

EFFLUENT AND WASTE DISPOSAL

SEMI-ANNUAL REPORT

1st & 2nd Quarter 1981

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 Rev. 1. 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. The Semi-Annual Effluent and Waste Disposal Report for Indian Point Units 1 and 2 covers discharges for the first and second quarters of 1981.

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" (ETSR). The "percent of limit" reported in Table 2A of this document, is the percent of the applicable 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 isotopic concentration values as reported for elevated releases (Table 1B) and the isotopic concentration values as reported for ground releases (Table 1C) are used in conjunction with K, L, M, N. values found in Table 2.4-5 of the ETSR to determine the \bar{K} , \bar{L} , \bar{M} , \bar{N} values for Unit 1 stack releases and Unit 2 vent release points respectively. The K, L, M, N values represent the gamma-beta dose factors.

b&c. Iodines and Particulates

The applicable 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

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maximum permissible concentrations for the purpose of calculating the percent of technical specification limit in Table 1A of this document.

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 has been added, and a weighted average fraction of MPC has been calculated for this isotopic mixture as described in 10CFR20. The percent of applicable limit reported in Table 2A of this document is the percent of MPC concentration of the time averaged diluted concentration for each calendar quarter.

The first and second quarter continuous releases are for Units 1 and 2. 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 10CFR20, we have adapted the conservative MPC of 2×10^{-4} uci/ml as suggested by K. F. Eckerman.

3. Average Energy

The average energy (\bar{E}) of the radionuclide mixture in releases of fission and activation gases for the 1st quarter was \bar{E}_γ of 2.28×10^{-3} Mev/Dis., and \bar{E}_β of 2.19×10^{-1} Mev/Dis. The corresponding values for the 2nd quarter were \bar{E}_γ of 8.33×10^{-3} Mev/Dis., and \bar{E}_β of 2.15×10^{-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.

the 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 is then used to determine total discharges.

b&c. Iodines and Particulates

Iodine-131 and particulate releases are quantified by collecting a continuous sample of ventilation air on an activated charcoal cartridge impregnated with potassium iodide 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. 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

1981

	<u>1st Otr.</u>	<u>2nd Otr.</u>
a. <u>Liquid</u>		
Number of Batch Releases	56	61
Total Time Period Batch Release (Min.)	7,025	5,476
Maximum Time Period Batch Release (Min.)	530	350
Average Time Period Batch Releases (Min.)	125	90
Minimum Time Period Batch Releases (Min.)	20	37
Average Stream Flow (cfs)	22,410	15,245
b. <u>Gaseous</u>		
Number of Batch Releases	3	72
Total Time Period Batch Releases (Min.)	256	11,168
Maximum Time Period Batch Releases (Min.)	151	685
Average Time Period Batch Releases (Min.)	85	155
Minimum Time Period Batch Releases (Min.)	80	35

6. Abnormal Releases

- a. Liquid - None
- b. Gaseous - None

Effluent and Waste Disposal

Semi-Annual Report

B - Gaseous Effluents

First Half - 1981

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1981)

GASEOUS EFFLUENTS—SUMMATION OF ALL RELEASES

	Unit	Quarter 1st	Quarter 2nd	Est. Total Error, %
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A. Fission & activation gases

1. Total release	Ci	2.12 E+3	2.06 E+3	+ 50 E-1
2. Average release rate for period	$\mu\text{Ci}/\text{sec}$	2.73 E+2	2.62 E+2	
3. Percent of Technical specification limit	%	4.90 E 0	2.94 E 0	

B. Iodines

1. Total iodine-131	Ci	1.36 E-4	3.94 E-4	+5.0 E-1
2. Average release rate for period	$\mu\text{Ci}/\text{sec}$	1.75 E-5	5.01 E-5	
3. Percent of technical specification limit	%	6.60 E-2	1.89 E-1	

C. Particulates

1. Particulates with half-lives >8 days	Ci	4.15 E-3	1.25 E-3	+5.0 E-1
2. Average release rate for period	$\mu\text{Ci}/\text{sec}$	5.34 E-4	1.59 E-4	
3. Percent of technical specification limit	%	3.06 E-1	9.76 E-2	
4. Gross alpha radioactivity	Ci	8.00 E-7	4.85 E-7	

D. Tritium

1. Total release	Ci	6.48 E-1	3.59 E-1	+5.0 E-1
2. Average release rate for period	$\mu\text{Ci}/\text{sec}$	8.33 E-2	4.56 E-2	
3. Percent of technical specification limit	%			

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1981)

GASEOUS EFFLUENTS—ELEVATED RELEASE

CONTINUOUS MODE

BATCH MODE

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter

1. Fission gases

krypton-85	Ci	1.15 E+3	1.39 E+3	. E	. E
krypton-85m	Ci	3.46 E-1	. E	. E	. E
krypton-87	Ci	. E	5.14 E-1	. E	. E
krypton-88	Ci	. E	5.18 E-1	. E	. E
xenon-133	Ci	4.04 E+0	5.90 E+1	. E	. E
xenon-135	Ci	. E	. E	. E	. E
xenon-135m	Ci	1.11 E+0	. E	. E	. E
xenon-138	Ci	1.38 E+0	1.51 E+0	. E	. E
Others (specify)	Ci	. E	. E	. E	. E
Xenon - 131m	Ci	2.47 E+1	. E	. E	. E
Xenon - 133m	Ci	1.82 E+0	2.64 E+0	. E	. E
unidentified	Ci	. E	. E	. E	. E
Total for period	Ci	1.18 E+3	1.46 E+3	. E	. E

2. Iodines

iodine-131	Ci	5.97 E-5	1.08 E-4	. E	. E
iodine-133	Ci	2.51 E-4	2.35 E-4	. E	. E
iodine-135	Ci	3.72 E-3	5.73 E-3	. E	. E
Total for period	Ci	4.03 E-3	6.07 E-3	. E	. E

