

Effluent and Waste Disposal

Semi-Annual Report

3rd & 4th Quarter, 1978

Facility Indian Point Station
Licensee Consolidated Edison Company of New York, Inc.

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. The Power Authority of the State of New York has chosen to issue a separate semi-annual report. This report covers discharges for the third and fourth quarters of 1978. The liquid discharges have been proportioned to Units 1 and 2 based on the total volume of site waste processed at Con Edison. The airborne releases are for Units 1 and 2 only.

A. Supplemental Information

1. Regulatory Limits

Indian Point Units 1, 2 and 3 are presently subject to specifications on radioactive waste releases that are set forth in sections 2.4 and 3.4 of Appendix B to Docket's 50-3, 50-247 or 50-286 entitled "Environmental Technical Specification Requirements for Once-Through Cooling". The percent of technical specification limit reported in Table 1A and the percent of applicable limit reported in Table 2A are the percent of the quarterly limit 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 Unit 2 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 isotopic analysis in Table 1B and the values in Table 2.4-5 were used to determine the K, L, M, N values for Unit 1 stack releases.

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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.

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 for each calendar quarter 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 each calendar quarter.

The third and fourth quarter continuous releases are for Units 1 and 2 only. The batch releases discharged through the common site processing facility have been apportioned according to the volume transferred from the respective units to the processing facility.

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.

3. Average Energy

The average energy (\bar{E}) of the radionuclide mixture in releases of fission and activation gases for the third quarter was $\bar{E} = 3.83E-2$ Mev/Dis, and \bar{E} of $1.51E-1$ Mev/Dis. The corresponding values for the fourth quarter were $\bar{E} = 3.97E-2$ Mev/Dis and \bar{E} of $1.52E-1$ Mev/Dis.

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 releases) the total activity discharged is based on an isotopic analysis of each batch and the volume of gas in that batch corrected to standard temperature and pressure.

Vapor containment ventilation discharges have been generally 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 discharge. 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 the isotopic content determined from weekly samples of ventilation air. This information is combined with total air volume discharged by this route. The accumulation of batch and containment ventilation releases are then used to determine total discharges.

For this reporting period, the plant vent was the major source of gaseous 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 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 of volume discharged to determine the amount of each isotope discharged in the 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.

5. Batch Releases

	<u>1978</u>	
	<u>3rd Qtr.</u>	<u>4th Qtr.</u>
a) <u>Liquid</u> (1)		
Number of Batch Releases	366	360
Total Time Period Batch Release (Min.)	43359	42996
Maximum Time Period Batch Release (Min.)	180	857
Average Time Period Batch Releases (Min.)	118	119
Minimum Time Period Batch Releases (Min.)	25	15
Average Stream Flow (cfs)	6670	10480
b) <u>Gaseous</u> (2)		
Number of Batch Releases	109	116
Total Time Period Batch Releases (Min.)	36589	27278
Maximum Time Period Batch Releases (Min.)	1632	1440
Average Time Period Batch Releases (Min.)	336	235
Minimum Time Period Batch Releases (Min.)	20	40

6. Abnormal Releases

- a) Liquid - None
- b) Gaseous - None

EFFLUENT AND WASTE DISPOSAL

SEMI - ANNUAL REPORT

B. GASEOUS EFFLUENTS

SECOND HALF, 1978

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1978)

GASEOUS EFFLUENTS—SUMMATION OF ALL RELEASES

	Unit	Quarter 3 RD	Quarter 4 TH	Est. Total Error, %
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A. Fission & activation gases

1. Total release	Ci	2.74 E-3	1.22 E-3	5.0 E-1
2. Average release rate for period	$\mu\text{Ci}/\text{sec}$	3.45 E-2	1.53 E-2	
3. Percent of Technical specification limit	%	3.46 E+0	3.40 E+0	

B. Iodines

1. Total iodine-131	Ci	3.11 E-3	1.17 E-3	5.0 E-1
2. Average release rate for period	$\mu\text{Ci}/\text{sec}$	3.91 E-4	1.47 E-4	
3. Percent of technical specification limit	%	2.61 E-1	4.62 E+0	

C. Particulates

1. Particulates with half-lives >8 days	Ci	6.62 E-4	1.87 E-1	5.0 E-1
2. Average release rate for period	$\mu\text{Ci}/\text{sec}$	8.33 E-5	2.36 E-2	
3. Percent of technical specification limit	%	2.61 E-1	4.62 E+0	
4. Gross alpha radioactivity	Ci	<3.54 E-7	<1.65 E-6	

D. Tritium

1. Total release	Ci	1.00 E+0	1.39 E+0	5.0 E-1
2. Average release rate for period	$\mu\text{Ci}/\text{sec}$	1.26 E-1	1.75 E-1	
3. Percent of technical specification limit	%	. E	. E	

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1970)

GASEOUS EFFLUENTS—ELEVATED RELEASE

CONTINUOUS MODE BATCH MODE

Nuclides Released	Unit	Quarter	Quarter	Quarter	Quarter
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1. Fission gases

krypton-85	Ci	2.71 E-1	4.37 E-2	. E	. E
krypton-85m	Ci	. E	7.25 E-2	. E	. E
krypton-87	Ci	. E	. E	. E	. E
krypton-88	Ci	< 1.25 E-1	< 1.13 E-1	. E	. E
xenon-133	Ci	5.43 E+1	1.75 E+1	. E	. E
xenon-135	Ci	. E	. E	. E	. E
xenon-135m	Ci	. E	. E	. E	. E
xenon-138	Ci	. E	. E	. E	. E
Others (specify)	Ci	. E	. E	. E	. E
XENON - 132m	Ci	. E	6.05 E+0	. E	. E
XENON - 132n	Ci	. E	2.06 E+0	. E	. E
unidentified	Ci	. E	. E	. E	. E
Total for period	Ci	5.47 E+1	2.59 E+1	. E	. E

2. Iodines

iodine-131	Ci	1.06 E-3	3.80 E-3	. E	. E
iodine-133	Ci	2.17 E-4	3.69 E-4	. E	. E
iodine-135	Ci	2.08 E-3	2.81 E-3	. E	. E
Total for period	Ci	3.36 E-3	6.98 E-3	. E	. E

