

Effluent and Waste Disposal

Semi-Annual Report

January 1 - June 30, 1982

Facility Indian Point 3

Licensee Power Authority of the State of New York

This information is provided in accordance with the requirements of Regulatory Guide 1.21. The numbered sections of this report reference corresponding sections of the subject Regulatory Guide, pages 1.21-10 to 12.

A. Supplemental Information

1. Regulatory Limits

Indian Point Unit 3 is presently subject to limits on radioactive waste releases that are set forth in sections 2.4 and 3.4 of Appendix B to Docket # 50-286 entitled "Environmental Technical Specification Requirements for Once-Through Cooling" (T.S.). The percentages of technical specification limits reported in Table 1A are the percent of one half of the quarterly limits specified in the ETSR.

2. Maximum Permissible Concentrations

a. Fission and Activation Gases

The quarterly limits for those specifications stated in the ETSR have been used to calculate the percent of technical specification limit. The K, L, M, N values for vent release points are based on the isotopic concentrations reported in Table 1C and on the individual isotopic K, L, M, N values in Table 2.4-5 of the ETSR. The percent of permissible discharges reported for IP-3 are based on assuming that IP-3 can use only 50% of the T.S. limits measured in Curies/ second and detailed in Memorandum of Understanding between PASNY and Con Edison.

b&c. Iodines & Particulates

The quarterly limits for iodine-131 and particulates with half-lives greater than 8 days in section 2.4.2.b.3 of the ETSR have been used as the maximum permissible concentration for the purpose of calculating the percent of technical specification limit. Again only one half of the permissible limit is used for IP-3 as stated in 2(a) above.

d. Liquid Effluents

All liquid discharges from Indian Point are made through a common discharge canal with a minimum of 100,000 gpm dilution water. The isotopic content, excluding tritium and dissolved noble gas, of continuous and batch mode discharges from the site for the third and fourth calendar quarters have been added and a weighted average fraction of MPC has been calculated for this isotopic mixture as described in 10 CFR 20. The percent of applicable limit reported is the percent of MPC concentration of the time averaged diluted concentration for the calendar quarter.

The tritium limit has been established in the same manner as the other isotopes in liquid effluents.

Since there is no limit stated for dissolved noble gases in 10 CFR 20, we have established a limit of 2.55×10^{-3} uCi/cc based on a dose calculation that has been provided to USNRC inspectors.

3. Average Energy

The average energy (E) of the radionuclide mixture in releases of fission and activation gases was as follows:

$$\begin{array}{llll} \text{1st Quarter:} & \bar{E}_{\beta} & = 1.56 \text{ E-1 MeV/dis} & \bar{E}_{\gamma} & = 5.24 \text{ E-2 MeV/dis} \\ \text{2nd Quarter:} & \bar{E}_{\beta} & = 1.50 \text{ E-1 MeV/dis} & \bar{E}_{\gamma} & = 4.60 \text{ E-2 MeV/dis} \end{array}$$

4. Measurements and Approximations of Total Radioactivity

a. Fission and Activation Gases

Analysis of effluent gases has been performed in compliance with the requirements of Table 2.4-2 of the ETSR. In the case of isolated tanks (batch release) the total activity discharged is based on an isotopic analysis of each batch and the volume of gas in the batch corrected to standard temperature and pressure.

Vapor containment purge and pressure relief discharges have been treated as batch releases. At least one complete isotopic concentration analysis of containment air is performed per month and this is applied to a gross analysis of the ventilation air performed prior to each pressure relief. Isotopic analyses for each vapor containment purge are taken prior to and during the purge. This information is combined with the volume of air in each discharge to calculate the radionuclide composition of these discharges.

The continuous discharges are based on weekly samples of ventilation air for isotopic content. This information is combined with total air volume discharged and the process radiation monitor readings to determine the continuous discharges.

b&c Iodines and Particulates

Iodine-131 and particulate releases are quantified by collecting a continuous sample of ventilation air on a potassium-iodide impregnated activated charcoal cartridge and a glass-fiber filter paper. These samples are changed weekly as required in Table 2.4-2 of the ETSR and the concentration of isotopes found by analysis of these samples is combined with the volume of air discharged during the sampling period to calculate the amount of activity discharged.