3. Particulates

strontium-89	Ci	7.20 E-6	7.05 E-6	. E	. E
strontium-90	Ci	2.40 E-6	1.95 E-6	. E	. E
cesium-134	Ci	5.98 E-5	2.71 E-5	. E	. E
cesium-137	Ci	2.79 E-4	1.26 E-4	. E	. E
barium-lanthanum-140	Ci	3.61 E-5	7.01 E-5	. E	. E
I-131	Ci	1.38 E-5	2.06 E-5	. E	. E
CO-58	Ci	2.60 E-4	1.15 E-4	. E	. E
CO-60	Ci	2.34 E-4	2.12 E-4	. E	. E
MN-54	Ci	8.15 E-6	1.09 E-6	. E	. E
CR-51	ci	1.14 E-5	9.23 E-6		
FE-55	ci	2.85 E-4	4.43 E-5		
P-32	ci	4.98 E-6	7.54 E-6		
NI-63	ci	1.26 E-4	1.33 E-5		
CO-57	ci	8.87 E-7	2.42 E-6		
NB-95	ci		1.13 E-6		

Blank boxes indicate radionuclide not detected.

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1981)

GASEOUS EFFLUENTS—GROUND-LEVEL RELEASES Unit 2

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter

1. Fission gases

krypton-85	Ci	9.21 E+2	3.80 E+2	6.48 E-2	5.39 E+1
krypton-85m	Ci	. E	7.69 E-1	. E	3.45 E-1
krypton-87	Ci	. E	4.01 E-1	. E	5.64 E-2
krypton-88	Ci	. E	4.51 E-1	. E	4.36 E-1
xenon-133	Ci	3.82 E+0	4.27 E+1	1.73 E-5	1.03 E+2
xenon-135	Ci	. E	5.16 E+0	. E	6.81 E-0
xenon-135m	Ci	. E	. E	. E	1.03 E-2
xenon-138	Ci	. E	. E	. E	3.02 E-3
Others (specify)	Ci	. E	. E	. E	. E
Xenon - 131m	Ci	1.44 E+1	3.14 E+0	9.35 E-4	1.80 E-0
Xenon - 133m	Ci	. E	1.38 E+0	1.28 E-5	1.92 E-0
unidentified	Ci	. E	. E	. E	. E
Total for period	Ci	9.39 E+2	4.34 E+2	6.58 E-2	1.69 E+2

2. Iodines

iodine-131	Ci	7.61 E-5	2.86 E-4	. E	. E
iodine-133	Ci	2.47 E-4	2.92 E-4	. E	. E
iodine-135	Ci	3.75 E-3	1.43 E-3	. E	. E
Total for period	Ci	4.07 E-3	2.01 E-3	. E	. E

3. Particulates

strontium-89	Ci	6.76 E-6	3.89 E-6	. E	. E
strontium-90	Ci	1.85 E-6	1.03 E-6	. E	. E
cesium-134	Ci	3.20 E-5	2.30 E-5	. E	. E
cesium-137	Ci	1.39 E-4	9.72 E-5	. E	. E
barium-lanthanum-140	Ci	6.83 E-5	4.50 E-5	. E	. E
I-131	Ci	2.86 E-5	1.58 E-5	. E	. E
Co-58	Ci	1.08 E-3	1.29 E-4	. E	. E
Co-60	Ci	3.10 E-4	1.74 E-4	. E	. E
MN-54	Ci	1.55 E-5	7.59 E-7	. E	. E
FE-55	Ci	1.09 E-3	7.39 E-5		
P-32	Ci	4.92 E-6	2.58 E-6		
NI-63	Ci	4.32 E-5	9.34 E-6		
CO-57	Ci	2.45 E-6	5.55 E-7		
CR-51	Ci		5.59 E-6		
ZN-65	Ci		5.48 E-6		
NB-95	Ci		8.22 E-7		

Blank boxes indicate radionuclide not detected.

Effluent and Waste Disposal

Semi-Annual Report

C - Liquid Effluent

First Half - 1981

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1981)

LIQUID EFFLUENTS—SUMMATION OF ALL RELEASES

Unit	Quarter 1st	Quarter 2nd	Est. Total Error, %
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A. Fission and activation products

1. Total release (not including tritium, gases, alpha)	Ci	2.71 E-1	2.47 E0	±2.5 E+1
2. Average diluted concentration during period	μCi/ml	2.56 E-9	1.92 E-8	
3. Percent of applicable limit	%	2.69 E-2	1.11 E-1	

B. Tritium

1. Total release	Ci	3.16 E+1	3.92 E+1	±2.5 E+1
2. Average diluted concentration during period	μCi/ml	2.98 E-7	3.05 E-7	
3. Percent of applicable limit	%	9.96 E-3	1.01 E-2	

C. Dissolved and entrained gases

1. Total release	Ci	2.16 E-3	6.56 E-2	±2.5 E+1
2. Average diluted concentration during period	μCi/ml	2.04 E-11	5.11 E-10	
3. Percent of applicable limit	%	1.02 E-5	2.55 E-4	

D. Gross alpha radioactivity

1. Total release	Ci	<4.21 E-4	<1.98 E-3	±2.5 E+1
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E. Volume of waste released (prior to dilution)	liters	4.49 E+6	2.52 E+7	±1.0 E+1
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F. Volume of dilution water used during period	liters	1.05 E+1	1.28 E+1	±1.0 E+1
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EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1961)

