.00E+00	0.00E+00	5.10E-02	4.08E-01
Xe-133m	Ci	0.00E+00	0.00E+00	2.02E-02	4.54E-01
TOTAL FOR PERIOD	Ci	1.27E+01	1.37E+01	6.27E+00	4.81E+01
2. Iodines					
I-131	Ci	1.24E-05	3.91E-06	0.00E+00	0.00E+00
I-133	Ci	3.37E-05	0.00E+00	0.00E+00	0.00E+00
TOTAL FOR PERIOD	Ci	4.61E-05	3.91E-06	0.00E+00	0.00E+00

*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.

TABLE 2-3c (Page 2 of 2)
VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - MIXED MODE
July 1, 1990 Through December 31, 1990
Site

Nuclides Released	Unit	Continuous Mode Quarter 3	Continuous Mode Quarter 4	Batch Mode Quarter 3	Batch Mode Quarter 4
3. Particulates**					
Co-58	Ci	1.78E-05	5.50E-06	0.00E+00	0.00E+00
Co-60	Ci	0.00E+00	1.19E-06	0.00E+00	0.00E+00
H-3	Ci	3.72E+01	7.64E+01	3.89E+00	6.22E-01
G-Alpha	Ci	1.35E-07	1.72E-07	0.00E+00	0.00E+00
TOTAL FOR PERIOD	Ci	3.72E+01	7.64E+01	3.89E+00	6.22E-01

*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.

**Half lives greater than 8 days.

TABLE 2-4a (Page 1 of 2)

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - GROUND RELEASES
July 1, 1990 Through December 31, 1990
UNIT 1

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter* 3	Quarter* 4	Quarter* 3	Quarter* 4
1. Fission Gases	Ci				
Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
Kr-88	Ci				
Xe-133	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
Xe-133m	Ci				
TOTAL FOR PERIOD	Ci				
2. Iodines					
I-131	Ci				
I-133	Ci				
TOTAL FOR PERIOD	Ci				

*No releases during this period.

TABLE 2-4a (Page 2 of 2)

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - GROUND LEVEL
July 1, 1990 Through December 31, 1990
UNIT 1

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter* 3	Quarter* 4	Quarter* 3	Quarter* 4
3. Particulates **					
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
Sr-89	Ci				
Sr-90	Ci				
Mo-99	Ci				
Nb-95	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
La-140	Ci				
Ce-144	Ci				
Ce-141	Ci				
TOTAL FOR PERIOD	Ci				

* No releases during this period

** Half lives greater than 8 days

TABLE 2-4b (Page 1 of 2)

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - GROUND RELEASES
July 1, 1990 Through December 31, 1990
UNIT 2

Nuclides Released	Unit	Continuous Mode Quarter* 3	Continuous Mode Quarter* 4	Batch Mode Quarter* 3	Batch Mode Quarter* 4
1. Fission Gases	Ci				
Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
Kr-88	Ci				
Xe-133	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
Xe-133m	Ci				
TOTAL FOR PERIOD	Ci				
2. Iodines					
I-131	Ci				
I-133	Ci				
I-135	Ci				
TOTAL FOR PERIOD	Ci				

*No releases during this period.

TABLE 2-4b (Page 2 of 2)

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - GROUND LEVEL
July 1, 1990 Through December 31, 1990
UNIT 2

Nuclides Released	Unit	Continuous Mode Quarter* 3	Continuous Mode Quarter* 4	Batch Mode Quarter* 3	Batch Mode Quarter* 4
3. Particulates **					
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
Sr-89	Ci				
Sr-90	Ci				
Mo-99	Ci				
Nb-95	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
La-140	Ci				
Ce-144	Ci				
Ce-141	Ci				
TOTAL FOR PERIOD	Ci				

* No releases during this period

** Half lives greater than 8 days

TABLE 2-4c (Page 1 of 2)

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - GROUND RELEASES
July 1, 1990 Through December 31, 1990
Site

Nuclides Released	Unit	Continuous Mode Quarter* 3	Continuous Mode Quarter* 4	Batch Mode Quarter* 3	Batch Mode Quarter* 4
1. Fission Gases	Ci				
Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
Kr-88	Ci				
Xe-133	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
Xe-133m	Ci				
TOTAL FOR PERIOD	Ci				
2. Iodines					
I-131	Ci				
I-133	Ci				
TOTAL FOR PERIOD	Ci				

*No releases during this period.

TABLE 2-4c (Page 2 of 2)
VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT REPORT
GASEOUS EFFLUENTS - GROUND LEVEL
July 1, 1990 Through December 31, 1990
Site

Nuclides Released	Unit	Continuous Mode Quarter* 3	Continuous Mode Quarter* 4	Batch Mode Quarter* 3	Batch Mode Quarter* 4
3. Particulates **					
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
Sr-89	Ci				
Sr-90	Ci				
Mo-99	Ci				
Nb-95	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
La-140	Ci				
Ce-144	Ci				
Ce-141	Ci				
TOTAL FOR PERIOD	Ci				

* No releases during this period.

** Half lives greater than 8 days

TABLE 2-6A
VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
AIR DOSES DUE TO NOBLE GAS RELEASES

July 1, 1990 Through December 31, 1990
UNIT 1

Type of Radiation	Tech Spec Limit	Units	Quarter 3	% of Tech Limit	Quarter 4	% of Tech Limit
Gamma	5.0	mrad	6.49E-04	1.30E-02	4.08E-04	8.16E-03
Beta	10.0	mrad	8.22E-04	8.22E-03	9.26E-04	9.26E-03

Cumulative Doses Per Year

Type of Radiation	Tech Spec Limit	Units	1990	% of Tech Limit
Gamma	10.0	mrad	1.06E-03	1.06E-02
Beta	20.0	mrad	2.23E-03	1.11E-02

TABLE 2-6b
VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
AIR DOSES DUE TO NOBLE GAS RELEASES

July 1, 1990 Through December 31, 1990
UNIT 2

Type of Radiation	Tech Spec Limit	Units	Quarter 3	% of Tech Limit	Quarter 4	% of Tech Limit
Gamma	5.0	mrad	4.35E-03	8.70E-02	8.10E-04	1.62E-02
Beta	10.0	mrad	1.67E-03	1.67E-02	3.87E-04	3.87E-03

Cumulative Doses Per Year

Type of Radiation	Tech Spec Limit	Units	1990	% of Tech Limit
Gamma	10.0	mrad	1.77E-03	1.77E-02
Beta	20.0	mrad	1.36E-03	6.80E-03

TABLE 2-7A

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
INDIVIDUAL DOSES DUE TO RADIOIODINE, TRITIUM
AND PARTICULATES IN GASEOUS RELEASES
July 1, 1990 Through December 31, 1990
UNIT 1

Cumulative Dose Per Quarter

Organ	Tech Spec Limit	Units	Quarter 3	% of Tech Limit	Quarter 4	% of Tech Limit
Bone	7.5	mrem	1.13E-06	1.73E-05	9.57E-07	1.28E-05
Liver	7.5	mrem	1.85E-04	2.47E-03	3.50E-04	4.67E-03
T. Body	7.5	mrem	1.85E-04	2.47E-03	3.50E-04	4.67E-03
Thyroid	7.5	mrem	4.97E-04	6.63E-03	3.50E-04	4.67E-03
Kidney	7.5	mrem	1.86E-04	2.48E-03	3.50E-04	4.67E-03
Lung	7.5	mrem	1.84E-04	2.47E-03	3.50E-04	4.67E-03
GI-LLI	7.5	mrem	1.84E-04	2.47E-03	3.50E-04	4.67E-03

Cumulative Dose Per Year

Organ	Tech Spec Limit	Units	Year to Date	% of Tech Spec Limit
Bone	15.0	mrem	3.58E-06	2.39E-05
Liver	15.0	mrem	8.65E-04	5.77E-03
T. Body	15.0	mrem	8.65E-04	5.77E-03
Thyroid	15.0	mrem	1.18E-03	7.85E-03
Kidney	15.0	mrem	8.66E-04	5.77E-03
Lung	15.0	mrem	8.64E-04	5.76E-03
GI-LLI	15.0	mrem	8.63E-04	5.75E-03

TABLE 2-7b

VOGTLE ELECTRIC GENERATING PLANT
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
INDIVIDUAL DOSES DUE TO RADIOIODINE, TRITIUM
AND PARTICULATES IN GASEOUS RELEASES
July 1, 1990 Through December 31, 1990
UNIT 2

Cumulative Dose Per Quarter

Organ	Tech Spec Limit	Units	Quarter 3	% of Tech Limit	Quarter 4	% of Tech Limit
Bone	7.5	mrem	2.02E-08	2.69E-07	4.56E-08	6.08E-07
Liver	7.5	mrem	2.32E-06	3.09E-05	4.56E-08	6.08E-07
T. Body	7.5	mrem	2.32E-06	3.09E-05	4.56E-08	6.08E-07
Thyroid	7.5	mrem	2.61E-06	3.48E-05	8.13E-08	1.08E-06
Kidney	7.5	mrem	2.32E-06	3.09E-05	4.57E-08	6.09E-07
Lung	7.5	mrem	2.32E-06	3.09E-05	6.24E-08	8.32E-07
GI-LLI	7.5	mrem	2.32E-06	3.09E-05	4.60E-08	6.13E-07

Cumulative Dose Per Year

Organ	Tech Spec Limit	Units	Year to Date	% of Tech Spec Limit
Bone	15.0	mrem	1.42E-07	9.49E-07
Liver	15.0	mrem	1.12E-04	7.49E-04
T. Body	15.0	mrem	1.12E-04	7.49E-04
Thyroid	15.0	mrem	1.13E-04	7.51E-04
Kidney	15.0	mrem	1.12E-04	7.49E-04
Lung	15.0	mrem	1.12E-04	7.49E-04
GI-LLI	15.0	mrem	1.12E-04	7.49E-04

TABLE 2-8

LOWER LIMITS OF DETECTION - GASEOUS SAMPLE ANALYSES
VOGTLE ELECTRIC GENERATING PLANT
JULY 1, 1990 - DECEMBER 31, 1990

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

RADIONUCLIDE	LLD	UNTIS
Kr-87	1.82E-08	uCi/ml
Kr-88	2.53E-08	uCi/ml
Xe-133	2.05E-08	uCi/ml
Xe-133m	8.63E-08	uCi/ml
Xe-135	7.12E-08	uCi/ml
Xe-138	1.05E-07	uCi/ml
I-131	7.93E-15	uCi/ml
Mn-54	3.94E-14	uCi/ml
Fe-59	2.45E-14	uCi/ml
Co-58	1.39E-14	uCi/ml
Co-60	1.75E-14	uCi/ml
Zn-65	2.82E-14	uCi/ml
Mo-99	9.57E-14	uCi/ml
Cs-134	1.12E-14	uCi/ml
Cs-137	8.71E-15	uCi/ml
Ce-141	8.62E-15	uCi/ml
Ce-144	2.77E-14	uCi/ml
Sr-89	1.00E-13*	uCi/ml
Sr-90	1.00E-13*	uCi/ml
H-3	9.00E-08	uCi/ml
Gross Alpha	1.00E-13	uCi/ml

* Based on an estimated sample volume of 5.7E+08 cc's.

3.0 Solid Waste

3.1 Regulatory Limits/Technical Specification

The Technical Specifications presented in this section are for Unit 1 and Unit 2 and are stated in part.

3.1.1 Use of Solid Radioactive Waste System

3.11.3

Radioactive wastes shall be solidified or dewatered in accordance with the PROCESS CONTROL PROGRAM to meet shipping and transportation requirements during transit, and disposal site requirements when received at the disposal site.

3.1.2 Reporting Requirements

6.8.1.4

The Semiannual Radioactive Effluent Release Reports shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit as outlined in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants", Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof. For solid wastes, the format for Table 3 in Appendix B shall be supplemented with three additional categories: class of solid wastes (as defined by 10 CFR Part 61), type of container (e.g., LSA, Type A, Type B, Large Quantity) and SOLIDIFICATION agent or absorbent (e.g., cement, urea formaldehyde).

3.1.3 Process Control Program (PCP)

6.12.1

The PCP shall be approved by the Commission prior to implementation.

6.12.2

Licensee - initiated changes to the PCP.

a. Shall be submitted to the Commission in the Semiannual Radioactive Effluent Release Report for the period in which the change(s) was made. This submittal shall contain:

   1. Sufficiently detailed information to totally support the rationale for the change without benefit of additional or supplemental information;

2. A determination that the change did not reduce the overall conformance of the solidified waste product to existing criteria for solid wastes; and

3. Documentation of the fact that the change has been reviewed and found acceptable by the PRB.

b. Shall become effective upon approval by the General Manager - Nuclear Plant.

For this reporting period there was no revision to the PCP.

3.2 Solid Waste Data

Regulatory Guide 1.21, Table 3 is found in this report as Table 3-1.

TABLE 3-1 (Page 1 of 2)

VOGTLE ELECTRIC GENERATING PLANT
JULY 1, 1990 THROUGH DECEMBER 31, 1990
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
SOLID AND IRRADIATED FUEL SHIPMENTS

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 bottom, etc.	m^3	2.270E+01	
		Ci	4.393E+01	1.00E+01
b.	Dry compressible waste, contaminated equipment, etc.	m^3	4.223E+01	
		Ci	5.855E-01	4.00E+01
c.	Irradiated components, control rod, etc.	m^3	*	*
		Ci	*	*
d.	Other (describe) oily trash speedi-dry mix equipment, etc., Solidified oil, CRD filters	m^3	*	*
		Ci	*	*

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

	Isotope	Percent	Curies
a.	Co-58	4.614E+01	2.027E+01
	Co-60	3.224E+01	1.416E+01
	All others	2.162E+01	9.498E+00
b.	Co-58	3.58E+01	2.096E-01
	Fe-55	2.46E+01	1.440E-01
	All others	3.96E+01	2.319E-01

* No solid waste during this report period.

TABLE 3-1 (Page 2 of 2)
VOGTLE ELECTRIC GENERATING PLANT
July 1, 1990 THROUGH December 31, 1990
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
SOLID AND IRRADIATED FUEL SHIPMENTS

	Isotope	Percent	Curies
c.	None shipped this period		
d.	Co-60	*	*
	Zn-65	*	*
	Nb-95	*	*
	Zr-95	*	*
	All others	*	*

* No solid waste shipped during this report period.

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
5	Tractor and Shielded cask	Chem Nuclear Barnwell, S.C.
6	Tractor -Trailer	Scientific Ecology, Oakridge, TN.

4. Irradiated Fuel Shipments (Disposition)

Number of Shipments	Mode of Transportation	Destination
0	N/A	N/A

Additional Information Required by Tech Specs:

Shipment No.	Waste Class	Type Container	Shipping Class	Solidification Agent
RWS-90-004	A stable	Type A	LSA	N/A
RWS-90-005	A stable	" "	LSA	N/A
RWS-90-006	A stable	" "	LSA	N/A
RWS-90-007	A stable	" "	LSA	N/A
RWS-90-008	A stable	" "	LSA	N/A
RVRS-90-005	A unstable	Strong-Tight	LSA	N/A
RVRS-90-006	A unstable	Strong-Tight	LSA	N/A
RVRS-90-007	A unstable	" "	LSA	N/A
RVRS-90-008	A unstable	" "	LSA	N/A
RVRS-90-009	A unstable	" "	LSA	N/A
RVRS-90-0010	A unstable	" "	LSA	N/A

NOTES: Vogtle Electric Generating Plant performed five (5) shipments to Chem Nuclear, Barnwell, SC and six (6) shipments to Scientific Ecology Group, Inc. in Oak Ridge, TN. During this reporting period, the waste volume and activity on this report reflects only that volume of waste and activity which was processed and disposed of as radioactive waste at Chem-Nuclear Systems, Inc., Barnwell Waste Management Facility, or by Scientific Ecology

4.0 Changes to the Vogtle Electric Generating Plant ODCM

6.8.1.4

Technical Specification 6.8.1.4 requires, in part, that changes to the Offsite Dose Calculation Manual (ODCM) be reported to the Commission in the next Semiannual Effluent Release Report.

There were no changes to the Vogtle Electric Generating Plant ODCM for the period of July 1, 1990 through December 31, 1990.

6.13.2

Licensee-initiated changes to the ODCM

a. Shall be submitted to the Commission in the Semiannual Radioactive Effluent Release Report for the period in which the change(s) was made effective. The submittal shall contain:

   1. Sufficiently detailed information to totally support the rationale for the change without benefit of additional or supplemental information. Information submitted should consist of a package of those pages of the ODCM to be changed with each page numbered, dated and containing the revision number, together with appropriate analyses or evaluations justifying the change(s);

   2. A determination that the change will not reduce the accuracy or reliability of dose calculations or setpoint determinations; and

   3. Documentation of the fact that the change has been reviewed and found acceptable by the PRB.

b. Shall become effective upon approval by the General Manager - Nuclear Plant.

3.12.1

The Radiological Environmental Monitoring Program shall be conducted as specified in Table 3.12-1.

Table Notation (1) states in part:

It is recognized that, at times, it may not be possible or practicable to continue to obtain samples of the media of choice at the most desired location or time. In these instances, suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions, if available, will be made within 30 days in the Radiological Environmental Monitoring Program given in the ODCM.

Pursuant to specification 6.13, submit in the next Semiannual Radioactive Effluent Release Report documentation for a change in the ODCM including a revised figure(s) and Table for the ODCM reflecting the new location (s), if any, with supporting information identifying the cause of the unavailability of samples for the pathway and justifying the selection of the new location(s) for obtaining samples, or the unavailability of suitable new locations.

3.12.2 states in part

A Land Use Census shall be conducted. . . .

The Action Statement for this requirement states in part:

a. With a Land Use Census identifying a location(s) that yields a calculated dose or dose commitment greater than the value currently being calculated in specification 4.11.2.3, pursuant to specification 6.8.1.4, identify the new location(s) in the next Semiannual Radioactive Effluent Release Report.

4.1 Changes in the Radiological Environmental Monitoring Program

For this semiannual period, there has been no change to the Radiological Environmental Monitoring Program.

5.0 Doses to Members of the Public Inside the Site Boundary

6.8.1.4 states in part:

This same report shall also include an assessment of the radiation doses from radioactive liquid and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the Site Boundary (Figure 5.1-1 of the Technical Specifications) during the report period. All assumptions used in making these assessments, i.e., specific activity, exposure time, and location, shall be included in these reports.

The locations of concern within the site boundary are the Visitors Center and Plant Wilson. The activities at the Visitor Center consists of the occasional attendance at meetings and/or short visits for informational purposes. The activity at Plant Wilson consists of regular employment. There will be no radiation dose at these locations due to radioactive liquid effluents. Delineated in Table 5-1 for each of these locations are the values of the basic data assumed in the dose assessment due to radioactive gaseous effluents. Listed in this table are: The distances and directions from a point midway between the center of Unit 1 and the Unit 2 reactors; the dispersion and deposition factors for any releases from the plant vent (mixed mode) and from the turbine building (ground level); and the estimated maximum occupancy factor for an individual and the assumed age group of this individual.

Not listed in Table 5-1 is the source term. Listed in Tables 2-4a and 2-4b for the ground level releases and in Tables 2-3a and 2-3b for the mixed mode releases are the noble gases, radioiodines, and particulates with half lives greater than eight days; these are tabulated by radionuclide and by quarter. The tritium releases in units of curies were as follows:

Quarter	3	4
Mixed Mode	4.12E+01	7.71E+01

The maximum doses in units of mrem accumulated by an individual MEMBER OF THE PUBLIC due to their activities inside the site boundary during the second half of the year were assessed to be as follows:

	VISITORS CENTER	PLANT WILSON
Total Body (direct radiation from plume)	5.04E-07	6.05E-05
Maximum Organ (Thyroid) - Inhalation and ground-plane	1.30E-06	1.73E-04

Table 5-1

JULY 1,1990 THROUGH DECEMBER 31,1990

Basic Data Assumed in Dose assessments
TO MEMBERS OF THE PUBLIC

Item		Visitors center	Plant Wilson
Distance(meters)		447	1420
Sector		SE	ESE
X/Q (sec/m3)	(1)	5.93e-06	9.45e-07
Depleted X/Q (sec/m3)	(1)	5.58e-06	8.34e-07
D/Q (m-2)	(1)	2.28e-08	4.20e-09
X/Q (sec/m3)	(2)	7.12e-07	1.76e-07
Depleted X/Q (sec/m3)	(2)	6.74e-07	1.59e-07
D/Q (m-2)	(2)	5.77e-09	2.07e-09
Occupancy factor		0.00046 (4hr/yr)	0.228 (2000 hr/yr)
Age group		Child	Adult

(1) Ground level release
(2) Mixed mode release

	VISITORS CENTER			PLANT WILSON		
	Quarter 3 mrem	Quarter 4 mrem	Total mrem	Quarter 3 mrem	Quarter 4 mrem	Total mrem
Total Body	2.54e-07	2.81e-07	5.35e-07	3.05e-05	3.45e-05	6.50e-05
ORGAN DOSE						
Bone	8.[illegible]-10	1.93E-10	1.09E-09	1.06E-07	4.77E-07	5.83E-07
Liver	4.53E-07	8.46E-07	1.30E-06	5.98E-05	1.13E-04	1.73E-04
TBod	.53E-07	8.46E-07	1.30E-06	5.98E-05	1.13E-04	1.73E-04
Thy	4.56E-07	8.47E-07	1.30E-06	6.00E-05	1.13E-04	1.73E-04
Kidn	4.53E-07	8.46E-07	1.30E-06	5.98E-05	1.13E-04	1.73E-04
Lung	4.53E-07	8.46E-07	1.30E-06	5.98E-05	1.13E-04	1.73E-04
GI	4.53E-07	8.46E-07	1.30E-06	5.98E-05	1.13E-04	1.73E-04

6.0 Major Changes to Liquid, Gaseous or Solid Radwaste Treatment Systems

6.8.1.4 states in part:

The Semiannual Radioactive Effluent Release Report shall include . . . any major change to Liquid, Gaseous, or Solid Radwaste Treatment Systems pursuant to Specification 6.14.

