John D. O'Toole
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N Y 10003
Telephone (212) 460-2533

Letter No. 81-38
March 1, 1981

Re: Indian Point Units 1&2
Docket Nos. 50-3, 50-247

RECEIVED
MAR 09 1981
U.S. NUCLEAR REGULATORY COMMISSION

Mr. Boyce Grier, Director
Office of Inspection and Enforcement
Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Grier

Enclosed are two copies of the semi-annual effluent release report for the period July 1,1980 to December 31, 1980.

Very truly yours

John D. O'Toole

Enc.

6 Copies to: Mr. Victor Stello, Jr., Director
Office of Inspection and Enforcement
c/o Distribution Services Branch, DD,ADM
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

1 Copy to: Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

1 Copy to: Mr. Ted Rebelowski, Resident Inspector
U.S. Nuclear Regulatory Commission
Box 38
Buchanan, New York 10511

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EFFLUENT AND WASTE DISPOSAL

SEMI-ANNUAL REPORT

3rd + 4th Quarter, 1980

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. The Semi-Annual Effluent and Waste Disposal Report for Indian Point Units 1 and 2 covers discharges for the third and fourth quarters of 1980. 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 Points 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 $\overline{K}$, $\overline{L}$, $\overline{M}$, $\overline{N}$ 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 the maximum per-

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missible 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 have 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 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 10CFR20, we have adapted the conservative MPC of $2X10^{-4}$ 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 of gases for the third quarter was $\bar{E}\gamma$ 3.89 E-2 Mev/Dis., and $\bar{E}\beta$ of 1.50 E-1 Mev/Dis. The corresponding values for the fourth quarter were $\bar{E}\gamma$ 2.40 E-2 Mev/Dis., and $\bar{E}\beta$ of 1.58 E-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 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 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.

Batch Releases

	1980	
	3rd Qtr.	4th Qtr.
a. Liquid		
Number of Batch Releases	59	50
Total Time Period Batch Release (Min.)	6,340	7,469
Maximum Time Period Batch Release (Min.)	360	900
Average Time Period Batch Releases (Min.)	107	149
Minimum Time Period Batch Releases (Min.)	37	38
Average Stream Flow (cfs)	8,870	9,327
b. Gaseous		
Number of Batch Releases	104	75
Total Time Period Batch Releases (Min.)	13,091	9,325
Maximum Time Period Batch Releases (Min.)	560	510
Average Time Period Batch Releases (Min.)	126	124
Minimum Time Period Batch Releases (Min.)	68	10

6. Abnormal Releases

a. Liquid - None

b. Gaseous - None

Effluent and Waste Disposal

Semi-Annual Report

B - Gaseous Effluents

Second Half - 1980

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1980)

GASEOUS EFFLUENTS—SUMMATION OF ALL RELEASES

	Unit	Quarter 3rd	Quarter 4th	Est. Total Error, %
A. Fission & activation gases				
1. Total release	Ci	3.22 E+3	4.51 E+3	±5.0 E+1
2. Average release rate for period	μCi/sec	4.05 E+2	5.67 E+2	
3. Percent of Technical specification limit	%	8.30 E+0	1.07 E+1	
B. Iodines				
1. Total iodine-131	Ci	8.83 E-3	5.52 E-3	±5.0 E+1
2. Average release rate for period	μCi/sec	1.11 E-3	6.94 E-4	
3. Percent of technical specification limit	%	6.72 E-1	5.30 E-1	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	9.10 E-4	1.27 E-3	±5.0 E+1
2. Average release rate for period	μCi/sec	1.14 E-4	1.60 E-4	
3. Percent of technical specification limit	%	6.72 E-1	5.30 E-1	
4. Gross alpha radioactivity	Ci	<4.31 E-7	<4.57 E-7	
D. Tritium				
1. Total release	Ci	8.78 E-1	1.47 E+0	±5.0 E+1
2. Average release rate for period	μCi/sec	1.10 E-1	1.85 E-1	
3. Percent of technical specification limit	%	. E	. E	

TABLE 1B

EFFLUENT AN[illegible]ASTE DISPOSAL SEMIANNUAL [illegible]PORT (1980)

GASEOUS EFFLUENTS—ELEVATED RELEASE

Nuclides Released	Unit	CONTINUOUS MODE 3rd Quarter	CONTINUOUS MODE 4th Quarter	BATCH MODE Quarter	BATCH MODE Quarter
1. Fission gases					
krypton-85	Ci	2.68 E+0	3.53 E+2	. E	. E
krypton-85m	Ci	5.46 E-1	5.35 E-2	. E	. E
krypton-87	Ci	2.08 E-1	. E	. E	. E
krypton-88	Ci	. E	. E	. E	. E
xenon-133	Ci	5.36 E+2	7.35 E+2	. E	. E
xenon-135	Ci	3.10 E-1	8.77 E-2	. E	. E
xenon-135m	Ci	. E	. E	. E	. E
xenon-138	Ci	7.57 E-1	. E	. E	. E
xenon-131m	Ci	1.27 E+1	3.42 E+1	. E	. E
xenon-133m	Ci	6.15 E+0	5.27 E+0	. E	. E
	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
Total for period	Ci	5.62 E+2	1.13 E+3	. E	. E
2. Iodines					
iodine-131	Ci	2.66 E-3	7.16 E-4	. E	. E
iodine-133	Ci	7.19 E-3	1.81 E-4	. E	. E
iodine-135	Ci	3.48 E-3	3.86 E-3	. E	. E
Total for period	Ci	1.33 E-2	4.76 E-3	. E	. E
3. Particulates					
strontium-89	Ci	<5.95 E-6	<6.16 E-6	. E	. E
strontium-90	Ci	<1.31 E-6	<1.33 E-6	. E	. E
cesium-134	Ci	4.50 E-5	5.34 E-5	. E	. E
cesium-137	Ci	1.64 E-4	1.32 E-4	. E	. E
barium-lanthanum-140	Ci	<3.79 E-5	<5.64 E-5	. E	. E
I-131	Ci	6.08 E-5	2.16 E-5	. E	. E
Co-58	Ci	1.69 E-4	2.83 E-4	. E	. E
Co-60	Ci	1.44 E-4	1.73 E-4	. E	. E
Mn-54	Ci	6.58 E-6	2.61 E-6	. E	. E
Cr-51	Ci	6.22 E-6	1.28 E-5		
Fe-55	Ci	1.22 E-5	9.62 E-6		
P-32	Ci	4.31 E-6	5.99 E-6		
Ni-63	Ci	6.24 E-6	4.01 E-6		
Zn-65	Ci	1.16 E-6	9.61 E-7		
Co-57	Ci		7.86 E-7		