LIQUID EFFLUENTS

CONTINUOUS MODE

BATCH MODE

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
strontium-89	Ci	9.79 E-5	6.14 E-4	7.40 E-5	9.90 E-5
strontium-90	Ci	2.44 E-5	1.36 E-4	3.25 E-4	2.07 E-4
cesium-134	Ci	7.21 E-3	7.42 E-3	1.81 E-2	5.62 E-3
cesium-137	Ci	1.01 E-2	2.72 E-2	5.85 E-3	2.10 E-2
iodine-131	Ci	1.02 E-3	2.55 E-2	2.41 E-3	3.02 E-3
cobalt-58	Ci	2.82 E-3	4.53 E-1	1.09 E-1	6.70 E-2
cobalt-60	Ci	7.65 E-4	6.81 E-1	4.95 E-2	7.77 E-2
iron-59	Ci	8.41 E-4	1.04 E-2	5.47 E-4	1.10 E-3
zinc-65	Ci	7.66 E-4	1.54 E-2	9.13 E-4	1.56 E-3
manganese-54	Ci	3.06 E-4	3.19 E-2	3.84 E-3	2.04 E-3
chromium-51	Ci	3.52 E-3	8.40 E-2	6.71 E-3	9.38 E-3
zirconium-niobium-95	Ci	5.17 E-4	1.41 E-2	8.21 E-4	1.25 E-3
molybdenum-99	Ci	1.36 E-3	2.35 E-1	5.51 E-3	4.69 E-3
technetium-99m	Ci	8.06 E-5	1.49 E-2	6.51 E-4	6.20 E-4
barium-lanthanum-140	Ci	1.80 E-3	4.09 E-2	3.05 E-3	4.33 E-3
cerium-141	Ci	4.27 E-4	7.28 E-3	8.20 E-4	8.33 E-4
Other (specify)	Ci	E	E	E	E
FE 55	Ci	3.21 E-3	5.31 E-1	1.87 E-2	2.53 E-2
Ni63	Ci	4.89 E-4	4.42 E-2	8.19 E-3	9.12 E-3
P 32	Ci	2.03 E-4	1.05 E-2	2.08 E-4	9.94 E-4
CO 57	Ci	5.04 E-5	4.68 E-3	1.81 E-4	6.33 E-4
unidentified	Ci	E	E	E	E
Total for period (above)	Ci	3.57 E-2	2.24 E 0	2.36 E-1	2.36 E-1
xenon-133	Ci	2.25 E-4	2.98 E-2	9.64 E-4	8.68 E-4
xenon-135	Ci	1.92 E-4	3.41 E-2	7.85 E-4	7.81 E-4

Blank boxes indicate radionuclide not detected.

Effluent and Waste Disposal

Semi-Annual Report

D - Solid Waste

First Half - 1981

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1991)

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	2.4 E+2	
	Ci	8.4 E+2	1.0 E+2
b. Dry compressible waste, contaminated equip, etc.	m ³	5.6 E+2	
	Ci	2.3 E+1	1.0 E+2
c. Irradiated components, control rods, etc.	m ³	. E	
	Ci	. E	. E
d. Other (describe)	m ³	. E	
	Ci	. E	. E

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

a.	Co-58	46 %	2.5 E+1
	Cs-137	17 %	2.5 E+1
	Co-60	13 %	2.5 E+1
	Cs-134	12 %	2.5 E+1
	Ni-63	10 %	2.5 E+1
	Mn-54, Co-57, Sr-89, Sr-90, Fe-55 & P-32	2 %	2.5 E+1
b.	Same as "a"	%	. E
		%	. E
		%	. E
c.		%	. E
		%	. E
		%	. E

3. Solid Waste Disposition

Number of Shipments

66

Mode of Transportation

Truck

Destination

Barnwell, S. C.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments

None

Mode of TransportationDestination

Effluent and Waste Disposal

Semi-Annual Report

E - Radiological Impact on Man

First Half - 1981

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	.161	.405	N/A	N/A
b) Continuous Releases	.018	.703	N/A	N/A
Inhalation*	3.37×10^{-3}	N/A	6.85×10^{-3}	1.64×10^{-2}
Ground Deposition	9.59×10^{-3}	1.13×10^{-2}	N/A	N/A
Milk Ingestion*	3.21×10^{-3}	N/A	3.61×10^{-3}	1.51×10^{-2}
Meat Ingestion***	4.93×10^{-4}	N/A	4.94×10^{-4}	4.93×10^{-4}
Vegetable Ingestion***	1.49×10^{-2}	N/A	1.74×10^{-2}	7.46×10^{-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

N/A = Not Applicable

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	1.440	N/A
b) Continuous Release	.862	N/A
Inhalation	.132	.261
Ground Deposition	.224	N/A
Totals	2.658	.261

Pathways
(Liquid)

All See attached "LADTAP" printout
Attachment I

C. Average Doses to Individuals

1. Liquid-Total Body
 $5.57 \times 10^{-4} \text{mr}$
2. Gaseous-Total Body
 $1.38 \times 10^{-4} \text{mr}$

N/A = Not Applicable

RADIOLOGICAL IMPACT EVALUATION

Doses from noble gas immersion, inhalation, ground deposition, and vegetation ingestion were evaluated for the nearest residence likely to be occupied in the critical sector for each pathway and were combined to provide a conservative determination of the maximum individual offsite radiation dose from these pathways. Doses were also evaluated for an individual ingesting milk and meat from a cow located about 8.9 miles to the ESE. 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. For the purpose of analysis, 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.