6.14.1

Licensee-initiated major changes to the Radwaste Treatment Systems (liquid, gaseous, and solid):

a. Shall be reported to the Commission in the Semiannual Radiactive Effluent Release Report fo the period in which the evaluation was reviewed by the PRB. The discussion of each change shall contain:

1. A summary of the evaluation that led to the determination that the change could be made in accordance with 10 CFR 50.59;

2. Sufficient detailed information to totally support the reason for the change without benefit of additional or supplemental information;

3. A detailed description of the equipment, components, and processes involved and the interfaces with other plant systems;

4. An evaluation of the change, which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the License application and amendments thereto;

5. An evaluation of the change, which shows the expected maximum exposures to a MEMBER OF THE PUBLIC in the UNRESTRICTED AREA and to the general population that differ from those previously estimated in the License application and amendments thereto;

6. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents and in solid waste, to the actual releases for the period prior to when the change is to be made;

7. An estimate of the exposure to plant operating personnel as a result of the change; and

8. Documentation of the fact that the change was reviewed and found acceptable by the PRB.

b. Shall become effective upon approval by the General Manager - Nuclear Plant.

There have been no major changes to the Liquid, Gaseous or Solid Radwaste Treatment Systems during this report period.

7.0 Meteorological Data

6.8.1.4 states in part:

The Semiannual Radioactive Effluent Release Report to be submitted within 60 days after January 1 of each year shall include an annual summary of hourly meteorological data collected over the previous year. This annual summary may be either in the form of an hour-by-hour listing on magnetic tape of wind speed, wind direction, atmospheric stability, and precipitation (if measured), or in the form of joint frequency distributions of wind speed, wind direction, and atmospheric stability.

The meteorological data is included in Attachment A.

8.0 Inoperable Liquid or Gaseous Effluent Monitoring Instrumentation

6.8.1.4 states in part that:

The Semiannual Radioactive Effluent Release Reports shall also include the following: an explanation as to why the inoperability of liquid or gaseous effluent monitoring instrumentation was not corrected within the time specified in Specifications 3.3.3.9 or 3.3.3.10 respectively.

3.3.3.9 states in part:

The radioactive liquid effluent monitoring instrumentation channels shown in Table 3.3-9 shall be OPERABLE . . .

Action b. states:

With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.3-9. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain in the next Semiannual Radioactive Effluent Release Report pursuant to Specification 6.8.1.4 why this inoperability was not corrected in a timely manner.

3.3.3.10 states in part:

The radioactive gaseous effluent monitoring instrumentation channels shown in Table 3.3-10 shall be OPERABLE . . .

Action b. states:

With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.3-10. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain in the next Semiannual Radioactive Effluent Release Report pursuant to specification 6.8.1.4 why this inoperability was not corrected in a timely manuer.

Inoperable Tech Spec monitors are tracked on Limiting Condition of Operation (LCO) Forms. The operators declare equipment operable and inoperable and monitors are considered inoperable if there are open LCO's for that monitor.

8.1.1 LCO 2-90-547 was written on October 20, 1990, for 2-RE021 monitor. The monitor was isolated on Septembe- 19, 1990. On September 27, 1990 and on October 1, 1990, the SG contents were released to the offsite while the monitor was isolated. On October 20, 1990, during the monthly alignment check on 2-RE021, it was found that it had been valved out and isolated.

Samples had been taken prior to draining and refilling the SG's. These results did not indicate any primary to secondary leak. Procedures 13601-1 and 13601-2 have been revised to require personnel to check that RE021 is in service or take the appropriate actions to meet the Technical Specifications by way of taking grab samples. This LCO was closed on October 29, 1990.

9.0 Tanks Exceeding Curie Content Limits

6.8.1.4 states in part:

The Semiannual Radioactive Effluent Release Reports shall also include the following, " and description of the events leading to liquid holdup tanks or gas storage tanks exceeding the limits of specification 3.11.1.4 or 3.11.2.6, respectively ".

3.11.1.4.

The quantity of radioactive material contained in each outside temporary tank shall be limited to less than or equal to 10 Curies, excluding tritium and dissolved or entrained noble gases.

Action A states:

With the quantity of radioactive material in any of the outside temporary tanks exceeding the above limit, immediately suspend all additions of radioactive material to the tank, within 48 hours reduce the tank contents to within the limit, and describe the events leading to this condition in the next Semiannual Radioactive Effluent Release Report, pursuant to specification 6.8.1.4.

3.11.2.6

The quantity of radioactivity contained in each gas decay tank shall be limited to less than or equal to 2E5 curies of noble gases (considered as Xe-133 equivalent).

Action A states:

With the quantity of radioactive material in any gas decay tank exceeding the above limit, immediately suspend all additions of radioactive material to the tank, within 48 hours reduce the tank contents to within the limit, and describe the events leading to this condition in the next Semiannual Radioactive Effluent Release Report, pursuant to specification 6.8.1.4.

There were no outside temporary liquid tanks for radioactive liquids during this reporting period. The radioactive material contained in each waste gas decay tank did not exceed 2E5 curies of noble gases (considered as Xe-133 equivalent).

10.0 40 CFR Part 190 Assessment

A review of cumulative doses resulting from liquid effluents (Table 1-4) and gaseous effluents (Tables 2-6 and 2-7) shows total annual doses to be a small fraction of one millirem. These evaluations and those discussed in Section 5.0 of this report (Doses to Members of the Public Inside the Site Bounday) indicated the total dose to any Member of the Public is well below the criteria of 40 CFR 190.

ENCLOSURE A

METEOROLOGICAL DATA

JANUARY 1, 1990

THRU

JUNE 30, 1990

ENCLOSURE A

PICKARD, LOWE AND GARRICK, INC.
1615 M STREET, N.W., SUITE 730
WASHINGTON, D.C. 20036

NEWPORT BEACH, CALIFORNIA
TELEPHONE 714 650-8000
TELECOPIER 714 646-9023
TELEX 3718953 PLG IRV

WASHINGTON, D.C.
TELEPHONE 202 659-1122
TELECOPIER 202 296-0774
TELEX 251921 PLG UR

July 26, 1990

Mr. Shan Sundaran
Georgia Power Company
Plant Vogtle
Route 2, Box 299A
Waynesboro, GA 30830

Dear Shan:

As you requested, enclosed is the semi-annual meteorological report for Plant Vogtle for the first and second quarters of 1990. The data used in the attached tables and figures were generated primarily from the on-site micro-processor (DRT) supplemented by strip chart data for a few periods of missing data.

The data quality and recovery rate for the first half of 1990 were quite good. It averaged about 98% for pertinent parameters of wind speed, direction and delta temperature. The only major problem was with the dew point temperature that was out of adjustment intermittently during the spring.

The attachments are as follows:

- Attachment 1. Data Recovery Percentage for Each Parameter and Composites of Pertinent Parameters. January 1, 1990 through June 30, 1990.

- Attachment 2. Wind Roses

  - A-1: 10m Wind Speed and Direction January 1, 1990 through June 30, 1990.

  - A-2: 10m Wind Speed and Direction January 1, 1990 through March 31, 1990.

  - A-3: 10m Wind Speed and Direction April 1, 1990 through June 30, 1990.

  - B-1: 10m Wind Speed and Direction January 1, 1990 through June 30, 1990.

- B-2: 60m Wind Speed and Direction January 1, 1990 through March 31, 1990.

- B-3: 60m Wind Speed and Direction April 1, 1990 through June 30, 1990.

- Attachment 3. Joint Frequency Tables of Wind Speed and Direction 10m vs Delta Temperature 60-10m.

  - A: January 1, 1990 through June 30, 1990.
  - B: January 1, 1990 through March 31, 1990.
  - C: April 1, 1990 through June 30, 1990.

- Attachment 4. Joint Frequency Tables of Wind Speed and Direction 60m vs Delta Temperature 60-10m.

  - A: January 1, 1990 through June 30, 1990.
  - B: January 1, 1990 through March 31, 1990.
  - C: April 1, 1990 through June 30, 1990.

- Attachment 5. Daily and Monthly Rainfall Totals for January 1, 1990 through June 30, 1990.

- Attachment 6. Average of the Daily Maximum and Minimum Temperatures for January 1, 1990 through June 30, 1990.

  - A: Ambient Temperature
  - B: Dew Point Temperature

If you have any questions or need additional information, please call.

Very truly yours,

Mark Abrams

Mark J. Abrams

Enclosures

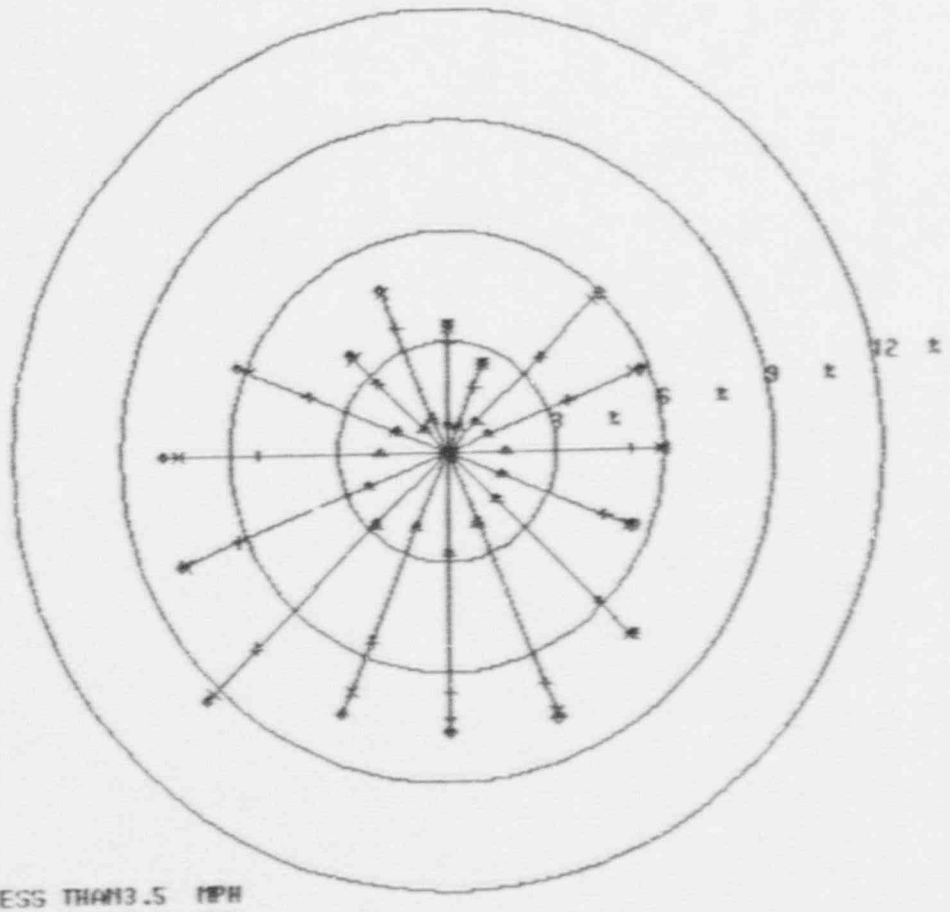
ENCLOSURE A

ATTACHMENT 1. PERCENT DATA RECOVERY BY PARAMETER
- JANUARY 1, 1990 THROUGH JUNE 30, 1990

Parameter	Percent
Wind Speed 10m	98.6
Wind Speed 60m	99.7
Wind Direction 10m	99.3
Wind Direction 60m	99.5
Delta Temperature 60-10m	99.2
Temperature 10m	98.9
Dew Point Temperature 10m	89.3
Precipitation	96.7
Composites	
Wind Speed and Direction 10m, Delta Temperature 60-10m	97.9
Wind Speed and Direction 60m, Delta Temperature 60-10m	98.8

6743A072690

ATTACHMENT 2A-1. ±0m WIND ROSE
JANUARY 1, 1990 THROUGH JUNE 30, 1990



WIND ROSE
(WINDS FROM)
N

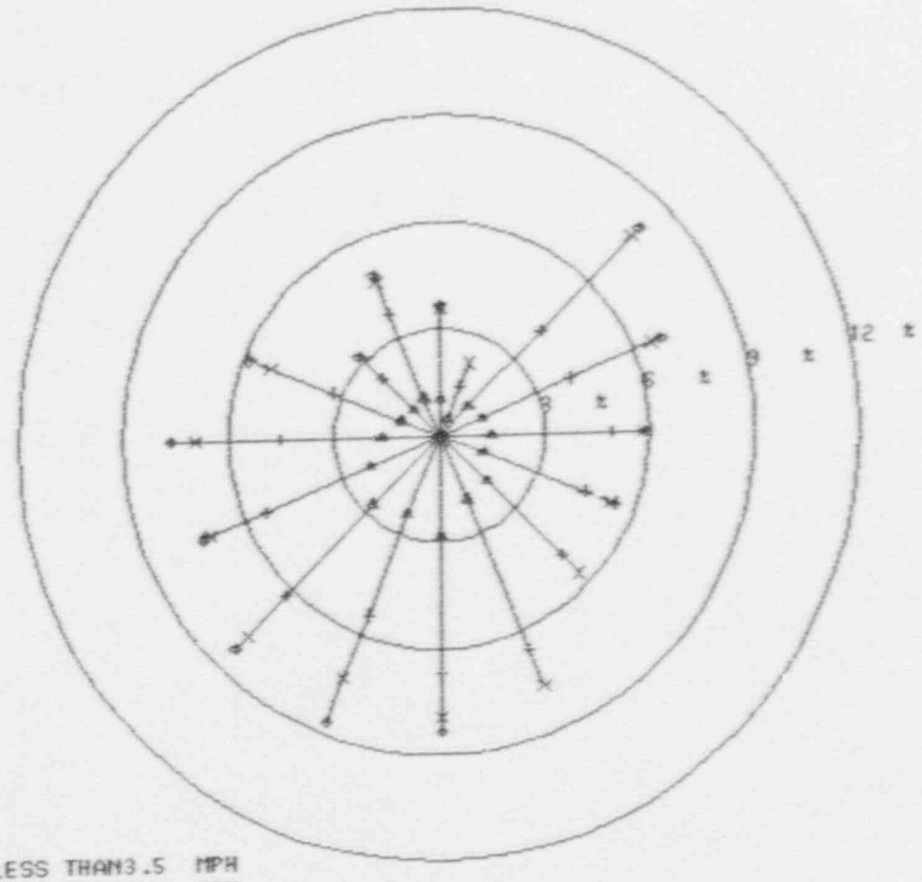
▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

0.3 PERCENT CALMS

SITE: PLANT VOGTLE

07/24/90 12:47

ATTACHMENT 2A-2. 10m WIND ROSE
JANUARY 1, 1990 THROUGH MARCH 31, 1990



WIND ROSE
(WINDS FROM)
N

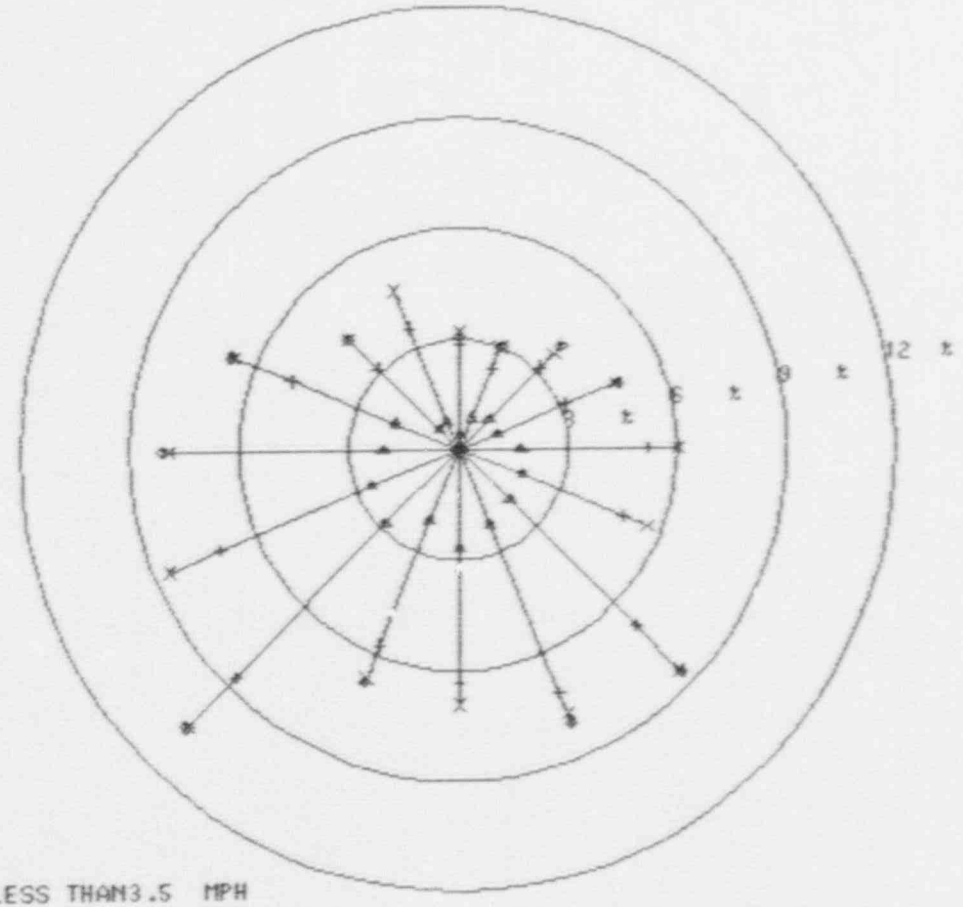
▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

0.3 PERCENT CALMS

SITE: PLANT VOGTLE

07/25/90 14:20

ATTACHMENT 2A-3. 10m WIND ROSE
APRIL 1, 1990 THROUGH JUNE 30, 1990



▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

0.2 PERCENT CALMS

SITE: PLANT VOGTLE

07/25/90 14:28

ENCLOSURE A

ATTACHMENT 2A-3 (CONTINUED)

Plant Vogtle 10m Wind Direction Frequency and Wind Speed Average
January 1, 1990 Through June 30, 1990

JOINT FREQUENCY TABLES

DIR (FROM)	CALM	CALM+ - 3.5	3.6 - 7.5	7.6 -12.5	12.6 -18.5	18.6 -24.5	24.6 -32.5	32.6+	TOTAL	%	AVE SPEED
				SPEED (MPH)							
N	0	32	92	20	0	0	0	0	144	3.4	5.2
NNE	0	32	51	29	1	0	0	0	113	2.7	5.7
NE	0	50	105	90	11	0	0	0	256	6.0	6.6
ENE	0	52	102	86	6	1	0	0	247	5.8	6.5
E	0	69	149	36	1	0	0	0	255	6.0	5.2
ESE	0	69	131	32	3	0	0	0	235	5.5	5.1
SE	0	81	170	52	1	0	0	0	304	7.2	5.2
SSE	0	90	202	37	6	0	0	0	335	7.9	5.1
S	0	116	159	38	9	0	0	0	322	7.6	4.9
SSW	0	93	141	61	28	2	0	0	325	7.6	6.3
SW	0	120	200	73	11	1	0	0	405	9.5	5.5
WSW	0	101	165	69	5	0	0	0	340	8.0	5.4
W	0	80	144	94	17	1	0	0	336	7.9	6.5
WNW	0	64	112	77	14	1	0	0	268	6.3	6.5
NW	0	39	79	38	6	0	0	0	162	3.8	6.0
NNW	0	43	114	43	4	0	0	0	204	4.8	5.7
TOTAL	0	1131	2116	875	123	6	0	0	4251	100.0	
%	0.0	26.6	49.8	20.6	2.9	0.1	0.0	0.0	100.0		

AVE SPEED FOR THIS TABLE= 5.7 MPH
HOURS IN ABOVE TABLE WITH VARIABLE DIRECTION= 753

ENCLOSURE A

ATTACHMENT 2A-3 (CONTINUED)

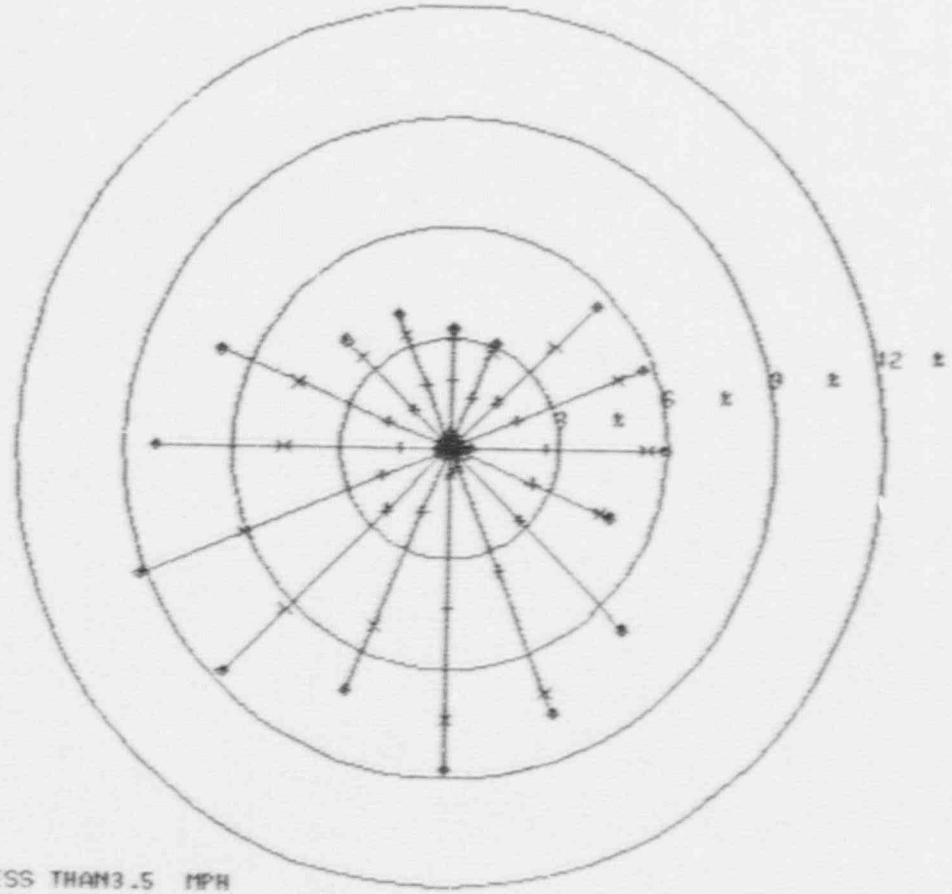
Plant Vogtle 60m Wind Direction Frequency and Wind Speed Average
January 1, 1990 Through June 30, 1990