Blank boxes indicate radionuclide not detected.

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1980)

GASEOUS EFFLUENTS—GROUND-LEVEL RELEASES

Nuclides Released	Unit	CONTINUOUS MODE 3rd Quarter	CONTINUOUS MODE 4th Quarter	BATCH MODE 3rd Quarter	BATCH MODE 4th Quarter
1. Fission gases					
krypton-85	Ci	4.39 E+1	5.93 E+2	5.54 E+0	1.54 E+1
krypton-85m	Ci	3.33 E+0	6.65 E-1	3.01 E+0	1.39 E-1
krypton-87	Ci	1.53 E-1	4.80 E-1	4.05 E-1	1.24 E-2
krypton-88	Ci	5.47 E+0	1.06 E+0	3.09 E+0	1.14 E-1
xenon-133	Ci	1.58 E+3	1.65 E+3	8.57 E+2	9.32 E+2
xenon-135	Ci	2.80 E+1	4.87 E+0	3.89 E+1	4.32 E+0
xenon-135m	Ci	2.36 E-1	1.28 E+0	2.23 E+0	. E
xenon-138	Ci	2.07 E+0	. E	2.58 E-1	2.13 E-2
xenon-131m	Ci	2.92 E+1	1.50 E+2	2.54 E+0	3.24 E+0
xenon-133m	Ci	1.09 E+1	9.85 E+0	1.26 E+1	1.08 E+1
xenon-137	Ci	2.17 E+1	. E	. E	2.03 E-1
	Ci	. E	. E	. E	. E
Total for period	Ci	1.73 E+3	2.41 E+3	9.25 E+2	9.66 E+2
2. Iodines					
iodine-131	Ci	6.17 E-3	4.80 E-3	. E	. E
iodine-133	Ci	9.99 E-4	9.79 E-4	. E	. E
iodine-135	Ci	8.43 E-3	4.45 E-3	. E	. E
Total for period	Ci	1.56 E-2	1.02 E-2	. E	. E
3. Particulates					
strontium-89	Ci	< 3.80 E-6	< 3.79 E-6	. E	. E
strontium-90	Ci	< 3.81 E-7	< 8.57 E-7	. E	. E
cesium-134	Ci	1.57 E-5	3.39 E-5	. E	. E
cesium-137	Ci	4.32 E-5	7.38 E-5	. E	. E
barium-lanthanum-140	Ci	< 2.14 E-5	< 2.40 E-5	. E	. E
I-131	Ci	9.99 E-6	2.25 E-5	. E	. E
Co-58	Ci	5.26 E-5	1.98 E-4	. E	. E
Co-60	Ci	6.01 E-5	9.71 E-5	. E	. E
Mn-54	Ci	3.65 E-6	1.38 E-6	. E	. E
Cr-51	Ci	3.82 E-6	8.76 E-6		
Fe-55	Ci	7.80 E-6	2.68 E-5		
P-32	Ci	2.69 E-6	2.79 E-6		
Ni-63	Ci	1.03 E-5	5.34 E-6		
Nb-95	Ci		5.20 E-7		

Blank boxes indicate radionuclide not detected.

Effluent and Waste Disposal

Semi-Annual Report

C - Liquid Effluent

Second Half - 1980

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1980)

LIQUID EFFLUENTS–SUMMATION OF ALL RELEASES

	Unit	Quarter 3rd	Quarter 4th	Est. Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	1.58 E-1	4.33 E-1	± 2.5 E +1
2. Average diluted concentration during period	μCi/ml	3.89 E-10	2.85 E-9	
3. Percent of applicable limit	%	3.57 E-3	8.96 E-2	
B. Tritium				
1. Total release	Ci	6.33 E+1	7.46 E+1	± 2.5 E +1
2. Average diluted concentration during period	μCi/ml	1.55 E-7	4.91 E-7	
3. Percent of applicable limit	%	5.18 E-3	1.63 E-2	
C. Dissolved and entrained gases				
1. Total release	Ci	3.80 E-3	6.02 E-3	± 2.5 E +1
2. Average diluted concentration during period	μCi/ml	9.35 E-12	3.96 E-11	
3. Percent of applicable limit	%	4.67 E-6	1.98 E-5	
D. Gross alpha radioactivity				
1. Total release	Ci	<2.41 E-3	<1.27 E-3	± 2.5 E +1
E. Volume of waste released (prior to dilution)	liters	2.43 E+7	1.57 E+7	± 1.0 E +1
F. Volume of dilution water used during period	liters	4.07 E+11	1.51 E+11	± 1.0 E +1