* * * AS LOW AS REASONABLY ACHIEVABLE * * *

ADULT DOSES

PATHWAY	DOSE (MREM PER YEAR INTAKE)							
	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		3.77E+00	6.65E-01	4.48E-01	1.30E-02	1.42E-01	7.49E-02	4.56E-01
INVERTEBRATE		2.23E-01	2.86E-01	8.31E-02	1.11E-03	2.68E-02	2.29E-01	3.26E-01
ALGAE		8.44E-06	7.62E-07	4.27E-07	1.75E-08	6.36E-08	1.48E-07	1.16E-06
DRINKING		2.10E-12	2.82E-12	1.87E-12	3.51E-12	7.38E-13	1.85E-12	4.36E-12
SHORELINE	2.15E-02	1.83E-02	1.83E-02	1.83E-02	1.83E-02	1.83E-02	1.83E-02	1.83E-02
SWIMMING	0.0	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04
BOATING	0.0	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04
TOTAL	2.15E-02	4.01E+00	9.71E-01	5.50E-01	3.36E-02	1.88E-01	3.23E-01	8.01E-01

PATHWAY	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.2
FISH	21.0	5.0	25.00	
INVERTEBRATE	5.0	5.0	25.00	
ALGAE	0.0	5.0	25.00	
DRINKING	0.0	500.0	112.00	
SHORELINE	50.0	5.0	1.00	
SWIMMING	50.0	5.0	1.00	
BOATING	100.0	5.0	1.00	

TEENAGER DOSES

PATHWAY	DOSE (MREM PER YEAR INTAKE)							
	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.93E+00	6.05E-01	2.81E-01	1.22E-02	1.08E-01	7.49E-02	3.43E-01
INVERTEBRATE		1.71E-01	2.19E-01	6.35E-02	9.73E-04	2.03E-02	1.74E-01	2.43E-01
ALGAE		8.46E-06	7.70E-07	4.22E-07	2.03E-08	6.36E-08	1.51E-07	1.14E-06
DRINKING		2.47E-12	3.11E-12	1.78E-12	3.97E-12	7.38E-13	1.84E-12	3.66E-12
SHORELINE	2.89E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02
SWIMMING	0.0	4.08E-04	4.08E-04	4.08E-04	4.08E-04	4.08E-04	4.08E-04	4.08E-04
BOATING	0.0	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04
TOTAL	2.89E-02	3.13E+00	8.50E-01	3.70E-01	3.83E-02	1.54E-01	2.74E-01	6.10E-01

PATHWAY	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.2
FISH	16.0	5.0	25.00	
INVERTEBRATE	3.0	5.0	25.00	
ALGAE	0.0	5.0	25.00	
DRINKING	0.0	500.0	112.00	
SHORELINE	67.0	5.0	1.00	
SWIMMING	100.0	5.0	1.00	
BOATING	100.0	5.0	1.00	

CHILD DOSES

PATHWAY	DOSE (MREM PER YEAR INTAKE)							
	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.46E+00	4.43E-01	1.16E-01	1.26E-02	4.68E-02	5.08E-02	1.46E-01
INVERTEBRATE		8.05E-02	1.01E-01	3.10E-02	1.04E-03	9.10E-03	7.82E-02	1.07E-01
ALGAE		8.56E-03	8.48E-04	4.39E-04	4.86E-05	6.36E-05	1.58E-04	1.13E-03
DRINKING		4.49E-09	4.85E-09	2.80E-09	9.37E-09	7.38E-10	2.21E-09	3.51E-09
SHORELINE	6.03E-03	5.13E-03	5.13E-03	5.13E-03	5.13E-03	5.13E-03	5.13E-03	5.13E-03
SWIMMING	0.0	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04
BOATING	0.0	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04
TOTAL	6.03E-03	1.56E+00	5.50E-01	1.53E-01	1.91E-02	6.14E-02	1.35E-01	2.60E-01

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.2
FISH	6.9	5.0	25.00	
INVERTEBRATE	1.7	5.0	25.00	
ALGAE	0.0	5.0	25.00	
DRINKING	0.0	500.0	112.00	
SHORELINE	14.0	5.0	1.00	
SWIMMING	25.0	5.0	1.00	
BOATING	100.0	5.0	1.00	

I N F A N T D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.30E-01	6.63E-02	8.17E-03	2.20E-03	3.39E-03	7.80E-03	1.06E-02
INVERTEBRATE		5.09E-03	6.37E-03	1.99E-03	1.47E-04	5.35E-04	4.64E-03	6.27E-03
ALGAE		8.72E-06	1.03E-06	4.59E-07	1.17E-07	6.36E-08	1.78E-07	1.13E-06
DRINKING		7.66E-12	8.98E-12	3.94E-12	2.22E-11	7.36E-13	2.87E-12	3.57E-12
SHORELINE	1.29E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03
SWIMMING	0.0	4.08E-11	4.08E-11	4.08E-11	4.08E-11	4.08E-11	4.08E-11	4.08E-11
BOATING	0.0	1.02E-06	1.02E-06	1.02E-06	1.02E-06	1.02E-06	1.02E-06	1.02E-06
TOTAL	1.29E-03	1.36E-01	7.38E-02	1.13E-02	3.45E-03	5.03E-03	1.35E-02	1.79E-02

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.2
FISH	0.5	5.0	25.00	
INVERTEBRATE	0.1	5.0	25.00	
ALGAE	0.0	5.0	25.00	
DRINKING	0.0	500.0	112.00	
SHORELINE	3.0	5.0	1.00	
SWIMMING	0.0	5.0	1.00	
BOATING	0.5	5.0	1.00	

* * * SELECTED LOCATION * * *

LOCATION IS DOWNSTREAM

A D U L T D O S E S

PATHWAY	DOSE (MREM PER YEAR INTAKE)								
	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	
FISH		2.66E+00	4.73E-01	3.19E-01	9.64E-03	1.02E-01	5.35E-02	3.22E-01	
INVERTEBRATE		1.58E-01	2.04E-01	5.93E-02	7.73E-04	1.91E-02	1.64E-01	2.33E-01	
ALGAE		5.96E-06	5.40E-07	3.02E-07	1.22E-08	4.48E-08	1.06E-07	8.18E-07	
DRINKING		1.54E-10	2.05E-10	1.35E-10	3.41E-10	6.00E-11	1.33E-10	3.23E-10	
SHORELINE	1.54E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	
SWIMMING	0.0	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	
BOATING	0.0	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	
TOTAL	1.54E-02	2.83E+00	6.91E-01	3.91E-01	2.38E-02	1.34E-01	2.30E-01	5.68E-01	