JOINT FREQUENCY TABLES

DIR (FROM)	CALM	CALM+ - 3.5	3.6 - 7.5	7.6 -12.5	12.6 -18.5	18.6 -24.5	24.6 -32.5	32.6+	TOTAL	%	AVE SPEED
N	0	19	61	52	8	0	0	0	140	3.3	7.1
NNE	0	12	50	58	12	1	0	0	133	3.1	8.2
NE	0	12	64	95	59	8	0	0	238	5.5	10.0
ENE	0	13	71	130	29	2	0	0	245	5.7	8.8
E	0	24	91	120	20	0	0	0	255	5.9	8.0
ESE	0	20	86	88	13	0	0	0	207	4.8	7.8
SE	0	14	102	139	39	1	0	0	295	6.9	8.8
SSE	0	25	129	151	24	3	0	0	332	7.7	7.9
S	0	33	155	127	47	11	2	0	375	8.7	8.5
SSW	0	10	71	144	70	11	0	0	306	7.1	10.3
SW	0	11	92	166	94	11	0	0	374	8.7	10.3
WSW	0	13	74	177	121	8	3	1	397	9.2	10.8
W	0	10	48	139	121	26	5	0	349	8.1	12.0
WNW	0	12	67	117	79	20	3	0	298	6.9	11.0
NW	0	8	55	87	23	5	0	0	178	4.1	9.1
NNW	0	13	66	65	26	0	0	0	170	4.0	8.3
TOTAL	0	249	1282	1855	785	107	13	1	4292	100.0	
%	0.0	5.8	29.9	43.2	18.3	2.5	0.3	0.0	100.0		

AVE SPEED FOR THIS TABLE= 9.4 MPH
HOURS IN ABOVE TABLE WITH VARIABLE DIRECTION= 309

ATTACHMENT 2B-1. 60m WIND ROSE
JANUARY 1, 1990 THROUGH JUNE 30, 1990



WIND ROSE
(WINDS FROM)
N

▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

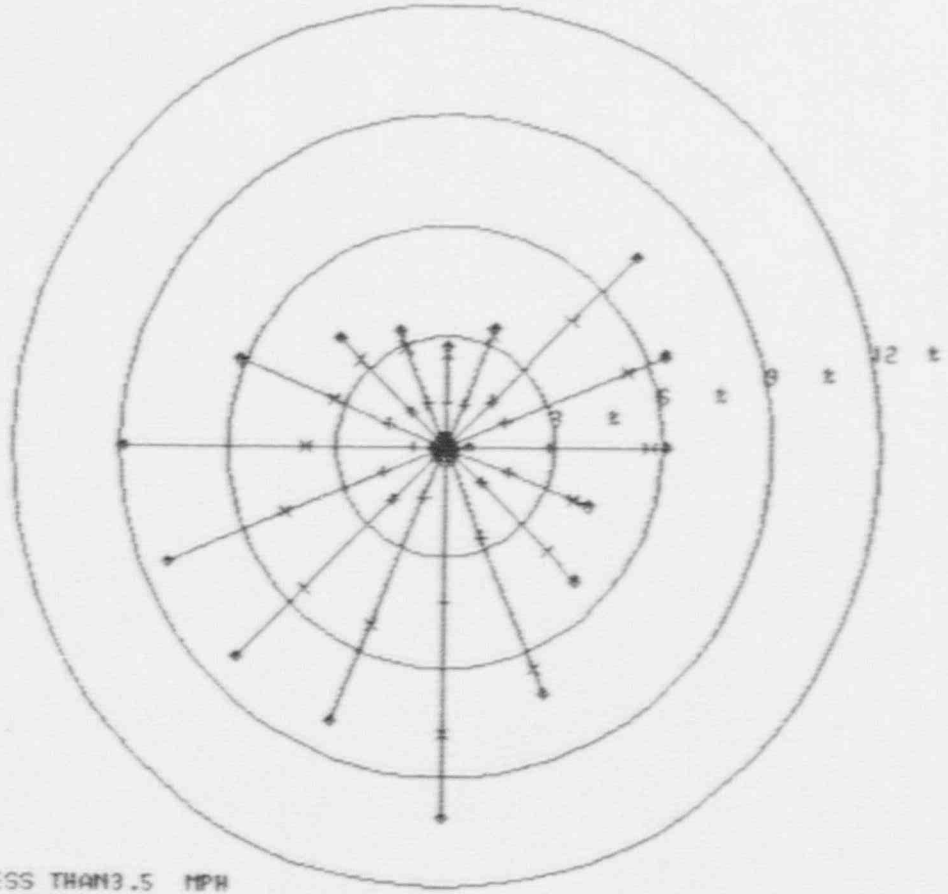
0.0 PERCENT CALMS

SITE: PLANT VOGTLE

07/25/90 14:16

ENCLOSURE A

ATTACHMENT 2B-2. 60m WIND ROSE
JANUARY 1, 1990 THROUGH MARCH 31, 1990



WIND ROSE
(WINDS FROM)
N

▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

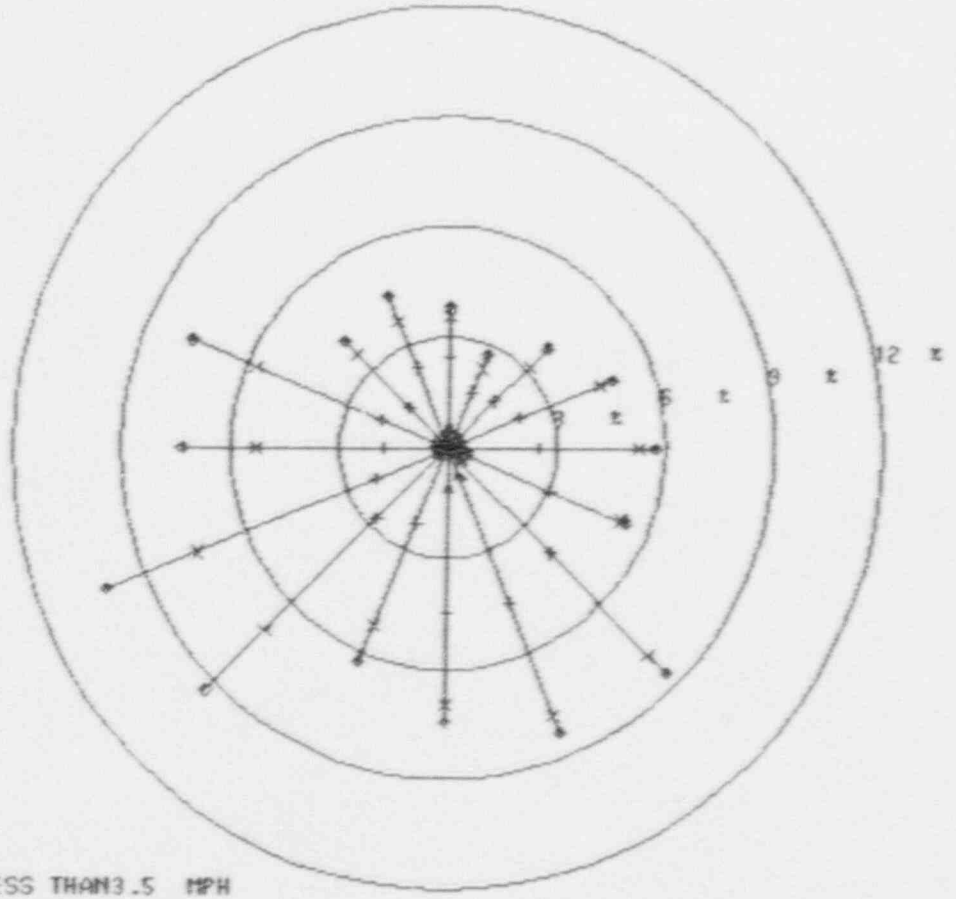
0.0 PERCENT CALMS

SITE: PLANT VOGTLE

07/25/90 14:23

ENCLOSURE A

ATTACHMENT 2B-3. 60m WIND ROSE
APRIL 1, 1990 THROUGH JUNE 30, 1990



WIND ROSE
(WINDS FROM)
N

▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

SITE: PLANT VOGTLE

07/25/90 14:33

ENCLOSURE A

ATTACHMENT 3A. JOINT FREQUENCY TABLE OF WIND SPEED AND DIRECTION 10m VS DELTA TEMPERATURE 60-10m
JANUARY 1, 1990 THROUGH JUNE 30, 1990

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	16	2	0	0	0	21
NNE	2	12	1	0	0	0	15
NE	5	16	6	1	0	0	28
ENE	2	10	17	0	0	0	29
E	1	27	15	0	0	0	43
ESE	0	11	5	0	0	0	16
SE	3	11	9	0	0	0	23
SSE	2	19	4	0	0	0	25
S	3	18	7	0	0	0	28
SSW	1	14	10	5	0	0	30
SW	2	25	31	2	0	0	60
WSW	0	34	35	1	0	0	70
W	1	36	44	3	0	0	84
WNW	2	22	33	4	0	0	61
NW	2	26	22	2	0	0	52
NNW	1	12	16	1	0	0	30
TOTAL	30	309	257	19	0	0	615

PERIODS OF CALM(HOURS): 12
VARIABLE DIRECTION 97
HOURS OF MISSING DATA: 93

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	12	5	0	0	0	17
NNE	0	9	0	0	0	0	9
NE	2	10	5	0	0	0	17
ENE	2	8	16	1	0	0	27
E	3	10	4	0	0	0	17
ESE	1	13	2	0	0	0	16
SE	0	8	1	0	0	0	9
SSE	1	13	4	1	0	0	19
S	1	12	4	1	0	0	18
SSW	1	8	6	4	0	0	19
SW	3	13	6	1	0	0	23
WSW	0	14	5	2	0	0	21
W	1	14	9	1	0	0	25
WNW	0	13	7	0	0	0	20
NW	2	9	3	0	0	0	14
NNW	2	8	8	1	0	0	19
TOTAL	19	174	85	12	0	0	290

PERIODS OF CALM(HOURS): 12
VARIABLE DIRECTION 74
HOURS OF MISSING DATA: 93

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	13	3	0	0	0	18
NNE	3	5	3	0	0	0	11
NE	0	9	5	1	0	0	15
ENE	0	8	3	2	0	0	13
E	3	10	5	0	0	0	18
ESE	0	7	6	0	0	0	13
SE	1	14	7	0	0	0	22
SSE	1	6	2	2	0	0	11
S	3	8	10	1	0	0	22
SSW	0	9	11	4	0	0	24
SW	1	7	3	3	1	0	15
WSW	0	11	6	0	0	0	17
W	3	9	6	2	0	0	20
WNW	1	6	1	1	1	0	10
NW	1	7	2	1	0	0	11
NNW	2	6	2	0	0	0	10
TOTAL	21	135	75	17	2	0	250

PERIODS OF CALM(HOURS): 12
VARIABLE DIRECTION 58
HOURS OF MISSING DATA: 93

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	10	33	5	0	0	0	48
NNE	4	13	22	1	0	0	40
NE	7	33	58	6	0	0	104
ENE	6	35	39	2	1	0	83
E	14	50	6	0	0	0	70
ESE	12	34	9	0	0	0	55
SE	12	39	26	1	0	0	78
SSE	13	55	18	3	0	0	89
S	20	40	14	2	0	0	76
SSW	13	28	20	11	1	0	73
SW	8	48	19	4	0	0	79
WSW	5	39	11	2	0	0	57
W	6	21	25	9	1	0	62
WNW	8	18	24	8	0	0	58
NW	7	15	6	2	0	0	30
NNW	11	32	14	1	0	0	58
TOTAL	156	533	316	52	3	0	1060

PERIODS OF CALM(HOURS): 12
VARIABLE DIRECTION 185
HOURS OF MISSING DATA: 93

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	16	3	0	0	0	23
NNE	12	9	3	0	0	0	24
NE	19	23	14	0	0	0	56
ENE	17	27	8	0	0	0	52
E	17	32	1	0	0	0	50
ESE	26	49	6	0	0	0	81
SE	20	72	7	0	0	0	99
SSE	36	87	6	0	0	0	129
S	34	51	2	3	0	0	90
SSW	24	51	12	3	1	0	91
SW	29	52	12	0	0	0	93
WSW	33	33	12	0	0	0	78
W	9	39	9	2	0	0	59
WNW	22	38	8	1	0	0	69
NW	7	19	2	1	0	0	29
NNW	9	32	1	1	0	0	43
TOTAL	318	630	106	11	1	0	1066

PERIODS OF CALM(HOURS): 12
VARIABLE DIRECTION 140
HOURS OF MISSING DATA: 93

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	1	1	0	0	0	8
NNE	6	2	0	0	0	0	8
NE	7	12	1	0	0	0	20
ENE	10	11	1	0	0	0	22
E	21	15	1	0	0	0	37
ESE	18	15	1	0	0	0	34
SE	25	20	0	0	0	0	45
SSE	25	18	2	0	0	0	45
S	34	17	1	1	0	0	53
SSW	26	21	0	1	0	0	48
SW	36	32	1	0	0	0	69
WSW	34	14	0	0	0	0	48
W	31	19	1	0	0	0	51
WNW	17	10	3	0	0	0	30
NW	14	0	2	0	0	0	16
NNW	8	15	0	0	0	0	23
TOTAL	318	222	15	2	0	0	557

PERIODS OF CALM(HOURS): 12
VARIABLE DIRECTION 90
HOURS OF MISSING DATA: 93

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-900[illegible]3024
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	1	1	0	0	0	9
NNE	5	1	0	0	0	0	6
NE	10	2	1	3	0	0	16
ENE	15	3	2	1	0	0	21
E	10	5	4	1	0	0	20
ESE	12	2	3	3	0	0	20
SE	20	6	2	0	0	0	28
SSE	12	4	1	0	0	0	17
S	21	13	0	1	0	0	35
SSW	28	10	2	0	0	0	40
SW	41	23	1	1	0	0	66
WSW	29	20	0	0	0	0	49
W	29	6	0	0	0	0	35
WNW	14	5	1	0	0	0	20
NW	6	3	1	0	0	0	10
NNW	10	9	2	0	0	0	21
TOTAL	269	113	21	10	0	0	413

PERIODS OF CALM(HOURS): 12
VARIABLE DIRECTION 109
HOURS OF MISSING DATA: 93

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	32	92	20	0	0	0	144
NNE	32	51	29	1	0	0	113
NE	50	105	90	11	0	0	256
ENE	52	102	86	6	1	0	247
E	69	149	36	1	0	0	255
ESE	69	131	32	3	0	0	235
SE	81	170	52	1	0	0	304
SSE	90	202	37	6	0	0	335
S	116	159	38	9	0	0	322
SSW	93	141	61	28	2	0	325
SW	120	200	73	11	1	0	405
WSW	101	165	69	5	0	0	340
W	80	144	94	17	1	0	336
WNW	64	112	77	14	1	0	268
NW	39	79	38	6	0	0	162
NNW	43	114	43	4	0	0	204
TOTAL	1131	2116	875	123	6	0	4251

PERIODS OF CALM(HOURS): 12
VARIABLE DIRECTION 753
HOURS OF MISSING DATA: 93

ATTACHMENT 3B. JOINT FREQUENCY TABLE OF WIND SPEED
AND DIRECTION 10m VS DELTA TEMPERATURE 60-10m
JANUARY 1, 1990 THROUGH MARCH 31, 1990

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	5	1	0	0	0	7
NNE	0	0	0	0	0	0	0
NE	1	8	3	0	0	0	12
ENE	1	1	9	0	0	0	11
E	0	5	4	0	0	0	9
ESE	0	1	0	0	0	0	1
SE	2	1	0	0	0	0	3
SSE	1	4	2	0	0	0	7
S	1	1	2	0	0	0	4
SSW	0	5	6	5	0	0	16
SW	0	10	7	1	0	0	18
WSW	0	4	7	1	0	0	12
W	0	5	13	2	0	0	20
WNW	1	6	6	3	0	0	16
NW	1	10	6	1	0	0	18
NNW	1	4	3	1	0	0	9
TOTAL	10	70	69	14	0	0	163

PERIODS OF CALM(HOURS): 7
VARIABLE DIRECTION 18
HOURS OF MISSING DATA: 75

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: B DT/DZ
ELEVATION: SPFED:SPD10M DIRECTION:DIR10M LAPSE:ΔT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	4	2	0	0	0	6
NNE	0	2	0	0	0	0	2
NE	1	3	3	0	0	0	7
ENE	0	2	9	1	0	0	12
E	2	7	3	0	0	0	12
ESE	1	6	1	0	0	0	8
SE	0	1	0	0	0	0	1
SSE	0	4	1	0	0	0	5
S	0	5	3	1	0	0	9
SSW	0	2	3	4	0	0	9
SW	0	8	4	1	0	0	13
WSW	0	4	5	2	0	0	11
W	1	5	4	0	0	0	10
WNW	0	4	3	0	0	0	7
NW	1	4	2	0	0	0	7
NNW	2	5	7	1	0	0	15
TOTAL	8	66	50	10	0	0	134

PERIODS OF CALM(HOURS): 7
VARIABLE DIRECTION 31
HOURS OF MISSING DATA: 75

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	3	2	0	0	0	6
NNE	0	2	0	0	0	0	2
NE	0	3	3	1	0	0	7
ENE	0	5	2	2	0	0	9
E	2	5	2	0	0	0	9
ESE	0	3	0	0	0	0	3
SE	1	7	0	0	0	0	8
SSE	0	3	1	0	0	0	4
S	2	3	7	1	0	0	13
SSW	0	8	8	2	0	0	18
SW	1	3	2	3	1	0	10
WSW	0	6	3	0	0	0	9
W	1	2	3	1	0	0	7
WNW	1	4	1	1	1	0	8
NW	1	4	0	1	0	0	6
NNW	1	3	1	0	0	0	5
TOTAL	11	64	35	12	2	0	124

PERIODS OF CALM(HOURS): 7
VARIABLE DIRECTION 31
HOURS OF MISSING DATA: 75

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	15	4	0	0	0	26
NNE	3	7	14	0	0	0	24
NE	5	25	53	1	[illegible]	0	84
ENE	4	24	23	2	0	0	53
E	6	31	4	0	0	0	41
ESE	7	18	6	0	0	0	31
SE	3	12	9	0	0	0	24
SSE	8	21	13	0	0	0	42
S	9	20	12	2	0	0	43
SSW	7	15	15	11	1	0	49
SW	4	17	9	4	0	0	34
WSW	3	18	10	2	0	0	33
W	6	9	21	9	1	0	46
WNW	6	8	19	8	0	0	41
NW	5	6	3	2	0	0	16
NNW	7	21	7	1	0	0	36
TOTAL	90	267	222	42	2	0	623

PERIODS OF CALM(HOURS): 7
VARIABLE DIRECTION 102
HOURS OF MISSING DATA: 75

ATTACHMENT 32 (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90810101-90833124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	10	1	0	0	0	14
NNE	4	6	1	0	0	0	11
NE	7	13	14	0	0	0	36
ENE	11		7	0	0	0	37
E	8	18	1	0	0	0	27
ESE	8	28	6	0	0	0	42
SE	3	26	4	0	0	0	23
SSE	8	49	4	0	0	0	61
S	14	30	1	3	0	0	48
SSW	11	17	6	3	1	0	38
SW	11	17	9	0	0	0	37
WSW	15	14	11	0	0	0	40
W	6	26	9	2	0	0	43
WNW	9	15	7	1	0	0	32
NW	4	2	0	1	0	0	7
NNW	4	13	0	1	9	0	18
TOTAL	128	303	81	11	1	0	525

PERIODS OF CALM(HOURS): 7
VARIABLE DIRECTION 66
HOURS OF MISSING DATA: 75

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	1	1	0	0	0	7
NNE	2	2	0	0	0	0	4
NE	2	9	1	0	0	0	12
ENE	2	5	1	0	0	0	8
E	6	6	1	0	0	0	13
ESE	7	8	1	0	0	0	16
SE	14	13	0	0	0	0	27
SSE	14	12	2	0	0	0	28
S	16	11	1	1	0	0	29
SSW	13	9	0	1	0	0	23
SW	14	12	1	0	0	0	27
WSW	12	7	0	0	0	0	19
W	11	11	1	0	0	0	23
WNW	4	5	3	0	0	0	12
NW	7	0	2	0	0	0	9
NNW	4	2	0	0	0	0	6
TOTAL	133	113	15	2	0	0	263

PERIODS OF CALM(HOURS): 7
VARIABLE DIRECTION 35
HOURS OF MISSING DATA: 75

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	1	1	0	0	0	8
NNE	3	1	0	0	0	0	4
NE	7	1	1	3	0	0	12
ENE	10	2	2	1	0	0	15
E	7	1	4	1	0	0	13
ESE	5	2	3	3	0	0	13
SE	15	4	2	0	0	0	21
SSE	8	3	1	0	0	0	12
S	15	10	0	1	0	0	26
SSW	16	7	2	0	0	0	25
SW	28	7	1	1	0	0	37
WSW	15	15	0	0	0	0	30
W	10	2	0	0	0	0	12
WNW	2	3	1	0	0	0	6
NW	4	1	1	0	0	0	6
NNW	6	6	2	0	0	0	14
TOTAL	157	66	21	10	0	0	254

PERIODS OF CALM(HOURS): 7
VARIABLE DIRECTION 57
HOURS OF MISSING DATA: 75

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	23	39	12	0	0	0	74
NNE	12	20	15	0	0	0	47
NE	25	62	78	5	0	0	170
ENE	28	58	53	6	0	0	145
E	31	73	19	1	0	0	124
ESE	28	66	17	3	0	0	114
SE	38	64	15	0	0	0	117
SSE	39	96	24	0	0	0	159
S	57	80	26	9	0	0	172
SSW	47	63	40	26	2	0	178
SW	58	74	33	10	1	0	176
WSW	45	68	36	5	0	0	154
W	35	60	51	14	1	0	161
WNW	23	45	40	13	1	0	122
NW	23	27	14	5	0	0	69
NNW	25	54	20	4	0	0	103
TOTAL	537	949	493	101	5	0	2085

PERIODS OF CALM(HOURS): 7
VARIABLE DIRECTION 340
HOURS OF MISSING DATA: 75

ATTACHMENT 3C. JOINT FREQUENCY TABLES OF WIND SPEED AND DIRECTION BY 10m VS DELTA TEMPERATURE 60-10m
APRIL 1, 1990 THROUGH JUNE 30, 1990

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	11	1	0	0	0	14
NNE	2	12	1	0	0	0	15
NE	4	8	3	1	0	0	16
ENE	1	9	8	0	0	0	18
E	1	22	11	0	0	0	34
ESE	0	10	5	0	0	0	15
SE	1	10	9	0	0	0	20
SSE	1	15	2	0	0	0	18
S	2	17	5	0	0	0	24
SSW	1	9	4	0	0	0	14
SW	2	15	24	1	0	0	42
WSW	0	30	28	0	0	0	58
W	1	31	31	1	0	0	64
WNW	1	16	27	1	0	0	45
NW	1	16	16	1	0	0	34
NNW	0	8	13	0	0	0	21
TOTAL	20	239	188	5	0	0	452

