

Effluent and Waste Disposal
Semi-Annual Report
January 1, 1999 - June 30, 1999

Facility Indian Point 3
Licensee New York Power Authority

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 10 to 12.

A. Supplemental Information

1. Regulatory Limits

Indian Point 3 is presently subject to limits on radioactive waste releases that are set forth in sections 2.3.1, 2.3.2, 2.3.3, 2.4.1, 2.4.2, 2.4.3 and 2.4.4 of Appendix B to Docket No. 50-286 entitled "Environmental Technical Specification Requirements Part II Radiological Environmental" (ETSR). The percentages of the technical specification limits reported in Tables 1A and 2A are the percent of the quarterly limits specified in the ETSR. If more than one limit applies to the release, the most restrictive limit is reported.

2. Maximum Permissible Concentration

a) Fission and Activation Gases

The quarterly dose resulting from release of fission and activation gases is calculated in accordance with the methodology stated in the Offsite Dose Calculation Manual (ODCM). The specific isotopes listed in Table 1C are used to determine the effective dose factors for the time period.

b/c) Iodines, Tritium and Particulates

The quarterly organ dose limit for Iodine 131, tritium and particulates with half-lives greater than eight days is calculated in accordance with the methodology stated in the ODCM.

d) Liquid Effluents

The quarterly dose limit for liquid isotopic releases is calculated in accordance with the methodology stated in the ODCM. The concentration limit for noble gases dissolved in liquid releases is calculated based upon a maximum permissible concentration of $2.00E-4$ $\mu\text{Ci/ml}$ as required by section 2.3.1.A of the ETSR.

3. Average Energy

The average energies (\bar{E}) of the radionuclide mixtures in releases of fission and activation gases were as follows:

1st Quarter $\bar{E}_\beta = 3.55E-01$ Mev/dis $\bar{E}_\gamma = 8.66E-01$ Mev/dis

2nd Quarter $\bar{E}_\beta = 3.94E-01$ Mev/dis $\bar{E}_\gamma = 1.02E+00$ 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 3.4-1 of the ETSR. In the case of isolated tanks (batch release), the total activity discharged is based on an isotopic analysis of each batch with the volume of gas in the batch corrected to standard temperature and pressure.

Vapor containment purge discharges that are less than 150 hours/quarter in duration have been treated as batch releases. Vapor Containment pressure relief discharges have been treated as continuous releases. Both types of releases from the Vapor Containment are performed randomly with regard to time of day and duration (release periods were not dependant solely on time of day or atmospheric condition). Therefore, determination of doses due to Vapor Containment releases includes the use of annual average dispersion data, as defined in NUREG 0133, Section 3.3.

At least one complete isotopic concentration analysis of containment air is performed monthly. This analysis is used in conjunction with a process monitor to obtain the isotopic mixture and quantification of 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 quantity of activity released from these discharges.

The continuous building discharges are based on weekly samples of ventilation air analyzed for isotopic content. This information is combined with total air volume discharged and the process radiation monitor readings to determine the quantity of activity from continuous discharges.

When no gaseous activity is identified for an entire quarter, a "less than" value is reported. This value is determined from the established Xe-133 minimum detectable concentration and the total volume of air released from all continuous release points for the quarter.

b/c) Iodines and Particulates

Iodine-131 and particulate releases are quantified by collecting a continuous sample of ventilation air on a TEDA impregnated, activated charcoal cartridge and a glass-fiber filter paper. These samples are changed weekly as required in Table 3.4-1 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 quantity of activity discharged.

For other iodine isotopes, concentrations are determined monthly on a 24-hour sample. The concentration of each isotope is analytically determined and combined with the volume of air discharged during the sampling period to calculate the quantity of activity discharged.

When no iodine is identified for an entire quarter, a "less than" value is reported. The "less than" value (in curies) is derived from the established minimum detectable concentration of I-131 and the total volume of air released from all continuous release points.

d) Liquid Effluents

A sample of each batch discharge is taken and an isotopic analysis is performed in compliance with requirements specified in Table 3.3-1 of the ETSR. These isotopic concentration data are combined with the information on volume discharged to determine the amount of each isotope discharged.

