Effluent and Waste Disposal

Semi-Annual Report

July 1 - December 31, 1980

Facility Indian Point 3

Licensee Power Authority of the State of New York

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

A. Supplemental Information

1. Regulatory Limits

Indian Point Unit 3 is presently subject to limits on radioactive waste releases that are set forth in sections 2.4 and 3.4 of Appendix B to Docket # 50-286 entitled "Environmental Technical Specification Requirements for Once-Through Cooling" (T.S.). The percent of technical specification limit reported in Table 1A and the percent of applicable limit reported in Table 2A are the percent of one half 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 $\bar{K}$, $\bar{L}$, $\bar{M}$, $\bar{N}$ values for vent release points are based on the isotopic concentrations reported in Table 1C and on the individual isotopic K, L, M, N values in Table 2.4-5 of the ETSR. The percent of permissible discharges reported for IP-3 are based on assuming that IP-3 can use only 50% of the T.S. limits measured in Curies/ second and detailed in Memorandum of Understanding between PASNY and Con Edison.

b&c. Iodines & Pariculates

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

d. Liquid Effluents

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

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

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

3. Average Energy

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

3rd Quarter:	$\bar{E}\gamma$ = 5.84 E-2 MeV/dis	$\bar{E}\beta$ = 1.60 E-1 MeV/dis
4th Quarter:	$\bar{E}\gamma$ = 4.99 E-2 MeV/dis	$\bar{E}\beta$ = 1.53 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 release) the total activity discharged is based on an isotopic analysis of each batch and the volume of gas in the batch corrected to standard temperature and pressure.

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

The continuous discharges are based on weekly samples of ventilation air for isotopic content. This information is combined with total air volume discharged by this route. The batch and containment ventilation releases are then used to determine continuous discharges.

b&c Iodines and Particulates

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

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

d. Liquid Effluents

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

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

5. Batch Releases

a. Liquid

	1980	
	3rd Quarter	4th Quarter
Number of Batch Releases	72	62
Total Time Period Batch Releases (Min.)	13,254	19,084
Maximum " " " " "	410	850
Average " " " " "	186	314
Minimum " " " " "	20	110
Average Stream Flow (cfs)	8870	9327

b. Gaseous

Number of Batch Releases	49	25
Total Time Period Batch Releases	10,500	14,270
Maximum " " " "	1,217	6,725
Average " " " "	219	637
Minimum " " " "	51	8

6. Abnormal Releases

a. Liquid
None

b. Gaseous

3rd Quarter, 3 abnormal releases
2.73 Curies total activity released

Indian Point 3

EFFLUENT AND WASTE DISPOSAL

SEMI - ANNUAL REPORT

B. GASEOUS EFFLUENTS
THIRD AND FOURTH
QUARTERS, 1980

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

GASEOUS EFFLUENTS–SUMMATION OF ALL RELEASES

	Unit	Quarter 3rd	Quarter 4th	Est. Total Error, %
A. Fission & activation gases				
1. Total release	Ci	2.58 E+2	7.73 E+2	2.5 E+1
2. Average release rate for period	μCi/sec	3.25 E+1	9.72 E+1	
3. Percent of Technical specification limit	%	9.59 E-1	2.73 E0	
B. Iodines				
1. Total iodine-131	Ci	7.13 E-4	1.08 E-2	2.5 E+1
2. Average release rate for period	μCi/sec	8.97 E-5	1.36 E-3	
3. Percent of technical specification limit	%	7.62 E-2	1.03 E0	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	7.99 E-4	1.08 E-2	2.5 E+1
2. Average release rate for period	μCi/sec	1.01 E-4	1.36 E-3	
3. Percent of technical specification limit	%	7.62 E-2	1.03 E0	
4. Gross alpha radioactivity	Ci	<1.13 E-7	<1.49 E-7	
D. Tritium				
1. Total release	Ci	2.37 E0	2.55 E0	2.5 E+1
2. Average release rate for period	μCi/sec	2.98 E-1	3.21 E-1	
3. Percent of technical specification limit	%	E	E	