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1980)

LIQUID EFFLUENTS

Nuclides Released	Unit	CONTINUOUS MODE 3rd Quarter	CONTINUOUS MODE 4th Quarter	BATCH MODE 3rd Quarter	BATCH MODE 4th Quarter
strontium-89	Ci	<9.12 E-4	<4.05 E-4	<1.99 E-4	<5.49 E-4
strontium-90	Ci	<1.23 E-4	<1.30 E-4	<1.39 E-4	<5.40 E-4
cesium-134	Ci	1.21 E-3	1.02 E-2	4.93 E-3	3.12 E-2
cesium-137	Ci	2.34 E-3	1.22 E-2	1.04 E-2	5.03 E-2
iodine-131	Ci	1.98 E-3	8.65 E-3	2.09 E-2	1.98 E-2
cobalt-58	Ci	1.56 E-3	1.87 E-3	4.58 E-3	1.34 E-1
cobalt-60	Ci	2.89 E-3	1.19 E-3	2.45 E-3	3.80 E-2
iron-59	Ci	4.34 E-3	3.18 E-3	3.00 E-4	7.25 E-4
zinc-65	Ci	3.92 E-3	2.62 E-3	2.43 E-4	8.66 E-4
manganese-54	Ci	1.37 E-3	1.20 E-3	5.54 E-4	6.16 E-3
chromium-51	Ci	5.07 E-3	1.24 E-2	2.32 E-3	9.71 E-3
zirconium-niobium-95	Ci	2.48 E-3	2.40 E-3	2.40 E-4	9.74 E-4
molybdenum-99	Ci	1.09 E-2	7.31 E-3	1.23 E-3	2.88 E-3
technetium-99m	Ci	8.02 E-4	6.55 E-4	1.29 E-4	3.86 E-4
barium-lanthanum-140	Ci	<5.83 E-3	<9.77 E-3	<1.23 E-3	<4.42 E-3
cerium-141	Ci	8.49 E-4	1.35 E-3	3.30 E-4	1.32 E-3
cesium-136	Ci	. E	. E	1.21 E-4	. E
iron-55	Ci	4.56 E-2	1.35 E-2	1.92 E-3	1.75 E-2
nickel-63	Ci	4.56 E-3	2.70 E-3	1.22 E-3	1.33 E-2
phosphorous-32	Ci	6.93 E-3	5.40 E-3	7.23 E-4	2.48 E-3
cobalt-57	Ci	. E	. E	. E	3.77 E-4
unidentified	Ci	. E	. E	. E	. E
Total for period (above)	Ci	1.04 E-1	9.73 E-2	5.43 E-2	3.36 E-1
xenon-133	Ci	1.34 E-3	1.72 E-3	1.14 E-3	3.06 E-3
xenon-135	Ci	1.16 E-3	8.30 E-4	1.56 E-4	4.06 E-4

Blank boxes indicate radionuclide not detected.

Effluent and Waste Disposal

Semi-Annual Report

D - Solid Waste

Second Half - 1980

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1980)

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

1. Type of waste	Unit	3rd + 4th Qtr. 6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	3.19 E+2 9.79 E+1	 ±1.0 E+2
b. Dry compressible waste, contaminated equip, etc.	m^3 Ci	1.88 E+2 3.54 E+1	 ±1.0 E+2
c. Irradiated components, control rods, etc.	m^3 Ci	. E . E	 . E
d. Other (describe)	m^3 Ci	. E . E	 . E

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

a.	Cs^{137}	41 %	±1.0 E+2
	Co^{58}	23 %	±1.0 E+2
	Cs^{134}	12 %	±1.0 E+2
	Co^{60}	11 %	±1.0 E+2
	I^{131}, Mn^{54}, Fe^{55}, Ni^{63}	13 %	±1.0 E+2
b.	Same as "a".	%	. E
c.		%	. E
		%	. E
		%	. E
d.		%	. E
		%	. E
		%	. E

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
49	Truck	Barnwell, S.C.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None		

Effluent and Waste Disposal

Semi-Annual Report

E - Radiological Impact on Man

Second Half - 1980

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.

Indian Point Units 1 and 2

RADIOLOGICAL IMPACT ON MAN

(Reference regulatory guide 1.21, page 12)

A. Maximum Individual Doses

Pathways (Gaseous)	Total Body (mr)	Skin (mr)	Thyroid (mr)	Bone (mr)
Noble Gas Immersion				
a) Batch Releases	.108	.270	N/A	N/A
b) Continuous Releases	.264	.938	N/A	N/A
Inhalation*	4.10×10^{-3}	N/A	5.03×10^{-2}	1.89×10^{-2}
Ground Deposition	5.30×10^{-3}	6.22×10^{-3}	N/A	N/A
Milk Ingestion*	3.73×10^{-3}	N/A	1.13×10^{-2}	1.74×10^{-2}
Meat Ingestion***	5.71×10^{-4}	N/A	6.10×10^{-4}	2.85×10^{-3}
Vegetable Ingestion***	1.74×10^{-2}	N/A	9.63×10^{-2}	8.62×10^{-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

Pathways (Gaseous)	Total Body (man-rem)	Thyroid (man-thyroid rem)
Noble Gas Immersion		
a) Batch Release	5.10	
b) Continuous Release	11.80	
Inhalation	.18	2.16
Ground Deposition	.12	
Totals	17.20	2.16

Pathways (Liquid)

