Public Service

Public Service
Company of Colorado
P.O. Box 840
Denver, CO 80201-0840

Fort St. Vrain Nuclear Station
16805 WCR 19-1/2, Platteville, Colorado 80651

March 24, 1994
Fort St. Vrain
Unit No. 1
P-94028

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

Docket No. 50-267

SUBJECT: ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

Gentlemen:

Attached please find the Annual Radioactive Effluent Release Report for the Fort St. Vrain Nuclear Station.

This report covers the period January 1, 1993, through December 31, 1993 and is submitted pursuant to Section 5.5.2 of the Fort St. Vrain Decommissioning Technical Specifications (DTS).

A copy of the Offsite Dose Calculation Manual (ODCM), Issue 4, is included as required.

Please contact Mr. M. H. Holmes at (303) 620-1701 if you have questions regarding this report.

Sincerely,

Don W. Warembourg
Decommissioning Program Director

DWW/TES:bj

Attachments

IE48
1/1

cc: w/attachments

Regional Administrator, Region IV

Dottie Sherman, ANI Library
American Nuclear Insurers
The Exchange, Suite 245
270 Farmington Avenue
Farmington, CT 06032

Mr. Robert Quillin, Director
Radiation Control Division
Colorado Department of Health
RCD-DO-B1
4300 Cherry Creek Drive South
Denver, CO 80222-1530

Mr. Milt Lammering, Chief
Regional Representative, Radiation Program
U.S. Environmental Protection Agency
Region VIII
999 18th Street, Suite 500
Denver, CO 80202-2405

Mr. Farrell D. Hobbs
Environmental Management
EG & G
Building 250, P.O. Box 464
Golden, CO 80402

Dr. James E. Johnson
Department of Radiological Health Sciences
MRB Building
Colorado State University
Fort Collins, CO 80523

Ms. Pat Nelson
Water Quality Control Division
Colorado Department of Health
Permits & Enforcement Section
WQCD-PD-B2
4300 Cherry Creek Drive South
Denver, Colorado 80222-1530

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

January - December

1993

Public Service Company of Colorado

Fort St. Vrain
Nuclear Station

March, 1994

1.0 SUMMARY

This report summarizes radiological effluent released from the Fort St. Vrain Nuclear Station for the period of January through December, 1993 consistent with 10 CFR 50.36a. This information is provided pursuant to the requirements of Sections 5.5.2 of the Fort St. Vrain Decommissioning Technical Specifications (DTS).

This report uses the reporting format recommended by Regulatory Guide 1.21 where appropriate.

The following tables with a supplemental information section are included with this report:

Table	Description
1A	Gaseous Effluents - Summation of All Releases
1C	Gaseous Effluents - Ground-Level Releases
2A	Liquid Effluents - Summation of All Releases
2B	Liquid Effluents - Batch and Continuous
3	Solid Waste and Irradiated Fuel Shipments
4A	Hourly Meteorological Data

Please note that Table 1B (of Regulatory Guide 1.21) has been omitted from this report because all of our gaseous effluents are assumed to be ground-level releases as opposed to being elevated releases.

The Fort St. Vrain Decommissioning Technical Specifications and Offsite Dose Calculation Manual (ODCM) requirements apply to the following radionuclides: H-3, Mn-54, Co-60, Zn-65, Cs-134, Cs-137, and Ce-144. This list does not mean that only these nuclides are considered. Other gamma emitting nuclides that are identifiable, together with the above nuclides, are analyzed and included in this report.

Sample activities that are less than the detection limits are listed as "none detected" and no value is entered into the calculations of the total activities. This results in the reporting of values which are representative of the total curies released.

The lower limit of detection (LLD), for the purposes of this report, is defined as the smallest concentration of radioactive material in a sample that will yield a net count above the system background, that will be detected with a 95% probability of being correct and only a 5% probability of falsely concluding that a blank observation represents a real signal. The LLD values specified in the ODCM are as follows:

Liquid	
Principal Gamma Emitters	5.00E-07 µCi/ml
Tritium	1.00E-05 µCi/ml
Gaseous	
Principal Gamma Emitters (Particulate)	1.00E-11 µCi/cc
Tritium (Gas)	1.00E-06 µCi/cc

All samples were analyzed to the LLD concentration limits for nuclides specifically listed in our ODCM, however, those which had values of less than LLD were marked as "none detected". The "none detected" values were not included in the total values for the pathway.

With respect to the total volume of water used for dilution of radioactive liquid effluent, all average diluted concentrations are based on the activity at the unrestricted area. Although this effluent could eventually reach one of two rivers (St. Vrain Creek and South Platte River) which converge approximately one and one-half miles downstream of the plant, no further dilutions were assumed. Additional discussion on river flow is contained in Section 4d of the Supplemental Information Section.

There were no abnormal or unplanned radioactive gaseous or liquid waste releases made during this reporting period.

Table 3 summarizes the radioactive solid waste shipments made during 1993. Since the table states "....for burial or disposal" we have identified only those shipments made to a burial site. The summary includes shipments performed by processors and agents in addition to those made directly by the station during 1993. Materials which were shipped to a processor for volume reduction in 1993 are not included in this report.

There have been 2 major design changes to the radioactive waste systems reviewed by the Decommissioning Safety Review Committee (DSRC) during the period covered by this report. In accordance with decommissioning procedure DPP 4.1.1, Design/Design Document Control, changes to components/systems addressed by the DTS or by the Off-site Dose Calculation Manual are considered upgraded design and hence must be performed by an Engineering Change Request (ECR).

1. The radioactive gaseous waste hold-up system (System 63) was not required to remain in service and decommissioning by removal or decontamination methods was initiated in March, 1993. PSC does not anticipate that there will be a need to make batch releases of radioactive gaseous effluent through the remainder of the decommissioning process. All radioactive gaseous waste currently generated as a result of decommissioning activities originates from the PCRV Shield Water System and is directed on a continuous basis to the existing Reactor Building ventilation exhaust HEPA filter system for subsequent release to the environs. This gaseous effluent stream is sampled weekly and analyzed for tritium and gamma isotopes.

2. ECR 93-03 authorized the tie-in of the Airborne Contamination Control System (ACCS) for the decommissioning rotary work platform to the Reactor Building ventilation exhaust system. The installation of the ACCS ducting and filters was performed by Westinghouse Team (WT) package 2.3.2.9A. This modification allowed either exhaust system train (F-7301 or F-7302) to take suction directly from the Reactor Building (existing) and/or the ACCS. See the attached ECR copy.

ECR 93-33 authorized the temporary installation of commercial grade HEPA filters in F-7301, F-7302, and F-7302S (following DOP testing) until the requirements of DTS 3.2 became applicable; these have since been replaced with nuclear grade HEPA filters. See the attached ECR copy.

Issue 4 of the Decommissioning Offsite Dose Calculation Manual (DPP-5.4.2 attached to this report), was reviewed by the Decommissioning Safety Review Committee (DSRC) on December 8, 1993 and became effective December 13, 1993. The ODCM was revised during the report period to provide site specific dose conversion factors for additional radionuclides beyond those covered in the initial issue, simplify the process for determining alarm setpoints prior to liquid effluent releases, delete requirements for the gaseous waste hold-up system which is no longer in use and provide clarification as appropriate. These revisions maintained the required levels of radioactive effluent control and did not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations.

The Decommissioning Process Control Program administrative procedure, FSV-RW-PCP-A-100, Process Control Program was reviewed by the DSRC and revised to add Section 5.6.2 which discusses shipment and disposal of resins and filter media containing a total activity of less than 1.0 microcurie per cubic centimeter for nuclides with half lives greater than 5 years. Section 5.6.3 was also added which describes the PCRV Shield Water System.

There were no liquid effluent activity monitors or their associated recorders inoperable for more than thirty days during this reporting period.

Radiation doses resulting from the release of radioactive liquid and gaseous effluents from Fort St. Vrain during this period are reported below. Radiation doses were calculated in accordance with the Fort St. Vrain Offsite Dose Calculation Manual which is based on NUREG-0472, "Radiological Effluent Technical Specifications for PWRs", NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants", and other inputs from the NRC.

Doses were calculated for a "maximum exposed" individual present at all times of the year at the Emergency Planning Zone (EPZ), which was reduced from 590 meters to a minimum of 100 meters upon implementation of the DTS, and in the sector in which all of the activity was calculated to have been released. The following are the 1993 doses:

Liquid - 10CFR50

Whole Body	9.80E-05	mrem
Maximum Exposed Organ	5.68E-03	mrem

Gaseous - 10CFR50

Noble Gas Gamma	0.00	mrem
Noble Gas Beta	0.00	mrem
Iodine, Particulates, Tritium		
Adult		
Whole Body	6.45E-02	mrem
Organ(maximum)	6.45E-02	mrem
Bone	0.00	mrem
Teen		
Whole Body	7.39E-02	mrem
Organ(maximum)	7.39E-02	mrem
Bone	0.00	mrem
Child		
Whole Body	1.05E-01	mrem
Organ(maximum)	1.05E-01	mrem
Bone	0.00	mrem

Infant		
Whole Body	8.25E-02	mrem
Organ(maximum)	8.25E-02	mrem
Bone	0.00	mrem

Gaseous - 10CFR20

Iodine, Particulates, Tritium 8.38E-02 mrem

All doses are within the limits of 10CFR20 and 10CFR50.

The doses demonstrate conformance with the exposure limit in 40CFR190 of 25 mrem to the total body, 75 mrem to the thyroid, and 25 mrem to any organ.

To show conformance with 40CFR190 subpart B, the total curies of krypton released from Fort St. Vrain was 0.00 Ci. The 29.78 keV iodine-129 peak is below the minimum detectable energy of our detectors. However, waste streams are regularly analyzed specifically for iodine-129 for compliance with 10CFR61. The results of these analyses have been less than the LLD. The reactor has been shutdown since August, 1989. Any iodine-131 which was produced by the fission process has undergone in excess of 100 half-lives decay. It is assumed the release of iodine-131 to the environment would be impossible, therefore, iodine-131 analysis has been discontinued in accordance with the decommissioning ODCM.

An annual land use census was performed as part of the Fort St. Vrain Radiological Environmental Monitoring Program. Changes made to environmental sampling locations as a result of the land use census are reported in the Annual Radiological Environmental Monitoring Program Report (Annual Radiological Environmental Operating Report).

Effluent and Waste Disposal Annual Report

Supplemental Information

Facility: Fort St. Vrain Nuclear Generating Station

Licensee: Public Service Company of Colorado

1. Regulatory Limits

All results of radioactivity analyses of gaseous and liquid effluent are used in accordance with the methodology and parameters listed in the Offsite Dose Calculation Manual (DPP-5.4.2) to assure that the concentrations at the point of release are maintained within the regulatory limits contained in the Offsite Dose Calculation Manual (ODCM). These limits ensure the quantity of radioactive effluent released from the plant is maintained as low as reasonably achievable, and in any event, within the limits of 10CFR20 and in accordance with 10CFR50.

The dose to a member of the public due to I-131, tritium, and radioactive particulates with half-lives longer than eight days in gaseous effluents will be limited to:

a) 7.5 millirems to any organ during any calendar quarter, and,

b) 15 millirems to any organ during any calendar year.

The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas is limited as follows:

a) During any calendar quarter to less than or equal to 1.5 millirems to the total body and to less than or equal to 5 millirems to any organ, and,

b) During any calendar year to less than or equal to 3 millirems to the total body and to less than or equal to 10 millirems to any organ.

2. Maximum Permissible Concentrations (MPC's)

All MPC's used in determining allowable release rates from the gas and liquid waste systems were those listed in Table II, Columns 1 and 2 respectively, of Appendix B to 10CFR20.

3. Average Energy

The average energy (E-Bar) of the radionuclide mixture in releases of fission and activation gases was not calculated or used at this facility.

4. Measurements and Approximations of Total Radioactivity

a) Fission and Activation Gases

A continuous release is being made from the PCRV via the ACCS and Reactor Building ventilation exhaust systems. This release methodology is acceptable because of the low activity level of gas within the PCRV.

Batch releases of radioactive gaseous waste were discontinued after March, 1993, when the gaseous waste hold up system was taken out of service.

All radioactive gases were released to the Reactor Building exhaust ventilation system which has a flow rate of approximately 20,000 cubic feet per minute. The full-flow of this exhaust was directed through high efficiency particulate filters (HEPA) prior to the release to the environment.

Downstream of the HEPA filters, the gas stream radioactivity was sampled and analyzed on a weekly basis.

b) Iodines

The reactor was shut down permanently in August, 1989 and the fuel removed completely in May of 1992 resulting in the elimination of the iodine source term. Therefore, iodine-131 analysis has been discontinued in accordance with the decommissioning ODCM.

c) Particulates

A 2-inch particulate filter was removed and analyzed each week. Gross beta analysis, as well as gamma spectral analyses, was performed to identify and quantify any radionuclides. The quantity of any radionuclides on this filter with half-lives greater than eight days was similarly correlated to total flow during the collection period.

d) Liquid Effluents

All liquid effluent discharged from the site reached the unrestricted area at the Goosequill Ditch. From that point, the effluent can be diverted to the St. Vrain Creek via the St. Vrain Slough or, more commonly, diverted to the Farm Pond which is approximately one mile north of the plant site. Outfall from the Farm Pond reaches the South Platte River. Both rivers converge approximately 1-1/2 miles from the plant site. The average stream flow reported in section 5a of this supplemental report is a summation of both rivers, and was received and tabulated from data provided by the Colorado Department of Natural Resources in Greeley, Colorado.

Liquid effluent was released from the site using a batch mode from the Reactor Building Sump and the radioactive liquid waste system. The Reactor Building Sump area can hold several hundred thousand gallons of waste water from various sources which could be contaminated. The liquid waste system consists of two 2000 gallon receivers, one 2000 gallon monitoring tank, and associated filters and demineralizers. This system was designed to collect and process contaminated waste water resulting from reactor and laboratory operations.

A sample of the tank or sump contents was taken and analyzed prior to each release. These analyses include gross beta, gross alpha, tritium, and gamma spectroscopy. The results of these analyses, and other analyses as dictated by the gross beta results, were used to determine the maximum release rate from the site. The liquid effluent was diluted with cooling tower blowdown which runs at or more than 1100 gallons per minute. The resulting mixture was sampled during the release period to confirm compliance with regulatory limits.

The liquid effluent from the batch release mode was monitored continuously by a gamma activity monitor.

All tank level indicating devices, flow monitoring and recording devices, and radiation monitoring equipment were calibrated and maintained at scheduled intervals in accordance with established procedures.

e) Overall Errors

The overall error associated with determining the total activity released from the site for both gaseous and liquid effluent is estimated to be 17.3 percent. This value is the square root of the sum of squares of counting statistics and associated calibration errors, sampling errors, and tank volume estimates, each considered to be plus or minus 10 percent.

5. Batch Releases (All of 1993)

a) Liquid

Number of Batch Releases	127
Total Time Period for Batch Releases	815.3 HOURS
Maximum Time Period for a Batch Release	20.65 HOURS
Average Time Period for a Batch Release	6.42 HOURS
Minimum Time Period for a Batch Release	3.53 HOURS
Average Stream Flow During Periods of Release of Effluent into a Flowing Stream	3.15E+05 GPM*

* Gallons Per Minute

b) Gaseous

Number of Batch Releases	2
Total Time Period for Batch Releases	4.55 HOURS
Maximum Time Period for a Batch Release	2.37 HOURS
Average Time Period for a Batch Release	2.28 HOURS
Minimum Time Period for a Batch Release	2.18 HOURS

6. Abnormal Releases (All of 1992)

a) Liquid

Number of Releases		-0-
Total Activity Released	Ci	-0-

b) Gaseous

Number of Releases		-0-
Total Activity Released	Ci	-0-

TABLE 1A

EFFLUENT AND WASTE DISPOSAL

GASEOUS EFFLUENT - SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Estimated Total Error %
A. Fission and activation gases				
1. None detected				
B. Iodine				
1. None Detected				
C. Particulates				
1. Particulates with half-lives >8 days	Ci	1.33E-06	0.00E+00	1.73E+01
2. Average release rate for period	μCi/sec	2.20E-06	0.00E+00	
3. Percent of Technical Specification Limit	%	<1.00	0.00	
4. Gross alpha radioactivity		0.00E+00	0.00E+00	
D. Tritium				
1. Total Release	Ci	6.10E-01	2.82E-01	1.73E+01
2. Average release rate for period	μCi/sec	7.70E-02	3.57E-02	
3. Percent of Technical Specification Limit	%	1.77E-04	8.18E-05	

TABLE 1A

EFFLUENT AND WASTE DISPOSAL

GASEOUS EFFLUENT - SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Estimated Total Error %
A. Fission and activation gases				
1. None detected.				
B. Iodine				
1. None detected.				
C. Particulates				
1. Particulates with half-lives >8 days	Ci	3.85E-06	9.28E-07	1.73E+01
2. Average Release Rate for Period	μCi/sec	2.71E-07	1.18E-07	
3. Percent of Technical Specification Limit	%	<1.0	<1.0	
4. Gross Alpha Radioactivity	Ci	0.00	0.00	
D. Tritium				
1. Total Release	Ci	1.17E-01	1.65E-01	1.73E+01
2. Average release rate for period	μCi/sec	1.46E-02	2.08E-02	
3. Percent of Technical Specification Limit	%	1.00E-04	1.43E-04	

TABLE 1C

EFFLUENT AND WASTE DISPOSAL

GASEOUS EFFLUENTS -- GROUND-LEVEL RELEASE

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Qtr 1	Qtr 2	Qtr 1	Qtr 2
1. Fission Gases					
a. None Detected					
2. Iodines					
a. None Detected					
3. Particulates					
Cobalt-60	Ci	1.33E-06	ND*	ND*	N/A**

* None Detected

** Batch release system no longer required; removed from service and decommissioned.

TABLE 1C

EFFLUENT AND WASTE DISPOSAL

GASEOUS EFFLUENTS -- GROUND-LEVEL RELEASE

CONTINUOUS MODE

Nuclides Released	Unit	Quarter 3	Quarter 4
1. Fission Gases			
a. None Detected			
2. Iodines			
a. None Detected			
3. Particulates			
Cobalt-60	Ci	3.44E-06	2.84E-07
Cesium-137	Ci	4.11E-07	1.29E-06

TABLE 2A

EFFLUENT AND WASTE DISPOSAL

LIQUID EFFLUENT - SUMMATION OF ALL RELEASES

	Units	Qtr 1	Qtr 2	Est. Total Error %
A. Fission and Activation Products				
1. Total Release	Ci	7.03E-06	4.07E-03	1.73E+01
2. Average diluted concentration	µCi/ml	1.55E-11	1.25E-09	
3. % of Applicable Limit	%	1.72E-06	1.39E-04	
B. Tritium				
1. Total Release	Ci	3.08E-03	2.79E-02	1.73E+01
2. Average diluted concentration	µCi/ml	2.81E-05	5.13E-05	
3. % of Applicable Limit	%	9.37E-03	1.71E-02	
C. Gross Alpha Radioactivity				
1. None Detected				
D. Volume of Waste Released				
prior to dilution	Liters	2.07E+05	4.66E+05	1.00E+01
E. Volume of Dilution Water Used During Release				
	Liters	4.40E+07	7.53E+07	1.00E+01

TABLE 2A

EFFLUENT AND WASTE DISPOSAL

LIQUID EFFLUENT - SUMMATION OF ALL RELEASES

	Units	Qtr 3	Qtr 4	Est. Total Error %
A. Fission and Activation Products				
1. Total Release	Ci	1.10E-02	2.06E-03	1.73E+01
2. Average diluted concentration	µCi/ml	5.15E-08	1.22E-08	
3. % of Applicable Limit	%	5.73E-03	1.36E-03	
B. Tritium				
1. Total Release	Ci	1.24E-01	9.41E-02	1.73E+01
2. Average diluted concentration	µCi/ml	3.70E-07	4.44E-07	
3. % of Applicable Limit	%	1.23E-04	1.49E-04	
C. Gross Alpha Radioactivity				
a. None Detected				
D. Volume of Waste Released				
prior to dilution	Liters	1.42E+08	1.12E+08	1.00E+01
E. Volume of Dilution Water Used During Release				
	Liters	5.05E+07	3.93E+07	1.00E+01

TABLE 2B
EFFLUENT AND WASTE DISPOSAL
LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
manganese-54	Ci	*	*	ND**	2.56E-06
cobalt-60	Ci			6.40E-06	3.03E-04
barium-133	Ci			ND	1.27E-06
cesium-134	Ci			ND	3.81E-04
cesium-137	Ci			6.34E-07	3.29E-03
europium-152	Ci			ND	6.20E-05
europium-154	Ci			ND	1.99E-05
europium-155	Ci			ND	8.08E-06
tritium	Ci			3.08E-03	2.79E-02
Total for period (above)	Ci			3.09E-03	3.20E-02

* Continuous liquid effluent discharges were not made during this reporting period.

** None Detected

TABLE 2B
EFFLUENT AND WASTE DISPOSAL
LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
manganese-54	Ci	*	*	3.11E-05	3.17E-06
cobalt-60	Ci			1.50E-03	5.83E-04
barium-133	Ci			1.02E-05	4.60E-06
cesium-134	Ci			8.24E-04	9.68E-05
cesium-137	Ci			7.98E-03	1.03E-03
europium-152	Ci			2.95E-04	1.51E-04
europium-154	Ci			2.34E-04	1.17E-04
europium-155	Ci			1.48E-04	7.13E-05
tritium	Ci			1.24E-01	9.41E-02
Total for perio[2] (above)	Ci			1.35E-01	9.62E-02

* Continuous liquid effluent discharges were not made during this reporting period.

TABLE 3

EFFLUENT AND WASTE DISPOSAL (1993)

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

1. Type of waste	Unit	Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	5.07 E+00 4.39 E+00	1.00 E+01
b. Dry compressible waste, contaminated equip, etc.	m^3 Ci	3.11 E+01 2.44 E-01	1.00 E+01
c. Irradiated components, control rods, etc.	m^3 Ci	3.98 E+02 2.63 E+04	1.00 E+01
d. Other (describe): Irradiated concrete	m^3 Ci	6.63 E+02 6.58 E+01	1.00 E+01

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

a. Fe-55	1.1%	4.61 E-02
Sr-90	8.9%	3.89 E-01
Cs-134	7.9%	3.45 E-01
Cs-137	82.1%	3.60 E+00
b. Fe-55	85.80%	2.09 E-01
Co-60	7.70%	1.88 E-02
H-3	5.60%	1.37 E-02
c. Fe-55	40.36%	1.06 E+04
Co-60	35.50%	9.34 E+03
Ni-63	4.70%	1.23 E+03
H-3	10.50%	2.77 E+03
Eu-152	5.1%	1.35 E+03
Eu-154	3.5%	9.21 E+02
d. H-3	67.9%	4.47 E+01
Fe-55	25.1%	1.65 E+01
Co-60	1.0%	6.61 E-01
Eu-152	5.4%	3.58 E+00

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
120	Public Highway	US Ecology, Inc. Richland, WA

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None		

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	14.75	21.50	18.75	9.75	1.75	0.25	66.75
NNE	17.00	23.25	18.00	17.00	6.25	0.00	81.50
NE	16.50	29.50	15.50	7.75	0.25	0.00	69.50
ENE	14.00	52.75	17.50	2.50	0.00	0.00	86.75
E	18.00	56.50	15.50	4.50	0.00	0.00	94.50
ESE	19.50	30.75	10.75	1.50	1.25	0.25	64.00
SE	17.75	16.00	9.25	0.75	3.75	0.00	47.50
SSE	27.00	21.25	3.50	0.50	0.75	0.00	53.00
S	25.25	17.50	0.75	0.00	1.75	0.00	45.25
SSW	18.25	18.00	1.75	0.25	0.00	0.00	38.25
SW	15.50	17.50	1.75	0.00	0.25	0.25	35.25
WSW	11.25	15.00	1.00	0.00	0.00	0.25	27.50
W	7.25	6.75	1.75	1.25	0.75	0.25	18.00
WNW	7.25	3.25	1.00	3.75	3.00	1.75	20.00
NW	10.25	11.25	3.75	5.00	1.75	0.25	32.25
NNW	17.25	17.75	4.50	3.00	0.75	0.00	43.25
TOTAL	256.75	358.50	125.00	57.50	22.25	3.25	823.25

TIME DURATION OF CALMS = 0.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 823.75 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.00	1.25	0.00	0.00	0.00	0.00	4.25
NNE	0.50	1.50	0.75	0.25	0.00	0.00	3.00
NE	1.00	4.25	1.75	0.50	0.25	0.00	7.75
ENE	2.00	3.50	0.50	0.00	0.00	0.00	6.00
E	2.00	2.25	0.75	0.00	0.00	0.00	5.00
ESE	1.50	0.75	0.25	0.00	0.00	0.00	2.50
SE	1.75	0.25	0.00	0.00	0.00	0.00	2.00
SSE	1.25	1.00	0.00	0.00	0.00	0.00	2.25
S	2.50	1.50	0.00	0.00	0.00	0.00	4.00
SSW	3.25	3.50	0.00	0.00	0.00	0.00	6.75
SW	3.50	7.75	0.00	0.00	0.00	0.00	11.25
WSW	3.25	7.25	0.00	0.00	0.00	0.00	10.50
W	0.75	0.75	0.00	0.00	0.25	0.00	1.75
WNW	1.25	1.25	0.00	0.25	0.00	0.00	2.75
NW	4.50	3.00	0.25	0.00	0.00	0.00	7.75
NNW	2.50	2.00	0.00	0.00	0.00	0.00	4.50
TOTAL	34.50	41.75	4.25	1.00	0.50	0.00	82.00

TIME DURATION OF CALMS = 0.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 82.50 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.25	0.50	0.00	0.00	0.00	0.00	1.75
NNE	1.25	0.75	1.00	0.25	0.00	0.00	3.25
NE	0.25	1.25	0.25	0.00	0.00	0.00	1.75
ENE	1.25	1.75	0.25	0.00	0.00	0.00	3.25
E	0.00	1.25	0.25	0.00	0.00	0.00	1.50
ESE	0.50	1.00	0.00	0.00	0.00	0.00	1.50
SE	0.00	0.50	0.25	0.00	0.00	0.00	0.75
SSE	0.75	0.00	0.00	0.00	0.00	0.00	0.75
S	1.00	0.75	0.25	0.00	0.00	0.00	2.00
SSW	4.75	1.25	0.00	0.00	0.00	0.00	6.00
SW	3.00	6.00	0.25	0.00	0.00	0.00	9.25
WSW	3.50	7.75	0.00	0.00	0.00	0.00	11.25
W	0.25	0.75	0.00	0.00	0.00	0.00	1.00
WNW	1.00	1.25	0.00	0.00	0.00	0.00	2.25
NW	0.75	0.50	0.00	0.25	0.00	0.00	1.50
NNW	0.50	1.25	0.00	0.25	0.00	0.00	2.00
TOTAL	20.00	26.50	2.50	0.75	0.00	0.00	49.75

TIME DURATION OF CALMS = 0.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 50.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.75	4.00	1.25	0.75	0.00	0.00	9.75
NNE	1.25	4.50	1.00	2.50	0.00	0.00	9.25
NE	2.75	6.25	2.00	0.25	0.00	0.00	11.25
ENE	4.25	7.25	6.00	0.00	0.00	0.00	17.50
E	3.75	4.75	1.25	0.00	0.00	0.00	9.75
ESE	2.75	3.25	0.25	0.00	0.00	0.00	6.25
SE	0.75	2.50	0.50	0.00	0.00	0.00	3.75
SSE	1.75	1.25	0.75	0.00	0.00	0.00	3.75
S	2.75	1.00	0.25	0.00	0.00	0.00	4.00
SSW	3.25	3.25	0.25	0.00	0.00	0.00	6.75
SW	4.25	6.75	0.50	0.00	0.00	0.00	11.50
WSW	2.50	4.50	0.25	0.25	0.00	0.00	7.50
W	1.25	0.75	0.50	0.00	0.00	0.00	2.50
WNW	1.25	0.25	0.25	1.00	0.75	0.00	3.50
NW	0.50	2.00	1.25	0.25	0.00	0.00	4.00
NNW	0.50	3.00	2.25	0.50	0.00	0.00	6.25
TOTAL	37.25	55.25	18.50	5.50	0.75	0.00	117.25

TIME DURATION OF CALMS = 0.75 HRS.

TOTAL HOURS IN STABILITY CLASS = 118.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7.75	9.00	5.50	4.50	0.25	0.25	27.25
NNE	10.00	11.00	8.75	5.00	2.00	0.00	36.75
NE	10.00	12.25	5.00	0.00	0.00	0.00	27.25
ENE	11.00	24.00	6.25	1.25	0.00	0.00	42.50
E	9.50	19.00	3.25	0.00	0.00	0.00	31.75
ESE	8.00	8.00	3.00	0.00	0.00	0.00	19.00
SE	7.75	8.25	5.00	0.75	0.00	0.00	21.75
SSE	7.25	6.50	2.75	0.50	0.00	0.00	17.00
S	5.25	5.25	1.50	0.00	0.00	0.00	12.00
SSW	10.00	6.25	0.50	0.00	0.00	0.00	16.75
SW	5.25	8.25	0.25	0.00	0.00	0.00	13.75
WSW	4.75	6.75	0.75	0.50	0.00	0.00	12.75
W	2.75	2.25	0.50	0.25	0.25	0.00	6.00
WNW	5.00	2.00	0.50	2.25	0.50	0.00	10.25
NW	5.25	3.75	0.50	1.25	0.25	0.00	11.00
NNW	4.00	3.50	4.25	1.00	0.00	0.25	13.00
TOTAL	113.50	136.00	48.25	17.25	3.25	0.50	318.75

TIME DURATION OF CALMS = 3.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 322.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8.50	9.50	0.75	0.75	0.00	0.00	19.50
NNE	11.75	9.00	1.25	0.75	0.00	0.00	22.75
NE	10.00	10.50	1.00	0.25	0.00	0.00	21.75
ENE	12.75	13.25	0.75	0.00	0.00	0.00	26.75
E	3.75	6.50	1.00	0.00	0.00	0.00	11.25
ESE	3.50	3.25	2.00	0.00	0.00	0.00	8.75
SE	3.50	3.00	2.00	0.00	0.00	0.00	8.50
SSE	3.00	5.50	2.00	0.00	0.00	0.00	10.50
S	7.25	7.50	1.75	0.75	0.00	0.00	17.25
SSW	7.25	8.00	0.00	0.00	0.00	0.00	15.25
SW	6.75	12.00	1.50	0.00	0.00	0.00	20.25
WSW	9.50	5.75	2.50	1.00	0.25	0.00	19.00
W	3.25	1.50	0.00	0.00	0.25	0.00	5.00
WNW	5.50	1.75	0.25	1.00	1.50	0.25	10.25
NW	3.50	2.25	0.75	1.00	0.50	0.00	8.00
NNW	6.75	5.00	2.50	0.25	0.00	0.25	14.75
TOTAL	106.50	104.25	20.00	5.75	2.50	0.50	239.50

TIME DURATION OF CALMS = 1.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 241.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	18.50	11.50	0.50	0.00	0.00	0.00	30.50
NNE	18.25	13.25	1.00	0.00	0.25	0.00	32.75
NE	18.00	16.50	1.00	0.00	0.00	0.00	35.50
ENE	21.25	14.50	0.50	0.00	0.00	0.00	36.25
E	12.50	1.75	0.75	0.00	0.00	0.00	15.00
ESE	7.75	4.50	0.00	0.00	0.00	0.00	12.25
SE	8.25	5.50	1.50	0.00	0.00	0.00	15.25
SSE	9.75	5.25	1.25	0.50	0.00	0.00	16.75
S	12.75	12.00	1.75	0.00	0.00	0.00	26.50
SSW	18.75	14.50	0.25	0.00	0.00	0.00	33.50
SW	20.75	34.00	1.25	0.00	0.00	0.00	56.00
WSW	17.00	28.75	6.00	0.25	0.00	0.00	52.00
W	10.50	7.25	1.50	0.00	0.00	0.00	19.25
WNW	11.50	5.75	1.00	0.00	0.00	0.00	18.25
NW	11.50	8.00	1.00	0.50	0.00	0.00	21.00
NNW	16.00	7.00	0.50	0.50	0.00	0.00	24.00
TOTAL	233.00	190.00	19.75	1.75	0.25	0.00	444.75

TIME DURATION OF CALMS = 2.75 HRS.

TOTAL HOURS IN STABILITY CLASS = 447.50 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

ALL STABILITY CLASSES

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	57.50	57.25	26.75	15.75	2.00	0.50	159.75
NNE	60.00	63.25	31.75	25.75	8.50	0.00	189.25
NE	58.50	80.50	26.50	8.75	0.50	0.00	174.75
ENE	66.50	117.00	31.75	3.75	0.00	0.00	219.00
E	49.50	92.00	22.75	4.50	0.00	0.00	168.75
ESE	43.50	51.50	16.25	1.50	1.25	0.25	114.25
SE	39.75	36.00	18.50	1.50	3.75	0.00	99.50
SSE	50.75	40.75	10.25	1.50	0.75	0.00	104.00
S	56.75	45.50	6.25	0.75	1.75	0.00	111.00
SSW	65.50	54.75	2.75	0.25	0.00	0.00	123.25
SW	59.00	92.25	5.50	0.00	0.25	0.25	157.25
WSW	51.75	75.75	10.50	2.00	0.25	0.25	140.50
W	26.00	20.00	4.25	1.50	1.50	0.25	53.50
WNW	32.75	15.50	3.00	8.25	5.75	2.00	67.25
NW	36.25	30.75	7.50	8.25	2.50	0.25	85.50
NNW	47.50	39.50	14.00	5.50	0.75	0.50	107.75
TOTAL	801.50	912.25	238.25	89.50	29.50	4.25	2075.25

TIME DURATION OF CALMS = 9.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 2084.75 HRS.