PERIODS OF CALM(HOURS): 5
VARIABLE DIRECTION 79
HOURS OF MISSING DATA: 18

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	8	3	0	0	0	11
NNE	0	7	0	0	0	0	7
NE	1	7	2	0	0	0	10
ENE	2	6	7	0	0	0	15
E	1	3	1	0	0	0	5
ESE	0	7	1	0	0	0	8
SE	0	7	1	0	0	0	8
SSE	1	9	3	1	0	0	14
S	1	7	1	0	0	0	9
SSW	1	6	3	0	0	0	10
SW	3	5	2	0	0	0	10
WSW	0	10	0	0	0	0	10
W	0	9	5	1	0	0	15
WNW	0	9	4	0	0	0	13
NW	1	5	1	0	0	0	7
NNW	0	3	1	0	0	0	4
TOTAL	11	108	35	2	0	0	156

PERIODS OF CALM(HOURS): 5
VARIABLE DIRECTION 43
HOURS OF MISSING DATA: 18

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	10	1	0	0	0	12
NNE	3	3	3	0	0	0	9
NE	0	6	2	0	0	0	8
ENE	0	3	1	0	0	0	4
E	1	5	3	0	0	0	9
ESE	0	4	6	0	0	0	10
SE	0	7	7	0	0	0	14
SSE	1	3	1	2	0	0	7
S	1	5	3	0	0	0	9
SSW	0	1	3	2	0	0	6
SW	0	4	1	0	0	0	5
WSW	0	5	3	0	0	0	8
W	2	7	3	1	0	0	13
WNW	0	2	0	0	0	0	2
NW	0	3	2	0	0	0	5
NNW	1	3	1	0	0	0	5
TOTAL	10	71	40	5	0	0	126

PERIODS OF CALM(HOURS): 5
VARIABLE DIRECTION 27
HOURS OF MISSING DATA: 18

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90040101-90063124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT∆0M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	18	1	0	0	0	22
NNE	1	6	8	1	0	0	16
NE	2	8	5	5	0	0	20
ENE	2	11	16	0	1	0	30
E	8	19	2	0	0	0	29
ESE	5	16	3	0	0	0	24
SE	9	27	17	1	0	0	54
SSE	5	34	5	3	0	0	47
S	11	20	2	0	0	0	33
SSW	6	13	5	0	0	0	24
SW	4	31	10	0	0	0	45
WSW	2	21	1	0	0	0	24
W	0	12	4	0	0	0	16
WNW	2	10	5	0	0	0	17
NW	2	9	3	0	0	0	14
NNW	4	11	7	0	0	0	22
TOTAL	66	266	94	10	1	0	437

PERIODS OF CALM(HOURS): 5
VARIABLE DIRECTION 83
HOURS OF MISSING DATA: 18

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	6	2	0	0	0	9
NNE	8	3	2	0	0	0	13
NE	10	10	0	0	0	0	20
ENE	6	8	1	0	0	0	15
E	9	14	0	0	0	0	23
ESE	18	21	0	0	0	0	39
SE	17	46	3	0	0	0	66
SSE	28	38	2	0	0	0	68
S	20	21	1	0	0	0	42
SSW	13	34	6	0	0	0	53
SW	18	35	3	0	0	0	56
WSW	18	19	1	0	0	0	38
W	3	13	0	0	0	0	16
WNW	13	23	1	0	0	0	37
NW	3	17	2	0	0	0	22
NNW	5	19	1	0	0	0	25
TOTAL	190	327	25	0	0	0	542

PERIODS OF CALM(HOURS): 5
VARIABLE DIRECTION 74
HOURS OF MISSING DATA: 18

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	0	0	0	0	0	1
NNE	4	0	0	0	0	0	4
NE	5	3	0	0	0	0	8
ENE	8	6	0	0	0	0	14
E	15	9	0	0	0	0	24
ESE	11	7	0	0	0	0	18
SE	11	7	0	0	0	0	18
SSE	11	6	0	0	0	0	17
S	18	6	0	0	0	0	24
SSW	13	12	0	0	0	0	25
SW	22	20	0	0	0	0	42
WSW	22	7	0	0	0	0	29
W	20	8	0	0	0	0	28
WNW	13	5	0	0	0	0	18
NW	7	0	0	0	0	0	7
NNW	4	13	0	0	0	0	17
TOTAL	185	109	0	0	0	0	294

PERIODS OF CALM(HOURS): 5
VARIABLE DIRECTION 55
HOURS OF MISSING DATA: 18

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	0	0	0	0	0	1
NNE	2	0	0	0	0	0	2
NE	3	1	0	0	0	0	4
ENE	5	1	0	0	0	0	6
E	3	4	0	0	0	0	7
ESE	7	0	0	0	0	0	7
SE	5	2	0	0	0	0	7
SSE	4	1	0	0	0	0	5
S	6	3	0	0	0	0	9
SSW	12	3	0	0	0	0	15
SW	13	16	0	0	0	0	29
WSW	14	5	0	0	0	0	19
W	19	4	0	0	0	0	23
WNW	12	2	0	0	0	0	14
NW	2	2	0	0	0	0	4
NNW	4	3	0	0	0	0	7
TOTAL	112	47	0	0	0	0	159

PERIODS OF CALM(HOURS): 5
VARIABLE DIRECTION 52
HOURS OF MISSING DATA: 18

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9	53	8	0	0	0	70
NNE	20	31	14	1	0	0	66
NE	25	43	12	6	0	0	86
ENE	24	44	33	0	1	0	102
E	38	76	17	0	0	0	131
ESE	41	65	15	0	0	0	121
SE	43	106	37	1	0	0	187
SSE	51	106	13	6	0	0	176
S	59	79	12	0	0	0	150
SSW	46	78	21	2	0	0	147
SW	62	126	40	1	0	0	229
WSW	56	97	33	0	0	0	186
W	45	84	43	3	0	0	175
WNW	41	67	37	1	0	0	146
NW	16	52	24	1	0	0	93
NNW	18	60	23	0	0	0	101
TOTAL	594	1167	382	22	1	0	2166

PERIODS OF CALM(HOURS): 5
VARIABLE DIRECTION 413
HOURS OF MISSING DATA: 18

ATTACHMENT 4A. JOINT FREQUENCY TABLES OF WIND SPEED
AND DIRECTION 60m VS DELTA TEMPERATURE 60-10m
JANUARY 1, 1990 THROUGH JUNE 30, 1990

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	8	5	1	0	0	18
NNE	3	6	3	0	0	0	12
NE	1	15	7	1	1	0	25
ENE	0	17	25	4	0	0	46
E	2	10	18	0	0	0	30
ESE	3	9	4	0	0	0	16
SE	1	9	11	0	0	0	21
SSE	3	16	6	0	0	0	25
S	1	10	10	4	2	2	29
SSW	0	11	7	5	0	0	23
SW	1	16	22	15	2	0	56
WSW	1	17	51	31	2	3	105
W	1	11	40	21	4	3	80
WNW	3	10	37	12	5	0	67
NW	2	15	20	10	1	0	48
NNW	0	12	12	4	0	0	28
TOTAL	26	192	278	108	17	8	629

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 74
HOURS OF MISSING DATA: 52

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	8	3	1	0	0	13
NNE	0	8	2	0	0	0	10
NE	1	1	12	4	0	0	18
ENE	2	10	13	5	0	0	30
E	1	8	8	0	0	0	17
ESE	0	7	0	0	0	0	7
SE	2	9	3	1	0	0	15
SSE	2	10	6	0	0	0	18
S	1	7	6	2	3	0	19
SSW	2	5	2	2	1	0	12
SW	0	7	15	5	0	0	27
WSW	1	6	11	7	1	0	26
W	1	9	9	7	1	0	27
WNW	1	6	5	4	1	0	17
NW	0	12	6	1	2	0	21
NNW	1	5	5	4	0	0	15
TOTAL	16	118	106	43	9	0	292

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 50
HOURS OF MISSING DATA: 52

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	12	5	1	0	0	21
NNE	0	3	3	0	0	0	6
NE	1	5	7	2	1	0	16
ENE	0	5	5	0	1	0	11
E	1	7	11	0	0	0	19
ESE	0	6	7	1	0	0	14
SE	2	12	5	1	0	0	21
SSE	0		3	1	1	0	12
S	3	4	9	3	1	0	20
SSW	2	1	7	6	2	0	18
SW	1	5	8	3	2	0	19
WSW	1	6	16	3	0	1	27
W	1	2	4	5	1	0	13
WNW	0	3	3	1	0	1	13
NW	0	3	4	2	1	0	10
NNW	2	4	4	0	0	0	10
TOTAL	17	91	101	29	10	2	250

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 34
HOURS OF MISSING DATA: 52

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	20	16	1	0	0	41
NNE	1	15	32	4	1	0	53
NE	3	23	47	33	6	0	112
ENE	6	22	32	12	1	0	73
E	9	40	22	5	0	0	76
ESE	12	21	15	1	0	0	49
SE	5	30	28	12	1	0	76
SSE	6	33	40	9	2	0	90
S	6	36	26	12	5	0	85
SSW	3	13	17	12	4	0	49
SW	5	16	41	14	3	0	79
WSW	4	14	33	18	3	0	72
W	2	4	17	20	12	2	57
WNW	4	13	11	29	7	2	66
NW	1	12	9	5	1	0	28
NNW	4	26	18	10	0	0	58
TOTAL	75	338	404	197	46	4	1064

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 98
HOURS OF MISSING DATA: 52

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	7	14	2	0	0	25
NNE	3	7	11	7	0	0	28
NE	4	12	17	17	0	0	50
ENE	3	9	37	6	0	0	55
E	6	16	30	3	0	0	55
ESE	3	24	38	4	0	0	69
SE	1	29	62	14	0	0	106
SSE	5	41	70	6	0	0	122
S	8	52	46	9	0	0	115
SSW	3	14	50	20	4	0	91
SW	1	21	35	20	4	0	81
WSW	4	15	31	23	2	0	75
W	2	7	31	34	8	0	82
WNW	1	18	24	24	6	0	73
NW	2	2	21	3	0	0	28
NNW	2	5	17	4	0	0	28
TOTAL	50	279	534	196	24	0	1083

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 27
HOURS OF MISSING DATA: 52

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	2	5	2	0	0	10
NNE	0	3	5	1	0	0	9
NE	1	1	3	2	0	0	7
ENE	2	6	13	1	0	0	22
E	0	5	23	5	0	0	33
ESE	0	10	17	2	0	0	29
SE	2	5	25	7	0	0	39
SSE	4	14	23	5	0	0	46
S	9	35	13	8	0	0	65
SSW	0	10	37	16	0	0	63
SW	1	9	25	16	0	0	51
WSW	1	10	22	17	0	0	50
W	1	9	21	21	0	0	52
WNW	0	5	28	3	0	0	36
NW	1	7	19	2	0	0	29
NNW	0	10	6	2	0	0	18
TOTAL	23	141	285	110	0	0	559

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 9
HOURS OF MISSING DATA: 52

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	4	4	0	0	0	12
NNE	5	8	2	0	0	0	15
NE	1	7	2	0	0	0	10
ENE	0	2	5	1	0	0	8
E	5	5	8	7	0	0	25
ESE	2	9	7	5	0	0	23
SE	1	7	5	4	0	0	17
SSE	5	8	3	3	0	0	19
S	5	11	17	9	0	0	42
SSW	0	17	24	9	0	0	50
SW	2	18	20	21	0	0	61
WSW	1	6	13	22	0	0	42
W	2	6	17	13	0	0	38
WNW	3	7	9	6	1	0	26
NW	2	4	8	0	0	0	14
NNW	4	4	3	2	0	0	13
TOTAL	42	123	147	102	1	0	415

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 17
HOURS OF MISSING DATA: 52

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90063024
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	19	61	52	8	0	0	140
NNE	12	50	58	12	1	0	133
NE	12	64	95	59	8	0	238
ENE	13	71	130	29	2	0	245
E	24	91	120	20	0	0	255
ESE	20	86	88	13	0	0	207
SE	14	102	139	39	1	0	295
SSE	25	129	151	24	3	0	332
S	33	155	127	47	11	2	375
SSW	10	71	144	70	11	0	306
SW	11	92	166	94	11	0	374
WSW	13	74	177	121	8	4	397
W	10	48	139	121	26	5	349
WNW	12	67	117	79	20	3	298
NW	8	55	87	23	5	0	178
NNW	13	66	65	26	0	0	170
TOTAL	249	1282	1855	785	107	14	4292

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 309
HOURS OF MISSING DATA: 52

ATTACHMENT 4B. JOINT FREQUENCY TABLES OF WIND SPEED
AND DIRECTION 60m VS DELTA TEMPERATURE 60-10m
JANUARY 1, 1990 THROUGH MARCH 31, 1990

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND SPEED(MPH)

WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	1	1	1	0	0	4
NNE	1	1	1	0	0	0	3
NE	0	7	2	1	0	0	10
ENE	0	3	9	3	0	0	15
E	1	1	2	0	0	0	4
ESE	1	1	0	0	0	0	2
SE	0	1	1	0	0	0	2
SSE	1	4	4	0	0	0	9
S	0	1	2	1	2	2	8
SSW	0	2	4	5	0	0	11
SW	0	2	8	3	2	0	15
WSW	0	1	10	6	2	3	22
W	1	1	9	7	2	3	23
WNW	0	2	5	6	2	0	15
NW	0	8	11	4	1	0	24
NNW	0	3	6	1	0	0	10
TOTAL	6	39	75	38	11	8	177

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 11
HOURS OF MISSING DATA: 37

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: 8 DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	3	1	1	0	0	6
NNE	0	2	0	0	0	0	2
NE	0	0	7	3	0	0	10
ENE	0	4	6	3	0	0	13
E	0	6	4	0	0	0	10
ESE	0	2	0	0	0	0	2
SE	0	3	0	0	0	0	3
SSE	0	2	2	0	0	0	4
S	0	4	4	1	3	0	12
SSW	0	2	1	1	1	0	5
SW	0	1	11	3	0	0	15
WSW	0	4	3	4	0	0	11
W	1	3	3	4	1	0	12
WNW	1	2	2	2	1	0	8
NW	0	4	6	1	2	0	13
NNW	1	1	4	3	0	0	9
TOTAL	4	43	54	26	8	0	135

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 16
HOURS OF MISSING DATA: 37

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	4	1	0	0	0	6
NNE	0	1	1	0	0	0	2
NE	0	2	4	1	1	0	8
ENE	0	3	5	0	1	0	9
E	0	2	5	0	0	0	7
ESE	0	3	1	0	0	0	4
SE	1	4	1	1	0	0	7
SSE	0	4	0	0	0	0	4
S	1	3	8	3	1	0	16
SSW	2	1	6	4	0	0	13
SW	1	1	5	2	2	0	11
WSW	0	4	5	2	0	1	12
W	0	1	3	4	0	0	8
WNW	0	6	1	1	0	1	9
NW	0	0	3	1	1	0	5
NNW	0	1	3	0	0	0	4
TOTAL	6	40	52	19	6	2	125

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 16
HOURS OF MISSING DATA: 37

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	7	12	1	0	0	21
NNE	1	8	25	2	0	0	36
NE	3	15	39	28	1	0	86
ENE	3	14	22	8	1	0	48
E	5	25	14	3	0	0	47
ESE	3	13	10	0	0	0	26
SE	1	6	8	8	0	0	23
SSE	3	14	17	6	0	0	40
S	3	17	15	11	5	0	51
SSW	2	9	11	9	4	0	35
SW	5	6	14	5	3	0	33
WSW	2	7	17	14	3	0	43
W	1	1	10	15	12	2	41
WNW	2	9	5	21	7	2	46
NW	1	8	5	3	1	0	18
NNW	2	13	13	5	0	0	33
TOTAL	38	172	237	139	37	4	627

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 50
HOURS OF MISSING DATA: 37

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	3	8	0	0	0	12
NNE	1	4	11	2	0	0	18
NE	1	5	10	15	0	0	31
ENE	1	7	27	6	0	0	41
E	4	11	16	2	0	0	33
ESE	1	8	21	4	0	0	34
SE	0	6	26	9	0	0	41
SSE	0	8	37	3	0	0	48
S	0	30	25	7	0	0	62
SSW	0	2	17	13	3	0	35
SW	0	9	10	11	3	0	33
WSW	1	9	13	14	2	0	39
W	2	3	19	30	8	0	62
WNW	0	9	9	10	6	0	34
NW	2	1	4	2	0	0	9
NNW	1	0	7	1	0	0	9
TOTAL	15	115	260	129	22	0	541

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 7
HOURS OF MISSING DATA: 37

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	0	2	0	0	0	3
NNE	0	2	3	0	0	0	5
NE	0	1	3	2	0	0	6
ENE	0	2	6	1	0	0	9
E	0	1	11	2	0	0	14
ESE	0	0	6	0	0	0	6
SE	1	0	15	3	0	0	19
SSE	0	9	18	4	0	0	31
S	0	16	6	4	0	0	26
SSW	0	4	21	12	0	0	37
SW	0	8	15	7	0	0	30
WSW	1	6	8	8	0	0	23
W	1	1	8	15	0	0	25
WNW	0	1	9	0	0	0	10
NW	1	2	11	2	0	0	16
NNW	0	2	2	0	0	0	4
TOTAL	5	55	144	60	0	0	264

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 3
HOURS OF MISSING DATA: 37

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	2	2	0	0	0	5
NNE	2	3	2	0	0	0	7
NE	0	3	1	0	0	0	4
ENE	0	1	3	1	0	0	5
E	4	1	8	3	0	0	16
ESE	2	6	4	5	0	0	17
SE	1	5	5	3	0	0	14
SSE	3	7	2	3	0	0	15
S	5	11	13	9	0	0	38
SSW	0	8	19	6	0	0	33
SW	2	8	10	15	0	0	35
WSW	1	4	6	16	0	0	27
W	1	2	11	5	0	0	19
WNW	2	2	4	1	1	0	10
NW	1	1	3	0	0	0	5
NNW	2	2	0	0	0	0	4
TOTAL	27	66	93	67	1	0	254

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 3
HOURS OF MISSING DATA: 37

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90010101-90033124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	20	27	3	0	0	57
NNE	5	21	43	4	0	0	73
NE	4	33	66	50	2	0	155
ENE	4	34	78	22	2	0	140
E	14	47	60	10	0	0	131
ESE	7	33	42	9	0	0	91
SE	4	25	56	24	0	0	109
SSE	7	48	80	16	0	0	151
S	9	82	73	36	11	2	213
SSW	4	28	79	50	8	0	169
SW	8	35	73	46	10	0	172
WSW	5	35	62	64	7	4	177
W	7	12	63	80	23	5	190
WNW	5	31	35	41	17	3	132
NW	5	24	43	13	5	0	90
NNW	6	22	35	10	0	0	73
TOTAL	101	530	915	478	85	14	2123

PERIODS OF CALM(HOURS): 0
VARIABLE DIRECTION 106
HOURS OF MISSING DATA: 37

ATTACHMENT 4C. JOINT FREQUENCY TABLES OF WIND SPEED AND DIRECTION 60m VS DELTA TEMPERATURE 60-10m
APRIL 1, 1990 THROUGH JUNE 30, 1990

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	7	4	0	0	0	14
NNE	2	5	2	0	0	0	9
NE	1	8	5	0	1	0	15
ENE	0	14	16	1	0	0	31
E	1	9	16	0	0	0	26
ESE	2	8	4	0	0	0	14
SE	1	8	10	0	0	0	19
SSE	2	12	2	0	0	0	16
S	1	9	8	3	0	0	21
SSW	0	9	3	0	0	0	12
SW	1	14	14	12	0	0	41
WSW	1	16	41	25	0	0	83
W	0	10	31	14	2	0	57
WNW	3	8	32	6	3	0	52
NW	2	7	9	6	0	0	24
NNW	0	9	6	3	0	0	18
TOTAL	20	153	203	70	6	0	452

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 63
HOURS OF MISSING DATA: 15

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	5	2	0	0	0	7
NNE	0	6	2	0	0	0	8
NE	1	1	5	1	0	0	8
ENE	2	6	7	2	0	0	17
E	1	2	4	0	0	0	7
ESE	0	5	0	0	0	0	5
SE	2	6	3	1	0	0	12
SSE	2	8	4	0	0	0	14
S	1	3	2	1	0	0	7
SSW	2	3	1	1	0	0	7
SW	0	6	4	2	0	0	12
WSW	1	2	8	3	1	0	15
W	0	6	6	3	0	0	15
WNW	0	4	3	2	0	0	9
NW	0	8	0	0	0	0	8
NNW	0	4	1	1	0	0	6
TOTAL	12	75	52	17	1	0	157

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 34
HOURS OF MISSING DATA: 15

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	8	4	1	0	0	15
NNE	0	2	2	0	0	0	4
NE	1	3	3	1	0	0	8
ENE	0	2	0	0	0	0	2
E	1	5	6	0	0	0	12
ESE	0	3	6	1	0	0	10
SE	1	9	4	0	0	0	14
SSE	0	3	3	1	1	0	8
S	2	1	1	0	0	0	4
SSW	0	0	1	2	2	0	5
SW	0	4	3	1	0	0	8
WSW	1	2	11	1	0	0	15
W	1	1	1	1	1	0	5
WNW	0	2	2	0	0	0	4
NW	0	3	1	1	0	0	5
NNW	2	3	1	0	0	0	6
TOTAL	11	51	49	10	4	0	125

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 18
HOURS OF MISSING DATA: 15

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	13	4	0	0	0	20
NNE	0	7	7	2	1	0	17
NE	0	8	8	5	5	0	26
ENE	3	8	10	4	0	0	25
E	4	15	8	2	0	0	29
ESE	9	8	5	1	0	0	23
SE	4	24	20	4	1	0	53
SSE	3	19	23	3	2	0	50
S	3	19	11	1	0	0	34
SSW	1	4	6	3	0	0	14
SW	0	10	27	9	0	0	46
WSW	2	7	16	4	0	0	29
W	1	3	7	5	0	0	16
WNW	2	4	6	8	0	0	20
NW	0	4	4	2	0	0	10
NNW	2	13	5	5	0	0	25
TOTAL	37	166	167	58	9	0	437

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 48
HOURS OF MISSING DATA: 15