All — See attached "LADTAP" printout Attachment I

C. Average Doses to Individuals

1. Liquid-Total Body
   1.56×10^{-4} mr

2. Gaseous-Total Body
   9.05×10^{-4} mr

* * * AS LOW AS REASONABLY ACHIEVABLE * * *

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.86E+00	2.99E-01	2.05E-01	8.51E-03	6.33E-02	2.23E-02	2.03E-01
INVERTEBRATE		8.89E-02	2.54E-02	9.94E-03	6.92E-04	3.57E-03	1.22E-02	3.44E-02
ALGAE		4.18E-06	2.98E-07	1.85E-07	1.07E-08	1.29E-08	9.96E-09	4.85E-07
DRINKING		6.69E-13	1.08E-12	9.56E-13	2.49E-12	7.02E-13	6.63E-13	7.44E-13
SHORELINE	9.38E-04	8.01E-04	8.01E-04	8.01E-04	8.01E-04	8.01E-04	8.01E-04	8.01E-04
SWIMMING	0.0	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05
BOATING	0.0	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05
TOTAL	9.38E-04	1.95E+00	3.25E-01	2.16E-01	1.00E-02	6.77E-02	3.53E-02	2.38E-01

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
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

SHOREWIDTH FACTOR=0.2

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.44E+00	2.73E-01	1.28E-01	7.52E-03	4.82E-02	2.51E-02	1.54E-01
INVERTEBRATE		6.83E-02	1.99E-02	7.33E-03	6.05E-04	2.71E-03	9.37E-03	2.59E-02
ALGAE		4.19E-06	3.05E-07	1.82E-07	1.25E-08	1.29E-08	1.12E-08	4.83E-07
DRINKING		8.45E-13	1.11E-12	7.81E-13	2.70E-12	7.02E-13	5.75E-13	5.99E-13
SHORELINE	1.26E-03	1.07E-03	1.07E-03	1.07E-03	1.07E-03	1.07E-03	1.07E-03	1.07E-03
SWIMMING	0.0	2.30E-05	2.30E-05	2.30E-05	2.30E-05	2.30E-05	2.30E-05	2.30E-05
BOATING	0.0	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05
TOTAL	1.26E-03	1.51E+00	2.94E-01	1.37E-01	9.23E-03	5.20E-02	3.56E-02	1.81E-01

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	16.0	5.0	25.00
INVERTEBRATE	3.8	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

SHOREWIDTH FACTOR=0.2

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		7.12E-01	2.01E-01	5.20E-02	7.74E-03	2.08E-02	1.93E-02	6.63E-02
INVERTEBRATE		3.22E-02	9.94E-03	3.42E-03	6.44E-04	1.21E-03	4.30E-03	1.15E-02
ALGAE		4.23E-03	3.35E-04	1.84E-04	2.98E-05	1.29E-05	1.43E-05	4.83E-04
DRINKING		1.77E-09	2.11E-09	1.23E-09	6.25E-09	7.02E-10	1.03E-09	9.74E-10
SHORELINE	2.63E-04	2.24E-04	2.24E-04	2.24E-04	2.24E-04	2.24E-04	2.24E-04	2.24E-04
SWIMMING	0.0	5.74E-06	5.74E-06	5.74E-06	5.74E-06	5.74E-06	5.74E-06	5.74E-06
BOATING	0.0	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05
TOTAL	2.63E-04	7.49E-01	2.11E-01	5.58E-02	8.66E-03	2.23E-02	2.39E-02	7.86E-02

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
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

SHOREWIDTH FACTOR=0.2

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		6.24E-02	3.01E-02	3.57E-03	1.35E-03	1.51E-03	3.28E-03	4.81E-03
INVERTEBRATE		2.04E-03	7.44E-04	2.12E-04	9.07E-05	7.14E-05	2.72E-04	6.77E-04
ALGAE		4.31E-06	4.13E-07	1.86E-07	7.18E-08	1.29E-08	2.38E-08	4.83E-07
DRINKING		3.20E-12	4.13E-12	1.73E-12	1.44E-11	7.02E-13	1.63E-12	1.39E-12
SHORELINE	5.63E-05	4.81E-05	4.81E-05	4.81E-05	4.81E-05	4.81E-05	4.81E-05	4.81E-05
SWIMMING	0.0	2.30E-12	2.30E-12	2.30E-12	2.30E-12	2.30E-12	2.30E-12	2.30E-12
BOATING	0.0	5.74E-08	5.74E-08	5.74E-08	5.74E-08	5.74E-08	5.74E-08	5.74E-08
TOTAL	5.63E-05	6.45E-02	3.09E-02	3.83E-03	1.49E-03	1.63E-03	3.60E-03	5.53E-03

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
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

SHOREWIDTH FACTOR=0.2

* * * SELECTED LOCATION * * *

LOCATION IS DOWNSTREAM

A D U L T D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.31E+00	2.13E-01	1.46E-01	5.95E-03	4.52E-02	1.59E-02	1.43E-01
INVERTEBRATE		6.28E-02	1.81E-02	7.07E-03	4.84E-04	2.55E-03	8.72E-03	2.45E-02
ALGAE		2.95E-06	2.10E-07	1.31E-07	7.50E-09	9.22E-09	7.12E-09	3.42E-07
DRINKING		4.92E-11	7.73E-11	6.86E-11	2.33E-10	5.07E-11	4.74E-11	5.42E-11
SHORELINE	6.70E-04	5.72E-04	5.72E-04	5.72E-04	5.72E-04	5.72E-04	5.72E-04	5.72E-04
SWIMMING	0.0	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06
BOATING	0.0	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06
TOTAL	6.70E-04	1.37E+00	2.31E-01	1.54E-01	7.02E-03	4.83E-02	2.52E-02	1.68E-01