3. Particulates

strontium-89	Ci	< 1.31 E-6	< 2.38 E-5	. E	. E
strontium-90	Ci	< 9.39 E-7	< 4.18 E-5	. E	. E
cesium-134	Ci	1.09 E-5	2.09 E-2	. E	. E
cesium-137	Ci	2.75 E-5	7.02 E-2	. E	. E
barium-lanthanum-140	Ci	< 2.13 E-5	< 1.43 E-3	. E	. E
Others (specify) Co - 58	Ci	2.57 E-5	1.77 E-2	. E	. E
Co - 60	Ci	2.55 E-5	7.07 E-2	. E	. E
I - 131	Ci	1.10 E-5	2.60 E-4	. E	. E
Mn ⁵⁴ + Cr ⁵¹ + Zn ⁶⁵ + Zr ⁹⁵	Ci	. E	5.94 E-3	. E	. E

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1978)

GASEOUS EFFLUENTS-GROUND-LEVEL RELEASES

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		$\frac{3}{31}$ Quarter	$\frac{4}{31}$ Quarter	$\frac{3}{31}$ Quarter	$\frac{4}{31}$ Quarter

1. Fission gases

krypton-85	Ci	5.36 E+1	1.93 E+0	1.30 E+1	5.01 E+0
krypton-85m	Ci	3.02 E+0	2.24 E+0	1.36 E+0	7.50 E-1
krypton-87	Ci	1.43 E+0	. E	1.53 E-1	6.70 E-2
krypton-88	Ci	< 3.90 E+0	< 5.65 E-1	< 1.44 E+0	< 3.91 E-1
xenon-133	Ci	9.94 E+2	2.65 E+2	1.48 E+3	6.54 E+2
xenon-135	Ci	3.84 E+1	2.16 E+1	2.29 E-1	2.04 E+1
xenon-135m	Ci	8.35 E+0	7.19 E+0	. E	. E
xenon-138	Ci	. E	. E	. E	. E
Others (specify) Xe - 137	Ci	1.10 E+1	. E	. E	. E
XENON - 131 m	Ci	3.01 E+0	. E	3.27 E+1	5.01 E+0
XENON - 133 m	Ci	6.79 E+0	9.31 E-1	1.58 E-1	7.93 E-1
unidentified	Ci	. E	. E	. E	. E
Total for period	Ci	1.12 E+3	3.02 E+2	1.57 E+3	8.94 E+2

2. Iodines

iodine-131	Ci	2.07 E-3	7.87 E-3	. E	. E
iodine-133	Ci	5.45 E-4	5.73 E-3	. E	. E
iodine-135	Ci	4.66 E-3	3.61 E-2	. E	. E
Total for period	Ci	7.25 E-3	4.67 E-2	. E	. E

3. Particulates

strontium-89	Ci	< 1.53 E-6	< 8.20 E-7	. E	. E
strontium-90	Ci	4.38 E-7	2.06 E-7	. E	. E
cesium-134	Ci	1.74 E-4	2.50 E-5	. E	. E
cesium-137	Ci	1.75 E-4	6.99 E-5	. E	. E
barium-lanthanum-140	Ci	2.66 E-5	1.65 E-5	. E	. E
Others (specify) Cs - 90	Ci	9.30 E-5	1.30 E-5	. E	. E
Co - 60	Ci	9.49 E-5	4.55 E-5	. E	. E
I - 131	Ci	1.34 E-5	2.55 E-5	. E	. E
unidentified	Ci	. E	. E	. E	. E

EFFLUENT AND WASTE DISPOSAL

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C. LIQUID EFFLUENT

SECOND HALF, 1978

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1970)

LIQUID EFFLUENTS—SUMMATION OF ALL RELEASES

	Unit	Quarter 3 RD	Quarter 4 TH	Est. Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	1.50 E -1	9.02 E -1	2.5 E -1
2. Average diluted concentration during period	μ Ci/ml	5.23 E -10	2.38 E -9	
3. Percent of applicable limit	%	1.31 E -2	6.27 E -2	
B. Tritium				
1. Total release	Ci	8.42 E +1	1.38 E +2	2.5 E +1
2. Average diluted concentration during period	μ Ci/ml	2.76 E -7	3.66 E -7	
3. Percent of applicable limit	%	9.21 E -3	1.22 E -2	
C. Dissolved and entrained gases				
1. Total release	Ci	4.16 E -1	2.01 E -1	2.5 E -1
2. Average diluted concentration during period	μ Ci/ml	1.36 E -9	5.33 E -10	
3. Percent of applicable limit	%	5.86 E -5	2.88 E -5	
D. Gross alpha radioactivity				
1. Total release	Ci	<1.18 E -4	<1.33 E -3	2.5 E -1
E. Volume of waste released (prior to dilution)				
	liters	1.57 E +7	2.70 E +7	1.0 E +1
F. Volume of dilution water used during period				
	liters	3.04 E +11	3.77 E +11	1.0 E +1

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1978)

LIQUID EFFLUENTS

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter	Quarter	Quarter	Quarter
strontium-89	Ci	< 3.90 E -4	< 7.30 E -4	< 7.41 E -5	< 2.22 E -4
strontium-90	Ci	< 5.06 E -4	< 1.73 E -4	< 5.55 E -5	< 3.16 E -5
cesium-134	Ci	1.14 E -3	2.17 E -3	4.45 E -5	1.35 E -2
cesium-137	Ci	2.10 E -3	1.49 E -2	2.17 E -2	3.15 E -1
iodine-131	Ci	2.82 E -3	6.69 E -3	4.59 E -3	4.83 E -2
cobalt-58	Ci	2.59 E -3	3.31 E -3	9.99 E -3	1.49 E -1
cobalt-60	Ci	1.30 E -3	6.80 E -3	3.09 E -2	4.92 E -2
iron-59	Ci	< 3.07 E -3	< 6.90 E -3	< 1.13 E -3	< 1.60 E -3
zinc-65	Ci	< 2.75 E -3	< 6.12 E -3	< 1.64 E -3	< 1.91 E -3
manganese-54	Ci	1.38 E -3	2.62 E -3	2.95 E -2	4.37 E -3
chromium-51	Ci	8.16 E -3	1.48 E -2	5.88 E -3	1.92 E -2
zirconium-niobium-95	Ci	< 2.14 E -3	< 5.46 E -3	< 1.15 E -3	< 1.68 E -3
molybdenum-99	Ci	< 3.03 E -3	< 3.67 E -3	< 4.47 E -3	< 1.24 E -3
technetium-99m	Ci	< 2.38 E -4	< 6.51 E -4	< 3.38 E -4	< 1.99 E -3
barium-lanthanum-140	Ci	< 6.92 E -3	< 1.37 E -2	< 3.57 E -3	< 9.50 E -3
cerium-141	Ci	< 7.36 E -4	< 2.86 E -3	< 7.71 E -4	< 3.51 E -3
Other (specify)	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
unidentified	Ci	. E	. E	. E	. E
Total for period (above)	Ci	3.89 E -2	9.67 E -2	1.20 E -1	3.05 E -1
xenon-133	Ci	1.18 E -3	2.52 E -3	4.13 E -2	1.95 E -2
xenon-135	Ci	5.16 E -4	1.23 E -3	6.67 E -4	1.83 E -3