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	4	6	2	0	0	13
NNE	2	3	0	5	0	0	10
NE	3	7	7	2	0	0	19
ENE	2	2	10	0	0	0	14
E	2	5	14	1	0	0	22
ESE	2	16	17	0	0	0	35
SE	1	23	36	5	0	0	65
SSE	5	33	33	3	0	0	74
S	8	22	21	2	0	0	53
SSW	3	12	33	7	1	0	56
SW	1	12	25	9	1	0	48
WSW	3	6	18	9	0	0	36
W	0	4	12	4	0	0	20
WNW	1	9	15	14	0	0	39
NW	0	1	17	1	0	0	19
NNW	1	5	10	3	0	0	19
TOTAL	35	164	274	67	2	0	542

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 20
HOURS OF MISSING DATA: 15

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	2	3	2	0	0	7
NNE	0	1	2	1	0	0	4
NE	1	0	0	0	0	0	1
ENE	2	4	7	0	0	0	13
E	0	4	12	3	0	0	19
ESE	0	10	11	2	0	0	23
SE	1	5	10	4	0	0	20
SSE	4	5	5	1	0	0	15
S	9	19	7	4	0	0	39
SSW	0	6	16	4	0	0	26
SW	1	1	10	9	0	0	21
WSW	0	4	14	9	0	0	27
W	0	8	13	6	0	0	27
WNW	0	4	19	3	0	0	26
NW	0	5	8	0	0	0	13
NNW	0	8	4	2	0	0	14
TOTAL	18	86	141	50	0	0	295

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 6
HOURS OF MISSING DATA: 15

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	2	2	0	0	0	7
NNE	3	5	0	0	0	0	8
NE	1	4	1	0	0	0	6
ENE	0	1	2	0	0	0	3
E	1	4	0	4	0	0	9
ESE	0	3	3	0	0	0	6
SE	0	2	0	1	0	0	3
SSE	2	1	1	0	0	0	4
S	0	0	4	0	0	0	4
SSW	0	9	5	3	0	0	17
SW	0	10	10	6	0	0	26
WSW	0	2	7	6	0	0	15
W	1	4	6	8	0	0	19
WNW	1	5	5	5	0	0	16
NW	1	3	5	0	0	0	9
NNW	2	2	3	2	0	0	9
TOTAL	15	57	54	35	0	0	161

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 14
HOURS OF MISSING DATA: 15

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90040101-90063024
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

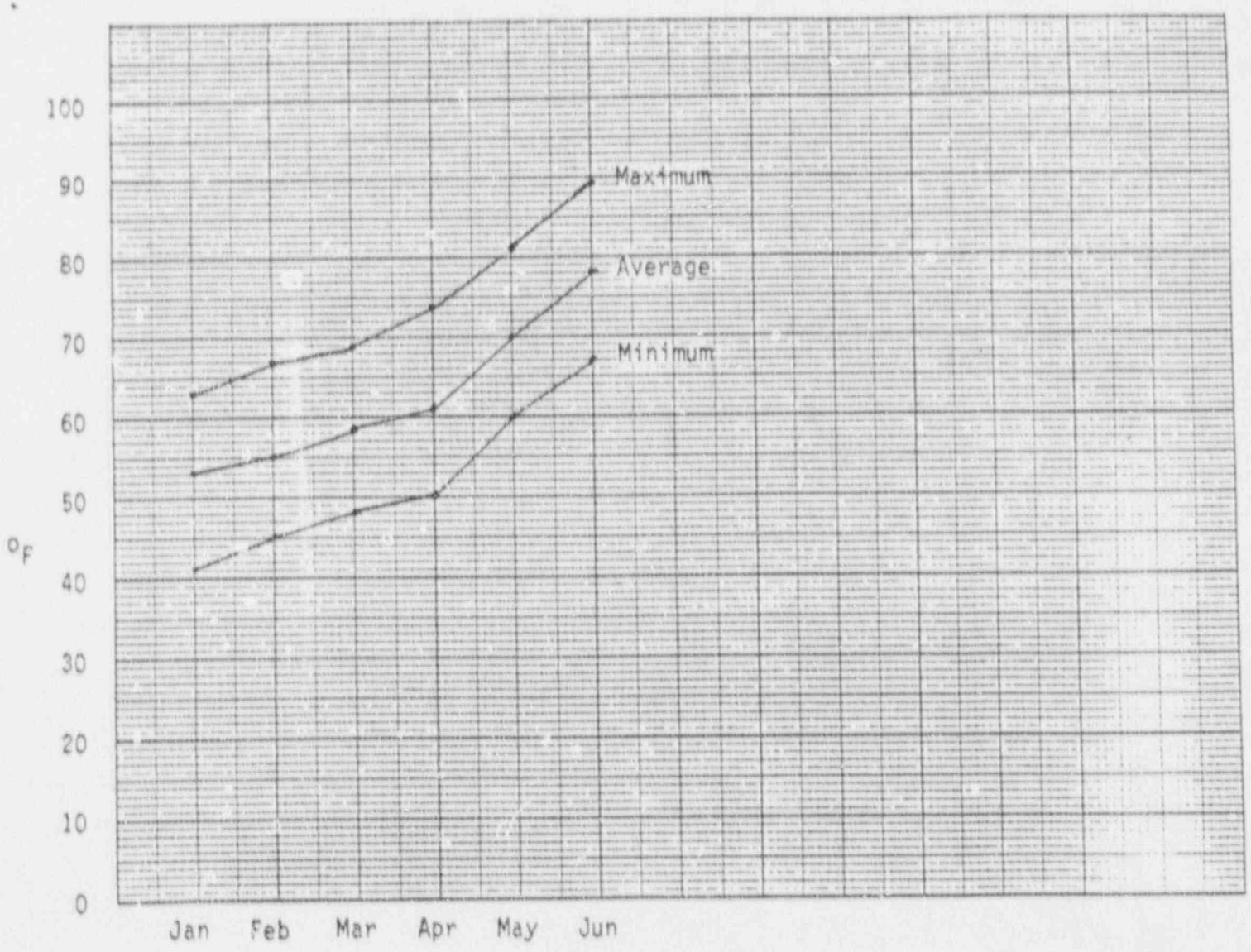
WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	41	25	5	0	0	83
NNE	7	29	15	8	1	0	60
NE	8	31	29	9	6	0	83
ENE	9	37	52	7	0	0	105
E	10	44	60	10	0	0	124
ESE	13	53	46	4	0	0	116
SE	10	77	83	15	1	0	186
SSE	18	81	71	8	3	0	181
S	24	73	54	11	0	0	162
SSW	6	43	65	20	3	0	137
SW	3	57	93	48	1	0	202
WSW	8	39	115	57	1	0	220
W	3	36	76	41	3	0	159
WNW	7	36	82	38	3	0	166
NW	3	31	44	10	0	0	88
NNW	7	44	30	16	0	0	97
TOTAL	148	752	940	307	22	0	2169

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 203
HOURS OF MISSING DATA: 15

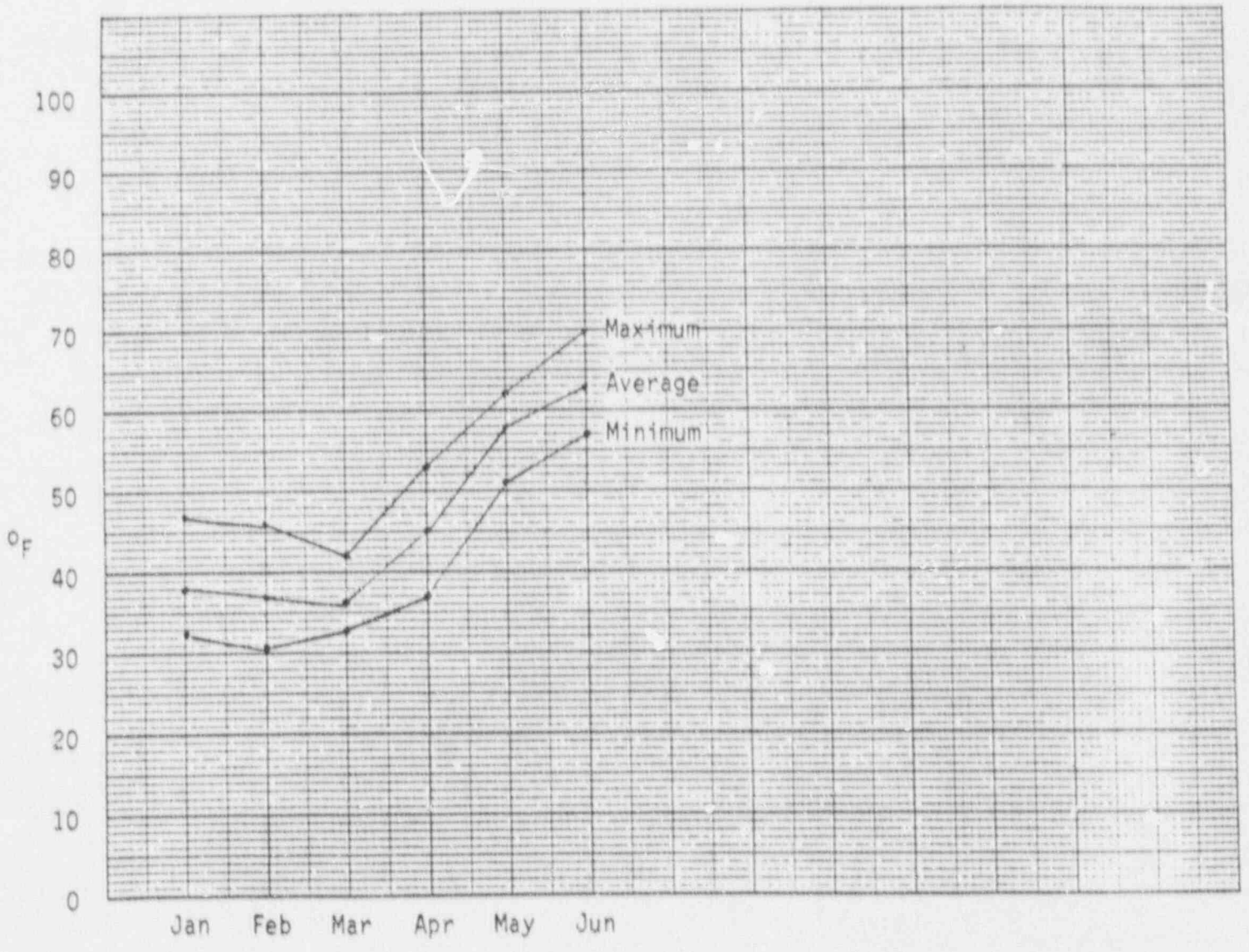
ATTACHMENT 5. PLANT VOGTLE RAINFALL
JANUARY 1, 1990 THROUGH JUNE 30, 1990

Month	Precipitation (Inches)	Month	Precipitation (Inches)
January		April	
1	0.06	6	0.01
6	0.49	7	0.14
7	1.19	10	0.24
8	0.09	11	0.02
	1.83	14	0.04
		28	0.60
		30	0.02
			1.07
February			
4	0.19		
10	0.15	May	
16	1.01		
18	0.54	5	0.11
19	0.24	9	0.39
22	0.30	10	0.19
	2.43	17	0.06
		28	0.66
			1.41
March			
2	0.05	June	
9	0.28		
16	0.65	3	0.35
28	0.31	8	0.47
29	0.36	10	0.04
30	0.06	16	0.11
	1.71		0.97

ATTACHMENT 6A. PLANT VOGTLE
AVERAGE OF DAILY MAXIMUM, MINIMUM AND
AVERAGE VALUES OF AMBIENT TEMPERATURE
JANUARY 1, 1990 THROUGH JUNE 30, 1990



ATTACHMENT 6B. PLANT VOGTLE
AVERAGE OF DAILY MAXIMUM, MINIMUM AND
AVERAGE VALUES OF DEW POINT TEMPERATURE
JANUARY 1, 1990 THROUGH JUNE 30, 1990



ENCLOSURE B

METEOROLOGICAL DATA

JULY 1, 1990

THRU

DECEMBER 31, 1990

ENCLOSURE B

PLG

ENGINEERS • APPLIED SCIENTISTS • MANAGEMENT CONSULTANTS

PLG, Inc., 1615 M Street, N.W., Suite 730, Washington, D.C. 20036-3215
Tel. 202-659-1122 • Fax 202-296-0774

PLG, Inc., Newport Beach, CA, Office
Tel. 714-833-2020 • Fax 714-833-2085

January 22, 1991

Mr. Shan Sundaran
Georgia Power Company
Plant Vogtle
Route 2, Box 299A
Waynesboro, GA 30830

Dear Shan:

As you requested, enclosed is the semi-annual meteorological report for Plant Vogtle covering the third and fourth quarters of 1990. The data used in the attached tables and figures were generated primarily from the on-site micro-processor (DRT) supplemented by strip chart data for a few periods of missing data in September and November.

The data quality and recovery rate for the second half of 1990 were quite good, averaging about 97% for pertinent parameters of wind speed, direction and delta temperature. The only major problem was with the 60m wind speed which was out of service during the end of July. The daily rainfall totals continue to be somewhat questionable. The total for the second half of the year was about normal but there were still extended periods of more than a month with no rain at all. The rain gage should be checked periodically to make sure it is clear of all debris. The data for 1990 is summarized in Attachment 7.

The attachments are as follows:

- Attachment 1. Data Recovery Percentage for Each Parameter and Composites of Pertinent Parameters. July 1, 1990 through December 31, 1990.

- Attachment 2. Wind Roses

  - A-1: 10m Wind Speed and Direction July 1, 1990 through December 31, 1990.

  - A-2: 10m Wind Speed and Direction July 1, 1990 through September 30, 1990.

- A-3: 10m Wind Speed and Direction October 1, 1990 through December 31, 1990.

- B-1: 60m Wind Speed and Direction July 1, 1990 through December 31, 1990.

- B-2: 60m Wind Speed and Direction July 1, 1990 through September 30, 1990.

- B-3: 60m Wind Speed and Direction October 1, 1990 through December 31, 1990.

- Attachment 3. Joint Frequency Tables of Wind Speed and Direction 10m vs Delta Temperature 60-10m.

  - A: July 1, 1990 through December 31, 1990.
  - B: July 1, 1990 through September 30, 1990.
  - C: October 1, 1990 through December 31, 1990.

- Attachment 4. Joint Frequency Tables of Wind Speed and Direction 60m vs Delta Temperature 60-10m.

  - A: July 1, 1990 through December 31, 1990.
  - B: July 1, 1990 through September 30, 1990.
  - C: October 1, 1990 through December 31, 1990.

- Attachment 5. Daily and Monthly Rainfall Totals for January 1, 1990 through December 31, 1990.

- Attachment 6. Average of the Daily Maximum and Minimum Temperatures for January 1, 1990 through December 31, 1990.

  - A: Ambient Temperature
  - B: Dew Point Temperature

- Attachment 7. 1990 Climatological Summary and comparison with previous years.

If you have any questions or need additional information, please call.

Very truly yours,

Mark Abrams

Mark J. Abrams

Enclosures

ENCLOSURE B

ATTACHMENT 1. PERCENT DATA RECOVERY BY PARAMETER
JULY 1, 1990 THROUGH DECEMBER 31, 1990

Parameter	Percent
Wind Speed 10m	98.8
Wind Speed 60m	96.0
Wind Direction 10m	99.2
Wind Direction 60m	99.3
Delta Temperature 60-10m	97.4
Temperature 10m	98.1
Dew Point Temperature 10m	98.7
Precipitation	99.9
Composites	
Wind Speed and Direction 10m, Delta Temperature 60-10m	97.0
Wind Speed and Direction 60m, Delta Temperature 60-10m	93.9

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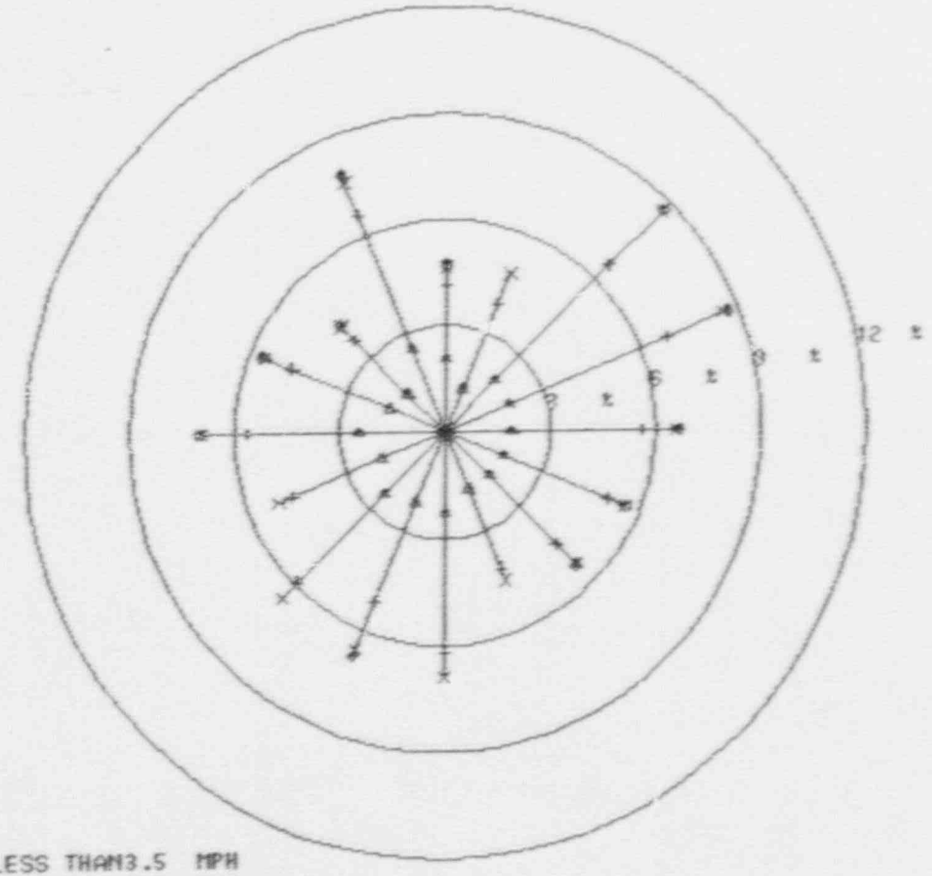
ENCLOSURE B

ATTACHMENT 2A-1. 10m WIND ROSE
JULY 1, 1990 THROUGH DECEMBER 31, 1990



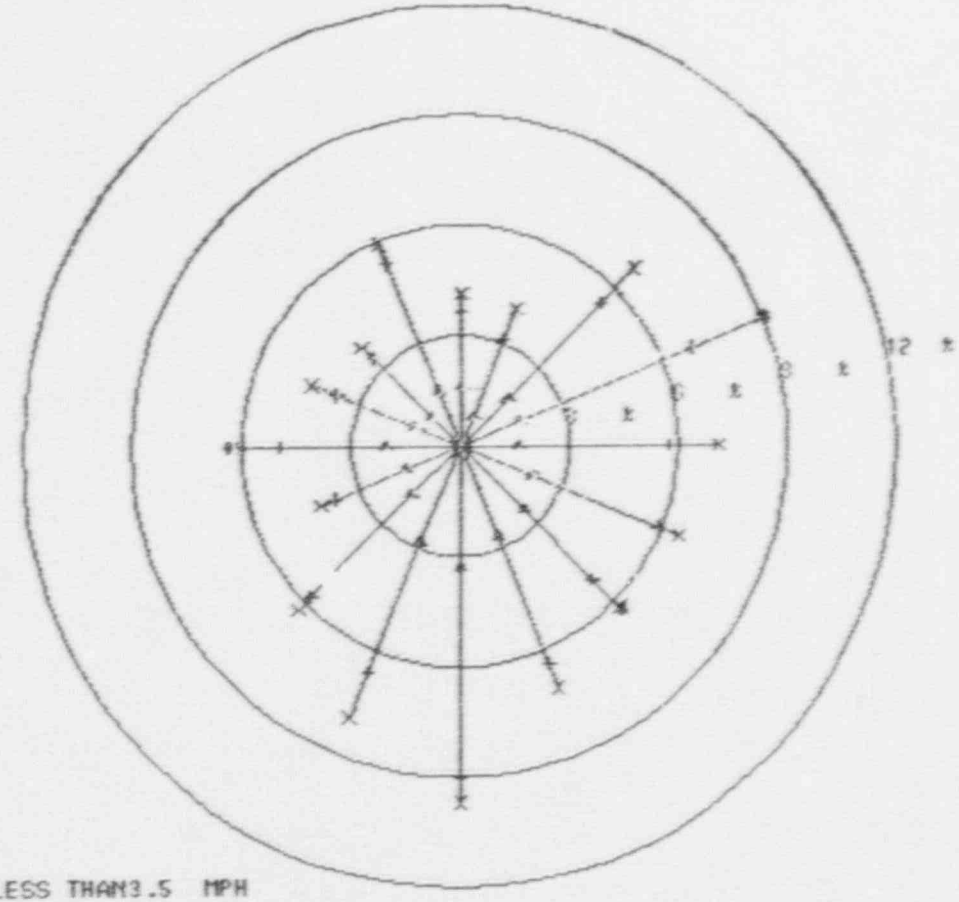
WIND ROSE
(WINDS FROM)
N

▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
•WIND SPEED GREATER THAN 12.5 MPH

