March 1, 1987

Re: Indian Point Unit Nos. 1 and 2
Docket Nos. 50-3 and 50-247

SEMI-ANNUAL

EFFLUENT AND WASTE DISPOSAL REPORT

JULY 1, 1986 - DECEMBER 31, 1986

FACILITY: Indian Point Station (Units 1 and 2)

LICENSEE: Consolidated Edison Company of New York, Inc.

This information is provided pursuant to 10 CFR 50.36a(a)(2), and employs certain guidance as set forth in Regulatory Guide 1.21, Revision 1. The numbered sections of this part of the report reference corresponding sections of the subject Regulatory Guide, pages 1.21-10 through 1.21-12. This Semi-Annual Effluent and Waste Disposal Report for Indian Point Units 1 and 2 covers discharges for the third and fourth quarters of 1986. The New York Power Authority, licensee of Indian Point Unit 3, has chosen to issue a separate semi-annual report.

A. Supplemental Information

1. Regulatory Limits

Indian Point Units 1 and 2 are presently subject to radioactive waste release specifications that are set forth in Sections 3.9 and 4.10 of Appendix A to Facility Operating Licenses DPR-5 and DPR-26 entitled "Technical Specifications and Bases".

2. Maximum Permissible Concentrations

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. 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.

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The tritium limit has been established in the same manner as the other isotopes in liquid effluents. A derived MPC of $2x10^{-4}$ uCi/ml for dissolved noble gases has been conservatively adopted for the swimming pathway.

3. Average Energy

The average energy (E) of the radionuclide mixture in releases of fission and activation gases for the third quarter was .062 Mev/Dis. for $\bar{E}_\gamma$ and .202 Mev/Dis. for $\bar{E}_\beta$. The corresponding values for the fourth quarter were .068 Mev/Dis. and .205 Mev/Dis., respectively.

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 4.10-3 of the Technical Specifications. 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 week and this is applied to 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.

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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 obtained as required by Table 4.10-3 of the Technical Specifications, 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 by a monthly 24 hour composite sample. This ensures the proper identification of the short-lived I-133 & I-135 isotopes.

d. Liquid Effluents

A sample of each batch discharge is taken and an isotopic analysis is performed in compliance with requirements specified in Table 4.10-1 of the Technical Specifications. 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 4.10-1 of the Technical Specifications. This concentration data is combined with the volume discharged to calculate the total activity discharged.

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5. Batch Releases:

	1986	
a. Liquid	3rd Qtr.	4th Qtr.
Number of Batch Releases	47	34
Total Time Period Batch Release (Minutes)	1.03E+5	2.22E+5
Maximum Time Period Batch Release (Minutes)	4.31E+4	4.46E+4
Average Time Period Batch Release (Minutes)	2.20E+3	6.52E+3
Minimum Time Period Batch Release (Minutes)	5.50E+1	6.90E+1
Average Stream Flow (L/Minute)	4.88E+6	3.90E+7
b. Gaseous		
Number of Batch Release	55	35
Total Time Period Batch Release (Minutes)	5.25E+5	5.30E+5
Maximum Time Period Batch Release (Minutes)	1.32E+5	1.32E+5
Average Time Period Batch Release (Minutes)	9.54E+3	1.52E+4
Minimum Time Period Batch Release (Minutes)	1.10E+2	5.00E+1

6. ABNORMAL RELEASES

a. Liquid - None

b. Gaseous - None

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B - GASEOUS EFFLUENTS

SECOND HALF - 1986

CONSOLIDATED EDISON CO. OF NEW DATE OF REPORT: FEB. 24, 1987
INDIAN POINT UNITS 1 & 2 PREPARED BY: CON EDISON
QUARTER 1 : START DATE 86070101 END DATE 86093024
QUARTER 2 : START DATE 86100101 END DATE 86123124

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS -- SUMMATION OF ALL RELEASES

	UNITS	QUARTER 3	QUARTER 4	EST. TOTAL ERROR, %
A. FISSION AND ACTIVATION GASES				
1. TOTAL RELEASE	CI	1.83E 02	1.35E 02	5.00E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	2.30E 01	1.70E 01	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	N.A	N.A	
B. IODINES				
1. TOTAL IODINE-131	CI	1.11E-03	3.17E-04	5.00E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	1.39E-04	3.99E-05	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	N.A.	N.A.	
C. PARTICULATES				
1. PARTICULATES WITH HALF-LIVES >8 DAYS	CI	2.00E 00	2.01E 00	5.00E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	2.52E-01	2.53E-01	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	N.A.	N.A.	
4. GROSS ALPHA RADIOACTIVITY	CI	0.00E 00	0.00E 00	
D. TRITIUM				
1. TOTAL RELEASE	CI	9.71E-01	5.18E-01	5.00E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	1.22E-01	6.52E-02	
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	N.A.	N.A.	

CONSOLIDATED EDISON CO. OF NEW
INDIAN POINT UNITS 1 & 2

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR ALL RELEASE POINTS

QUARTER 1 : START DATE 86070101 END DATE 86093024
QUARTER 2 : START DATE 86100101 END DATE 86123124
DATE OF REPORT: FEB. 24, 1987
PREPARED BY: CON EDISON

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
1. FISSION AND ACTIVATION GASES					
H3	CI	9.70E-01	5.18E-01	1.79E-03	0.00E 00
AR41	CI	2.57E-02	8.08E-02	0.00E 00	0.00E 00
KR85M	CI	2.60E-02	8.67E-02	0.00E 00	0.00E 00
KR87	CI	6.76E-03	4.09E-02	0.00E 00	0.00E 00
KR88	CI	3.60E-02	1.43E-01	0.00E 00	0.00E 00
XE133M	CI	2.68E-02	6.27E-02	2.79E-02	2.35E-01
XE133	CI	1.59E 02	9.82E 01	1.20E 01	2.36E 01
XE135M	CI	2.75E-01	8.27E-01	0.00E 00	0.00E 00
XE135	CI	1.12E 01	1.18E 01	1.32E-01	4.75E-02
TOTAL FOR PERIOD (ABOVE)	CI	1.72E 02	1.12E 02	1.21E 01	2.40E 01

EFFLUENT AND WASTE DISPOSAL REPORT

GASEOUS EFFLUENTS FOR ALL RELEASE POINTS

QUARTER 1 : START DATE 86070101 END DATE 86093024
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DATE OF REPORT: FEB. 24, 1987
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		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
2. IODINES					
I131	CI	1.10E-03	3.17E-04	2.12E-06	0.00E 00
I133	CI	1.89E-03	8.93E-04	0.00E 00	0.00E 00
TOTAL FOR PERIOD (ABOVE)	CI	2.99E-03	1.21E-03	2.12E-06	0.00E 00
3. PARTICULATES					
C14	CI	2.00E 00	2.00E 00	0.00E 00	0.00E 00
CO58	CI	2.37E-05	0.00E 00	0.00E 00	0.00E 00
CO60	CI	6.90E-05	3.50E-05	0.00E 00	0.00E 00
CS137	CI	7.43E-05	6.78E-05	0.00E 00	0.00E 00
FE55	CI	4.73E-06	4.82E-03	0.00E 00	0.00E 00
NI63	CI	1.76E-06	5.25E-03	6.83E-12	0.00E 00
TOTAL FOR PERIOD (ABOVE)	CI	2.00E 00	2.01E 00	6.83E-12	0.00E 00

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SEMI-ANNUAL EFFLUENT AND WASTE DISPOSAL REPORT

C - LIQUID EFFLUENTS

SECOND HALF - 1986

CONSOLIDATED EDISON CO. OF NEW DATE OF REPORT: FEB. 23, 1987
INDIAN POINT UNITS 1 & 2 PREPARED BY: CON EDISON
QUARTER 1 : START DATE 86070101 END DATE 86093024
QUARTER 2 : START DATE 86100101 END DATE 86123124