For other iodine isotopes the ratio of each isotope to iodine-131 is determined for a monthly 24-hour sample. These ratios are then used, along with the total monthly discharge of iodine-131, to calculate the amount of these other isotopes discharged in this monthly period.

d. Liquid Effluents

A proportional composite sample of each batch discharge is taken and an isotopic analysis is performed in compliance with requirements specified in Table 2.4-1 of the ETSR. This isotopic concentration data is combined with information on volume discharged to determine the amount of each isotope discharged in this period.

Samples of continuous discharges have been taken and analyzed in compliance with Table 2.4-1 of the ETSR. This concentration data is combined with the volume discharged to calculate the total activity discharged.

e. Batch Releases

a. Liquid

1982

	<u>1st Quarter</u>	<u>2nd Quarter</u>
Number of Batch Releases	79	41
Total Time Period Batch Releases (Min.)	1.28 E+4	6.76 E+3
Maximum " " " " " "	5.40 E+2	3.40 E+2
Average " " " " " "	1.62 E+2	1.65 E+2
Minimum " " " " " "	8.50 E+1	1.00 E+1
Average Stream Flow (cfs)	25533	37666

b. Gaseous

Number of Batch Releases	54	4
Total Time Period Batch Releases (Min.)	1.20 E+4	2.90 E+2
Maximum " " " " " "	1.86 E+3	1.05 E+2
Average " " " " " "	2.22 E+2	7.38 E+1
Minimum " " " " " "	4.00 E+1	5.00 E+1

6. Abnormal Releases

a. Liquid

None

b. Gaseous

1st Quarter, 1 Abnormal Release
 .45 Curies Total Activity Released
 Technical Specification Limit of Appendix B
 Section 2.4.2.a was not exceeded.

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B. GASEOUS EFFLUENTS
FIRST AND SECOND
QUARTERS, 1982

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1982)

GASEOUS EFFLUENTS SUMMATION OF ALL RELEASES

	UNIT	1st QUARTER	2nd QUARTER	EST. TOTAL ERROR %
A. Fission & Activation Gases				
1. Total release	Ci	2.44E+3	1.33E+2	2.50E+1
2. Average release rate for period	uCi/sec	3.14E+2	1.69E+1	
3. Percent of technical specification limit.	%	8.95E 0	4.59E-1	
B. Iodines				
1. Total iodine 131	Ci	1.24E-3	7.81E-4	2.50E+1
2. Average release rate for period	uCi/sec	1.59E-4	9.93E-5	
3. Percent of technical specification limit.	%	1.33E-1	6.92E-3	
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	1.38E-3	8.35E-4	2.50E+1
2. Average release rate for period	uCi/sec	1.77E-4	9.18E-6	
3. Percent of technical specification limit	%	1.33E-1	6.92E-3	
4. Gross alpha radioactivity	Ci	<1.64E-7	<3.10E-7	
D. Tritium				
1. Total release	Ci	7.23E-1	4.83E-1	2.50E+1
2. Average release rate for period	uCi/sec	9.30E-2	6.14E-2	
3. Percent of technical specification limit	%	NA	NA	

TABLE 1C
 EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1982)
 GASEOUS EFFLUENTS-GROUND-RELEASES

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1. Fission Gases					
Krypton (Kr) 85	Ci	7.09E-2		1.38E+1	
Krypton (Kr) 85m	Ci	6.74E 0		7.00E-1	4.02E-5
Krypton (Kr) 87	Ci	5.85E-2		6.35E-2	
Krypton (Kr) 88	Ci	8.16E-2		3.26E-1	
Xenon (Xe) 133	Ci	7.74E+2	1.33E+2	1.53E+3	2.23E-2
Xenon (Xe) 133m	Ci	7.82E-3		1.79E+1	
Xenon (Xe) 135	Ci	5.23E+1		2.32E+1	
Xenon (Xe) 135m	Ci	1.66E-1			
Xenon (Xe) 138	Ci	4.52E-2			
Xenon (Xe) 131m	Ci	1.56E-2		1.55E+1	
Unidentified	Ci				
TOTAL FOR PERIOD	Ci	8.34E+2	1.33E+2	1.61E+3	2.23E-2
2. Iodines					
iodine (I) 131	Ci	1.24E-3	7.81E-4		
iodine (I) 133	Ci	7.21E-4			
Iodine (I) 135	Ci				
TOTAL FOR PERIOD	Ci	1.96E-3	7.81E-4		