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

GASEOUS EFFLUENTS-GROUND-LEVEL RELEASES

Nuclides Released	Unit	CONTINOUS MODE		BATCH MODE	
		3rd Quarter	4th Quarter	3rd Quarter	4th Quarter
1. Fission Gases					
krypton - 85	Ci	4.01 E -2	8.57 E-2	4.84 E 0	6.24 E 0
krypton - 85m	Ci	2.27 E -2	9.87 E-1	2.33 E -1	9.80 E-3
krypton - 87	Ci	. E	. E	4.81 E -1	. E
krypton - 88	Ci	. E	. E	4.23 E -1	5.46 E-3
xenon - 133	Ci	1.37 E +1	2.93 E+1	2.20 E +2	6.99 E+2
xenon - 133m	Ci	. E	. E	3.23 E.0	8.50 E 0
xenon - 135	Ci	2.26 E 0	7.76 E 0	5.58 E 0	4.96 E 0
xenon - 135m	Ci	. E	. E	2.51 E -1	. E
xenon - 138	Ci	. E	. E	6.23 E -1	. E
xenon - 131m	Ci	. E	. E	5.02 E 0	1.63 E+1
	Ci	. E	. E	. E	. E
unidentified	Ci	0.00 E0	. E	0.00 E 0	. E
Total for period	Ci	1.60 E+1	3.81 E+1	2.41 E +2	7.35 E+2
2. Iodines					
iodine - 131	Ci	7.13 E -4	1.08 E-2	. E	. E
iodine - 133	Ci	8.72 E -4	. E	. E	. E
iodine - 135	Ci	. E	. E	. E	. E
Total for period	Ci	1.59 E -3	. E	. E	. E
3. Particulates					
strontium - 89	Ci	. E	. E	. E	. E
strontium - 90	Ci	. E	. E	. E	. E
cesium - 134	Ci	. E	1.45 E-7	. E	. E
cesium - 137	Ci	1.90 E-6	8.90 E-6	. E	. E
barium-lanthanum - 140	Ci	E	. E	. E	. E
cobalt - 60	Ci	1.54 E-5	1.18 E-6	. E	. E
cobalt - 58	Ci	2.73 E-6	1.86 E-6	. E	. E
iron - 55	Ci	6.39 E-6	1.13 E-5	. E	. E
nickel - 63	Ci	4.52 E-6	1.42 E-6	. E	. E
phosphorus - 32	Ci	2.36 E-7	. E	. E	. E
cerium - 141	Ci	6.21 E-8	3.81 E-6	. E	. E
cerium - 144	Ci	. E	5.82 E-6	. E	. E
neptunium - 239	Ci	2.95 E-6	1.19 E-6	. E	. E
manganese - 54	Ci	. E	2.18 E-7	. E	. E
tin - 113	Ci	. E	. E	. E	. E
barium 133	Ci	9.13 E-7	2.45 E-7	. E	. E
zirconium 99	Ci	1.01 E-5	. E	. E	. E
cobalt 57	ci	2.18 E-7			
cadmium 109	ci	2.42 E-6			
chromium 51	ci	3.59 E-5	3.17 E-6		
antimony 122	ci	1.91 E-6			
cerium 139	ci	4.31 E-8			
mercury 203	ci	1.79 E-7	1.47 E-7		
Strontium 85	ci		2.56 E-7		

Indian Point 3

EFFLUENT AND WASTE DISPOSAL

SEMI - ANNUAL REPORT

C. LIQUID EFFLUENTS
THIRD AND FOURTH
QUARTERS, 1980

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

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	5.76 E-1	1.04E0	2.5 E+1
2. Average diluted concentration during period	μCi/ml	1.42 E-9	6.84 E-9	
3. Percent of applicable limit	%	3.31 E-2	7.48 E-2	
B. Tritium				
1. Total release	Ci	1.75 E+2	8.42 E+1	2.5 E+1
2. Average diluted concentration during period	μCi/ml	4.31 E-7	5.54 E-7	
3. Percent of applicable limit	%	1.44 E-2	1.85 E-2	
C. Dissolved and entrained gases				
1. Total release	Ci	8.43 E-1	6.25 E-1	2.5 E+1
2. Average diluted concentration during period	μCi/ml	2.08 E-9	4.11 E-9	
3. Percent of applicable limit	%	8.16 E-5	1.61 E-4	
D. Gross alpha radioactivity				
1. Total release	Ci	5.92 E-4	4.58 E-4	2.5 E+1
E. Volume of waste released (prior to dilution)	liters	4.84 E+6	4.13 E+6	1.0 E+1
F. Volume of dilution water used during period	liters	4.06 E+1	1.52 E+11	1.0 E+1