EFFLUENT AND WASTE DISPOSAL REPORT

LIQUID EFFLUENTS -- SUMMATION OF ALL RELEASES

	UNITS	QUARTER 3	QUARTER 4	EST. TOTAL ERROR, %
A. FISSION AND ACTIVATION PRODUCTS				
1. TOTAL RELEASE (EXCL. TRIT., GASES, ALPHA)	CI	6.48E-01	1.00E 00	2.50E 01
2. AVERAGE DILUTED CONC. DURING PERIOD	UCI/ML	1.29E-09	1.16E-10	
3. PERCENT OF MPC	%	2.86E-02	9.71E-02	
B. TRITIUM				
1. TOTAL RELEASE	CI	6.79E 01	1.79E 02	2.50E 01
2. AVERAGE DILUTED. CONC. DURING PERIOD	UCI/ML	1.35E-07	2.07E-08	
3. PERCENT OF MPC	%	8.17E-02	9.61E-01	
C. DISSOLVED AND ENTRAINED GASES				
1. TOTAL RELEASE	CI	9.52E-02	6.63E-02	2.50E 01
2. AVERAGE DILUTED CONC. DURING PERIOD	UCI/ML	1.89E-10	7.67E-12	
3. PERCENT OF MPC	%	9.44E-05	3.83E-06	
D. GROSS ALPHA RADIOACTIVITY				
1. TOTAL RELEASE	CI	0.00E 00	0.00E 00	2.50E 01
E. VOLUME WASTE RELEASED (PRIOR TO DILUTION)	LITERS	3.49E 07	4.38E 07	1.00E 01
F. VOLUME DILUTION WATER USED DURING PERIOD	LITERS	5.04E 11	8.64E 12	1.00E 01

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CONSOLIDATED EDISON CO. OF NEW
INDIAN POINT UNITS 1 & 2

EFFLUENT AND WASTE DISPOSAL REPORT

LIQUID EFFLUENTS FOR ALL RELEASE POINTS

QUARTER 1 : START DATE 86070101 END DATE 86093024
QUARTER 2 : START DATE 86100101 END DATE 86123124
DATE OF REPORT: FEB. 23, 1987
PREPARED BY: CON EDISON

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
H3	CI	4.00E 00	1.23E 00	6.39E 01	1.78E 02
CR51	CI	0.00E 00	0.00E 00	5.13E-03	0.00E 00
MN54	CI	0.00E 00	0.00E 00	1.67E-04	0.00E 00
FE55	CI	1.87E-03	2.26E-01	5.09E-02	3.09E-02
CO58	CI	0.00E 00	4.33E-02	3.38E-02	5.46E-03
CO60	CI	1.94E-03	3.52E-02	7.63E-02	3.01E-02
NI63	CI	2.00E-03	1.75E-02	2.74E-03	1.53E-02
SR89	CI	0.00E 00	7.76E-04	0.00E 00	0.00E 00
SR90	CI	0.00E 00	0.00E 00	0.00E 00	9.18E-05
ZR95	CI	0.00E 00	0.00E 00	3.24E-04	0.00E 00
NB95	CI	0.00E 00	0.00E 00	2.55E-03	0.00E 00
AG110M	CI	0.00E 00	0.00E 00	6.31E-04	8.23E-04
I131	CI	9.47E-03	3.82E-02	0.00E 00	0.00E 00
I133	CI	4.24E-02	0.00E 00	0.00E 00	0.00E 00
CS134	CI	1.39E-03	1.80E-01	2.55E-04	1.81E-02
CS136	CI	0.00E 00	1.91E-02	0.00E 00	0.00E 00
CS137	CI	1.87E-02	2.52E-01	4.37E-03	3.84E-02

EFFLUENT AND WASTE DISPOSAL REPORT

LIQUID EFFLUENTS FOR ALL RELEASE POINTS

QUARTER 1 : START DATE 86070101 END DATE 86093024
QUARTER 2 : START DATE 86100101 END DATE 86123124
DATE OF REPORT: FEB. 23, 1987
PREPARED BY: CON EDISON

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
LIQUID EFFLUENTS (CONTD)					
LA140	CI	0.00E 00	0.00E 00	2.14E-05	0.00E 00
SB125	CI	2.73E-01	0.00E 00	1.18E-01	5.04E-02
SB124	CI	0.00E 00	0.00E 00	1.78E-03	0.00E 00
SB137	CI	0.00E 00	0.00E 00	0.00E 00	6.53E-04
TOTAL FOR PERIOD (ABOVE)	CI	4.35E 00	2.05E 00	6.42E 01	1.78E 02

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
XE133	CI	4.22E-03	0.00E 00	6.05E-02	6.63E-02
KR85	CI	0.00E 00	0.00E 00	3.04E-02	0.00E 00

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SEMI-ANNUAL EFFLUENT AND WASTE DISPOSAL REPORT

D - SOLID WASTE

SECOND HALF - 1986

Solid Radwaste Disposal Report

Solid Waste Shipped Offsite for Burial Or Disposal (Not irradiated fuel)

1. Type of Waste	Unit	6 Month Period Class A	Class B	Class C	Est Total
a. Spent Resins, sludges, etc.	m^3	49.1352	-	3.56832	52.703
	Ci	0.1531	-	3.2	3.353
b. DAW	m^3	244.2954	-	-	244.2954
	Ci	1.96	-	-	5.313
c. Irradiated components control rods, etc.	m^3	-	-	-	-
	Ci				

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

a.	Co-58	%	3.43
	Co-60	%	18.0
	Cs-137	%	12.23
	Fe-55	%	9.0
	H3	%	47.28
	Ni-63	%	5.41
	Other Cr51, C14, Cs134, Sb125 Pu241 included)	%	4.65
b.	Co-60	%	48.56
	Ni-63	%	14.73
	Cs-137	%	7.29
	Fe-55	%	24.02
	Other (Mn54, Cs134, C14, H3 Co58 included)	%	5.4

3. Solid Waste Disposition

Number of Shipments	Mode of Transportations	Destination
14	Truck	Barnwell, S.C.
2	Truck	Channahon, Ill.

4. Solid waste containers

a. 0 - Fiberglass reinforced pressure vessels
0 - Pressure Vessel
0 - High integrity containers
10 - Carbon steel containers - cement used for solidification
b. 445 - Drums - this includes the 237 drums shipped to Channahon, Ill. for supercompaction 2 to 1 ratio
56 - Crates

Solid Radwaste Disposal Report

5. Waste Class

No irradiated fuel shipments

Container	Class A	Class B	Class C
Pressure Vessel/FRP-Hic	-	-	-
High Integrity Container	-	-	-
Steel Liners	9	-	1
Steel Drums	326.5	-	-
Steel Crates	56	-	-

March 1, 1987

Re: Indian Point Unit Nos. 1 and 2
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SEMI-ANNUAL EFFLUENT AND WASTE DISPOSAL REPORT

E - RADIOLOGICAL IMPACT ON MAN

SECOND HALF - 1986

March 1, 1987

Re: Indian Point Unit Nos. 1 and 2
Docket Nos. 50-03 and 50-247

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. Calculations were performed for members of the public on site for 1986. Doses to such individuals were found to be significantly less than one percent of the maximum individual offsite dose. Doses were also evaluated for an individual ingesting milk and meat from a cow located at a 5.0 mile distance, for all sectors. In all cases, these evaluations were performed using the models presented in Regulatory Guide 1.109.

All releases were evaluated using actual meteorological conditions existing during the release period.

Integrated doses from the population within 50 miles of Indian Point from gaseous effluents were computed based on the most current population data.

Dose calculations for liquid pathways to individuals and populations are computed for a year. The LADTAP II computer program that is utilized for these calculations incorporated the calculational model and parameters that are presented in Regulatory Guide 1.109.