EFFLUENT AND WASTE DISPOSAL

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D. SOLID WASTE FOR SITE

SECOND HALF, 1978

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (YEAR)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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	3.3 E+2	1.0 E+2
	Ci	4.7 E+2	
b. Dry compressible waste, contaminated equip, etc.	m ³	2.5 E+2	1.0 E+2
	Ci	9.1 E 0	
c. Irradiated components, control rods, etc.	m ³	- . - E -	1.0 E+2
	Ci	2.7 E 0	
d. Other (describe)	m ³	. F	. E
	Ci	. E	

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

a. Co-58	40 %	5.0 E+1
Cs-137	25 %	5.0 E+1
Cs-134, Co-60	33 %	5.0 E+1
b. Same as A	%	. E
	%	. E
	%	. E
c.	%	. E
	%	. E
	%	. E
d. None	- %	- . - E
	%	. E
	%	. E

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
47	Truck	Barnwell, S.C.
1	Truck	Windsor, Conn.
1	Truck	Pittsburgh, Pa.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

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

Indian Point Units 1 and 2

EFFLUENT AND WASTE DISPOSAL
SEMI-ANNUAL REPORT

E. RADIOLOGICAL IMPACT ON MAN
SECOND HALF, 1978

RADIOLOGICAL IMPACT EVALUATION

Doses from noble gas immersion, inhalation, ground deposition, and vegetation ingestion were evaluated for the residence located 1525 meters SSW of Indian Point Unit No. 3, which is the point of maximum offsite radiation dose (all pathways considered) likely to be occupied. Doses were evaluated for an individual ingesting milk and meat from a cow located about 7.5 miles to the NNE. In all cases, these evaluations were performed using the models presented in Regulatory Guide 1.109. Noble gas releases were considered to be either batch or continuous, while all iodine and particulate release were considered to be continuous. Noble gas release from containment pressure reliefs and purges were treated as a continuous release, because of the large number of such releases. Other releases (e.g. gas decay tank releases) were considered as batch and were evaluated using actual meteorological conditions existing during the release period. Continuous releases were evaluated using average meteorological conditions based on the six month release period. Estimates of relative deposition per unit area were obtained from the numerical approximation presented in the NRC computer program XOQDOQ for ground releases. Values of atmospheric dispersion factors (X/Q) were computed using the Sagendorf straight line air flow model, assuming a ground level release, and the subroutine POLYN (from XOQDOQ) for computing standard deviations in the horizontal direction (σ_y) and vertical direction (σ_z).

Integrated doses for the population within 50 miles of Indian Point from gaseous effluents were computed based on linear interpolation of 1970 - 2010 population data contained in the Indian Point Unit No. 3 FSAR.

NUREG-0017, "Calculation of Release of Radioactive Materials in Gaseous and Liquid effluents from Pressurized Water Reactors", assumes an annual release of 8.0Ci/yr of Carbon-14. Therefore, to be consistent with NUREG-0017, a release of 4.0 Curies of Carbon-14 was assumed for the six month period in addition to the radioactive materials measured in Indian Point gaseous effluents.

Indian Point Units 1 and 2

RADIOLOGICAL IMPACT ON MAN

(Reference Regulatory Guide 1.21, page 12)

A. Maximum Individual Doses

<u>Pathways</u> (Gaseous)	<u>Total Body</u> (mr)	<u>Skin</u> (mr)	<u>Thyroid</u> (mr)	<u>Bone</u> (mr)
Noble Gas Immersion				
a) Batch Releases	1.09×10^{-1}	2.87×10^{-1}	-	-
b) Continuous Releases	1.39×10^{-1}	3.66×10^{-1}		
Inhalation	$9.47 \times 10^{-3**}$	-	$5.97 \times 10^{-2*}$	$1.83 \times 10^{-2**}$
Ground Deposition	8.96×10^{-1}	1.05	-	-
Milk Ingestion*	1.68×10^{-2}	-	4.17×10^{-2}	3.75×10^{-2}
Meat Ingestion	$2.39 \times 10^{-3***}$	-	$2.39 \times 10^{-3***}$	$7.89 \times 10^{-3**}$
Vegetable Ingestion	$3.63 \times 10^{-2**}$	-	$1.01 \times 10^{-1***}$	$8.53 \times 10^{-2**}$

* Infants are critical age group

** Adults are critical age group

*** Children are critical age group

Pathways
(Liquid)

All

See Attached "LADTAP: printout
Attachment I

B. Population Doses

<u>Pathways</u> (Gaseous)	<u>Total Body</u> (man-rem)	<u>Thyroid</u> (man-thyroid rem)
Noble Gas Immersion		
a) Batch Release	10.0	-
b) Continuous Release	8.4	-
Inhalation	.698	3.111
Ground Deposition	20.6	-
Totals	39.7	3.111

Pathways
(Liquid)