MISSING DATA (HRS) = 75.25

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.791E-02	2.610E-02	2.276E-02	1.184E-02	2.124E-03	3.035E-04	8.103E-02
NNE	2.064E-02	2.822E-02	2.185E-02	2.064E-02	7.587E-03	0.000E+00	9.894E-02
NE	2.003E-02	3.581E-02	1.882E-02	9.408E-03	3.035E-04	0.000E+00	8.437E-02
ENE	1.700E-02	6.404E-02	2.124E-02	3.035E-03	0.000E+00	0.000E+00	1.053E-01
E	2.185E-02	6.859E-02	1.882E-02	5.463E-03	0.000E+00	0.000E+00	1.147E-01
ESE	2.367E-02	3.733E-02	1.305E-02	1.821E-03	1.517E-03	3.035E-04	7.769E-02
SE	2.155E-02	1.942E-02	1.123E-02	9.105E-04	4.552E-03	0.000E+00	5.766E-02
SSE	3.278E-02	2.580E-02	4.249E-03	6.070E-04	9.105E-04	0.000E+00	6.434E-02
S	1.065E-02	2.124E-02	9.105E-04	0.000E+00	2.124E-03	0.000E+00	5.493E-02
SSW	2.215E-02	2.185E-02	2.124E-03	3.035E-04	0.000E+00	0.000E+00	4.643E-02
SW	1.882E-02	2.124E-02	2.124E-03	0.000E+00	3.035E-04	3.035E-04	4.279E-02
WSW	1.366E-02	1.821E-02	1.214E-03	0.000E+00	0.000E+00	3.035E-04	3.338E-02
W	8.801E-03	8.194E-03	2.124E-03	1.517E-03	9.105E-04	3.035E-04	2.185E-02
WNW	8.801E-03	3.945E-03	1.214E-03	4.552E-03	3.642E-03	2.124E-03	2.428E-02
NW	1.244E-02	1.366E-02	4.552E-03	6.070E-03	2.124E-03	3.035E-04	3.915E-02
NNW	2.094E-02	2.155E-02	5.463E-03	3.642E-03	9.105E-04	0.000E+00	5.250E-02
TOTAL	3.117E-01	4.352E-01	1.517E-01	6.980E-02	2.701E-02	3.945E-03	9.994E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.070E-04

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.636E-02	1.515E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.152E-02
NNE	6.061E-03	1.818E-02	9.091E-03	3.030E-03	0.000E+00	0.000E+00	3.636E-02
NE	1.212E-02	5.152E-02	2.121E-02	6.061E-03	3.030E-03	0.000E+00	9.394E-02
ENE	2.424E-02	4.242E-02	6.061E-03	0.000E+00	0.000E+00	0.000E+00	7.273E-02
E	2.424E-02	2.727E-02	9.091E-03	0.000E+00	0.000E+00	0.000E+00	6.061E-02
ESE	1.818E-02	9.091E-03	3.030E-03	0.000E+00	0.000E+00	0.000E+00	3.030E-02
SE	2.121E-02	3.030E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.424E-02
SSE	1.515E-02	1.212E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.727E-02
S	3.030E-02	1.818E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.848E-02
SSW	3.939E-02	4.242E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.182E-02
SW	4.242E-02	9.394E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.364E-01
WSW	3.939E-02	8.788E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.273E-01
W	9.091E-03	9.091E-03	0.000E+00	0.000E+00	3.030E-03	0.000E+00	2.121E-02
WNW	1.515E-02	1.515E-02	0.000E+00	3.030E-03	0.000E+00	0.000E+00	3.333E-02
NW	5.455E-02	3.636E-02	3.030E-03	0.000E+00	0.000E+00	0.000E+00	9.394E-02
NNW	3.030E-02	2.424E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.455E-02
TOTAL	4.182E-01	5.061E-01	5.152E-02	1.212E-02	6.061E-03	0.000E+00	9.939E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.061E-03

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.500E-02	1.000E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.500E-02
NNE	2.500E-02	1.500E-02	2.000E-02	5.000E-03	0.000E+00	0.000E+00	6.500E-02
NE	5.000E-03	2.500E-02	5.000E-03	0.000E+00	0.000E+00	0.000E+00	3.500E-02
ENE	2.500E-02	3.500E-02	5.000E-03	0.000E+00	0.000E+00	0.000E+00	6.500E-02
E	0.000E+00	2.500E-02	5.000E-03	0.000E+00	0.000E+00	0.000E+00	3.000E-02
ESE	1.000E-02	2.000E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.000E-02
SE	0.000E+00	1.000E-02	5.000E-03	0.000E+00	0.000E+00	0.000E+00	1.500E-02
SSE	1.500E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.500E-02
S	2.000E-02	1.500E-02	5.000E-03	0.000E+00	0.000E+00	0.000E+00	4.000E-02
SSW	9.500E-02	2.500E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.200E-01
SW	6.000E-02	1.200E-01	5.000E-03	0.000E+00	0.000E+00	0.000E+00	1.850E-01
WSW	7.000E-02	1.550E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.250E-01
W	5.000E-03	1.500E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.000E-02
WNW	2.000E-02	2.500E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.500E-02
NW	1.500E-02	1.000E-02	0.000E+00	5.000E-03	0.000E+00	0.000E+00	3.000E-02
NNW	1.000E-02	2.500E-02	0.000E+00	5.000E-03	0.000E+00	0.000E+00	4.000E-02
TOTAL	4.000E-01	5.300E-01	5.000E-02	1.500E-02	0.000E+00	0.000E+00	9.950E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 5.000E-03

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.178E-02	3.390E-02	1.059E-02	6.356E-03	0.000E+00	0.000E+00	8.263E-02
NNE	1.059E-02	3.814E-02	8.475E-03	2.119E-02	0.000E+00	0.000E+00	7.839E-02
NE	2.331E-02	5.297E-02	1.695E-02	2.119E-03	0.000E+00	0.000E+00	9.534E-02
ENE	3.602E-02	6.144E-02	5.085E-02	0.000E+00	0.000E+00	0.000E+00	1.483E-01
E	3.178E-02	4.025E-02	1.059E-02	0.000E+00	0.000E+00	0.000E+00	8.263E-02
ESE	2.331E-02	2.754E-02	2.119E-03	0.000E+00	0.000E+00	0.000E+00	5.297E-02
SE	6.356E-03	2.119E-02	4.237E-03	0.000E+00	0.000E+00	0.000E+00	3.178E-02
SSE	1.483E-02	1.059E-02	6.356E-03	0.000E+00	0.000E+00	0.000E+00	3.178E-02
S	2.331E-02	8.475E-03	2.119E-03	0.000E+00	0.000E+00	0.000E+00	3.390E-02
SSW	2.754E-02	2.754E-02	2.119E-03	0.000E+00	0.000E+00	0.000E+00	5.720E-02
SW	3.602E-02	5.720E-02	4.237E-03	0.000E+00	0.000E+00	0.000E+00	9.746E-02
WSW	2.119E-02	3.814E-02	2.119E-03	2.119E-03	0.000E+00	0.000E+00	6.356E-02
W	1.059E-02	6.356E-03	4.237E-03	0.000E+00	0.000E+00	0.000E+00	2.119E-02
WNW	1.059E-02	2.119E-03	2.119E-03	8.475E-03	6.356E-03	0.000E+00	2.966E-02
NW	4.237E-03	1.695E-02	1.059E-02	2.119E-03	0.000E+00	0.000E+00	3.390E-02
NNW	4.237E-03	2.542E-02	1.907E-02	4.237E-03	0.000E+00	0.000E+00	5.297E-02
TOTAL	3.157E-01	4.682E-01	1.568E-01	4.661E-02	6.356E-03	0.000E+00	9.936E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.356E-03

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.407E-02	2.795E-02	1.708E-02	1.398E-02	7.764E-04	7.764E-04	8.463E-02
NNE	3.106E-02	3.416E-02	2.717E-02	1.553E-02	6.211E-03	0.000E+00	1.141E-01
NE	3.106E-02	3.804E-02	1.553E-02	0.000E+00	0.000E+00	0.000E+00	8.463E-02
ENE	3.416E-02	7.453E-02	1.941E-02	3.882E-03	0.000E+00	0.000E+00	1.320E-01
E	2.950E-02	5.901E-02	1.009E-02	0.000E+00	0.000E+00	0.000E+00	9.860E-02
ESE	2.484E-02	2.484E-02	9.317E-03	0.000E+00	0.000E+00	0.000E+00	5.901E-02
SE	2.407E-02	2.562E-02	1.553E-02	2.329E-03	0.000E+00	0.000E+00	6.755E-02
SSE	2.252E-02	2.019E-02	8.540E-03	1.553E-03	0.000E+00	0.000E+00	5.280E-02
S	1.630E-02	1.630E-02	4.658E-03	0.000E+00	0.000E+00	0.000E+00	3.727E-02
SSW	3.106E-02	1.941E-02	1.553E-03	0.000E+00	0.000E+00	0.000E+00	5.202E-02
SW	1.630E-02	2.562E-02	7.764E-04	0.000E+00	0.000E+00	0.000E+00	4.270E-02
WSW	1.475E-02	2.096E-02	2.329E-03	1.553E-03	0.000E+00	0.000E+00	3.960E-02
W	8.540E-03	6.988E-03	1.553E-03	7.764E-04	7.764E-04	0.000E+00	1.863E-02
WNW	1.553E-02	6.211E-03	1.553E-03	6.988E-03	1.553E-03	0.000E+00	3.183E-02
NW	1.630E-02	1.165E-02	1.553E-03	3.882E-03	7.764E-04	0.000E+00	3.416E-02
NNW	1.242E-02	1.087E-02	1.320E-02	3.106E-03	0.000E+00	7.764E-04	4.037E-02
TOTAL	3.525E-01	4.224E-01	1.498E-01	5.357E-02	1.009E-02	1.553E-03	9.899E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 1.009E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.527E-02	3.942E-02	3.112E-03	3.112E-03	0.000E+00	0.000E+00	8.091E-02
NNE	4.876E-02	3.734E-02	5.187E-03	3.112E-03	0.000E+00	0.000E+00	9.440E-02
NE	4.149E-02	4.357E-02	4.149E-03	1.037E-03	0.000E+00	0.000E+00	9.025E-02
ENE	5.290E-02	5.498E-02	3.112E-03	0.000E+00	0.000E+00	0.000E+00	1.110E-01
E	1.556E-02	2.697E-02	4.149E-03	0.000E+00	0.000E+00	0.000E+00	4.668E-02
ESE	1.452E-02	1.349E-02	8.299E-03	0.000E+00	0.000E+00	0.000E+00	3.631E-02
SE	1.452E-02	1.245E-02	8.299E-03	0.000E+00	0.000E+00	0.000E+00	3.527E-02
SSE	1.245E-02	2.282E-02	8.299E-03	0.000E+00	0.000E+00	0.000E+00	4.357E-02
S	3.008E-02	3.112E-02	7.261E-03	3.112E-03	0.000E+00	0.000E+00	7.158E-02
SSW	3.008E-02	3.320E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.328E-02
SW	2.801E-02	4.979E-02	6.224E-03	0.000E+00	0.000E+00	0.000E+00	8.402E-02
WSW	3.942E-02	2.386E-02	1.037E-02	4.149E-03	1.037E-03	0.000E+00	7.884E-02
W	1.349E-02	6.224E-03	0.000E+00	0.000E+00	1.037E-03	0.000E+00	2.075E-02
WNW	2.282E-02	7.261E-03	1.037E-03	4.149E-03	6.224E-03	1.037E-03	4.253E-02
NW	1.452E-02	9.336E-03	3.112E-03	4.149E-03	2.075E-03	0.000E+00	3.320E-02
NNW	2.801E-02	2.075E-02	1.037E-02	1.037E-03	0.000E+00	1.037E-03	6.120E-02
TOTAL	4.419E-01	4.326E-01	8.299E-02	2.386E-02	1.037E-02	2.075E-03	9.938E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.224E-03

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.134E-02	2.570E-02	1.117E-03	0.000E+00	0.000E+00	0.000E+00	6.816E-02
NNE	4.078E-02	2.961E-02	2.235E-03	0.000E+00	5.587E-04	0.000E+00	7.318E-02
NE	4.022E-02	3.687E-02	2.235E-03	0.000E+00	0.000E+00	0.000E+00	7.933E-02
ENE	4.749E-02	3.240E-02	1.117E-03	0.000E+00	0.000E+00	0.000E+00	8.101E-02
E	2.793E-02	3.911E-03	1.676E-03	0.000E+00	0.000E+00	0.000E+00	3.352E-02
ESE	1.732E-02	1.006E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.737E-02
SE	1.844E-02	1.229E-02	3.352E-03	0.000E+00	0.000E+00	0.000E+00	3.408E-02
SSE	2.179E-02	1.173E-02	2.793E-03	1.117E-03	0.000E+00	0.000E+00	3.743E-02
S	2.849E-02	2.682E-02	3.911E-03	0.000E+00	0.000E+00	0.000E+00	5.922E-02
SSW	4.190E-02	3.240E-02	5.587E-04	0.000E+00	0.000E+00	0.000E+00	7.486E-02
SW	4.637E-02	7.598E-02	2.793E-03	0.000E+00	0.000E+00	0.000E+00	1.251E-01
WSW	3.799E-02	6.425E-02	1.341E-02	5.587E-04	0.000E+00	0.000E+00	1.162E-01
W	2.346E-02	1.620E-02	3.352E-03	0.000E+00	0.000E+00	0.000E+00	4.302E-02
WNW	2.570E-02	1.285E-02	2.235E-03	0.000E+00	0.000E+00	0.000E+00	4.078E-02
NW	2.570E-02	1.788E-02	2.235E-03	1.117E-03	0.000E+00	0.000E+00	4.693E-02
NNW	3.575E-02	1.564E-02	1.117E-03	1.117E-03	0.000E+00	0.000E+00	5.363E-02
TOTAL	5.207E-01	4.246E-01	4.413E-02	3.911E-03	5.587E-04	0.000E+00	9.939E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.145E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7.075E-03	1.031E-02	8.994E-03	4.677E-03	8.394E-04	1.199E-04	3.202E-02
NNE	8.154E-03	1.115E-02	8.634E-03	8.154E-03	2.998E-03	0.000E+00	3.909E-02
NE	7.915E-03	1.415E-02	7.435E-03	3.717E-03	1.199E-04	0.000E+00	3.334E-02
ENE	6.715E-03	2.530E-02	8.394E-03	1.199E-03	0.000E+00	0.000E+00	4.161E-02
E	8.634E-03	2.710E-02	7.435E-03	2.159E-03	0.000E+00	0.000E+00	4.533E-02
ESE	9.354E-03	1.475E-02	5.156E-03	7.195E-04	5.996E-04	1.199E-04	3.070E-02
SE	8.514E-03	7.675E-03	4.437E-03	3.598E-04	1.799E-03	0.000E+00	2.278E-02
SSE	1.295E-02	1.019E-02	1.679E-03	2.398E-04	3.598E-04	0.000E+00	2.542E-02
S	1.211E-02	8.394E-03	3.598E-04	0.000E+00	8.394E-04	0.000E+00	2.171E-02
SSW	8.754E-03	8.634E-03	8.394E-04	1.199E-04	0.000E+00	0.000E+00	1.835E-02
SW	7.435E-03	8.394E-03	8.394E-04	0.000E+00	1.199E-04	1.199E-04	1.691E-02
WSW	5.396E-03	7.195E-03	4.797E-04	0.000E+00	0.000E+00	1.199E-04	1.319E-02
W	3.478E-03	3.238E-03	8.394E-04	5.996E-04	3.598E-04	1.199E-04	8.634E-03
WNW	3.478E-03	1.559E-03	4.797E-04	1.799E-03	1.439E-03	8.394E-04	9.593E-03
NW	4.917E-03	5.396E-03	1.799E-03	2.398E-03	8.394E-04	1.199E-04	1.547E-02
NNW	8.274E-03	8.514E-03	2.159E-03	1.439E-03	3.598E-04	0.000E+00	2.075E-02
TOTAL	1.232E-01	1.720E-01	5.996E-02	2.758E-02	1.067E-02	1.559E-03	3.949E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 2.398E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.439E-03	5.996E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.039E-03
NNE	2.398E-04	7.195E-04	3.598E-04	1.199E-04	0.000E+00	0.000E+00	1.439E-03
NE	4.797E-04	2.039E-03	8.394E-04	2.398E-04	1.199E-04	0.000E+00	3.717E-03
ENE	9.593E-04	1.679E-03	2.398E-04	0.000E+00	0.000E+00	0.000E+00	2.878E-03
E	9.593E-04	1.079E-03	3.598E-04	0.000E+00	0.000E+00	0.000E+00	2.398E-03
ESE	7.195E-04	3.598E-04	1.199E-04	0.000E+00	0.000E+00	0.000E+00	1.199E-03
SE	8.394E-04	1.199E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.593E-04
SSE	5.996E-04	4.797E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.079E-03
S	1.199E-03	7.195E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.919E-03
SSW	1.559E-03	1.679E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.238E-03
SW	1.679E-03	3.717E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.396E-03
WSW	1.559E-03	3.478E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.037E-03
W	3.598E-04	3.598E-04	0.000E+00	0.000E+00	1.199E-04	0.000E+00	8.394E-04
WNW	5.996E-04	5.996E-04	0.000E+00	1.199E-04	0.000E+00	0.000E+00	1.319E-03
NW	2.159E-03	1.439E-03	1.199E-04	0.000E+00	0.000E+00	0.000E+00	3.717E-03
NNW	1.199E-03	9.593E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.159E-03
TOTAL	1.655E-02	2.003E-02	2.039E-03	4.797E-04	2.398E-04	0.000E+00	3.933E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 2.398E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5.996E-04	2.398E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.394E-04
NNE	5.996E-04	3.598E-04	4.797E-04	1.199E-04	0.000E+00	0.000E+00	1.559E-03
NE	1.199E-04	5.996E-04	1.199E-04	0.000E+00	0.000E+00	0.000E+00	8.394E-04
ENE	5.996E-04	8.394E-04	1.199E-04	0.000E+00	0.000E+00	0.000E+00	1.559E-03
E	0.000E+00	5.996E-04	1.199E-04	0.000E+00	0.000E+00	0.000E+00	7.195E-04
ESE	2.398E-04	4.797E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.195E-04
SE	0.000E+00	2.398E-04	1.199E-04	0.000E+00	0.000E+00	0.000E+00	3.598E-04
SSE	3.598E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.598E-04
S	4.797E-04	3.598E-04	1.199E-04	0.000E+00	0.000E+00	0.000E+00	9.593E-04
SSW	2.278E-03	5.996E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.878E-03
SW	1.439E-03	2.878E-03	1.199E-04	0.000E+00	0.000E+00	0.000E+00	4.437E-03
WSW	1.679E-03	3.717E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.396E-03
W	1.199E-04	3.598E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.797E-04
WNW	4.797E-04	5.996E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.079E-03
NW	3.598E-04	2.398E-04	0.000E+00	1.199E-04	0.000E+00	0.000E+00	7.195E-04
NNW	2.398E-04	5.996E-04	0.000E+00	1.199E-04	0.000E+00	0.000E+00	9.593E-04
TOTAL	9.593E-03	1.271E-02	1.199E-03	3.598E-04	0.000E+00	0.000E+00	2.386E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.199E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.799E-03	1.919E-03	5.996E-04	3.598E-04	0.000E+00	0.000E+00	4.677E-03
NNE	5.996E-04	2.159E-03	4.797E-04	1.199E-03	0.000E+00	0.000E+00	4.437E-03
NE	1.319E-03	2.998E-03	9.593E-04	1.199E-04	0.000E+00	0.000E+00	5.396E-03
ENE	2.039E-03	3.478E-03	2.878E-03	0.000E+00	0.000E+00	0.000E+00	8.394E-03
E	1.799E-03	2.278E-03	5.996E-04	0.000E+00	0.000E+00	0.000E+00	4.677E-03
ESE	1.319E-03	1.559E-03	1.199E-04	0.000E+00	0.000E+00	0.000E+00	2.998E-03
SE	3.598E-04	1.199E-03	2.398E-04	0.000E+00	0.000E+00	0.000E+00	1.799E-03
SSE	8.394E-04	5.996E-04	3.598E-04	0.000E+00	0.000E+00	0.000E+00	1.799E-03
S	1.319E-03	4.797E-04	1.199E-04	0.000E+00	0.000E+00	0.000E+00	1.919E-03
SSW	1.559E-03	1.559E-03	1.199E-04	0.000E+00	0.000E+00	0.000E+00	3.238E-03
SW	2.039E-03	3.238E-03	2.398E-04	0.000E+00	0.000E+00	0.000E+00	5.516E-03
WSW	1.199E-03	2.159E-03	1.199E-04	1.199E-04	0.000E+00	0.000E+00	3.598E-03
W	5.996E-04	3.598E-04	2.398E-04	0.000E+00	0.000E+00	0.000E+00	1.199E-03
WNW	5.996E-04	1.199E-04	1.199E-04	4.797E-04	3.598E-04	0.000E+00	1.679E-03
NW	2.398E-04	9.593E-04	5.996E-04	1.199E-04	0.000E+00	0.000E+00	1.919E-03
NNW	2.398E-04	1.439E-03	1.079E-03	2.398E-04	0.000E+00	0.000E+00	2.998E-03
TOTAL	1.787E-02	2.650E-02	8.874E-03	2.638E-03	3.598E-04	0.000E+00	5.624E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 3.598E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.717E-03	4.317E-03	2.638E-03	2.159E-03	1.199E-04	1.199E-04	1.307E-02
NNE	4.797E-03	5.276E-03	4.197E-03	2.398E-03	9.593E-04	0.000E+00	1.763E-02
NE	4.797E-03	5.876E-03	2.398E-03	0.000E+00	0.000E+00	0.000E+00	1.307E-02
ENE	5.276E-03	1.151E-02	2.998E-03	5.996E-04	0.000E+00	0.000E+00	2.039E-02
E	4.557E-03	9.114E-03	1.559E-03	0.000E+00	0.000E+00	0.000E+00	1.523E-02
ESE	3.837E-03	3.837E-03	1.439E-03	0.000E+00	0.000E+00	0.000E+00	9.114E-03
SE	3.717E-03	3.957E-03	2.398E-03	3.598E-04	0.000E+00	0.000E+00	1.043E-02
SSE	3.478E-03	3.118E-03	1.319E-03	2.398E-04	0.000E+00	0.000E+00	8.154E-03
S	2.518E-03	2.518E-03	7.195E-04	0.000E+00	0.000E+00	0.000E+00	5.756E-03
SSW	4.797E-03	2.998E-03	2.398E-04	0.000E+00	0.000E+00	0.000E+00	8.035E-03
SW	2.518E-03	3.957E-03	1.199E-04	0.000E+00	0.000E+00	0.000E+00	6.596E-03
WSW	2.278E-03	3.238E-03	3.598E-04	2.398E-04	0.000E+00	0.000E+00	6.116E-03
W	1.319E-03	1.079E-03	2.398E-04	1.199E-04	1.199E-04	0.000E+00	2.878E-03
WNW	2.398E-03	9.593E-04	2.398E-04	1.079E-03	2.398E-04	0.000E+00	4.917E-03
NW	2.518E-03	1.799E-03	2.398E-04	5.996E-04	1.199E-04	0.000E+00	5.276E-03
NNW	1.919E-03	1.679E-03	2.039E-03	4.797E-04	0.000E+00	1.199E-04	6.236E-03
TOTAL	5.444E-02	6.524E-02	2.314E-02	8.274E-03	1.559E-03	2.398E-04	1.529E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.559E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.077E-03	4.557E-03	3.598E-04	3.598E-04	0.000E+00	0.000E+00	9.354E-03
NNE	5.636E-03	4.317E-03	5.996E-04	3.598E-04	0.000E+00	0.000E+00	1.091E-02
NE	4.797E-03	5.037E-03	4.797E-04	1.199E-04	0.000E+00	0.000E+00	1.043E-02
ENE	6.116E-03	6.356E-03	3.598E-04	0.000E+00	0.000E+00	0.000E+00	1.283E-02
E	1.799E-03	3.118E-03	4.797E-04	0.000E+00	0.000E+00	0.000E+00	5.396E-03
ESE	1.679E-03	1.559E-03	9.593E-04	0.000E+00	0.000E+00	0.000E+00	4.197E-03
SE	1.679E-03	1.439E-03	9.593E-04	0.000E+00	0.000E+00	0.000E+00	4.077E-03
SSE	1.439E-03	2.638E-03	9.593E-04	0.000E+00	0.000E+00	0.000E+00	5.037E-03
S	3.478E-03	3.598E-03	8.394E-04	3.598E-04	0.000E+00	0.000E+00	8.274E-03
SSW	3.478E-03	3.837E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.315E-03
SW	3.238E-03	5.756E-03	7.195E-04	0.000E+00	0.000E+00	0.000E+00	9.713E-03
WSW	4.557E-03	2.758E-03	1.199E-03	4.797E-04	1.199E-04	0.000E+00	9.114E-03
W	1.559E-03	7.195E-04	0.000E+00	0.000E+00	1.199E-04	0.000E+00	2.398E-03
WNW	2.638E-03	8.394E-04	1.199E-04	4.797E-04	7.195E-04	1.199E-04	4.917E-03
NW	1.679E-03	1.079E-03	3.598E-04	4.797E-04	2.398E-04	0.000E+00	3.837E-03
NNW	3.238E-03	2.398E-03	1.199E-03	1.199E-04	0.000E+00	1.199E-04	7.075E-03
TOTAL	5.109E-02	5.001E-02	9.593E-03	2.758E-03	1.199E-03	2.398E-04	1.149E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 7.195E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8.874E-03	5.516E-03	2.398E-04	0.000E+00	0.000E+00	0.000E+00	1.463E-02
NNE	8.754E-03	6.356E-03	4.797E-04	0.000E+00	1.199E-04	0.000E+00	1.571E-02
NE	8.634E-03	7.915E-03	4.797E-04	0.000E+00	0.000E+00	0.000E+00	1.703E-02
ENE	1.019E-02	6.955E-03	2.398E-04	0.000E+00	0.000E+00	0.000E+00	1.739E-02
E	5.996E-03	8.394E-04	3.598E-04	0.000E+00	0.000E+00	0.000E+00	7.195E-03
ESE	3.717E-03	2.159E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.876E-03
SE	3.957E-03	2.638E-03	7.195E-04	0.000E+00	0.000E+00	0.000E+00	7.315E-03
SSE	4.677E-03	2.518E-03	5.996E-04	2.398E-04	0.000E+00	0.000E+00	8.035E-03
S	6.116E-03	5.756E-03	8.394E-04	0.000E+00	0.000E+00	0.000E+00	1.271E-02
SSW	8.994E-03	6.955E-03	1.199E-04	0.000E+00	0.000E+00	0.000E+00	1.607E-02
SW	9.953E-03	1.631E-02	5.996E-04	0.000E+00	0.000E+00	0.000E+00	2.686E-02
WSW	8.154E-03	1.379E-02	2.878E-03	1.199E-04	0.000E+00	0.000E+00	2.494E-02
W	5.037E-03	3.478E-03	7.195E-04	0.000E+00	0.000E+00	0.000E+00	9.234E-03
WNW	5.516E-03	2.758E-03	4.797E-04	0.000E+00	0.000E+00	0.000E+00	8.754E-03
NW	5.516E-03	3.837E-03	4.797E-04	2.398E-04	0.000E+00	0.000E+00	1.007E-02
NNW	7.675E-03	3.358E-03	2.398E-04	2.398E-04	0.000E+00	0.000E+00	1.151E-02
TOTAL	1.118E-01	9.114E-02	9.474E-03	8.394E-04	1.199E-04	0.000E+00	2.133E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.319E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 1ST QUARTER OF 1993

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

ALL STABILITY CLASSES

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.758E-02	2.746E-02	1.283E-02	7.555E-03	9.593E-04	2.398E-04	7.663E-02
NNE	2.878E-02	3.034E-02	1.523E-02	1.235E-02	4.077E-03	0.000E+00	9.078E-02
NE	2.806E-02	3.861E-02	1.271E-02	4.197E-03	2.398E-04	0.000E+00	8.382E-02
ENE	3.190E-02	5.612E-02	1.523E-02	1.799E-03	0.000E+00	0.000E+00	1.050E-01
E	2.374E-02	4.413E-02	1.091E-02	2.159E-03	0.000E+00	0.000E+00	8.094E-02
ESE	2.087E-02	2.470E-02	7.795E-03	7.195E-04	5.996E-04	1.199E-04	5.480E-02
SE	1.907E-02	1.727E-02	8.874E-03	7.195E-04	1.799E-03	0.000E+00	4.773E-02
SSE	2.434E-02	1.955E-02	4.917E-03	7.195E-04	3.598E-04	0.000E+00	4.989E-02
S	2.722E-02	2.183E-02	2.998E-03	3.598E-04	8.394E-04	0.000E+00	5.324E-02
SSW	3.142E-02	2.626E-02	1.319E-03	1.199E-04	0.000E+00	0.000E+00	5.912E-02
SW	2.830E-02	4.425E-02	2.638E-03	0.000E+00	1.199E-04	1.199E-04	7.543E-02
WSW	2.482E-02	3.634E-02	5.037E-03	9.593E-04	1.199E-04	1.199E-04	6.739E-02
W	1.247E-02	9.593E-03	2.039E-03	7.195E-04	7.195E-04	1.199E-04	2.566E-02
WNW	1.571E-02	7.435E-03	1.439E-03	3.957E-03	2.758E-03	9.593E-04	3.226E-02
NW	1.739E-02	1.475E-02	3.598E-03	3.957E-03	1.199E-03	1.199E-04	4.101E-02
NNW	2.278E-02	1.895E-02	6.715E-03	2.638E-03	3.598E-04	2.398E-04	5.168E-02
TOTAL	3.845E-01	4.376E-01	1.143E-01	4.293E-02	1.415E-02	2.039E-03	9.954E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 4.557E-03

PERIOD OF REPORT: 01/01/93 THRU 03/31/93

NUMBER OF OBSERVATIONS FOR SELECTED TIME PERIOD = 8437

TOTAL TIME IN PERIOD = 2160.00 HRS. LOST/MISSING TIME = 75.25 HRS.

DATA AVAILABILITY = 96.5 %

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	15.00	48.25	34.50	20.25	9.50	4.50	132.00
NNE	23.00	71.25	43.75	27.00	11.00	2.50	178.50
NE	26.00	97.50	45.50	16.00	2.50	0.25	187.75
ENE	21.75	99.50	55.25	3.75	0.50	0.25	181.00
E	15.00	78.25	39.50	6.00	0.25	0.00	139.00
ESE	15.25	61.25	41.25	4.75	0.25	0.00	122.75
SE	14.00	47.00	37.00	9.25	1.25	0.00	108.50
SSE	18.25	38.25	20.00	8.00	1.00	1.50	87.00
S	19.00	39.50	17.00	2.25	0.00	0.75	78.50
SSW	16.25	36.25	11.25	2.00	0.50	0.25	66.50
SW	21.25	39.00	9.50	1.25	1.00	0.50	72.50
WSW	17.75	29.75	9.25	10.00	3.25	0.75	70.75
W	8.00	14.25	13.25	7.25	3.75	2.25	48.75
WNW	6.00	6.00	5.00	7.50	2.25	1.75	28.50
NW	6.50	13.00	9.75	9.75	3.50	1.25	43.75
NNW	12.50	31.00	14.50	12.50	4.00	0.50	75.00
TOTAL	255.50	750.00	406.25	147.50	44.50	17.00	1620.75

TIME DURATION OF CALMS = 0.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 1621.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.75	1.00	1.00	0.00	0.00	0.00	2.75
NNE	0.75	2.25	2.75	0.00	0.00	0.00	5.75
NE	0.50	2.00	0.25	0.00	0.00	0.00	2.75
ENE	0.25	2.00	0.75	0.00	0.00	0.00	3.00
E	1.00	1.00	0.25	0.00	0.00	0.00	2.25
ESE	0.25	0.00	0.50	0.00	0.00	0.00	0.75
SE	0.00	1.25	0.75	0.00	0.00	0.00	2.00
SSE	0.25	0.50	0.50	0.50	0.00	0.00	1.75
S	0.50	1.75	0.50	0.00	0.00	0.00	2.75
SSW	1.25	1.50	0.50	0.00	0.00	0.00	3.25
SW	1.00	2.00	0.00	0.00	0.00	0.00	3.00
WSW	0.75	1.75	0.00	0.25	0.00	0.00	2.75
W	0.25	0.75	0.00	0.00	0.00	0.00	1.00
WNW	0.75	0.00	0.25	0.00	0.00	0.00	1.00
NW	1.00	0.50	0.75	0.25	0.00	0.00	2.50
NNW	0.00	1.50	0.00	0.00	0.00	0.00	1.50
TOTAL	9.25	19.75	8.75	1.00	0.00	0.00	38.75

TIME DURATION OF CALMS = 0.00 HRS.

TOTAL HOURS IN STABILITY CLASS = 38.75 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.25	0.00	0.75	0.00	0.00	0.00	1.00
NNE	0.50	0.75	0.50	2.00	0.00	0.00	3.75
NE	0.00	1.00	1.00	1.25	0.00	0.00	3.25
ENE	0.50	0.25	0.75	1.00	0.00	0.00	2.50
E	0.00	0.25	0.25	0.00	0.00	0.00	0.50
ESE	0.50	0.25	0.50	0.00	0.00	0.00	1.25
SE	0.00	0.00	1.00	0.00	0.00	0.00	1.00
SSE	0.25	0.25	1.00	0.00	0.00	0.00	1.50
S	0.00	0.25	0.25	0.00	0.00	0.00	0.50
SSW	0.50	1.00	0.00	0.00	0.00	0.00	1.50
SW	0.75	1.00	0.00	0.50	0.00	0.00	2.25
WSW	0.75	0.75	0.25	0.50	0.00	0.00	2.25
W	0.00	0.25	0.50	0.50	0.00	0.00	1.25
WNW	0.25	0.00	0.00	0.00	0.00	0.00	0.25
NW	0.25	0.75	0.50	0.00	0.00	0.00	1.50
NNW	0.50	0.25	0.25	0.00	0.00	0.00	1.00
TOTAL	5.00	7.00	7.50	5.75	0.00	0.00	25.25

TIME DURATION OF CALMS = 0.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 25.50 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.00	4.50	0.75	0.25	0.25	0.00	9.75
NNE	6.50	7.50	1.50	1.00	0.25	0.00	16.75
NE	4.25	3.50	1.50	1.25	0.00	0.00	10.50
ENE	3.25	3.25	0.75	1.00	0.00	0.00	8.25
E	4.00	2.00	0.25	0.00	0.00	0.00	6.25
ESE	2.25	2.25	0.25	0.00	0.00	0.00	4.75
SE	1.75	2.50	0.50	0.00	0.50	0.00	5.25
SSE	2.75	1.75	0.75	0.25	0.00	0.00	5.50
S	3.50	3.00	1.25	0.00	0.00	0.00	7.75
SSW	3.75	5.50	1.00	0.75	0.00	0.00	11.00
SW	4.75	5.25	0.50	0.50	0.00	0.00	11.00
WSW	2.00	5.25	1.75	2.00	0.00	0.00	11.00
W	1.75	2.50	1.25	0.50	0.00	0.00	6.00
WNW	2.50	2.00	1.75	0.25	0.00	0.00	6.50
NW	1.25	6.75	1.00	0.00	0.00	0.00	9.00
NNW	2.00	3.00	0.25	0.00	0.00	0.00	5.25
TOTAL	50.25	60.50	15.00	7.75	1.00	0.00	134.50

TIME DURATION OF CALMS = 0.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 134.75 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.50	4.75	0.00	0.00	0.25	0.00	9.50
NNE	5.25	6.00	0.00	0.00	0.00	0.00	11.25
NE	4.00	2.75	0.75	0.00	0.00	0.00	7.50
ENE	5.25	2.25	1.25	0.00	0.00	0.00	8.75
E	4.50	3.25	1.00	0.00	0.00	0.00	8.75
ESE	3.00	4.25	0.50	0.00	0.00	0.00	7.75
SE	4.00	2.75	0.25	0.00	0.25	0.00	7.25
SSE	3.25	2.50	0.75	0.00	0.00	0.25	6.75
S	4.75	5.75	1.25	0.00	0.00	0.00	11.75
SSW	6.75	9.50	0.50	0.50	0.00	0.00	17.25
SW	8.25	13.50	2.25	0.25	0.00	0.00	24.25
WSW	2.25	13.00	1.50	0.75	0.00	0.00	17.50
W	2.75	2.50	1.25	0.00	0.00	0.00	6.50
WNW	1.75	2.50	0.25	0.00	0.00	0.00	4.50
NW	2.75	5.25	0.50	0.25	0.00	0.00	8.75
NNW	3.00	5.00	0.25	0.00	0.00	0.00	8.25
TOTAL	66.00	85.50	12.25	1.75	0.50	0.25	166.25

TIME DURATION OF CALMS = 0.00 HRS.

TOTAL HOURS IN STABILITY CLASS = 166.25 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.00	1.00	0.00	0.00	0.00	0.00	3.00
NNE	2.75	1.25	0.00	0.00	0.00	0.00	4.00
NE	4.25	2.00	0.00	0.25	0.00	0.00	6.50
ENE	1.50	0.00	0.00	0.00	0.00	0.00	1.50
E	2.00	1.00	0.25	0.00	0.00	0.00	3.25
ESE	1.50	2.00	0.00	0.00	0.00	0.00	3.50
SE	1.75	2.50	0.00	0.00	0.00	0.00	4.25
SSE	4.50	1.75	0.25	0.00	0.00	0.00	6.50
S	2.50	5.50	0.50	0.00	0.00	0.00	8.50
SSW	5.75	6.50	0.50	0.00	0.00	0.00	12.75
SW	5.25	18.00	1.75	0.00	0.00	0.00	25.00
WSW	5.75	8.75	0.50	0.00	0.00	0.00	15.00
W	2.50	2.00	0.00	0.00	0.00	0.00	4.50
WNW	1.00	2.50	0.25	0.00	0.00	0.00	3.75
NW	1.00	3.50	0.00	0.00	0.00	0.00	4.50
NNW	4.25	2.25	0.00	0.00	0.00	0.00	6.50
TOTAL	48.25	60.50	4.00	0.25	0.00	0.00	113.00

TIME DURATION OF CALMS = 0.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 113.25 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.75	0.25	0.00	0.00	0.00	0.00	1.00
NNE	0.75	0.50	0.00	0.00	0.00	0.00	1.25
NE	0.75	1.00	0.00	0.25	0.00	0.00	2.00
ENE	0.50	1.25	0.00	0.00	0.00	0.00	1.75
E	0.50	0.50	0.00	0.00	0.00	0.00	1.00
ESE	0.75	0.75	0.00	0.00	0.00	0.00	1.50
SE	0.25	0.00	0.00	0.00	0.00	0.00	0.25
SSE	0.75	0.25	0.00	0.00	0.00	0.00	1.00
S	1.25	1.50	0.00	0.00	0.00	0.00	2.75
SSW	3.50	5.25	0.25	0.00	0.00	0.00	9.00
SW	4.50	9.75	2.50	0.00	0.00	0.00	16.75
WSW	3.50	7.25	0.25	0.00	0.00	0.00	11.00
W	1.50	2.25	0.00	0.00	0.00	0.00	3.75
WNW	1.00	2.00	0.00	0.00	0.00	0.00	3.00
NW	0.75	1.25	0.00	0.25	0.00	0.00	5
NNW	0.00	0.50	0.25	0.00	0.00	0.00	0.75
TOTAL	21.00	34.25	3.25	0.50	0.00	0.00	59.00

TIME DURATION OF CALMS = 0.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 59.25 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

ALL STABILITY CLASSES

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	27.25	59.75	37.00	20.50	10.00	4.50	159.00
NNE	39.50	89.50	48.50	30.00	11.25	2.50	221.25
NE	39.75	109.75	49.00	19.00	2.50	0.25	220.25
ENE	33.00	108.50	58.75	5.75	0.50	0.25	206.75
E	27.00	86.25	41.50	6.00	0.25	0.00	161.00
ESE	23.50	70.75	43.00	4.75	0.25	0.00	142.25
SE	21.75	56.00	39.50	9.25	2.00	0.00	128.50
SSE	30.00	45.25	23.25	8.75	1.00	1.75	110.00
S	31.50	57.25	20.75	2.25	0.00	0.75	112.50
SSW	37.75	65.50	14.00	3.25	0.50	0.25	121.25
SW	45.75	88.50	16.50	2.50	1.00	0.50	154.75
WSW	32.75	66.50	13.50	13.50	3.25	0.75	130.25
W	16.75	24.50	16.25	8.25	3.75	2.25	71.75
WNW	13.25	15.00	7.50	7.75	2.25	1.75	47.50
NW	13.50	31.00	12.50	10.50	3.50	1.25	72.25
NNW	22.25	43.50	15.50	12.50	4.00	0.50	98.25
TOTAL	455.25	1017.50	457.00	164.50	46.00	17.25	2157.50

TIME DURATION OF CALMS = 1.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 2158.75 HRS.