0.9 PERCENT CALMS

ENCLOSURE B

ATTACHMENT 2A-2. 10m WIND ROSE
JULY 1, 1990 THROUGH SEPTEMBER 30, 1990

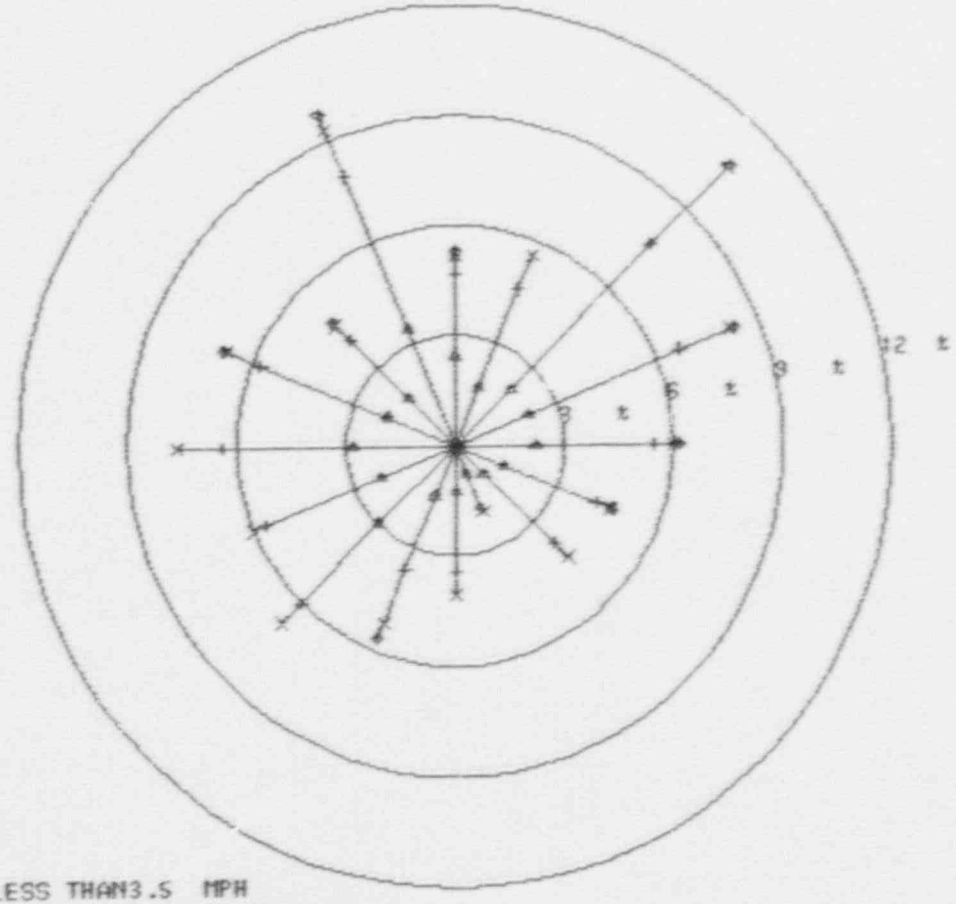


▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

0.5 PERCENT CALMS

ENCLOSURE B

ATTACHMENT 2A-3. 10m WIND ROSE
OCTOBER 1, 1990 THROUGH DECEMBER 31, 1990



WIND ROSE
(WINDS FROM)
N

▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

1.4 PERCENT CALMS

ATTACHMENT 2A-3 (CONTINUED)

Plant Vogtle 10m Wind Direction Frequency and Wind Speed Average
July 1, 1990 Through December 31, 1990

JOINT FREQUENCY TABLES

DIR (FROM)	CALM	CALM+ - 3.5	3.6 - 7.5	7.6 -12.5	12.6 -18.5	18.6 -24.5	24.6 -32.5	32.6+	TOTAL	%	AVE SPEED
			SPEED (MPH)								
N	0	93	92	19	3	0	0	0	207	4.8	4.3
NNE	0	59	108	40	0	0	0	0	207	4.8	5.3
NE	0	89	194	91	2	0	0	0	376	8.8	5.7
ENE	0	88	204	75	5	0	0	0	372	8.7	5.6
E	0	87	159	37	3	0	0	0	286	6.7	5.2
ESE	0	78	138	20	0	1	0	0	237	5.5	4.7
SE	0	80	116	32	2	0	0	0	230	5.4	4.8
SSE	0	79	98	15	0	0	0	0	192	4.5	4.3
S	0	102	167	28	0	0	0	0	297	6.9	4.6
SSW	0	94	132	62	10	0	0	0	298	7.0	5.5
SW	0	111	150	26	0	0	0	0	287	6.7	4.3
WSW	0	85	121	18	0	0	0	0	224	5.2	4.4
W	0	107	138	56	0	1	0	0	302	7.0	5.0
WNW	0	74	129	38	1	0	0	0	242	5.6	5.2
NW	0	68	95	22	3	0	0	0	188	4.4	4.7
NNW	0	111	177	41	10	0	0	0	339	7.9	5.0
TOTAL	0	1405	2218	620	39	2	0	0	4284	100.0	
%	0.0	32.8	51.8	14.5	0.9	0.0	0.0	0.0	100.0		

AVE SPEED FOR THIS TABLE= 5.0 MPH
HOURS IN ABOVE TABLE WITH VARIABLE DIRECTION= 1093

ENCLOSURE B

ATTACHMENT 2A-3 (CONTINUED)

Plant Vogtle 60m Wind Direction Frequency and Wind Speed Average
July 1, 1990 Through December 31, 1990

JOINT FREQUENCY TABLES

SPEED (MPH)

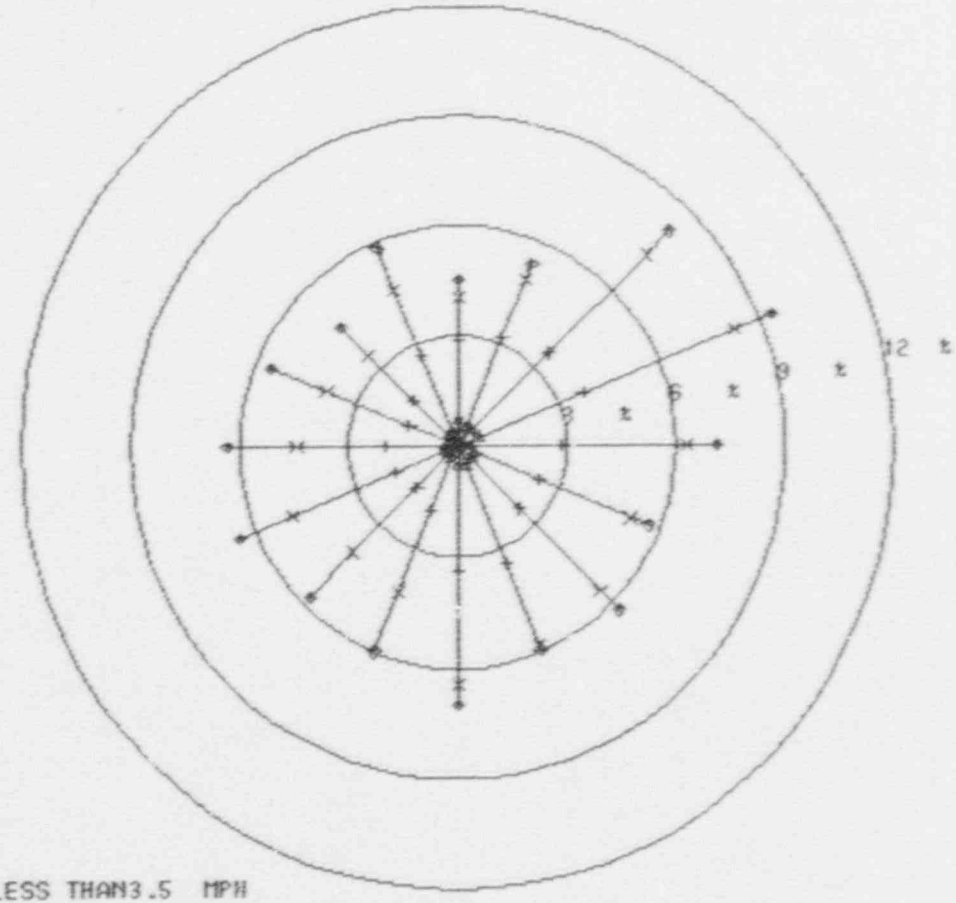
DIR (FROM)	CALM	CALM+ - 3.5	3.6 - 7.5	7.6 -12.5	12.6 -18.5	18.6 -24.5	24.6 -32.5	32.6+	TOTAL	%	AVE SPEED
N	0	29	89	49	15	3	0	0	185	4.5	7.0
NNE	0	21	109	72	18	0	0	0	220	5.3	7.5
NE	0	23	125	157	37	1	0	0	343	8.3	8.5
ENE	0	24	127	188	44	2	0	0	385	9.3	8.6
E	0	12	105	145	32	2	1	0	297	7.2	8.7
ESE	0	19	78	113	21	0	1	0	232	5.6	8.2
SE	0	20	76	129	31	0	0	0	256	6.2	8.6
SSE	0	22	118	96	6	0	0	0	242	5.8	7.2
S	0	22	119	126	23	1	0	0	291	7.0	8.0
SSW	0	18	61	100	64	9	0	0	252	6.1	10.0
SW	0	14	53	104	71	0	0	0	242	5.8	10.0
WSW	0	18	57	128	64	2	0	0	269	6.5	9.7
W	0	14	68	103	73	7	0	0	265	6.4	10.2
WNW	0	7	53	104	58	12	0	0	234	5.6	10.5
NW	0	15	57	75	38	4	1	0	190	4.6	9.4
NNW	0	14	96	83	45	2	2	0	242	5.8	8.9
TOTAL	0	292	1391	1772	640	45	5	0	4145	100.0	
%	0.0	7.0	33.6	42.8	15.4	1.1	0.1	0.0	100.0		

AVE SPEED FOR THIS TABLE= 8.8 MPH

HOURS IN ABOVE TABLE WITH VARIABLE DIRECTION= 373

ENCLOSURE B

ATTACHMENT 2B-1. 60m WIND ROSE
JULY 1, 1990 THROUGH DECEMBER 31, 1990



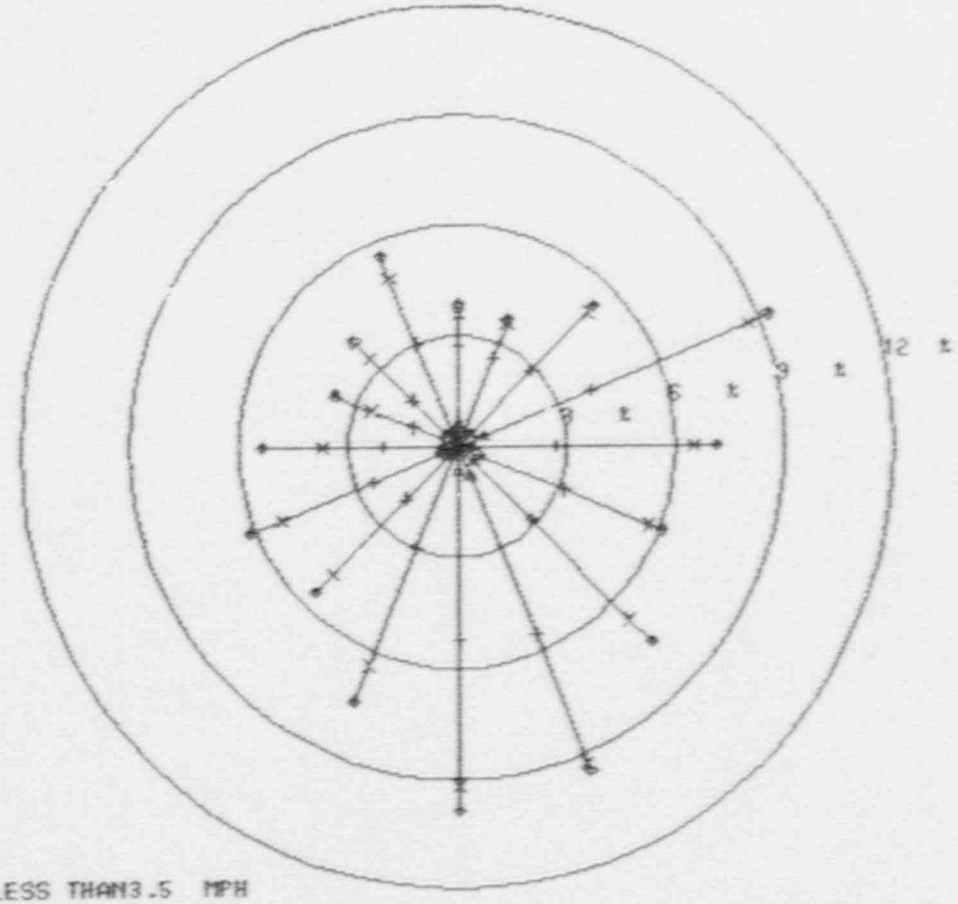
WIND ROSE
(WINDS FROM)
N

▲WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

ENCLOSURE B

ATTACHMENT 2B-2. 60m WIND ROSE
JULY 1, 1990 THROUGH SEPTEMBER 30, 1990

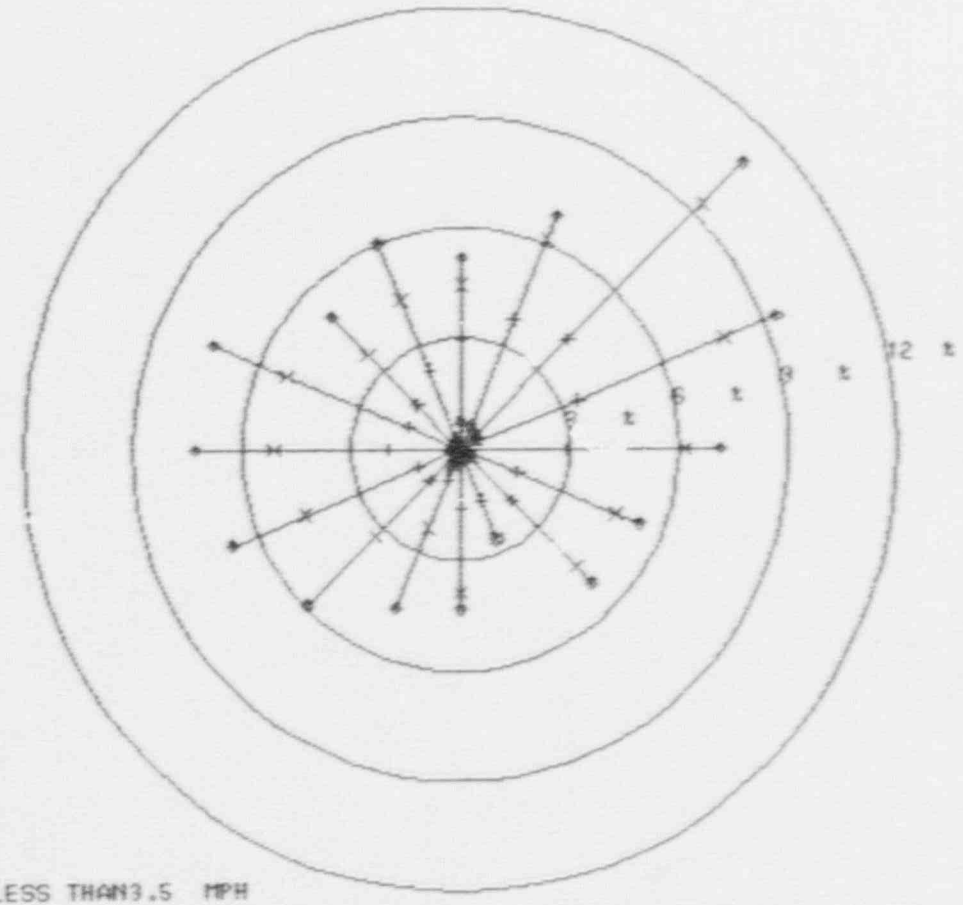


WIND ROSE
(WINDS FROM)
N

*WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
◆WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

ATTACHMENT 2B-3. 60m WIND ROSE
OCTOBER 1, 1990 THROUGH DECEMBER 31, 1990



WIND ROSE
(WINDS FROM)
N

*WIND SPEED LESS THAN3.5 MPH
+WIND SPEED LESS THAN7.5 MPH
×WIND SPEED LESS THAN12.5 MPH
•WIND SPEED GREATER THAN 12.5 MPH

0.0 PERCENT CALMS

ENCLOSURE B

ATTACHMENT 3A. JOINT FREQUENCY TABLE OF WIND SPEED AND DIRECTION 10m VS DELTA TEMPERATURE 60-10m JULY 1, 1990 THROUGH DECEMBER 31, 1990

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	6	5	0	0	0	11
NNE	0	5	4	0	0	0	9
NE	0	2	8	0	0	0	10
ENE	1	16	12	2	0	0	31
E	0	15	11	0	0	0	26
ESE	0	17	5	0	0	0	22
SE	0	6	6	2	0	0	14
SSE	0	6	5	0	0	0	11
S	1	8	2	0	0	0	11
SSW	0	2	13	0	0	0	15
SW	1	7	5	0	0	0	13
WSW	0	10	8	0	0	0	18
W	2	10	22	0	0	0	34
WNW	0	7	11	0	0	0	18
NW	0	5	3	0	0	0	8
NNW	1	5	5	0	0	0	11
TOTAL	6	127	125	4	0	0	262

PERIODS OF CALM(HOURS): 41
VARIABLE DIRECTION 38
HOURS OF MISSING DATA: 132

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	3	1	0	0	0	5
NNE	1	6	2	0	0	0	9
NE	5	8	9	1	0	0	23
ENE	2	6	10	0	0	0	18
E	2	7	8	0	0	0	17
ESE	2	8	1	0	0	0	11
SE	3	5	3	0	0	0	11
SSE	0	10	0	0	0	0	10
S	2	10	2	0	0	0	14
SSW	2	9	3	0	0	0	14
SW	5	5	1	0	0	0	11
WSW	1	6	0	0	0	0	7
W	1	5	7	0	0	0	13
WNW	0	8	4	0	0	0	12
NW	1	9	3	1	0	0	14
NNW	1	12	2	0	0	0	15
TOTAL	29	117	56	2	0	0	204

PERIODS OF CALM(HOURS): 41
VARIABLE DIRECTION 61
HOURS OF MISSING DATA: 132

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DTS0M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	11	1	0	0	0	14
NNE	1	13	1	0	0	0	15
NE	3	13	8	0	0	0	24
ENE	2	12	10	0	0	0	24
E	1	26	2	0	0	0	29
ESE	2	9	2	0	0	0	13
SE	1	9	3	0	0	0	13
SSE	6	1	2	0	0	0	9
S	1	10	7	0	0	0	18
SSW	2	12	3	0	0	0	17
SW	0	7	5	0	0	0	12
WSW	3	8	2	0	0	0	13
W	0	21	5	0	0	0	26
WNW	1	8	5	1	0	0	15
NW	0	13	3	1	0	0	17
NNW	4	8	3	0	0	0	15
TOTAL	29	181	62	2	0	0	274

PERIODS OF CALM(HOURS): 41
VARIABLE DIRECTION 96
HOURS OF MISSING DATA: 132

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	23	35	8	1	0	0	67
NNE	8	41	18	0	0	0	67
NE	15	71	50	0	0	0	136
ENE	12	64	26	1	0	0	103
E	12	47	14	0	0	0	73
ESE	11	35	9	0	0	0	55
SE	5	25	15	0	0	0	45
SSE	6	29	6	0	0	0	41
S	13	45	11	0	0	0	69
SSW	13	21	25	9	0	0	68
SW	11	44	6	0	0	0	61
WSW	3	25	7	0	0	0	35
W	12	32	15	0	0	0	59
WNW	10	44	11	0	0	0	65
NW	6	29	10	1	0	0	46
NNW	11	53	17	8	0	0	89
TOTAL	171	640	248	20	0	0	1079

PERIODS OF CALM(HOURS): 41
VARIABLE DIRECTION 299
HOURS OF MISSING DATA: 132

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	27	25	3	2	0	0	57
NNE	18	33	10	0	0	0	61
NE	25	60	14	1	0	0	100
ENE	24	48	14	2	0	0	88
E	34	41	2	3	0	0	80
ESE	24	48	2	0	1	0	75
SE	24	59	5	0	0	0	88
SSE	27	46	2	0	0	0	75
S	48	77	6	0	0	0	131
SSW	33	47	18	1	0	0	99
SW	30	34	8	0	0	0	72
WSW	24	32	1	0	0	0	57
W	27	46	5	0	1	0	79
WNW	27	49	7	0	0	0	83
NW	17	20	3	0	0	0	40
NNW	21	39	7	2	0	0	69
TOTAL	430	704	107	11	2	0	1254

PERIODS OF CALM(HOURS): 41
VARIABLE DIRECTION 274
HOURS OF MISSING DATA: 132

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90070101-90123124

STABILITY CLASS: F DT/DZ

ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	13	12	1	0	0	0	26
NNE	12	8	4	0	0	0	24
NE	19	31	2	0	0	0	52
ENE	31	41	2	0	0	0	74
E	17	19	0	0	0	0	36
ESE	22	16	1	0	0	0	39
SE	31	10	0	0	0	0	41
SSE	27	5	0	0	0	0	32
S	23	12	0	0	0	0	35
SSW	22	21	0	0	0	0	43
SW	24	19	1	0	0	0	44
WSW	22	18	0	0	0	0	40
W	35	17	1	0	0	0	53
WNW	18	12	0	0	0	0	30
NW	25	13	0	0	0	0	38
NNW	22	29	4	0	0	0	55
TOTAL	363	283	16	0	0	0	662

PERIODS OF CALM(HOURS): 41

VARIABLE DIRECTION 167

HOURS OF MISSING DATA: 132

ATTACHMENT 3A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	27	0	0	0	0	0	27
NNE	19	2	1	0	0	0	22
NE	22	9	0	0	0	0	31
ENE	16	17	1	0	0	0	34
E	21	4	0	0	0	0	25
ESE	17	5	0	0	0	0	22
SE	16	2	0	0	0	0	18
SSE	13	1	0	0	0	0	14
S	14	5	0	0	0	0	19
SSW	22	20	0	0	0	0	42
SW	40	34	0	0	0	0	74
WSW	32	22	0	0	0	0	54
W	30	7	1	0	0	0	38
WNW	18	1	0	0	0	0	19
NW	19	6	0	0	0	0	25
NNW	51	31	3	0	0	0	85
TOTAL	377	166	6	0	0	0	549

PERIODS OF CALM(HOURS): 41
VARIABLE DIRECTION 158
HOURS OF MISSING DATA: 132

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	93	92	19	3	0	0	207
NNE	59	108	40	0	0	0	207
NE	89	194	91	2	0	0	376
ENE	88	204	75	5	0	0	372
E	87	159	37	3	0	0	286
ESE	78	138	20	0	1	0	237
SE	80	116	32	2	0	0	230
SSE	79	98	15	0	0	0	192
S	102	167	28	0	0	0	297
SSW	94	132	62	10	0	0	298
SW	111	150	26	3	0	0	287
WSW	85	121	18	0	0	0	224
W	107	138	56	0	1	0	302
WNW	74	129	38	1	0	0	242
NW	68	95	22	3	0	0	188
NNW	111	177	41	10	0	0	339
TOTAL	1405	2218	620	39	2	0	4284

PERIODS OF CALM(HOURS): 41
VARIABLE DIRECTION 1093
HOURS OF MISSING DATA: 132

ATTACHMENT 3B. JOINT FREQUENCY TABLE OF WIND SPEED
AND DIRECTION 10M VS DELTA TEMPERATURE 60-10m
JULY 1, 1990 THROUGH SEPTEMBER 30, 1990