All See attached "LADTAP" printout
Attachment I

C. Average Doses to Individuals

1. Liquid-Total Body
 1.94×10^{-4} mr
2. Gaseous-Total Body
 1.21×10^{-3} mr

TABLE D O S E S

DOSE -- CMREM PER YEAR INTAKE

PARTICULATE	SKIN	NOSE	LIVER	TOTAL BODY	THYROID	KIDNEY	LOU6	GI-ILL
FISH	23.0	5.57E-01	5.57E-01	5.57E-01	6.50E-02	1.89E-01	6.09E-02	1.50E-02
FAVORABLE	5.5	5.57E-01	2.62E-02	5.06E-05	5.79E-04	7.26E-05	8.65E-04	2.71E-02
ALGAE	5.5	4.79E-05	7.67E-08	5.23E-08	2.64E-05	2.53E-05	7.55E-05	2.59E-02
SPHACELITE	50.0	1.15E-15	1.20E-12	1.81E-12	2.29E-12	1.33E-12	8.02E-15	8.52E-15
SHALLOE	50.0	1.15E-05	1.75E-05	1.72E-05	1.75E-05	1.75E-05	1.75E-05	1.75E-05
PLANTING	50.0	1.15E-05	1.75E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05
TOTAL	100.0	5.57E-01	5.79E-01	5.09E-01	5.59E-05	1.94E-01	6.54E-02	6.61E-02

SPHACELITE FACTOR=0.2

TABLE D O S E S

DOSE -- CMREM PER YEAR INTAKE

PARTICULATE	SKIN	NOSE	LIVER	TOTAL BODY	THYROID	KIDNEY	LOU6	GI-ILL
FISH	23.0	5.57E-01	5.57E-01	2.22E-01	6.15E-02	1.89E-01	7.09E-02	1.50E-02
FAVORABLE	5.5	4.79E-05	1.79E-02	5.23E-05	4.29E-04	6.02E-05	9.51E-04	2.71E-02
ALGAE	5.5	5.79E-05	4.31E-04	4.31E-04	1.27E-04	2.82E-03	1.11E-04	2.14E-02
SPHACELITE	50.0	1.15E-15	2.26E-12	1.27E-12	2.57E-12	1.33E-12	7.61E-15	1.76E-15
SHALLOE	50.0	1.15E-05	2.53E-05	2.53E-05	2.53E-05	2.53E-05	2.53E-05	2.53E-05
PLANTING	50.0	1.15E-05	2.53E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05
TOTAL	100.0	5.57E-01	5.79E-01	2.22E-01	5.65E-05	1.94E-01	7.51E-02	5.60E-02

SPHACELITE FACTOR=0.2

TABLE D O S E S

DOSE -- CMREM PER YEAR INTAKE

PARTICULATE	SKIN	NOSE	LIVER	TOTAL BODY	THYROID	KIDNEY	LOU6	GI-ILL
FISH	23.0	4.15E-01	4.15E-01	8.49E-02	6.55E-02	6.05E-02	5.54E-02	5.49E-02
FAVORABLE	5.5	5.79E-05	1.79E-02	2.55E-05	5.50E-05	2.70E-05	7.59E-04	1.70E-02
ALGAE	5.5	1.15E-04	1.66E-04	5.73E-05	2.43E-05	2.05E-05	2.02E-05	2.17E-05
SPHACELITE	50.0	5.79E-15	4.52E-12	1.71E-09	5.43E-09	1.11E-09	1.90E-09	1.15E-09
SHALLOE	50.0	1.15E-05	4.50E-05	4.50E-05	4.50E-05	4.50E-05	4.50E-05	4.50E-05
PLANTING	50.0	1.15E-05	4.50E-05	4.50E-05	4.50E-05	4.50E-05	4.50E-05	4.50E-05
TOTAL	100.0	4.15E-01	4.96E-01	8.80E-02	7.40E-02	6.58E-02	5.64E-02	5.64E-02

	USAGE (KG/YR PER YR)	DILUTION	TIME (HR)	SHOREWIDTH FACTOR=0.2
FISH	4.0	5.0	25.00	
LEVEL HERBATE	1.7	5.0	25.00	
ALGAE	6.0	5.0	25.00	
DRINKING	0.0	500.0	142.00	
SURF LING	18.0	5.0	1.00	
SWIMMING	05.0	5.0	1.00	
BOATING	100.0	5.0	1.00	

INTEGRAL DOSES

DOSE (MMOL PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	INTROD	KIDNEY	BLOOD	GI-ILL
FISH		6.02E-02	8.13E-02	5.56E-05	1.10E-05	4.57E-05	9.61E-05	2.79E-04
LEVEL HERBATE		6.89E-04	1.17E-05	1.59E-04	7.99E-05	1.89E-04	9.76E-05	1.60E-05
ALGAE		5.52E-07	9.17E-07	5.43E-08	5.86E-08	2.85E-08	4.82E-08	2.12E-08
DRINKING		6.89E-12	9.69E-12	2.22E-12	1.22E-11	1.11E-12	2.86E-12	1.09E-12
SURF LING	1.02E-04	1.07E-04	1.05E-04	1.07E-04	1.05E-04	1.05E-04	1.05E-04	1.05E-04
SWIMMING	0.0	5.53E-12	5.53E-12	5.53E-12	5.53E-12	5.53E-12	5.53E-12	5.53E-12
BOATING	0.0	8.82E-08	8.82E-08	8.82E-08	8.82E-08	8.82E-08	8.82E-08	8.82E-08
TOTAL	1.02E-04	6.50E-02	8.26E-02	5.82E-05	1.28E-05	4.65E-05	9.82E-05	1.59E-05

	USAGE (KG/YR PER YR)	DILUTION	TIME (HR)	SHOREWIDTH FACTOR=0.2
FISH	0.5	5.0	25.00	
LEVEL HERBATE	0.1	5.0	25.00	
ALGAE	0.0	5.0	25.00	
DRINKING	0.0	500.0	142.00	
SURF LING	5.0	5.0	1.00	
SWIMMING	0.0	5.0	1.00	
BOATING	0.0	5.0	1.00	

* * * SELECTED LOCATION * * *

LOCATION IS DOWNSTREAM

A D U L T D O S E S

DOSE (CMREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.56E-01	5.95E-01	2.95E-01	4.68E-03	1.52E-01	4.59E-02	9.72E-03
INVERTEBRATE		5.65E-03	1.71E-02	6.52E-03	4.61E-04	5.68E-03	6.16E-04	5.62E-02
ALGAE		7.29E-08	5.49E-08	5.72E-08	6.15E-09	2.02E-08	5.25E-09	1.67E-08
DRINKING		7.13E-11	1.42E-10	1.17E-10	2.86E-10	7.37E-11	5.73E-11	6.17E-11
SHORELINE	1.66E-03	1.25E-03	1.25E-03	1.25E-03	1.25E-03	1.25E-03	1.25E-03	1.25E-03
SWIMMING	0.0	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05
BOATING	0.0	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05
TOTAL	1.66E-03	2.94E-01	4.12E-01	2.92E-01	6.56E-03	1.59E-01	4.53E-02	4.72E-02