MISSING DATA (HRS) = 25.25

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9.254E-03	2.977E-02	2.128E-02	1.249E-02	5.861E-03	2.776E-03	8.143E-02
NNE	1.419E-02	4.395E-02	2.699E-02	1.666E-02	6.786E-03	1.542E-03	1.101E-01
NE	1.604E-02	6.015E-02	2.807E-02	9.870E-03	1.542E-03	1.542E-04	1.158E-01
ENE	1.342E-02	6.138E-02	3.408E-02	2.313E-03	3.085E-04	1.542E-04	1.117E-01
E	9.254E-03	4.827E-02	2.437E-02	3.701E-03	1.542E-04	0.000E+00	8.575E-02
ESE	9.408E-03	3.779E-02	2.545E-02	2.930E-03	1.542E-04	0.000E+00	7.572E-02
SE	8.637E-03	2.899E-02	2.283E-02	5.706E-03	7.711E-04	0.000E+00	6.693E-02
SSE	1.126E-02	2.360E-02	1.234E-02	4.935E-03	6.169E-04	9.254E-04	5.367E-02
S	1.172E-02	2.437E-02	1.049E-02	1.388E-03	0.000E+00	4.627E-04	4.843E-02
SSW	1.002E-02	2.236E-02	6.940E-03	1.234E-03	3.085E-04	1.542E-04	4.102E-02
SW	1.311E-02	2.406E-02	5.861E-03	7.711E-04	6.169E-04	3.085E-04	4.473E-02
WSW	1.095E-02	1.835E-02	5.706E-03	6.169E-03	2.005E-03	4.627E-04	4.365E-02
W	4.935E-03	8.791E-03	8.174E-03	4.473E-03	2.313E-03	1.388E-03	3.007E-02
WNW	3.701E-03	3.701E-03	3.085E-03	4.627E-03	1.388E-03	1.080E-03	1.758E-02
NW	4.010E-03	8.020E-03	6.015E-03	6.015E-03	2.159E-03	7.711E-04	2.699E-02
NNW	7.711E-03	1.912E-02	8.945E-03	7.711E-03	2.468E-03	3.085E-04	4.627E-02
TOTAL	1.576E-01	4.627E-01	2.506E-01	9.099E-02	2.745E-02	1.049E-02	9.998E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 1.542E-04

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.935E-02	2.581E-02	2.581E-02	0.000E+00	0.000E+00	0.000E+00	7.097E-02
NNE	1.935E-02	5.806E-02	7.097E-02	0.000E+00	0.000E+00	0.000E+00	1.484E-01
NE	1.290E-02	5.161E-02	6.452E-03	0.000E+00	0.000E+00	0.000E+00	7.097E-02
ENE	6.452E-03	5.161E-02	1.935E-02	0.000E+00	0.000E+00	0.000E+00	7.742E-02
E	2.581E-02	2.581E-02	6.452E-03	0.000E+00	0.000E+00	0.000E+00	5.806E-02
ESE	6.452E-03	0.000E+00	1.290E-02	0.000E+00	0.000E+00	0.000E+00	1.935E-02
SE	0.000E+00	3.226E-02	1.935E-02	0.000E+00	0.000E+00	0.000E+00	5.161E-02
SSE	6.452E-03	1.290E-02	1.290E-02	1.290E-02	0.000E+00	0.000E+00	4.516E-02
S	1.290E-02	4.516E-02	1.290E-02	0.000E+00	0.000E+00	0.000E+00	7.097E-02
SSW	3.226E-02	3.871E-02	1.290E-02	0.000E+00	0.000E+00	0.000E+00	8.387E-02
SW	2.581E-02	5.161E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.742E-02
WSW	1.935E-02	4.516E-02	0.000E+00	6.452E-03	0.000E+00	0.000E+00	7.097E-02
W	6.452E-03	1.935E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.581E-02
WNW	1.935E-02	0.000E+00	6.452E-03	0.000E+00	0.000E+00	0.000E+00	2.581E-02
NW	2.581E-02	1.290E-02	1.935E-02	6.452E-03	0.000E+00	0.000E+00	6.452E-02
NNW	0.000E+00	3.871E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.871E-02
TOTAL	2.387E-01	5.097E-01	2.258E-01	2.581E-02	0.000E+00	0.000E+00	1.000E+00

PROBABILITY OF CALM WITHIN STABILITY CLASS = 0.000E+00

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9.804E-03	0.000E+00	2.941E-02	0.000E+00	0.000E+00	0.000E+00	3.922E-02
NNE	1.961E-02	2.941E-02	1.961E-02	7.843E-02	0.000E+00	0.000E+00	1.471E-01
NE	0.000E+00	3.922E-02	3.922E-02	4.902E-02	0.000E+00	0.000E+00	1.275E-01
ENE	1.961E-02	9.804E-03	2.941E-02	3.922E-02	0.000E+00	0.000E+00	9.804E-02
E	0.000E+00	9.804E-03	9.804E-03	0.000E+00	0.000E+00	0.000E+00	1.961E-02
ESE	1.961E-02	9.804E-03	1.961E-02	0.000E+00	0.000E+00	0.000E+00	4.902E-02
SE	0.000E+00	0.000E+00	3.922E-02	0.000E+00	0.000E+00	0.000E+00	3.922E-02
SSE	9.804E-03	9.804E-03	3.922E-02	0.000E+00	0.000E+00	0.000E+00	5.882E-02
S	0.000E+00	9.804E-03	9.804E-03	0.000E+00	0.000E+00	0.000E+00	1.961E-02
SSW	1.961E-02	3.922E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.882E-02
SW	2.941E-02	3.922E-02	0.000E+00	1.961E-02	0.000E+00	0.000E+00	8.824E-02
WSW	2.941E-02	2.941E-02	9.804E-03	1.961E-02	0.000E+00	0.000E+00	8.824E-02
W	0.000E+00	9.804E-03	1.961E-02	1.961E-02	0.000E+00	0.000E+00	4.902E-02
WNW	9.804E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.804E-03
NW	9.804E-03	2.941E-02	1.961E-02	0.000E+00	0.000E+00	0.000E+00	5.882E-02
NNW	1.961E-02	9.804E-03	9.804E-03	0.000E+00	0.000E+00	0.000E+00	3.922E-02
TOTAL	1.961E-01	2.745E-01	2.941E-01	2.255E-01	0.000E+00	0.000E+00	9.902E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 9.804E-03

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.968E-02	3.340E-02	5.566E-03	1.855E-03	1.855E-03	0.000E+00	7.236E-02
NNE	4.824E-02	5.566E-02	1.113E-02	7.421E-03	1.855E-03	0.000E+00	1.243E-01
NE	3.154E-02	2.597E-02	1.113E-02	9.276E-03	0.000E+00	0.000E+00	7.792E-02
ENE	2.412E-02	2.412E-02	5.566E-03	7.421E-03	0.000E+00	0.000E+00	6.122E-02
E	2.968E-02	1.484E-02	1.855E-03	0.000E+00	0.000E+00	0.000E+00	4.638E-02
ESE	1.670E-02	1.670E-02	1.855E-03	0.000E+00	0.000E+00	0.000E+00	3.525E-02
SE	1.299E-02	1.855E-02	3.711E-03	0.000E+00	3.711E-03	0.000E+00	3.896E-02
SSE	2.041E-02	1.299E-02	5.566E-03	1.855E-03	0.000E+00	0.000E+00	4.082E-02
S	2.597E-02	2.226E-02	9.276E-03	0.000E+00	0.000E+00	0.000E+00	5.751E-02
SSW	2.783E-02	4.082E-02	7.421E-03	5.566E-03	0.000E+00	0.000E+00	8.163E-02
SW	3.525E-02	3.896E-02	3.711E-03	3.711E-03	0.000E+00	0.000E+00	8.163E-02
WSW	1.484E-02	3.896E-02	1.299E-02	1.484E-02	0.000E+00	0.000E+00	8.163E-02
W	1.299E-02	1.855E-02	9.276E-03	3.711E-03	0.000E+00	0.000E+00	4.453E-02
WNW	1.855E-02	1.484E-02	1.299E-02	1.855E-03	0.000E+00	0.000E+00	4.824E-02
NW	9.276E-03	5.009E-02	7.421E-03	0.000E+00	0.000E+00	0.000E+00	6.679E-02
NNW	1.484E-02	2.226E-02	1.855E-03	0.000E+00	0.000E+00	0.000E+00	3.896E-02
TOTAL	3.729E-01	4.490E-01	1.113E-01	5.751E-02	7.421E-03	0.000E+00	9.981E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 1.855E-03

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.707E-02	2.857E-02	0.000E+00	0.000E+00	1.504E-03	0.000E+00	5.714E-02
NNE	3.158E-02	3.609E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.767E-02
NE	2.406E-02	1.654E-02	4.511E-03	0.000E+00	0.000E+00	0.000E+00	4.511E-02
ENE	3.158E-02	1.353E-02	7.519E-03	0.000E+00	0.000E+00	0.000E+00	5.263E-02
E	2.707E-02	1.955E-02	6.015E-03	0.000E+00	0.000E+00	0.000E+00	5.263E-02
ESE	1.805E-02	2.556E-02	3.008E-03	0.000E+00	0.000E+00	0.000E+00	4.662E-02
SE	2.406E-02	1.654E-02	1.504E-03	0.000E+00	1.504E-03	0.000E+00	4.361E-02
SSE	1.955E-02	1.504E-02	4.511E-03	0.000E+00	0.000E+00	1.504E-03	4.060E-02
S	2.857E-02	3.459E-02	7.519E-03	0.000E+00	0.000E+00	0.000E+00	7.068E-02
SSW	4.060E-02	5.714E-02	3.008E-03	3.008E-03	0.000E+00	0.000E+00	1.038E-01
SW	4.962E-02	8.120E-02	1.353E-02	1.504E-03	0.000E+00	0.000E+00	1.459E-01
WSW	1.353E-02	7.820E-02	9.023E-03	4.511E-03	0.000E+00	0.000E+00	1.053E-01
W	1.654E-02	1.504E-02	7.519E-03	0.000E+00	0.000E+00	0.000E+00	3.910E-02
WNW	1.053E-02	1.504E-02	1.504E-03	0.000E+00	0.000E+00	0.000E+00	2.707E-02
NW	1.654E-02	3.158E-02	3.008E-03	1.504E-03	0.000E+00	0.000E+00	5.263E-02
NNW	1.805E-02	3.008E-02	1.504E-03	0.000E+00	0.000E+00	0.000E+00	4.962E-02
TOTAL	3.970E-01	5.143E-01	7.368E-02	1.053E-02	3.008E-03	1.504E-03	1.000E+00

PROBABILITY OF CALM WITHIN STABILITY CLASS = 0.000E+00

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.766E-02	8.830E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.649E-02
NNE	2.428E-02	1.104E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.532E-02
NE	3.753E-02	1.766E-02	0.000E+00	2.208E-03	0.000E+00	0.000E+00	5.740E-02
ENE	1.325E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.325E-02
E	1.766E-02	8.830E-03	2.208E-03	0.000E+00	0.000E+00	0.000E+00	2.870E-02
ESE	1.325E-02	1.766E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.091E-02
SE	1.545E-02	2.208E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.753E-02
SSE	3.974E-02	1.545E-02	2.208E-03	0.000E+00	0.000E+00	0.000E+00	5.740E-02
S	2.208E-02	4.857E-02	4.415E-03	0.000E+00	0.000E+00	0.000E+00	7.506E-02
SSW	5.077E-02	5.740E-02	4.415E-03	0.000E+00	0.000E+00	0.000E+00	1.126E-01
SW	4.636E-02	1.589E-01	1.545E-02	0.000E+00	0.000E+00	0.000E+00	2.208E-01
WSW	5.077E-02	7.726E-02	4.415E-03	0.000E+00	0.000E+00	0.000E+00	1.325E-01
W	2.208E-02	1.766E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.974E-02
WNW	8.830E-03	2.208E-02	2.208E-03	0.000E+00	0.000E+00	0.000E+00	3.311E-02
NW	8.830E-03	3.091E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.974E-02
NNW	3.753E-02	1.987E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.740E-02
TOTAL	4.260E-01	5.342E-01	3.532E-02	2.208E-03	0.000E+00	0.000E+00	9.978E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 2.208E-03

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.266E-02	4.219E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.688E-02
NNE	1.266E-02	8.439E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.110E-02
NE	1.266E-02	1.688E-02	0.000E+00	4.219E-03	0.000E+00	0.000E+00	3.376E-02
ENE	8.439E-03	2.110E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.954E-02
E	8.439E-03	8.439E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.688E-02
ESE	1.266E-02	1.266E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.532E-02
SE	4.219E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.219E-03
SSE	1.266E-02	4.219E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.688E-02
S	2.110E-02	2.532E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.641E-02
SSW	5.907E-02	8.861E-02	4.219E-03	0.000E+00	0.000E+00	0.000E+00	1.519E-01
SW	7.595E-02	1.646E-01	4.219E-02	0.000E+00	0.000E+00	0.000E+00	2.827E-01
WSW	5.907E-02	1.224E-01	4.219E-03	0.000E+00	0.000E+00	0.000E+00	1.857E-01
W	2.532E-02	3.797E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.329E-02
WNW	1.688E-02	3.376E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.063E-02
NW	1.266E-02	2.110E-02	0.000E+00	4.219E-03	0.000E+00	0.000E+00	3.797E-02
NNW	0.000E+00	8.439E-03	4.219E-03	0.000E+00	0.000E+00	0.000E+00	1.266E-02
TOTAL	3.544E-01	5.781E-01	5.485E-02	8.439E-03	0.000E+00	0.000E+00	9.958E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 4.219E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6.948E-03	2.235E-02	1.598E-02	9.380E-03	4.401E-03	2.085E-03	6.115E-02
NNE	1.065E-02	3.301E-02	2.027E-02	1.251E-02	5.096E-03	1.158E-03	8.269E-02
NE	1.204E-02	4.517E-02	2.108E-02	7.412E-03	1.158E-03	1.158E-04	8.697E-02
ENE	1.008E-02	4.609E-02	2.559E-02	1.737E-03	2.316E-04	1.158E-04	8.384E-02
E	6.948E-03	3.625E-02	1.830E-02	2.779E-03	1.158E-04	0.000E+00	6.439E-02
ESE	7.064E-03	2.837E-02	1.911E-02	2.200E-03	1.158E-04	0.000E+00	5.686E-02
SE	6.485E-03	2.177E-02	1.714E-02	4.285E-03	5.790E-04	0.000E+00	5.026E-02
SSE	8.454E-03	1.772E-02	9.265E-03	3.706E-03	4.632E-04	6.948E-04	4.030E-02
S	8.801E-03	1.830E-02	7.875E-03	1.042E-03	0.000E+00	3.474E-04	3.636E-02
SSW	7.528E-03	1.679E-02	5.211E-03	9.265E-04	2.316E-04	1.158E-04	3.080E-02
SW	9.844E-03	1.807E-02	4.401E-03	5.790E-04	4.632E-04	2.316E-04	3.358E-02
WSW	8.222E-03	1.378E-02	4.285E-03	4.632E-03	1.506E-03	3.474E-04	3.277E-02
W	3.706E-03	6.601E-03	6.138E-03	3.358E-03	1.737E-03	1.042E-03	2.258E-02
WNW	2.779E-03	2.779E-03	2.316E-03	3.474E-03	1.042E-03	8.107E-04	1.320E-02
NW	3.011E-03	6.022E-03	4.517E-03	4.517E-03	1.621E-03	5.790E-04	2.027E-02
NNW	5.790E-03	1.436E-02	6.717E-03	5.790E-03	1.853E-03	2.316E-04	3.474E-02
TOTAL	1.184E-01	3.474E-01	1.882E-01	6.833E-02	2.061E-02	7.875E-03	7.508E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.158E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.474E-04	4.632E-04	4.632E-04	0.000E+00	0.000E+00	0.000E+00	1.274E-03
NNE	3.474E-04	1.042E-03	1.274E-03	0.000E+00	0.000E+00	0.000E+00	2.664E-03
NE	2.316E-04	9.265E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	1.274E-03
ENE	1.158E-04	9.265E-04	3.474E-04	0.000E+00	0.000E+00	0.000E+00	1.390E-03
E	4.632E-04	4.632E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	1.042E-03
ESE	1.158E-04	0.000E+00	2.316E-04	0.000E+00	0.000E+00	0.000E+00	3.474E-04
SE	0.000E+00	5.790E-04	3.474E-04	0.000E+00	0.000E+00	0.000E+00	9.265E-04
SSE	1.158E-04	2.316E-04	2.316E-04	2.316E-04	0.000E+00	0.000E+00	8.107E-04
S	2.316E-04	8.107E-04	2.316E-04	0.000E+00	0.000E+00	0.000E+00	1.274E-03
SSW	5.790E-04	6.948E-04	2.316E-04	0.000E+00	0.000E+00	0.000E+00	1.506E-03
SW	4.632E-04	9.265E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.390E-03
WSW	3.474E-04	8.107E-04	0.000E+00	1.158E-04	0.000E+00	0.000E+00	1.274E-03
W	1.158E-04	3.474E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.632E-04
WNW	3.474E-04	0.000E+00	1.158E-04	0.000E+00	0.000E+00	0.000E+00	4.632E-04
NW	4.632E-04	2.316E-04	3.474E-04	1.158E-04	0.000E+00	0.000E+00	1.158E-03
NNW	0.000E+00	6.948E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.948E-04
TOTAL	4.285E-03	9.149E-03	4.053E-03	4.632E-04	0.000E+00	0.000E+00	1.795E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 0.000E+00

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.158E-04	0.000E+00	3.474E-04	0.000E+00	0.000E+00	0.000E+00	4.632E-04
NNE	2.316E-04	3.474E-04	2.316E-04	9.265E-04	0.000E+00	0.000E+00	1.737E-03
NE	0.000E+00	4.632E-04	4.632E-04	5.790E-04	0.000E+00	0.000E+00	1.506E-03
ENE	2.316E-04	1.158E-04	3.474E-04	4.632E-04	0.000E+00	0.000E+00	1.158E-03
E	0.000E+00	1.158E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	2.316E-04
ESE	2.316E-04	1.158E-04	2.316E-04	0.000E+00	0.000E+00	0.000E+00	5.790E-04
SE	0.000E+00	0.000E+00	4.632E-04	0.000E+00	0.000E+00	0.000E+00	4.632E-04
SSE	1.158E-04	1.158E-04	4.632E-04	0.000E+00	0.000E+00	0.000E+00	6.948E-04
S	0.000E+00	1.158E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	2.316E-04
SSW	2.316E-04	4.632E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.948E-04
SW	3.474E-04	4.632E-04	0.000E+00	2.316E-04	0.000E+00	0.000E+00	1.042E-03
WSW	3.474E-04	3.474E-04	1.158E-04	2.316E-04	0.000E+00	0.000E+00	1.042E-03
W	0.000E+00	1.158E-04	2.316E-04	2.316E-04	0.000E+00	0.000E+00	5.790E-04
WNW	1.158E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.158E-04
NW	1.158E-04	3.474E-04	2.316E-04	0.000E+00	0.000E+00	0.000E+00	6.948E-04
NNW	2.316E-04	1.158E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	4.632E-04
TOTAL	2.316E-03	3.243E-03	3.474E-03	2.664E-03	0.000E+00	0.000E+00	1.170E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.158E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.853E-03	2.085E-03	3.474E-04	1.158E-04	1.158E-04	0.000E+00	4.517E-03
NNE	3.011E-03	3.474E-03	6.948E-04	4.632E-04	1.158E-04	0.000E+00	7.759E-03
NE	1.969E-03	1.621E-03	6.948E-04	5.790E-04	0.000E+00	0.000E+00	4.864E-03
ENE	1.506E-03	1.506E-03	3.474E-04	4.632E-04	0.000E+00	0.000E+00	3.822E-03
E	1.853E-03	9.265E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	2.895E-03
ESE	1.042E-03	1.042E-03	1.158E-04	0.000E+00	0.000E+00	0.000E+00	2.200E-03
SE	8.107E-04	1.158E-03	2.316E-04	0.000E+00	2.316E-04	0.000E+00	2.432E-03
SSE	1.274E-03	8.107E-04	3.474E-04	1.158E-04	0.000E+00	0.000E+00	2.548E-03
S	1.621E-03	1.390E-03	5.790E-04	0.000E+00	0.000E+00	0.000E+00	3.590E-03
SSW	1.737E-03	2.548E-03	4.632E-04	3.474E-04	0.000E+00	0.000E+00	5.096E-03
SW	2.200E-03	2.432E-03	2.316E-04	2.316E-04	0.000E+00	0.000E+00	5.096E-03
WSW	9.265E-04	2.432E-03	8.107E-04	9.265E-04	0.000E+00	0.000E+00	5.096E-03
W	8.107E-04	1.158E-03	5.790E-04	2.316E-04	0.000E+00	0.000E+00	2.779E-03
WNW	1.158E-03	9.265E-04	8.107E-04	1.158E-04	0.000E+00	0.000E+00	3.011E-03
NW	5.790E-04	3.127E-03	4.632E-04	0.000E+00	0.000E+00	0.000E+00	4.169E-03
NNW	9.265E-04	1.390E-03	1.158E-04	0.000E+00	0.000E+00	0.000E+00	2.432E-03
TOTAL	2.328E-02	2.803E-02	6.948E-03	3.590E-03	4.632E-04	0.000E+00	6.230E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.158E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.085E-03	2.200E-03	0.000E+00	0.000E+00	1.158E-04	0.000E+00	4.401E-03
NNE	2.432E-03	2.779E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.211E-03
NE	1.853E-03	1.274E-03	3.474E-04	0.000E+00	0.000E+00	0.000E+00	3.474E-03
ENE	2.432E-03	1.042E-03	5.790E-04	0.000E+00	0.000E+00	0.000E+00	4.053E-03
E	2.085E-03	1.506E-03	4.632E-04	0.000E+00	0.000E+00	0.000E+00	4.053E-03
ESE	1.390E-03	1.969E-03	2.316E-04	0.000E+00	0.000E+00	0.000E+00	3.590E-03
SE	1.853E-03	1.274E-03	1.158E-04	0.000E+00	1.158E-04	0.000E+00	3.358E-03
SSE	1.506E-03	1.158E-03	3.474E-04	0.000E+00	0.000E+00	1.158E-04	3.127E-03
S	2.200E-03	2.664E-03	5.790E-04	0.000E+00	0.000E+00	0.000E+00	5.443E-03
SSW	3.127E-03	4.401E-03	2.316E-04	2.316E-04	0.000E+00	0.000E+00	7.991E-03
SW	3.822E-03	6.254E-03	1.042E-03	1.158E-04	0.000E+00	0.000E+00	1.123E-02
WSW	1.042E-03	6.022E-03	6.948E-04	3.474E-04	0.000E+00	0.000E+00	8.107E-03
W	1.274E-03	1.158E-03	5.790E-04	0.000E+00	0.000E+00	0.000E+00	3.011E-03
WNW	8.107E-04	1.158E-03	1.158E-04	0.000E+00	0.000E+00	0.000E+00	2.085E-03
NW	1.274E-03	2.432E-03	2.316E-04	1.158E-04	0.000E+00	0.000E+00	4.053E-03
NNW	1.390E-03	2.316E-03	1.158E-04	0.000E+00	0.000E+00	0.000E+00	3.822E-03
TOTAL	3.057E-02	3.961E-02	5.675E-03	8.107E-04	2.316E-04	1.158E-04	7.701E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 0.000E+00

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9.265E-04	4.632E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.390E-03
NNE	1.274E-03	5.790E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.853E-03
NE	1.969E-03	9.265E-04	0.000E+00	1.158E-04	0.000E+00	0.000E+00	3.011E-03
ENE	6.948E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.948E-04
E	9.265E-04	4.632E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	1.506E-03
ESE	6.948E-04	9.265E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.621E-03
SE	8.107E-04	1.158E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.969E-03
SSE	2.085E-03	8.107E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	3.011E-03
S	1.158E-03	2.548E-03	2.316E-04	0.000E+00	0.000E+00	0.000E+00	3.937E-03
SSW	2.664E-03	3.011E-03	2.316E-04	0.000E+00	0.000E+00	0.000E+00	5.906E-03
SW	2.432E-03	8.338E-03	8.107E-04	0.000E+00	0.000E+00	0.000E+00	1.158E-02
WSW	2.664E-03	4.053E-03	2.316E-04	0.000E+00	0.000E+00	0.000E+00	6.948E-03
W	1.158E-03	9.265E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.085E-03
WNW	4.632E-04	1.158E-03	1.158E-04	0.000E+00	0.000E+00	0.000E+00	1.737E-03
NW	4.632E-04	1.621E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.085E-03
NNW	1.969E-03	1.042E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.011E-03
TOTAL	2.235E-02	2.803E-02	1.853E-03	1.158E-04	0.000E+00	0.000E+00	5.235E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.158E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.474E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.632E-04
NNE	3.474E-04	2.316E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.790E-04
NE	3.474E-04	4.632E-04	0.000E+00	1.158E-04	0.000E+00	0.000E+00	9.265E-04
ENE	2.316E-04	5.790E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.107E-04
E	2.316E-04	2.316E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.632E-04
ESE	3.474E-04	3.474E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.948E-04
SE	1.158E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.158E-04
SSE	3.474E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.632E-04
S	5.790E-04	6.948E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.274E-03
SSW	1.621E-03	2.432E-03	1.158E-04	0.000E+00	0.000E+00	0.000E+00	4.169E-03
SW	2.085E-03	4.517E-03	1.158E-03	0.000E+00	0.000E+00	0.000E+00	7.759E-03
WSW	1.621E-03	3.358E-03	1.158E-04	0.000E+00	0.000E+00	0.000E+00	5.096E-03
W	6.948E-04	1.042E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.737E-03
WNW	4.632E-04	9.265E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.390E-03
NW	3.474E-04	5.790E-04	0.000E+00	1.158E-04	0.000E+00	0.000E+00	1.042E-03
NNW	0.000E+00	2.316E-04	1.158E-04	0.000E+00	0.000E+00	0.000E+00	3.474E-04
TOTAL	9.728E-03	1.587E-02	1.506E-03	2.316E-04	0.000E+00	0.000E+00	2.733E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.158E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 2ND QUARTER OF 1993

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

ALL STABILITY CLASSES

WIND DIRECTION	WIND SPEED ~ MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.262E-02	2.768E-02	1.714E-02	9.496E-03	4.632E-03	2.085E-03	7.365E-02
NNE	1.830E-02	4.146E-02	2.247E-02	1.390E-02	5.211E-03	1.158E-03	1.025E-01
NE	1.841E-02	5.084E-02	2.270E-02	8.801E-03	1.158E-03	1.158E-04	1.020E-01
ENE	1.529E-02	5.026E-02	2.721E-02	2.664E-03	2.316E-04	1.158E-04	9.577E-02
E	1.251E-02	3.995E-02	1.922E-02	2.779E-03	1.158E-04	0.000E+00	7.458E-02
ESE	1.089E-02	3.277E-02	1.992E-02	2.200E-03	1.158E-04	0.000E+00	6.589E-02
SE	1.008E-02	2.594E-02	1.830E-02	4.285E-03	9.265E-04	0.000E+00	5.953E-02
SSE	1.390E-02	2.096E-02	1.077E-02	4.053E-03	4.632E-04	8.107E-04	5.096E-02
S	1.459E-02	2.652E-02	9.612E-03	1.042E-03	0.000E+00	3.474E-04	5.211E-02
SSW	1.749E-02	3.034E-02	6.485E-03	1.506E-03	2.316E-04	1.158E-04	5.617E-02
SW	2.119E-02	4.100E-02	7.643E-03	1.158E-03	4.632E-04	2.316E-04	7.169E-02
WSW	1.517E-02	3.080E-02	6.254E-03	6.254E-03	1.506E-03	3.474E-04	6.034E-02
W	7.759E-03	1.135E-02	7.528E-03	3.822E-03	1.737E-03	1.042E-03	3.324E-02
WNW	6.138E-03	6.948E-03	3.474E-03	3.590E-03	1.042E-03	8.107E-04	2.200E-02
NW	6.254E-03	1.436E-02	5.790E-03	4.864E-03	1.621E-03	5.790E-04	3.347E-02
NNW	1.031E-02	2.015E-02	7.180E-03	5.790E-03	1.853E-03	2.316E-04	4.551E-02
TOTAL	2.109E-01	4.713E-01	2.117E-01	7.620E-02	2.131E-02	7.991E-03	9.994E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 5.790E-04

PERIOD OF REPORT: 04/01/93 THRU 06/30/93

NUMBER OF OBSERVATIONS FOR SELECTED TIME PERIOD = 8677

TOTAL TIME IN PERIOD = 2184.00 HRS. LOST/MISSING TIME = 25.25 HRS.

DATA AVAILABILITY = 98.8 %

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8.25	30.25	12.25	2.75	0.25	0.00	53.75
NNE	11.25	37.25	21.00	5.25	0.00	0.25	75.00
NE	19.25	51.50	20.75	1.25	0.00	0.00	92.75
ENE	14.75	66.50	25.00	1.00	0.25	0.00	107.50
E	9.00	44.25	15.75	1.50	0.00	0.00	70.50
ESE	10.50	38.50	12.75	3.75	0.00	0.00	65.50
SE	13.00	44.00	15.75	4.75	0.50	0.25	78.25
SSE	13.50	55.75	20.25	2.50	0.50	0.00	92.50
S	10.50	43.00	11.25	0.75	0.00	0.00	65.50
SSW	9.75	24.00	7.50	1.50	0.00	0.00	42.75
SW	12.75	13.75	3.25	2.00	0.75	0.00	32.50
WSW	8.50	9.00	3.50	3.00	2.75	0.75	27.50
W	2.50	3.50	2.25	5.50	3.00	0.50	17.25
WNW	0.75	2.25	2.50	2.75	1.75	0.50	10.50
NW	4.00	5.50	6.50	5.00	0.25	0.00	21.25
NNW	3.75	14.50	7.25	2.75	0.75	0.00	29.00
TOTAL	152.00	483.50	187.50	46.00	10.75	2.25	882.00

TIME DURATION OF CALMS = 55.00 HRS.

TOTAL HOURS IN STABILITY CLASS = 937.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.75	1.25	0.25	0.00	0.50	0.00	2.75
NNE	1.25	3.00	1.00	0.00	0.00	0.00	5.25
NE	1.25	3.25	0.75	0.00	0.00	0.00	5.25
ENE	1.00	4.75	0.75	0.00	0.00	0.00	6.50
E	0.75	3.00	0.00	0.00	0.00	0.00	3.75
ESE	1.75	3.25	0.25	0.00	0.00	0.00	5.25
SE	1.75	2.50	0.75	0.00	0.00	0.00	5.00
SSE	1.75	3.50	2.25	0.00	0.00	0.00	7.50
S	1.00	6.75	1.00	0.00	0.00	0.00	8.75
SSW	1.50	4.00	0.25	0.00	0.00	0.00	5.75
SW	4.25	5.50	0.00	0.00	0.00	0.00	9.75
WSW	0.75	1.25	0.75	0.25	0.00	0.00	3.00
W	1.00	1.50	0.25	1.00	0.50	0.00	4.25
WNW	0.25	0.25	0.25	0.00	0.00	0.00	0.75
NW	0.00	1.25	0.75	0.50	0.00	0.00	2.50
NNW	0.75	1.00	0.75	1.00	0.00	0.00	3.50
TOTAL	19.75	46.00	10.00	2.75	1.00	0.00	79.50

TIME DURATION OF CALMS = 0.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 80.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.00	1.25	0.25	0.25	0.00	0.00	2.75
NNE	1.75	3.25	0.25	0.00	0.00	0.00	5.25
NE	0.25	4.00	1.25	0.00	0.00	0.00	5.50
ENE	0.50	3.25	0.50	0.00	0.00	0.00	4.25
E	0.25	2.75	0.25	0.00	0.00	0.00	3.25
ESE	0.75	2.25	0.50	0.00	0.00	0.00	3.50
SE	0.75	1.25	1.50	0.25	0.00	0.00	3.75
SSE	0.25	1.00	0.50	0.00	0.00	0.00	1.75
S	0.50	4.00	0.75	0.00	0.00	0.00	5.25
SSW	2.75	3.75	0.00	0.00	0.00	0.00	6.50
SW	2.00	5.75	0.00	0.00	0.00	0.00	7.75
WSW	2.25	1.75	0.00	0.00	0.00	0.00	4.00
W	0.50	0.25	0.25	0.00	0.00	0.00	1.00
WNW	0.50	0.75	0.50	0.25	0.25	0.00	2.25
NW	0.00	2.00	0.50	0.00	0.00	0.00	2.50
NNW	0.00	1.00	0.25	0.00	0.00	0.00	1.25
TOTAL	14.00	38.25	7.25	0.75	0.25	0.00	60.50

TIME DURATION OF CALMS = 1.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 62.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.00	5.00	2.50	1.25	0.50	0.25	12.50
NNE	2.25	8.00	1.50	0.25	0.00	0.00	12.00
NE	3.00	10.50	2.25	0.00	0.00	0.00	15.75
ENE	1.50	7.75	2.75	0.25	0.00	0.00	12.25
E	1.25	6.25	0.25	0.00	0.00	0.00	7.75
ESE	3.00	3.25	0.25	0.00	0.00	0.00	6.50
SE	0.75	3.25	2.25	0.25	0.00	0.00	6.50
SSE	2.00	6.25	1.75	0.00	0.00	0.00	10.00
S	3.50	9.50	2.00	0.00	0.00	0.00	15.00
SSW	2.00	8.25	2.00	0.75	0.25	0.00	13.25
SW	2.50	10.50	1.00	0.25	0.00	0.00	14.25
WSW	2.00	6.75	1.25	0.50	0.00	0.00	10.50
W	0.25	2.75	0.50	0.75	1.00	0.00	5.25
WNW	0.75	2.25	0.00	0.00	0.25	0.00	3.25
NW	1.00	2.50	3.50	0.75	0.25	0.00	8.00
NNW	2.25	6.00	3.25	0.25	0.00	0.00	11.75
TOTAL	31.00	98.75	27.00	5.25	2.25	0.25	164.50

TIME DURATION OF CALMS = 7.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 172.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8.25	15.50	7.75	5.50	2.25	0.25	39.50
NNE	10.50	26.25	9.00	4.50	0.75	0.25	51.25
NE	6.75	16.00	3.75	0.50	0.00	0.00	27.00
ENE	5.75	12.00	6.00	1.00	0.25	0.00	25.00
E	4.75	7.25	0.75	0.00	0.00	0.00	12.75
ESE	3.75	8.50	2.25	0.00	0.00	0.00	14.50
SE	2.50	9.25	5.25	0.25	0.00	0.00	17.25
SSE	4.25	9.00	3.75	0.00	0.00	0.00	17.00
S	5.25	7.75	3.25	0.00	0.00	0.00	16.25
SSW	3.50	7.25	1.00	0.25	0.00	0.00	12.00
SW	3.75	12.00	2.00	1.00	0.25	0.00	19.00
WSW	5.00	9.25	1.50	0.00	0.00	0.00	15.75
W	1.50	2.00	1.75	0.50	0.00	0.00	5.75
WNW	3.75	2.75	0.25	0.50	0.00	0.00	7.25
NW	4.00	8.00	3.50	0.25	0.00	0.00	15.75
NNW	5.25	11.00	2.75	0.50	1.00	0.00	20.50
TOTAL	78.50	163.75	54.50	14.75	4.50	0.50	316.50

TIME DURATION OF CALMS = 15.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 332.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	10.50	6.50	1.25	0.50	0.00	0.00	18.75
NNE	9.00	11.25	2.75	0.25	0.00	0.00	23.25
NE	5.50	5.75	1.00	0.00	0.00	0.00	12.25
ENE	4.50	5.00	2.25	0.00	0.00	0.00	11.75
E	5.75	2.50	0.00	0.00	0.00	0.00	8.25
ESE	4.50	2.75	0.75	0.00	0.00	0.00	8.00
SE	4.50	6.25	0.00	0.00	0.00	0.00	10.75
SSE	6.50	8.25	1.75	0.00	0.00	0.00	16.50
S	4.75	11.25	1.50	0.00	0.00	0.00	17.50
SSW	8.25	15.00	3.00	0.00	0.00	0.00	26.25
SW	7.25	10.25	1.25	0.00	0.00	0.00	18.75
WSW	5.00	10.00	0.50	0.00	0.00	0.00	15.50
W	3.50	2.00	0.25	0.00	0.00	0.00	5.75
WNW	1.75	1.25	0.25	0.00	0.00	0.00	3.25
NW	6.75	5.00	2.00	0.75	0.00	0.00	14.50
NNW	7.75	5.00	0.50	0.25	0.00	0.00	13.50
TOTAL	95.75	108.00	19.00	1.75	0.00	0.00	224.50

TIME DURATION OF CALMS = 6.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 231.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8.50	7.25	0.25	0.00	0.00	0.00	16.00
NNE	7.50	4.75	0.00	0.00	0.00	0.00	12.25
NE	4.50	2.50	0.00	0.00	0.00	0.00	7.00
ENE	4.00	4.50	0.00	0.00	0.00	0.00	8.50
E	2.50	2.00	0.00	0.00	0.00	0.00	4.50
ESE	5.50	2.00	0.00	0.00	0.00	0.00	7.50
SE	5.50	4.50	0.00	0.00	0.00	0.00	10.00
SSE	7.25	8.75	1.50	0.00	0.00	0.00	17.50
S	9.00	12.75	1.00	0.00	0.00	0.00	22.75
SSW	17.25	22.50	1.75	0.00	0.00	0.00	41.50
SW	15.50	30.25	1.25	0.00	0.00	0.00	47.00
WSW	13.25	11.25	0.00	0.00	0.00	0.00	24.50
W	4.50	5.00	0.50	0.00	0.00	0.00	10.00
WNW	1.75	2.25	0.75	0.00	0.00	0.00	4.75
NW	7.00	4.00	0.75	0.25	0.00	0.00	12.00
NNW	7.75	3.75	1.25	0.00	0.00	0.00	12.75
TOTAL	121.25	128.00	9.00	0.25	0.00	0.00	258.50

TIME DURATION OF CALMS = 4.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 263.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

ALL STABILITY CLASSES

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	40.25	67.00	24.50	10.25	3.50	0.50	146.00
NNE	43.50	93.75	35.50	10.25	0.75	0.50	184.25
NE	40.50	93.50	29.75	1.75	0.00	0.00	165.50
ENE	32.00	103.75	37.25	2.25	0.50	0.00	175.75
E	24.25	68.00	17.00	1.50	0.00	0.00	110.75
ESE	29.75	60.50	16.75	3.75	0.00	0.00	110.75
SE	28.75	71.00	25.50	5.50	0.50	0.25	131.50
SSE	35.50	92.50	31.75	2.50	0.50	0.00	162.75
S	34.50	95.00	20.75	0.75	0.00	0.00	151.00
SSW	45.00	84.75	15.50	2.50	0.25	0.00	148.00
SW	48.00	88.00	8.75	3.25	1.00	0.00	149.00
WSW	36.75	49.25	7.50	3.75	2.75	0.75	100.75
W	13.75	17.00	5.75	7.75	4.50	0.50	49.25
WNW	9.50	11.75	4.50	3.50	2.25	0.50	32.00
NW	22.75	28.25	17.50	7.50	0.50	0.00	76.50
NNW	27.50	42.25	16.00	4.75	1.75	0.00	92.25
TOTAL	512.25	1066.25	314.25	71.50	18.75	3.00	1986.00

TIME DURATION OF CALMS = 91.00 HRS.