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.2
FISH	21.0	7.0	31.00	
INVERTEBRATE	5.0	7.0	31.00	
ALGAE	0.0	7.0	31.00	
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

T E E N A G E R D O S E S

PATHWAY	DOSE (MREM PER YEAR INTAKE)								
	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	
FISH		2.07E+00	4.31E-01	2.00E-01	8.54E-03	7.75E-02	5.35E-02	2.42E-01	
INVERTEBRATE		1.21E-01	1.56E-01	4.53E-02	6.81E-04	1.45E-02	1.24E-01	1.73E-01	
ALGAE		5.97E-06	5.51E-07	2.99E-07	1.42E-08	4.48E-08	1.08E-07	8.05E-07	
DRINKING		1.80E-10	2.26E-10	1.29E-10	3.89E-10	6.00E-11	1.32E-10	2.71E-10	
SHORELINE	2.06E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	
SWIMMING	0.0	2.91E-04	2.91E-04	2.91E-04	2.91E-04	2.91E-04	2.91E-04	2.91E-04	
BOATING	0.0	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	
TOTAL	2.06E-02	2.21E+00	6.05E-01	2.63E-01	2.72E-02	1.10E-01	1.96E-01	4.33E-01	

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.2
FISH	16.0	7.0	31.00	
INVERTEBRATE	3.8	7.0	31.00	
ALGAE	0.0	7.0	31.00	
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

PATHWAY	DOSE (MREM PER YEAR INTAKE)								
	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	
FISH		1.03E+00	3.16E-01	8.25E-02	8.80E-03	3.34E-02	3.63E-02	1.03E-01	
INVERTEBRATE		5.75E-01	7.21E-01	2.01E-02	7.27E-04	6.50E-02	5.07E-02	7.67E-02	
ALGAE		5.97E-06	5.51E-07	2.99E-07	1.42E-08	4.48E-08	1.08E-07	8.05E-07	
DRINKING		1.80E-10	2.26E-10	1.29E-10	3.89E-10	6.00E-11	1.32E-10	2.71E-10	
SHORELINE	2.06E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	
SWIMMING	0.0	2.91E-04	2.91E-04	2.91E-04	2.91E-04	2.91E-04	2.91E-04	2.91E-04	
BOATING	0.0	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	
TOTAL	2.06E-02	2.21E+00	6.05E-01	2.63E-01	2.72E-02	1.10E-01	1.96E-01	4.33E-01	

ALGAE		6.04E-03	6.01E-04	3.11E-04	3.40E-05	4.46E-05	1.13E-04	8.00E-04
DRINKING		3.28E-07	3.51E-07	2.02E-07	9.21E-07	6.00E-08	1.58E-07	2.60E-07
SHORELINE	4.31E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03
SWIMMING	0.0	7.27E-05	7.27E-05	7.27E-05	7.27E-05	7.27E-05	7.27E-05	7.27E-05
BOATING	0.0	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04
TOTAL	4.31E-03	1.10E+00	3.92E-01	1.09E-01	1.34E-02	4.38E-02	9.61E-02	1.85E-01

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.2
FISH	6.9	7.0	31.00	
INVERTEBRATE	1.7	7.0	31.00	
ALGAE	0.0	7.0	31.00	
DRINKING	0.0	7.0	19.00	
SHORELINE	14.0	7.0	7.00	
SWIMMING	25.0	7.0	7.00	
BOATING	100.0	7.0	7.00	

LOCATION IS DOWNSTREAM

INFANT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		9.18E-02	4.73E-02	5.81E-03	1.54E-03	2.42E-03	5.57E-03	7.46E-03
INVERTEBRATE		3.60E-03	4.54E-03	1.42E-03	1.03E-04	3.82E-04	3.31E-03	4.47E-03
ALGAE		6.16E-06	7.29E-07	3.25E-07	8.19E-08	4.48E-08	1.27E-07	7.97E-07
DRINKING		5.61E-10	6.48E-10	2.85E-10	2.19E-09	6.00E-11	2.06E-10	2.64E-10
SHORELINE	9.23E-04	7.85E-04	7.85E-04	7.85E-04	7.85E-04	7.85E-04	7.85E-04	7.85E-04
SWIMMING	0.0	2.91E-11	2.91E-11	2.91E-11	2.91E-11	2.91E-11	2.91E-11	2.91E-11
BOATING	0.0	7.27E-07	7.27E-07	7.27E-07	7.27E-07	7.27E-07	7.27E-07	7.27E-07
TOTAL	9.23E-04	9.62E-02	5.27E-02	8.02E-03	2.43E-03	3.59E-03	9.67E-03	1.27E-02

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.2
FISH	0.5	7.0	31.00	
INVERTEBRATE	0.1	7.0	31.00	
ALGAE	0.0	7.0	31.00	
DRINKING	0.0	7.0	19.00	
SHORELINE	3.0	7.0	7.00	
SWIMMING	0.0	7.0	7.00	
BOATING	0.5	7.0	7.00	

* * * FISH CONSUMPTION POPULATION DOSES * * *
 MAN-REM

SPORTFISH HARVEST

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

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	7.24E+04	7.00E+00	1.47E+00	1.00E+00	2.00E-02	3.43E-01	1.81E-01	8.62E-01
FISH	TEENAGER	1.16E+04	1.15E+00	2.86E-01	1.29E-01	3.72E-03	5.48E-02	3.79E-02	1.35E-01
FISH	CHILD	7.00E+03	8.35E-01	3.02E-01	7.45E-02	5.37E-03	3.31E-02	3.61E-02	8.08E-02
FISH	TOTAL	9.10E+04	8.98E+00	2.06E+00	1.20E+00	2.91E-02	4.31E-01	2.55E-01	1.08E+00

DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR POPULATION=1.59E+04
 7.00E+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 * * *
MAN-REM