The fish, invertebrate, algae, drinking, shoreline, swimming, and boating pathways are calculated for the adult, teenager, child, and infant. These calculations are performed for reasons such as estimating the population water consumption dose, the population recreation dose, and cost-benefit analysis.

NUREG-0017, "Calculation of Release of Radioactive Materials in Gaseous and Liquid effluents from Pressurized Water Reactors", assumes an annual release of 8.0 Ci/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 & 2

RADIOLOGICAL IMPACT ON MAN

(Reference Regulatory Guide 1.21, Page 12)

A. Maximum Individual Doses

(1) Pathways (Gaseous)

	Total Body mRem	Skin mRem	Thyroid mRem	Bone mRem
a) Noble Gas Immersion	5.41E-02	1.25E-01	N/A	N/A
(b) Inhalation***	1.91E-02	N/A	6.97E-03	3.55E-03
(c) Ground Deposition	1.47E-03	1.72E-03	N/A	N/A
(d) Milk Ingestion*	1.92E-02	N/A	3.28E-02	8.96E-02
(e) Meat Ingestion***	2.94E-03	N/A	2.99E-03	1.47E-02
(f) Vegetable Ingestion***	2.01E-01	N/A	2.09E-01	1.00E+00

2) Pathways (Liquid)

(a) All — See Attached "LADTAP" printout Attachment I

* Infants are critical age group
** Adults are critical age group
*** Children are critical age group

NA = Not Applicable

B. Population

(1) Pathways (Gaseous)

	Total Body (man-rem)	Thyroid (man-thyroid rem)
(a) Noble Gas Immersion	5.8E-01	N/A
(b) Inhalation	1.9E-01	1.9E-01
(c) Ground Deposition	2.9E-02	N/A
(d) Totals	7.9E-01	1.9E-01

(2) Pathways (Liquid)

(a) All — See attached "LADTAP" printout Attachment I

C. Average Doses to Individuals

(1) Pathways

(a) Liquid-Total Body 2.43E-06 millirem

(b) Gaseous-Total Body 3.89E-05 millirem

* * * AS LOW AS REASONABLY ACHIEVABLE * * *

CATEGORY I DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.26E-03	3.85E-03	2.81E-03	4.19E-05	1.29E-03	4.25E-04	1.34E-04
INVERTEBRATE		4.57E-05	5.90E-05	3.78E-05	3.44E-06	1.58E-05	1.18E-05	2.06E-05
ALGAE		2.99E-10	4.68E-10	3.44E-10	5.26E-11	1.54E-10	6.79E-11	2.25E-10
DRINKING		5.96E-15	1.30E-14	1.06E-14	1.26E-14	6.79E-15	4.83E-15	6.19E-15
SHORELINE	1.87E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05
SWIMMING	0.0	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
BOATING	0.0	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
TOTAL	1.87E-05	2.32E-03	3.93E-03	2.87E-03	6.17E-05	1.32E-03	4.53E-04	1.71E-04

	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

CATEGORY II DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.38E-03	3.96E-03	1.60E-03	3.92E-05	1.31E-03	5.04E-04	9.72E-05
INVERTEBRATE		4.79E-05	6.10E-05	2.35E-05	3.19E-06	1.60E-05	1.41E-05	1.50E-05
ALGAE		4.14E-10	6.32E-10	2.61E-10	6.48E-11	2.07E-10	1.06E-10	2.19E-10
DRINKING		8.25E-15	1.63E-14	8.95E-15	1.47E-14	7.88E-15	5.50E-15	6.11E-15
SHORELINE	2.51E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05
SWIMMING	0.0	3.16E-07	3.16E-07	3.16E-07	3.16E-07	3.16E-07	3.16E-07	3.16E-07
BOATING	0.0	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
TOTAL	2.51E-05	2.45E-03	4.04E-03	1.64E-03	6.43E-05	1.35E-03	5.40E-04	1.34E-04

	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

CATEGORY III DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.96E-03	3.47E-03	6.21E-04	4.09E-05	1.11E-03	3.98E-04	3.64E-05
INVERTEBRATE		6.31E-05	5.67E-05	1.33E-05	3.44E-06	1.40E-05	1.22E-05	5.88E-06
ALGAE		1.20E-06	1.29E-06	2.56E-07	1.57E-07	4.05E-07	1.95E-07	1.93E-07
DRINKING		2.39E-11	3.27E-11	1.22E-11	3.33E-11	1.53E-11	1.04E-11	9.18E-12
SHORELINE	5.23E-06	4.49E-06	4.49E-06	4.49E-06	4.49E-06	4.49E-06	4.49E-06	4.49E-06
SWIMMING	0.0	7.89E-08	7.89E-08	7.89E-08	7.89E-08	7.89E-08	7.89E-08	7.89E-08
BOATING	0.0	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
TOTAL	5.23E-06	3.03E-03	3.53E-03	6.40E-04	4.93E-05	1.13E-03	4.15E-04	4.72E-05

	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	

C A T E G O R Y I V D O S E S

	DOSE (MREM PER YEAR INTAKE)							
PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		3.43E-04	4.78E-04	4.12E-05	7.18E-06	1.26E-04	5.13E-05	2.49E-06
INVERTEBRATE		5.34E-06	6.01E-06	8.66E-07	4.85E-07	1.29E-06	1.06E-06	3.41E-07
ALGAE		1.91E-09	2.43E-09	2.54E-10	3.82E-10	6.36E-10	3.41E-10	1.87E-10
DRINKING		3.76E-14	5.93E-14	1.59E-14	7.45E-14	2.37E-14	1.66E-14	1.27E-14
SHORELINE	1.12E-06	9.62E-07	9.62E-07	9.62E-07	9.62E-07	9.62E-07	9.62E-07	9.62E-07
SWIMMING	0.0	3.16E-14	3.16E-14	3.16E-14	3.16E-14	3.16E-14	3.16E-14	3.16E-14
BOATING	0.0	7.89E-10	7.89E-10	7.89E-10	7.89E-10	7.89E-10	7.89E-10	7.89E-10
TOTAL	1.12E-06	3.50E-04	4.85E-04	4.30E-05	8.63E-06	1.29E-04	5.33E-05	3.79E-06

	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

C A T E G O R Y I D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.61E-03	2.75E-03	2.01E-03	2.89E-05	9.18E-04	3.04E-04	9.52E-05
INVERTEBRATE		3.26E-05	4.21E-05	2.70E-05	2.38E-06	1.13E-05	8.39E-06	1.47E-05
ALGAE		2.14E-10	3.34E-10	2.45E-10	3.64E-11	1.10E-10	4.85E-11	1.61E-10
DRINKING		4.28E-13	9.33E-13	7.56E-13	1.23E-12	4.88E-13	3.45E-13	4.44E-13
SHORELINE	1.34E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05	1.15E-05
SWIMMING	0.0	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07
BOATING	0.0	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07
TOTAL	1.34E-05	1.66E-03	2.80E-03	2.05E-03	4.30E-05	9.41E-04	3.24E-04	1.22E-04

	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

C A T E G O R Y I I D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.70E-03	2.83E-03	1.14E-03	2.71E-05	9.37E-04	3.60E-04	6.93E-05
INVERTEBRATE		3.42E-05	4.36E-05	1.67E-05	2.20E-06	1.14E-05	1.00E-05	1.07E-05
ALGAE		2.96E-10	4.52E-10	1.87E-10	4.47E-11	1.47E-10	7.57E-11	1.56E-10
DRINKING		5.92E-13	1.17E-12	6.42E-13	1.46E-12	5.67E-13	3.93E-13	4.38E-13
SHORELINE	1.79E-05	1.53E-05	1.53E-05	1.53E-05	1.53E-05	1.53E-05	1.53E-05	1.53E-05
SWIMMING	0.0	2.25E-07	2.25E-07	2.25E-07	2.25E-07	2.25E-07	2.25E-07	2.25E-07
BOATING	0.0	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07
TOTAL	1.79E-05	1.75E-03	2.89E-03	1.17E-03	4.50E-05	9.65E-04	3.86E-04	9.57E-05