TOTAL HOURS IN STABILITY CLASS = 2077.00 HRS.

MISSING DATA (HRS) = 131.00

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	8.805E-03	3.228E-02	1.307E-02	2.935E-03	2.668E-04	0.000E+00	5.736E-02
NNE	1.201E-02	3.975E-02	2.241E-02	5.603E-03	0.000E+00	2.668E-04	8.004E-02
NE	2.054E-02	5.496E-02	2.215E-02	1.334E-03	0.000E+00	0.000E+00	9.899E-02
ENE	1.574E-02	7.097E-02	2.668E-02	1.067E-03	2.668E-04	0.000E+00	1.147E-01
E	9.605E-03	4.723E-02	1.681E-02	1.601E-03	0.000E+00	0.000E+00	7.524E-02
ESE	1.121E-02	4.109E-02	1.361E-02	4.002E-03	0.000E+00	0.000E+00	6.990E-02
SE	1.387E-02	4.696E-02	1.681E-02	5.069E-03	5.336E-04	2.668E-04	8.351E-02
SSE	1.441E-02	5.950E-02	2.161E-02	2.668E-03	5.336E-04	0.000E+00	9.872E-02
S	1.121E-02	4.589E-02	1.201E-02	8.004E-04	0.000E+00	0.000E+00	6.990E-02
SSW	1.041E-02	2.561E-02	8.004E-03	1.601E-03	0.000E+00	0.000E+00	4.562E-02
SW	1.361E-02	1.467E-02	3.469E-03	2.134E-03	8.004E-04	0.000E+00	3.469E-02
WSW	9.072E-03	9.605E-03	3.735E-03	3.202E-03	2.935E-03	8.004E-04	2.935E-02
W	2.668E-03	3.735E-03	2.401E-03	5.870E-03	3.202E-03	5.336E-04	1.841E-02
WNW	8.004E-04	2.401E-03	2.668E-03	2.935E-03	1.868E-03	5.336E-04	1.121E-02
NW	4.269E-03	5.870E-03	6.937E-03	5.336E-03	2.668E-04	0.000E+00	2.268E-02
NNW	4.002E-03	1.547E-02	7.737E-03	2.935E-03	8.004E-04	0.000E+00	3.095E-02
TOTAL	1.622E-01	5.160E-01	2.001E-01	4.909E-02	1.147E-02	2.401E-03	9.413E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 5.870E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9.375E-03	1.563E-02	3.125E-03	0.000E+00	6.250E-03	0.000E+00	3.438E-02
NNE	1.563E-02	3.750E-02	1.250E-02	0.000E+00	0.000E+00	0.000E+00	6.563E-02
NE	1.563E-02	4.062E-02	9.375E-03	0.000E+00	0.000E+00	0.000E+00	6.562E-02
ENE	1.250E-02	5.937E-02	9.375E-03	0.000E+00	0.000E+00	0.000E+00	8.125E-02
E	9.375E-03	3.750E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.688E-02
ESE	2.187E-02	4.062E-02	3.125E-03	0.000E+00	0.000E+00	0.000E+00	6.562E-02
SE	2.187E-02	3.125E-02	9.375E-03	0.000E+00	0.000E+00	0.000E+00	6.250E-02
SSE	2.187E-02	4.375E-02	2.812E-02	0.000E+00	0.000E+00	0.000E+00	9.375E-02
S	1.250E-02	8.438E-02	1.250E-02	0.000E+00	0.000E+00	0.000E+00	1.094E-01
SSW	1.875E-02	5.000E-02	3.125E-03	0.000E+00	0.000E+00	0.000E+00	7.187E-02
SW	5.313E-02	6.875E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.219E-01
WSW	9.375E-03	1.563E-02	9.375E-03	3.125E-03	0.000E+00	0.000E+00	3.750E-02
W	1.250E-02	1.875E-02	3.125E-03	1.250E-02	6.250E-03	0.000E+00	5.313E-02
WNW	3.125E-03	3.125E-03	3.125E-03	0.000E+00	0.000E+00	0.000E+00	9.375E-03
NW	0.000E+00	1.563E-02	9.375E-03	6.250E-03	0.000E+00	0.000E+00	3.125E-02
NNW	9.375E-03	1.250E-02	9.375E-03	1.250E-02	0.000E+00	0.000E+00	4.375E-02
TOTAL	2.469E-01	5.750E-01	1.250E-01	3.438E-02	1.250E-02	0.000E+00	9.938E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.250E-03

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.613E-02	2.016E-02	4.032E-03	4.032E-03	0.000E+00	0.000E+00	4.435E-02
NNE	2.823E-02	5.242E-02	4.032E-03	0.000E+00	0.000E+00	0.000E+00	8.468E-02
NE	4.032E-03	6.452E-02	2.016E-02	0.000E+00	0.000E+00	0.000E+00	8.871E-02
ENE	8.065E-03	5.242E-02	8.065E-03	0.000E+00	0.000E+00	0.000E+00	6.855E-02
E	4.032E-03	4.435E-02	4.032E-03	0.000E+00	0.000E+00	0.000E+00	5.242E-02
ESE	1.210E-02	3.629E-02	8.065E-03	0.000E+00	0.000E+00	0.000E+00	5.645E-02
SE	1.210E-02	2.016E-02	2.419E-02	4.032E-03	0.000E+00	0.000E+00	6.048E-02
SSE	4.032E-03	1.613E-02	8.065E-03	0.000E+00	0.000E+00	0.000E+00	2.823E-02
S	8.065E-03	6.452E-02	1.210E-02	0.000E+00	0.000E+00	0.000E+00	8.468E-02
SSW	4.435E-02	6.048E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.048E-01
SW	3.226E-02	9.274E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.250E-01
WSW	3.629E-02	2.823E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.452E-02
W	8.065E-03	4.032E-03	4.032E-03	0.000E+00	0.000E+00	0.000E+00	1.613E-02
WNW	8.065E-03	1.210E-02	8.065E-03	4.032E-03	4.032E-03	0.000E+00	3.629E-02
NW	0.000E+00	3.226E-02	8.065E-03	0.000E+00	0.000E+00	0.000E+00	4.032E-02
NNW	0.000E+00	1.613E-02	4.032E-03	0.000E+00	0.000E+00	0.000E+00	2.016E-02
TOTAL	2.258E-01	6.169E-01	1.169E-01	1.210E-02	4.032E-03	0.000E+00	9.758E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 2.419E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.744E-02	2.907E-02	1.453E-02	7.267E-03	2.907E-03	1.453E-03	7.267E-02
NNE	1.308E-02	4.651E-02	8.721E-03	1.453E-03	0.000E+00	0.000E+00	6.977E-02
NE	1.744E-02	6.105E-02	1.308E-02	0.000E+00	0.000E+00	0.000E+00	9.157E-02
ENE	8.721E-03	4.506E-02	1.599E-02	1.453E-03	0.000E+00	0.000E+00	7.122E-02
E	7.267E-03	3.634E-02	1.453E-03	0.000E+00	0.000E+00	0.000E+00	4.506E-02
ESE	1.744E-02	1.890E-02	1.453E-03	0.000E+00	0.000E+00	0.000E+00	3.779E-02
SE	4.360E-03	1.890E-02	1.308E-02	1.453E-03	0.000E+00	0.000E+00	3.779E-02
SSE	1.163E-02	3.634E-02	1.017E-02	0.000E+00	0.000E+00	0.000E+00	5.814E-02
S	2.035E-02	5.523E-02	1.163E-02	0.000E+00	0.000E+00	0.000E+00	8.721E-02
SSW	1.163E-02	4.797E-02	1.163E-02	4.360E-03	1.453E-03	0.000E+00	7.703E-02
SW	1.453E-02	6.105E-02	5.814E-03	1.453E-03	0.000E+00	0.000E+00	8.285E-02
WSW	1.163E-02	3.924E-02	7.267E-03	2.907E-03	0.000E+00	0.000E+00	6.105E-02
W	1.453E-03	1.599E-02	2.907E-03	4.360E-03	5.814E-03	0.000E+00	3.052E-02
WNW	4.360E-03	1.308E-02	0.000E+00	0.000E+00	1.453E-03	0.000E+00	1.890E-02
NW	5.814E-03	1.453E-02	2.035E-02	4.360E-03	1.453E-03	0.000E+00	4.651E-02
NNW	1.308E-02	3.488E-02	1.890E-02	1.453E-03	0.000E+00	0.000E+00	6.831E-02
TOTAL	1.802E-01	5.741E-01	1.570E-01	3.052E-02	1.308E-02	1.453E-03	9.564E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 4.360E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.485E-02	4.669E-02	2.334E-02	1.657E-02	6.777E-03	7.530E-04	1.190E-01
NNE	3.163E-02	7.907E-02	2.711E-02	1.355E-02	2.259E-03	7.530E-04	1.544E-01
NE	2.033E-02	4.819E-02	1.130E-02	1.506E-03	0.000E+00	0.000E+00	8.133E-02
ENE	1.732E-02	3.614E-02	1.807E-02	3.012E-03	7.530E-04	0.000E+00	7.530E-02
E	1.431E-02	2.184E-02	2.259E-03	0.000E+00	0.000E+00	0.000E+00	3.840E-02
ESE	1.130E-02	2.560E-02	6.777E-03	0.000E+00	0.000E+00	0.000E+00	4.367E-02
SE	7.530E-03	2.786E-02	1.581E-02	7.530E-04	0.000E+00	0.000E+00	5.196E-02
SSE	1.280E-02	2.711E-02	1.130E-02	0.000E+00	0.000E+00	0.000E+00	5.120E-02
S	1.581E-02	2.334E-02	9.789E-03	0.000E+00	0.000E+00	0.000E+00	4.895E-02
SSW	1.054E-02	2.184E-02	3.012E-03	7.530E-04	0.000E+00	0.000E+00	3.614E-02
SW	1.130E-02	3.614E-02	6.024E-03	3.012E-03	7.530E-04	0.000E+00	5.723E-02
WSW	1.506E-02	2.786E-02	4.518E-03	0.000E+00	0.000E+00	0.000E+00	4.744E-02
W	4.518E-03	6.024E-03	5.271E-03	1.506E-03	0.000E+00	0.000E+00	1.732E-02
WNW	1.130E-02	8.283E-03	7.530E-04	1.506E-03	0.000E+00	0.000E+00	2.184E-02
NW	1.205E-02	2.410E-02	1.054E-02	7.530E-04	0.000E+00	0.000E+00	4.744E-02
NNW	1.581E-02	3.313E-02	8.283E-03	1.506E-03	3.012E-03	0.000E+00	6.175E-02
TOTAL	2.364E-01	4.932E-01	1.642E-01	4.443E-02	1.355E-02	1.506E-03	9.533E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 4.669E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.545E-02	2.814E-02	5.411E-03	2.165E-03	0.000E+00	0.000E+00	8.117E-02
NNE	3.896E-02	4.870E-02	1.190E-02	1.082E-03	0.000E+00	0.000E+00	1.006E-01
NE	2.381E-02	2.489E-02	4.329E-03	0.000E+00	0.000E+00	0.000E+00	5.303E-02
ENE	1.948E-02	2.165E-02	9.740E-03	0.000E+00	0.000E+00	0.000E+00	5.087E-02
E	2.489E-02	1.082E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.571E-02
ESE	1.948E-02	1.190E-02	3.247E-03	0.000E+00	0.000E+00	0.000E+00	3.463E-02
SE	1.948E-02	2.706E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.654E-02
SSE	2.814E-02	3.571E-02	7.576E-03	0.000E+00	0.000E+00	0.000E+00	7.143E-02
S	2.056E-02	4.870E-02	6.494E-03	0.000E+00	0.000E+00	0.000E+00	7.576E-02
SSW	3.571E-02	6.494E-02	1.299E-02	0.000E+00	0.000E+00	0.000E+00	1.136E-01
SW	3.139E-02	4.437E-02	5.411E-03	0.000E+00	0.000E+00	0.000E+00	8.117E-02
WSW	2.165E-02	4.329E-02	2.165E-03	0.000E+00	0.000E+00	0.000E+00	6.710E-02
W	1.515E-02	8.658E-03	1.082E-03	0.000E+00	0.000E+00	0.000E+00	2.489E-02
WNW	7.576E-03	5.411E-03	1.082E-03	0.000E+00	0.000E+00	0.000E+00	1.407E-02
NW	2.922E-02	2.165E-02	8.658E-03	3.247E-03	0.000E+00	0.000E+00	6.277E-02
NNW	3.355E-02	2.165E-02	2.165E-03	1.082E-03	0.000E+00	0.000E+00	5.844E-02
TOTAL	4.145E-01	4.675E-01	8.225E-02	7.576E-03	0.000E+00	0.000E+00	9.719E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 2.814E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.232E-02	2.757E-02	9.506E-04	0.000E+00	0.000E+00	0.000E+00	6.084E-02
NNE	2.852E-02	1.806E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.658E-02
NE	1.711E-02	9.506E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.662E-02
ENE	1.521E-02	1.711E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.232E-02
E	9.506E-03	7.605E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.711E-02
ESE	2.091E-02	7.605E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.852E-02
SE	2.091E-02	1.711E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.802E-02
SSE	2.757E-02	3.327E-02	5.703E-03	0.000E+00	0.000E+00	0.000E+00	6.654E-02
S	3.422E-02	4.848E-02	3.802E-03	0.000E+00	0.000E+00	0.000E+00	8.650E-02
SSW	6.559E-02	8.555E-02	6.654E-03	0.000E+00	0.000E+00	0.000E+00	1.578E-01
SW	5.894E-02	1.150E-01	4.753E-03	0.000E+00	0.000E+00	0.000E+00	1.787E-01
WSW	5.038E-02	4.278E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.316E-02
W	1.711E-02	1.901E-02	1.901E-03	0.000E+00	0.000E+00	0.000E+00	3.802E-02
WNW	6.654E-03	8.555E-03	2.852E-03	0.000E+00	0.000E+00	0.000E+00	1.806E-02
NW	2.662E-02	1.521E-02	2.852E-03	9.506E-04	0.000E+00	0.000E+00	4.563E-02
NNW	2.947E-02	1.426E-02	4.753E-03	0.000E+00	0.000E+00	0.000E+00	4.848E-02
TOTAL	4.610E-01	4.867E-01	3.422E-02	9.506E-04	0.000E+00	0.000E+00	9.829E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 1.711E-02

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.972E-03	1.456E-02	5.898E-03	1.324E-03	1.204E-04	0.000E+00	2.588E-02
NNE	5.416E-03	1.793E-02	1.011E-02	2.528E-03	0.000E+00	1.204E-04	3.611E-02
NE	9.268E-03	2.480E-02	9.990E-03	6.018E-04	0.000E+00	0.000E+00	4.466E-02
ENE	7.102E-03	3.202E-02	1.204E-02	4.815E-04	1.204E-04	0.000E+00	5.176E-02
E	4.333E-03	2.130E-02	7.583E-03	7.222E-04	0.000E+00	0.000E+00	3.394E-02
ESE	5.055E-03	1.854E-02	6.139E-03	1.805E-03	0.000E+00	0.000E+00	3.154E-02
SE	6.259E-03	2.118E-02	7.583E-03	2.287E-03	2.407E-04	1.204E-04	3.767E-02
SSE	6.500E-03	2.684E-02	9.750E-03	1.204E-03	2.407E-04	0.000E+00	4.454E-02
S	5.055E-03	2.070E-02	5.416E-03	3.611E-04	0.000E+00	0.000E+00	3.154E-02
SSW	4.694E-03	1.156E-02	3.611E-03	7.222E-04	0.000E+00	0.000E+00	2.058E-02
SW	6.139E-03	6.620E-03	1.565E-03	9.629E-04	3.611E-04	0.000E+00	1.565E-02
WSW	4.092E-03	4.333E-03	1.685E-03	1.444E-03	1.324E-03	3.611E-04	1.324E-02
W	1.204E-03	1.685E-03	1.083E-03	2.648E-03	1.444E-03	2.407E-04	8.305E-03
WNW	3.611E-04	1.083E-03	1.204E-03	1.324E-03	8.426E-04	2.407E-04	5.055E-03
NW	1.926E-03	2.648E-03	3.130E-03	2.407E-03	1.204E-04	0.000E+00	1.023E-02
NNW	1.805E-03	6.981E-03	3.491E-03	1.324E-03	3.611E-04	0.000E+00	1.396E-02
TOTAL	7.318E-02	2.328E-01	9.027E-02	2.215E-02	5.176E-03	1.083E-03	4.247E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 2.648E-02

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.611E-04	6.018E-04	1.204E-04	0.000E+00	2.407E-04	0.000E+00	1.324E-03
NNE	6.018E-04	1.444E-03	4.815E-04	0.000E+00	0.000E+00	0.000E+00	2.528E-03
NE	6.018E-04	1.565E-03	3.611E-04	0.000E+00	0.000E+00	0.000E+00	2.528E-03
ENE	4.815E-04	2.287E-03	3.611E-04	0.000E+00	0.000E+00	0.000E+00	3.130E-03
E	3.611E-04	1.444E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.805E-03
ESE	8.426E-04	1.565E-03	1.204E-04	0.000E+00	0.000E+00	0.000E+00	2.528E-03
SE	8.426E-04	1.204E-03	3.611E-04	0.000E+00	0.000E+00	0.000E+00	2.407E-03
SSE	8.426E-04	1.685E-03	1.083E-03	0.000E+00	0.000E+00	0.000E+00	3.611E-03
S	4.815E-04	3.250E-03	4.815E-04	0.000E+00	0.000E+00	0.000E+00	4.213E-03
SSW	7.222E-04	1.926E-03	1.204E-04	0.000E+00	0.000E+00	0.000E+00	2.768E-03
SW	2.046E-03	2.648E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.694E-03
WSW	3.611E-04	6.018E-04	3.611E-04	1.204E-04	0.000E+00	0.000E+00	1.444E-03
W	4.815E-04	7.222E-04	1.204E-04	4.815E-04	2.407E-04	0.000E+00	2.046E-03
WNW	1.204E-04	1.204E-04	1.204E-04	0.000E+00	0.000E+00	0.000E+00	3.611E-04
NW	0.000E+00	6.018E-04	3.611E-04	2.407E-04	0.000E+00	0.000E+00	1.204E-03
NNW	3.611E-04	4.815E-04	3.611E-04	4.815E-04	0.000E+00	0.000E+00	1.685E-03
TOTAL	9.509E-03	2.215E-02	4.815E-03	1.324E-03	4.815E-04	0.000E+00	3.828E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 2.407E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.815E-04	6.018E-04	1.204E-04	1.204E-04	0.000E+00	0.000E+00	1.324E-03
NNE	8.426E-04	1.565E-03	1.204E-04	0.000E+00	0.000E+00	0.000E+00	2.528E-03
NE	1.204E-04	1.926E-03	6.018E-04	0.000E+00	0.000E+00	0.000E+00	2.648E-03
ENE	2.407E-04	1.565E-03	2.407E-04	0.000E+00	0.000E+00	0.000E+00	2.046E-03
E	1.204E-04	1.324E-03	1.204E-04	0.000E+00	0.000E+00	0.000E+00	1.565E-03
ESE	3.611E-04	1.083E-03	2.407E-04	0.000E+00	0.000E+00	0.000E+00	1.685E-03
SE	3.611E-04	6.018E-04	7.222E-04	1.204E-04	0.000E+00	0.000E+00	1.805E-03
SSE	1.204E-04	4.815E-04	2.407E-04	0.000E+00	0.000E+00	0.000E+00	8.426E-04
S	2.407E-04	1.926E-03	3.611E-04	0.000E+00	0.000E+00	0.000E+00	2.528E-03
SSW	1.324E-03	1.805E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.130E-03
SW	9.629E-04	2.768E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.731E-03
WSW	1.083E-03	8.426E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.926E-03
W	2.407E-04	1.204E-04	1.204E-04	0.000E+00	0.000E+00	0.000E+00	4.815E-04
WNW	2.407E-04	3.611E-04	2.407E-04	1.204E-04	1.204E-04	0.000E+00	1.083E-03
NW	0.000E+00	9.629E-04	2.407E-04	0.000E+00	0.000E+00	0.000E+00	1.204E-03
NNW	0.000E+00	4.815E-04	1.204E-04	0.000E+00	0.000E+00	0.000E+00	6.018E-04
TOTAL	6.740E-03	1.842E-02	3.491E-03	3.611E-04	1.204E-04	0.000E+00	2.913E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 7.222E-04

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.444E-03	2.407E-03	1.204E-03	6.018E-04	2.407E-04	1.204E-04	6.018E-03
NNE	1.083E-03	3.852E-03	7.222E-04	1.204E-04	0.000E+00	0.000E+00	5.778E-03
NE	1.444E-03	5.055E-03	1.083E-03	0.000E+00	0.000E+00	0.000E+00	7.583E-03
ENE	7.222E-04	3.731E-03	1.324E-03	1.204E-04	0.000E+00	0.000E+00	5.898E-03
E	6.018E-04	3.009E-03	1.204E-04	0.000E+00	0.000E+00	0.000E+00	3.731E-03
ESE	1.444E-03	1.565E-03	1.204E-04	0.000E+00	0.000E+00	0.000E+00	3.130E-03
SE	3.611E-04	1.565E-03	1.083E-03	1.204E-04	0.000E+00	0.000E+00	3.130E-03
SSE	9.629E-04	3.009E-03	8.426E-04	0.000E+00	0.000E+00	0.000E+00	4.815E-03
S	1.685E-03	4.574E-03	9.629E-04	0.000E+00	0.000E+00	0.000E+00	7.222E-03
SSW	9.629E-04	3.972E-03	9.629E-04	3.611E-04	1.204E-04	0.000E+00	6.379E-03
SW	1.204E-03	5.055E-03	4.815E-04	1.204E-04	0.000E+00	0.000E+00	6.861E-03
WSW	9.629E-04	3.250E-03	6.018E-04	2.407E-04	0.000E+00	0.000E+00	5.055E-03
W	1.204E-04	1.324E-03	2.407E-04	3.611E-04	4.815E-04	0.000E+00	2.528E-03
WNW	3.611E-04	1.083E-03	0.000E+00	0.000E+00	1.204E-04	0.000E+00	1.565E-03
NW	4.815E-04	1.204E-03	1.685E-03	3.611E-04	1.204E-04	0.000E+00	3.852E-03
NNW	1.083E-03	2.889E-03	1.565E-03	1.204E-04	0.000E+00	0.000E+00	5.657E-03
TOTAL	1.493E-02	4.754E-02	1.300E-02	2.528E-03	1.083E-03	1.204E-04	7.920E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 3.611E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.972E-03	7.463E-03	3.731E-03	2.648E-03	1.083E-03	1.204E-04	1.902E-02
NNE	5.055E-03	1.264E-02	4.333E-03	2.167E-03	3.611E-04	1.204E-04	2.468E-02
NE	3.250E-03	7.703E-03	1.805E-03	2.407E-04	0.000E+00	0.000E+00	1.300E-02
ENE	2.768E-03	5.778E-03	2.889E-03	4.815E-04	1.204E-04	0.000E+00	1.204E-02
E	2.287E-03	3.491E-03	3.611E-04	0.000E+00	0.000E+00	0.000E+00	6.139E-03
ESE	1.805E-03	4.092E-03	1.083E-03	0.000E+00	0.000E+00	0.000E+00	6.981E-03
SE	1.204E-03	4.454E-03	2.528E-03	1.204E-04	0.000E+00	0.000E+00	8.305E-03
SSE	2.046E-03	4.333E-03	1.805E-03	0.000E+00	0.000E+00	0.000E+00	8.185E-03
S	2.528E-03	3.731E-03	1.565E-03	0.000E+00	0.000E+00	0.000E+00	7.824E-03
SSW	1.685E-03	3.491E-03	4.815E-04	1.204E-04	0.000E+00	0.000E+00	5.778E-03
SW	1.805E-03	5.778E-03	9.629E-04	4.815E-04	1.204E-04	0.000E+00	9.148E-03
WSW	2.407E-03	4.454E-03	7.222E-04	0.000E+00	0.000E+00	0.000E+00	7.583E-03
W	7.222E-04	9.629E-04	8.426E-04	2.407E-04	0.000E+00	0.000E+00	2.768E-03
WNW	1.805E-03	1.324E-03	1.204E-04	2.407E-04	0.000E+00	0.000E+00	3.491E-03
NW	1.926E-03	3.852E-03	1.685E-03	1.204E-04	0.000E+00	0.000E+00	7.583E-03
NNW	2.528E-03	5.296E-03	1.324E-03	2.407E-04	4.815E-04	0.000E+00	9.870E-03
TOTAL	3.779E-02	7.884E-02	2.624E-02	7.102E-03	2.167E-03	2.407E-04	1.524E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 7.463E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5.055E-03	3.130E-03	6.018E-04	2.407E-04	0.000E+00	0.000E+00	9.027E-03
NNE	4.333E-03	5.416E-03	1.324E-03	1.204E-04	0.000E+00	0.000E+00	1.119E-02
NE	2.648E-03	2.768E-03	4.815E-04	0.000E+00	0.000E+00	0.000E+00	5.898E-03
ENE	2.167E-03	2.407E-03	1.083E-03	0.000E+00	0.000E+00	0.000E+00	5.657E-03
E	2.768E-03	1.204E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.972E-03
ESE	2.167E-03	1.324E-03	3.611E-04	0.000E+00	0.000E+00	0.000E+00	3.852E-03
SE	2.167E-03	3.009E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.176E-03
SSE	3.130E-03	3.972E-03	8.426E-04	0.000E+00	0.000E+00	0.000E+00	7.944E-03
S	2.287E-03	5.416E-03	7.222E-04	0.000E+00	0.000E+00	0.000E+00	8.426E-03
SSW	3.972E-03	7.222E-03	1.444E-03	0.000E+00	0.000E+00	0.000E+00	1.264E-02
SW	3.491E-03	4.935E-03	6.018E-04	0.000E+00	0.000E+00	0.000E+00	9.027E-03
WSW	2.407E-03	4.815E-03	2.407E-04	0.000E+00	0.000E+00	0.000E+00	7.463E-03
W	1.685E-03	9.629E-04	1.204E-04	0.000E+00	0.000E+00	0.000E+00	2.768E-03
WNW	8.426E-04	6.018E-04	1.204E-04	0.000E+00	0.000E+00	0.000E+00	1.565E-03
NW	3.250E-03	2.407E-03	9.629E-04	3.611E-04	0.000E+00	0.000E+00	6.981E-03
NNW	3.731E-03	2.407E-03	2.407E-04	1.204E-04	0.000E+00	0.000E+00	6.500E-03
TOTAL	4.610E-02	5.200E-02	9.148E-03	8.426E-04	0.000E+00	0.000E+00	1.081E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 3.130E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.092E-03	3.491E-03	1.204E-04	0.000E+00	0.000E+00	0.000E+00	7.703E-03
NNE	3.611E-03	2.287E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.898E-03
NE	2.167E-03	1.204E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.370E-03
ENE	1.926E-03	2.167E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.092E-03
E	1.204E-03	9.629E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.167E-03
ESE	2.648E-03	9.629E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.611E-03
SE	2.648E-03	2.167E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.815E-03
SSE	3.491E-03	4.213E-03	7.222E-04	0.000E+00	0.000E+00	0.000E+00	8.426E-03
S	4.333E-03	6.139E-03	4.815E-04	0.000E+00	0.000E+00	0.000E+00	1.095E-02
SSW	8.305E-03	1.083E-02	8.426E-04	0.000E+00	0.000E+00	0.000E+00	1.998E-02
SW	7.463E-03	1.456E-02	6.018E-04	0.000E+00	0.000E+00	0.000E+00	2.263E-02
WSW	6.379E-03	5.416E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.180E-02
W	2.167E-03	2.407E-03	2.407E-04	0.000E+00	0.000E+00	0.000E+00	4.815E-03
WNW	8.426E-04	1.083E-03	3.611E-04	0.000E+00	0.000E+00	0.000E+00	2.287E-03
NW	3.370E-03	1.926E-03	3.611E-04	1.204E-04	0.000E+00	0.000E+00	5.778E-03
NNW	3.731E-03	1.805E-03	6.018E-04	0.000E+00	0.000E+00	0.000E+00	6.139E-03
TOTAL	5.838E-02	6.163E-02	4.333E-03	1.204E-04	0.000E+00	0.000E+00	1.245E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 2.167E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 3RD QUARTER OF 1993

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

ALL STABILITY CLASSES

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.938E-02	3.226E-02	1.180E-02	4.935E-03	1.685E-03	2.407E-04	7.029E-02
NNE	2.094E-02	4.514E-02	1.709E-02	4.935E-03	3.611E-04	2.407E-04	8.871E-02
NE	1.950E-02	4.502E-02	1.432E-02	8.426E-04	0.000E+00	0.000E+00	7.968E-02
ENE	1.541E-02	4.995E-02	1.793E-02	1.083E-03	2.407E-04	0.000E+00	8.462E-02
E	1.168E-02	3.274E-02	8.185E-03	7.222E-04	0.000E+00	0.000E+00	5.332E-02
ESE	1.432E-02	2.913E-02	8.065E-03	1.805E-03	0.000E+00	0.000E+00	5.332E-02
SE	1.384E-02	3.418E-02	1.228E-02	2.648E-03	2.407E-04	1.204E-04	6.331E-02
SSE	1.709E-02	4.454E-02	1.529E-02	1.204E-03	2.407E-04	0.000E+00	7.836E-02
S	1.661E-02	4.574E-02	9.990E-03	3.611E-04	0.000E+00	0.000E+00	7.270E-02
SSW	2.167E-02	4.080E-02	7.463E-03	1.204E-03	1.204E-04	0.000E+00	7.126E-02
SW	2.311E-02	4.237E-02	4.213E-03	1.565E-03	4.815E-04	0.000E+00	7.174E-02
WSW	1.769E-02	2.371E-02	3.611E-03	1.805E-03	1.324E-03	3.611E-04	4.851E-02
W	6.620E-03	8.185E-03	2.768E-03	3.731E-03	2.167E-03	2.407E-04	2.371E-02
WNW	4.574E-03	5.657E-03	2.167E-03	1.685E-03	1.083E-03	2.407E-04	1.541E-02
NW	1.095E-02	1.360E-02	8.426E-03	3.611E-03	2.407E-04	0.000E+00	3.683E-02
NNW	1.324E-02	2.034E-02	7.703E-03	2.287E-03	8.426E-04	0.000E+00	4.442E-02
TOTAL	2.466E-01	5.134E-01	1.513E-01	3.442E-02	9.027E-03	1.444E-03	9.562E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 4.381E-02

PERIOD OF REPORT: 07/01/93 THRU 09/30/93

NUMBER OF OBSERVATIONS FOR SELECTED TIME PERIOD = 8377

TOTAL TIME IN PERIOD = 2208.00 HRS. LOST/MISSING TIME = 131.00 HRS.

DATA AVAILABILITY = 94.1 %

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.00	6.00	4.50	1.25	0.00	0.00	14.75
NNE	7.25	11.00	5.50	0.00	0.50	0.00	24.25
NE	5.50	10.75	4.50	0.50	0.00	0.00	21.25
ENE	8.00	10.25	0.75	0.25	0.00	0.00	19.25
E	9.50	14.25	1.00	0.00	0.00	0.00	24.75
ESE	9.75	10.75	0.75	0.00	0.00	0.00	21.25
SE	12.75	12.50	1.00	0.00	0.00	0.00	26.25
SSE	13.25	7.25	1.00	0.00	0.00	0.00	21.50
S	14.00	9.00	1.50	0.00	0.00	0.00	24.50
SSW	15.75	13.25	1.00	0.00	0.00	0.00	30.00
SW	10.50	9.50	0.25	0.00	0.00	0.00	20.25
WSW	8.75	4.50	0.00	0.00	0.00	0.00	13.25
W	2.75	0.75	0.00	0.00	0.00	0.00	3.50
WNW	1.00	1.50	0.25	0.00	0.00	0.00	2.75
NW	1.25	1.25	0.00	0.00	0.00	0.00	2.50
NNW	5.00	3.25	2.00	0.75	0.00	0.00	11.00
TOTAL	128.00	125.75	24.00	2.75	0.50	0.00	281.00

TIME DURATION OF CALMS = 10.75 HRS.

TOTAL HOURS IN STABILITY CLASS = 291.75 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.00	1.00	0.50	0.00	0.00	0.00	3.50
NNE	3.00	3.25	0.75	0.00	0.00	0.00	7.00
NE	5.25	4.25	2.50	0.00	0.00	0.00	12.00
ENE	1.75	3.50	1.50	0.00	0.00	0.00	6.75
E	3.75	3.75	1.00	0.00	0.00	0.00	8.50
ESE	2.00	1.50	0.50	0.00	0.00	0.00	4.00
SE	2.25	3.00	1.50	0.00	0.00	0.00	6.75
SSE	3.25	2.25	1.00	0.00	0.00	0.00	6.50
S	3.25	4.00	0.50	0.00	0.00	0.00	7.75
SSW	4.50	6.50	0.75	0.00	0.00	0.00	11.75
SW	6.00	11.50	0.25	0.00	0.00	0.00	17.75
WSW	4.25	3.50	0.00	0.00	0.00	0.00	7.75
W	2.25	1.25	0.00	0.00	0.00	0.00	3.50
WNW	0.75	0.50	0.00	0.00	0.00	0.00	1.25
NW	2.50	1.25	0.00	0.00	0.00	0.00	3.75
NNW	3.00	3.25	0.00	0.00	0.00	0.00	6.25
TOTAL	49.75	54.25	10.75	0.00	0.00	0.00	114.75

TIME DURATION OF CALMS = 9.00 HRS.

TOTAL HOURS IN STABILITY CLASS = 123.75 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.25	3.50	0.25	0.25	0.00	0.00	6.25
NNE	3.50	6.25	1.25	0.00	0.00	0.00	11.00
NE	2.00	4.50	2.25	0.50	0.00	0.00	9.25
ENE	3.25	1.75	0.50	0.00	0.00	0.00	5.50
E	2.25	2.00	2.75	0.00	0.00	0.00	7.00
ESE	1.50	1.50	0.25	0.00	0.00	0.00	3.25
SE	1.00	2.00	0.50	0.00	0.00	0.00	3.50
SSE	0.75	0.50	0.25	0.00	0.00	0.00	1.50
S	3.25	3.75	1.75	0.00	0.00	0.00	8.75
SSW	4.75	5.75	0.25	0.00	0.00	0.00	10.75
SW	4.00	7.25	0.25	0.00	0.00	0.00	11.50
WSW	3.00	3.25	0.00	0.00	0.00	0.00	6.25
W	0.75	0.00	0.00	0.00	0.00	0.00	0.75
WNW	0.50	1.00	0.00	0.00	0.00	0.00	1.50
NW	0.25	1.50	0.00	0.00	0.00	0.00	1.75
NNW	2.50	3.00	0.75	0.00	0.00	0.00	6.25
TOTAL	35.50	47.50	11.00	0.75	0.00	0.00	94.75

TIME DURATION OF CALMS = 6.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 101.25 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.50	8.00	5.25	6.25	1.00	0.00	23.00
NNE	4.25	9.75	4.75	0.75	0.00	0.25	19.75
NE	4.25	10.75	3.50	1.25	0.25	0.00	20.00
ENE	5.25	11.50	2.50	0.00	0.00	0.00	19.25
E	7.50	7.75	6.75	0.00	0.00	0.00	22.00
ESE	4.75	4.50	2.50	0.25	0.00	0.00	12.00
SE	3.00	5.25	6.25	0.00	0.00	0.00	14.50
SSE	3.50	1.75	5.00	0.00	0.00	0.00	10.25
S	5.50	5.75	4.75	0.00	0.00	0.00	16.00
SSW	6.75	6.50	0.00	0.00	0.00	0.00	13.25
SW	7.00	13.25	2.75	0.50	0.00	0.00	23.50
WSW	5.00	10.50	0.75	0.00	0.00	0.25	16.50
W	1.00	1.50	1.00	0.00	0.00	0.25	3.75
WNW	0.00	0.50	0.00	0.00	1.25	1.25	3.00
NW	0.25	1.75	0.25	0.50	0.50	0.50	3.75
NNW	4.25	4.00	4.50	1.75	0.25	0.00	14.75
TOTAL	64.75	103.00	50.50	11.25	3.25	2.50	235.25

TIME DURATION OF CALMS = 4.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 239.75 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6.75	15.75	8.25	10.25	2.50	2.00	45.50
NNE	10.00	16.25	11.25	6.00	5.75	2.25	51.50
NE	6.50	26.50	24.75	5.75	0.00	0.00	63.50
ENE	9.50	34.00	15.50	1.25	0.00	0.00	60.25
E	7.75	22.50	9.00	0.00	0.00	0.00	39.25
ESE	5.00	10.25	2.50	0.00	0.00	0.00	17.75
SE	4.25	4.00	2.25	0.00	0.00	0.00	10.50
SSE	5.25	3.50	1.50	0.00	0.00	0.00	10.25
S	6.00	8.25	3.25	0.25	0.00	0.00	17.75
SSW	7.50	9.50	1.50	0.00	0.00	0.00	18.50
SW	6.50	7.75	1.50	0.00	0.00	0.00	15.75
WSW	8.00	10.75	0.75	2.00	0.75	0.00	22.25
W	3.00	2.25	0.75	0.50	0.00	0.00	6.50
WNW	4.50	1.25	0.50	0.25	0.75	1.00	8.25
NW	6.75	3.75	1.75	0.75	0.00	0.00	13.00
NNW	5.00	13.50	6.50	5.50	1.50	0.00	32.00
TOTAL	102.25	189.75	91.50	32.50	11.25	5.25	432.50

TIME DURATION OF CALMS = 30.25 HRS.