COMMERCIAL HARVEST

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

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	8.74E+07	2.61E+01	6.03E+00	4.11E+00	6.60E-02	1.46E+00	7.68E-01	3.25E+00
FISH	TEENAGER	1.40E+07	4.30E+00	1.18E+00	5.27E-01	1.22E-02	2.33E-01	1.61E-01	5.10E-01
FISH	CHILD	8.45E+06	3.20E+00	1.26E+00	3.03E-01	1.77E-02	1.41E-01	1.53E-01	3.04E-01
FISH	TOTAL	1.10E+08	3.36E+01	8.47E+00	4.94E+00	9.59E-02	1.83E+00	1.08E+00	4.07E+00

DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR POPULATION=1.92E+07
7.00E+00 1.55E+05 2.40E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

NEPA DOSES

NOTE--TOATL NEPA DOSE MUST INCLUDE SPORT CATCH, DOSES BELOW ARE FOR COMMERCIAL CATCH ONLY

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

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	1.23E+05	1.04E+01	2.42E+00	1.64E+00	2.64E-02	5.83E-01	3.08E-01	1.30E+00
FISH	TEENAGER	1.97E+04	1.72E+00	4.71E-01	2.11E-01	4.90E-03	9.32E-02	6.45E-02	2.04E-01
FISH	CHILD	1.19E+04	1.28E+00	5.04E-01	1.21E-01	7.08E-03	5.63E-02	6.13E-02	1.22E-01
FISH	TOTAL	1.55E+05	1.35E+01	3.39E+00	1.98E+00	3.84E-02	7.33E-01	4.33E-01	1.63E+00

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *

MAN-REM

SPORTFISH HARVEST

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

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	7.94E+03	2.02E-01	3.14E-01	9.02E-02	7.45E-04	2.94E-02	2.54E-01	3.53E-01
INVER	TEENAGER	1.26E+03	3.25E-02	5.04E-02	1.44E-02	1.37E-04	4.68E-03	4.05E-02	5.51E-02
INVER	CHILD	7.94E+02	2.16E-02	3.26E-02	9.90E-03	2.05E-04	2.94E-03	2.55E-02	3.42E-02
INVER	TOTAL	1.00E+04	2.56E-01	3.97E-01	1.15E-01	1.09E-03	3.70E-02	3.20E-01	4.43E-01

DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR POPULATION=1.20E+04
 7.00E+00 1.00E+04 1.68E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILO=3.30E-01

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

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

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	1.27E+07	1.27E-01	2.16E-01	6.18E-02	4.02E-04	2.02E-02	1.76E-01	2.42E-01
INVER	TEENAGER	2.02E+06	2.04E-02	3.47E-02	9.89E-03	7.37E-05	3.22E-03	2.80E-02	3.78E-02
INVER	CHILD	1.27E+06	1.36E-02	2.24E-02	6.79E-03	1.10E-04	2.02E-03	1.77E-02	2.34E-02
INVER	TOTAL	1.60E+07	1.61E-01	2.74E-01	7.85E-02	5.86E-04	2.55E-02	2.22E-01	3.03E-01

DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR POPULATION=1.92E+07
7.00E+00 1.00E+03 2.40E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

NEPA DOSES

NOTE--TOATL NEPA DOSE MUST INCLUDE SPORT CATCH, DOSES BELOW ARE FOR COMMERCIAL CATCH ONLY

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

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	7.94E+02	1.83E-02	3.12E-02	8.91E-03	5.79E-05	2.92E-03	2.54E-02	3.49E-02
INVER	TEENAGER	1.26E+02	2.94E-03	5.00E-03	1.43E-03	1.06E-05	4.64E-04	4.04E-03	5.45E-03
INVER	CHILD	7.94E+01	1.97E-03	3.24E-03	9.79E-04	1.59E-05	2.92E-04	2.55E-03	3.38E-03
INVER	TOTAL	1.00E+03	2.32E-02	3.94E-02	1.13E-02	8.44E-05	3.67E-03	3.20E-02	4.37E-02

* * * RECREATION POPULATION DOSES * * *

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	1.66E+07	5.11E+00	4.34E+00	4.34E+00

LOCATION- DOWNSTREAM

DILUTION=0.70E+01

TRANSIT TIME=0.40E+01 HR

SWF=0.2

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	1.66E+07	0.0	4.83E-02	4.83E-02

LOCATION- DOWNSTREAM

DILUTION=0.70E+01

TRANSIT TIME=0.40E+01 HR

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.66E+07	0.0	2.42E-02	2.42E-02

LOCATION- DOWNSTREAM

DILUTION=0.70E+01

TRANSIT TIME=0.40E+01 HR

* * * DOSE TO BIOTA * * *

MRADS PER YEAR

ILUTION= 7.00E+00 TRANSIT TIME= 4.00E+00 HR

	INTERNAL	EXTERNAL	TOTAL
FISH	9.13E+00	1.15E+01	2.06E+01
INVERTEBRATE	4.38E+00	2.30E+01	2.73E+01
ALGAE	4.43E+01	2.55E-02	4.43E+01
MUSKRAT	7.37E+01	7.66E+00	8.14E+01
RACCOON	4.30E+00	5.73E+00	1.00E+01
HERON	3.73E+01	7.65E+00	4.50E+01
DUCK	7.28E+01	1.15E+01	8.43E+01