	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 A T E G O R Y I I I D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.11E-03	2.48E-03	4.44E-04	2.82E-05	7.93E-04	2.84E-04	2.59E-05
INVERTEBRATE		4.51E-05	4.05E-05	9.50E-06	2.37E-06	1.00E-05	8.73E-06	4.20E-06

ALGAE		8.54E-07	9.18E-07	1.83E-07	1.08E-07	2.89E-07	1.40E-07	1.38E-07
DRINKING		1.71E-09	2.35E-09	8.79E-10	3.42E-09	1.10E-09	7.43E-10	6.57E-10
SHORELINE	3.74E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06
SWIMMING	0.0	5.61E-08	5.61E-08	5.61E-08	5.61E-08	5.61E-08	5.61E-08	5.61E-08
BOATING	0.0	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07
TOTAL	3.74E-06	2.16E-03	2.52E-03	4.57E-04	3.41E-05	8.07E-04	2.96E-04	3.37E-05

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

SHOREWIDTH FACTOR=0.2

LOCATION IS DOWNSTREAM

C A T E G O R Y I V D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.45E-04	3.41E-04	2.94E-05	4.95E-06	9.03E-05	3.66E-05	1.77E-06
INVERTEBRATE		3.81E-06	4.29E-06	6.18E-07	3.34E-07	9.24E-07	7.60E-07	2.43E-07
ALGAE		1.36E-09	1.74E-09	1.82E-10	2.63E-10	4.54E-10	2.44E-10	1.34E-10
DRINKING		2.70E-12	4.26E-12	1.14E-12	7.84E-12	1.70E-12	1.18E-12	9.11E-13
SHORELINE	8.01E-07	6.87E-07	6.87E-07	6.87E-07	6.87E-07	6.87E-07	6.87E-07	6.87E-07
SWIMMING	0.0	2.25E-14	2.25E-14	2.25E-14	2.25E-14	2.25E-14	2.25E-14	2.25E-14
BOATING	0.0	5.61E-10	5.61E-10	5.61E-10	5.61E-10	5.61E-10	5.61E-10	5.61E-10
TOTAL	8.01E-07	2.50E-04	3.46E-04	3.07E-05	5.97E-06	9.19E-05	3.81E-05	2.70E-06

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

SHOREWIDTH FACTOR=0.2

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

SPORT HARVEST

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
			DOSE (MAN-REM)						
FISH	CATEGORY I	7.60E+04	5.72E-03	9.74E-03	7.11E-03	5.99E-05	3.25E-03	1.08E-03	3.23E-04
FISH	CATEGORY II	8.87E+03	9.26E-04	1.54E-03	6.18E-04	8.52E-06	5.08E-04	1.95E-04	3.61E-05
FISH	CATEGORY III	6.14E+03	1.85E-03	2.16E-03	3.85E-04	1.41E-05	6.90E-04	2.48E-04	2.17E-05
FISH	TOTAL	9.10E+04	8.49E-03	1.34E-02	8.11E-03	8.24E-05	4.44E-03	1.52E-03	3.81E-04

LOCATION DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR POPULATION=1.55E+04
7.00E+00 9.10E+04 1.68E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) CATEGORY I=6.90E+00 CATEGORY II=5.20E+00 CATEGORY IV=2.20E+00

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

COMMERCIAL HARVEST

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
			DOSE (MAN-REM)						
FISH	CATEGORY I	9.94E+07	2.64E-02	4.48E-02	3.27E-02	2.15E-04	1.49E-02	4.95E-03	1.46E-03
FISH	CATEGORY II	1.16E+07	4.26E-03	7.06E-03	2.84E-03	3.05E-05	2.34E-03	9.00E-04	1.63E-04
FISH	CATEGORY III	8.04E+06	8.50E-03	9.93E-03	1.77E-03	5.03E-05	3.18E-03	1.14E-03	9.80E-05
FISH	TOTAL	1.19E+08	3.91E-02	6.18E-02	3.73E-02	2.96E-04	2.04E-02	6.99E-03	1.72E-03

LOCATION DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR POPULATION=2.03E+07
7.00E+00 1.55E+05 2.40E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) CATEGORY I=6.90E+00 CATEGORY II=5.20E+00 CATEGORY IV=2.20E+00

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
			DOSE (MAN-REM)						
FISH	CATEGORY I	2.05E+05	1.55E-02	2.63E-02	1.92E-02	1.39E-04	8.76E-03	2.90E-03	8.61E-04
FISH	CATEGORY II	2.40E+04	2.50E-03	4.14E-03	1.67E-03	1.98E-05	1.37E-03	5.28E-04	9.62E-05
FISH	CATEGORY III	1.66E+04	4.99E-03	5.83E-03	1.04E-03	3.26E-05	1.86E-03	6.69E-04	5.80E-05
FISH	TOTAL	2.46E+05	2.29E-02	3.63E-02	2.19E-02	1.92E-04	1.20E-02	4.10E-03	1.01E-03

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

SPORT HARVEST

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
			DOSE (MAN-REM)						
INVER	CATEGORY I	8.33E+03	5.33E-05	6.87E-05	4.40E-05	2.32E-06	1.83E-05	1.37E-05	2.38E-05
INVER	CATEGORY II	9.68E+02	8.55E-06	1.09E-05	4.17E-06	3.25E-07	2.85E-06	2.51E-06	2.66E-06
INVER	CATEGORY III	6.97E+02	1.81E-05	1.62E-05	3.80E-06	5.53E-07	4.02E-06	3.51E-06	1.68E-06
INVER	TOTAL	1.00E+04	7.99E-05	9.58E-05	5.19E-05	3.20E-06	2.52E-05	1.97E-05	2.82E-05

LOCATION DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR POPULATION=1.17E+04
7.00E+00 1.00E+04 1.68E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) CATEGORY I=1.00E+00 CATEGORY II=7.50E-01 CATEGORY IV=3.30E-01

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

COMMERCIAL HARVEST

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
			DOSE (MAN-REM)						
INVER	CATEGORY I	1.44E+07	4.00E-05	5.16E-05	3.30E-05	1.38E-06	1.38E-05	1.03E-05	1.78E-05
INVER	CATEGORY II	1.67E+06	6.41E-06	8.15E-06	3.13E-06	1.93E-07	2.14E-06	1.88E-06	1.99E-06
INVER	CATEGORY III	1.21E+06	1.36E-05	1.22E-05	2.85E-06	3.26E-07	3.01E-06	2.63E-06	1.26E-06
INVER	TOTAL	1.73E+07	6.00E-05	7.19E-05	3.90E-05	1.90E-06	1.89E-05	1.48E-05	2.11E-05

LOCATION DILUTION CATCH TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR POPULATION=2.03E+07
7.00E+00 1.00E+03 2.40E+02

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) CATEGORY I=1.00E+00 CATEGORY II=7.50E-01 CATEGORY IV=3.30E-01

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
			DOSE (MAN-REM)						
INVER	CATEGORY I	9.17E+03	5.86E-05	7.56E-05	4.84E-05	2.50E-06	2.02E-05	1.51E-05	2.62E-05
INVER	CATEGORY II	1.07E+03	9.40E-06	1.19E-05	4.59E-06	3.51E-07	3.13E-06	2.76E-06	2.93E-06
INVER	CATEGORY III	7.67E+02	1.99E-05	1.79E-05	4.18E-06	5.96E-07	4.42E-06	3.86E-06	1.84E-06
INVER	TOTAL	1.10E+04	8.79E-05	1.05E-04	5.71E-05	3.45E-06	2.77E-05	2.17E-05	3.10E-05