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	6	5	0	0	0	11
NNE	0	4	4	0	0	0	8
NE	0	2	6	0	0	0	8
ENE	1	16	11	2	0	0	30
E	0	14	11	0	0	0	25
ESE	0	17	4	0	0	0	21
SE	0	4	6	2	0	0	12
SSE	0	6	5	0	0	0	11
S	1	8	2	0	0	0	11
SSW	0	2	12	0	0	0	14
SW	1	7	5	0	0	0	13
WSW	0	10	8	0	0	0	18
W	2	10	22	0	0	0	34
WNW	0	7	10	0	0	0	17
NW	0	5	3	0	0	0	8
NNW	1	5	4	0	0	0	10
TOTAL	6	123	118	4	0	0	251

PERIODS OF CALM(HOURS): 10
VARIABLE DIRECTION 37
HOURS OF MISSING DATA: 102

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	3	1	0	0	0	5
NNE	0	4	2	0	0	0	6
NE	5	8	3	0	0	0	16
ENE	2	3	6	0	0	0	11
E	0	4	5	0	0	0	9
ESE	1	5	0	0	0	0	6
SE	2	4	1	0	0	0	7
SSE	0	10	0	0	0	0	10
S	1	10	2	0	0	0	13
SSW	2	9	2	0	0	0	13
SW	4	4	0	0	0	0	8
WSW	1	4	0	0	0	0	5
W	1	2	2	0	0	0	5
WNW	0	4	1	0	0	0	5
NW	0	7	2	0	0	0	9
NNW	0	10	1	0	0	0	11
TOTAL	20	91	28	0	0	0	139

PERIODS OF CALM(HOURS): 10
VARIABLE DIRECTION 49
HOURS OF MISSING DATA: 102

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	6	1	0	0	0	9
NNE	1	8	1	0	0	0	10
NE	3	4	3	0	0	0	10
ENE	1	3	9	0	0	0	13
E	1	13	1	0	0	0	15
ESE	2	5	1	0	0	0	8
SE	0	6	2	0	0	0	8
SSE	6	1	2	0	0	0	9
S	0	9	3	0	0	0	12
SSW	2	9	1	0	0	0	12
SW	0	4	1	0	0	0	5
WSW	1	4	0	0	0	0	5
W	0	8	0	0	0	0	8
WNW	0	4	2	0	0	0	6
NW	0	8	2	0	0	0	10
NNW	1	4	1	0	0	0	6
TOTAL	20	96	30	0	0	0	146

PERIODS OF CALM(HOURS): 10
VARIABLE DIRECTION 61
HOURS OF MISSING DATA: 102

ATTACHMENT 3B (continued)

HOURS AT EACH [illegible] SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-[illegible]93024
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8	13	2	0	0	0	23
NNE	3	10	8	0	0	0	21
NE	4	18	13	0	0	0	35
ENE	4	28	10	0	0	0	42
E	2	19	7	0	0	0	28
ESE	5	23	4	0	0	0	32
SE	3	12	10	0	0	0	25
SSE	4	23	5	0	0	0	32
S	10	35	6	0	0	0	51
SSW	10	13	7	0	0	0	30
SW	4	31	1	0	0	0	36
WSW	2	7	1	0	0	0	10
W	6	8	1	0	0	0	15
WNW	4	11	1	0	0	0	16
NW	4	11	2	0	0	0	17
NNW	3	23	3	0	0	0	29
TOTAL	76	285	81	0	0	0	442

PERIODS OF CALM(HOURS): 10
VARIABLE DIRECTION 128
HOURS OF MISSING DATA: 102

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	15	11	1	0	0	0	27
NNE	8	15	1	0	0	0	24
NE	15	22	0	0	0	0	37
ENE	17	29	5	0	0	0	51
E	23	23	1	0	0	0	47
ESE	16	20	1	0	0	0	37
SE	19	25	1	0	0	0	45
SSE	22	30	2	0	0	0	54
S	38	48	1	0	0	0	87
SSW	26	30	6	0	0	0	62
SW	16	23	2	0	0	0	41
WSW	11	10	0	0	0	0	21
W	11	25	1	0	1	0	38
WNW	8	18	2	0	0	0	28
NW	5	8	1	0	0	0	14
NNW	14	20	3	0	0	0	37
TOTAL	264	357	28	0	1	0	650

PERIODS OF CALM(HOURS): 10
VARIABLE DIRECTION 160
HOURS OF MISSING DATA: 102

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	4	1	0	0	0	10
NNE	6	4	2	0	0	0	12
NE	8	19	1	0	0	0	28
ENE	11	25	2	0	0	0	38
E	8	13	0	0	0	0	21
ESE	18	8	1	0	0	0	27
SE	25	4	0	0	0	0	29
SSE	22	5	0	0	0	0	27
S	20	8	0	0	0	0	28
SSW	17	13	0	0	0	0	30
SW	14	9	1	0	0	0	24
WSW	10	7	0	0	0	0	17
W	16	8	1	0	0	0	25
WNW	11	3	0	0	0	0	14
NW	13	5	0	0	0	0	18
NNW	8	14	0	0	0	0	22
TOTAL	212	149	9	0	0	0	370

PERIODS OF CALM(HOURS): 10
VARIABLE DIRECTION 95
HOURS OF MISSING DATA: 102

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	0	0	0	0	0	6
NNE	1	0	0	0	0	0	1
NE	5	1	0	0	0	0	6
ENE	2	1	0	0	0	0	3
E	2	2	0	0	0	0	4
ESE	5	0	0	0	0	0	5
SE	6	1	0	0	0	0	7
SSE	5	0	0	0	0	0	5
S	4	1	0	0	0	0	5
SSW	4	8	0	0	0	0	12
SW	4	5	0	0	0	0	9
WSW	10	4	0	0	0	0	14
W	8	0	1	0	0	0	9
WNW	7	0	0	0	0	0	7
NW	3	2	0	0	0	0	5
NNW	8	2	0	0	0	0	10
TOTAL	80	27	1	0	0	0	108

PERIODS OF CALM(HOURS): 10
VARIABLE DIRECTION 39
HOURS OF MISSING DATA: 102

ATTACHMENT 3B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	37	43	11	0	0	0	91
NNE	19	45	18	0	0	0	82
NE	40	74	26	0	0	0	140
ENE	38	105	43	2	0	0	188
E	36	88	25	0	0	0	149
ESE	47	78	11	0	0	0	136
SE	55	56	20	2	0	0	133
SSE	59	75	14	0	0	0	148
S	74	119	14	0	0	0	207
SSW	61	84	28	0	0	0	173
SW	43	83	10	0	0	0	136
WSW	35	46	9	0	0	0	90
W	44	61	28	0	1	0	134
WNW	30	47	16	0	0	0	93
NW	25	46	10	0	0	0	81
NNW	35	78	12	0	0	0	125
TOTAL	678	1128	295	4	1	0	2106

PERIODS OF CALM(HOURS): 10
VARIABLE DIRECTION 569
HOURS OF MISSING DATA: 102

ATTACHMENT 3C. JOINT FREQUENCY TABLES OF WIND SPEED
AND DIRECTION OF 10m VS DELTA TEMPERATURE 60-10m
OCTOBER 1, 1990 THROUGH DECEMBER 31, 1990

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	1	0	0	0	0	1
NE	0	0	2	0	0	0	2
ENE	0	0	1	0	0	0	1
E	0	1	0	0	0	0	1
ESE	0	0	1	0	0	0	1
SE	0	2	0	0	0	0	2
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	1	0	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	1	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	1	0	0	0	1
TOTAL	0	4	7	0	0	0	11

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION 1
HOURS OF MISSING DATA: 30

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	1	2	0	0	0	0	3
NE	0	0	6	1	0	0	7
ENE	0	3	4	0	0	0	7
E	2	3	3	0	0	0	8
ESE	1	3	1	0	0	0	5
SE	1	1	2	0	0	0	4
SSE	0	0	0	0	0	0	0
S	1	0	0	0	0	0	1
SSW	0	0	1	0	0	0	1
SW	1	1	1	0	0	0	3
WSW	0	2	0	0	0	0	2
W	0	3	5	0	0	0	8
WNW	0	4	3	0	0	0	7
NW	1	2	1	1	0	0	5
NNW	1	2	1	0	0	0	4
TOTAL	9	26	28	2	0	0	65

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION 12
HOURS OF MISSING DATA: 30

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	5	0	0	0	0	5
NNE	0	5	0	0	0	0	5
NE	0	9	5	0	0	0	14
ENE	1	9	1	0	0	0	11
E	0	13	1	0	0	0	14
ESE	0	4	1	0	0	0	5
SE	1	3	1	0	0	0	5
SSE	0	0	0	0	0	0	0
S	1	1	4	0	0	0	6
SSW	0	3	2	0	0	0	5
SW	0	3	4	0	0	0	7
WSW	2	4	2	0	0	0	8
W	0	13	5	0	0	0	18
WNW	1	4	3	1	0	0	9
NW	0	5	1	1	0	0	7
NNW	3	4	2	0	0	0	9
TOTAL	9	85	32	2	0	0	128

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION 35
HOURS OF MISSING DATA: 30

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	15	22	6	1	0	0	44
NNE	5	31	10	0	0	0	46
NE	11	53	37	0	0	0	101
ENE	8	36	16	1	0	0	61
E	10	28	7	0	0	0	45
ESE	6	12	5	0	0	0	23
SE	2	13	5	0	0	0	20
SSE	2	6	1	0	0	0	9
S	3	10	5	0	0	0	18
SSW	3	8	18	9	0	0	38
SW	7	13	5	0	0	0	25
WSW	1	18	6	0	0	0	25
W	6	24	14	0	0	0	44
WNW	6	33	10	0	0	0	49
NW	2	18	8	1	0	0	29
NNW	8	30	14	8	0	0	60
TOTAL	95	355	167	20	0	0	637

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION 171
HOURS OF MISSING DATA: 30

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	14	2	2	0	0	30
NNE	10	18	9	0	0	0	37
NE	10	38	14	1	0	0	63
ENE	7	19	9	2	0	0	37
E	11	18	1	3	0	0	33
ESE	8	28	1	0	1	0	38
SE	5	34	4	0	0	0	43
SSE	5	16	0	0	0	0	21
S	10	29	5	0	0	0	44
SSW	7	17	12	1	0	0	37
SW	14	11	6	0	0	0	31
WSW	13	22	1	0	0	0	36
W	16	21	4	0	0	0	41
WNW	19	31	5	0	0	0	55
NW	12	12	2	0	0	0	26
NNW	7	19	4	2	0	0	32
TOTAL	166	347	79	11	1	0	604

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION 114
HOURS OF MISSING DATA: 30

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8	8	0	0	0	0	16
NNE	6	4	2	0	0	0	12
NE	11	12	1	0	0	0	24
ENE	20	16	0	0	0	0	36
E	9	6	0	0	0	0	15
ESE	4	8	0	0	0	0	12
SE	6	6	0	0	0	0	12
SSE	5	0	0	0	0	0	5
S	3	4	0	0	0	0	7
SSW	5	8	0	0	0	0	13
SW	10	10	0	0	0	0	20
WSW	12	11	0	0	0	0	23
W	19	9	0	0	0	0	28
WNW	7	9	0	0	0	0	16
NW	12	8	0	0	0	0	20
NNW	14	15	4	0	0	0	33
TOTAL	151	134	7	0	0	0	292

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION 72
HOURS OF MISSING DATA: 30

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	21	0	0	0	0	0	21
NNE	18	2	1	0	0	0	21
NE	17	8	0	0	0	0	25
ENE	14	16	1	0	0	0	31
E	19	2	0	0	0	0	21
ESE	12	5	0	0	0	0	17
SE	10	1	0	0	0	0	11
SSE	8	1	0	0	0	0	9
S	10	4	0	0	0	0	14
SSW	18	12	0	0	0	0	30
SW	36	29	0	0	0	0	65
WSW	22	18	0	0	0	0	40
W	22	7	0	0	0	0	29
WNW	11	1	0	0	0	0	12
NW	16	4	0	0	0	0	20
NNW	43	29	3	0	0	0	75
TOTAL	297	139	5	0	0	0	441

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION 119
HOURS OF MISSING DATA: 30

ATTACHMENT 3C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	56	49	8	3	0	0	116
NNE	40	63	22	0	0	0	125
NE	49	120	65	2	0	0	236
ENE	50	99	32	3	0	0	184
E	51	71	12	3	0	0	137
ESE	31	60	9	0	1	0	101
SE	25	60	12	0	0	0	97
SSE	20	23	1	0	0	0	44
S	28	48	14	0	0	0	90
SSW	33	48	34	10	0	0	125
SW	68	67	16	0	0	0	151
WSW	50	75	9	0	0	0	134
W	63	77	28	0	0	0	168
WNW	44	82	22	1	0	0	149
NW	43	49	12	3	0	0	107
NNW	76	99	29	10	0	0	214
TOTAL	727	1090	325	35	1	0	2178

PERIODS OF CALM(HOURS): 31
VARIABLE DIRECTION 524
HOURS OF MISSING DATA: 30

ATTACHMENT 4A. JOINT FREQUENCY TABLES OF WIND SPEED
AND DIRECTION 60m VS DELTA TEMPERATURE 60-10m
JULY 1, 1990 THROUGH DECEMBER 31, 1990

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	7	2	0	0	0	10
NNE	0	2	3	0	0	0	5
NE	0	8	9	1	0	0	18
ENE	0	10	18	2	0	0	30
E	1	6	19	0	0	0	26
ESE	0	14	4	0	0	0	18
SE	0	6	6	3	0	0	15
SSE	0	7	2	1	0	0	10
S	0	3	6	2	0	0	11
SSW	1	5	5	3	0	0	14
SW	1	6	3	4	0	0	14
WSW	2	7	12	5	1	0	27
W	1	5	12	17	1	0	36
WNW	0	3	4	2	2	0	11
NW	1	1	2	1	0	0	5
NNW	0	7	5	2	0	0	14
TOTAL	8	97	112	43	4	0	264

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 24
HOURS OF MISSING DATA: 271

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	6	2	0	0	0	11
NNE	1	7	2	0	0	0	10
NE	2	4	12	1	0	0	19
ENE	2	4	14	0	0	0	20
E	2	3	6	2	0	0	13
ESE	2	3	2	0	0	0	7
SE	2	10	2	0	0	0	14
SSE	0	9	6	1	0	0	16
S	0	6	4	0	0	0	10
SSW	3	2	1	2	0	0	8
SW	1	4	1	0	0	0	6
WSW	3	5	4	3	0	0	15
W	1	6	6	2	0	0	15
WNW	0	5	8	1	2	0	16
NW	1	3	1	2	0	0	7
NNW	1	4	7	1	0	0	13
TOTAL	24	81	78	15	2	0	200

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 51
HOURS OF MISSING DATA: 271

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	14	2	0	0	0	18
NNE	2	6	3	0	0	0	11
NE	1	12	11	0	0	0	24
ENE	0	14	16	1	0	0	31
E	1	13	4	0	0	0	18
ESE	1	7	4	1	0	0	13
SE	1	6	5	1	0	0	13
SSE	0	10	3	0	0	0	13
S	1	4	6	1	0	0	12
SSW	3	4	3	3	0	0	13
SW	1	5	8	2	0	0	16
WSW	2	5	9	1	0	0	17
W	0	9	11	5	0	0	25
WNW	0	9	4	4	1	0	18
NW	1	6	3	1	1	0	12
NNW	3	9	2	1	0	0	15
TOTAL	19	133	94	21	2	0	269

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 56
HOURS OF MISSING DATA: 271

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	41	17	2	1	0	73
NNE	6	29	27	2	0	0	64
NE	7	51	50	14	0	0	122
ENE	7	42	42	8	0	0	99
E	3	37	19	8	0	0	67
ESE	5	16	20	3	0	0	44
SE	10	13	18	8	0	0	49
SSE	3	26	18	2	0	0	49
S	7	33	33	4	0	0	77
SSW	2	19	13	16	7	0	57
SW	5	13	13	4	0	0	35
WSW	5	20	25	10	1	0	61
W	1	18	16	11	4	0	50
WNW	2	17	26	9	5	0	59
NW	6	22	13	6	2	1	50
NNW	5	40	20	17	0	1	83
TOTAL	86	437	379	124	20	2	1039

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 148
HOURS OF MISSING DATA: 271

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	12	11	4	2	0	34
NNE	8	42	19	6	0	0	75
NE	8	26	46	15	1	0	96
ENE	5	30	37	12	2	0	86
E	1	24	34	4	2	1	66
ESE	2	19	43	7	0	1	72
SE	4	15	59	16	0	0	94
SSE	8	44	50	2	0	0	104
S	4	51	65	7	1	0	128
SSW	2	12	47	20	2	0	83
SW	2	10	25	16	0	0	53
WSW	2	8	33	15	0	0	58
W	7	14	27	17	1	0	66
WNW	3	7	29	30	2	0	71
NW	3	13	23	13	1	0	53
NNW	3	20	23	11	2	1	60
TOTAL	67	347	571	195	16	3	1199

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 66
HOURS OF MISSING DATA: 271

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4	7	6	6	0	0	23
NNE	1	6	9	9	0	0	25
NE	2	14	18	5	0	0	39
ENE	4	19	35	12	0	0	70
E	3	15	35	10	0	0	63
ESE	3	7	24	7	0	0	41
SE	1	12	21	1	0	0	35
SSE	4	14	14	0	0	0	32
S	4	15	9	5	0	0	33
SSW	2	14	24	8	0	0	48
SW	0	8	26	10	0	0	44
WSW	3	8	24	10	0	0	45
W	2	6	17	9	1	0	35
WNW	1	6	20	7	0	0	34
NW	1	5	17	11	0	0	34
NNW	1	9	14	10	0	0	34
TOTAL	36	165	313	120	1	0	635

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 15
HOURS OF MISSING DATA: 271

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	2	9	3	0	0	16
NNE	3	17	9	1	0	0	30
NE	3	10	11	1	0	0	25
ENE	6	8	26	9	0	0	49
E	1	7	28	8	0	0	44
ESE	6	12	16	3	0	0	37
SE	2	14	18	2	0	0	36
SSE	7	8	3	0	0	0	18
S	6	7	3	4	0	0	20
SSW	5	5	7	12	0	0	29
SW	4	7	28	35	0	0	74
WSW	1	4	21	20	0	0	46
W	2	10	14	12	0	0	38
WNW	1	6	13	5	0	0	25
NW	2	7	16	4	0	0	29
NNW	1	7	12	3	0	0	23
TOTAL	52	131	234	122	0	0	539

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 13
HOURS OF MISSING DATA: 271

ATTACHMENT 4A (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	29	89	49	15	3	0	185
NNE	21	109	72	18	0	0	220
NE	23	125	157	37	1	0	343
ENE	24	127	188	44	2	0	385
E	12	105	145	32	2	1	297
ESE	19	78	113	21	0	1	232
SE	20	76	129	31	0	0	256
SSE	22	118	96	6	0	0	242
S	22	119	126	23	1	0	291
SSW	18	61	100	64	9	0	252
SW	14	53	104	71	0	0	242
WSW	18	57	128	64	2	0	269
W	14	68	103	73	7	0	265
WNW	7	53	104	58	12	0	234
NW	15	57	75	38	4	1	190
NNW	14	96	83	45	2	2	242
TOTAL	292	1391	1772	640	45	5	4145

PERIODS OF CALM(HOURS): 2
VARIABLE DIRECTION 373
HOURS OF MISSING DATA: 271

ATTACHMENT 4B. JOINT FREQUENCY TABLES OF WIND SPEED AND DIRECTION 60m VS DELTA TEMPERATURE 60-10m
JULY 1, 1990 THROUGH SEPTEMBER 30, 1990

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	7	2	0	0	0	10
NNE	0	1	3	0	0	0	4
NE	0	8	8	0	0	0	16
ENE	0	9	16	2	0	0	27
E	1	6	19	0	0	0	26
ESE	0	14	2	0	0	0	16
SE	0	6	6	3	0	0	15
SSE	0	7	2	1	0	0	10
S	0	3	6	2	0	0	11
SSW	1	5	5	2	0	0	13
SW	1	6	3	4	0	0	14
WSW	2	7	12	5	1	0	27
W	1	5	12	17	1	0	36
WNW	0	3	3	2	2	0	10
NW	1	1	2	1	0	0	5
NNW	0	7	5	1	0	0	13
TOTAL	8	95	106	40	4	0	253

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 23
HOURS OF MISSING DATA: 241

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: B JT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	6	2	0	0	0	9
NNE	0	6	1	0	0	0	7
NE	2	4	6	0	0	0	12
ENE	1	3	7	0	0	0	11
E	1	1	3	1	0	0	6
ESE	2	1	1	0	0	0	4
SE	1	9	0	0	0	0	10
SSE	0	8	6	1	0	0	15
S	0	6	4	0	0	0	10
SSW	2	2	1	1	0	0	6
SW	1	3	0	0	0	0	4
WSW	2	5	2	1	0	0	10
W	1	6	1	0	0	0	8
WNW	0	4	4	0	0	0	8
NW	0	2	1	1	0	0	4
NNW	1	2	7	0	0	0	10
TOTAL	15	68	46	5	0	0	134

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 39
HOURS OF MISSING DATA: 241

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	9	2	0	0	0	11
NNE	2	4	2	0	0	0	8
NE	1	5	4	0	0		10
ENE	0	5	9	1	0	1	15
E	1	5	0	0	0	0	6
ESE	0	4	3	0	0	0	7
SE	1	5	4	1	0	0	11
SSE	0	9	3	0	0	0	12
S	1	4	3	1	0	0	9
SSW	2	4	1	1	0	0	8
SW	0	4	2	0	0	0	6
WSW	1	4	3	0	0	0	8
W	0	6	5	1	0	0	12
WNW	0	4	1	0	0	0	5
NW	1	3	1	1	0	0	6
NNW	2	4	1	0	0	0	7
TOTAL	12	79	44	6	0	0	141

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 42
HOURS OF MISSING DATA: 241

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	13	5	1	0	0	25
NNE	0	10	6	0	0	0	16
NE	1	13	8	1	0	0	23
ENE	4	12	17	1	0	0	34
E	2	11	7	5	0	0	25
ESE	4	10	10	1	0	0	25
SE	5	5	8	7	0	0	25
SSE	3	22	15	1	0	0	41
S	5	26	25	2	0	0	58
SSW	0	15	6	2	0	0	23
SW	3	5	7	1	0	0	16
WSW	4	11	8	1	0	0	24
W	0	4	0	2	0	0	6
WNW	0	4	6	2	0	0	12
NW	4	9	4	0	0	0	17
NNW	2	19	9	3	0	0	33
TOTAL	43	189	141	30	0	0	403