* * * COST-BENEFIT ANALYSIS * * *

NUCLIDE	RELEASE CI/YR	MAN-REM DOSE		MAN-REM PER CURIE	
		TOTAL BODY	THYROID	TOTAL BODY	THYROID
1H 3	3.17E+01	1.03E-03	1.03E-03	3.24E-05	3.24E-05
38SR 89	8.85E-04	7.89E-05	4.12E-08	8.91E-02	4.66E-05
38SR 90	6.92E-04	1.27E-02	3.38E-09	1.84E+01	4.89E-06
55CS 134	3.84E-02	2.29E+00	6.21E-02	5.97E+01	1.62E+00
55CS 137	6.42E-02	2.36E+00	1.55E-01	3.67E+01	2.41E+00
53I 131	3.20E-02	5.87E-04	1.26E-01	1.84E-02	3.94E+00
27CO 58	6.32E-01	8.39E-02	6.66E-02	1.33E-01	1.05E-01
27CO 60	8.09E-01	4.16E+00	4.09E+00	5.14E+00	5.05E+00
26FE 59	1.29E-02	3.49E-03	1.07E-03	2.70E-01	8.32E-02
30ZN 65	1.86E-02	7.96E-02	3.39E-03	4.28E+00	1.82E-01
25MN 54	3.81E-02	4.28E-02	1.28E-02	1.12E+00	3.36E-01
24CR 51	1.04E-01	1.77E-04	1.71E-04	1.70E-03	1.64E-03
40ZR 95	1.67E-02	1.20E-03	1.20E-03	7.20E-02	7.20E-02
42MO 99	2.47E-01	1.28E-03	1.23E-03	5.19E-03	4.97E-03
43TC 99M	1.63E-02	2.28E-05	2.28E-05	1.40E-03	1.40E-03
56BA 140	5.01E-02	6.07E-04	4.57E-04	1.21E-02	9.13E-03
59CE 141	9.36E-03	4.07E-05	4.06E-05	4.35E-03	4.34E-03
26FE 55	5.78E-01	2.30E-01	3.35E-07	3.99E-01	5.80E-07
20NI 63	6.20E-02	7.17E-03	0.0	1.16E-01	0.0
15P 32	1.19E-02	1.46E+00	6.84E-07	1.22E+02	5.75E-05
27CU 57	5.54E-03	2.76E-04	2.53E-04	4.99E-02	4.57E-02
TOTAL		1.07E+01	4.52E+00		

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION^a

PERIOD OF RECORD: January 1 - March 31, 1981

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	1	12	4	0	0	0	17
NNE	0	4	7	0	0	0	11
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	0	0	0	0	0	0
SE	1	0	0	0	0	0	1
SSE	2	6	0	0	0	0	8
S	13	8	0	0	0	0	21
SSW	6	18	1	0	0	0	25
SW	1	3	1	0	0	0	5
WSW	3	4	9	0	0	0	16
W	1	3	3	0	0	0	7
WNW	0	13	9	1	0	0	23
NW	0	5	11	2	0	0	18
NNW	0	12	10	5	0	0	27

VARIABLE

Total	28	88	55	8	0	0	179
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Periods of calm (hours): 0

Hours of missing data: Total hours of missing data for all stability classes this quarter = 219

^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, 1981

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	0	6	1	0	0	0	7
NNE	0	7	1	0	0	0	8
NE	1	0	0	0	0	0	1
ENE	0	1	0	0	0	0	1
E	0	0	0	0	0	0	0
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	2	2	0	0	0	0	4
SSW	2	3	0	0	0	0	5
SW	1	3	1	0	0	0	5
WSW	0	4	0	0	0	0	4
W	0	2	0	0	0	0	2
WNW	1	2	3	0	0	0	6
NW	0	5	13	0	0	0	18
NNW	1	6	13	0	0	0	20
VARIABLE							
Total	9	41	32	0	0	0	82
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, 1981

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	2	11	1	0	0	0	14
NNE	1	7	2	0	0	0	10
NE	0	7	0	0	0	0	7
ENE	1	3	0	0	0	0	4
E	0	0	0	0	0	0	0
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	2	3	0	0	0	0	5
SSW	4	3	1	0	0	0	8
SW	2	2	1	0	0	0	5
WSW	3	3	0	0	0	0	6
W	3	1	0	0	0	0	4
WNW	0	3	4	0	0	0	7
NW	1	10	11	0	0	0	22
NNW	0	8	7	0	0	0	15

VARIABLE

Total 20 61 27 0 0 0 108

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, 1981

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	10	46	24	1	0	0	81
NNE	9	63	23	3	0	0	98
NE	11	31	2	0	0	0	44
ENE	10	7	1	0	0	0	18
E	7	0	0	0	0	0	7
ESE	7	3	0	0	0	0	10
SE	4	3	0	0	0	0	7
SSE	5	3	0	0	0	0	8
S	17	11	0	0	0	0	28
SSW	11	6	3	0	0	0	20
SW	5	9	1	0	0	0	15
WSW	8	5	2	0	0	0	15
W	11	17	1	0	0	0	29
WNW	8	65	26	2	0	0	101
NW	1	47	77	11	1	0	137
NNW	6	81	76	4	0	0	167
VARIABLE							
Total	130	397	236	21	1	0	785
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, 1981

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	13	10	12	4	0	0	39
NNE	14	24	14	4	0	0	56
NE	35	28	1	0	0	0	64
ENE	38	19	0	0	0	0	57
E	17	3	0	0	0	0	20
ESE	13	1	0	0	0	0	14
SE	8	1	0	0	0	0	9
SSE	29	10	0	0	0	0	39
S	46	22	0	0	0	0	68
SSW	33	7	0	0	0	0	40
SW	17	9	1	0	0	0	27
WSW	17	3	0	0	0	0	20
W	19	8	0	0	0	0	27
WNW	10	22	2	0	0	0	34
NW	8	20	12	0	1	0	41
NNW	11	19	10	0	0	0	40
VARIABLE							
Total	328	206	52	8	1	0	595
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: January 1 - March 31, 1981