* * * POPULATION WATER CONSUMPTION DOSES * * *

SUPPLIER-

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
			DOSE (MAN-REM)						
DRINKING	CATEGORY I	2.63E+02	5.40E-11	4.86E-11	3.19E-11	8.00E-13	1.66E-11	6.04E-12	1.99E-12
DRINKING	CATEGORY II	2.86E+01	8.17E-12	7.21E-12	2.60E-12	8.80E-14	2.44E-12	1.00E-12	2.20E-13
DRINKING	CATEGORY III	4.68E+01	3.96E-11	2.48E-11	4.29E-12	2.76E-13	8.02E-12	3.06E-12	4.78E-13
DRINKING	TOTAL	3.38E+02	1.02E-10	8.07E-11	3.88E-11	1.16E-12	2.70E-11	1.01E-11	2.69E-12

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) CATEGORY I =3.70E+02 CATEGORY II=2.60E+02 CATEGORY III=2.60E+02

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

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
DRINKING	CUMUL TOTAL	3.38E+02	1.02E-10	8.07E-11	3.88E-11	1.16E-12	2.70E-11	1.01E-11	2.69E-12

HYDROSPHERE TRITIUM DOSE

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
WATER	TOTAL	2.20E+00	2.03E-05	2.03E-05	2.03E-05	2.03E-05	2.03E-05	2.03E-05	2.03E-05

* * * RECREATION POPULATION DOSES * * *

LOCATION- DOWNSTREAM

DILUTION=0.70E+01 TRANSIT TIME=0.40E+01 HR SWF=0.2

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	1.66E+07	4.43E-03	3.80E-03	3.80E-03

LOCATION- 0.200

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

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	1.66E+07	0.0	3.73E-05	3.73E-05

LOCATION- 0.200

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

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.66E+07	0.0	1.87E-05	1.87E-05

* * * DOSE TO BIOTA * * *

MRADS PER YEAR

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

	INTERNAL	EXTERNAL	TOTAL
FISH	5.57E-03	1.01E-02	1.56E-02
INVERTEBRATE	5.83E-04	2.01E-02	2.07E-02
ALGAE	3.04E-03	1.97E-05	3.06E-03
MUSKRAT	3.17E-02	6.70E-03	3.84E-02
RACCOON	1.42E-03	5.02E-03	6.44E-03
HERON	1.89E-01	6.70E-03	1.95E-01
DUCK	2.78E-02	1.00E-02	3.78E-02

* * * 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	2.47E+00	1.31E-05	1.31E-05	5.31E-06	5.31E-06
25MN 54	1.67E-06	4.08E-07	1.05E-07	2.44E-01	6.27E-02
26FE 55	2.69E-03	1.61E-05	2.91E-10	5.97E-03	1.08E-07
27CO 58	8.26E-04	2.05E-05	1.61E-05	2.48E-02	1.95E-02
27CO 60	1.43E-03	1.37E-03	1.35E-03	9.58E-01	9.42E-01
28NI 63	1.88E-04	5.43E-06	0.0	2.89E-02	0.0
38SR 89	7.76E-06	1.30E-07	6.75E-11	1.68E-02	8.69E-06
53I 131	4.77E-04	1.62E-06	3.71E-04	3.40E-03	7.77E-01
53I 133	4.24E-04	6.42E-07	7.80E-07	1.51E-03	1.84E-03
55CS 134	2.00E-03	2.40E-02	6.04E-04	1.20E+01	3.02E-01
55CS 136	1.91E-04	2.46E-04	2.55E-06	1.29E+00	1.33E-02
55CS 137	3.14E-03	2.32E-02	1.41E-03	7.39E+00	4.50E-01
57LA 140	2.14E-07	1.89E-10	1.89E-10	8.85E-04	8.85E-04
24CR 51	5.13E-05	1.66E-08	1.59E-08	3.24E-04	3.09E-04
30ZN 65	2.20E-06	2.19E-06	7.53E-08	9.97E-01	3.42E-02
40ZR 95	3.24E-06	4.27E-08	4.27E-08	1.32E-02	1.32E-02
41NB 95	2.55E-05	2.50E-07	1.78E-07	9.82E-03	6.99E-03
47AG 110M	1.45E-05	2.30E-06	2.29E-06	1.58E-01	1.58E-01
51SB 124	1.78E-05	5.72E-07	5.71E-07	3.22E-02	3.21E-02
51SB 125	4.42E-03	4.55E-04	4.55E-04	1.03E-01	1.03E-01
TOTAL		4.94E-02	4.22E-03		

NOTE ON AGE GROUP:

CATEGORY I (17 YEARS OLD OR OLDER)
CATEGORY II (11 TO 17 YEARS OLD)
CATEGORY III (1 TO 11 YEARS OLD)
CATEGORY IV (0 TO 1 YEAR OLD)

TABLE 4A

HOURS AT EACH WIND SPEED AND DIRECTION [a]

PERIOD OF RECORD: July - Sept. 1986

STABILITY CLASS: A

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.	67.	6.	0.	0.	0.	77.
NNE	1.	9.	1.	0.	0.	0.	11.
NE	1.	4.	2.	0.	0.	0.	7.
ENE	2.	1.	0.	0.	0.	0.	3.
E	0.	0.	0.	0.	0.	0.	0.
ESE	1.	0.	0.	0.	0.	0.	1.
SE	5.	2.	0.	0.	0.	0.	7.
SSE	11.	14.	0.	0.	0.	0.	25.
S	19.	72.	3.	0.	0.	0.	94.
SSW	7.	25.	8.	0.	0.	0.	40.
SW	3.	13.	0.	0.	0.	0.	16.
WSW	1.	7.	0.	0.	0.	0.	8.
W	6.	16.	0.	0.	0.	0.	22.
WNW	2.	5.	0.	0.	0.	0.	7.
NW	2.	16.	4.	0.	0.	0.	22.
NNW	5.	26.	6.	0.	0.	0.	37.
VARIABLE							
Total	70.	277.	30.	0.	0.	0.	377.

Periods of calm (hours): 0.
Hours of missing data: 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: July - Sept. 1986

STABILITY CLASS: B

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	4.	18.	1.	0.	0.	0.	23.
NNE	3.	9.	1.	0.	0.	0.	13.
NE	0.	1.	0.	0.	0.	0.	1.
ENE	1.	0.	0.	0.	0.	0.	1.
E	1.	0.	0.	0.	0.	0.	1.
ESE	1.	0.	0.	0.	0.	0.	1.
SE	1.	0.	0.	0.	0.	0.	1.
SSE	1.	1.	0.	0.	0.	0.	2.
S	8.	18.	1.	0.	0.	0.	27.
SSW	2.	4.	0.	0.	0.	0.	6.
SW	1.	5.	0.	0.	0.	0.	6.
WSW	1.	1.	0.	0.	0.	0.	2.
W	3.	2.	0.	0.	0.	0.	5.
WNW	1.	2.	0.	0.	0.	0.	3.
NW	2.	0.	0.	0.	0.	0.	2.
NNW	1.	0.	0.	0.	0.	0.	1.
VARIABLE							
Total	31.	61.	3.	0.	0.	0.	95.