TOTAL HOURS IN STABILITY CLASS = 462.75 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	10.25	11.00	6.75	5.25	0.50	0.25	34.00
NNE	12.25	14.25	2.00	3.25	0.75	0.00	32.50
NE	13.50	13.00	1.00	0.75	0.00	0.00	28.25
ENE	11.75	10.25	1.25	0.25	0.00	0.00	23.50
E	8.25	8.00	2.00	0.00	0.00	0.00	18.25
ESE	5.75	10.00	1.75	0.00	0.00	0.00	17.50
SE	4.50	4.50	1.25	0.00	0.00	0.00	10.25
SSE	5.25	5.25	1.50	0.00	0.25	0.00	12.25
S	7.50	8.50	2.00	0.25	0.00	0.00	18.25
SSW	9.75	8.00	1.00	0.00	0.00	0.00	18.75
SW	10.25	9.00	1.00	0.00	0.00	0.00	20.25
WSW	8.25	8.00	2.25	0.75	0.25	0.00	19.50
W	4.00	1.25	1.50	1.75	1.00	0.00	9.50
WNW	3.00	3.75	1.75	2.00	2.00	0.50	13.00
NW	5.00	6.25	3.00	3.50	1.50	0.25	19.50
NNW	8.75	6.75	4.75	3.25	0.50	0.00	24.00
TOTAL	128.00	127.75	34.75	21.00	6.75	1.00	319.25

TIME DURATION OF CALMS = 6.75 HRS.

TOTAL HOURS IN STABILITY CLASS = 326.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	17.25	13.00	1.25	0.50	0.00	0.00	32.00
NNE	19.25	13.25	0.75	1.00	0.00	0.00	34.25
NE	19.75	17.50	0.75	0.25	0.00	0.00	38.25
ENE	18.50	12.75	1.00	0.00	0.00	0.00	32.25
E	10.25	7.75	1.00	0.00	0.00	0.00	19.00
ESE	11.25	5.00	1.50	0.25	0.00	0.00	18.00
SE	9.75	5.75	0.50	0.00	0.00	0.00	16.00
SSE	16.75	5.50	0.50	0.00	0.00	0.00	22.75
S	20.00	14.25	0.25	0.00	0.00	0.00	34.50
SSW	31.75	27.25	1.50	0.00	0.00	0.00	60.50
SW	29.50	47.50	5.00	0.00	0.00	0.00	82.00
WSW	25.75	34.75	6.50	1.25	0.00	0.00	68.25
W	12.75	10.75	2.00	2.75	0.50	0.00	28.75
WNW	10.25	10.75	4.25	1.25	0.00	0.00	26.50
NW	14.00	12.00	4.25	0.50	0.00	0.00	30.75
NNW	19.75	15.00	2.00	0.75	0.00	0.00	37.50
TOTAL	286.50	252.75	33.00	8.50	0.50	0.00	581.25

TIME DURATION OF CALMS = 42.75 HRS.

TOTAL HOURS IN STABILITY CLASS = 624.00 HRS.

HOURS AT EACH WIND SPEED AND DIRECTION

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

ALL STABILITY CLASSES

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	44.00	58.25	26.75	23.75	4.00	2.25	159.00
NNE	59.50	74.00	26.25	11.00	7.00	2.50	180.25
NE	56.75	87.25	39.25	9.00	0.25	0.00	192.50
ENE	58.00	84.00	23.00	1.75	0.00	0.00	166.75
E	49.25	66.00	23.50	0.00	0.00	0.00	138.75
ESE	40.00	43.50	9.75	0.50	0.00	0.00	93.75
SE	37.50	37.00	13.25	0.00	0.00	0.00	87.75
SSE	48.00	26.00	10.75	0.00	0.25	0.00	85.00
S	59.50	53.50	14.00	0.50	0.00	0.00	127.50
SSW	80.75	76.75	6.00	0.00	0.00	0.00	163.50
SW	73.75	105.75	11.00	0.50	0.00	0.00	191.00
WSW	63.00	75.25	10.25	4.00	1.00	0.25	153.75
W	26.50	17.75	5.25	5.00	1.50	0.25	56.25
WNW	20.00	19.25	6.75	3.50	4.00	2.75	56.25
NW	30.00	27.75	9.25	5.25	2.00	0.75	75.00
NNW	48.25	48.75	20.50	12.00	2.25	0.00	131.75
TOTAL	794.75	900.75	255.50	76.75	22.25	8.75	2058.75

TIME DURATION OF CALMS = 110.50 HRS.

TOTAL HOURS IN STABILITY CLASS = 2169.25 HRS.

MISSING DATA (HRS) = 38.75

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.028E-02	2.057E-02	1.542E-02	4.284E-03	0.000E+00	0.000E+00	5.056E-02
NNE	2.485E-02	3.770E-02	1.885E-02	0.000E+00	1.714E-03	0.000E+00	8.312E-02
NE	1.885E-02	3.685E-02	1.542E-02	1.714E-03	0.000E+00	0.000E+00	7.284E-02
ENE	2.742E-02	3.513E-02	2.571E-03	8.569E-04	0.000E+00	0.000E+00	6.598E-02
E	3.256E-02	4.884E-02	3.428E-03	0.000E+00	0.000E+00	0.000E+00	8.483E-02
ESE	3.342E-02	3.685E-02	2.571E-03	0.000E+00	0.000E+00	0.000E+00	7.284E-02
SE	4.370E-02	4.284E-02	3.428E-03	0.000E+00	0.000E+00	0.000E+00	8.997E-02
SSE	4.542E-02	2.485E-02	3.428E-03	0.000E+00	0.000E+00	0.000E+00	7.369E-02
S	4.799E-02	3.085E-02	5.141E-03	0.000E+00	0.000E+00	0.000E+00	8.398E-02
SSW	5.398E-02	4.542E-02	3.428E-03	0.000E+00	0.000E+00	0.000E+00	1.028E-01
SW	3.599E-02	3.256E-02	8.569E-04	0.000E+00	0.000E+00	0.000E+00	6.941E-02
WSW	2.999E-02	1.542E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.542E-02
W	9.426E-03	2.571E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.200E-02
WNW	3.428E-03	5.141E-03	8.569E-04	0.000E+00	0.000E+00	0.000E+00	9.426E-03
NW	4.284E-03	4.284E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.569E-03
NNW	1.714E-02	1.114E-02	6.855E-03	2.571E-03	0.000E+00	0.000E+00	3.770E-02
TOTAL	4.387E-01	4.310E-01	8.226E-02	9.426E-03	1.714E-03	0.000E+00	9.632E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 3.685E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.616E-02	8.081E-03	4.040E-03	0.000E+00	0.000E+00	0.000E+00	2.828E-02
NNE	2.424E-02	2.626E-02	6.061E-03	0.000E+00	0.000E+00	0.000E+00	5.657E-02
NE	4.242E-02	3.434E-02	2.020E-02	0.000E+00	0.000E+00	0.000E+00	9.697E-02
ENE	1.414E-02	2.828E-02	1.212E-02	0.000E+00	0.000E+00	0.000E+00	5.455E-02
E	3.030E-02	3.030E-02	8.081E-03	0.000E+00	0.000E+00	0.000E+00	6.869E-02
ESE	1.616E-02	1.212E-02	4.040E-03	0.000E+00	0.000E+00	0.000E+00	3.232E-02
SE	1.818E-02	2.424E-02	1.212E-02	0.000E+00	0.000E+00	0.000E+00	5.455E-02
SSE	2.626E-02	1.818E-02	8.081E-03	0.000E+00	0.000E+00	0.000E+00	5.253E-02
S	2.626E-02	3.232E-02	4.040E-03	0.000E+00	0.000E+00	0.000E+00	6.263E-02
SSW	3.636E-02	5.253E-02	6.061E-03	0.000E+00	0.000E+00	0.000E+00	9.495E-02
SW	4.848E-02	9.293E-02	2.020E-03	0.000E+00	0.000E+00	0.000E+00	1.434E-01
WSW	3.434E-02	2.828E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.263E-02
W	1.818E-02	1.010E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.828E-02
WNW	6.061E-03	4.040E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.010E-02
NW	2.020E-02	1.010E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.030E-02
NNW	2.424E-02	2.626E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.051E-02
TOTAL	4.020E-01	4.384E-01	8.687E-02	0.000E+00	0.000E+00	0.000E+00	9.273E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 7.273E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.222E-02	3.457E-02	2.469E-03	2.469E-03	0.000E+00	0.000E+00	6.173E-02
NNE	3.457E-02	6.173E-02	1.235E-02	0.000E+00	0.000E+00	0.000E+00	1.086E-01
NE	1.975E-02	4.444E-02	2.222E-02	4.938E-03	0.000E+00	0.000E+00	9.136E-02
ENE	3.210E-02	1.728E-02	4.938E-03	0.000E+00	0.000E+00	0.000E+00	5.432E-02
E	2.222E-02	1.975E-02	2.716E-02	0.000E+00	0.000E+00	0.000E+00	6.914E-02
ESE	1.481E-02	1.481E-02	2.469E-03	0.000E+00	0.000E+00	0.000E+00	3.210E-02
SE	9.877E-03	1.975E-02	4.938E-03	0.000E+00	0.000E+00	0.000E+00	3.457E-02
SSE	7.407E-03	4.938E-03	2.469E-03	0.000E+00	0.000E+00	0.000E+00	1.481E-02
S	3.210E-02	3.704E-02	1.728E-02	0.000E+00	0.000E+00	0.000E+00	8.642E-02
SSW	4.691E-02	5.679E-02	2.469E-03	0.000E+00	0.000E+00	0.000E+00	1.062E-01
SW	3.951E-02	7.160E-02	2.469E-03	0.000E+00	0.000E+00	0.000E+00	1.136E-01
WSW	2.963E-02	3.210E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.173E-02
W	7.407E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.407E-03
WNW	4.938E-03	9.877E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.481E-02
NW	2.469E-03	1.481E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.728E-02
NNW	2.469E-02	2.963E-02	7.407E-03	0.000E+00	0.000E+00	0.000E+00	6.173E-02
TOTAL	3.506E-01	4.691E-01	1.086E-01	7.407E-03	0.000E+00	0.000E+00	9.358E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.420E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.043E-02	3.337E-02	2.190E-02	2.607E-02	4.171E-03	0.000E+00	9.593E-02
NNE	1.773E-02	4.067E-02	1.981E-02	3.128E-03	0.000E+00	1.043E-03	8.238E-02
NE	1.773E-02	4.484E-02	1.460E-02	5.214E-03	1.043E-03	0.000E+00	8.342E-02
ENE	2.190E-02	4.797E-02	1.043E-02	0.000E+00	0.000E+00	0.000E+00	8.029E-02
E	3.128E-02	3.233E-02	2.815E-02	0.000E+00	0.000E+00	0.000E+00	9.176E-02
ESE	1.981E-02	1.877E-02	1.043E-02	1.043E-03	0.000E+00	0.000E+00	5.005E-02
SE	1.251E-02	2.190E-02	2.607E-02	0.000E+00	0.000E+00	0.000E+00	6.048E-02
SSE	1.460E-02	7.299E-03	2.086E-02	0.000E+00	0.000E+00	0.000E+00	4.275E-02
S	2.294E-02	2.398E-02	1.981E-02	0.000E+00	0.000E+00	0.000E+00	6.674E-02
SSW	2.815E-02	2.711E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.527E-02
SW	2.920E-02	5.527E-02	1.147E-02	2.086E-03	0.000E+00	0.000E+00	9.802E-02
WSW	2.086E-02	4.380E-02	3.128E-03	0.000E+00	0.000E+00	1.043E-03	6.882E-02
W	4.171E-03	6.257E-03	4.171E-03	0.000E+00	0.000E+00	1.043E-03	1.564E-02
WNW	0.000E+00	2.086E-03	0.000E+00	0.000E+00	5.214E-03	5.214E-03	1.251E-02
NW	1.043E-03	7.299E-03	1.043E-03	2.086E-03	2.086E-03	2.086E-03	1.564E-02
NNW	1.773E-02	1.668E-02	1.877E-02	7.299E-03	1.043E-03	0.000E+00	6.152E-02
TOTAL	2.701E-01	4.296E-01	2.106E-01	4.692E-02	1.356E-02	1.043E-02	9.812E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 1.877E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.459E-02	3.404E-02	1.783E-02	2.215E-02	5.402E-03	4.322E-03	9.833E-02
NNE	2.161E-02	3.512E-02	2.431E-02	1.297E-02	1.243E-02	4.862E-03	1.113E-01
NE	1.405E-02	5.727E-02	5.348E-02	1.243E-02	0.000E+00	0.000E+00	1.372E-01
ENE	2.053E-02	7.347E-02	3.350E-02	2.701E-03	0.000E+00	0.000E+00	1.302E-01
E	1.675E-02	4.862E-02	1.945E-02	0.000E+00	0.000E+00	0.000E+00	8.482E-02
ESE	1.080E-02	2.215E-02	5.402E-03	0.000E+00	0.000E+00	0.000E+00	3.836E-02
SE	9.184E-03	8.644E-03	4.862E-03	0.000E+00	0.000E+00	0.000E+00	2.269E-02
SSE	1.135E-02	7.563E-03	3.241E-03	0.000E+00	0.000E+00	0.000E+00	2.215E-02
S	1.297E-02	1.783E-02	7.023E-03	5.402E-04	0.000E+00	0.000E+00	3.836E-02
SSW	1.621E-02	2.053E-02	3.241E-03	0.000E+00	0.000E+00	0.000E+00	3.998E-02
SW	1.405E-02	1.675E-02	3.241E-03	0.000E+00	0.000E+00	0.000E+00	3.404E-02
WSW	1.729E-02	2.323E-02	1.621E-03	4.322E-03	1.621E-03	0.000E+00	4.808E-02
W	6.483E-03	4.862E-03	1.621E-03	1.080E-03	0.000E+00	0.000E+00	1.405E-02
WNW	9.724E-03	2.701E-03	1.080E-03	5.402E-04	1.621E-03	2.161E-03	1.783E-02
NW	1.459E-02	8.104E-03	3.782E-03	1.621E-03	0.000E+00	0.000E+00	2.809E-02
NNW	1.080E-02	2.917E-02	1.405E-02	1.189E-02	3.241E-03	0.000E+00	6.915E-02
TOTAL	2.210E-01	4.100E-01	1.977E-01	7.023E-02	2.431E-02	1.135E-02	9.346E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.537E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.144E-02	3.374E-02	2.071E-02	1.610E-02	1.534E-03	7.669E-04	1.043E-01
NNE	3.758E-02	1.371E-02	6.135E-03	9.969E-03	2.301E-03	0.000E+00	9.969E-02
NE	4.141E-02	3.988E-02	3.067E-03	2.301E-03	0.000E+00	0.000E+00	8.666E-02
ENE	3.604E-02	3.144E-02	3.834E-03	7.669E-04	0.000E+00	0.000E+00	7.209E-02
E	2.531E-02	2.454E-02	6.135E-03	0.000E+00	0.000E+00	0.000E+00	5.598E-02
ESE	1.764E-02	3.067E-02	5.368E-03	0.000E+00	0.000E+00	0.000E+00	5.368E-02
SE	1.380E-02	1.380E-02	3.834E-03	0.000E+00	0.000E+00	0.000E+00	3.144E-02
SSE	1.610E-02	1.610E-02	4.601E-03	0.000E+00	7.669E-04	0.000E+00	3.758E-02
S	2.301E-02	2.607E-02	6.135E-03	7.669E-04	0.000E+00	0.000E+00	5.598E-02
SSW	2.991E-02	2.454E-02	3.067E-03	0.000E+00	0.000E+00	0.000E+00	5.752E-02
SW	3.144E-02	2.761E-02	3.067E-03	0.000E+00	0.000E+00	0.000E+00	6.212E-02
WSW	2.531E-02	2.454E-02	6.902E-03	2.301E-03	7.669E-04	0.000E+00	5.982E-02
W	1.227E-02	3.834E-03	4.601E-03	5.368E-03	3.067E-03	0.000E+00	2.914E-02
WNW	9.202E-03	1.150E-02	5.368E-03	6.135E-03	6.135E-03	1.534E-03	3.988E-02
NW	1.534E-02	1.917E-02	9.202E-03	1.074E-02	4.601E-03	7.669E-04	5.982E-02
NNW	2.684E-02	2.071E-02	1.457E-02	9.969E-03	1.534E-03	0.000E+00	7.362E-02
TOTAL	3.926E-01	3.919E-01	1.066E-01	6.442E-02	2.071E-02	3.067E-03	9.793E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 2.071E-02

PROBABILITY OF CONDITION OCCURRENCE WITHIN STABILITY CLASS

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.764E-02	2.083E-02	2.003E-03	8.013E-04	0.000E+00	0.000E+00	5.128E-02
NNE	3.085E-02	2.123E-02	1.202E-03	1.603E-03	0.000E+00	0.000E+00	5.489E-02
NE	3.165E-02	2.804E-02	1.202E-03	4.006E-04	0.000E+00	0.000E+00	6.130E-02
ENE	2.965E-02	2.043E-02	1.603E-03	0.000E+00	0.000E+00	0.000E+00	5.168E-02
E	1.643E-02	1.242E-02	1.603E-03	0.000E+00	0.000E+00	0.000E+00	3.045E-02
ESE	1.803E-02	8.013E-03	2.404E-03	4.006E-04	0.000E+00	0.000E+00	2.885E-02
SE	1.563E-02	9.215E-03	8.013E-04	0.000E+00	0.000E+00	0.000E+00	2.564E-02
SSE	2.684E-02	8.814E-03	8.013E-04	0.000E+00	0.000E+00	0.000E+00	3.646E-02
S	3.205E-02	2.284E-02	4.006E-04	0.000E+00	0.000E+00	0.000E+00	5.529E-02
SSW	5.088E-02	4.367E-02	2.404E-03	0.000E+00	0.000E+00	0.000E+00	9.696E-02
SW	4.728E-02	7.612E-02	8.013E-03	0.000E+00	0.000E+00	0.000E+00	1.314E-01
WSW	4.127E-02	5.569E-02	1.042E-02	2.003E-03	0.000E+00	0.000E+00	1.094E-01
W	2.043E-02	1.723E-02	3.205E-03	4.407E-03	8.013E-04	0.000E+00	4.607E-02
WNW	1.643E-02	1.723E-02	6.811E-03	2.003E-03	0.000E+00	0.000E+00	4.247E-02
NW	2.244E-02	1.923E-02	6.811E-03	8.013E-04	0.000E+00	0.000E+00	4.928E-02
NNW	3.165E-02	2.404E-02	3.205E-03	1.202E-03	0.000E+00	0.000E+00	6.010E-02
TOTAL	4.591E-01	4.050E-01	5.288E-02	1.362E-02	8.013E-04	0.000E+00	9.315E-01

PROBABILITY OF CALM WITHIN STABILITY CLASS = 6.851E-02

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: A

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.383E-03	2.766E-03	2.074E-03	5.762E-04	0.000E+00	0.000E+00	6.800E-03
NNE	3.342E-03	5.071E-03	2.535E-03	0.000E+00	2.305E-04	0.000E+00	1.118E-02
NE	2.535E-03	4.956E-03	2.074E-03	2.305E-04	0.000E+00	0.000E+00	9.796E-03
ENE	3.688E-03	4.725E-03	3.457E-04	1.152E-04	0.000E+00	0.000E+00	8.874E-03
E	4.379E-03	6.569E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	1.141E-02
ESE	4.495E-03	4.956E-03	3.457E-04	0.000E+00	0.000E+00	0.000E+00	9.796E-03
SE	5.878E-03	5.762E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	1.210E-02
SSE	6.108E-03	3.342E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	9.911E-03
S	6.454E-03	4.149E-03	6.915E-04	0.000E+00	0.000E+00	0.000E+00	1.129E-02
SSW	7.261E-03	6.108E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	1.383E-02
SW	4.840E-03	4.379E-03	1.152E-04	0.000E+00	0.000E+00	0.000E+00	9.335E-03
WSW	4.034E-03	2.074E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.108E-03
W	1.268E-03	3.457E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.613E-03
WNW	4.610E-04	6.915E-04	1.152E-04	0.000E+00	0.000E+00	0.000E+00	1.268E-03
NW	5.762E-04	5.762E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.152E-03
NNW	2.305E-03	1.498E-03	9.220E-04	3.457E-04	0.000E+00	0.000E+00	5.071E-03
TOTAL	5.901E-02	5.797E-02	1.106E-02	1.268E-03	2.305E-04	0.000E+00	1.295E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 4.956E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: B

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	9.220E-04	4.610E-04	2.305E-04	0.000E+00	0.000E+00	0.000E+00	1.613E-03
NNE	1.383E-03	1.498E-03	3.457E-04	0.000E+00	0.000E+00	0.000E+00	3.227E-03
NE	2.420E-03	1.959E-03	1.152E-03	0.000E+00	0.000E+00	0.000E+00	5.532E-03
ENE	8.067E-04	1.613E-03	6.915E-04	0.000E+00	0.000E+00	0.000E+00	3.112E-03
E	1.729E-03	1.729E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	3.918E-03
ESE	9.220E-04	6.915E-04	2.305E-04	0.000E+00	0.000E+00	0.000E+00	1.844E-03
SE	1.037E-03	1.383E-03	6.915E-04	0.000E+00	0.000E+00	0.000E+00	3.112E-03
SSE	1.498E-03	1.037E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	2.996E-03
S	1.498E-03	1.844E-03	2.305E-04	0.000E+00	0.000E+00	0.000E+00	3.573E-03
SSW	2.074E-03	2.996E-03	3.457E-04	0.000E+00	0.000E+00	0.000E+00	5.417E-03
SW	2.766E-03	5.301E-03	1.152E-04	0.000E+00	0.000E+00	0.000E+00	8.183E-03
WSW	1.959E-03	1.613E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.573E-03
W	1.037E-03	5.762E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.613E-03
WNW	3.457E-04	2.305E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.762E-04
NW	1.152E-03	5.762E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.729E-03
NNW	1.383E-03	1.498E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.881E-03
TOTAL	2.293E-02	2.501E-02	4.956E-03	0.000E+00	0.000E+00	0.000E+00	5.290E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 4.149E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: C

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.037E-03	1.613E-03	1.152E-04	1.152E-04	0.000E+00	0.000E+00	2.881E-03
NNE	1.613E-03	2.881E-03	5.762E-04	0.000E+00	0.000E+00	0.000E+00	5.071E-03
NE	9.220E-04	2.074E-03	1.037E-03	2.305E-04	0.000E+00	0.000E+00	4.264E-03
ENE	1.498E-03	8.067E-04	2.305E-04	0.000E+00	0.000E+00	0.000E+00	2.535E-03
E	1.037E-03	9.220E-04	1.268E-03	0.000E+00	0.000E+00	0.000E+00	3.227E-03
ESE	6.915E-04	6.915E-04	1.152E-04	0.000E+00	0.000E+00	0.000E+00	1.498E-03
SE	4.610E-04	9.220E-04	2.305E-04	0.000E+00	0.000E+00	0.000E+00	1.613E-03
SSE	3.457E-04	2.305E-04	1.152E-04	0.000E+00	0.000E+00	0.000E+00	6.915E-04
S	1.498E-03	1.729E-03	8.067E-04	0.000E+00	0.000E+00	0.000E+00	4.034E-03
SSW	2.190E-03	2.651E-03	1.152E-04	0.000E+00	0.000E+00	0.000E+00	4.956E-03
SW	1.844E-03	3.342E-03	1.152E-04	0.000E+00	0.000E+00	0.000E+00	5.301E-03
WSW	1.383E-03	1.498E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.881E-03
W	3.457E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.457E-04
WNW	2.305E-04	4.610E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.915E-04
NW	1.152E-04	6.915E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.067E-04
NNW	1.152E-03	1.383E-03	3.457E-04	0.000E+00	0.000E+00	0.000E+00	2.881E-03
TOTAL	1.637E-02	2.190E-02	5.071E-03	3.457E-04	0.000E+00	0.000E+00	4.368E-02

OVERALL PROBABILITY OF CALM OCCURRENCE = 2.996E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: D

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.152E-03	3.688E-03	2.420E-03	2.881E-03	4.610E-04	0.000E+00	1.060E-02
NNE	1.959E-03	4.495E-03	2.190E-03	3.457E-04	0.000E+00	1.152E-04	9.105E-03
NE	1.959E-03	4.956E-03	1.613E-03	5.762E-04	1.152E-04	0.000E+00	9.220E-03
ENE	2.420E-03	5.301E-03	1.152E-03	0.000E+00	0.000E+00	0.000E+00	8.874E-03
E	3.457E-03	3.573E-03	3.112E-03	0.000E+00	0.000E+00	0.000E+00	1.014E-02
ESE	2.190E-03	2.074E-03	1.152E-03	1.152E-04	0.000E+00	0.000E+00	5.532E-03
SE	1.383E-03	2.420E-03	2.881E-03	0.000E+00	0.000E+00	0.000E+00	6.684E-03
SSE	1.613E-03	8.067E-04	2.305E-03	0.000E+00	0.000E+00	0.000E+00	4.725E-03
S	2.535E-03	2.651E-03	2.190E-03	0.000E+00	0.000E+00	0.000E+00	7.376E-03
SSW	3.112E-03	2.996E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.108E-03
SW	3.227E-03	6.108E-03	1.268E-03	2.305E-04	0.000E+00	0.000E+00	1.083E-02
WSW	2.305E-03	4.840E-03	3.457E-04	0.000E+00	0.000E+00	1.152E-04	7.606E-03
W	4.610E-04	6.915E-04	4.610E-04	0.000E+00	0.000E+00	1.152E-04	1.729E-03
WNW	0.000E+00	2.305E-04	0.000E+00	0.000E+00	5.762E-04	5.762E-04	1.383E-03
NW	1.152E-04	8.067E-04	1.152E-04	2.305E-04	2.305E-04	2.305E-04	1.729E-03
NNW	1.959E-03	1.844E-03	2.074E-03	8.067E-04	1.152E-04	0.000E+00	6.800E-03
TOTAL	2.985E-02	4.748E-02	2.328E-02	5.186E-03	1.498E-03	1.152E-03	1.084E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 2.074E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: E

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.112E-03	7.261E-03	3.803E-03	4.725E-03	1.152E-03	9.220E-04	2.097E-02
NNE	4.610E-03	7.491E-03	5.186E-03	2.766E-03	2.651E-03	1.037E-03	2.374E-02
NE	2.996E-03	1.222E-02	1.141E-02	2.651E-03	0.000E+00	0.000E+00	2.927E-02
ENE	4.379E-03	1.567E-02	7.145E-03	5.762E-04	0.000E+00	0.000E+00	2.777E-02
E	3.573E-03	1.037E-02	4.149E-03	0.000E+00	0.000E+00	0.000E+00	1.809E-02
ESE	2.305E-03	4.725E-03	1.152E-03	0.000E+00	0.000E+00	0.000E+00	8.183E-03
SE	1.959E-03	1.844E-03	1.037E-03	0.000E+00	0.000E+00	0.000E+00	4.840E-03
SSE	2.420E-03	1.613E-03	6.915E-04	0.000E+00	0.000E+00	0.000E+00	4.725E-03
S	2.766E-03	3.803E-03	1.498E-03	1.152E-04	0.000E+00	0.000E+00	8.183E-03
SSW	3.457E-03	4.379E-03	6.915E-04	0.000E+00	0.000E+00	0.000E+00	8.528E-03
SW	2.996E-03	3.573E-03	6.915E-04	0.000E+00	0.000E+00	0.000E+00	7.261E-03
WSW	3.688E-03	4.956E-03	3.457E-04	9.220E-04	3.457E-04	0.000E+00	1.026E-02
W	1.383E-03	1.037E-03	3.457E-04	2.305E-04	0.000E+00	0.000E+00	2.996E-03
WNW	2.074E-03	5.762E-04	2.305E-04	1.152E-04	3.457E-04	4.610E-04	3.803E-03
NW	3.112E-03	1.729E-03	8.067E-04	3.457E-04	0.000E+00	0.000E+00	5.993E-03
NNW	2.305E-03	6.223E-03	2.996E-03	2.535E-03	6.915E-04	0.000E+00	1.475E-02
TOTAL	4.714E-02	8.747E-02	4.218E-02	1.498E-02	5.186E-03	2.420E-03	1.994E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.394E-02

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: F

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.725E-03	5.071E-03	3.112E-03	2.420E-03	2.305E-04	1.152E-04	1.567E-02
NNE	5.647E-03	6.569E-03	9.220E-04	1.498E-03	3.457E-04	0.000E+00	1.498E-02
NE	6.223E-03	5.993E-03	4.610E-04	3.457E-04	0.000E+00	0.000E+00	1.302E-02
ENE	5.417E-03	4.725E-03	5.762E-04	1.152E-04	0.000E+00	0.000E+00	1.083E-02
E	3.803E-03	3.688E-03	9.220E-04	0.000E+00	0.000E+00	0.000E+00	8.413E-03
ESE	2.651E-03	4.610E-03	8.067E-04	0.000E+00	0.000E+00	0.000E+00	8.067E-03
SE	2.074E-03	2.074E-03	5.762E-04	0.000E+00	0.000E+00	0.000E+00	4.725E-03
SSE	2.420E-03	2.420E-03	6.915E-04	0.000E+00	1.152E-04	0.000E+00	5.647E-03
S	3.457E-03	3.918E-03	9.220E-04	1.152E-04	0.000E+00	0.000E+00	8.413E-03
SSW	4.495E-03	3.688E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	8.644E-03
SW	4.725E-03	4.149E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	9.335E-03
WSW	3.803E-03	3.688E-03	1.037E-03	3.457E-04	1.152E-04	0.000E+00	8.989E-03
W	1.844E-03	5.762E-04	6.915E-04	8.067E-04	4.610E-04	0.000E+00	4.379E-03
WNW	1.383E-03	1.729E-03	8.067E-04	9.220E-04	9.220E-04	2.305E-04	5.993E-03
NW	2.305E-03	2.881E-03	1.383E-03	1.613E-03	6.915E-04	1.152E-04	8.989E-03
NNW	4.034E-03	3.112E-03	2.190E-03	1.498E-03	2.305E-04	0.000E+00	1.106E-02
TOTAL	5.901E-02	5.889E-02	1.602E-02	9.681E-03	3.112E-03	4.610E-04	1.472E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 3.112E-03

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

STABILITY CLASS: G

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7.952E-03	5.993E-03	5.762E-04	2.305E-04	0.000E+00	0.000E+00	1.475E-02
NNE	8.874E-03	6.108E-03	3.457E-04	4.610E-04	0.000E+00	0.000E+00	1.579E-02
NE	9.105E-03	8.067E-03	3.457E-04	1.152E-04	0.000E+00	0.000E+00	1.763E-02
ENE	8.528E-03	5.878E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	1.487E-02
E	4.725E-03	3.573E-03	4.610E-04	0.000E+00	0.000E+00	0.000E+00	8.759E-03
ESE	5.186E-03	2.305E-03	6.915E-04	1.152E-04	0.000E+00	0.000E+00	8.298E-03
SE	4.495E-03	2.651E-03	2.305E-04	0.000E+00	0.000E+00	0.000E+00	7.376E-03
SSE	7.722E-03	2.535E-03	2.305E-04	0.000E+00	0.000E+00	0.000E+00	1.049E-02
S	9.220E-03	6.569E-03	1.152E-04	0.000E+00	0.000E+00	0.000E+00	1.590E-02
SSW	1.464E-02	1.256E-02	6.915E-04	0.000E+00	0.000E+00	0.000E+00	2.789E-02
SW	1.360E-02	2.190E-02	2.305E-03	0.000E+00	0.000E+00	0.000E+00	3.780E-02
WSW	1.187E-02	1.602E-02	2.996E-03	5.762E-04	0.000E+00	0.000E+00	3.146E-02
W	5.878E-03	4.956E-03	9.220E-04	1.268E-03	2.305E-04	0.000E+00	1.325E-02
WNW	4.725E-03	4.956E-03	1.959E-03	5.762E-04	0.000E+00	0.000E+00	1.222E-02
NW	6.454E-03	5.532E-03	1.959E-03	2.305E-04	0.000E+00	0.000E+00	1.418E-02
NNW	9.105E-03	6.915E-03	9.220E-04	3.457E-04	0.000E+00	0.000E+00	1.729E-02
TOTAL	1.321E-01	1.165E-01	1.521E-02	3.918E-03	2.305E-04	0.000E+00	2.679E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 1.971E-02

OVERALL PROBABILITY OF CONDITION OCCURRENCE

REPORT FOR 4TH QUARTER OF 1993

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

ALL STABILITY CLASSES

WIND DIRECTION	WIND SPEED - MPH 0.75-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.028E-02	2.685E-02	1.233E-02	1.095E-02	1.844E-03	1.037E-03	7.330E-02
NNE	2.743E-02	3.411E-02	1.210E-02	5.071E-03	3.227E-03	1.152E-03	8.309E-02
NE	2.616E-02	4.022E-02	1.809E-02	4.149E-03	1.152E-04	0.000E+00	8.874E-02
ENE	2.674E-02	3.872E-02	1.060E-02	8.067E-04	0.000E+00	0.000E+00	7.687E-02
E	2.270E-02	3.043E-02	1.083E-02	0.000E+00	0.000E+00	0.000E+00	6.396E-02
ESE	1.844E-02	2.005E-02	4.495E-03	2.305E-04	0.000E+00	0.000E+00	4.322E-02
SE	1.729E-02	1.706E-02	6.108E-03	0.000E+00	0.000E+00	0.000E+00	4.045E-02
SSE	2.213E-02	1.199E-02	4.956E-03	0 000E+00	1.152E-04	0.000E+00	3.918E-02
S	2.743E-02	2.466E-02	6.454E-03	2.305E-04	0.000E+00	0.000E+00	5.878E-02
SSW	3.722E-02	3.538E-02	2.766E-03	0.000E+00	0.000E+00	0.000E+00	7.537E-02
SW	3.400E-02	4.875E-02	5.071E-03	2.305E-04	0.000E+00	0.000E+00	8.805E-02
WSW	2.904E-02	3.469E-02	4.725E-03	1.844E-03	4.610E-04	1.152E-04	7.088E-02
W	1.222E-02	8.183E-03	2.420E-03	2.305E-03	6.915E-04	1.152E-04	2.593E-02
WNW	9.220E-03	8.874E-03	3.112E-03	1.613E-03	1.844E-03	1.268E-03	2.593E-02
NW	1.383E-02	1.279E-02	4.264E-03	2.420E-03	9.220E-04	3.457E-04	3.457E-02
NNW	2.224E-02	2.247E-02	9.450E-03	5.532E-03	1.037E-03	0.000E+00	6.074E-02
TOTAL	3.664E-01	4.152E-01	1.178E-01	3.538E-02	1.026E-02	4.034E-03	9.491E-01

OVERALL PROBABILITY OF CALM OCCURRENCE = 5.094E-02

PERIOD OF REPORT: 10/01/93 THRU 12/31/93

NUMBER OF OBSERVATIONS FOR SELECTED TIME PERIOD = 8721

TOTAL TIME IN PERIOD = 2208.00 HRS. LOST/MISSING TIME = 38.75 HRS.