USAGE (KG/YR, HR/YR)

DILUTION

TIME (HR)

SHOREWIDTH FACTOR=0.2

FISH	21.0	7.0	51.00
INVERTEBRATE	5.0	7.0	51.00
ALGAE	0.0	7.0	51.00
DRINKING	0.0	7.0	19.00
SHORELINE	50.0	7.0	7.00
SWIMMING	50.0	7.0	7.00
BOATING	100.0	7.0	7.00

LOCATION IS DOWNSTREAM

I N F A N T D O S E S

DOSE (CMREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.57E-01	5.94E-01	1.59E-01	4.59E-03	1.03E-01	5.03E-02	6.70E-03
INVERTEBRATE		5.76E-03	1.42E-02	4.19E-03	5.49E-04	4.52E-03	6.73E-04	2.72E-02
ALGAE		6.29E-08	6.96E-08	2.89E-08	7.11E-09	2.02E-08	7.53E-09	1.54E-08
DRINKING		8.29E-11	1.62E-10	8.96E-11	2.22E-10	7.95E-11	5.29E-11	4.88E-11
SHORELINE	1.56E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03
SWIMMING	0.0	2.52E-05	2.52E-05	2.52E-05	2.52E-05	2.52E-05	2.52E-05	2.52E-05
BOATING	0.0	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05
TOTAL	1.56E-03	2.93E-01	4.10E-01	1.64E-01	6.36E-03	1.06E-01	5.27E-02	5.57E-02

USAGE (KG/YR, HR/YR)

DILUTION

TIME (HR)

SHOREWIDTH FACTOR=0.2

FISH	16.0	7.0	51.00
INVERTEBRATE	5.0	7.0	51.00
ALGAE	0.0	7.0	51.00
DRINKING	0.0	7.0	19.00
SHORELINE	67.0	7.0	7.00
SWIMMING	100.0	7.0	7.00
BOATING	100.0	7.0	7.00

LOCATION IS DOWNSTREAM

C H I L D D O S E S

DOSE (CMREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.95E-01	5.45E-01	4.06E-01	4.43E-03	4.52E-01	5.96E-02	2.74E-03
INVERTEBRATE		4.15E-03	8.51E-03	1.85E-03	5.71E-04	1.93E-03	5.25E-04	1.22E-02

FISH		1.17E-04	1.55E-04	2.47E-05	1.70E-05	2.52E-05	1.94E-05	1.52E-05
DRINKING		2.57E-07	5.24E-07	1.22E-07	5.15E-07	7.79E-08	9.28E-08	8.17E-08
SPOKELINE	4.7E-04	5.57E-04	5.50E-04	5.50E-04	5.50E-04	5.50E-04	5.50E-04	5.50E-04
SWIMMING	0.0	6.27E-06	6.27E-06	6.27E-06	6.27E-06	6.27E-06	6.27E-06	6.27E-06
BOATING	0.0	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05
TOTAL	4.07E-04	5.22E-04	5.54E-04	6.27E-02	5.18E-03	9.56E-02	9.05E-02	1.53E-02

	USAGE (KG/YR) (MC/YR)	DILUTION	TIME (HR)	SHORTWIDTH FACTOR=0.2
FISH	0.0	7.0	51.00	
INVERTEDRAE	1.7	7.0	51.00	
FEED	0.0	7.0	51.00	
DRINKING	0.0	7.0	19.00	
SPOKELINE	19.0	7.0	7.00	
SWIMMING	25.0	7.0	7.00	
BOATING	100.0	7.0	7.00	

LOCATION IS DOWNSTREAM

INTERNAL DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	SPLE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-TRACT
FISH		4.94E-02	5.81E-02	5.97E-03	7.73E-04	5.15E-03	6.84E-03	1.27E-04
INVERTEDRAE		4.17E-04	8.54E-04	1.11E-04	5.20E-05	1.14E-04	7.17E-05	7.14E-04
FEED		2.57E-07	2.99E-07	2.57E-08	9.10E-08	2.62E-08	5.94E-08	1.51E-08
DRINKING		4.79E-10	6.79E-10	1.20E-10	1.17E-09	7.95E-11	1.76E-10	1.17E-10
SPOKELINE	8.77E-05	7.57E-05	7.50E-05	7.50E-05	7.50E-05	7.50E-05	7.50E-05	7.50E-05
SWIMMING	0.0	2.52E-12	2.52E-12	2.52E-12	2.52E-12	2.52E-12	2.52E-12	2.52E-12
BOATING	0.0	6.27E-08	6.27E-08	6.27E-08	6.27E-08	6.27E-08	6.27E-08	6.27E-08
TOTAL	8.77E-05	4.50E-02	5.90E-02	9.16E-03	8.96E-04	5.52E-03	7.01E-03	9.89E-04

	USAGE (KG/YR) (MC/YR)	DILUTION	TIME (HR)	SHORTWIDTH FACTOR=0.2
FISH	0.0	7.0	51.00	
INVERTEDRAE	0.1	7.0	51.00	
FEED	0.0	7.0	51.00	
DRINKING	0.0	7.0	19.00	
SPOKELINE	0.0	7.0	7.00	
SWIMMING	0.0	7.0	7.00	
BOATING	0.0	7.0	7.00	

* * * FISH CONSUMPTION POPULATION DOSES * * *

PAU-REM

SPOTTED TAIL HARVEY

		-----DOSE (MAU-REM)-----								
PATHWAY	AGE GROUP	OTAGE	BONE	LIVER	TOOTH	BODY	THYROID	KIDNEY	LUNG	GILL
FISH	ADULT	7.29E+04	7.97E+01	1.53E+00	2.65E-01	1.02E-02	4.45E-01	1.47E-01	5.27E-02	
FISH	TEENAGER	1.16E+04	1.65E+01	2.80E-01	1.12E-01	1.89E-05	7.11E-02	3.57E-02	4.75E-03	
FISH	CHILD	7.37E+03	2.98E+01	3.95E-01	6.02E-02	2.72E-03	4.50E-02	5.94E-02	2.71E-03	
FISH	TOTAL	9.10E+04	1.25E+02	1.98E+00	1.15E+00	1.48E-02	5.59E-01	2.22E-01	4.01E-02	
DILUTION		CATCH	FISH (KG) - INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR				POPULATION=1.59E+04			
7.05E+00		9.10E+04	1.68E+02							
AVERAGE INDIVIDUAL CONSUMPTION (KG/YR)			ADULT=6.90E+00		TEEN=5.20E+00		CHILD=2.20E+00			