TABLE 1C -PAGE 2

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1982)
GASEOUS EFFLUENTS-GROUND-RELEASES

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
3. Particulates					
Antimony (Sb) 125	Ci	3.18E-6			
Barium-Lanthanum 140	Ci				
Cadmium (Cd) 109	Ci	1.39E-5	3.98E-6		
Cerium (Ce) 139	Ci	2.59E-7	6.55E-7		
Cerium (Ce) 141	Ci	2.85E-7	4.51E-7		
Cerium (Ce) 144	Ci	6.74E-7	4.90E-7		
Cesium (Cs) 134	Ci	1.15E-6			
Cesium (Cs) 137	Ci	4.62E-6	6.23E-7		
Cobalt (Co) 57	Ci	2.19E-7	2.09E-8		
Cobalt (Co) 58	Ci	2.32E-5	1.51E-5		
Cobalt (Co) 60	Ci	1.21E-5	3.48E-6		
Iron (Fe) 55	Ci	6.96E-5	2.32E-5		
Manganese (Mn) 54	Ci	2.07E-6			
Mercury (Hg) 203	Ci		2.17E-7		
Neptunium (Np) 239	Ci		3.13E-6		
Nickel (Ni) 63	Ci	2.98E-6	2.42E-6		
Strontium (Sr) 85	Ci	1.24E-6			
Strontium (Sr) 89	Ci				
Strontium (Sr) 90	Ci				
Tin (Sn) 113	Ci		1.13E-8		

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C. LIQUID EFFLUENTS
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TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1982)

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	UNIT	1st QUARTER	2nd QUARTER	EST. TOTAL ERROR %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	1.17E-1	1.67E-1	2.50E+1
2. Average diluted concentration during period	uCi/ml	4.81E-10	1.00E-9	
3. Percent of applicable limit	%	1.52E-2	1.11E-3	
B. Tritium				
1. Total release	Ci	1.33E+2	5.53E+1	2.50E+1
2. Average diluted concentration during period	uCi/ml	5.47E-7	3.31E-7	
3. Percent of applicable limit	%	1.82E-2	1.10E-2	
C. Dissolved and entrained gases				
1. Total release	Ci	1.02E+1	3.48E-1	2.50E+1
2. Average diluted concentration during period	uCi/ml	4.20E-8	2.08E-9	
3. percent of applicable limit	%	1.65E-3	8.16E-5	
D. Gross alpha radioactivity				
1. Total release	Ci	<2.79E-4	<2.98E-4	2.50E+1
E. Volume of waste release (prior to dilution)	liters	4.00E+7	2.31E+6	1.00E+1
F. Volume of dilution water used during period	liters	2.43E+11	1.67E+11	1.00E+1