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
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

SHOREWIDTH FACTOR=0.2

LOCATION IS DOWNSTREAM

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

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.02E+00	1.94E-01	9.13E-02	5.26E-03	3.44E-02	1.79E-02	1.09E-01
INVERTEBRATE		4.82E-02	1.42E-02	5.21E-03	4.23E-04	1.94E-03	6.69E-03	1.84E-02
ALGAE		2.96E-06	2.15E-07	1.28E-07	8.71E-09	9.22E-09	8.02E-09	3.41E-07
DRINKING		6.19E-11	7.96E-11	5.61E-11	2.57E-10	5.07E-11	4.11E-11	4.35E-11
SHORELINE	8.98E-04	7.67E-04	7.67E-04	7.67E-04	7.67E-04	7.67E-04	7.67E-04	7.67E-04
SWIMMING	0.0	1.64E-05	1.64E-05	1.64E-05	1.64E-05	1.64E-05	1.64E-05	1.64E-05
BOATING	0.0	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06
TOTAL	8.98E-04	1.07E+00	2.09E-01	9.73E-02	6.47E-03	3.72E-02	2.54E-02	1.28E-01

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
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

SHOREWIDTH FACTOR=0.2

LOCATION IS DOWNSTREAM

C H I L D D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		5.04E-01	1.43E-01	3.69E-02	5.41E-03	1.48E-02	1.38E-02	4.68E-02
INVERTEBRATE		2.27E-02	7.08E-03	2.43E-03	4.50E-04	8.66E-04	3.07E-03	8.21E-03

ALGAE		2.99E-03	2.37E-04	1.30E-04	2.08E-05	9.22E-06	1.02E-05	3.41E-04
DRINKING		1.29E-07	1.52E-07	8.65E-08	6.01E-07	5.07E-08	7.34E-08	7.02E-08
SHORELINE	1.88E-04	1.60E-04	1.60E-04	1.60E-04	1.60E-04	1.60E-04	1.60E-04	1.60E-04
SWIMMING	0.0	4.09E-06	4.09E-06	4.09E-06	4.09E-06	4.09E-06	4.09E-06	4.09E-06
BOATING	0.0	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06	8.18E-06
TOTAL	1.88E-04	5.29E-01	1.50E-01	3.97E-02	6.06E-03	1.59E-02	1.70E-02	5.56E-02

	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

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		4.42E-02	2.15E-02	2.54E-03	9.44E-04	1.08E-03	2.34E-03	3.39E-03
INVERTEBRATE		1.44E-03	5.31E-04	1.50E-04	6.35E-05	5.10E-05	1.94E-04	4.82E-04
ALGAE		3.04E-06	2.93E-07	1.32E-07	5.02E-08	9.22E-09	1.70E-08	3.41E-07
DRINKING		2.33E-10	2.97E-10	1.24E-10	1.40E-09	5.07E-11	1.17E-10	9.96E-11
SHORELINE	4.02E-05	3.43E-05	3.43E-05	3.43E-05	3.43E-05	3.43E-05	3.43E-05	3.43E-05
SWIMMING	0.0	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12
BOATING	0.0	4.09E-08	4.09E-08	4.09E-08	4.09E-08	4.09E-08	4.09E-08	4.09E-08
TOTAL	4.02E-05	4.57E-02	2.21E-02	2.72E-03	1.04E-03	1.16E-03	2.57E-03	3.91E-03

	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

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	7.24E+04	3.44E+00	6.56E-01	4.55E-01	1.24E-02	1.53E-01	5.37E-02	3.72E-01
FISH	TEENAGER	1.16E+04	5.63E-01	1.28E-01	5.86E-02	2.30E-03	2.44E-02	1.27E-02	5.92E-02
FISH	CHILD	7.00E+03	4.04E-01	1.36E-01	3.30E-02	3.31E-03	1.48E-02	1.37E-02	3.57E-02
FISH	TOTAL	9.10E+04	4.40E+00	9.20E-01	5.47E-01	1.80E-02	1.92E-01	8.01E-02	4.67E-01

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

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	8.65E+07	1.27E+01	2.65E+00	1.84E+00	4.06E-02	6.42E-01	2.26E-01	1.36E+00
FISH	TEENAGER	1.38E+07	2.08E+00	5.19E-01	2.35E-01	7.50E-03	1.03E-01	5.34E-02	2.17E-01
FISH	CHILD	8.36E+06	1.53E+00	5.61E-01	1.32E-01	1.08E-02	6.20E-02	5.76E-02	1.31E-01
FISH	TOTAL	1.09E+08	1.63E+01	3.73E+00	2.21E+00	5.89E-02	8.06E-01	3.37E-01	1.71E+00

DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=1.90E+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

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	1.23E+05	5.12E+00	1.07E+00	7.47E-01	1.64E-02	2.60E-01	9.14E-02	5.51E-01
FISH	TEENAGER	1.97E+04	8.43E-01	2.10E-01	9.51E-02	3.04E-03	4.15E-02	2.16E-02	8.77E-02
FISH	CHILD	1.19E+04	6.18E-01	2.27E-01	5.33E-02	4.37E-03	2.51E-02	2.33E-02	5.29E-02
FISH	TOTAL	1.55E+05	6.58E+00	1.51E+00	8.95E-01	2.39E-02	3.26E-01	1.36E-01	6.92E-01