* * * FISH CONSUMPTION POPULATION DOSES * * *

FISH-008

-----COMMERCIAL HARVEST-----

-----DOSE (MAY-REM)-----

PATHWAY	AGE GROUP	USAGE	BODY	LIVER	TOTAL BODY	HYPOID	KIDNEY	LUNG	G1-LL1
FISH	ADULT	8.67E+07	5.47E+00	5.47E+00	4.89E+00	3.57E-02	1.87E+00	6.17E-01	1.57E-01
FISH	TEENAGER	1.59E+07	7.11E-01	1.19E+00	9.71E-01	6.17E-05	2.49E-01	1.59E-01	1.99E-02
FISH	CHILD	2.56E+06	1.25E+00	1.89E+00	2.55E-01	8.87E-05	1.81E-01	1.65E-01	1.14E-02
FISH	TOTAL	1.09E+08	6.53E+00	8.27E+00	4.77E+00	4.87E-02	2.55E+00	7.55E-01	1.80E-01

DIETARY CATCH TIME (YR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR POPULATION=1.40E+07
 7.02E+00 1.59E+05 2.40E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=2.02E+00 CHILD=2.20E+00

-----RECREATION-----

NOTE--TOTAL RECREATION DOSE MUST INCLUDE SPORT CATCH. DOSES BELOW ARE FOR COMMERCIAL CATCH ONLY

-----DOSE (MAY-REM)-----

PATHWAY	AGE GROUP	USAGE	BODY	LIVER	TOTAL BODY	HYPOID	KIDNEY	LUNG	G1-LL1
FISH	ADULT	1.27E+05	1.56E+00	2.26E+00	1.69E+00	1.51E-02	7.57E-01	2.50E-01	5.54E-02
FISH	TEENAGER	1.77E+04	2.49E-01	4.75E-01	1.90E-01	2.50E-05	1.21E-01	6.07E-02	8.02E-03
FISH	CHILD	1.17E+04	5.00E-01	5.89E-01	1.02E-01	2.59E-05	7.51E-02	6.70E-02	4.60E-03
FISH	TOTAL	1.55E+05	2.19E+00	5.32E+00	1.95E+00	1.97E-02	9.51E-01	3.77E-01	6.80E-02

* * * IVERMECTIN CONSUMPTION POPULATION DOSES * * *

MAN-REM

SPORTFISH HARVEST

-----DOSE (MAN-REM)-----

PARTIC	AGE GROUP	DOSE	SKIN	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
ADULT	ADULT	7.99E+03	8.52E+03	2.75E+02	9.78E+03	3.96E+09	8.77E+03	9.81E+04	5.55E+02
ADULT	TEENAGER	1.26E+03	1.45E+03	4.59E+01	1.59E+03	7.15E+05	1.40E+03	2.17E+04	8.77E+01
ADULT	CHILD	7.99E+02	1.68E+03	5.09E+01	8.40E+02	1.06E+09	8.77E+02	2.57E+04	5.50E+01
ADULT	TOTAL	1.00E+04	8.65E+03	5.49E+02	1.20E+04	5.79E+09	1.10E+02	1.49E+05	6.98E+02

DILUTION FACTOR TIME (HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR POPULATION=1.26E+04
 7.10E+03 1.60E+04 1.68E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E+01 CHILD=5.50E+01

* * * EXPONENTIAL CONSUMPTION POPULATION DOSES * * *

----- COMMERCIAL HARVEST -----

-----DOSE (MAY-RELM)-----									
CATEGORY	AGE GROUP	DOSE	FOOD	LIVER	TOTAL BODY	HYPOD	PLONY	LUNG	GI-LLI
ADULT	1.271+07	5.09E-05	1.47E-02	5.08E-05	2.13E-09	5.77E-05	6.47E-04	5.70E-02	
CHILD	1.271+06	7.69E-05	5.15E-02	7.14E-09	2.05E-05	9.25E-04	1.47E-04	5.97E-05	
TOTAL	1.271+07	1.28E-04	2.62E-02	7.75E-09	5.70E-05	7.29E-05	1.69E-04	5.79E-05	
TOTAL	1.50E+07	5.29E-05	2.59E-02	8.17E-05	5.11E-09	7.29E-05	9.60E-04	5.79E-02	

WILDLIFE: CATCH 11% ONLY-EXCLUDES FOOD PROCESSING 10% OF 2.40E+02 HC POPULATION=1.90E+07
 1.50E+00 1.00E+05 2.40E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 INFAN=1.50E-01 CHILD=5.50E-01

----- MEAT DOSES -----

-----DOSE (MAY-RELM)-----									
CATEGORY	AGE GROUP	DOSE	FOOD	LIVER	TOTAL BODY	HYPOD	PLONY	LUNG	GI-LLI
ADULT	1.271+07	7.29E-04	2.59E-04	2.63E-02	7.76E-09	5.15E-05	6.75E-04	9.45E-05	5.51E-05
CHILD	1.271+06	1.47E-04	5.15E-04	1.55E-04	2.63E-06	1.59E-04	2.16E-05	3.70E-04	
TOTAL	1.271+07	1.47E-04	5.09E-04	4.39E-05	8.51E-06	6.75E-05	2.59E-05	2.59E-05	5.85E-04
TOTAL	1.50E+05	7.69E-04	5.97E-02	1.19E-05	9.25E-05	1.10E-05	1.40E-04	6.92E-05	

NOTE--EATL MEAT DOSE MUST INCLUDE SPORT CATCH DOSES BELOW AGE FOR COMMERCIAL CATCH ONLY

* * * RECREATION POPULATION DENSE * * *

----- DOSE (FAM-REM) -----

PARKWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	TOXICOID
50000000	TOTAL POPUL	1.66E+07	4.07E+01	4.13E+01	4.13E+01
LOCATION - BOSTON					
DICTIONARY	TRANSFER	1.19E+04	4.01E+01	5.4E+02	