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMINANNUAL REPORT (YEAR)

LIQUID EFFLUENTS

NUCLIDES RELEASED	UNIT	CONTINUOUS MODE 3rd Quarter	CONTINUOUS MODE 4th Quarter	BATCH MODE 3rd Quarter	BATCH MODE 4th Quarter
strontium - 89	ci	. E	. E	2.68 E -4	4.63 E -4
Strontium - 90	ci	. E	. E	1.84 E -4	1.90 E -3
cesium - 134	ci	. E	. E	1.55 E -1	9.87 E -2
cesium - 137	ci	. E	. E	2.56 E -1	1.61 E -1
iodine - 131	ci	. E	. E	3.03 E -2	2.46 E -2
cobalt - 58	ci	. E	. E	2.20 E -2	2.42 E -1
cobalt - 60	ci	. E	. E	7.55 E -3	9.48 E -2
iron - 59	ci	. E	. E	1.12 E -3	4.37 E -3
zinc - 65	ci	. E	. E	3.58 E -4	6.94 E -4
manganese - 54	ci	. E	. E	1.13 E -3	9.73 E -3
chromium - 51	ci	. E	. E	5.04 E -3	2.98 E -2
zirconium-niobium - 95	ci	. E	. E	3.97 E -4	4.75 E -3
molybdenum - 99	ci	. E	. E	1.70 E -3	4.29 E -3
technetium - 99m	ci	. E	. E	2.09 E -4	5.64 E -3
barium-lanthanum - 140	ci	. E	. E	1.71 E -3	2.9 E -3
cerium - 141	ci	. E	. E	4.73 E -4	9.44 E -4
sodium - 24	ci	. E	. E	6.17 E -3	4.24 E -4
iron - 55	ci	. E	. E	2.02 E -2	1.54 E -1
nickel - 63	ci	. E	. E	8.58 E -3	4.65 E -2
manganese - 56	ci	. E	. E	9.21 E -6	8.07 E -6
antimony - 122	ci	. E	. E	1.58 E -2	1.14 E -2
antimony - 124	ci	. E	. E	4.32 E -3	1.18 E -2
antimony - 125	ci	. E	. E	8.02 E -3	2.11 E -2
silver - 110m	ci	. E	. E	2.26 E -5	1.28 E -2
niobium - 97	ci	. E	. E	7.79 E -5	1.6 E -2
tungsten - 187	ci	. E	. E	. E	. E
ruthenium - 103	ci	. E	. E	. E	4.82 E -5
phosphorus - 32	ci	. E	. E	1.72 E -2	4.31 E -2
cerium - 144	ci	. E	. E	9.41 E -5	. E
cerium - 139	ci	. E	. E	2.49 E -5	4.49 E -4
zirconium - 97	ci	. E	. E	1.42 E -5	. E
yttrium - 92	ci	. E	. E	2.06 E -4	. E
mercury - 203	ci	. E	. E	8.99 E -6	. E
rhodium - 106	ci	. E	. E	1.08 E -4	1.21 E -3
cesium - 136	ci	. E	. E	3.84 E -3	1.83 E -2
strontium - 92	ci	. E	. E	7.60 E -3	6.34 E -4
strontium - 85	ci	. E	. E	3.11 E -5	1.67 E -5
iodine - 133	ci	. E	. E	2.27 E -4	. E
tin - 113	ci	. E	. E	. E	5.37 E -5
cobalt - 57	ci	. E	. E	6.32 E -6	3.24 E -4
yttrium - 91m	ci	. E	. E	. E	4.09 E -5
barium - 133	ci	. E	. E	4.13 E -6	4.92 E -5
cadmium - 109	Ci	. E	. E	. E	1.8 E -2
cesium - 138	ci	. E	. E	. E	7.82 E -5
Total for period (above)	ci	. E	. E	5.76 E -1	1.04 E 0
Unidentified	ci	. E	. E	. E	. E
Xenon - 133	ci	. E	. E	8.34 E -1	6.22 E -1
Xenon - 135	ci	. E	. E	9.10 E -3	2.93 E -3