Proportional composite samples of continuous discharges are taken and analyzed in compliance with Table 3.3-1 of the ETSR. These concentration data are combined with the volume discharged to calculate the total activity discharged.

5. Batch Releases

a) Liquid Releases

	1999	
	<u>1st Quarter</u>	<u>2nd Quarter</u>
Number of Batch Releases	24	35
Total Time Period Batch Releases (min)	2497	3592
Maximum " " " " "	113	132
Average " " " " "	104	103
Minimum " " " " "	90	68
Average Stream Flow (cfs)	Note *	Note *

Note:*

Hudson River flow information is obtained from the Department of the Interior, United States Geological Survey (USGS). These data are received after review from the USGS, approximately 18 months after initial data collection. This information is included in semi-annual reports as the data become available.

b) Gaseous Releases

	1999	
	<u>1st Quarter</u>	<u>2nd Quarter</u>
Number of Batch Releases	0	0
Total Time Period Batch Releases (min)	0	0
Maximum " " " " "	0	0
Average " " " " "	0	0
Minimum " " " " "	0	0

6. Abnormal Releases

a) Liquid
None

b) Gaseous
None

7. Radiological Environmental Technical Specifications

The Radiological Environmental Technical Specifications (RETS) require reporting of prolonged outages of effluent monitoring equipment (Sections 2.1.C and 2.2.B) and significant changes in the land use census, Radiological Environmental Monitoring Program (REMP), or exceeding the total curie content limitations in outdoor tanks (Sections 2.8.A, 2.8.B, 2.7.C and 2.3.4.B).

During this reporting period, no required Technical Specification Effluent Monitoring equipment was out of service (OOS) for periods greater than 30 consecutive days.

During this reporting period, the total curie content limit in outdoor tanks was not exceeded.

The Offsite Dose Calculation Manual, REMP, and Process Control Program were not changed during this reporting period. No new locations for dose calculations and/or environmental monitoring were identified by the land use census.

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B. GASEOUS EFFLUENTS
FIRST AND SECOND QUARTERS, 1999

TABLE 1A
 EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (Jan - Jun 1999)
 GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 1st	Quarter 2nd	Est. Total Error %
A. Fission & Activation Gases				
1. Total Release	Ci	5.25E-02	4.50E-02	±25
2. Average release rate	µCi/sec	6.75E-03	5.73E-03	
3. Percent of Tech Spec Limit	%	4.50E-04	4.51E-04	
B. Iodines				
1. Total Iodine-131	Ci	<3.70E-06	<3.06E-06	±25
2. Average release rate	µCi/sec	<4.76E-07	<3.89E-07	
C. Particulates				
1. Total release, with half-life > 8 days	Ci	7.44E-07	2.05E-07	±25
2. Average release rate	µCi/sec	9.57E-08	2.61E-08	
3. Gross alpha radioactivity	Ci	<3.08E-07	<2.59E-07	
D. Tritium				
1. Total release	Ci	8.73E-01	6.92E-01	±25
2. Average release rate	µCi/sec	1.12E-01	8.80E-02	
E. Percent Tech Spec limit, I & P with half-life > 8 days, including H-3				
	%	1.81E-03	1.42E-03	±25

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (Jan - Jun 1999)
 GASEOUS EFFLUENTS - GROUND RELEASES

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 1st	Quarter 2nd	Quarter 1st	Quarter 2nd
1) Fission Gases					
Kr-85m	Ci				
Kr-85	Ci				
Kr-87	Ci				
Kr-88	Ci				
Xe-131m	Ci				
Xe-133m	Ci				
Xe-133	Ci	1.70E-02	9.56E-03		
Xe-135m	Ci				
Xe-135	Ci	7.79E-04			
Xe-138	Ci				
Ar-41	Ci	3.46E-02	3.55E-02		
Total for Period	Ci	5.25E-02	4.50E-02		
2) Iodines					
I-131	Ci				
I-133	Ci				
I-135	Ci				
Total for Period	Ci	<3.70E-06	<3.06E-06		
3) Particulates					
Cs-137	Ci	7.44E-07	2.05E-07		
Total for Period	Ci	7.44E-07	2.05E-07		