Periods of calm (hours): 0.
Hours of missing data: 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: July - Sept. 1986

STABILITY CLASS: C

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.	21.	0.	0.	0.	0.	24.
NNE	2.	2.	0.	0.	0.	0.	4.
NE	4.	4.	1.	0.	0.	0.	9.
ENE	1.	0.	0.	0.	0.	0.	1.
E	1.	1.	0.	0.	0.	0.	2.
ESE	2.	0.	0.	0.	0.	0.	2.
SE	2.	0.	0.	0.	0.	0.	2.
SSE	3.	3.	0.	0.	0.	0.	6.
S	9.	15.	0.	0.	0.	0.	24.
SSW	3.	4.	1.	0.	0.	0.	8.
SW	1.	1.	0.	0.	0.	0.	2.
WSW	0.	1.	0.	0.	0.	0.	1.
W	3.	4.	0.	0.	0.	0.	7.
WNW	0.	0.	0.	0.	0.	0.	0.
NW	0.	2.	0.	0.	0.	0.	2.
NNW	4.	3.	0.	0.	0.	0.	7.
VARIABLE							
Total	38.	61.	2.	0.	0.	0.	101.

Periods of calm (hours): 0.
Hours of missing data: 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: July - Sept. 1986

STABILITY CLASS: D

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	11.	77.	7.	0.	0.	0.	95.
NNE	21.	36.	2.	0.	0.	0.	59.
NE	34.	22.	0.	0.	0.	0.	56.
ENE	34.	5.	0.	0.	0.	0.	39.
E	20.	6.	0.	0.	0.	0.	26.
ESE	5.	2.	0.	0.	0.	0.	7.
SE	22.	0.	0.	0.	0.	0.	22.
SSE	13.	4.	0.	0.	0.	0.	17.
S	43.	86.	5.	0.	0.	0.	134.
SSW	15.	39.	4.	0.	0.	0.	58.
SW	11.	3.	0.	0.	0.	0.	14.
WSW	12.	2.	0.	0.	0.	0.	14.
W	6.	8.	0.	0.	0.	0.	14.
WNW	2.	3.	1.	0.	0.	0.	6.
NW	2.	8.	1.	0.	0.	0.	11.
NNW	5.	13.	1.	0.	0.	0.	19.
VARIABLE							
Total	256.	314.	21.	0.	0.	0.	591.

Periods of calm (hours): 0.
Hours of missing data: 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: July - Sept. 1986

STABILITY CLASS: E

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	31.	41.	0.	0.	0.	0.	72.
NNE	52.	49.	0.	0.	0.	0.	101.
NE	56.	38.	0.	0.	0.	0.	94.
ENE	26.	3.	0.	0.	0.	0.	29.
E	23.	2.	0.	0.	0.	0.	25.
ESE	19.	0.	0.	0.	0.	0.	19.
SE	36.	0.	0.	0.	0.	0.	36.
SSE	31.	2.	0.	0.	0.	0.	33.
S	76.	95.	2.	0.	0.	0.	173.
SSW	55.	42.	2.	0.	0.	0.	99.
SW	18.	3.	1.	0.	0.	0.	22.
WSW	9.	3.	0.	0.	0.	0.	12.
W	11.	4.	0.	0.	0.	0.	15.
WNW	10.	4.	0.	0.	0.	0.	14.
NW	19.	6.	0.	0.	0.	0.	25.
NNW	14.	18.	0.	0.	0.	0.	32.
VARIABLE							
Total	486.	310.	5.	0.	0.	0.	801.

Periods of calm (hours): 14.
Hours of missing data: 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: July - Sept. 1986

STABILITY CLASS: F

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	21.	2.	0.	0.	0.	0.	23.
NNE	32.	6.	0.	0.	0.	0.	38.
NE	43.	24.	1.	0.	0.	0.	68.
ENE	15.	0.	0.	0.	0.	0.	15.
E	17.	0.	0.	0.	0.	0.	17.
ESE	6.	0.	0.	0.	0.	0.	6.
SE	8.	0.	0.	0.	0.	0.	8.
SSE	12.	0.	0.	0.	0.	0.	12.
S	6.	1.	0.	0.	0.	0.	7.
SSW	4.	0.	0.	0.	0.	0.	4.
SW	2.	0.	0.	0.	0.	0.	2.
WSW	1.	0.	0.	0.	0.	0.	1.
W	2.	0.	0.	0.	0.	0.	2.
WNW	2.	0.	0.	0.	0.	0.	2.
NW	5.	0.	0.	0.	0.	0.	5.
NNW	2.	0.	0.	0.	0.	0.	2.
VARIABLE							
Total	178.	33.	1.	0.	0.	0.	212.

Periods of calm (hours): 4.
Hours of missing data: 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: July - Sept. 1986

STABILITY CLASS: G

ELEVATION: 10 Meter

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	1.	0.	0.	0.	0.	0.	1.
NE	3.	3.	0.	0.	0.	0.	6.
ENE	1.	0.	0.	0.	0.	0.	1.
E	0.	0.	0.	0.	0.	0.	0.
ESE	1.	0.	0.	0.	0.	0.	1.
SE	0.	0.	0.	0.	0.	0.	0.
SSE	0.	0.	0.	0.	0.	0.	0.
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	0.	0.	0.	0.	0.	0.	0.
W	0.	0.	0.	0.	0.	0.	0.
WNW	0.	0.	0.	0.	0.	0.	0.
NW	0.	0.	0.	0.	0.	0.	0.
NNW	0.	0.	0.	0.	0.	0.	0.
VARIABLE							
Total	10.	3.	0.	0.	0.	0.	13.

Periods of calm (hours): 0.
Hours of missing data: 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: Oct. - Dec. 1986

STABILITY CLASS: A

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.	22.	6.	0.	0.	0.	29.
NNE	0.	0.	0.	0.	0.	0.	0.
NE	0.	0.	0.	0.	0.	0.	0.
ENE	0.	0.	0.	0.	0.	0.	0.
E	0.	0.	0.	0.	0.	0.	0.
ESE	0.	1.	0.	0.	0.	0.	1.
SE	0.	0.	0.	0.	0.	0.	0.
SSE	3.	9.	0.	0.	0.	0.	12.
S	6.	16.	4.	0.	0.	0.	26.
SSW	1.	4.	5.	0.	0.	0.	10.
SW	0.	8.	0.	0.	0.	0.	8.
WSW	0.	1.	0.	0.	0.	0.	1.
W	1.	6.	1.	0.	0.	0.	8.
WNW	0.	11.	1.	0.	0.	0.	12.
NW	0.	16.	6.	0.	0.	0.	22.
NNW	1.	12.	2.	0.	0.	0.	15.
VARIABLE							
Total	13.	106.	25.	0.	0.	0.	144.

Periods of calm (hours): 0.
Hours of missing data: 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: Oct. - Dec. 1986

STABILITY CLASS: B

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.	16.	6.	0.	0.	0.	22.
NNE	0.	1.	1.	0.	0.	0.	2.
NE	0.	0.	0.	0.	0.	0.	0.
ENE	0.	1.	0.	0.	0.	0.	1.
E	0.	0.	0.	0.	0.	0.	0.
ESE	0.	2.	0.	0.	0.	0.	2.
SE	1.	0.	0.	0.	0.	0.	1.
SSE	1.	2.	0.	0.	0.	0.	3.
S	4.	10.	1.	0.	0.	0.	15.
SSW	2.	2.	1.	0.	0.	0.	5.
SW	0.	1.	0.	0.	0.	0.	1.
WSW	2.	0.	0.	0.	0.	0.	2.
W	0.	0.	0.	0.	0.	0.	0.
WNW	1.	3.	0.	0.	0.	0.	4.
NW	1.	4.	5.	1.	0.	0.	11.
NNW	2.	8.	5.	0.	0.	0.	15.
VARIABLE							
Total	14.	50.	19.	1.	0.	0.	84.