Indian Point 3

EFFLUENT AND WASTE DISPOSAL

SEMI - ANNUAL REPORT

D. SOLID WASTE
THIRD AND FOURTH
QUARTERS, 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	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	6.50E+1	
	Ci	1.73E+2	1.0 E+2
b. Dry compressible waste, contaminated equip, etc.	m^3	6.4 E+1	
	Ci	2.08E+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. Cobalt-58	%	2.1 E+1
Cobalt-60	%	1.7 E+1
Cesium-134	%	1.9 E+1
Cesium-137	%	2.7 E+1
Ruthenium-106	%	1.6 E+1
	%	. E
b. Cobalt-58	%	5.0 E+0
Cobalt-60	%	1.6 E+1
Cesium-134	%	2.3 E+1
Cesium-137	%	5.2 E+1
Manganese-54	%	4.0 E+0
	%	. E

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
20	Truck	Barnwell, South Carolina
1	Truck	Richland, Washington

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None		

Indian Point 3

EFFLUENT AND WASTE DISPOSAL

SEMI - ANNUAL REPORT

E. RADIOLOGIAL IMPACT ON MAN
THIRD AND FOURTH
QUARTERS, 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. 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 Unit 3

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	.128	.297		
b) Continuous Releases	.0408	.107		
Inhalation*	4.36×10^{-3}	-	3.51×10^{-2}	1.88×10^{-2}
Ground Deposition	2.21×10^{-4}	2.63×10^{-4}	-	-
Milk Ingestion*	3.73×10^{-3}	-	9.77×10^{-3}	1.74×10^{-2}
Meat Ingestion***	5.71×10^{-4}	-	6.03×10^{-4}	2.85×10^{-3}
Vegetable Ingestion***	1.73×10^{-2}	-	7.95×10^{-2}	8.58×10^{-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

Pathways (Gaseous)	Total Body (man-rem)	Thyroid (man-thyroid rem)
Noble Gas Immersion		
a) Batch Release	2.19	
b) Continuous Release	1.83	
Inhalation	.206	1.56
Ground Deposition	4.99×10^{-3}	
Totals	4.231	1.56

Pathways (Liquid)	
All	See attached "LADTAP" printout Attachment I

C. Average Doses to Individuals

1. Liquid-Total Body
   6.26×10^{-4}mr

2. Gaseous-Total Body
   2.227×10^{-4}mr

* * * AS LOW AS REASONAB[illegible]IEVABLE * * *

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		5.98E+00	1.18E+00	8.18E-01	7.44E-03	2.77E-01	9.42E-02	6.36E-01
INVERTEBRATE		2.74E-01	5.04E-02	2.40E-02	6.16E-04	5.04E-03	2.25E-02	5.66E-02
ALGAE		1.31E-05	9.31E-07	5.86E-07	9.33E-09	3.41E-08	4.84E-08	1.49E-06
DRINKING		1.96E-12	2.94E-12	2.41E-12	2.51E-12	1.49E-12	1.33E-12	1.20E-12
SHORELINE	3.01E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03
SWIMMING	0.0	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05
BOATING	0.0	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05
TOTAL	3.01E-03	6.26E+00	1.23E+00	8.45E-01	1.07E-02	2.85E-01	1.19E-01	6.95E-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		4.68E+00	1.09E+00	4.99E-01	6.55E-03	2.11E-01	1.08E-01	4.83E-01
INVERTEBRATE		2.10E-01	4.07E-02	1.70E-02	5.34E-04	3.83E-03	1.75E-02	4.27E-02
ALGAE		1.32E-05	9.62E-07	5.69E-07	1.08E-08	3.41E-08	5.40E-08	1.49E-06
DRINKING		2.48E-12	3.40E-12	1.90E-12	2.62E-12	1.49E-12	1.27E-12	9.99E-13
SHORELINE	4.03E-03	3.45E-03	3.45E-03	3.45E-03	3.45E-03	3.45E-03	3.45E-03	3.45E-03
SWIMMING	0.0	5.90E-05	5.90E-05	5.90E-05	5.90E-05	5.90E-05	5.90E-05	5.90E-05
BOATING	0.0	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05
TOTAL	4.03E-03	4.89E+00	1.14E+00	5.20E-01	1.06E-02	2.19E-01	1.29E-01	5.30E-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		2.42E+00	8.38E-01	2.00E-01	6.74E-03	9.12E-02	8.39E-02	2.08E-01
INVERTEBRATE		9.96E-02	2.28E-02	7.70E-03	5.67E-04	1.71E-03	8.30E-03	1.90E-02
ALGAE		1.33E-02	1.10E-03	5.68E-04	2.59E-05	3.41E-05	6.76E-05	1.49E-03
DRINKING		5.72E-09	6.65E-09	2.51E-09	5.95E-09	1.49E-09	2.13E-09	1.56E-09
SHORELINE	8.42E-04	7.20E-04	7.20E-04	7.20E-04	7.20E-04	7.20E-04	7.20E-04	7.20E-04
SWIMMING	0.0	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05
BOATING	0.0	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05
TOTAL	8.42E-04	2.53E+00	8.62E-01	2.09E-01	8.10E-03	9.37E-02	9.30E-02	2.29E-01