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 70
HOURS OF MISSING DATA: 241

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	4	3	1	0	0	11
NNE	4	18	7	1	0	0	30
NE	4	12	14	2	0	0	32
ENE	4	17	19	2	0	0	42
E	0	12	21	1	0	0	34
ESE	2	12	19	3	0	0	36
SE	3	7	37	6	0	0	53
SSE	5	35	33	2	0	0	75
S	2	40	31	3	0	0	76
SSW	0	11	33	9	0	0	53
SW	1	8	21	5	0	0	35
WSW	0	2	14	6	0	0	22
W	4	4	7	9	1	0	25
WNW	2	3	5	11	1	0	22
NW	1	5	10	2	0	0	18
NNW	2	11	12	6	0	0	31
TOTAL	37	201	286	69	2	0	595

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 35
HOURS OF MISSING DATA: 241

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	3	2	3	0	0	9
NNE	0	3	0	1	0	0	4
NE	1	5	2	1	0	0	9
ENE	3	14	21	6	0	0	44
E	3	10	20	6	0	0	39
ESE	3	4	10	2	0	0	19
SE	0	7	16	0	0	0	23
SSE	4	10	12	0	0	0	26
S	3	13	7	4	0	0	27
SSW	2	13	19	4	0	0	38
SW	0	6	18	3	0	0	27
WSW	3	6	11	5	0	0	25
W	1	4	6	2	0	0	13
WNW	1	4	5	3	0	0	13
NW	1	3	7	4	0	0	15
NNW	0	6	4	2	0	0	12
TOTAL	26	111	160	46	0	0	343

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 9
HOURS OF MISSING DATA: 241

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SP060M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1	0	0	0	1
NNE	0	0	1	0	0	0	1
NE	1	0	1	0	0	0	2
ENE	2	1	4	0	0	0	7
E	0	0	5	0	0	0	5
ESE	2	2	4	1	0	0	9
SE	1	3	3	0	0	0	7
SSE	4	1	0	0	0	0	5
S	2	0	1	2	0	0	5
SSW	0	3	4	3	0	0	10
SW	2	1	7	1	0	0	11
WSW	0	1	4	0	0	0	5
W	1	3	3	0	0	0	7
WNW	0	1	1	1	0	0	3
NW	2	2	8	3	0	0	15
NNW	0	3	1	1	0	0	5
TOTAL	17	21	48	12	0	0	98

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 5
HOURS OF MISSING DATA: 241

ATTACHMENT 4B (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90070101-90093024
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	12	42	17	5	0	0	76
NNE	6	42	20	2	0	0	70
NE	10	47	43	4	0	0	104
ENE	14	61	93	12	0	0	180
E	8	45	75	13	0	0	141
ESE	13	47	49	7	0	0	116
SE	11	42	74	17	0	0	144
SSE	16	92	71	5	0	0	184
S	13	92	77	14	0	0	196
SSW	7	53	69	22	0	0	151
SW	8	33	58	14	0	0	113
WSW	12	36	54	18	1	0	121
W	8	32	34	31	2	0	107
WNW	3	23	25	19	3	0	73
NW	10	25	33	12	0	0	80
NNW	7	52	39	13	0	0	111
TOTAL	158	764	831	208	6	0	1967

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 223
HOURS OF MISSING DATA: 241

ATTACHMENT 4C. JOINT FREQUENCY TABLES OF WIND SPEED
AND DIRECTION 60m VS DELTA TEMPERATURE 60-10m
OCTOBER 1, 1990 THROUGH DECEMBER 31, 1990

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: A DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	1	0	0	0	0	1
NE	0	0	1	1	0	0	2
ENE	0	1	2	0	0	0	3
E	0	0	0	0	0	0	0
ESE	0	0	2	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	1	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	1	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	1	0	0	1
TOTAL	0	2	6	3	0	0	11

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 1
HOURS OF MISSING DATA: 30

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: B DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

	WIND SPEED(MPH)						
WIND DIRECTION	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	0	0	0	0	0	2
NNE	1	1	1	0	0	0	3
NE	0	0	6	1	0	0	7
ENE	1	1	7	0	0	0	9
E	1	2	3	1	0	0	7
ESE	0	2	1	0	0	0	3
SE	1	1	2	0	0	0	4
SSE	0	1	0	0	0	0	1
S	0	0	0	0	0	0	0
SSW	1	0	0	1	0	0	2
SW	0	1	1	0	0	0	2
WSW	1	0	2	2	0	0	5
W	0	0	5	2	0	0	7
WNW	0	1	4	1	2	0	8
NW	1	1	0	1	0	0	3
NNW	0	2	0	1	0	0	3
TOTAL	9	13	32	10	2	0	66

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 12
HOURS OF MISSING DATA: 30

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIPECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: C DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	5	0	0	0	0	7
NNE	0	2	1	0	0	0	3
NE	0	7	7	0	0	0	14
ENE	0	9	7	0	0	0	16
E	0	8	4	0	0	0	12
ESE	1	3	1	1	0	0	6
SE	0	1	1	0	0	0	2
SSE	0	1	0	0	0	0	1
S	0	0	3	0	0	0	3
SSW	1	0	2	2	0	0	5
SW	1	1	6	2	0	0	10
WSW	1	1	6	1	0	0	9
W	0	3	6	4	0	0	13
WNW	0	5	3	4	1	0	13
NW	0	3	2	0	1	0	6
NNW	1	5	1	1	0	0	8
TOTAL	7	54	50	15	2	0	128

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 14
HOURS OF MISSING DATA: 30

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: D DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6	28	12	1	1	0	48
NNE	6	19	21	2	0	0	48
NE	6	38	42	13	0	0	99
ENE	3	30	25	7	0	0	65
E	1	26	12	3	0	0	42
ESE	1	6	10	2	0	0	19
SE	5	8	10	1	0	0	24
SSE	0	4	3	1	0	0	8
S	2	7	8	2	0	0	19
SSW	2	4	7	14	7	0	34
SW	2	8	6	3	0	0	19
WSW	1	9	17	9	1	0	37
W	1	14	16	9	4	0	44
WNW	2	13	20	7	5	0	47
NW	2	13	9	6	2	1	33
NNW	3	21	11	14	0	1	50
TOTAL	43	248	229	94	20	2	636

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 78
HOURS OF MISSING DATA: 30

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: E DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	8	8	3	2	0	23
NNE	4	24	12	5	0	0	45
NE	4	14	32	13	1	0	64
ENE	1	13	18	10	2	0	44
E	1	12	13	3	2	1	32
ESE	0	7	24	4	0	1	36
SE	1	8	22	10	0	0	41
SSE	3	9	17	0	0	0	29
S	2	11	34	4	1	0	52
SSW	2	1	14	11	2	0	30
SW	1	2	4	11	0	0	18
WSW	2	6	19	9	0	0	36
W	3	10	20	8	0	0	41
WNW	1	4	24	19	1	0	49
NW	2	8	13	11	1	0	35
NNW	1	9	11	5	2	1	29
TOTAL	30	146	285	126	14	3	604

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 31
HOURS OF MISSING DATA: 30

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: F DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3	4	4	3	0	0	14
NNE	1	3	9	8	0	0	21
NE	1	9	16	4	0	0	30
ENE	1	5	14	6	0	0	26
E	0	5	15	4	0	0	24
ESE	0	3	14	5	0	0	22
SE	1	5	5	1	0	0	12
SSE	0	4	2	0	0	0	6
S	1	2	2	1	0	0	6
SSW	0	1	5	4	0	0	10
SW	0	2	8	7	0	0	17
WSW	0	2	13	5	0	0	20
W	1	2	11	7	1	0	22
WNW	0	2	15	4	0	0	21
NW	0	2	10	7	0	0	19
NNW	1	3	10	8	0	0	22
TOTAL	10	54	153	74	1	0	292

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 6
HOURS OF MISSING DATA: 30

ATTACHMENT 4C (continued)

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: G DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	2	8	3	0	0	15
NNE	3	17	8	1	0	0	29
NE	2	10	10	1	0	0	23
ENE	4	7	22	9	0	0	42
E	1	7	23	8	0	0	39
ESE	4	10	12	2	0	0	28
SE	1	11	15	2	0	0	29
SSE	3	7	3	0	0	0	13
S	4	7	2	2	0	0	15
SSW	5	2	3	9	0	0	19
SW	2	6	21	34	0	0	63
WSW	1	3	17	20	0	0	41
W	1	7	11	12	0	0	31
WNW	1	5	12	4	0	0	22
NW	0	5	8	1	0	0	14
NNW	1	4	11	2	0	0	18
TOTAL	35	110	186	110	0	0	441

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 8
HOURS OF MISSING DATA: 30

HOURS AT EACH WIND SPEED AND DIRECTION
PERIOD OF RECORD = 90100101-90123124
STABILITY CLASS: ALL DT/DZ
ELEVATION: SPEED:SPD60M DIRECTION:DIR60M LAPSE:DT60M

WIND DIRECTION	WIND SPEED(MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	17	47	32	10	3	0	109
NNE	15	67	52	16	0	0	150
NE	13	78	114	33	1	0	239
ENE	10	66	95	32	2	0	205
E	4	60	70	19	2	1	156
ESE	6	31	64	14	0	1	116
SE	9	34	55	14	0	0	112
SSE	6	26	25	1	0	0	58
S	9	27	49	9	1	0	95
SSW	11	8	31	42	9	0	101
SW	6	20	46	57	0	0	129
WSW	6	21	74	46	1	0	148
W	6	36	69	42	5	0	158
WNW	4	30	79	39	9	0	161
NW	5	32	42	26	4	1	110
NNW	7	44	44	32	2	2	131
TOTAL	134	627	941	432	39	5	2178

PERIODS OF CALM(HOURS): 1
VARIABLE DIRECTION 150
HOURS OF MISSING DATA: 30

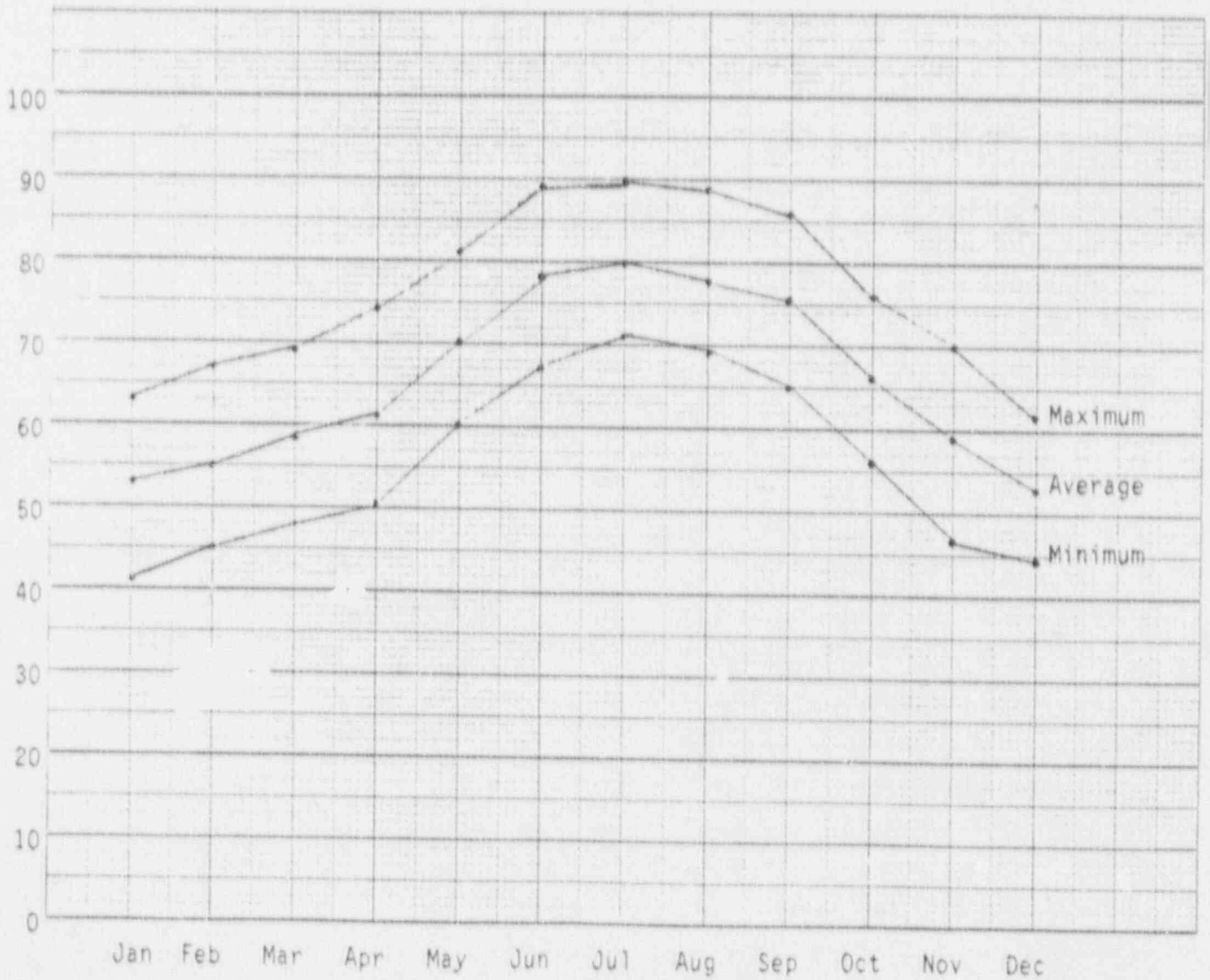
ENCLOSURE B

ATTACHMENT 5. PLANT VOGTLE RAINFALL
JANUARY 1, 1990 THROUGH DECEMBER 31, 1990

Month	Precipitation (Inches)	Month	Precipitation (Inches)
January		April	
1	0.06	6	0.01
6	0.49	7	0.14
7	1.19	10	0.24
8	0.09	11	0.02
	1.83	14	0.04
		28	0.60
		30	0.02
			1.07
February			
4	0.19		
10	0.15	May	
16	1.01		
18	0.54	5	0.11
19	0.24	9	0.39
22	0.30	10	0.19
	2.43	17	0.06
		28	0.66
			1.41
March			
2	0.05	June	
9	0.28		
16	0.65	3	0.35
28	0.31	8	0.47
29	0.36	10	0.04
30	0.06	16	0.11
	1.71		0.97

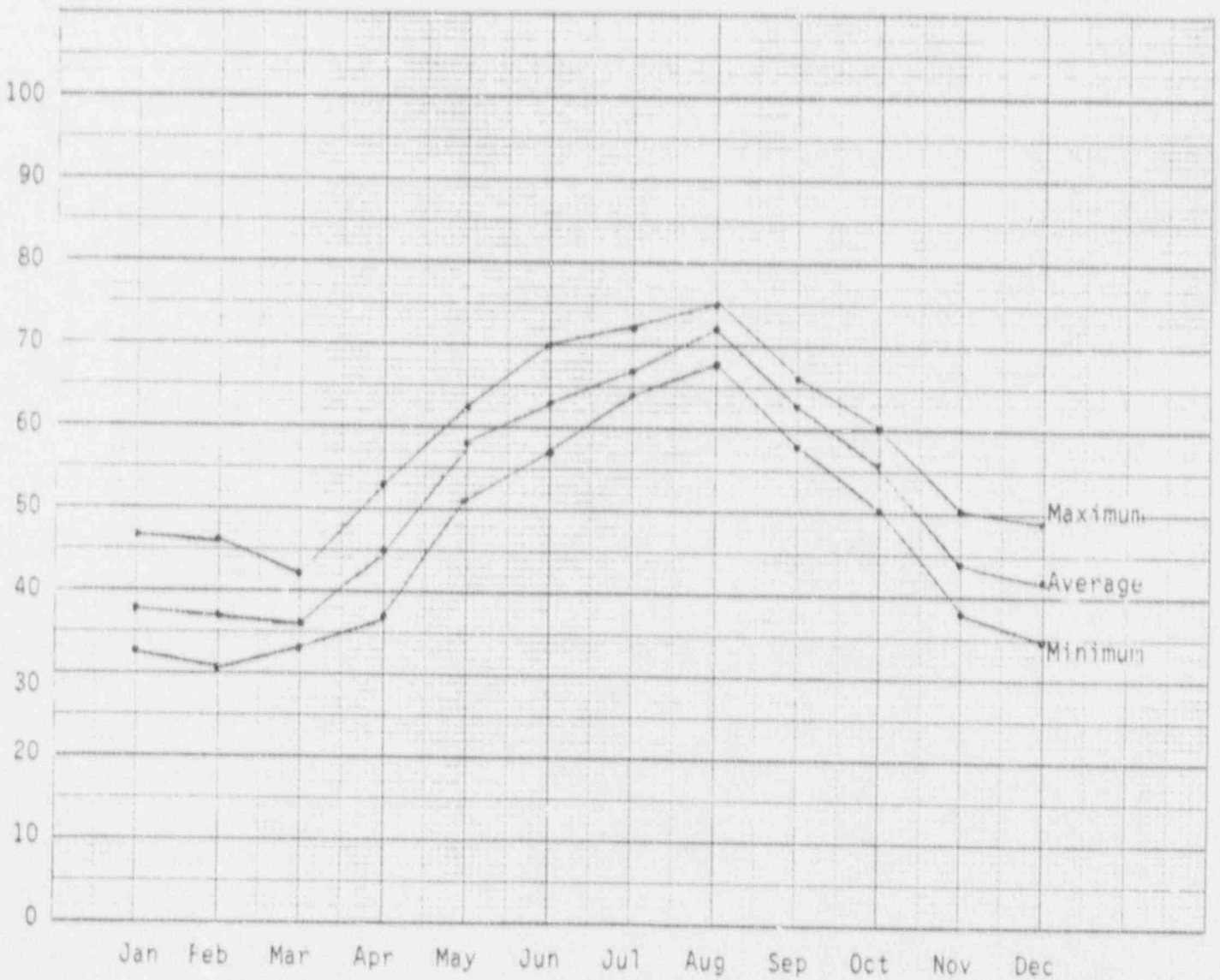
Month	Precipitation (Inches)	Month	Precipitation (Inches)
July		October	
13	0.87	4	0.29
14	0.10	7	0.02
18	0.35	10	3.40
19	0.03	11	1.38
22	0.26	12	2.99
23	0.03	13	0.28
24	1.50	18	0.10
25	1.20	22	0.66
	4.34	23	1.76
		24	0.58
		25	0.19
August		26	0.18
			11.83
2	0.21		
6	0.03		
7	0.11	November	
8	2.02		
10	0.04		0.00
15	0.15		
22	1.49		
23	0.41	December	
	4.46		
		7	0.20
		8	0.40
September		20	0.39
		21	0.12
14	0.26	24	0.04
22	0.04		1.15
30	0.10		
	0.40	TOTAL	31.60

ATTACHMENT 6A. PLANT VOGTLE
AVERAGE OF DAILY MAXIMUM, MINIMUM AND
AVERAGE VALUES OF AMBIENT TEMPERATURE
JANUARY 1, 1990 THROUGH DECEMBER 31, 1990



ENCLOSURE B

ATTACHMENT 6B. PLANT VOGTLE
AVERAGE OF DAILY MAXIMUM, MINIMUM AND
AVERAGE VALUES OF DEW POINT TEMPERATURE
JANUARY 1, 1990 THROUGH DECEMBER 31, 1990



ENCLOSURE B

ATTACHMENT 7. 1990 CLIMATOLOGICAL SUMMARY AND COMPARISON

The 1990 data collection on the Vogtle meteorological tower was quite good for the entire year. There were no extended outages, particularly of the pertinent parameters of wind speed and wind direction 10m and delta temperature 60-10m. The main problems were with the dew point temperature and the wind speed at 60m that were each out of service for more than one week during the year. The site data collection computer was operational more than 95% of the time during 1990. The main problem with the computer data collection was the auto-answer modem that occasionally would be found in a non-functional mode.

The table below summarizes the data collection over the last 4 years.

	1987	1988	1989	1990
Wind Speed 10m	99.6	98.4	98.2	98.7
Wind Speed 60m	95.4	95.8	98.1	97.8
Wind Direction 10m	99.4	99.0	98.2	99.2
Wind Direction 60m	99.1	99.0	98.5	99.4
Delta Temperature 60-10m	85.4	96.7	95.3	98.3
Temperature 10m	85.5	98.1	98.1	98.5
Dew Point Temperature 10m	82.5	78.8	95.2	94.0
Rainfall	99.8	99.5	97.7	98.3
Composite				
WS, WD10m DT60-10m	84.9	95.8	94.9	97.4
WS, WD60m DT60-10m	81.6	93.2	93.8	96.3

The wind roses between the 10m and 60m levels agree very well between levels and with previous years. Over the course of 1990, the peak wind directions were from the southwest with secondary peaks from the west and northeast. This is consistent with the wind data over previous years. During the first half of the year, the predominant direction was the southwest with a shift to the northeast and east-northeast during the second half of the year.

The table below summarizes the joint frequency data of wind speed and direction 10m versus delta temperature 60-10m for the last three years.

Stability Category	1988	1989	1990
A	6.6	9.8	10.3
B	5.8	4.7	5.8
C	6.8	5.7	6.1
D	28.0	30.6	25.0
E	28.5	28.0	27.3
F	13.9	12.4	14.3
G	10.4	8.8	11.3

The 1990 data showed the continued trend towards more unstable and stable hours with less hours of neutral conditions. This does correspond to the low rainfall amounts discussed below because unstable and stable conditions usually occur with clear to partially cloudy sky conditions. The 1990 data does continue to show a normal breakdown by stability group considering the historical record from the site.

The temperatures in 1990 were warmer than normal as was the case in the eastern United States. The ambient temperature was higher in each month than it had been in recent years. The summer high temperatures averaged about 90°, which is close to the normal. The dew point temperature which is also reliant on the moisture available, averaged above normal for the year but not for each month.

The rainfall total for 1990 equaled 31.6 inches which was considerably lower than in 1989 but somewhat consistent with many of the years in the 1980s. The rainfall in the first half of the year (9.42 inches) was much below what is normally expected. The total of 22.18 inches for the second half of the year was about normal. The annual total of 31.60 inches is about 10 inches below the Vogtle site normal.