Periods of calm (hours): 0.
Hours of missing data: 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: Oct. - Dec. 1986

STABILITY CLASS: C

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	3.	14.	6.	1.	0.	0.	24.
NNE	1.	4.	0.	0.	0.	0.	5.
NE	0.	1.	0.	0.	0.	0.	1.
ENE	1.	1.	0.	0.	0.	0.	2.
E	0.	1.	0.	0.	0.	0.	1.
ESE	0.	0.	0.	0.	0.	0.	0.
SE	0.	0.	0.	0.	0.	0.	0.
SSE	2.	1.	0.	0.	0.	0.	3.
S	5.	3.	0.	0.	0.	0.	8.
SSW	7.	3.	1.	0.	0.	0.	11.
SW	1.	0.	0.	0.	0.	0.	1.
WSW	0.	0.	0.	0.	0.	0.	0.
W	1.	1.	1.	0.	0.	0.	3.
WNW	1.	2.	3.	0.	0.	0.	6.
NW	2.	2.	3.	0.	0.	0.	7.
NNW	4.	7.	5.	0.	0.	0.	16.
VARIABLE							
Total	28.	40.	19.	1.	0.	0.	88.

Periods of calm (hours): 0.
Hours of missing data: 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: Oct. - Dec. 1986

STABILITY CLASS: D

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	45.	127.	41.	8.	0.	0.	221.
NNE	29.	91.	26.	1.	0.	0.	147.
NE	19.	32.	2.	0.	0.	0.	53.
ENE	16.	13.	0.	0.	0.	0.	29.
E	8.	2.	0.	0.	0.	0.	10.
ESE	9.	0.	0.	0.	0.	0.	9.
SE	10.	3.	0.	0.	0.	0.	13.
SSE	14.	2.	0.	0.	0.	0.	16.
S	33.	48.	0.	0.	0.	0.	81.
SSW	28.	13.	1.	0.	0.	0.	42.
SW	13.	1.	0.	0.	0.	0.	14.
WSW	8.	4.	1.	0.	0.	0.	13.
W	10.	15.	5.	0.	0.	0.	30.
WNW	4.	21.	7.	2.	0.	0.	34.
NW	7.	46.	28.	2.	0.	0.	83.
NNW	14.	47.	28.	4.	0.	0.	93.
VARIABLE							
Total	267.	465.	139.	17.	0.	0.	888.

Periods of calm (hours): 0.
Hours of missing data: 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: Oct. - Dec. 1986

STABILITY CLASS: E

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	41.	26.	0.	0.	0.	0.	67.
NNE	59.	37.	2.	0.	0.	0.	98.
NE	58.	28.	0.	0.	0.	0.	86.
ENE	17.	4.	1.	0.	0.	0.	22.
E	17.	1.	0.	0.	0.	0.	18.
ESE	13.	1.	0.	0.	0.	0.	14.
SE	22.	0.	0.	0.	0.	0.	22.
SSE	33.	2.	0.	0.	0.	0.	35.
S	60.	55.	2.	0.	0.	0.	117.
SSW	30.	17.	0.	0.	0.	0.	47.
SW	23.	10.	0.	0.	0.	0.	33.
WSW	22.	4.	1.	0.	0.	0.	27.
W	18.	32.	1.	0.	0.	0.	51.
WNW	16.	19.	0.	0.	0.	0.	35.
NW	14.	19.	4.	0.	0.	0.	37.
NNW	20.	10.	4.	0.	0.	0.	34.
VARIABLE							
Total	463.	265.	15.	0.	0.	0.	743.

Periods of calm (hours): 0.
Hours of missing data: 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: Oct. - Dec. 1986

STABILITY CLASS: F

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	25.	2.	0.	0.	0.	0.	27.
NNE	47.	4.	0.	0.	0.	0.	51.
NE	46.	30.	0.	0.	0.	0.	76.
ENE	13.	2.	0.	0.	0.	0.	15.
E	9.	0.	0.	0.	0.	0.	9.
ESE	0.	0.	0.	0.	0.	0.	0.
SE	5.	0.	0.	0.	0.	0.	5.
SSE	6.	0.	0.	0.	0.	0.	6.
S	10.	2.	0.	0.	0.	0.	12.
SSW	6.	0.	0.	0.	0.	0.	6.
SW	3.	0.	0.	0.	0.	0.	3.
WSW	6.	0.	0.	0.	0.	0.	6.
W	3.	0.	0.	0.	0.	0.	3.
WNW	2.	0.	0.	0.	0.	0.	2.
NW	4.	0.	0.	0.	0.	0.	4.
NNW	11.	0.	0.	0.	0.	0.	11.
VARIABLE							
Total	196.	40.	0.	0.	0.	0.	236.

Periods of calm (hours): 0.
Hours of missing data: 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: Oct. - Dec. 1986

STABILITY CLASS: G

ELEVATION: 10 Meter

Wind Direction	Wind Speed (mph) at 10m Level 1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	6.	0.	0.	0.	0.	0.	6.
NNE	3.	1.	0.	0.	0.	0.	4.
NE	4.	5.	0.	0.	0.	0.	9.
ENE	1.	0.	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	0.	0.	0.	0.	0.	0.	0.
SSW	1.	0.	0.	0.	0.	0.	1.
SW	0.	0.	0.	0.	0.	0.	0.
WSW	0.	0.	0.	0.	0.	0.	0.
W	0.	0.	0.	0.	0.	0.	0.
WNW	1.	0.	0.	0.	0.	0.	1.
NW	0.	0.	0.	0.	0.	0.	0.
NNW	2.	0.	0.	0.	0.	0.	2.
VARIABLE							
Total	19.	6.	0.	0.	0.	0.	25.

Periods of calm (hours): 0.
Hours of missing data: 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.

March 1, 1987

Re: Indian Point Unit Nos. 1 and 2
Docket Nos. 50-03 and 50-247

SEMI-ANNUAL EFFLUENT AND WASTE DISPOSAL REPORT

F - REPORTABLE CHANGES

TO THE PROCESS CONTROL PROGRAM (PCP)

OFFSITE DOSE CALULATION MANUAL (ODCM)

AND RADIOACTIVE WASTE SYSTEMS

G - REPORTABLE ITEMS

THE RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

AND LIQUID HOLDUP TANK RADIOACTIVITY

H - UNPLANNED RELEASES

GASEOUS PLANT VENT (R-14)

SECOND HALF - 1986

Reportable Changes

A. Process Control Program (PCP)

Section 6.14.1 of the Indian Point Unit No. 2 Technical Specifications addresses licensee initiated changes to a Process Control Program (PCP). During the 2nd half of 1986, NP Radwaste made changes to its PCP program by revising EH&S Procedure No. EH&S-SQ-4.007 entitled Process Control Program. These changes, under Revision 2, merely included additional references and editorally restated the verification of checklist entries as shown with revision bars on the attached pages of the PCP. These changes were purely administrative and did not require SNSC approval (per EH&S-200.2). The effective date of Revision 2 to EH&S-SQ-4.007 was August 5, 1986. Revision 1 was reported in the first half of 1986 with the discussion of changes. However, Revision 2 was inadvertantly attached to that report instead of Revision 1.

B. Offsite Dose Calculation Manual (ODCM)

In reference to the reportable changes to the Offsite Dose Calculation Manual and pursuant to Indian Point Unit No. 2 Technical Specifications 6.15.2 (1A, B and C), the following information is submitted. The change added Section 3.4 on contractor quality assurance stating the vendors' commitment to quality control. A copy of this change is attached, (page 34 of the ODCM), as per 6.15.2 (1A). The copy has been stamped, approved, revised, and dated by SNSC, as per 6.15.2 (1 C).

C. Radioactive Waste Systems

For the period reported there were no major changes made to any of the radioactive waste systems.

Reportable Items

A. Radioactive Liquid Effluent Monitoring Instrumentation

The steam generator blowdown effluent line flow rate measurement device has been inoperable for greater than 30 days and is being reported pursuant to Indian Point 2 Technical Specification 3.9.A.2.C. Prior to the issuance of the radiological effluent technical specifications, Amendment 90 to Indian Point Facility Operating License No. DPR-26 on June 20, 1984, the provisions to measure steam generator blowdown flow had been disconnected to establish sampling connections outside containment. Engineering has been underway to provide this capability. This new flow measurement equipment is expected to be operable by the end of the 1987 Refueling Outage.