	GE (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		2.23E-01	1.30E-01	1.36E-02	1.17E-03	6.61E-03	1.44E-02	1.51E-02
INVERTEBRATE		6.38E-03	2.04E-03	4.64E-04	7.94E-05	1.01E-04	5.72E-04	1.12E-03
ALGAE		1.36E-05	1.44E-06	5.70E-07	6.23E-08	3.41E-08	1.09E-07	1.49E-06
DRINKING		1.09E-11	1.42E-11	3.21E-12	1.32E-11	1.49E-12	3.60E-12	2.19E-12
SHORELINE	1.80E-04	1.54E-04	1.54E-04	1.54E-04	1.54E-04	1.54E-04	1.54E-04	1.54E-04
SWIMMING	0.0	5.90E-12	5.90E-12	5.90E-12	5.90E-12	5.90E-12	5.90E-12	5.90E-12
BOATING	0.0	1.47E-07	1.47E-07	1.47E-07	1.47E-07	1.47E-07	1.47E-07	1.47E-07
TOTAL	1.80E-04	2.29E-01	1.32E-01	1.42E-02	1.41E-03	6.86E-03	1.51E-02	1.64E-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

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		4.22E+00	8.37E-01	5.82E-01	5.20E-03	1.98E-01	6.73E-02	4.49E-01
INVERTEBRATE		1.93E-01	3.59E-02	1.71E-02	4.31E-04	3.60E-03	1.61E-02	4.01E-02
ALGAE		9.27E-06	6.58E-07	4.14E-07	6.52E-09	2.43E-08	3.45E-08	1.05E-06
DRINKING		1.44E-10	2.11E-10	1.73E-10	2.27E-10	1.07E-10	9.50E-11	8.66E-11
SHORELINE	2.15E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03
SWIMMING	0.0	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05
BOATING	0.0	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05
TOTAL	2.15E-03	4.42E+00	8.74E-01	6.01E-01	7.51E-03	2.04E-01	8.52E-02	4.91E-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

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		3.31E+00	7.79E-01	3.55E-01	4.58E-03	1.51E-01	7.70E-02	3.41E-01
INVERTEBRATE		1.48E-01	2.90E-02	1.21E-02	3.74E-04	2.74E-03	1.25E-02	3.03E-02
ALGAE		9.29E-06	6.80E-07	4.02E-07	7.57E-09	2.43E-08	3.85E-08	1.05E-06
DRINKING		1.81E-10	2.44E-10	1.36E-10	2.43E-10	1.07E-10	9.08E-11	7.22E-11
SHORELINE	2.88E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03
SWIMMING	0.0	4.14E-05	4.14E-05	4.14E-05	4.14E-05	4.14E-05	4.14E-05	4.14E-05
BOATING	0.0	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05
TOTAL	2.88E-03	3.46E+00	8.11E-01	3.70E-01	7.48E-03	1.56E-01	9.20E-02	3.74E-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