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

SPORTFISH HARVEST

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	7.94E+03	7.59E-02	2.67E-02	1.01E-02	4.73E-04	3.93E-03	1.36E-02	3.52E-02
INVER	TEENAGER	1.26E+03	1.22E-02	4.37E-03	1.56E-03	8.59E-05	6.25E-04	2.18E-03	5.55E-03
INVER	CHILD	7.94E+02	8.21E-03	3.09E-03	1.02E-03	1.28E-04	3.93E-04	1.40E-03	3.47E-03
INVER	TOTAL	1.00E+04	9.63E-02	3.42E-02	1.27E-02	6.87E-04	4.95E-03	1.71E-02	4.43E-02

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 CHILD=3.30E-01

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

COMMERCIAL HARVEST

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	1.25E+07	4.56E-02	1.79E-02	6.67E-03	2.55E-04	2.68E-03	9.28E-03	2.33E-02
INVER	TEENAGER	1.99E+06	7.37E-03	2.93E-03	1.03E-03	4.61E-05	4.26E-04	1.49E-03	3.67E-03
INVER	CHILD	1.25E+06	4.98E-03	2.07E-03	6.75E-04	6.86E-05	2.68E-04	9.62E-04	2.30E-03
INVER	TOTAL	1.58E+07	5.80E-02	2.29E-02	8.37E-03	3.69E-04	3.37E-03	1.17E-02	2.92E-02

DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=1.90E+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

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	7.94E+02	6.65E-03	2.60E-03	9.72E-04	3.71E-05	3.90E-04	1.35E-03	3.39E-03
INVER	TEENAGER	1.26E+02	1.07E-03	4.26E-04	1.49E-04	6.71E-06	6.21E-05	2.17E-04	5.34E-04
INVER	CHILD	7.94E+01	7.26E-04	3.02E-04	9.83E-05	9.99E-06	3.90E-05	1.40E-04	3.34E-04
INVER	TOTAL	1.00E+03	8.45E-03	3.33E-03	1.22E-03	5.38E-05	4.92E-04	1.71E-03	4.26E-03

* * * POPULATION WATER CONSUMPTION DOSES * * *

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
			DOSE (MAN-REM)						
DRINKING	ADULT	2.44E+02	7.77E-09	2.53E-09	2.05E-09	1.09E-10	8.24E-10	3.46E-10	2.37E-10
DRINKING	TEENAGER	3.64E+01	1.33E-09	4.74E-10	2.64E-10	1.28E-11	1.23E-10	6.77E-11	3.53E-11
DRINKING	CHILD	5.20E+01	3.05E-09	1.34E-09	4.55E-10	3.50E-11	1.75E-10	1.80E-10	6.73E-11
DRINKING	TOTAL	3.33E+02	1.22E-08	4.34E-09	2.77E-09	1.56E-10	1.12E-09	5.94E-10	3.40E-10

POPULATION=1.00E+00 DILUTION=1.00E+02 TRANSIT TIME=1.00E+06 HR (INCLUDING 24 HR FOR TREATMENT FACILITY)

AVERAGE INDIVIDUAL CONSUMPTION (L/YR) ADULT=3.70E+02 TEEN=2.60E+02 CHILD=2.60E+02

-----CUMULATIVE TOTAL-----

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
DRINKING	CUMUL TOTAL	3.33E+02	1.22E-08	4.34E-09	2.77E-09	1.56E-10	1.12E-09	5.94E-10	3.40E-10

HYDROSPHERE TRITIUM DOSE

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
WATER	TOTAL	2.20E+00	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03

* * * RECREATION POPULATION DOSES * * *

DOSE(MAN-REM)

PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	1.66E+07	2.22E-01	1.90E-01	1.90E-01

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	2.72E-03	2.72E-03

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	1.36E-03	1.36E-03

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	4.45E+00	5.03E-01	4.95E+00
INVERTEBRATE	1.09E+00	1.00E+00	2.09E+00
ALGAE	2.11E+01	1.43E-03	2.11E+01
MUSKRAT	3.31E+01	3.35E-01	3.34E+01
RACCOON	5.02E-01	2.51E-01	7.53E-01
HERON	1.73E+01	3.35E-01	1.76E+01
DUCK	3.29E+01	5.02E-01	3.34E+01

* * * COST-BENEFIT ANALYSIS * * *

NUCLIDE	RELEASE CI/YR	MAN-REM DOSE TOTAL BODY	MAN-REM DOSE THYROID	MAN-REM PER CURIE TOTAL BODY	MAN-REM PER CURIE THYROID
1H 3	1.38E+02	1.69E-03	1.69E-03	1.23E-05	1.23E-05
38SR 89	2.07E-03	6.99E-05	3.68E-08	3.38E-02	1.78E-05
38SR 90	9.39E-04	6.55E-03	1.75E-09	6.98E+00	1.87E-06
55CS 134	4.75E-02	1.07E+00	2.94E-02	2.26E+01	6.18E-01
55CS 137	7.52E-02	1.05E+00	6.92E-02	1.39E+01	9.20E-01
53I 131	5.13E-02	3.59E-04	7.66E-02	6.99E-03	1.49E+00
27CO 58	1.42E-01	7.19E-03	5.72E-03	5.06E-02	4.03E-02
27CO 60	4.45E-02	8.73E-02	8.59E-02	1.96E+00	1.93E+00
26FE 59	8.55E-03	8.79E-04	2.72E-04	1.03E-01	3.18E-02
30ZN 65	7.65E-03	1.24E-02	5.33E-04	1.62E+00	6.97E-02
25MN 54	9.28E-03	3.97E-03	1.19E-03	4.28E-01	1.28E-01
24CR 51	3.01E-02	1.95E-05	1.88E-03	6.49E-04	6.26E-04
40ZR 95	6.09E-03	1.67E-04	1.67E-04	2.75E-02	2.75E-02
42MO 99	2.23E-02	4.42E-05	4.24E-05	1.98E-03	1.90E-03
43TC 99M	1.97E-03	1.05E-06	1.05E-06	5.35E-04	5.35E-04
56BA 140	2.13E-02	9.85E-05	7.43E-05	4.62E-03	3.49E-03
58CE 141	3.85E-03	6.40E-06	6.39E-06	1.66E-03	1.66E-03
55CS 136	1.21E-04	2.67E-04	3.29E-06	2.21E+00	2.72E-02
26FE 55	7.85E-02	1.19E-02	1.74E-08	1.51E-01	2.21E-07
28NI 63	2.18E-02	9.56E-04	0.0	4.38E-02	0.0
15P 32	1.55E-02	7.19E-01	3.40E-07	4.64E+01	2.20E-05
27CO 57	3.77E-04	7.18E-06	6.59E-06	1.90E-02	1.75E-02
TOTAL		2.97E+00	2.71E-01		