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	11	1	0	0	0	0	12
NNE	8	0	0	0	0	0	8
NE	20	10	0	0	0	0	30
ENE	17	11	0	0	0	0	28
E	9	1	0	0	0	0	10
ESE	5	0	0	0	0	0	5
SE	5	0	0	0	0	0	5
SSE	10	0	0	0	0	0	10
S	22	1	0	0	0	0	23
SSW	9	2	0	0	0	0	11
SW	10	0	0	0	0	0	10
WSW	7	0	0	0	0	0	7
W	7	0	0	0	0	0	7
WNW	1	0	0	0	0	0	1
NW	1	0	0	0	0	0	1
NNW	3	1	0	0	0	0	4
VARIABLE							
Total	145	27	0	0	0	0	172
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: January 1 - March 31, 1981

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	1	0	0	0	0	0	1
NNE	1	0	0	0	0	0	1
NE	1	1	0	0	0	0	2
ENE	1	2	0	0	0	0	3
E	0	0	0	0	0	0	0
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	1	0	0	0	0	0	1
SSW	2	0	0	0	0	0	2
SW	2	0	0	0	0	0	2
WSW	1	0	0	0	0	0	1
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
VARIABLE							
Total	10	3	0	0	0	0	13
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, 1981

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	7	22	13	0	0	0	42
NNE	11	38	10	0	0	0	59
NE	1	8	1	0	0	0	10
ENE	0	1	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	1	2	0	0	0	0	3
SSE	2	9	0	0	0	0	11
S	30	59	0	0	0	0	89
SSW	17	37	7	0	0	0	61
SW	14	23	3	0	0	0	40
WSW	7	10	4	0	0	0	21
W	2	10	0	0	0	0	12
WNW	4	14	1	0	0	0	19
NW	0	29	3	1	0	0	33
NNW	2	20	18	0	0	0	40

VARIABLE

Total 98 282 60 1 0 0 441

Periods of calm (hours): 0

Hours of missing data: Total hours of missing data for all stability classes this quarter = 0

^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, 1981

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	6	11	1	0	0	0	18
NNE	4	4	3	0	0	0	11
NE	1	2	0	0	0	0	3
ENE	1	2	0	0	0	0	3
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	1	0	0	0	0	1
S	9	8	0	0	0	0	17
SSW	5	3	1	0	0	0	9
SW	5	4	0	0	0	0	9
WSW	0	0	1	0	0	0	1
W	2	3	1	0	0	0	6
WNW	1	3	1	0	0	0	5
NW	0	3	1	1	0	0	5
NNW	1	3	5	0	0	0	9
VARIABLE							
Total	36	47	14	1	0	0	98
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, 1981

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	7	0	0	0	0	8
NNE	0	11	1	0	0	0	12
NE	3	4	1	0	0	0	8
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	2	0	0	0	0	0	2
SSE	1	0	0	0	0	0	1
S	7	4	0	0	0	0	11
SSW	5	1	0	0	0	0	6
SW	2	1	2	0	0	0	5
WSW	2	1	0	0	0	0	3
W	3	0	0	0	0	0	3
WNW	0	4	0	0	0	0	4
NW	1	7	4	0	0	0	12
NNW	0	5	2	1	0	0	8
VARIABLE							
Total	27	47	10	1	0	0	85
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, 1981

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	11	26	8	1	0	0	46
NNE	11	23	8	0	0	0	42
NE	22	16	0	0	0	0	38
ENE	10	6	0	0	0	0	16
E	18	4	0	0	0	0	22
ESE	12	0	0	0	0	0	12
SE	17	0	0	0	0	0	17
SSE	32	7	0	0	0	0	39
S	61	31	0	0	0	0	92
SSW	18	12	2	0	0	0	32
SW	20	16	2	0	0	0	38
WSW	7	7	1	0	0	0	15
W	8	6	0	0	0	0	14
WNW	3	8	3	0	0	0	14
NW	0	24	18	1	0	0	43
NNW	7	41	16	2	0	0	66
VARIABLE							
Total	257	227	58	4	0	0	546
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: April 1 - June 30, 1981

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	17	22	3	0	0	0	42
NNE	25	29	0	0	0	0	54
NE	36	22	2	0	0	0	60
ENE	26	12	0	0	0	0	38
E	24	2	1	0	0	0	27
ESE	18	0	0	0	0	0	18
SE	25	1	0	0	0	0	26
SSE	43	7	0	0	0	0	50
S	84	29	0	0	0	0	113
SSW	53	29	3	0	0	0	85
SW	38	15	1	0	0	0	54
WSW	15	9	0	0	0	0	24
W	19	3	0	0	0	0	22
WNW	10	23	2	0	0	0	35
NW	4	25	9	0	0	0	38
NNW	8	22	0	0	0	0	30

VARIABLE

Total 445 250 21 0 0 0 716

Periods of calm (hours): 8

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, 1981

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	8	0	0	0	0	0	8
NNE	9	0	0	0	0	0	9
NE	35	11	0	0	0	0	46
ENE	22	9	0	0	0	0	31
E	10	2	0	0	0	0	12
ESE	7	0	0	0	0	0	7
SE	7	0	0	0	0	0	7
SSE	16	0	0	0	0	0	16
S	22	1	0	0	0	0	23
SSW	16	1	0	0	0	0	17
SW	9	0	0	0	0	0	9
WSW	6	1	0	0	0	0	7
W	5	0	0	0	0	0	5
WNW	5	0	0	0	0	0	5
NW	3	0	0	0	0	0	3
NNW	3	0	0	0	0	0	3
VARIABLE							
Total	183	25	0	0	0	0	208
Periods of calm (hours):	10						
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, 1981

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	5	0	0	0	0	0	5
NE	18	7	1	0	0	0	26
ENE	11	5	0	0	0	0	16
E	5	0	0	0	0	0	5
ESE	1	0	0	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	3	0	0	0	0	0	3
S	2	0	0	0	0	0	2
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	1	0	0	0	0	0	1
W	2	0	0	0	0	0	2
WNW	0	0	0	0	0	0	0
NW	1	0	0	0	0	0	1
NNW	2	0	0	0	0	0	2

VARIABLE

Total 53 12 1 0 0 0 66

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.

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