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.71E+00	5.97E-01	1.42E-01	4.71E-03	6.51E-02	5.99E-02	1.47E-01
INVERTEBRATE		7.03E-02	1.62E-02	5.47E-03	3.96E-04	1.22E-03	5.93E-03	1.35E-02

ALGAE		9.41E-03	7.75E-04	4.[illegible]	1.81E-05	2.43E-05	4.82E-05	1.05E-03
DRINKING		4.13E-07	4.77E-07	1.8[illegible]	5.59E-07	1.07E-07	1.53E-07	1.13E-07
SHORELINE	6.01E-04	5.14E-04	5.14E-04	5.14E-04	5.14E-04	5.14E-04	5.14E-04	5.14E-04
SWIMMING	0.0	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05
BOATING	0.0	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05
TOTAL	6.01E-04	1.79E+00	6.15E-01	1.48E-01	5.67E-03	6.69E-02	6.64E-02	1.62E-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

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		1.58E-01	9.26E-02	9.64E-03	8.20E-04	4.72E-03	1.03E-02	1.06E-02
INVERTEBRATE		4.51E-03	1.45E-03	3.30E-04	5.55E-05	7.20E-05	4.09E-04	7.94E-04
ALGAE		9.59E-06	1.02E-06	4.03E-07	4.35E-08	2.43E-08	7.80E-08	1.05E-06
DRINKING		7.84E-10	1.02E-09	2.31E-10	1.27E-09	1.07E-10	2.57E-10	1.57E-10
SHORELINE	1.29E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04
SWIMMING	0.0	4.14E-12	4.14E-12	4.14E-12	4.14E-12	4.14E-12	4.14E-12	4.14E-12
BOATING	0.0	1.04E-07	1.04E-07	1.04E-07	1.04E-07	1.04E-07	1.04E-07	1.04E-07
TOTAL	1.29E-04	1.63E-01	9.41E-02	1.01E-02	9.86E-04	4.90E-03	1.06E-02	1.16E-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 POPULAT[redacted]OSES * * *
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	1.11E+01	2.63E+00	1.85E+00	1.09E-02	6.68E-01	2.27E-01	1.17E+00
FISH	TEENAGER	1.16E+04	1.84E+00	5.21E-01	2.32E-01	2.01E-03	1.07E-01	5.46E-02	1.86E-01
FISH	CHILD	7.00E+03	1.40E+00	5.75E-01	1.29E-01	2.89E-03	6.46E-02	5.95E-02	1.12E-01
FISH	TOTAL	9.10E+04	1.44E+01	3.72E+00	2.21E+00	1.58E-02	8.39E-01	3.41E-01	1.46E+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 POPULAT[illegible]OSES * * *
MAN-REM

COMMERCIAL HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	8.65E+07	4.12E+01	1.07E+01	7.53E+00	3.59E-02	2.80E+00	9.55E-01	4.27E+00
FISH	TEENAGER	1.38E+07	6.85E+00	2.13E+00	9.40E-01	6.58E-03	4.48E-01	2.29E-01	6.79E-01
FISH	CHILD	8.36E+06	5.33E+00	2.38E+00	5.21E-01	9.45E-03	2.71E-01	2.50E-01	4.09E-01
FISH	TOTAL	1.09E+08	5.34E+01	1.52E+01	8.99E+00	5.19E-02	3.52E+00	1.43E+00	5.35E+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

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	1.23E+05	1.67E+01	4.33E+00	3.05E+00	1.45E-02	1.14E+00	3.87E-01	1.73E+00
FISH	TEENAGER	1.97E+04	2.77E+00	8.63E-01	3.80E-01	2.66E-03	1.81E-01	9.28E-02	2.75E-01
FISH	CHILD	1.19E+04	2.16E+00	9.64E-01	2.11E-01	3.83E-03	1.10E-01	1.01E-01	1.66E-01
FISH	TOTAL	1.55E+05	2.16E+01	6.15E+00	3.64E+00	2.10E-02	1.43E+00	5.81E-01	2.17E+00