TABLE 2B
LIQUID EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT 1982

NUCLIDES	UNIT	Continuous Mode		Batch Mode	
		1st QUARTER	2nd QUARTER	1st QUARTER	2nd QUARTER
Antimony (Sb) 122	Ci	2.92E-5		2.10E-4	9.88E-5
Antimony (Sb) 124	Ci	7.16E-5		3.84E-4	4.52E-5
Antimony (Sb) 125	Ci	2.53E-4		6.76E-3	6.41E-3
Barium/Lanthanum 140	Ci	5.31E-5		1.25E-3	4.10E-3
Barium Ba 133	Ci	6.73E-5		3.09E-5	2.41E-6
Cadmium Cd 109	Ci	2.15E-3			1.98E-5
Cerium Ce 139	Ci	2.83E-4		9.15E-4	7.75E-5
Cerium Ce 141	Ci	1.46E-4		1.05E-4	4.87E-4
Cerium Ce 144	Ci	3.37E-4			3.36E-6
Cesium Cs 134	Ci	3.24E-4		4.83E-4	2.76E-3
Cesium Cs 136	Ci			5.77E-4	3.29E-4
Cesium Cs 137	Ci	6.70E-4		1.65E-3	5.15E-3
Chromium Cr 51	Ci	4.02E-4		1.66E-3	1.91E-2
Cobalt Co 57	Ci	7.12E-5		6.15E-5	1.77E-4
Cobalt Co 58	Ci	4.13E-3		8.41E-3	2.53E-2
Cobalt Co 60	Ci	9.97E-4		9.64E-3	3.61E-2
Iodine I 131	Ci	4.12E-3		1.43E-4	4.58E-3
Iodine I 132	Ci	1.72E-4		8.20E-4	
Iodine I 133	Ci	2.60E-3		1.18E-5	
Iodine I 134	Ci	5.23E-5			4.42E-5
Iodine I 135	Ci	2.92E-4		2.07E-4	
Iron Fe 55	Ci	4.37E-3		3.48E-2	3.61E-2
Iron Fe 59	Ci			5.47E-4	1.71E-3
Mercury Hg 203	Ci	2.11E-5		7.69E-6	3.77E-3
Neptunium Np 239	Ci	1.07E-4			
Manganese Mn 54	Ci	6.57E-4		6.83E-4	3.77E-3
Manganese Mn 56	Ci	6.29E-5		3.16E-6	

NUCLIDES	UNIT	Continuous Mode		Batch Mode	
		1st QUARTER	2nd QUARTER	1st QUARTER	2nd QUARTER
Molybdenum	Mo 99	Ci		1.03E-3	3.14E-3
Nickel	Ni 63	Ci		3.97E-3	7.96E-3
Nickel	Ni 65	Ci			
Niobium	Nb 94	Ci			
Niobium	Nb 95	Ci	7.61E-5	8.16E-5	3.56E-4
Niobium	Nb 97	Ci	1.50E-5	5.20E-4	9.18E-4
Phosphorus	P 32	Ci		2.39E-3	2.40E-4
Radium	Ra 226	Ci	1.53E-4	2.50E-4	5.89E-6
Rubidium	Rb 88	Ci	1.49E-3	1.34E-2	
Rhodium	Rh 106	Ci			
Ruthenium	Ru 103	Ci	9.06E-5	2.44E-6	2.49E-3
Silver	Ag 110m	Ci		6.35E-4	2.49E-3
Sodium	Na 24	Ci	1.03E-5	2.89E-6	
Strontium	Sr. 85	Ci	4.44E-5	5.36E-5	
Strontium	Sr 89	Ci		2.24E-5	1.78E-4
Strontium	Sr 90	Ci		1.34E-5	3.82E-5
Strontium	Sr 91	Ci			
Strontium	Sr 92	Ci		1.18E-5	
Technetium	Tc 99m	Ci	5.58E-5	1.34E-4	2.67E-4
Tin	Sn 113	Ci	3.00E-5	3.50E-6	
Tungsten	W 187	Ci			
Yttrium	Y 88	Ci	7.11E-5	2.28E-4	
Yttrium	Y 91m	Ci		4.06E-5	
Yttrium	Y 92	Ci			
Zinc	Zn 65	Ci		3.65E-4	1.51E-3
Zirconium	Zr 95	Ci		2.68E-4	9.82E-4
Zirconium	Zr 97	Ci		2.51E-6	
TOTAL FOR PERIOD		Ci	2.45E-2	9.28E-2	1.67E-1

NUCLIDES	UNIT	Continuous Mode		Batch Mode	
		1st QUARTER	2nd QUARTER	1st Quarter	2nd QUARTER
Xenon	Xe 133 Ci			9.92E+0	3.48E-1
Xenon	Xe 135 Ci			2.40E-1	3.45E-4

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D. SOLID WASTE
FIRST AND SECOND
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TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1982)

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

(January 1 - June 30, 1982)

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

1. Type of waste	Unit	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m ³	8.16 E+0	1.00 E+2
	Ci	4.80 E+0	
b. Dry compressible waste, contaminated equip, etc.	m ³	1.98 E+2	1.00 E+2
	Ci	6.31 E+0	
c. Irradiated components, control rods, etc.	m ³	0. E	. E
	Ci	0. E	
d. Other (describe) Filter Cartridges	m ³	4.81 E+0	1.00 E+2
	Ci	1.37 E+1	