DATA AVAILABILITY = 98.2 %

OFFSITE DOSE CALCULATION MANUAL (ODCM)

Approved Lead Manager: _____ Date: 11/24/93
Facility Support Manager

Approved: _____ Date: 11/29/93
Project Assurance Manager

Approved: _____ Date: 11/29/93
Operations Manager

Approved: _____ Date: 11-29-93
Engineering Manager

Reviewed: DSRC 038 DEC - 3 1993 Date: _____
DSRC Meeting Number

Reviewed: ISRC 030 DEC - 8 1993 Date: _____
ISRC Meeting Number

TABLE OF CONTENTS

1.0 PURPOSE

1.1 The Offsite Dose Calculation Manual (ODCM) is a supporting document of the Fort St. Vrain Nuclear Station Decommissioning Technical Specifications. The ODCM describes the methodology and parameters to be used in calculation of offsite doses due to radioactive gaseous and liquid effluents. This document also describes the methodology used for calculation of the liquid and gaseous effluent monitoring instrumentation alarm/trip setpoints. Liquid and gaseous radioactive waste treatment system configurations are described in the Decommissioning Plan (Ref. 4.1).

1.2 This ODCM provides the information and methodologies to be used by Fort St. Vrain (FSV) to assure compliance with 10CFR20, 10CFR50.36a, 10CFR50 Appendix A (GDC 60 & 64), 10CFR50 Appendix I, and 40CFR190 with respect to liquid and gaseous radiological effluents.

1.3 This ODCM is based on "Radiological Effluent Technical Specifications for PWR's (NUREG-0472, Draft)," and follows the methodology and models suggested by NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," and other inputs from the Nuclear Regulatory Commission (NRC). Regulatory Guide 1.109 is used for guidance and ICRP-30 dose conversion factors are used for dose calculations.

1.4 This ODCM is maintained at Fort St. Vrain for use as a reference guide and training document of accepted methodologies and calculations. Changes in the calculation methods or parameters will be incorporated to ensure this ODCM represents the present methodology in all applicable areas. Changes to this ODCM will be reviewed and approved in accordance with Section 5.10, Fort St. Vrain Decommissioning Technical Specifications.

1.5 Also included in this manual is a description of the FSV Radiological Environmental Monitoring Program (REMP) in Attachment F. This designates specific sample types and locations currently used to comply with FSV Decommissioning Technical Specification requirements for the REMP. They are subject to change based on the results of the annual land use census.

2.0 APPLICABILITY

This procedure is applicable to all routine, planned liquid and gaseous effluent releases made pursuant to the FSV Decommissioning Technical Specifications and unplanned liquid and gaseous effluent releases.

3.0 GENERAL

3.1 The Radiation Protection Manager (RPM) shall be responsible to assure that the ODCM is utilized in accordance with the FSV Decommissioning Technical Specifications. The RPM is also responsible for ensuring that all radioactive waste is handled, stored, and disposed of in accordance with NRC requirements and FSV procedures.

3.2 All radioactive liquid waste is discharged via a common line, is monitored by a liquid waste activity monitor, and therefore, there are no multiple release points and monitor settings do not have to be reduced to account for multiple releases.

3.3 Liquid effluent monitor alarm setpoints are determined in order to assure compliance with 10CFR20. The setpoints ensure that the concentration of radionuclides in the liquid effluent at the site boundary (unrestricted area) does not exceed the concentrations specified in 10CFR20, Appendix B.

3.4 If the calculated alarm setpoint for any of the FSV radiation monitors exceeds the range of the instrument, appropriate lower setpoints will be determined by the RPM. In all cases, since the setpoint is reduced, compliance with the limits in this procedure will be assured.

3.5 The alarm setpoints as calculated in this procedure are the maximum allowable; setpoints may be set lower than the calculated values if so desired.

3.6 Surveillance requirements must be completed within +25% of the specified frequency. Should this frequency be exceeded, the applicable instrument shall be declared inoperable until such time that the required test or calibration is successfully performed.

3.7 The appropriate portions of the liquid and gaseous effluent treatment systems shall be used to reduce releases of radioactivity when the projected doses in a 31-day period would exceed 2 percent of the guidelines for the annual dose or dose commitment conforming to Appendix I to 10 CFR Part 50.

3.8 The LLD is defined for purposes of these specifications as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

3.9 For a particular measurement system which may include radiochemical separation:

$$LLD = \frac{2.71 + 4.66\sqrt{B}}{T \cdot E \cdot V \cdot 2.22E6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD is the "a priori" lower limit of detection as defined above as microcuries per unit mass or volume,

$\sqrt{B}$ is the standard deviation of the total background counts or of the total counts of a blank sample, as appropriate, as counts,

T is the count time of background in minutes,

E is the counting efficiency as counts per disintegration or counts per gamma for gamma spectroscopy,

V is the sample size in units of mass or volume,

2.22E6 is the number of disintegrations per minute per microcurie, (dpm/μCi),

Y is the fractional radiochemical yield when applicable and/or the gammas per disintegration when applied to gamma spectroscopy,

λ is, if radioactive decay correction is applicable, the radioactive decay constant for the particular radionuclide,

Δt is the elapsed time between the sample collection and time of counting.

3.10 Values of E, V, Y, and Δt, which are appropriate to the sample, should be used in the calculation.

3.11 It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

4.0 REFERENCES

4.1 FSV Decommissioning Plan

4.2 10CFR20, "Standards for Protection Against Radiation"

4.3 Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I," October, 1977

4.4 10CFR50, "Domestic Licensing of Production and Utilization Facilities"

4.5 NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October, 1978

4.6 40CFR190, "Environmental Radiation Protection Standards for Nuclear Operation"

4.7 40CFR141, "EPA Interim Drinking Water Standards for Radionuclides"

4.8 Decommissioning Technical Specifications

4.9 ICRP-30, "Limits for Intakes of Radionuclides by Workers"

4.10 ORNL-4992, "A Methodology for Calculating Radiation Doses from Radioactivity Released to the Environment"

4.11 NUREG/CR-4007, "Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements"

4.12 USNRC Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexaflouride Production Plants", December, 1985

4.13 USNRC 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",June, 1974

4.14 USNRC Regulatory Guide 1.23, "Meteorological Programs in Support of Nuclear Power Plants", September, 1980

4.15 USNRC Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light Water Cooled Reactors"

4.16 USNRC Regulatory Guide 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants"

4.17 NUREG-0472 (DRAFT), "Radiological Effluent Technical Specifications for PWR'S"

4.18 Tritium Discharge Understanding between Public Service Co. of Colorado and the Colorado Department of Health, Water Quality Control Division, August, 1992

5.0 ATTACHMENTS

5.1 DPP 5.4.2-A A_i, Values (Dose Factors) for Fort St. Vrain.

5.2 DPP 5.4.2-B P_i Values for FSV.

5.3 DPP 5.4.2-C R Values for FSV.

5.4 DPP 5.4.2-D Monthly South Platte River Low Flow Rates.

5.5 DPP 5.4.2-E ODCM Background Information.

5.6 DPP 5.4.2-F Radiological Environmental Monitoring Program.

6.0 PROCEDURE

6.1 Liquid Effluent Release Requirements

6.1.1 The maximum instantaneous release rate of radioactive liquid effluents from the site shall be such that the concentration of radionuclides in the unrestricted area does not exceed the values specified in 10CFR20. If plant conditions exist such that the concentration of radioactivity in the liquid effluent from the plant exceeds the specified limits, immediate action shall be taken to terminate the release.

6.1.2 Liquid effluent releases will also be controlled so that the EPA Safe Drinking Water Standard of 20,000 pCi/ℓ for tritium will not be exceeded in the South Platte River on a monthly average basis. This is in accordance with the Tritium Discharge Understanding between PSC and the Colorado Department of Health.

6.1.3 Prior to initiating a batch or continuous release, a sample of liquid to be released via the radioactive liquid effluent discharge pathway shall be analyzed for principal gamma emitters, tritium, and for other radioisotopes of concern as identified by previous experience. The results of these analyses shall be used to ensure that the concentrations at the point of release to the unrestricted area are maintained within the limits described in 6.1.1 and 6.1.2 above.

6.1.4 The lower limits of detection (LLD) for the radioactive liquid waste sampling and analysis program shall satisfy the following:

Principal Gamma Emitters	5E-7 μCi/mℓ
H-3	1E-5 μCi/mℓ

6.1.5 The principal gamma emitters for which the LLD specification applies are the following radionuclides: Mn-54, Co-60, Zn-65, Cs-134, Cs-137, and Ce-144. This list does not mean that only these nuclides are to be considered. Other reactor produced gamma emitters that are identified shall also be analyzed and reported in the Annual Radioactive Effluent Release Report.

6.1.6 Continuous and batch effluent discharges shall not occur simultaneously.

6.1.7 All liquid effluent releases shall be continuously monitored by a gamma activity monitor and its associated recorder.

6.1.8 Equipment shall be operable to automatically terminate the release on high gamma activity or low blowdown flow and give a Control Room alarm.

6.1.9 If the gamma activity monitor becomes inoperable, liquid effluent releases may continue provided that prior to initiating a subsequert batch or continuous release, at least two technically-qualified members of the facility staff independently verify the release rate calculations.

6.1.10 If the gamma activity monitor becomes inoperable during a Reactor Building Sump release, the release may continue provided that a grab sample is taken every 12 hours during the release and analyzed for principal gamma emitters and tritium.

6.1.11 With the radioactive liquid effluent monitoring instrument inoperable, best efforts shall be exerted to return the instrument to operable status within thirty days and if unsuccessful, the failure to correct the inoperability in a timely fashion shall be explained in the next Annual Radioactive Effluent Release Report.

6.1.12 If the recorder associated with the gamma activity monitor becomes inoperable, liquid effluent releases may continue provided the count rate of the monitor is recorded at least once per four hours during actual releases.

6.1.13 Best efforts shall be exerted to return the recorder to operable status within thirty days and if unsuccessful, the failure to correct the inoperability in a timely fashion shall be explained in the next Annual Radioactive Effluent Release Report.

6.1.14 If the blowdown flow measuring devices become inoperable, liquid effluent releases may continue provided the flow rate is estimated at least once per four hours during actual releases. Flow rate can be estimated using the Parshall Flume in the liquid discharge pathway.

6.1.15 Liquid releases from the PCRV Shield Water System may be performed after the water in the PCRV has been processed to the extent that the concentrations of Co-60 and Cs-137, in the entire PCRV water volume are less than approximately 1.0% of the 10CFR20 MPC limits, and after tritium has been reduced to less than the 10 CFR 20 MPC limit. The water may be sent directly to the discharge line where it will be diluted with blowdown flow and released. At that time, the liquid waste holdup tank will not be required to be used and the entire PCRV will be considered a process tank and releases will be made directly to the dilution point, as long as no activities are in progress inside the PCRV that could stir up additional contaminants and release them into the PCRV Shield Water System.

6.1.16 If the liquid waste system effluent flow indicator (bull's eye) becomes inoperable, any release in progress must be terminated immediately and subsequent releases prohibited until the flow indicator is returned to operable status or an equivalent flow indicating device or method is established.

6.1.17 If the liquid waste system effluent flow rate measuring device becomes inoperable, releases may continue provided the flow rate is estimated once per hour.

6.1.18 Flow rate from the liquid waste holdup system can be estimated by performing a level decay evaluation.

6.2 Liquid Effluent Surveillance Requirements

6.2.1 The level alarms and pump interlocks on the two liquid waste receiver tanks and monitoring tank shall be tested once per year.

6.2.2 The liquid effluent discharge blocking valve shall be functionally tested prior to each release.

6.2.3 The gamma activity and Circulating Water blowdown flow rate monitors and their associated recorders shall be channel-checked hourly during each release, functionally tested prior to each release or quarterly whichever is more frequent, and calibrated once per 18 months.

NOTE: For the gamma activity monitor, the channel functional test shall also demonstrate that Control Room or local alarm annunciation occurs if any of the following conditions exist:

1. **Instrument indicates measured levels above the alarm setpoint.**
2. **Circuit failure.**
3. **Instrument indicates a downscale failure.**

6.2.4 The Radioactive Liquid Waste discharge flow rate measuring device and recorder shall be channel checked daily during releases and calibrated once per 18 months.

6.2.5 The Radioactive Liquid Waste discharge flow indicating device (bull's eye) shall be channel checked hourly during releases.

6.2.6 Channel check of flow instrumentation shall consist of verifying indication of flow during periods of release. Channel check shall be made at least once per 24 hours on days on which continuous, periodic, or batch releases are made.

6.2.7 During continuous releases, the liquid effluent discharge shall be sampled once per week and analyzed per 6.1.3 above.

6.3 Liquid Effluent Compliance with 10CFR20

6.3.1 In order to show compliance with 10CFR20, the concentration of radionuclides in liquid effluents will be determined and compared to maximum permissible concentrations (MPC) as defined in Appendix B, Table II, of 10CFR20.

6.3.2 Concentrations of radioactivity in effluents prior to dilution will be determined by sampling and analysis.

6.3.3 Concentrations of radioactivity in diluted effluent will be calculated using these results prior to and following each batch release.

6.3.4 The concentration of the various radionuclides in the liquid effluent prior to dilution will be divided by the minimum dilution flow to obtain the concentration at the unrestricted area. This calculation is shown in the following equation:

$$Conc_i = \frac{C_i R}{MDF}$$

Where:

$Conc_i$ = Concentration of radionuclide, i, at the unrestricted area in $\mu Ci/m\ell$;

C_i = Concentration of radionuclide, i, in the potential batch release in $\mu Ci/m\ell$;

R = Release rate of the batch in gpm;

MDF = Minimum Dilution Flow in gpm.

6.3.5 The projected concentration in the unrestricted area will be compared to the concentration in Appendix B, Table II, of 10CFR20 as follows:

$$\Sigma \frac{(Conc_i)}{(MPC_i)} \leq 1$$

Where:

MPC_i = Maximum Permissible Concentration of radionuclide, i, from 10CFR20 in $\mu Ci/m\ell$.

6.4 Liquid Effluent Doses - Compliance with 10CFR50

6.4.1 Doses resulting from liquid effluents will be calculated monthly to show compliance with 10CFR50. A cumulative summation of total body and the maximum exposed organ doses for each calendar quarter and calendar year will be maintained. Projected releases for the next month will also be evaluated by the Facility Support staff as necessary to ensure compliance with 10CFR50.

6.4.2 Dose calculations will normally only be performed for tritium. Dose calculations for any other radionuclides will only be performed if their undiluted concentration exceeds 1% of their respective 10CFR20 MPC.

6.4.3 Dose calculations will be performed for the most reasonably conservative pathways identified in the Environmental Report Supplement. These include doses resulting from tritium **after** dilution in downstream surface or ground water as follows:

a) Drinking water from Gilcrest town wells;

b) Ingestion of beef or poultry watered from surface water;

c) Drinking milk from cows that drink surface water;

d) Ingestion of vegetables irrigated with surface water;

e) Ingestion of fish from surface water.

6.4.4 Pathways involving consumption of tritiated water in the Goosequill Ditch will be minimized by posting of 'NO HUNTING' and 'NO FISHING' areas. These pathways were evaluated in the Environmental Report Supplement, and will not be re-evaluated in accordance with this ODCM.

6.4.5 The dose contribution from the release of liquid effluents will be calculated monthly, as follows:

$$D_\tau = \Sigma_k \Sigma_i A_{i\tau} t_k C_{ik} F_k$$

Where:

D_τ = The dose commitment to the total body or any organ from the liquid effluents for the 31-day period, mrem;

C_{ik} = The average concentration of radionuclide, i, in undiluted liquid effluent for the release k, μCi/mℓ;

$A_{i\tau}$ = The site-related ingestion dose commitment factor to the total body or maximum exposed organ, τ, (Attachment A);

F_k = The near field average dilution factor for C_{ik} during release, k, as determined in 6.4.6;

t_k = The length of time for release, k, hours.

6.4.6 The average dilution factor (F_k) for each release will be calculated as follows:

$$F_k = \frac{R_k}{ADDF_k}$$

Where:

R_k = Release rate during time period, k, gpm;

$ADDF_k$ = Actual downstream dilution flow rate during release k, gpm, from Attachment D.

NOTE: **This is the low monthly flow downstream of the confluence of the South Platte River and St. Vrain Creek and applies to both batch and continuous releases.**

6.4.7 The dose contributions from batch and continuous releases will be summed to determine the total dose contribution from liquid effluents and compare with quarterly and annual limits.

6.4.8 The monthly results will be added to the doses cumulated from the other months in the quarter of interest and in the year of interest.

6.4.9 The following relationships should hold:

a) Dose < 1.5 mrem/qtr total body

b) Dose < 5 mrem/qtr any organ

c) Dose < 3 mrem/yr total body

d) Dose < 10 mrem/yr any organ

6.4.10 If these quarterly or annual limits are exceeded, a special report should be submitted to the NRC stating the reason and corrective action to be taken. If twice these limits are exceeded, a special report will be submitted showing compliance with 40CFR190.

6.5 Liquid Effluent Releases - Compliance with Tritium Discharge Understanding

6.5.1 Releases of liquid effluent containing tritium from PCRV Shield Water shall be controlled to ensure that the monthly average tritium concentration in downstream surface water does not exceed 20,000 pCi/l, in compliance with the Tritium Discharge Understanding between PSC and the Colorado Department of Health.

6.5.2 Tritium release rates shall be based on the following mass balance calculations:

First, a calculated maximum tritium concentration in the Goosequill ditch shall be determined, based on available dilution flows in the surrounding surface waters. This calculation is described in Section 6.5.4.

Then, a maximum release rate shall be determined from the calculation in Section 6.5.5.

6.5.3 The Goosequill ditch represents the calculational point for determining tritium concentration to be released to the surface waters.

6.5.4 The calculated maximum tritium concentration for discharge into the Goosequill ditch shall be determined from the following mass balance equation:

$$M_{GQ} = \frac{Q_{DSP}M_{DSP} - (Q_{USP}M_{USP} + Q_{USV}M_{USV})}{Q_{GQ}}$$

Where,

M_{GQ} = Calculated Maximum Tritium Concentration for discharge into the Goosequill Ditch (pCi/l);

Q_{GQ} = 4.45 cfs (2000 gpm), conservatively assumed Goosequill Ditch flow rate;

Q_{DSP} = S. Platte River monthly low flow rate, Downstream, from Attachment D;

M_{DSP} = 20,000 pCi/l, Tritium Concentration in S. Platte River, Downstream;

Q_{USP} = S. Platte River monthly low flow rate, Upstream, from Attachment D (cfs);

M_{USP} = Tritium Concentration in S. Platte River, Upstream (pCi/l), from weekly sample data; if less than lower limit of detection, this will be considered zero;

Q_{USV} = St. Vrain Creek monthly low flow rate, Upstream, from Attachment D (cfs);

M_{USV} = Tritium Concentration in St. Vrain Creek, Upstream (pCi/l), from weekly sample data; if less than lower limit of detection, this will be considered zero.

6.5.5 The maximum in-plant release rate shall be determined from the following mass balance equation:

$$Q_{RLW} = \frac{Q_{GQ}M_{GQ} - Q_{BD}M_{BD}}{M_{RLW}}$$

Where,

Q_{RLW} = Radioactive Liquid Waste release flow rate (gpm);

M_{RLW} = Tritium concentration in Radioactive Liquid Waste (pCi/l), based on sampling prior to release;

Q_{GQ} = 1100 gpm, conservative Goosequill Ditch flow rate;

M_{GQ} = Maximum Tritium Concentration for discharge into the Goosequill Ditch

(pCi/l), obtained from Step 6.5.4 above;

Q_{BD} = Bypass/Blowdown flow rate (gpm);

M_{BD} = Tritium concentration in Bypass/Blowdown water (pCi/l), based on weekly sample data from storage pond; if less than the lower limit of detection, this will be considered zero.

6.5.6 Monthly flow rates for the S. Platte River (upstream), the St. Vrain Creek (upstream), and the combined downstream flow are based on the Monthly Low Flow Rates in Attachment D.

6.5.7 Upstream tritium concentrations in the S. Platte River, the St. Vrain Creek, and the storage ponds will be determined from weekly sampling and analysis.

6.5.8 During each batch release, or once per day during continuous releases, a sample from the Goosequill ditch downstream of the release point shall be collected and analyzed for tritium concentration.

6.5.9 Copies of the analysis results shall be provided to the PSC Radiation Protection Manager and the WT Project Radiation Protection Manager.

6.5.10 Actual tritium concentrations in the downstream S. Platte River shall be determined by analyzing water samples taken at the Milliken bridge.

6.5.11 A representative grab sample of downstream S. Platte River water shall be taken once per day during the first 90 days of releases from the PCRV Shield Water, and at least once per week thereafter.

6.5.12 If tritium concentration in the downstream So. Platte River Water exceeds 19,000 pCi/l, both the PSC Radiation Protection Manager and the WT Radiation Protection Manager shall be notified.

6.6 Liquid Effluent Monitor Alarm Setpoint Determination: Continuous Releases

6.6.1 The liquid activity monitor setpoints are determined based on an NIST traceable gamma source isotopic calibration of the monitors.

6.6.2 Based on the sensitivity of the monitor ($\mu Ci/m\ell/cpm$), a monitor response (cpm) corresponding to the unrestricted area MPC for the most restrictive gamma isotope present in the liquid waste system or the Reactor Building Sump (as found during 10CFR61 surveys and analysis of liquid waste release samples) or the PCRV Shield Water System effluent is determined using the following:

$$Alarm\ Setpoint(cpm) = (55)\ \frac{Most\ Restrictive\ MPC\ (\mu Ci/m\ell)}{Sensitivity\ (\mu Ci/m\ell/cpm)}$$

Where:

$$55 = \frac{110\ (minimum\ dilution\ (blowdown)\ factor)}{2\ (ALARA\ factor)}$$

6.7 Liquid Effluent Monitor Alarm Setpoint Determination: Batch Releases

6.7.1 The alarm setpoints for RT-6212 and/or RT-6213 will be evaluated prior to each batch release from the Liquid Waste Monitoring Tank, Receivers, Reactor Building Sump, or PCRV Shield Water System as applicable.

NOTE: **If, as a result of analysis, no gamma activity is identified, monitor alarm setpoints will be the same as for continuous releases.**

6.7.2 If the concentration of total gamma activity is greater than 1E-4μCi/ml the RPM or designee will evaluate whether revised setpoints are required.

6.7.3 If required, the monitor setpoint will be determined, taking into account the amount of tritium and other isotopes that would not be detected by RT-6212 and/or RT-6213, as follows:

a) For the isotope identified in the sample analysis above that has the most restrictive MPC per 10CFR20,

$$Alarm\ Setpoint\ (cpm) = B\ [\frac{MPC(\mu Ci/m\ell)}{Monitor\ Sensitivity\ (\mu Ci/m\ell/cpm)}]$$

Where:

Monitor Sensitivity$_i$ = the sensitivity of the monitor in μCi/mℓ/cpm, and

B=Adjustment factor to account for tritium and any other isotopes not detected by RT-6212 and/or RT-6213. The value used for "B" will be provided by the PSC Radiation Protection Manager and must be based on the requirement to maintain the total concentration of all nuclides at or below MPC i.e., $\Sigma\ C_i/MPC_i \leq 1$, with appropriate adjustment for ALARA.

6.8 Gaseous Effluent Generic Release Requirements

6.8.1 The lower limits of detection (LLD) for the radioactive gaseous waste sampling and analysis program shall satisfy the following:

Tritium	1E-06 μCi/cc
Particulate	1E-11 μCi/cc

6.8.2 The principal gamma emitters for which the lower limits of detection (LLD) specification applies are the following radionuclides: Mn-54, Co-60, Zn-65, Cs-134, Cs-137, and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be considered. Other reactor produced gamma emitters that are identified shall also be analyzed and reported in the Annual Radioactive Effluent Release Report.

6.8.3 At least one Reactor Building exhaust fan shall be operating whenever gaseous effluent releases are taking place.

6.8.4 Hourly meteorological data shall be collected and reported in the Annual Effluent Report in accordance with Section C.1 of Reference 4.13.

6.8.5 During gaseous effluent releases from the Reactor Building Ventilation Exhaust Stack, one particulate sampler shall be operable.

6.8.6 If the required particulate sampler becomes inoperable, gaseous effluent releases from the Reactor Building Ventilation Exhaust Stack may continue provided an alternate sampler is placed in operation during gas releases.

6.8.7 If the Reactor Building Exhaust Stack flow rate measuring device become inoperable, releases may continue provided the flow rate is estimated at least once per four hours.

6.8.8 The flow rate from the Reactor Building Exhaust Stack can be estimated by observing how many Reactor Building exhaust fans are operating.

6.9 Gaseous Effluent Batch Release Requirements

6.9.1 The allowable batch release rate, r, is calculated as follows:

$$r \frac{C_{H3}}{(MPC)_{H3}} \leq 2.18E9 cm^3/sec$$

Where:

C_{H3} = concentration in $\mu Ci/std.cc$ of tritium,

MPC_{H3} = maximum permissible concentration of tritium, per 10CFR20, in $\mu Ci/cm^3$,

r = release rate in std.cc/sec.

2.18E9 cm^3/sec = The inverse of the annual average dilution factor of 4.59E-10 sec/cm^3 at 100 meters.

NOTE: **If this condition cannot be met, immediate action shall be taken to terminate release from the gas waste system.**

6.9.2 Prior to a batch radioactive release, the contents shall be sampled and analyzed for tritium to determine that releases will be in compliance with 6.9.1 above.

6.10 Gaseous Effluent Surveillance Requirements

6.10.1 During continuous gaseous effluent releases, a grab sample shall be obtained once per week from the Reactor Building Ventilation Exhaust Stack and analyzed for tritium.

6.10.2 The gaseous effluent particulate sample filter shall be analyzed once per week for gamma emitters described in 6.7.2 above.

6.10.3 The gaseous effluent particulate sampler shall be channel-checked daily, and flow indicator calibrated once per 18 months and following maintenance on the flow indicator.

6.10.4 The gaseous effluent tritium sampler flow indicator shall be calibrated once per 18 months and following maintenance on the flow indicator.

6.10.5 Reactor Building Ventilation Exhaust flow recorders and flow indicators shall be channel-checked daily and calibrated once per 18 months.

6.10.6 Meteorological System instrumentation shall be calibrated semi-annually to ensure meeting the system accuracies presented in Reg. Guide 1.23 (Reference 4.14).

6.11 Gaseous Effluent Dose Rate - Compliance with 10CFR20

6.11.1 Dose rates resulting from the release of tritium and particulates with half lives greater than eight days shall be calculated monthly to show compliance with 10CFR20.

6.11.2 The limits of 10CFR20 is conservatively applied on an instantaneous basis at the hypothetical worst case location.

6.11.3 The dose rate in unrestricted areas resulting from the release of tritium and particulates with half lives greater than eight days is limited to 500 mrem/yr to any organ.

6.11.4 Dose calculations will normally only be performed for tritium. Dose calculations for any other radionuclides will only be performed if their undiluted concentration exceeds 1% of their respective 10CFR20 MPC. The calculations will be based on the results of analyses obtained pursuant to 6.9.2.

6.11.5 To show compliance with 10CFR20, the equation below will be evaluated for tritium and radioactive particulates with half lives greater than eight days identified in gaseous effluent releases.

$$\Sigma[P_{iI}(X/Q_sQ_{is}) + (P_{ig}+P_{icm}+P_{igm})(D/Q_sQ_{is})] +$$

$$\Sigma[(P_{3_{HI}}+P_{3_{Hcm}}+P_{3_{Hgm}})(X/Q_sQ_{is})] \leq 500 mrem$$

Where:

P_{iI} = Infant critical organ dose parameter for radionuclide, i, other than tritium for the inhalation pathway mrem/yr per $\mu Ci/m^3$ (ATTACHMENT B) use P_{3HI} for tritium;

P_{ig} = Infant critical organ dose parameter for radionuclide, i, other than tritium for the ground plane pathway mrem/yr per $\mu Ci/sec$ per m^{-2} (ATTACHMENT B);

P_{icm} = Infant critical organ dose parameter for radionuclide, i, other than tritium for the cow milk pathway mrem/yr per $\mu Ci/sec$ per m^{-2} (ATTACHMENT B) use P_{3Hcm} for tritium;

P_{igm} = Infant critical organ dose parameter for radionuclide, i, other than tritium for the goat milk pathway mrem/yr per μCi/sec per m^{-2} (ATTACHMENT B) use P_{3H} for tritium;

$(\chi/Q)_s$ = 4.59E-04 sec/m^3, Annual average dilution factor at 100 meters;

Q_{is} = The release rate of tritium from the stack for the week of interest, μCi/sec;

$(D/Q)_s$ = 2.63E-07 m^{-2}, annual average deposition factor at 100 meters.

6.11.6 Utilizing Tables E-5 and E-14 of Regulatory Guide 1.109, the critical age group for tritium for inhalation is teen, and for ingestion of cow and goat milk, the critical age group is infant.

6.11.7 Attachment B reflects the ICRP-30 dose conversion factor for tritium of 6.4 E-8 mrem/pCi.

6.11.8 Dose calculations will be made once per month.

6.11.9 The source term Q_{is} will be determined from the results of the Gas Waste Surge tank and Reactor Building Ventilation Exhaust stack tritium analyses, and the analysis of weekly reactor stack particulate filters.

6.11.10 These source terms include all gaseous releases from FSV and will be recorded and reported as the total dose for compliance with 10CFR20.

6.12 Gaseous Effluents - Compliance with 10CFR50

6.12.1 Doses resulting from the release of tritium and particulates with half lives greater than eight days must be calculated monthly to show compliance with Appendix I of 10CFR50.

6.12.2 Dose calculations will normally only be performed for tritium. Dose calculations for any other radionuclides will only be performed if their undiluted concentration exceeds 1% of their respective 10CFR20 MPC.

6.12.3 The worst case dose to an individual from tritium and particulates with half lives greater than eight days in gaseous effluents released to unrestricted areas is determined by the following expression:

$$3.17E\text{-}8\Sigma_j\Sigma_i R_{ijak}(W_s Q_{is})$$

During any calendar quarter or year the following relationships should hold:

Dose < 2.5 mrem per quarter

Dose <5 mrem per calendar year

Where:

3.17E-8 = The inverse of seconds in a year.

R_{ijak} = The dose factor for each identified radionuclide i, pathway j, age group a, and organ k, m^2 mrem/yr per $\mu Ci/m^3$.

W_s = Dispersion parameter for estimating dose to an individual from stack releases. For radionuclides other than tritium, χ/Q is used for the inhalation pathway and D/Q is used for food and ground plane pathways. For tritium, χ/Q is used for all pathways.

The annual average χ/Q value, 4.59E-04 sec/m^3 and D/Q value, 2.63E-07 m^{-2} at 100 meters, will be used for each gas waste release period.

Q_{is} = Release of radionuclide i for stack releases, μCi.

6.12.4 The above equation will be applied to each combination of age group and organ.

6.12.5 Values of R_{ijak} have been calculated using the methodology given in NUREG-0133 and are given in Attachment C.

6.12.6 The equation will be applied to a controlling location which will be one of the following: residence, vegetable garden, meat animal, milk animal.

6.12.7 The selection of the receptor is discussed in Section 6.12.4, 6.12.5 and 6.12.6.

6.12.8 Doses calculated monthly will be summed for comparison with quarterly and annual limits.

6.12.9 The monthly results will be added to the doses cumulated from the other months in the quarter of interest and in the year of interest, and compared to the limits given in 6.12.1.

6.12.10 If these limits are exceeded, a special report should be submitted stating the reason and the corrective action to be taken.

6.12.11 If twice the limits are exceeded, a Special Report showing compliance with 40CFR190 will be submitted as described in 6.13.

6.12.12 The critical receptors for compliance with 10CFR50, Appendix I, will be identified.

6.12.13 This location will be the off site location with the highest χ/Q and will be used for showing compliance with 10CFR20 and remain the same unless meteorological data is re-evaluated or the site boundary changes.

6.12.14 The critical location for the tritium and particulate pathway will be selected once per year. This selection will follow the annual land use census performed within five miles of FSV.

6.12.15 Each of the following locations will be evaluated as potential critical receptors:

a) Residences in each sector.

b) Vegetable garden producing leafy green vegetables.

c) All identified milk animal locations.

6.12.16 The critical receptor will be selected based on this evaluation.

6.12.17 Following the annual survey, doses will be calculated for all newly-identified receptors and those receptors whose characteristics have changed significantly.

a) The calculation should include appropriate information shown to exist at each location.

b) The dispersion parameters given in this manual should be employed.

c) The total releases reported for the previous calendar year should be used as the source term.

6.13 INFORMATION RELATED TO 40CFR190 AND 40CFR141

6.13.1 When the calculated doses associated with the effluent releases exceed twice the limits of any section, the licensee shall prepare and submit a Special Report to the Commission and limit subsequent releases such that the dose or dose commitment to a real individual from all uranium fuel cycle sources is limited to <25 mrem to the total body or any organ (except the thyroid which is limited to <75 mrem) over 12 consecutive months. This Special Report is to include an analysis which demonstrates that radiation exposures to all real individuals from all uranium fuel cycle sources (including all liquid and gaseous effluent pathways and direct radiation) are less than the standards in 40CFR190, Environmental Radiation Protection Standards for Nuclear Power Operations. If analysis indicates that releases resulting in doses that exceed the 40CFR190 Standard may have occurred, then a variance from the Commission to permit such releases will be requested or, if possible, action will be taken to reduce subsequent releases.

6.13.2 The "Uranium Fuel Cycle" is defined in 40CFR Part 190.02(b) as: "Uranium fuel cycle means the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel, and reprocessing of spent uranium fuel, to the extent that these directly support the production of electrical power for public use utilizing nuclear energy but excludes mining operations, operations at waste disposal sites, transportation of any radioactive material in support of these operations, and the reuse of recovered non-uranium special nuclear and by-product materials from the cycle."

6.13.3 For the purposes of this ODCM, Fort St. Vrain shall be construed to be part of the "Uranium Fuel Cycle."

6.13.4 The Special Report will contain:

a) A determination of which uranium fuel cycle facilities or operations, in addition to Fort St. Vrain contribute to the annual dose to the maximum exposed member of the public.

NOTE: Nuclear fuel facilities over five miles from FSV need not be considered in this determination.

b) A determination of the maximum exposed member of the public.

c) A determination of the total annual dose to this person from all existing pathways and sources of radioactive effluents and direct radiation using the methodologies described in this ODCM. Where additional information on pathways and nuclides is needed, the best available information will be used and documented.

d) A determination of the dose resulting from direct radiation from the plant and storage facilities.

6.13.5 The total body and organ doses resulting from liquid effluents from FSV will be summed with the doses resulting from gaseous releases.

6.13.6 These doses will be based upon releases from FSV during the past three quarters and from the quarter in which twice the specification was exceeded.

6.13.7 The doses from FSV will be summed with the doses to the maximum exposed individual contributed from other operations of the uranium fuel cycle.

6.13.8 The direct dose components will be determined by either calculation or actual measurement.

6.14 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

6.14.1 The Radiological Environmental Monitoring Program is conducted to provide data on levels of radiation and radioactive material in the site environs. The program discriminates between those changes in environmental radiation and radioactivity levels resulting from radioactive releases from the Fort St. Vrain Station and those changes attributed to other sources such as worldwide fallout from weapons testing. The program evaluates the relationship between quantities of radioactive material released in liquid and gaseous effluents and resultant radiation doses to individuals from principal pathways of exposure. The results of this program are used to verify the effectiveness of inplant measures applied to control the release of radioactive materials.

6.14.2 The Radiological Environmental Monitoring Program is described in ATTACHMENT F.

6.14.3 A pre-operational environmental radiation surveillance program for the Fort St. Vrain Station environs has been conducted for Public Service Company of Colorado by Colorado State University. Continuous operation of this program since March, 1969, has provided baseline data which will be utilized as control values for statistical analysis of the results of the decommissioning radiological surveillance program.

6.14.4 This ODCM specifies the requirements for the Radiological Environmental Monitoring Program which will continue to be the responsibility of Public Service Company of Colorado.

6.14.5 Additional monitoring in the vicinity of the facility may be conducted or coordinated by other organizations, notably the Colorado Department of Health.

6.14.6 The results of the radiological environmental monitoring are intended to supplement the results of the radiological effluent monitoring by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. Thus, the specified environmental monitoring program provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides which lead to the highest potential radiation exposures to individuals resulting from the station operation.

6.14.7 Sampling locations were selected on the basis of local meteorological conditions and airborne concentrations calculated from those conditions, proximity of the plant to residences and communities, and other considerations in accordance with Table 6.14.1. Each radiological environmental monitoring report shall contain a map and tables which present detailed information regarding sampling station locations.

6.14.8 The sampling and collection frequencies indicated in Table F-1 were selected on the basis of filter loading, crop harvest time, calculated potential human doses from plant effluents, and other considerations.

6.14.9 Samples will be analyzed in accordance with Table F-1 for radionuclides which may be attributable to effluents released from the facility. Table F-2 indicates the achievable detection capabilities for environmental sample analysis based upon the instrumentation and analytical procedures analyzed.

6.14.10 The requirement for participation in the Environmental Protection Agency crosscheck program or similar program is based on the need for independent checks on the precision and accuracy of the measurements of radioactive material in environmental sample matrices as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are reasonably valid.

6.14.11 The census of milk animals and gardens producing broad leaf vegetation is based on the requirement in Appendix I of 10CFR50 to "Identify changes in the use of unrestricted areas (e.g., for programs for evaluating doses to individuals from principal pathways of exposure."

6.14.12 The 50 square meter garden considering 20% used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage) and a vegetation yield of 2 kilograms per square meter will produce the 26 kilograms per year assumed in Regulatory Guide 1.109 for child consumption of leafy vegetation.

7.0 REPORTING REQUIREMENTS

7.1 An Annual Radiological Environmental Operating Report shall be submitted before May 1 of each year. The report shall include summaries, interpretations, and analyses or trends of the results of the REMP for the reporting period. The material provided shall be consistent with Sections IV.B.2, IV.B.3, and IV.C of Appendix I to 10CFR50.