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION [a]

PERIOD OF RECORD: July 1 - September 30, 1980

STABILITY CLASS: A

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	10	18	1	0	0	0	29
NNE	5	49	4	0	0	0	58
NE	5	3	2	0	0	0	10
ENE	0	2	0	0	0	0	2
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	2	0	0	0	0	0	2
SSE	3	1	0	0	0	0	4
S	30	22	0	0	0	0	52
SSW	32	42	2	0	0	0	76
SW	16	21	3	0	0	0	40
WSW	10	16	1	0	0	0	27
W	10	8	0	0	0	0	18
WNW	5	13	1	0	0	0	19
NW	2	7	0	0	0	0	9
NNW	5	8	2	0	0	0	15
VARIABLE							
Total	135	210	16	0	0	0	361

Periods of calm (hours): 0

Hours of missing data: Total Hours of missing data for all stability classes this quarter = 207.

[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, 1980

STABILITY CLASS: B

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	2	0	0	0	0	4
NNE	2	9	0	0	0	0	11
NE	3	5	3	0	0	0	11
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	0	0	0	0	0	1
SSE	2	0	0	0	0	0	2
S	4	2	0	0	0	0	6
SSW	6	1	0	0	0	0	7
SW	4	3	1	0	0	0	8
WSW	0	4	0	0	0	0	4
W	4	4	0	0	0	0	8
WNW	0	1	0	0	0	0	1
NW	1	0	0	0	0	0	1
NNW	0	3	0	0	0	0	3
VARIABLE							
Total	29	35	4	0	0	0	68
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, 1980

STABILITY CLASS: C

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	1	0	0	0	0	6
NNE	6	3	2	0	0	0	11
NE	3	9	3	0	0	0	15
ENE	2	7	0	0	0	0	9
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	1	0	0	0	0	0	1
S	4	3	0	0	0	0	7
SSW	6	1	0	0	0	0	7
SW	2	5	0	0	0	0	7
WSW	2	2	0	0	0	0	4
W	2	2	0	0	0	0	4
WNW	3	4	0	0	0	0	7
NW	2	2	0	0	0	0	4
NNW	3	1	0	0	0	0	4
VARIABLE							
Total	42	40	5	0	0	0	87
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, 1980

STABILITY CLASS: D

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	5	8	0	0	0	0	13
NNE	14	22	0	0	0	0	36
NE	12	29	9	0	0	0	50
ENE	11	15	1	0	0	0	27
E	14	2	0	0	0	0	16
ESE	5	0	0	0	0	0	5
SE	4	0	0	0	0	0	4
SSE	12	2	0	0	0	0	14
S	21	19	0	0	0	0	40
SSW	20	15	0	0	0	0	35
SW	11	24	3	0	0	0	38
WSW	6	13	1	0	0	0	20
W	11	5	1	0	0	0	17
WNW	1	3	0	0	0	0	4
NW	3	3	0	0	0	0	6
NNW	5	9	1	0	0	0	15
VARIABLE							
Total	155	169	16	0	0	0	340
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, 1980

STABILITY CLASS: E

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	29	26	0	0	0	0	55
NNE	29	25	0	0	0	0	54
NE	64	51	2	0	0	0	117
ENE	43	22	0	0	0	0	65
E	32	7	0	0	0	0	39
ESE	27	1	0	0	0	0	28
SE	20	0	0	0	0	0	20
SSE	18	1	0	0	0	0	19
S	44	5	0	0	0	0	49
SSW	69	54	0	0	0	0	123
SW	39	48	3	0	0	0	90
WSW	11	3	0	0	0	0	14
W	19	9	0	0	0	0	28
WNW	10	6	2	0	0	0	18
NW	4	8	3	0	0	0	15
NNW	7	4	0	0	0	0	11
VARIABLE							
Total	465	270	10	0	0	0	745

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: July 1 - September 30, 1980

STABILITY CLASS F

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	0	0	0	0	0	7
NNE	23	0	0	0	0	0	23
NE	64	37	0	0	0	0	101
ENE	46	34	0	0	0	0	80
E	18	1	0	0	0	0	19
ESE	17	0	0	0	0	0	17
SE	9	0	0	0	0	0	9
SSE	16	0	0	0	0	0	16
S	6	0	0	0	0	0	6
SSW	19	0	0	0	0	0	19
SW	10	3	0	0	0	0	13
WSW	6	0	0	0	0	0	6
W	7	0	0	0	0	0	7
WNW	6	1	0	0	0	0	7
NW	3	1	0	0	0	0	4
NNW	4	0	0	0	0	0	4
VARIABLE							
Total	261	77	0	0	0	0	338