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

a.	Co-58	%	3.4 E+1
	Co-60	%	2.0 E+1
	Cs-134	%	1.6 E+1
	Cs-137	%	3.0 E+1
b.	Co-58	%	1.4 E+1
	Co-60	%	5.6 E+1
	Cs-134	%	6.0 E+0
	Cs-137	%	2.0 E+1
	Mn-54	%	4.0 E+0
c.	Co-58	%	1.5 E+1
	Co-60	%	5.6 E+1
	Cr-51	%	2.9 E+1

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
8	Truck	Barnwell, South Carolina
6	Truck	Richland, Washington

B. IRRADIATED FUEL SHIPMENTS (Disposition)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None		

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F. METEOROLOGICAL DATA
FIRST AND SECOND
QUARTERS, 1982

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: January 1 - March 31, 1982

STABILITY CLASS: A

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	0	14	4	0	0	0	18
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	2	0	0	0	0	2
SE	2	2	0	0	0	0	4
SSE	11	12	0	0	0	0	23
S	8	11	0	0	0	0	19
SSW	0	10	0	0	0	0	10
SW	2	4	2	0	0	0	8
WSW	0	2	2	0	0	0	4
W	0	2	3	0	0	0	5
WNW	0	6	9	2	0	0	17
NW	0	9	15	0	0	0	24
NNW	0	9	8	1	0	0	18

VARIABLE

Total	23	83	43	3	0	0	152
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Periods of calm (hours): 0

Hours of missing data:

Total hours of missing data for all stability classes this quarter = 1

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: January 1 - March 31, 1982

STABILITY CLASS: B

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	6	5	0	0	0	12
NNE	0	4	1	0	0	0	5
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	1	1	0	0	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	2	1	0	0	0	0	3
S	2	1	0	0	0	0	3
SSW	1	0	0	0	0	0	1
SW	3	1	0	0	0	0	4
WSW	0	1	1	0	0	0	2
W	0	0	1	0	0	0	1
WNW	0	11	1	1	0	0	13
NW	0	4	6	1	0	0	11
NNW	0	13	2	0	0	0	15

VARIABLE

Total	10	44	17	2	0	0	73
Periods of calm (hours):	0						
Hours of missing data:							

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: January 1 - March 31, 1982

STABILITY CLASS: C

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	1	12	4	0	0	0	17
NNE	1	13	9	1	0	0	24
NE	0	2	0	0	0	0	2
ENE	0	3	0	0	0	0	3
E	0	3	0	0	0	0	3
ESE	1	0	0	0	0	0	1
SE	1	0	0	0	0	0	1
SSE	1	1	0	0	0	0	2
S	2	1	0	0	0	0	3
SSW	0	3	0	0	0	0	3
SW	1	1	0	0	0	0	2
WSW	1	2	1	0	0	0	4
W	2	2	1	0	0	0	5
WNW	0	6	4	1	0	0	11
NW	0	8	6	5	0	0	19
NNW	3	7	7	0	0	0	17

VARIABLE

Total 14 64 32 7 0 0 117

Periods of calm (hours): 0

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: January 1 - March 31, 1982

STABILITY CLASS: D

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	25	68	21	0	0	0	114
NNE	26	145	61	0	0	0	232
NE	35	55	8	0	0	0	98
ENE	29	17	1	0	0	0	47
E	17	0	0	0	0	0	17
ESE	9	0	0	0	0	0	9
SE	15	0	0	0	0	0	15
SSE	13	2	0	0	0	0	15
S	13	8	0	0	0	0	21
SSW	9	11	0	0	0	0	20
SW	3	8	1	0	0	0	12
WSW	9	10	5	0	0	0	24
W	16	22	12	0	0	0	50
WNW	16	51	14	3	0	0	84
NW	10	67	41	3	0	0	121
NNW	12	76	43	1	0	0	132

VARIABLE

Total	257	540	207	7	0	0	1011
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Periods of calm (hours): 1