7.2 An Annual Radioactive Effluent Release Report covering activities during the previous 12 months shall be submitted within 90 days after January 1 of each year. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit during the reporting period. The report shall also include a copy of the ODCM if any changes were made during the reporting period as required by Decommissioning Technical Specification 5.10. The material provided shall be in conformance with 10CFR50.36a and Section IV.B.1 of Appendix I to 10CFR50.

7.3 Within 30 days after each calendar month after releases of PCRV Shield Water have been initiated and until all PCRV Shield Water has been released, a report shall be submitted to the Colorado Department of Health Water Quality Control Division summarizing the release calculations and sampling results for tritium releases made during the month.

$A_{i\tau}$ Values (Dose Factors) for Fort St. Vrain

$A_{i\tau}$ is calculated for an adult using the following equation:

$$A_{i\tau} = 1.34\ E6\ (IF_i)\ (DF_{i\tau})$$

Where:

1.34 E6 = Unit conversion factor,
(1 E6 pCi/μCi)(1 E3 ml/l)(1 month/744 hr)

IF_i = Intake factor, based on consumption rates in Regulatory Guide 1.109. Since tritium does not affect any one organ more than the rest, IF_i for tritium is determined by converting the various pathways identified in 6.4.3 to an equivalent intake of tritiated water (HTO) for the month of the calculation, as follows:

Beef/Poultry
= (110 kg/yr)(1/12 yr)(0.6 ℓ HTO/kg)
= 5.5 ℓ/month

Milk
= (400 ℓ/yr)(1/12 yr)
= 33.3 ℓ/month

Vegetables
= (340 kg/yr)(1/12 yr) (0.75 ℓ HTO/kg)
= 21.2 ℓ/month

Fish
= (21 kg/yr)(1/12 yr)(0.9 ℓ HTO/kg)
= 1.6 ℓ/month

Drinking water: Assume Gilcrest well water with a tritium concentration 1/20 of that in surface water, times a conservative factor of 2, or 0.1.

= (2 ℓ/day)(31 days/month)(0.1)
= 6.2 ℓ/month

Total IF_i = 67.8 ℓ HTO/month

$DF_{i\tau}$ = Dose conversion factor, from ICRP-30. For tritium, DF = 6.4 E-8 mrem/pCi

For tritium,

$A_{i\tau}$ = (1.34 E6 pCi-mℓ-mo/μCi-ℓ-hr))(67.8 ℓ/mo)(6.4E-08 mrem/pCi)
= 5.81 mrem/hr per μCi/mℓ

The $A_{i\tau}$ factors for other radionuclides may be calculated, based on the same intake factor, IF_i, determined for tritium, 67.8 ℓ/month, and using ICRP-30 dose conversion factors.

$A_{i\tau}$ dose factors for other identified radionuclides are as follows:

Mn-54

$A_{i\tau}$ = 7.40E2 mrem/hr per μCi/ml

Co-60

$A_{i\tau}$ = 4.70E3 mrem/hr per μCi/ml

BA-133

$A_{i\tau}$ = 1.31E3 mrem/hr per μCi/ml

Cs-134

$A_{i\tau}$ = 7.73E3 mrem/hr per μCi/ml

Cs-137

$A_{i\tau}$ = 5.04E3 mrem/hr per μCi/ml

Eu-152

$A_{i\tau}$ = 3.36E3 mrem/hr per μCi/ml

Eu-154

$A_{i\tau}$ = 6.05E3 mrem/hr per μCi/ml

Eu-155

$A_{i\tau}$ = 1.14E3 mrem/hr per μCi/ml

P_i VALUES FOR FORT ST. VRAIN				
Isotope	Teen Inhalation	Ground Plane	Infant Cow Milk	Infant Goat Milk
H-3	5.11E2	0	1.44E3	2.93E3
CO-60	1.01E7	2.62E13	2.12E9	2.55E8
CS-137	2.81E5	6.98E12	3.78E9	1.13E10

Units are mrem/yr per $\mu Ci/m^3$ for the inhalation pathway and for tritium for cow and goat milk pathways, and mrem/yr per $\mu Ci/sec$ per m^{-2} for the food and ground plane pathways.

R VALUES FOR FORT ST. VRAIN*

PATHWAY = VEGET
AGE GROUP = ADULT

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	1.39E 03	1.39E 03	0.00E 00	1.39E 03	1.39E 03	1.39E 03	1.39E 03	1.39E03

PATHWAY = VEGET
AGE GROUP = TEEN

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	1.59E 03	1.59E 03	0.00E 00	1.59E 03	1.59E 03	1.59E 03	1.59E 03	1.59E03

PATHWAY = VEGET
AGE GROUP = CHILD

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	2.46E 03	2.46E 03	0.00E 00	2.46E 03	2.46E 03	2.46E 03	2.46E 03	2.46E03

*R Values in units of mrem/yr per $\mu Ci/m^3$ for inhalation and tritium.

R VALUES FOR FORT ST. VRAIN*

PATHWAY = MEAT
AGE GROUP = ADULT

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	1.99E 02	1.99E 02	0.00E 00	1.99E 02	1.99E 02	1.99E 02	1.99E 02	1.99E02

PATHWAY = MEAT
AGE GROUP = TEEN

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	1.19E 02	1.19E 02	0.00E 00	1.19E 02	1.19E 02	1.19E 02	1.19E 02	1.19E02

PATHWAY = MEAT
AGE GROUP = CHILD

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	1.44E 02	1.44E 02	0.00E 00	1.44E 02	1.44E 02	1.44E 02	1.44E 02	1.44E02

*R Values in units of mrem/yr per $\mu Ci/m^3$ for inhalation and tritium.

R VALUES FOR FORT ST. VRAIN*

PATHWAY = COW MILK
AGE GROUP = ADULT

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	4.69E 02	4.69E 02	0.00E 00	4.69E 02	4.69E 02	4.69E 02	4.69E 02	4.69E02

PATHWAY = COW MILK
AGE GROUP = TEEN

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	6.10E 02	6.10E 02	0.00E 00	6.10E 02	6.10E 02	6.10E 02	6.10E 02	6.10E02

PATHWAY = COW MILK
AGE GROUP = CHILD

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	9.63E 02	9.63E 02	0.00E 00	9.63E 02	9.63E 02	9.63E 02	9.63E 02	9.63E02

PATHWAY = COW MILK
AGE GROUP = INFANT

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	1.46E 03	1.46E 03	0.00E 00	1.46E 03	1.46E 03	1.46E 03	1.46E 03	1.46E03

*R Values in units of mrem/yr per $\mu Ci/m^3$ for inhalation and tritium.

R VALUES FOR FORT ST. VRAIN*

PATHWAY = GOAT MILK
AGE GROUP = ADULT

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	9.57E 02	9.57E 02	0.00E 00	9.57E 02	9.57E 02	9.57E 02	9.57E 02	9.57E02

PATHWAY = GOAT MILK
AGE GROUP = TEEN

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	1.24E 03	1.24E 03	0.00E 00	1.24E 03	1.24E 03	1.24E 03	1.24E 03	1.24E03

PATHWAY = GOAT MILK
AGE GROUP = CHILD

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	1.97E 03	1.97E 03	0.00E 00	1.97E 03	1.97E 03	1.97E 03	1.97E 03	1.97E03

PATHWAY = GOAT MILK
AGE GROUP = INFANT

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	2.99E 03	2.99E 03	0.00E 00	2.99E 03	2.99E 03	2.99E 03	2.99E 03	2.99E03

*R Values in units of mrem/yr per $\mu Ci/m^3$ for inhalation and tritium.

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R VALUES FOR FORT ST. VRAIN*

PATHWAY = INHALATION
AGE GROUP = ADULT

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	7.68E 02	7.68E 02	0.00E 00	7.68E 02	7.68E 02	7.68E 02	7.68E 02	7.68E02

PATHWAY = INHALATION
AGE GROUP = TEEN

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	7.74E 02	7.74E 02	0.00E 00	7.74E 02	7.74E 02	7.74E 02	7.74E 02	7.74E02

PATHWAY = INHALATION
AGE GROUP = CHILD

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	6.83E 02	6.83E 02	0.00E 00	6.83E 03	6.83E 02	6.83E 02	6.83E 02	6.83E02

PATHWAY = INHALATION
AGE GROUP = INFANT

NUCLIDE	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H3	3.94E 02	3.94E 02	0.00E 00	3.94E 02	3.94E 02	3.94E 02	3.94E 02	3.94E02

*R Values in units of mrem/yr per $\mu Ci/m^3$ for inhalation and tritium.

MONTHLY SOUTH PLATTE RIVER LOW FLOW RATES
(in cubic feet per second)

Month	Upstream S. Platte Q_{USPS}	Upstream St. Vrain Q_{USV}	Downstream Total Q_{DSP}
January	308	97	405
February	147	102	249
March	56	84	140
April	46	72	118
May	46	72	118
June	77	68	145
July	44	174	218
August	58	118	176
September	5	114	119
October	5	114	119
November	21	109	130
December	250	97	347

Actual Downstream Dilution Flow Rates

Month	Flow Rate (gpm)
January	182,000
February	112,000
March	63,000
April	53,000
May	53,000
June	65,000
July	98,000
August	79,000
September	53,000
October	53,000
November	58,000
December	156,000

ODCM BACKGROUND INFORMATION

Radioactive Liquid and Gaseous Waste System Background

1. The radioactive liquid and gaseous waste treatment systems are designed to ensure compliance with 10 CFR 20 and 10 CFR 50, Appendix I.

2. The Radioactive Liquid Waste System, System 62, is designed to collect, treat, and permit sampling, analysis and monitoring of all potentially radioactive liquid wastes discharged from the reactor plant, and is described in Section 2.3.3.10 of the Decommissioning Plan. Radioactive liquid waste is collected, monitored, and processed, if necessary, by the radioactive liquid waste system before being discharged from the plant. Effluent from the radioactive liquid waste system is diluted in the cooling tower blowdown/bypass line. The activity in the cooling tower blowdown/bypass line is maintained below the maximum permissible concentration (MPC) specified in 10 CFR 20.

3. The Radioactive Gas Waste System, System 63, (Decommissioned in mid-1993), was designed to collect, treat, and permit sampling, analysis, and monitoring of potentially radioactive gases discharged from the plant, and is described in Section 2.3.3.11 of the Decommissioning Plan. All radioactive gases currently being released are directed to the reactor building ventilation system, filtered, and discharged at high velocity at the top of the reactor building, about 180 ft. above grade. Average offsite radioactivity concentrations are significantly less than the MPCs specified in 10 CFR 20.

4. Solid radioactive wastes may be processed onsite or sent offsite for volume reduction or other processing. These processing activities, as well as activities associated with the packaging, storing, and shipping of radioactive wastes, are described in Section 3.3 of the Decommissioning Plan.

Equipment Descriptions

1. Liquid Effluent Activity and Flow Rate Monitors, RT-6212, RT-6213, FS-4101-1

   Two redundant activity monitors, RT-6212 and RT-6213, are provided in the radioactive liquid waste discharge line, arranged in one-out-of-two logic. Upon detection of high concentrations of gross gamma activity, these activity monitors will automatically alarm, shutdown the Liquid Waste Transfer Pumps, shutdown the Reactor Building sump pumps, and shut the block valves in the liquid waste discharge line. A flow switch, FS-4101-1, is provided in the cooling tower bypass/ blowdown line to automatically alarm, shutdown the Liquid Waste Transfer Pumps, shutdown the Reactor Building sump pumps, and shut the block valves in the liquid waste discharge line in the event of low cooling tower bypass/ blowdown flow conditions that would not provide sufficient dilution of radioactive liquid effluent.

2. Air Flow Measurement

   Ventilation system flow is measured at the outlet of the system. Above-normal flow rates are alarmed to ensure that allowable activity release rates are not exceeded.

3. Meteorological Instrumentation

   Two meteorological towers, one 60 meters high and the other 10 meters high, are installed approximately one-half mile north of the plant. This instrumentation is provided for determination of dispersion coefficients and to provide data for the annual effluent release report. The 60 meter tower is the primary tower and the 10 meter tower is a backup. The 60 meter tower provides information on wind speed and wind direction at 58 meters and 10 meters elevation, temperature at the lower level, temperature difference between the upper and lower levels, dewpoint, and precipitation. The 10 meter tower provides information on wind speed, wind direction, temperature and dewpoint. Both towers supply data to a data logger. Additionally, the 60 meter tower supplies data to chart recorders located in the control room. Both towers also supply data to chart recorders located in a weather station, which is also approximately one-half mile north of the plant. There is a gas-driven electric generator for emergency electrical supply in the event of loss of power to the towers and weather station.

1.0 Radiological Environmental Monitoring Program

1.1 A Radiological Environmental Monitoring Program shall be conducted in accordance with Table F-1.

1.2 The radiological environmental monitoring samples shall be collected from the specific locations given in table F-1, and shall be analyzed pursuant to the requirements of Table F-1 and the detection capabilities required by Table F-2.

1.3 If a confirmed measured radionuclide concentration in an environmental sampling medium averaged over any quarter sampling period exceeds the reporting level given in Table F-3, a special report shall be submitted to the Nuclear Regulatory Commission within 30 days.

1.4 Analytical techniques used shall be such that the detection capabilities in Table F-2 are achieved.

1.5 Radiological sampling station locations shall be delineated in maps and in written descriptions contained in each Annual Radiological Environmental Monitoring Report. All changes in sampling station locations which occur through the year shall be explained in each annual report.

1.6 Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment, and other legitimate reasons. If specimens are unobtainable due to sampling equipment malfunction, every effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the annual report.

1.7 If milk or fresh leafy vegetable samples are unavailable from one or more of the sample locations required by Table F-1, locations for obtaining replacement samples shall be identified and added to the Radiological Environmental Monitoring Program within 30 days. The specific locations from which samples were unavailable may then be deleted from the monitoring program. In lieu of a Licensee Event Report (LER), the cause of the unavailability of samples and the new location(s) for obtaining replacement samples shall be identified in the next Annual Radiological Environmental Monitoring Report. The report shall also

include a revised figure(s) and table for the ODCM reflecting the new location(s).

1.8 Analyses shall be performed on radioactive materials supplied as part of a documented inter-laboratory comparison program.

1.8.1 Analysis shall be performed on radioactive samples supplied by the EPA crosscheck program. This program involves the analysis of samples provided by a control laboratory as well as with other laboratories that receive portions of the same samples. Media used in this program (air, milk, water, etc.) may be limited to those found in the radiation monitoring program.

1.8.2 A summary of the results of analysis performed as part of the cross- check program shall be included in the Annual Radiological Environmental Monitoring Report.

1.8.3 The EPA uses the term, Estimated Laboratory Precision (ELP), calculated as $3\sigma/N$, as the control parameter where N= the number of analyses. Whenever mean values fall outside this limit, the sample calculations are rechecked and the sample reanalyzed if possible.

NOTE: **If analysis are not being performed as required, corrective actions taken to prevent recurrence shall be reported to the Nuclear Regulatory Commission in the Annual Radiological Environmental Monitoring Report.**

1.9 A census shall be conducted annually during the growing season to determine the location of the nearest resident, the nearest milk animal, and the nearest garden greater than 50 square meters (500 square feet) producing broad leaf vegetation in each of the 16 meteorological sectors within a distance of 8 kilometers (5 miles).

1.9.1 When the land use census identifies a location(s) that yields a calculated dose or dose commitment greater than the values currently being calculated in the ODCM, in lieu of a Licensee Event Report, the new location(s) will be identified in the next Annual Radioactive Effluent Release Report.

1.9.2 If it is learned from this census that the milk animals or gardens are present at a location which yields a calculated dose or dose commitment 20% greater than those previously calculated, or if the census results in changes in the sampling location, a written report shall be submitted in the next Annual Radiological Environmental Monitoring Report identifying the new location (distance and direction). Milk animals or garden locations resulting in 20% higher calculated doses shall be added to the monitoring program within 30 days or as soon as practicable.

1.9.3 The sampling location (excluding the control sample location) having the lowest calculated dose may then be dropped from the surveillance program at the end of the grazing or growing season during which the census was conducted. Any location from which milk can no longer be obtained may be dropped from the monitoring program after notifying the Nuclear Regulatory Commission in writing that milk samples are no longer obtainable at that location. The results of the land use census shall be reported in the Annual Radiological Environmental Monitoring Report.

TABLE F-1
DECOMMISSIONING RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Locations	Sampling Collection Frequency	Type and Frequency of Analysis
AIRBORNE			
Tritium Oxide and Particulates	Samples from seven locations. Four samples from offsite locations(in different sectors) of the highest calculated annual average ground level D/Q and airborne X/Q. One sample from the vicinity of a community having the highest calculated annual average ground level D/Q. Two samples from control location 15 to 30 kilometers (10 to 20 miles) distant and in the least prevalent wind direction.	Continuous sampler operation with sample collection weekly or as required by dust loading, whichever is more frequent.	Liquid scintillation counting for tritium on water vapor extracted from silica gel on each sample collected. Particulate Sampler: Gross beta radioactivity following filter change, composite (by location) for gamma isotopic quarterly. *

*If gross beta activity in air or water is greater than ten times the yearly mean of control sample for any medium, gamma isotopic analysis should be performed on the individual samples.

TABLE F-1 (Continued)
DECOMMISSIONING RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Locations	Sampling Collection Frequency	Type and Frequency of Analysis
DIRECT RADIATION	Forty stations with two or more dosimeters or one instrument for measuring and recording dose rate continuously to be placed as follows: 1) an inner ring of stations in the general area of the site boundary and an outer ring in the 4 to 5 mile range from the site with a station in each sector of each ring (16 sectors x 2 rings = 32 stations); eight shall be placed in special interest areas such as population centers, nearby residences, schools, and in two or three areas to serve as control stations.	Quarterly	Gamma Exposure Rate

TABLE F-1 (Continued)
DECOMMISSIONING RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Locations	Sampling Collection Frequency	Type and Frequency of Analysis
WATERBORNE			
Surface	One sample upstream, each stream, one sample downstream	Upstream samples collected monthly, Downstream sample aliquot taken continuously	Gamma isotopic analysis and tritium weekly
Surface (Farm Pond)	One sample in immediate area of discharge	Composite continuous sample over one week period. Composite collected weekly	Gamma isotopic analysis and tritium weekly

TABLE F-1 (Continued)
DECOMMISSIONING RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Locations	Sampling Collection Frequency	Type and Frequency of Analysis
Ground	Samples from two sources most likely to be affected	Weekly from Facility Area, Quarterly for Reference Area	Gamma isotopic and tritium
Drinking	One sample from the nearest water supply which could be affected by facility's discharge	Weekly	Composite for tritium, gross beta, and gamma isotopic analyses weekly
	One sample from a control location		
Sediment from Shoreline	One sample from downstream area with existing or potential recreational value	Semi-annually	Gamma isotopic analyses semi-annually
	One sample in effluent pathway	Monthly	Gamma isotopic analyses monthly

TABLE F-1 (Continued)
DECOMMISSIONING RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Locations	Sampling Collection Frequency	Type and Frequency of Analysis
INGESTION			
Milk	Samples from milking animals in all locations up to a total of three locations, within 5 kilometers	Semi-monthly when animals are on pasture, monthly at other times	Gamma isotopic analysis semi-monthly when animals are on pasture, monthly at other times
	One sample from milking animals in each of three areas between 5 to 8 kilometers distant having the highest dose potential[b]		
	One sample from milking animals at a control location (15 to 30 kilometers distant and in the least prevalent wind direction)	Semi-monthly when animals are on pasture, monthly at other times	Gamma isotopic analysis semi-monthly when animals are on pasture, monthly at other times

[b]The dose shall be calculated for the maximum organ and age group using the methodology contained in Regulatory Guide 1.109 and the actual parameters particular to the site.

TABLE F-1 (Continued)
DECOMMISSIONING RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Locations	Sampling Collection Frequency	Type and Frequency of Analysis
Aquatic Biota	Sample fish in vicinity of discharge point, upstream and downstream	Semi-annually	Gamma isotopic analyses and tritium
Food Products	One sample of each principal class of food products from any area which is irrigated by water in which liquid plant wastes have been discharged.	At time of harvest	Gamma isotopic analyses
	Tissue samples (muscle and liver) from one head of beef cattle that graze near effluent ditch pathway	Semi-annually	Tritium and gamma isotopic analyses

TABLE F-2
DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS
LOWER LIMIT OF DETECTION (LLD)[a,b]

Analysis	Water (pCi/ℓ)	Airborne Particulate or Gas (fCi/m³)	Fish (pCi/kg,wet)	Milk (pCi/ℓ)	Food Products (pCi/kg,wet)	Sediment (pCi/kg,dry)
Gross Beta	4	5				
H-3	2000					
Cs-134	15	9	130	15	60	150
Cs-137	18	8	150	18	80	180
Mn-54	15		130			
Co-60	15		130			
Zn-65	30		260			

NOTE: This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported.

"The LLD is defined for purposes of these specifications as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

1.10 For a particular measurement system which may include radiochemical separation:

$$LLD = \frac{2.71 + 4.66\sqrt{B}}{T \cdot E \cdot V \cdot 2.22E6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD is the "a priori" lower limit of detection as defined above as microcuries per unit mass or volume,

$\sqrt{B}$ is the standard deviation of the total background counts or of the total counts of a blank sample, as appropriate, as counts,

T is the count time of background in minutes,

E is the counting efficiency as counts per disintegration or counts per gamma for gamma spectroscopy,

V is the sample size in units of mass or volume,

2.22E6 is the number of disintegrations per minute per microcurie, (dpm/μCi),

Y is the fractional radiochemical yield when applicable and/or the gammas per disintegration when applied to gamma spectroscopy,

λ is, if radioactive decay correction is applicable, the radioactive decay constant for the particular radionuclide,

Δt is the elapsed time between the sample collection and time of counting.

1.11 Values of E, V, Y, and Δt, which are appropriate to the sample, should be used in the calculation.

1.12 It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement. Analyses shall be performed in such a manner that the stated LLD's will be achieved under routine conditions. Occasionally background fluctuations, unavoidable small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLD's unachievable. In such cases, the contributing factors shall be identified and described in the Annual Radiological Environmental Monitoring Report.

[b]Lower limit of detection for drinking water samples. If no drinking water pathway exists, the LLD of gamma isotopic analysis may be used.

TABLE F-3
REPORTING LEVELS FOR NON-ROUTINE OPERATING REPORTS
REPORTING LEVEL (RL)

Analysis	Water (pCi/ℓ)	Airborne Particulates or Gas (fCi/m³)	Fish (pCi/kg,wet)	Milk (pCi/ℓ)	Broad Leaf Vegetation (pCi/kg, wet)
H-3	2E4(a)				
Mn-54	1E3		3E4		
Co-60	3E2		1E4		
Zn-65	3E2		2E4		
Cs-134	30	10	1E3	60	1E3
Cs-137	50	20	2E3	70	2E3

[a]For drinking water samples. This is 40 CFR Part 141 value.

TABLE F-4
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING SITE DESCRIPTIONS
(F: Facility Area 0-1.6 km. A: Adjacent Area 1.6-8 km. R: Reference Area)

Exposure Pathway	Site No.	Location Description (see map)	Sector	Distance, km
Direct Radiation	F-1	Pole by gate to Goosequill road on dirt extension of CR 21.	1	1.3
	F-2	21st pole N of ditch on dirt extension of CR21 just before road drops down to river bottom.	2	1.1
	F-3	17th pole N of ditch on dirt extension of CR 21 or first pole N of East-West road.	3	0.7
	F-4	15th pole N of ditch on dirt extension of CR 21, S of pump road, midway between F-3 and F-5.	4	0.7
	F-5	11th pole N of ditch on dirt extension of CR 21, near drive to pump house.	5	0.6
	F-6	8th pole N of ditch on dirt extension of CR 21, by East-West concrete Ditch, S of bridge	6	0.8
	F-7	Old dairy barn, 1st pole N after crossing ditch on dirt extension of CR 21.	7	1.2
	F-8	1st pole W of pump house on N side of road, 0.4 km E of CR 19-1/2.	8	1.3
	F-9	Pole E of first shed at intersection of CR 19-1/2 and CR 34.	9	1.5
	F-10	Pole on NW corner of intersection of dirt extension of CR 19 and 34.	10	1.5

TABLE F-4
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING SITE DESCRIPTIONS
(F: Facility Area 0-1.6 km. A: Adjacent Area 1.6-8 km. R: Reference Area)

Exposure Pathway	Site No.	Location Description (see map)	Sector	Distance, km
Direct Radiation	F-11	7th pole N of intersection of dirt extension of CR 19 with CR 34.	11	1.2
	F-12	0.5 km S of FSV Visitor Center, take dirt road W across field, go into farmyard of Aristocrat Angus. (If chain across road, enter from CR 36). TLD is located on pole at SE corner of corral across from Aristocrat Angus office.	12	1.0
	F-13	Take first dirt road S of Visitor Center. Go W across railroad tracks, follow dirt road to metal staircase going down off dike. TLD is taped to railing.	13	0.5
	F-14	2nd pole 0.1 km S intersection CR 36-1/2 and Rd 19.	14	1.5
	F-15	2nd pole 0.7 km S of intersection of CR 38 on CR 19.	15	1.5
	F-16	Pole at NE corner of potato cellar at 3 Bar Ranch (Russell's).	1	1.2
	F-17	Visitor Center, on N end of cross beam over entrance.	13	0.2
	F-18	Pole closest to house on SW corner, 17250 CR 19-1/2. The address of 17250 is taped to the Mountain Bell underground cable warning post.	16	0.8
	A-1	Pole on NW corner of intersection of CR 44 and CR 21.	1	6.7

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TABLE F-4
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING SITE DESCRIPTIONS
(F: Facility Area 0-1.6 km. A: Adjacent Area 1.6-8 km. R: Reference Area)

Exposure Pathway	Site No.	Location Description (see map)	Sector	Distance, km
Direct Radiation	A-2	Pole on NE corner of intersection of CR 42 and CR 25-1/2	2	6.8
	A-3	Pole on NE corner of intersection of CR 42 and CO 60.	3	7.5
	A-4	1st pole NE of intersection of CR 29 and CR38, take CR 29 E out of Gilcrest to CR 38.	4	7.4
	A-5	SE corner of CR 34 and CR 29. Taped to road sign on SW corner of intersection.	5	7.2
	A-6	Pole on S side of CR 32 near drive to dairy 13278 CR 32.	6	7.1
	A-7	Niles Miller dairy. 0.4 km E of US 85 on 12854 CR 30. TLD is located on pole at NE corner of house.	7	7.3
	A-8	On CO 66 (CR 30) farm on S side of road (address 9476) Pole in front of house.	8	4.7
	A-9	Corner of CO 66 (CR 30) and CR 19, Miller produce stand. Second pole S on CR 19, on E side of road.	9	4.6
	A-10	Pole on SE corner at intersection CR 26-1/2 and CR 15.	10	7.8
	A-11	At intersection of CO 66 and CR 13, 2nd pole N of intersection on E side of CR 13.	11	7.2

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TABLE F-4
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING SITE DESCRIPTIONS
(F: Facility Area 0-1.6 km. A: Adjacent Area 1.6-8 km. R: Reference Area)

Exposure Pathway	Site No.	Location Description (see map)	Sector	Distance, km
Direct Radiation	A-12	On CR 34, pole E of house N of Lake Thomas 2 km from I-25.	12	7.2
	A-13	Pole opposite lake, N of silage pits E side of CR 13 2.9 km N of CR 34.	13	5.8
	A-14	Intersection of CR 13 and CR 40, NW corner.	14	6.9
	A-15	Intersection of CR 42 and CR 15, NW corner.	15	6.7
	A-16	Intersection of CR 44 and CR 19, SW corner.	16	6.8
	A-17	Platteville school (S edge of town on Main Street) pole on NW corner just outside school intramural field.	6	5.9
	A-20	1st pole N of white picket fence and driveway into turkey farm on S end of building that is parallel with CR 19.	9	2.5
	R-1	Milliken School, on CR 21-1/2. TLD is located on pole located at SE corner of Lola Park, across the street from school.		9.3
	R-2	Johnstown school (Letford Elementary), turn left at school crossing on Idaho St. onto Jay Ave. and proceed to school. TLD is located on pole at SE corner of main entrance to school on W side of town.		10.8
	R-3	CSU dairy farm on W Drake, N of Vet Hospital, Fort Collins, CO. Pole is E of hay barn next to railroad tracks.		45.1

TABLE F-4
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING SITE DESCRIPTIONS
(F: Facility Area 0-1.6 km. A: Adjacent Area 1.6-8 km. R: Reference Area)

Exposure Pathway	Site No.	Location Description (see map)	Sector	Distance, km
Direct Radiation	R-4	Air sampler corner US 287 and CO 66, Longmont Dairy Store. TLD is located on pole directly behind air sampler.		20.5
	R-7	Behind Gilcrest School quonset auditorium, pole on SW end of school property, just before garage.		9.3
Waterborne Sediment from Shoreline	F-1	Sediment from confluence of Goosdquill Ditch and Jay Thomas Ditch.	1	1.3
	R-10	Sediment from S. Platte River at bridge on CO 60.		10.1
Airborne	F-7	Farm at intersection of CR 21 and CR 34. Air sampler is located on west side of shop. Silica gel inside building on N end of workbench.	7	1.5
	F-9	First shed along drive at end of Rd 19-1/2 intersection with Rd 34. Silica gel is located in shed.	9	1.5
	F-16	Potato cellar at 3 Bar Ranch (Russell's). Silica gel in mailbox on tree to S of pump.	16	1.2
	A-19	Hunting cabin between Goosequill ditch and Platte River. Air sampler is on W side of cabin, silica gel is in box on tree north of air sampler.	1	1.7

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TABLE F-4
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING SITE DESCRIPTIONS
(F: Facility Area 0-1.6 km. A: Adjacent Area 1.6-8 km. R: Reference Area)

Exposure Pathway	Site No.	Location Description (see map)	Sector	Distance, km
Airborne	R-3	Colorado State University Dairy, W Drake Rd., Fort Collins, CO. W side of shed directly N of main dairy building. Silica gel inside mailbox.		45.1
	R-4	Intersection of US 66 and US 287, E side of dairy store, north edge of Longmont. Silica gel is in mailbox attached to utility pole.		20.5
	R-11	Air sampler is located in alley behind PSC office, next to garage. Silica gel is located next to air sampler in mailbox and on top of pose, 13-1/2 Parish St., Johnstown, CO.		10.5
Waterborne Surface	F-19	S Platte at dam located on dirt road E of pump house #3 directly E of reactor.	4	1.2
	F-20	St. Vrain creek on Rd 19-1/2, 0.3 km from discharge into St. Vrain Creek. Directly N of reactor.	16	1.5
	A-21	St. Vrain creek at bridge on Rd 34, E of Rd 19.	11	2.4
Waterborne Surface	A-25	Goosequill Pond outlet. Continuous sampler located in green box adjacent to the green shed on N end of pond.	1	2.2
	R-10	S. Platte river at bridge on CO 60 where highway has just turned and headed south.		10.1

TABLE F-4
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING SITE DESCRIPTIONS
(F: Facility Area 0-1.6 km. A: Adjacent Area 1.6-8 km. R: Reference Area)

Exposure Pathway	Site No.	Location Description (see map)	Sector	Distance, km
Ground	F-16	Well behind residence at 3 Bar Ranch (Russell's), 17578 WCR 19-1/2.	1	1.2
	R-5	Well at 108 S. Grace, Milliken.		9.5
Drinking	R-3	CSU dairy W Drake Rd, Fort Collins, CO, N of Vet Hospital. Water sample is taken from hydrant inside entrance to milking parlor.		45.1
	R-6	Gilcrest U.S. Post Office located on Birch St. and Rd 40 off Hwy 85. Water taken from utility sink inside Post Office.		9.3
Ingestion Milk	A-6	Hendrickson Dairy, 13278 Rd 32 (Grand Avenue), 1.6 km E of US 85.	6	7.1
	A-18	Boos Dairy, 11258 W Rd 40, W of US 85 behind modular home.	2	4.7
	A-22	Percy Odenbaugh Dairy, S on dirt rd from "LeRoy & Paul Odenbaugh Dairy" sign. Dairy sign on WCR 36, E of Rd 23. Dairy sign is located next to mailbox of Mike Thomas.	5	3.2
	A-23	Leroy Odenbaugh Dairy, 11733 Rd 36, W of Rd 25.	4	4.1
	A-24	Marostica Dairy, 20718 Rd 17, 4 miles S of CO 60.	16	6.9
	A-26	L & F Dairy (Fiechtner), E of Rd 13 on Rd 32. 6165 WCR 32.	11	7.8

TABLE F-4
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SAMPLING SITE DESCRIPTIONS
(F: Facility Area 0-1.6 km. A: Adjacent Area 1.6-8 km. R: Reference Area)

Exposure Pathway	Site No.	Location Description (see map)	Sector	Distance, km
Ingestion Milk	R-8	Gorzman Dairy, 2056 S CR 17, located off exit 255 W of I-25 directly N of Johnson's Corner restaurant.		22.5
Fish	F-19	S. Platte at dam located on dirt road E of pump house 3 directly E of reactor.	4	1.1
	A-25	Goosequill pond outlet.	1	2.2
	R-10	S. Platte River at bridge on CO 60.		10.1
Food Products	A-27	Fields on SE corner of intersection of WCR 25 and WCR 38.	4	4.3
	A-28	Residence 11399 WCR 40-1/2.	2	5.3
	R-6	Hernandez Produce Stand, Highway 85, Gilcrest.		9.6

ATTACHMENT A
ENGINEERING CHANGE REQUEST

ECR- 93-003
Page 1 of 27

IS UPGRADED DESIGN CONTROL REQUIRED: X YES ___ NO

Affected Component(s): Reactor Building Ventilation Exhaust System

Affected Document(s)/Drawing(s): PI-73-1

ACCEPTANCE OF ECR SUBMITTAL

Eng. Manager Acceptance: Jerry D. McCauley for M.E. Nieloff Date: 7-12-93

Assigned Designer: R. Dyck

REVIEW AND APPROVAL

IDV: T.S. Erbwine, PSC T.S Erbwine 7/12/93

IDV: MICHAEL FEDER Michael Feder Date: 6/30/93
PRINT NAME Signature

Designated Reviewers: Licensing: JR Johns Date: 7/12/93 Quality Assurance: D Richmond Date: 7/12/93

FT ST VRAIN
NON-CONTROLLED

Engineering Manager Approval: ME Nieloff Date: 7/22/93

DSRC/ISRC Review: DSRC 027 JUL 21 1993 Date: _____

CLOSE-OUT

Implementing SSR(s): 93500555

Issued ECR-CRs: ECR-93-003-A

Installation & Testing Complete: John O'Malley Date: 9/9/93

Doc. Update Complete: Control Room N/S Date: N/A Design N/S Date: 9/10/93

ECR Closed-Out: _____ Date: 10/6/93

Existing Condition/Requested Change:

Existing Condition: The reactor building ventilation exhaust system is lined up to have a minimum of one train maintaining a negative pressure in the reactor building when required by DTS LC 3.2.
Requested Change: Install an Airborne Contamination Control System (ACCS) as described in the FSV Decommissioning Plan Section 2.3.3.8.2. This system should be tied into F-7301 and F-7302, allowing either train to take a suction directly on the reactor building (existing) and/or the ACCS.

Originator: [signature] Date: 6/21/93

Originator's Supervisor/Manager: [signature] Date: 6/21/93

Disposition:

Modify the ducting supply to F-7301 and F-7302 allowing either train to take a suction directly from the reactor building (existing) and/or the ACCS. See the detailed description of this modification in this ECR.

Designer: [signature] Date: 6/21/93

Table of Attached Pages:

1 through 27

ECR/~~SCR/PC/TR~~
NO. 93-003
PAGE 3

SAFETY EVALUATION

CATEGORY

TYPE:

☒ ECR
☐ Setpoint Change Request
☐ Procedure Change
☐ Test Request
☐ Other _____

CLASSIFICATION: ARE THE SYSTEM(S) EQUIPMENT OR STRUCTURES INVOLVED, OR DOES THE ACTIVITY AFFECT:

Decommissioning Nuclear Safety ☒ Yes ☐ No
Important to Decommissioning Quality ☒ Yes ☐ No
Radiological Safety (ISFSI) ☐ Yes ☒ No
Important to Safety (ISFSI) ☐ Yes ☒ No
Enhanced Quality (ISFSI) ☐ Yes ☒ No
Security (ISFSI) ☐ Yes ☒ No

Remarks _____

EVALUATION (Use additional sheets if required)

1. Does this activity affect structures, systems, components, equipment, tests, experiments or procedures described in the applicable facility SAR, Tech Specs or DFPP? ☒ Yes ☐ No
List the applicable sections reviewed DP Section 2.3.3.8
DTS LC 3.2, LC 3.3, SR 3.2.1, SR 3.2.2, and SP 3.2.3

2. Does the activity require that change(s) be made to the applicable facility SAR, Tech Specs or DFPP? ☒ Yes ☐ No
List sections to be changed and the changes to be made See attached.

3. Determine whether or not the activity involved is an unreviewed safety question using the following guidelines. (Also, if ISFSI is involved, determine whether a significant increase in occupational exposure is involved.)

(A) Has the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the applicable SAR, or DFPP been increased? ☐ Yes ☒ No
State Basis See attached.

(B) Has the possibility of an accident or malfunction of a different type than any evaluated previously in the applicable SAR or DFPP been created? Address POL criteria on permanent removal and/or disposal of plant equipment. ☐ Yes ☒ No
State Basis See attached.