* * * INVERTEBRATE CONSUMPTI[redacted]ULATION 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	2.32E-01	5.14E-02	2.39E-02	4.27E-04	5.58E-03	2.50E-02	5.44E-02
INVER	TEENAGER	1.26E+03	3.74E-02	8.74E-03	3.50E-03	7.66E-05	8.87E-04	4.07E-03	8.61E-03
INVER	CHILD	7.94E+02	2.53E-02	6.98E-03	2.23E-03	1.14E-04	5.58E-04	2.71E-03	5.38E-03
INVER	TOTAL	1.00E+04	2.95E-01	6.72E-02	2.96E-02	6.17E-04	7.02E-03	3.17E-02	6.84E-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 CONSUMPTIO LATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	1.25E+07	1.39E-01	3.40E-02	1.56E-02	2,33E-04	3.81E-03	1.71E-02	3.49E-02
INVER	TEENAGER	1.99E+06	2.25E-02	5.78E-03	2.27E-03	4.14E-05	6.06E-04	2.79E-03	5.52E-03
INVER	CHILD	1.25E+06	1.54E-02	4.66E-03	1.45E-03	6.12E-05	3.81E-04	1.86E-03	3.45E-03
INVER	TOTAL	1.58E+07	1.77E-01	4.44E-02	1.93E-02	3.35E-04	4.80E-03	2.17E-02	4.39E-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

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	7.94E+02	2.03E-02	4.95E-03	2.27E-03	3.39E-05	5.55E-04	2.49E-03	5.09E-03
INVER	TEENAGER	1.26E+02	3.27E-03	8.42E-04	3.31E-04	6.03E-06	8.83E-05	4.06E-04	8.04E-04
INVER	CHILD	7.94E+01	2.24E-03	6.78E-04	2.11E-04	8.92E-06	5.55E-05	2.71E-04	5.03E-04
INVER	TOTAL	1.00E+03	2.58E-02	6.47E-03	2.81E-03	4.88E-05	6.99E-04	3.17E-03	6.40E-03

* * * POPULATION WATER CONSU[illegible] DOSES * * *

DOSE (MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
DRINKING	ADULT	2.44E+02	1.92E-08	1.02E-08	7.39E-09	1.65E-10	3.37E-09	1.23E-09	5.22E-10
DRINKING	TEENAGER	3.64E+01	3.38E-09	1.97E-09	8.67E-10	1.94E-11	5.03E-10	2.66E-10	7.72E-11
DRINKING	CHILD	5.20E+01	9.17E-09	5.75E-09	1.31E-09	5.32E-11	7.18E-10	7.05E-10	1.35E-10
DRINKING	TOTAL	3.33E+02	3.18E-08	1.80E-08	9.57E-09	2.37E-10	4.60E-09	2.20E-09	7.34E-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	3.18E-08	1.80E-08	9.57E-09	2.37E-10	4.60E-09	2.20E-09	7.34E-10

HYDROSPHERE TRITIUM DOSE

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
WATER	TOTAL	2.20E+00	2.71E-03	2.71E-03	2.71E-03	2.71E-03	2.71E-03	2.71E-03	2.71E-03

* * * RECREATION POPULATIO[illegible]ES * * *

		DOSE(MAN-REM)			
PATHWAY	AGE GROUP	USAGE	SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	1.66E+07	7.13E-01	6.10E-01	6.10E-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	6.92E-03	6.92E-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	3.46E-03	3.46E-03

LOCATION- DOWNSTREAM

DILUTION=0.70E+01 TRANSIT TIME=0.40E+01 HR

---

* * OSE TO BIOTA * * *
MRADS PER YEAR

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

	INTERNAL	EXTERNAL	TOTAL
FISH	1.44E+01	1.61E+00	1.60E+01
INVERTEBRATE	2.92E+00	3.22E+00	6.15E+00
ALGAE	6.62E+01	3.65E-03	6.62E+01
MUSKRAT	1.04E+02	1.07E+00	1.05E+02
RACCOON	1.26E+00	8.05E-01	2.07E+00
HERON	6.59E+01	1.07E+00	6.70E+01
DUCK	1.04E+02	1.61E+00	1.05E+02