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: January 1 - March 31, 1982

STABILITY CLASS: E

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	19	9	4	0	0	0	32
NNE	49	41	18	0	0	0	108
NE	73	22	3	0	0	0	98
ENE	49	11	0	0	0	0	60
E	53	1	0	0	0	0	54
ESE	21	2	0	0	0	0	23
SE	22	0	0	0	0	0	22
SSE	27	6	0	0	0	0	33
S	29	7	0	0	0	0	36
SSW	18	12	0	0	0	0	30
SW	10	4	1	1	0	0	16
WSW	8	1	3	0	0	0	12
W	6	7	3	0	0	0	16
WNW	11	6	0	0	0	0	17
NW	6	6	0	0	0	0	12
NNW	5	2	2	0	0	0	9

VARIABLE

Total 406 137 34 1 0 0 578

Periods of calm (hours): 5

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: January 1 - March 31, 1982

STABILITY CLASS: F

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	1	0	0	0	0	3
NNE	27	2	1	0	0	0	30
NE	56	8	0	0	0	0	64
ENE	18	4	0	0	0	0	22
E	18	0	0	0	0	0	18
ESE	5	0	0	0	0	0	5
SE	6	0	0	0	0	0	6
SSE	12	0	0	0	0	0	12
S	11	4	1	0	0	0	16
SSW	4	0	0	0	0	0	4
SW	4	0	0	0	0	0	4
WSW	3	0	0	0	0	0	3
W	1	0	0	0	0	0	1
WNW	0	0	0	0	0	0	0
NW	3	0	0	0	0	0	3
NNW	1	0	0	0	0	0	1

VARIABLE

Total 171 19 2 0 0 0 192

Periods of calm (hours): 0

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: January 1 - March 31, 1982

STABILITY CLASS: G

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	0	0	0	0	0	2
NNE	8	0	0	0	0	0	8
NE	8	4	0	0	0	0	12
ENE	2	0	0	0	0	0	2
E	1	0	0	0	0	0	1
ESE	2	0	0	0	0	0	2
SE	1	0	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	1	0	0	0	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	1	0	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0

VARIABLE

Total 26 4 0 0 0 0 0 30

Periods of calm (hours): 0

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: April 1 - June 30, 1982

STABILITY CLASS: A

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	10	49	18	0	0	0	77
NNE	2	12	5	0	0	0	19
NE	1	0	0	0	0	0	1
ENE	1	0	0	0	0	0	1
E	2	1	0	0	0	0	3
ESE	2	0	0	0	0	0	2
SE	8	9	0	0	0	0	17
SSE	22	30	0	0	0	0	52
S	25	19	0	0	0	0	44
SSW	3	5	0	0	0	0	8
SW	2	3	0	0	0	0	5
WSW	1	3	0	0	0	0	4
W	0	9	3	0	0	0	12
WNW	3	20	17	1	0	0	41
NW	0	13	15	2	0	0	30
NNW	4	11	7	0	0	0	22

VARIABLE

Total	86	184	65	3	0	0	338
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Periods of calm (hours): 0

Hours of missing data: Total hours of missing data for all stability classes this quarter = 149

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: April 1 - June 30, 1982

STABILITY CLASS: B

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	9	15	1	1	0	0	26
NNE	8	9	2	1	0	0	20
NE	1	2	0	0	0	0	3
ENE	1	0	0	0	0	0	1
E	2	0	0	0	0	0	2
ESE	1	0	0	0	0	0	1
SE	1	0	0	0	0	0	1
SSE	2	0	0	0	0	0	2
S	7	1	0	0	0	0	8
SSW	1	0	0	0	0	0	1
SW	0	3	0	0	0	0	3
WSW	0	1	0	0	0	0	1
W	2	4	2	0	0	0	8
WNW	0	3	6	2	0	0	11
NW	1	5	2	2	0	0	10
NNW	2	7	0	2	0	0	11

VARIABLE

Total	38	50	13	8	0	0	109
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Periods of calm (hours): 0