----- DOSE (FAM-REM) -----

PARKWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	TOXICOID
50000000	TOTAL POPUL	1.66E+07	0.0	4.13E+05	4.13E+05
LOCATION - BOSTON					
DICTIONARY	TRANSFER	1.19E+04	4.01E+01		

----- DOSE (FAM-REM) -----

PARKWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	TOXICOID
50000000	TOTAL POPUL	1.66E+07	0.0	2.09E+05	2.09E+05
LOCATION - BOSTON					
DICTIONARY	TRANSFER	1.19E+04	4.01E+01		

* * * 1956 TO 1957 * * *

1956 TO 1957		1957 TO 1958		1958 TO 1959	
	7,601.00		10,231.17	9,001.00	8,001.00
FISH	7,601.00	1,313.00	1,313.00	1,313.00	1,313.00
FURBERGATE	5,600.00	2,211.00	2,211.00	2,211.00	2,211.00
ALGAL	5,600.00	2,211.00	2,211.00	2,211.00	2,211.00
DUCKRAE	5,600.00	7,511.00	7,511.00	7,511.00	7,511.00
STEEGEM	2,400.00	5,001.00	5,001.00	5,001.00	5,001.00
BEHOB	2,400.00	7,511.00	7,511.00	7,511.00	7,511.00
DUCK	4,201.00	1,100.00	1,100.00	1,100.00	1,100.00

TOTAL

BUCKET	DATE	MAY-BEAM DOSE		JUN-BEAM PER CORE	
		TOTAL DOSE	HYDRON	TOTAL DOSE	HYDRON
10	5	5.00E+02	2.00E+04	8.30E+06	8.10E+06
11	5	5.00E+03	1.00E+08	9.00E+07	1.10E+08
12	9	5.00E+09	9.00E+10	9.00E+09	1.20E+10
13	17	5.00E+03	7.00E+02	1.00E+01	6.10E+01
14	17	5.00E+03	2.10E+01	9.00E+00	6.10E+01
15	17	5.00E+03	6.00E+02	9.00E+03	9.00E+03
16	17	5.00E+03	6.00E+03	5.00E+02	2.60E+02
17	17	5.00E+03	1.00E+01	1.00E+00	1.00E+00
18	17	1.00E+02	2.00E+04	6.00E+02	2.10E+02
19	17	1.00E+02	5.00E+04	1.00E+00	9.00E+02
20	17	5.00E+02	5.00E+05	2.00E+01	8.00E+02
21	17	9.00E+02	2.00E+09	9.00E+09	9.00E+09
22	17	1.00E+02	5.00E+05	1.00E+02	1.00E+02
23	17	2.00E+02	5.00E+05	1.00E+03	1.00E+03
24	17	5.00E+03	1.00E+06	5.00E+09	5.00E+09
25	17	6.00E+03	7.00E+06	5.00E+03	2.50E+03
26	17	6.00E+03	7.00E+06	1.00E+03	1.00E+03
TOTAL		6.29E+00	9.00E+01		

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION^a

PERIOD OF RECORD: July 1 - September 30, 1978

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	29	59	6	0	0	8	102
NNE	5	14	2	0	1	4	26
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	1	0	1
ESE	1	0	0	0	0	0	1
SE	1	2	0	0	0	0	3
SSE	3	1	0	0	0	0	4
S	52	29	0	0	1	4	86
SSW	54	34	0	0	1	7	96
SW	3	16	1	0	2	4	26
WSW	10	5	0	0	1	1	17
W	9	4	0	0	0	0	13
WNW	6	4	0	0	0	2	12
NW	5	7	0	0	0	2	14
NNW	13	11	0	0	0	1	25

Total	191	186	9	0	7	33	426
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Periods of calm (hours): 0

Hours of missing data: Total hours of missing data for all stability classes this quarter is 49.

^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 ¹

PERIOD OF RECORD: July 1 - September 30, 1978

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	12	1	0	0	0	22
NNE	3	3	1	0	0	0	7
NE	2	1	0	0	0	0	3
ENE	0	1	0	0	0	0	1
E	0	1	0	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	1	0	0	0	0	0	1
SSE	2	1	0	0	0	0	3
S	9	3	0	0	0	0	12
SSW	11	6	0	0	0	0	17
SW	6	4	3	0	0	0	13
WSW	1	3	0	0	0	0	4
W	3	0	0	0	0	0	3
WNW	0	1	0	0	0	0	1
NW	1	2	0	0	0	0	3
NNW	4	0	0	0	0	0	4
Total	52	38	5	0	0	0	95
Periods of calm (hours):	0						
Hours of missing data:							

¹ 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 DIRECTION⁴

PERIOD OF RECORD: July 1 - September 30, 1978

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	7	6	0	0	0	0	13
NNE	7	3	0	0	0	0	10
NE	5	1	0	0	0	0	6
NNE	0	0	0	0	0	0	0
E	2	0	0	0	0	0	2
ESE	2	0	0	0	0	0	2
SE	1	0	0	0	0	0	1
SSE	1	0	0	0	0	0	1
S	10	2	0	0	0	0	12
SSW	13	5	1	0	0	0	19
SW	2	7	1	0	0	0	10
WSW	3	1	0	0	0	0	4
W	2	1	0	0	0	0	3
WNW	0	1	0	0	0	0	1
NW	1	1	0	0	0	0	2
NNW	6	1	0	0	0	0	7
Total	62	29	2	0	0	0	93
Periods of calm (hours):	0						
Hours of missing data:							

⁴ 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: July 1 - September 30, 1978

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	39	11	0	1	1	74
NNE	30	90	22	0	3	6	151
NE	39	18	0	0	1	2	60
ENE	17	0	0	0	1	1	19
E	11	0	1	0	0	0	12
ESE	9	0	0	0	0	0	9
SE	7	0	0	0	1	0	8
SSE	18	2	0	0	0	0	20
S	70	12	0	0	0	1	83
SSW	36	44	0	0	1	7	88
SW	19	24	3	0	0	3	49
WSW	3	2	0	0	0	0	5
W	5	2	1	0	0	1	9
WNW	1	0	0	0	0	2	3
NW	2	2	0	0	0	0	4
NNW	3	6	0	0	0	0	9
Total	292	241	38	0	8	24	603
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: July 1 - September 30, 1978