* * * COST-BENEFIT ANALYSIS * * *

NUCLIDE	RELEASE	MAN-REM DOSE		MAN-REM PER CURIE	
	CI/YR	TOTAL BODY	THYROID	TOTAL BODY	THYROID
1H 3	2.59E+02	2.57E-03	2.57E-03	9.93E-06	9.93E-06
38SR 89	7.31E-04	2.00E-05	1.05E-08	2.73E-02	1.44E-05
38SR 90	2.08E-03	1.17E-02	3.14E-09	5.65E+00	1.51E-06
55CS 134	2.54E-01	4.65E+00	1.27E-01	1.83E+01	5.00E-01
55CS 137	4.17E-01	4.69E+00	3.10E-01	1.13E+01	7.44E-01
53I 131	5.49E-02	3.11E-04	6.63E-02	5.66E-03	1.21E+00
27CO 58	2.64E-01	1.08E-02	8.60E-03	4.10E-02	3.26E-02
27CO 60	1.02E-01	1.62E-01	1.59E-01	1.59E+00	1.56E+00
26FE 59	5.49E-03	4.57E-04	1.41E-04	8.32E-02	2.57E-02
30ZN 65	1.05E-03	1.38E-03	5.92E-05	1.31E+00	5.64E-02
25MN 54	1.09E-02	3.77E-03	1.13E-03	3.46E-01	1.04E-01
24CR 51	3.48E-02	1.83E-05	1.76E-05	5.25E-04	5.07E-04
40ZR 95	5.15E-03	1.15E-04	1.15E-04	2.23E-02	2.23E-02
42MO 99	5.99E-03	9.60E-06	9.21E-06	1.60E-03	1.54E-03
43TC 99M	5.85E-03	2.53E-06	2.53E-06	4.33E-04	4.33E-04
56BA 140	4.61E-03	1.72E-05	1.30E-05	3.74E-03	2.82E-03
58CE 141	1.42E-03	1.91E-06	1.91E-06	1.34E-03	1.34E-03
11NA 24	6.59E-03	1.24E-04	1.24E-04	1.89E-02	1.89E-02
26FE 55	1.74E-01	2.13E-02	3.12E-08	1.22E-01	1.79E-07
28NI 63	5.51E-02	1.95E-03	0.0	3.55E-02	0.0
25MN 56	1.73E-05	5.32E-08	5.32E-08	3.08E-03	3.08E-03
51SB 124	1.61E-02	8.57E-04	8.55E-04	5.32E-02	5.31E-02
51SB 125	2.91E-02	4.90E-03	4.89E-03	1.68E-01	1.68E-01
47AG 110M	1.28E-02	3.36E-03	3.36E-03	2.63E-01	2.63E-01
41NB 97	1.61E-02	5.66E-06	5.66E-06	3.52E-04	3.52E-04
44RU 103	4.82E-05	5.04E-07	4.98E-07	1.05E-02	1.03E-02
15P 32	6.03E-02	2.26E+00	1.07E-06	3.75E+01	1.78E-05
58CE 144	9.41E-05	5.01E-07	4.92E-07	5.33E-03	5.23E-03
40ZR 97	1.42E-05	5.32E-08	5.32E-08	3.74E-03	3.74E-03
39Y 92	2.06E-04	1.22E-07	1.22E-07	5.94E-04	5.94E-04
55CS 136	2.21E-02	3.95E-02	4.86E-04	1.79E+00	2.20E-02
38SR 92	8.23E-03	2.17E-05	2.17E-05	2.63E-03	2.63E-03
53I 133	2.27E-04	5.69E-07	7.31E-07	2.51E-03	3.22E-03
27CO 57	3.30E-04	5.09E-06	4.66E-06	1.54E-02	1.41E-02
39Y 91M	4.09E-05	4.06E-09	4.06E-09	9.94E-05	9.94E-05
55CS 138	7.82E-05	5.06E-09	5.06E-09	6.47E-05	6.47E-05
TOTAL		1.19E+01	6.85E-01		

Indian Point 3

Effluent and Waste Disposal

Semi - Annual Report

F. Meteorological Data
Third and Fourth
Quarters, 1980

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	9	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.