(C) Has the margin of safety, as defined in the basis for any Tech Spec, FPOR, or in the applicable SAR been reduced? ☐ Yes ☒ No
State Basis See attached.

Does the activity appear to involve an unreviewed safety question? ☐ Yes ☒ No

By	Date	Approved	Date
Dian Clark	6/21/93	[signature]	7-12-93

Dian Clark 7/12/93

Background

This Engineering Change Request (ECR) is specifically addressing the tie-in of the PCRV decommissioning rotary work platform (DRWP) air contamination control system (ACCS) to system 73. The details of the remainder of the ACCS are in the Westinghouse Team Work Specification Number 2.3.2.9, "Install and Remove PCRV Rotary Work Platform," Work Package Number 2.3.2.9A, "Airborne Contamination Control," and Reference 1.

The ACCS is designed for contamination control above the rotary work platform to enable workers to remove components from the PCRV. The system assures there is a downward flow of clean air through the rotary work platform to prevent the spread of radioactive contamination onto the platform and into the reactor building.

Evaluation

The only modification to the existing system 73 is the tie-in of the ACCS ducting using fasteners and the addition of two dampers upstream of the ACCS tie-in point with system 73. These dampers will be used to isolate the remainder of system 73 when that particular fan is being used to take a suction on the DRWP with the ACCS lined up. The normal operation of the ACCS is to use one reactor plant exhaust fan lined up to the DRWP and the remainder of system 73 isolated from the ACCS tie-in point.

Seismic design requirements are not required. The Decommissioning Plan Section 3.4.9, Natural Disasters, states, "The seismic qualification of the Reactor Building will be maintained during decommissioning. No other new or existing systems or equipment are required to function during or following an earthquake." System 73 is not seismically qualified and the ACCS will have no effect on the seismic qualification of the reactor building.

Of the accidents analyzed in the DP Section 3.4, only a heavy load drop accident involving activated graphite assumes that the reactor plant exhaust system is in operation. During the installation of the ACCS, only one of the three reactor plant exhaust trains will be isolated and a clearance placed on that train. This leaves the other two trains to provide for filtration. During the actual operation of the ACCS, one train will be used for the ACCS line up while one of the other two trains will normally be taking a suction directly on the reactor building. Even if only one ventilation exhaust train is in operation (lined up to the ACCS or directly to the reactor building), as long as SRs 3.2.1, 3.2.2, and 3.2.3 have been satisfactorily completed, the requirements of LC 3.2 will be met and the consequences of a heavy load drop analyzed in DP Section 3.4.5 will not increase.

Question 2

DP Section 2.3.3.8.2, General Arrangement of Work Area for Graphite Block Removal, states:

> *A ventilation system will be installed to provide control of airborne contamination, including tritium. Air will be drawn from the refueling floor to the Work Platform, down through the access openings in the platform, and then exhausted to the Reactor Building Ventilation (exhaust) System (System 73) for discharge. The discharges from the Reactor Building Ventilation System will be monitored in accordance with the FSV Offsite Dose Calculation Manual (ODCM) (Ref. 11). The airflow from uncontaminated areas to contaminated areas through the Work Platform will minimize personnel exposure to airborne contamination.*
>
> *The ventilation system will ensure a positive downward flow of air over the workers. Exhaust ducts under the work platform will carry air through a HEPA filter, then to the existing plant ventilation system.*

The ACCS exhaust ducting, upstream of the system 73 tie-in, will contain a roughing filter and not a HEPA filter as stated in the DP. This roughing filter will remove large particulate that may be in the ACCS ducting prior to entering the system 73 ducting. The HEPA filters in system 73 will ultimately remove any radioactive particulate prior to the air being released offsite. The accident analyses for radiological releases takes no credit for these HEPA filters in the ACCS.

Question 3(A)

The installation of the ACCS will not prevent the reactor plant exhaust system from mitigating the consequences of an accident. At least one train will be available while activated graphite is located in the reactor building. The operation of system 73 is essentially the same as without the ACCS installed, from an accident mitigation standpoint. If the only system 73 train in operation was taking a suction on the ACCS, the requirements of LC 3.2 would be met and the consequences of a heavy load drop accident involving activated graphite would not increase.

Therefore, the probability of occurrence or the consequences of an accident or malfunction of equipment important to decommissioning safety previously evaluated in the Decommissioning Plan has not been increased.

Question 3(B)

The only accident that relies upon system 73 for mitigation is a heavy load drop involving activated graphite blocks. There will be no handling of activated graphite blocks during installation of the ACCS. The installation and operation of the ACCS does not create any accidents. During installation there will be proper radiological precautions taken to minimize the spread of contamination that may be inside the system 73 ducting.

Therefore, the possibility of an accident or malfunction of a different type than any evaluated previously in the Decommissioning Plan has not been created.

Question 3(C)

The requirements of LC 3.2 will remain in effect. In addition, by adhering to the requirements of SRs 3.2.1, 3.2.2, and 3.2.3 the analysis in this ECR remains valid. All gaseous effluent released must be monitored and controlled by the ODCM program as stated in the Basis for LC 3.3.

Therefore, the margin of safety as defined in the basis for any Technical Specification or in the Decommissioning Plan has not been reduced.

ENVIRONMENTAL EVALUATION

ECR/~~OTHER~~
NO. 93-003
PAGE ~~2 of 7~~ 4
7/21/93

CATEGORY

TYPE:

☒ ECR ☐ Other _____

Are all measurable nonradiological effects of this activity confined to the on-site areas previously disturbed during site preparation, plant construction or previous plant operation? ☒ Yes ☐ No

State Basis All nonradiological effects associated with this ECP are confined to the Reactor Building.

Is the activity required to achieve compliance with Federal, State or local environmental regulations? ☐ Yes ☒ No

Applicable Regulations _____

NOTE: If either answer is Yes, the activity does not involve an unreviewed environmental question. Sign and date the form. If both answers are No, the activity has the potential for creating an unreviewed environmental question. Complete the remainder of the evaluation form.

EVALUATION (Use additional sheets if required)

1. Is the activity identified in the Final Environmental Statement (FES) or Supplementary Environmental Documents? ☐ Yes ☐ No

Identity documents and document sections reviewed _____

2. Determine whether or not the activity involved is an unreviewed environmental question using the following guidelines.(If the answer to any of the following questions is Yes, then this activity involves an unreviewed environmental question.)

(A) Will this activity result in a significant increase in any adverse environmental impact previously evaluated in the FES? ☐ Yes ☐ No

State Basis _____

(B) Will this activity result in a significant change in the types, or a significant increase in the amounts of effluents, or a significant increase in the authorized power level? ☐ Yes ☐ No

State Basis _____

(C) Does this activity involve an environmental matter not previously reviewed and evaluated in the FES? ☐ Yes ☐ No

State Basis _____

Does the activity involve an unreviewed environmental question or, if ISFSI is involved, a significant unreviewed environmental impact? ☐ Yes ☒ No

By	Date	Approved	Date
Brian Chappell	7/1/93	J. Johnson	7-12-93

Design Inputs

This Engineering Change Request (ECR) is specifically addressing the tie-in of the PCRV decommissioning rotary work platform (DRWP) air contamination control system (ACCS) to system 73 and any associated potential effects to the downstream system. The details of the ACCS are in the Westinghouse Team Work Specification Number 2.3.2.9, "Install and Remove PCRV Rotary Work Platform," Work Package Number 2.3.2.9A, "Airborne Contamination Control," and Reference 1. System 73 is designated a "Upgraded Design Control" system in accordance with PSC Procedure DPP 4.1.1 and "Important to Decommissioning Quality" in accordance PSC Procedure DPM 2.1.

The ACCS is designed for contamination control above the rotary work platform to enable workers to remove components from the PCRV. The system assures there is a downward air flow through the rotary work platform to prevent the spread of radioactive contamination onto the platform and into the reactor building. There are two tool slots for PCRV component removal. The rotary work platform and the stationary platform have a seal provided and there is a seal between the stationary platform and the cut concrete wall of the PCRV.

The air under the platform is exhausted through three ducts in the stationary platform. This air flow is then diverted into a singular duct that is routed up the vertical side of the PCRV concrete cut. The air is then routed to above the PCRV to elevation 4879'. At this point the air is split into two parallel ducts and each is routed through a roughing filter that removes large particles. At the exit of the roughing filters, the system is then routed to existing reactor building ventilation exhaust ducting that is on the suction side of the C-7301 and C-7302, reactor plant exhaust fans 1A and 1B, respectively. This is to allow the use of either roughing filter in combination with either reactor plant exhaust fan. See Figure 1 for a schematic of the ACCS.

The ACCS described above and depicted in Figure 1, will be installed via Westinghouse Team Work Specification Number 2.3.2.9 and Work Package Number 2.3.2.9A. The only modification to the existing system 73 is the tie-in of the ACCS ducting using fasteners and the addition of two dampers upstream of the ACCS tie-in point with system 73. These dampers will be used to isolate the remainder of system 73 when that particular fan is being used to take a suction on the DRWP and the ACCS is lined up. The normal operation of the ACCS is to use one reactor plant exhaust fan lined up to the DRWP and the remainder of system 73 isolated from the ACCS tie-in point. One of the other two reactor building exhaust fans would normally be taking a suction directly from the reactor building.

Decommissioning Plan (DP) Section 2.3.3.8.2, General Arrangement of Work Area for Graphite Block Removal (Reference 3), states:

> *A ventilation system will be installed to provide control of airborne contamination, including tritium. Air will be drawn from the refueling floor to the Work Platform, down through the access openings in the platform, and then exhausted to the Reactor Building Ventilation (exhaust) System (System 73) for discharge. The discharges from the Reactor Building Ventilation System will be monitored in accordance with the FSV Offsite Dose Calculation Manual (ODCM) (Ref. 11). The airflow from uncontaminated areas to contaminated areas through the Work Platform will minimize personnel exposure to airborne contamination.*
>
> *The ventilation system will ensure a positive downward flow of air over the workers. Exhaust ducts under the work platform will carry air through a HEPA filter, then to the existing plant ventilation system.*

The Decommissioning Technical Specifications, LC 3.2 states:

> *The Reactor Building ventilation exhaust system shall be OPERABLE with:*
>
> *a. Reactor Building internal pressure subatmospheric, and*
>
> *b. At least one of the three ventilation exhaust trains OPERABLE, with each train consisting of one exhaust fan (C-7301, C-7302, or C-7302S) and the HEPA filter section of the associated filter assembly (F-7301, F-7302, or F-7302S).*
>
> *APPLICABILITY: Whenever ACTIVATED GRAPHITE BLOCKS have been removed from the PCRV shielding water and remain inside the Reactor Building.*

Design calculations have been performed (Reference 2) that present the results of flow and stress analysis to assure compliance with the applicable requirements of Functional Requirements for the Block Removal System, Section 5.0, Airborne Contamination Control System (Reference 4). Specifically, three design calculations were performed:

1. Rotatory Work Platform Slot Flow Analysis - This analysis was performed to determine if the existing system 73 fans were able to provide sufficient flow through the two DRWP tool slots (minimum of 100 fpm per slot). With a minimum of 17,100 cfm of air flow through the system 73 fan in use, the minimum

air flow through the DRWP tool slots is 104 fpm per slot.

2. System Flow Analysis - This analysis was performed to calculate the pressure drop through the ACCS, from the DRWP to the tie-in with existing system 73 ducting, and assure the ducting is adequate. With the system flow at 19,000 cfm, the pressure drop through the system is 2.4 inches of water.

3. DRWP Duct Structural Analysis - This analysis was performed to assure the structural integrity of the ACCS ducting. Based on the flows calculated in item 2 above, the maximum calculated stresses in the ducting are within allowable stresses for the ducting under live and dead load conditions.

Various preconditions and operational scenarios related to system 73 and the ACCS have been agreed to between PSC and the Westinghouse Team and is documented in Reference 5. The applicable portions of this agreement are contained in this ECR.

References:

1. Westinghouse Electric Corporation Design Specification 411A81, Revision 1, "Equipment Specification - Airborne Contamination Control System for Fort Saint Vrain Decommissioning."

2. Westinghouse Electric Corporation Calculation STD-CN-1993-6262, Revision 1, "Fort St. Vrain Decommissioning Air Contamination and Control System - Design Calculations and Notes."

3. Fort St. Vrain Decommissioning Plan, dated April 17, 1992.

4. Fort St. Vrain Decommissioning Functional Requirements 2.3, Revision 1, "Block Removal System Functional Requirements."

5. PSC letter to Westinghouse Team, PLW-92-0104, dated July 17, 1992; Subject: "WT Tie-in to System 73."

Upgraded Design Control Analysis

The description of the ACCS in DP Section 2.3.3.8.2 is incorporated into this design as evaluated in the Safety Evaluation for this ECR. Decommissioning Technical Specifications LC 3.2 compliance will be verified by the performance of Decommissioning Technical Specifications SR 3.2.1 and SR 3.2.2 during the Functional Test. This FT will be performed with only one ventilation exhaust system train operating and lined up to the ACCS, and then with only one ventilation exhaust train operating and lined up to the Reactor Building.

1. Seismic Analysis/Seismic Interaction

   Not required. The Decommissioning Plan Section 3.4.9, Natural Disasters, states, "The seismic qualification of the Reactor Building will be maintained during decommissioning. No other new or existing systems or equipment are required to function during or following an earthquake." The ACCS will have no effect on the seismic qualification of the reactor building.

2. Stress Analysis

   An analysis was performed to assure the structural integrity of the ACCS ducting. Based on the calculated flow through the ACCS and the live and dead loads due to the ducting, Reference 2 calculated that the maximum stresses in the ducting are within allowable stresses.

3. Piping/Hanger Analysis

   The maximum stresses in the ducting analyzed in Reference 2, was based on the hanger and ducting supports specified in Westinghouse Drawing Number 6433E68 (Attachment to Reference 1).

4. Hydraulic/Pneumatic

   The analysis in Reference 2 determined that the existing system 73 fans were able to provide sufficient flow through the two DRWP tool slots (minimum of 100 fpm per slot). With a minimum of 17,100 cfm of air flow through the system 73 fan in use, the minimum air flow through the DRWP tool slots is 104 fpm per slot. In addition, Reference 2 calculated the pressure drop through the ACCS, from the DRWP to the tie-in with existing system 73 ducting, and assures the ducting is adequate. With the system flow at 19,000 cfm, the pressure

drop through the system is 2.4 inches of water.

5. Thermal Effects

The temperature variations of the air flowing through this system is minimal. The environmental conditions specified for the ACCS is 65°F - 105°F (Reference 1). This temperature range is of little effect and no thermal effect analysis has been performed.

6. Nuclear/Radiological/ALARA Analysis

During actual breaking into system 73 for installation of the ACCS, radiological precautions will be taken due to the potential for internal contamination. The dose rate due to the potentially contaminated/tritiated air flowing through the ACCS while in operation is minimal. Any radioactive particulates that may be in the ACCS will primarily be removed by the roughing filters and the system 73 HEPA filters. However, the particulate release to the atmosphere will be monitored and sampled in accordance with the ODCM. The tritium that may be in the system and released to the atmosphere will be monitored and sampled in accordance with the ODCM.

7. Fire Protection Analysis

There are no significant combustibles that would present a fire protection hazard. Any "hot work" that may occur due to installation of the ACCS will follow applicable procedures for hot work.

8. Environmental Analysis

There are no environmental affects due to the operation or installation of this system. Potential dust/non-radioactive particles that may be released via the ACCS would primarily be removed by the roughing filters and the system 73 HEPA filters.

9. Compatibility of Materials, Equipment and Processes

All materials to be used in the ACCS are compatible with the existing system 73 ducting/components. The specific quality requirements of the Westinghouse Team Project Quality Plan will be applied to the ACCS and will be specified in Work Specification Number 2.3.2.9 and Work Package Number 2.3.2.9A. The ACCS shall be in accordance with the Project Quality Plan, Attachment A, Item A5 except for the tie-in to system 73 which shall be in accordance with Attachment A, Item C1.

While the ACCS is in operation, a small amount of water vapor from the shield water system will be entrained in the air leaving the DRWP. The ducting and roughing filters in the ACCS have been selected with this as a requirement. The roughing filter housing is an expanded area of the ACCS which results in a lower pressure area. In this area some of the water that is entrained in the air will condense. The roughing filter housing has a drain valve in it. If any water vapor is in the air that enters the system 73 ventilation system, the existing moisture separators will be adequate to remove it.

10. Accessibility for Inspection, Maintenance and Repair

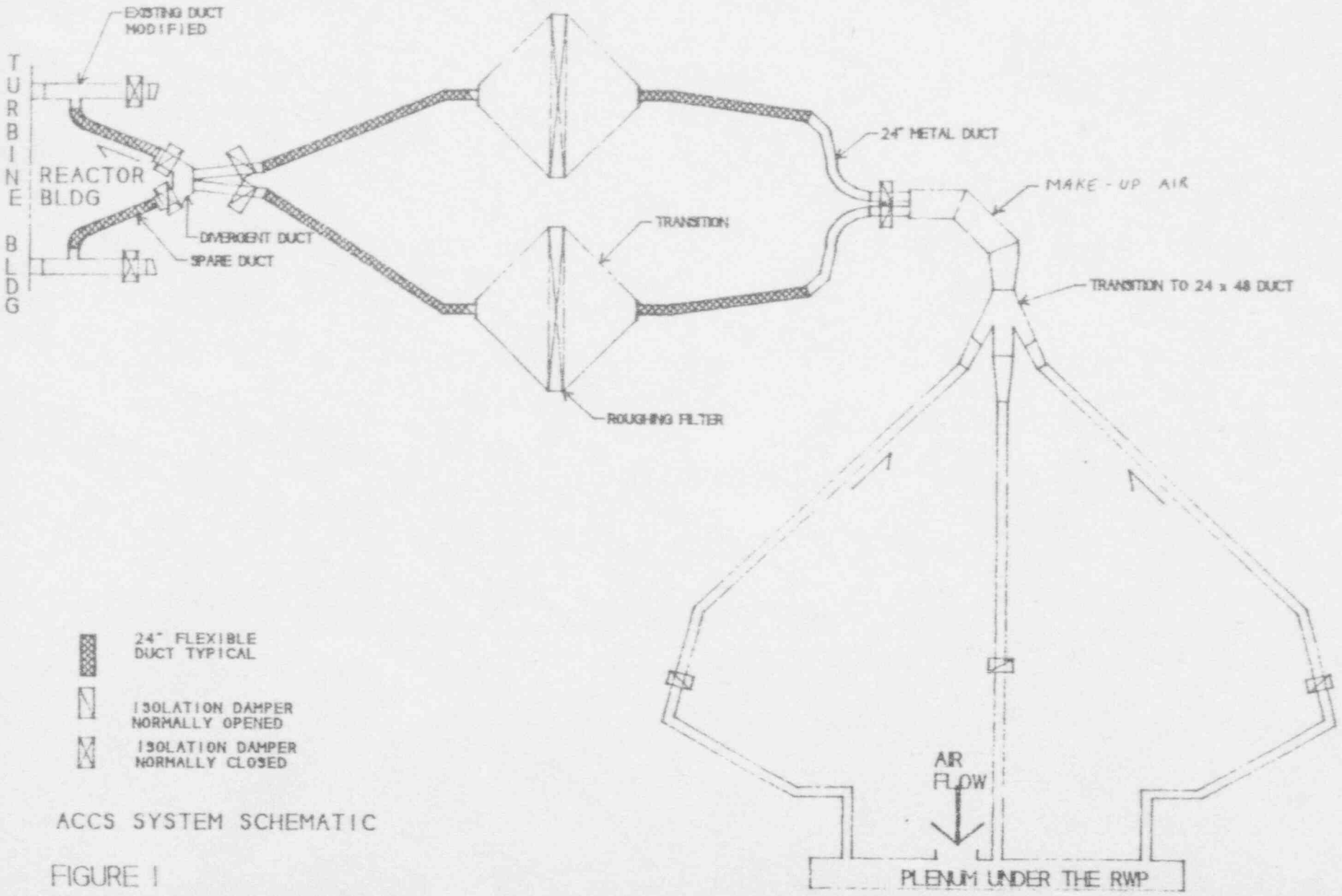
Although a portion of the ACCS will be potentially located in a radiation area, and the entire system will be located in the reactor building which is a radiologically controlled area, the ACCS is totally accessible for any inspections, maintenance, or repairs.

11. Electrical Analysis

There is no electrical installations or modifications associated with this ECR. The current electrical loading on the reactor plant exhaust fans will remain essentially the same.

12. Accident Analysis

Of the accidents analyzed in the DP Section 3.4, only a heavy load drop accident involving activated graphite assumes that the reactor plant exhaust system is in operation. During the installation of the ACCS, only one of the three reactor plant exhaust trains will be isolated and a clearance placed on that train. This leaves the other two trains to provide for filtration. During the actual operation of the ACCS, one train will be used for the ACCS line up while one of the other two trains are available for taking a suction directly on the reactor building. Even if only one ventilation exhaust train is in operation (lined up to the ACCS or directly to the reactor building), as long as SRs 3.2.1, 3.2.2, and 3.2.3 have been satisfactorily completed, the requirements of LC 3.2 will be met and the consequences of a heavy load drop analyzed in DP Section 3.4.5 will not increase.



ACCS SYSTEM SCHEMATIC

FIGURE 1

ATTACHMENT A
ENGINEERING CHANGE REQUEST

ECR-93-033
Page 1 of 12

IS UPGRADED DESIGN CONTROL REQUIRED: X YES ___ NO

Affected Component(s): F-7301, F-7302, F-7025, PDI 7323-3, PDI 7358-3, and PDI 7359-3.

Affected Document(s)/Drawing(s): None

ACCEPTANCE OF ECR SUBMITTAL

Eng. Manager Acceptance: W E Nicholas Date: 9/27/93

Assigned Designer: B. Dyck

REVIEW AND APPROVAL

IDV: Dan Johnson (PRINT NAME) Signature Date: 9-28-93

Designated Reviewers: Licensing: [illegible] Date: 9-27-93 Quality Assurance: [illegible] Date: 9-28-93

Williams & Jones 9/28/93

Engineering Manager Approval: W E Nicholas Date: 9/27/93

DSRC/ISRC Review: DSRC 033 SEP 29 1993 Date: ___

CLOSE-OUT

Implementing SSR(s): 93500631, 93500632, 93500629, 93500634, 93500633

Issued ECR-CRs: None

Installation & Testing Complete: [illegible] Date: 10/6/93

Doc. Update Complete: Control Room N/A Date: ___ Design: N/A Date: ___

ECR Closed-Out: [illegible] Date: 10/6/93

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Page 2 of 12

Existing Condition/Requested Change:

Existing Condition: (1) The reactor building ventilation exhaust HEPA filters (F-7301, F-7302, and F-7302S) that are currently ordered through the PSC procurement system are not an "off the shelf" item and must be specially made with a long lead time.

(2) The installed delta pressure (DP) gages for F-7301, F-7302, and F-7302S (PDI 7323-3, PDI 7358-3, and PDI 7359-3, respectively) have a range of 0 to 3" water gage. The DTS allow the HEPA filters to have a maximum DP of 6" and during wafer cutting operations a greater than 3" DP gage is desired.

Requested Change: Evaluate a interim replacement HEPA filter that is off the shelf and has a DOP tested efficiency of ≥ 99.97%. Evaluate a replacement gage that reads a pressure in the range from 0 to 6" water gage.

Originator: Brian L Dyck Date: 9/27/93

Originator's Supervisor/Manager: D. J. Hovan Date: 9/27/93

Disposition:

Procure temporary replacement filters for F-7301 and F-7302 that are DOP rated at ≥ 99.97% until the requirements of DTS 3.2 are applicable. Install permanent replacement DP gages for all HEPA filters that have a range of 0 to 8" water gage. See detailed description of this temporary filter change and this permanent gage replacement in this ECR.

Designer: Brian L Dyck Date: 9/27/93

Table of Attached Pages:

Pages 1 through 12.

ECR/~~SCR/PG/TR~~
NO. 93-033
PAGE 3

SAFETY EVALUATION

CATEGORY

TYPE:

- [X] ECR
- [ ] Setpoint Change Request
- [ ] Procedure Change
- [ ] Test Request
- [ ] Other _____

CLASSIFICATION: ARE THE SYSTEM(S) EQUIPMENT OR STRUCTURES INVOLVED, OR DOES THE ACTIVITY AFFECT:

Decommissioning Nuclear Safety	[X] Yes [ ] No	Radiological Safety (ISFSI)	[ ] Yes [X] No
Important to Decommissioning Quality	[X] Yes [ ] No	Important to Safety (ISFSI)	[ ] Yes [X] No
		Enhanced Quality (ISFSI)	[ ] Yes [X] No
		Security (ISFSI)	[ ] Yes [X] No

Remarks _____

EVALUATION (Use additional sheets if required)

1. Does this activity affect structures, systems, components, equipment, tests, experiments or procedures described in the applicable facility SAR, Tech Specs or DFPP? [X] Yes [~~X~~] No
   List the applicable sections reviewed DP Sections 2.2.3.13, 3.4.5.
   DTS LC 3.1, LC 3.2, SR 3.2.1, SR 3.2.2, SR 3.2.3.

2. Does the activity require that change(s) be made to the applicable facility SAR, Tech Specs or DFPP? [ ] Yes [X] No
   List sections to be changed and the changes to be made _____

3. Determine whether or not the activity involved is an unreviewed safety question using the following guidelines. (Also, if ISFSI is involved, determine whether a significant increase in occupational exposure is involved.)

   (A) Has the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the applicable SAR, or DFPP been increased? [ ] Yes [X] No
   State Basis See page 4

   (B) Has the possibility of an accident or malfunction of a different type than any evaluated previously in the applicable SAR or DFPP been created? Address POL criteria on permanent removal and/or disposal of plant equipment. [ ] Yes [X] No
   State Basis See page 5

   (C) Has the margin of safety, as defined in the basis for any Tech Spec, FPOR, or in the applicable SAR been reduced? [ ] Yes [X] No
   State Basis See page 5

Does the activity appear to involve an unreviewed safety question? [ ] Yes [X] No

By	Date	Approved	Date
[signature]	9/23/93	[signature]	9-23-93

Background

The reactor building ventilation exhaust HEPA filters (F-7301, F-7302, and F-7302S) are being temporarily replaced with HEPA filters that have the same filtration and flow specifications as that required by the Decommissioning Plan, but do not have the complete documentation as to what industry standards they conform to.

The installed delta pressure (DP) gages for F-7301, F-7302, and F-7302S (PDI 7323-3, PDI 7358-3, and PDI 7359-3, respectively) have a range of 0 to 3" water gage. The Decommissioning Technical Specifications (DTS) allow the HEPA filters to have a maximum DP of 6" and during wafer cutting operations a greater than 3" DP gage is desired. The HEPA filters are rated for at least 10" water gage DP.

Temporary replacement filters for F-7301 and F-7302 that are DOP rated at $\geq$ 99.97% will be used until the requirements of DTS 3.2 are applicable. Prior to handling activated graphite, HEPA filters will be installed that conform to the specifications called out in Decommissioning Plan Section 2.2.3.13. A permanent replacement of the DP gages for all HEPA filters will be performed, using gages that have a range of 0 to 8" water gage.

Evaluation

Question 3(A)

Of the accidents analyzed in the Decommissioning Plan Section 3.4, only a heavy load drop accident involving activated graphite assumes that the reactor plant exhaust system is in operation. During the period when the DTS are not required, the newly specified HEPA filters will be used. Until such time as DTS LC 3.2 is in effect, the HEPA filters are not required to be operable and the requirements specified in Decommissioning Plan Section 2.2.3.13 item 5 need not be met. Once qualified HEPA filters are installed and SRs 3.2.1, 3.2.2, and 3.2.3 have been satisfactorily completed, the requirements of LC 3.2 will be met and the consequences of a heavy load drop analyzed in Decommissioning Plan Section 3.4.5 will not increase. This will be accomplished prior to handling activated graphite. The newly specified gages have no effect on the accident analysis. Therefore, the probability of occurrence or the consequences of an accident or malfunction of equipment important to decommissioning safety previously evaluated in the Decommissioning Plan has not been increased.

Question 3(B)

The replacement HEPA filters have the same rating for filtering particulate. The replacement gages are virtually the same except for the gage indicating range. Therefore, the possibility of an accident or malfunction of a different type than any evaluated previously in the Decommissioning Plan has not been created.

Question 3(C)

The only DTS that are applicable to the HEPA filters are not applicable until handling activated graphite. There are no DTS that are applicable to the HEPA filter DP gages. The applicable requirements of the ODCM will continue to be in affect. Therefore, the margin of safety as defined in the basis for any Technical Specification or in the Decommissioning Plan has not been reduced.

ECR/~~OTHER~~
NO. 93-033
PAGE 6

ENVIRONMENTAL EVALUATION

CATEGORY

TYPE:

☒ ECR ☐ Other _____

Are all measurable nonradiological effects of this activity confined to the on-site areas previously disturbed during site preparation, plant construction or previous plant operation? ☒ Yes ☐ No

State Basis All non-radiological effects associated with this ECR are confined to on-site areas previously disturbed. The newly specified HEPA filters are rated for filtration equal to the existing specified HEPA filters.

Is the activity required to achieve compliance with Federal, State or local environmental regulations? ☐ Yes ☒ No

Applicable Regulations _____

NOTE: If either answer is Yes, the activity does not involve an unreviewed environmental question. Sign and date the form. If both answers are No, the activity has the potential for creating an unreviewed environmental question. Complete the remainder of the evaluation form.

EVALUATION (Use additional sheets if required)

1. Is the activity identified in the Final Environmental Statement (FES) or Supplementary Environmental Documents? ☐ Yes ☐ No

Identity documents and document sections reviewed _____

2. Determine whether or not the activity involved is an unreviewed environmental question using the following guidelines. (If the answer to any of the following questions is Yes, then this activity involves an unreviewed environmental question.)

(A) Will this activity result in a significant increase in any adverse environmental impact previously evaluated in the FES? ☐ Yes ☐ No

State Basis _____

(B) Will this activity result in a significant change in the types, or a significant increase in the amounts of effluents, or a significant increase in the authorized power level? ☐ Yes ☐ No

State Basis _____

(C) Does this activity involve an environmental matter not previously reviewed and evaluated in the FES? ☐ Yes ☐ No

State Basis _____

Does the activity involve an unreviewed environmental question or, if ISFSI is involved, a significant unreviewed environmental impact? ☐ Yes ☒ No

By	Date	Approved	Date
Brian Lloyd	9-7-93	Lon Chamberlain	9-28-93

Design Inputs

This ECR is addressing the temporary replacement of the reactor building ventilation exhaust HEPA filters (F-7301, F-7302, and F-7302S), that are specified as the required replacement filters, with filters that are adequately rated for the filtering of effluents from the reactor building. This temporary replacement is applicable only when the requirements of Decommissioning Technical Specifications (DTS) 3.2 are not applicable. Also, this ECR is addressing the permanent replacement of the installed delta pressure (DP) gages for F-7301, F-7302, and F-7302S (PDI 7323-3, PDI 7358-3, and PDI 7359-3, respectively) that have a range of 0 to 3" water gage with gages that have a range of 0 to 8" water gage.

HEPA Filters

Decommissioning Plan Section 2.3.3.13, item 5, Exhaust Filters, states:

> The reactor plant exhaust filters consist of three units. Exhaust air entering the reactor plant exhaust filters will pass in sequence through a moisture separator and a high efficiency particulate air (HEPA) filter. The HEPA filters conform to the requirements of the following documents:
>
> (1) MilSpec MIL-F-51068 (D)
> (2) Underwriters Laboratories Standard UL-568-1977
> (3) USNRC Regulatory Guide 1.140
> (4) USNRC Regulatory Guide 1.52, Rev. 2
> (5) ANSI N509 (1976,
>
> Each of the HEPA filter elements in each filter unit, manufactured from fiberglass conforming to MilSpec MIL-F-51079, is designed for a flow rate of 1200 cfm, with a maximum initial (clean) pressure drop of 1 inch (water gage). Each filter unit is rated at 19,000 cfm to handle the output of its associated reactor plant exhaust fan. The design specification requires that the maximum penetration is 0.03% when tested with thermally-generated mono-dispersed dioctylphthalate (DOP) smoke having a light-scattering geometric mean droplet diameter of 0.3 microns.

The only requirements for the temporary HEPA filters are the following:

(1) Sized to fit in the existing HEPA filter frames without modification (24" x 24" x 11½" deep).
(2) DOP rated at ≥ 99.97% efficiency with 0.3 micron particles.
(3) Rated flow of ≥ 1200 cfm at 1" water gage DP.

These requirements specified for the temporary HEPA filters will ensure any potential

radioactive effluents are adequately filtered. Once these temporary filters are installed, that filter train will be declared inoperable per DTS LC 3.2 until HEPA filters that meet the requirements of the DP are installed and SRs 3.2.1, 3.2.2, and 3.2.3 are satisfactorily completed. The installation of these HEPA filters is not included in this ECR and shall be performed using a SSR.

DP Gages

During top head wafer cutting, there is a large amount of smoke generated. This results in numerous filter change outs of the in-line filters (ACCS roughing filters, reactor building furnace filters, reactor building pre-filters, and the reactor building HEPA filters). When all of the filters upstream of the HEPA filters are clean and the HEPA filters are partially loaded, the DP on the HEPA filter is at its highest. The gage for reading HEPA filter DP indicates 0 to 3" water gage. There are times when a slightly higher indication is desired to monitor HEPA filter performance. In addition, DTS SR 3.2.2 states, "A pressure drop across the HEPA filter of less than 6 inches of water gauge at 90% of the filter design flow rate will indicate that the filters are not clogged by excessive amounts of foreign matter." A 0 to 8" gage is being specified for this application. The following is a comparison of the two gages.

Vendor:	Dwyer	Dwyer
Model:	Magnehelic 2008	Magnehelic 2003C
Gage Range:	0-8" water gage	0-3" water gage
Gage Increments:	0.2"	0.2"
Gage Accuracy:	± 2% of full scale	± 2% of full scale

The only item that is not equivalent is the gage accuracy. However, the required accuracy for 10/28/93
this application is well within ± 2% of full scale (8") which is ± 0.16" water gage vs. ± ~~0.6"~~ 0.06"
for the 0-3" gage. This accuracy is sufficient to demonstrate compliance with DTS requirement of 6" water gage. The installation and calibration of these gages is not included in this ECR and shall be performed using a SSR.

Upgraded Design Control Analysis

1. Seismic Analysis/Seismic Interaction

Not required. The Decommissioning Plan Section 3.4.9, Natural Disasters, states, "The seismic qualification of the Reactor Building will be maintained during decommissioning. No other new or existing systems or equipment are required to function during or following an earthquake." The replacement of the HEPA filters and the HEPA filter DP gages will have no effect on the seismic qualification of the reactor building.

2. Stress Analysis

The filters and gages specified in this ECR are rated for the system flows and pressures. No modifications of existing equipment is required for these installations.

3. Piping/Hanger Analysis

Not applicable. The newly specified HEPA filters and DP gages will fit in the same configuration as the existing components.

4. Hydraulic/Pneumatic

The newly specified HEPA filters are rated for 1250 cfm at 1" water gage DP which exceeds the required 1200 cfm at 1" water gage minimum. The newly specified HEPA filters are rated to at 10" water gage DP which exceeds the required 6" DP minimum. The newly specified gages are also rated for the required pressure of the system.

5. Thermal Effects

The temperature variation of the air flowing through this system is minimal. The HEPA filters are temperature rated for this temporary application. The temperature conditions specified for the new gages is 20-140 °F.

6. Nuclear/Radiological/ALARA Analysis

The newly specified HEPA filters will remove at least 99.97% of all particles 0.3 micron or greater. However, the particulate release to the atmosphere will be monitored and sampled in accordance with the ODCM. The tritium that may be in the system and released to the atmosphere is independent of the HEPA filter used, but tritium will be monitored and sampled in accordance with the ODCM.

7. Fire Protection Analysis

There are no significant combustibles that would present a fire protection hazard. The newly specified HEPA filters are rated to at least 200 °F continuous exposure and gages are rated for this application and are not combustible under these conditions.

8. Environmental Analysis

The newly specified HEPA filters will remove the same environmental dust/particles as the previously specified HEPA filters (i.e., both filters are rated at 99.97% efficient at $\geq$0.3 micron particle size)

9. Compatibility of Materials, Equipment and Processes

The HEPA filters to be installed during this interim non-DTS requirement period, are the same HEPA filters as required in accordance with the DP except that they do not have the certifications other than meeting the requirements of efficiency and flow specified. The gages are virtually the same except for the indicating range. Both the HEPA filters and calibrated gages are compatible with the system materials, equipment, and processes.

10. Accessibility for Inspection, Maintenance and Repair

The installation location and physical size of the HEPA filters and DP gages are the same.

11. Electrical Analysis

There are no electrical installations or modifications associated with this ECR. The current electrical loading on the reactor plant exhaust fans will remain essentially the same.

12. Accident Analysis

Of the accidents analyzed in the DP Section 3.4, only a heavy load drop accident involving activated graphite assumes that the reactor plant exhaust system is in operation. During the period when the DTS are not required, the newly specified HEPA filters will be used. Until such time as DTS LC 3.2 is in effect, the requirements specified in DP Section 2.2.3.13 item 5 are not required. Once the HEPA filters meet the requirements of the DP and SRs 3.2.1, 3.2.2, and 3.2.3 have been satisfactorily completed, the requirements of LC 3.2 will be met and the consequences of a heavy load drop analyzed in DP Section 3.4.5 will not increase. This will be accomplished prior to handling activated graphite. The newly specified gages have no effect on the accident analysis.