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: April 1 - June 30, 1982

STABILITY CLASS: C

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	8	12	2	1	0	0	23
NNE	4	8	4	3	0	0	19
NE	0	1	0	0	0	0	1
ENE	0	3	0	0	0	0	3
E	6	0	0	0	0	0	6
ESE	0	0	0	0	0	0	0
SE	1	0	0	0	0	0	1
SSE	5	1	0	0	0	0	6
S	3	1	0	0	0	0	4
SSW	2	0	0	0	0	0	2
SW	2	1	0	0	0	0	3
WSW	2	2	1	0	0	0	5
W	2	0	1	0	0	0	3
WNW	1	1	6	1	0	0	9
NW	1	2	0	2	2	0	7
NNW	1	3	3	1	0	0	8

VARIABLE

Total 38 35 17 8 2 0 100

Periods of calm (hours): 0

Hours of missing data:

^a In the table record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: April 1 - June 30, 1982

STABILITY CLASS: D

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	22	25	15	2	0	0	64
NNE	43	74	60	13	0	0	190
NE	59	23	1	0	0	0	83
ENE	35	6	0	0	0	0	41
E	22	2	0	0	0	0	24
ESE	12	0	0	0	0	0	12
SE	18	2	0	0	0	0	20
SSE	26	14	0	0	0	0	40
S	12	5	0	0	0	0	17
SSW	8	12	0	0	0	0	20
SW	4	6	1	0	0	0	11
WSW	4	3	2	0	0	0	9
W	5	9	7	0	0	0	21
WNW	4	26	21	2	0	0	53
NW	2	23	21	10	1	0	57
NNW	10	19	17	9	0	0	55

VARIABLE

Total	286	249	145	36	1	0	717
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Periods of calm (hours): 5

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: April 1 - June 30, 1982

STABILITY CLASS: E

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	23	7	1	0	0	0	31
NNE	40	13	6	1	0	0	60
NE	66	20	1	0	0	0	87
ENE	59	0	0	0	0	0	59
E	25	0	0	0	0	0	25
ESE	22	0	0	0	0	0	22
SE	20	0	0	0	0	0	20
SSE	44	6	1	0	0	0	51
S	22	15	0	2	0	0	39
SSW	9	6	0	0	0	0	15
SW	2	2	0	0	0	0	4
WSW	3	0	0	0	0	0	3
W	5	3	1	0	0	0	9
WNW	6	9	3	0	0	0	18
NW	1	10	4	1	0	0	16
NNW	4	7	1	0	0	0	12

VARIABLE

Total	351	98	18	4	0	0	471
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Periods of calm (hours): 16

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: April 1 - June 30, 1982

STABILITY CLASS: F

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	6	0	0	1	0	0	7
NNE	48	6	1	0	0	0	55
NE	55	29	0	0	0	0	84
ENE	20	0	0	0	0	0	20
E	7	0	0	0	0	0	7
ESE	3	0	0	0	0	0	3
SE	5	0	0	0	0	0	5
SSE	10	0	0	0	0	0	10
S	5	1	0	0	0	0	6
SSW	1	1	0	0	0	0	2
SW	0	0	0	0	0	0	0
WSW	1	0	0	0	0	0	1
W	1	0	0	0	0	0	1
WNW	4	1	0	0	0	0	5
NW	0	0	0	0	0	0	0
NNW	2	0	0	1	0	0	3

VARIABLE

Total	168	38	1	2	0	0	209
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Periods of calm (hours): 3

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION ^a

PERIOD OF RECORD: April 1 - June 30, 1982

STABILITY CLASS: G

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level						TOTAL
	1-3	4-7	8-12	13-18	19-24	>24	
N	2	0	1	4	0	0	7
NNE	18	0	1	1	0	0	20
NE	14	11	0	0	0	0	25
ENE	4	3	0	0	0	0	7
E	2	0	0	0	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	1	0	0	0	0	0	1
S	0	0	0	0	0	0	0
SSW	1	0	0	0	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	1	0	0	0	0	0	1
WNW	1	0	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	1	0	1	0	0	0	2

VARIABLE

Total	45	14	3	5	0	0	67
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Periods of calm (hours): 0

Hours of missing data:

^a In the table, record the total number of hours of each category of wind direction for each calendar quarter. Provide similar tables separately for each atmospheric stability class and elevation.