Periods of calm (hours): 14
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, 1980

STABILITY CLASS G

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	0	0	0	0	0	2
NNE	3	0	0	0	0	0	3
NE	10	2	0	0	0	0	12
ENE	7	6	0	0	0	0	13
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	1	0	0	0	0	0	1
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	1	0	0	0	0	0	1
WNW	2	0	0	0	0	0	2
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
VARIABLE							
Total	31	8	0	0	0	0	39

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, 1980

STABILITY CLASS: A

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1	12	3	0	0	0	16
NNE	1	9	3	0	0	0	13
NE	0	3	1	0	0	0	4
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	0	0	0	0	0	0	0
SSE	2	0	0	0	0	0	2
S	14	13	0	0	0	0	27
SSW	5	10	1	0	0	0	16
SW	2	7	0	0	0	0	9
WSW	1	2	0	0	0	0	3
W	3	6	0	0	0	0	9
WNW	0	9	0	0	0	0	9
NW	1	13	2	0	0	0	16
NNW	0	4	5	0	0	0	9
VARIABLE							
Total	30	88	15	0	0	0	133

Periods of calm (hours): 0

Hours of missing data: Total Hours of missing data for all stability classes this quarter = 12.

[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 1980

STABILITY CLASS: B

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	2	5	0	0	0	7
NNE	1	12	2	0	0	0	15
NE	0	2	1	0	0	0	3
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	1	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	1	3	0	0	0	0	4
SSW	4	6	0	0	0	0	10
SW	2	3	0	0	0	0	5
WSW	1	2	2	0	0	0	5
W	1	1	0	0	0	0	2
WNW	2	1	1	0	0	0	4
NW	1	5	5	0	0	0	11
NNW	0	6	4	4	0	0	14
VARIABLE							
Total	13	45	20	4	0	0	82

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, 1980

STABILITY CLASS: C

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	4	2	2	0	0	8
NNE	0	10	1	0	0	0	11
NE	1	6	1	0	0	0	8
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	0	0	0	0	0	0	0
SSE	1	0	0	0	0	0	1
S	5	0	0	0	0	0	5
SSW	3	2	0	0	0	0	5
SW	2	2	1	0	0	0	5
WSW	3	3	1	0	0	0	7
W	1	0	0	0	0	0	1
WNW	3	4	1	0	0	0	8
NW	0	10	2	1	0	0	13
NNW	1	11	7	1	1	0	21
VARIABLE							
Total	20	52	16	4	1	0	93

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, 1980

STABILITY CLASS: D

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	10	53	24	4	0	0	91
NNE	16	59	32	3	0	0	110
NE	14	40	3	0	0	0	57
ENE	13	7	0	0	0	0	20
E	8	0	0	0	0	0	8
ESE	3	0	0	0	0	0	3
SE	4	0	0	0	0	0	4
SSE	4	0	0	0	0	0	4
S	15	5	0	0	0	0	20
SSW	12	21	2	0	0	0	35
SW	16	11	2	0	0	0	29
WSW	5	6	4	0	0	0	15
W	11	23	12	0	0	0	46
WNW	10	57	5	1	0	0	73
NW	4	53	41	3	0	0	101
NNW	7	54	43	17	2	0	123
VARIABLE							
Total	152	389	168	28	2	0	739

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, 1980

STABILITY CLASS: E

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	39	27	2	0	0	0	68
NNE	31	33	24	1	0	0	89
NE	49	66	6	1	0	0	122
ENE	44	10	1	0	0	0	55
E	23	0	1	0	0	0	24
ESE	12	0	1	1	0	0	14
SE	18	0	0	0	0	0	18
SSE	22	1	0	0	0	0	23
S	55	19	1	0	0	0	75
SSW	51	61	0	0	0	0	112
SW	30	13	3	0	0	0	46
WSW	25	9	5	0	0	0	39
W	21	13	5	0	0	0	39
WNW	17	37	1	0	0	0	55
NW	10	17	0	0	0	0	27
NNW	28	20	5	0	0	0	53
VARIABLE							
Total	475	326	55	3	0	0	859

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, 1980

STABILITY CLASS: F

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	7	1	0	0	0	0	8
NNE	17	4	1	0	0	0	22
NE	51	10	1	0	0	0	62
ENE	36	12	0	0	0	0	48
E	12	2	0	0	0	0	14
ESE	5	1	0	0	0	0	6
SE	6	0	0	0	0	0	6
SSE	9	1	0	0	0	0	10
S	26	1	0	0	0	0	27
SSW	10	0	0	0	0	0	10
SW	4	0	0	0	0	0	4
WSW	5	0	0	0	0	0	5
W	8	0	0	0	0	0	8
WNW	2	0	0	0	0	0	2
NW	3	0	0	0	0	0	3
NNW	3	0	0	0	0	0	3
VARIABLE							
Total	204	32	2	0	0	0	238

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: October 1 - December 31, 1980

STABILITY CLASS: G

ELEVATION: 10 Meters

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2	0	0	0	0	0	2
NNE	4	1	1	0	0	0	6
NE	6	2	1	0	0	0	9
ENE	9	2	0	0	0	0	11
E	4	0	0	0	0	0	4
ESE	2	0	0	0	0	0	2
SE	1	0	0	0	0	0	1
SSE	4	0	0	0	0	0	4
S	3	0	0	0	0	0	3
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	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	38	6	2	0	0	0	46

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.