B. Radioactive Gaseous Effluent Monitoring Instrumentation

The Waste Gas Hold-up System Explosive Oxygen Recorder (ALARM) Monitor, Table 3.9-2.2B of the Technical Specifications has been out of service and inoperable in excess of thirty days. This recorder is obsolete equipment. It is being replaced by new instrumentation and should be in service by June of 1987, under Project #IP-30783.

C. Liquid Holdup Tank Radioactivity

For the semi-annual report covering the period of January 1986 to June 1986 the Refueling Water Storage Tank (RWST) Curie limit established by Indian Point 2 Technical Specification 3.9.A.5.A was exceeded. Corrective action was completed according to the following:

On May 5, 1986, at 2155 hours, the R.W.S.T. was sampled. Recirculation had begun at 0001 hours the same day. The tank contained 3.35 X 10^5 gallons.

Upon analysis it was found that the tank contained 19.9 Ci. This exceeded the 10 Ci limit set for the tank. Action was taken immediately to reduce the Ci content in the tank to within the acceptable limits within 48 hours. The action taken was to circulate the R.W.S.T. through the spent fuel ion exchanger and to bleed and feed the R.W.S.T. On May 3, 1986, at 0753, the Ci content of the tank was down to 14.7 Ci. On May 4, 1986, at 0830, Ci content of the tank was 10.8 Ci. Processing is continuing. On May 5, 1986, at 0830, the Ci content of the tank was 1.7.

Unplanned Releases

A. Unplanned Liquid Release

During this reporting period there were no unplanned liquid releases.

B. Unplanned Gaseous Release

During this reporting period there were no unplanned gaseous releases.

Environmental Health & Safety
Indian Point Station
Unit No. 1 and 2

Procedure No. EHS-SQ-4.007
Rev. 2

PROCESS CONTROL PROGRAM

Prepared by: Christopher English Technical Reviewer: Not required per EHS-2.0

Reviewer: Robert H. Swanson 7/25/86 Reviewer: Thomas Flowers

Reviewer: _____ Reviewer: _____

Reviewer: _____ Reviewer: _____

SNSC Review Not required per EHS-2.002
Meeting No. /Date

EH&S General Manager Approval Michael L. Miele 8/5/86
Effective/Date

Temporary Procedure Changes:

Change No.	Date	Change No.	Date	Change No.	Date

No. 19

CONTROLLED COPY
QUALITY ASSURANCE PROGRAM DOCUMENT

When Stamped in Red

5.5.3 When the ratios of chemical additives (e.g. lime) and binding agent (e.g. cement) to sample specimen are determined, a test solidification shall be performed. The quantity of chemical additives, solidification agent and sample volume shall be recorded on vendor provided data sheets.

5.5.4 Cure time for the test solidifications shall be recorded on vendor provided data sheets.

5.5.5 Unless proprietary in nature, the following documentation, at a minimum, shall be provided by the vendor to the station:

a. Quantity of chemical additives.
b. Quantity of solidification agent(s).
c. Sample volume.
d. Cure time for test solidification.

6.0 ACCEPTANCE CRITERIA

6.1 Attachment 8.1 has been completed and signed by a Radwaste Supervisor and a QA Engineer prior to implementation.

6.2 The sample solidification will be considered acceptable if:

a. The end product indicates a uniform, dry, free-standing monolith.
b. The end product resists penetration when probed with a firm object.

7.0 REFERENCES

7.1 10 CFR 20, Standards for Protection Against Radiation.

7.2 10 CFR 61, Licensing Requirements for Land Disposal of Radioactive Waste.

7.3 10 CFR 71, Packaging of Radioactive Material for Transportation.

7.4 49 CFR 173, Shipping Requirements for Radioactive Material.

7.5 Consolidated Edison Corporate Instruction CI-240 Supplement 1 Quality Assurance Program for Radioactive Material Packages and Quality Control Requirements for Radioactive Waste Classification and Characterization (Form).

7.6 Chem Nuclear Systems Inc. Procedure SD-OP-003 Process Control Program for CNSI Cement Solidification Units.

7.7 EHS-SQ-4.000, "Shipment Final QA Inspection"

7.8 SD-OP-048 CNSI Operating Procedure for In-Situ Solidification of Suspended Objects.

7.9 SD-OP-050 CNSI Operating Procedure for Mobile Cement Solidification.

7.10 SD-OP-026 CNSI Process Control Program for Cement/Oil Solidification.

7.11 DM-OP-022 Process Control Program for the CNSI Demineralization System.

7.12 FO-OP-022 Dewatering Procedure for CNSI 14-195 or Smaller Liners.

7.13 FO-OP-023 Bead Dewatering Procedure for CNSI 14-195 or Smaller Liners.

7.14 NUREG-0800, Standard Review Plan for Solid Waste Management Systems.

7.15 U.S.N.R.C, Final Waste Classification and Waste Form Technical Position Papers dated May 1983.

8.0 ATTACHMENTS

8.1 Form EHS 4.007-1, Checklist for Vendor Process Control Program (PCP)

9.0 ADDENDUM

NONE

ATTACHMENT 8.1

CHECKLIST FOR VENDOR PROCESS CONTROL PROGRAM

g.	A general description for the treatment of oily wastes that are to be transported offsite for burial.	YES	NO
h.	As appropriate, a sketch of the process systems.	YES	NO
i.	A statement that ALARA considerations were addressed in all phases of the solidification process.	YES	NO
j.	A description of the dewatering technique and control procedures (applicable to solidification liners and HIC's).	YES	NO
k.	A description of provisions to reprocess wastes through the dewatering system if excess free water is observed.	YES	NO
l.	Sample solidification worksheet.	YES	NO

4. Verification of Checklist Entries

This checklist is applicable to any shipment which utilize the attached procedures and documents and their specified revisions.

Name	Date	Name	Date
Radwaste Supervisor		QA Engineer	

of food (eg, milk). Data obtained from the latest land use census (Technical Specification 3.12.2) should be used to determine locations for evaluating doses. Also, the results of the Radiological Environmental Monitoring program will be included in determining more realistic doses to these real people by providing data on actual measured levels of radioactivity and radiation at locations of interest.

3.4 Contractor Quality Assurance Program

The vendor maintains its own comprehensive quality assurance program and has made a commitment to quality control. Quality assurance requirements specified in 10CFR50 Appendix B and Regulatory Guide 4.15 were met by the quality assurance program at TI. This program included stability, operational, and accuracy checks throughout the analysis procedures.

Checks were performed on analytical equipment using standards to monitor the stability and reproducibility of counting instruments. Operational checks were performed by laboratory personnel. Accuracy checks were performed by laboratory participation in the Environmental Protection Agency (EPA) and other laboratory intercomparison programs and by maintaining equipment calibrations with standards from the National Bureau of Standards (NBS), Amersham, or IAEA.

APPROVED
Alice Hayes

APPROVED
SNSC # 1069
1/20/87
Rev #1

Murray Selman
Vice President

Consolidated Edison Company of New York, Inc.
Indian Point Station
Broadway & Bleakley Avenue
Buchanan, NY 10511
Telephone (914) 737-8116

March 1, 1987

Re: Indian Point Unit Nos. 1 and 2
Docket Nos. 50-3 and 50-247

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Dear Gentlemen:

Attached is the Semi-Annual Effluent and Waste Disposal Report for the period July 1, 1986 through December 31, 1986.

Please contact us if you have questions concerning this submittal.

Very truly yours,

Murray Selman

attach.
cc: Dr. Thomas E. Murley
Regional Administrator - Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pa. 19406

Senior Resident Inspector
U. S. Nuclear Regulatory Commission
P. O. Box 38
Buchanan, New York 10511

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