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	40	10	0	0	2	1	53
NNE	58	43	4	0	4	8	117
NE	32	19	1	0	0	3	55
ENE	21	1	0	0	0	0	22
E	17	1	1	0	0	0	19
ESE	15	1	0	0	1	0	17
SE	17	0	0	0	0	0	17
SSE	27	4	0	0	0	0	31
S	88	13	1	0	2	1	105
SSW	93	26	0	0	3	4	126
SW	24	7	1	0	0	1	33
WSW	6	1	0	0	1	0	8
W	13	1	0	0	0	2	16
WNW	7	0	0	0	0	0	7
NW	4	1	0	0	0	0	5
NNW	5	0	0	0	0	1	6
Total	467	128	8	0	13	21	637
Periods of calm (hours):	2						
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: July 1 - September 30, 1978

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	6	1	0	0	0	0	7
NE	2	4	0	0	0	0	6
ENE	0	0	0	0	0	0	0
E	1	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	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	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Total	11	5	0	0	0	0	16

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: July 1 - September 30, 1978

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	29	0	0	0	0	0	29
NNE	68	23	0	0	0	0	91
NE	44	25	0	0	0	0	69
ENE	11	1	0	0	0	0	12
E	10	0	0	0	0	0	10
ESE	9	0	0	0	0	0	9
SE	13	2	0	0	0	0	15
SSE	11	0	0	0	0	0	11
S	16	0	0	0	0	0	16
SSW	8	0	0	0	0	0	8
SW	2	0	0	0	0	0	2
WSW	5	0	0	0	0	0	5
W	3	0	0	0	0	0	3
WNW	1	0	0	0	0	0	1
NW	1	0	0	0	0	0	1
NNW	3	0	0	0	0	0	3
Total	234	51	0	0	0	0	285
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: October 1 - December 31, 1978

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	23	2	0	0	0	25
NNE	0	3	2	0	0	0	5
NE	0	1	0	0	0	0	1
ENE	0	0	0	0	0	0	0
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	6	0	0	0	0	0	6
S	20	12	1	0	0	0	33
SSW	4	16	3	0	0	0	23
SW	0	1	0	0	0	0	1
WSW	1	4	0	0	0	0	5
W	0	4	0	0	0	0	4
WNW	0	3	0	0	0	0	3
NW	0	5	0	0	0	0	5
NNW	5	12	0	0	0	0	17
Total	38	84	8	0	0	0	130

Periods of calm (hours): 0

Hours of missing data: Total hours of missing data for all stability classes this quarter is 37

^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: October 1 - December 31, 1978

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	2	8	2	0	0	0	12
NNE	1	2	0	0	0	0	3
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	1	0	0	0	0	0	1
SE	1	0	0	0	0	0	1
SSE	1	0	0	0	0	0	1
S	7	2	0	0	0	0	9
SSW	3	5	1	0	0	0	9
SW	1	2	0	0	0	0	3
WSW	0	2	0	0	0	0	2
W	0	0	0	0	0	0	0
WNW	0	1	0	0	0	0	1
NW	0	1	0	0	0	0	1
NNW	1	4	0	0	0	0	5
Total	18	27	3	0	0	0	48
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: October 1 - December 31, 1978

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	0	12	1	0	0	0	13
NNE	0	2	1	0	0	0	3
NE	2	0	0	0	0	0	2
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	1	0	0	0	0	0	1
SE	2	0	0	0	0	0	2
SSE	2	0	0	0	0	0	2
S	10	2	0	0	0	0	12
SSW	7	4	1	0	0	0	12
SW	4	3	0	0	0	0	7
WSW	4	3	0	0	0	0	7
W	0	4	0	0	0	0	4
WNW	1	6	1	0	0	0	8
NW	1	3	0	0	0	0	4
NNW	0	2	0	0	0	0	2
Total	34	41	4	0	0	0	79
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: October 1 - December 31, 1978

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	8	93	20	0	0	0	121
NNE	17	75	12	0	0	0	104
NE	31	51	1	0	0	0	83
ENE	19	3	0	0	0	0	22
E	9	0	0	0	0	0	9
ESE	1	2	0	0	0	0	3
SE	8	0	0	0	0	0	8
SSE	17	2	0	0	0	0	19
S	30	11	0	0	0	0	41
SSW	26	12	2	0	0	0	40
SW	20	8	0	0	0	0	28
WSW	10	8	0	0	0	0	18
W	12	28	6	0	0	0	46
WNW	5	25	14	0	0	0	44
NW	6	38	42	2	0	0	88
NNW	4	30	23	1	0	0	53
Total	223	386	120	3	0	0	732
Periods of calm (hours):	2						
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: October 1 - December 31, 1978

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	24	32	10	0	0	0	66
NNE	41	57	7	0	0	0	105
NE	44	24	0	0	0	0	68
ENE	34	1	0	0	0	0	35
E	22	0	0	0	0	0	22
ESE	9	0	0	0	0	0	9
SE	16	0	0	0	0	0	16
SSE	32	0	0	0	0	0	32
S	77	20	4	0	0	0	101
SSW	53	46	5	0	0	0	104
W	24	12	1	0	0	0	37
WSW	25	14	1	0	0	0	40
W	43	52	7	0	0	0	102
WNW	8	20	18	6	0	0	52
NW	4	13	22	15	1	0	55
NNW	9	14	8	0	0	0	31
Total	465	305	83	21	1	0	875
Periods of calm (hours):	4						
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: October 1 - December 31, 1978

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	21	0	0	0	0	0	21
NNE	42	8	0	0	0	0	50
NE	43	30	0	0	0	0	73
ENE	8	2	0	0	0	0	10
E	6	0	0	0	0	0	6
ESE	4	0	0	0	0	0	4
SE	3	0	0	0	0	0	3
SSE	7	0	0	0	0	0	7
S	27	2	0	0	0	0	29
SSW	16	0	0	0	0	0	16
SW	4	0	0	0	0	0	4
WSW	6	0	0	0	0	0	6
W	8	0	0	0	0	0	8
WNW	7	0	0	0	0	0	7
NW	2	0	0	0	0	0	2
NNW	9	0	0	0	0	0	9
Total	213	42	0	0	0	0	255
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.