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C. LIQUID EFFLUENTS
FIRST AND SECOND QUARTERS, 1999

TABLE 2A
 EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (Jan - Jun 1999)
 LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 1st	Quarter 2nd	Est. Total Error %
A. Fission & Activation Products				
1. Total Release (excluding tritium, gases, alpha)	Ci	1.47E-02	8.39E-03	±25
2. Avg diluted concentration during period	µCi/ml	5.19E-11	2.21E-11	
B. Tritium				
1. Total Release	Ci	1.99E+02	2.15E+02	±25
2. Avg diluted concentration during period	µCi/ml	7.07E-07	5.66E-07	
C. Dissolved and entrained gases				
1. Total release	Ci	7.76E-04	4.24E-03	±25
2. Avg diluted concentration during period	µCi/ml	2.75E-12	1.12E-11	
D. Gross Alpha radioactivity				
1. Total release	Ci	<3.53E-05	<4.61E-05	±25
E. Volume of waste released prior to dilution				
	liters	5.55E+05	8.23E+05	±10
F. Volume of dilution water used during period				
	liters	2.82E+11	3.80E+11	±10
G. Percent of liquid effluent limit				
	%	1.62E-02	9.56E-03	±25

TABLE 2B

LIQUID EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (Jan - Jun 1999)

1) Fission and Activation Products (excluding gases)

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 1st	Quarter 2nd	Quarter 1st	Quarter 2nd
Cr-51	Ci			5.59E-04	
Mn-54	Ci			3.31E-05	
Fe-55	Ci			2.61E-03	2.78E-03
Co-58	Ci			3.95E-03	9.07E-04
Co-60	Ci			1.34E-03	9.45E-04
Ni-63	Ci			3.52E-03	1.86E-03
Zr-95	Ci			4.30E-05	
Nb-95	Ci			7.16E-05	
Sb-124	Ci				1.02E-05
Sb-125	Ci			1.20E-03	1.10E-03
I-131	Ci			1.55E-05	1.77E-05
Cs-134	Ci			3.41E-04	1.70E-04
Cs-137	Ci			9.74E-04	6.03E-04
Total for Period	Ci			1.47E-02	8.39E-03

2) Dissolved and Entrained Gases

Xe-133	Ci			7.76E-04	4.24E-03
Total for Period	Ci			7.76E-04	4.24E-03

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D. SOLID WASTE
FIRST AND SECOND QUARTERS, 1999

TABLE 3 EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
 SOLID WASTE SHIPMENTS Jan 1, 1999 - June 30, 1999

A. 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 Error, %
		a. Spent resins, filter sludges, etc.	m ³ Ci	0 0	
b. Dry compressible, contam. equipment for burial	m ³ Ci	0 0	0 0	0 0	 ±25
c. Irradiated Components	m ³ Ci	0 0	0 0	0 0	 ±25
d. Other: Dry compressible, contaminated equip. for volume reduction at offsite facility	m ³ Ci	5.87E+01 1.27E-03	0 0	0 0	 ±25

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

NUCLIDE	UNIT	Class A Dry Vol Reduction	
H-3	%	0.6127	
C-14	%	<0.0001	
Cr-51	%	<0.0001	
Mn-54	%	0.9473	
Fe-55	%	28.8095	
Co-57	%	<0.0001	
Co-58	%	5.4132	
Fe-59	%	<0.0001	
Ni-59	%	<0.0001	
Co-60	%	25.4739	Percentages of nuclides and total activities are based on a combination of direct measurements and scaling factors for non-gamma emitting nuclides.
Ni-63	%	19.6573	
Zn-65	%	<0.0001	
Sr-89	%	<0.0001	
Sr-90	%	0.0328	
Nb-95	%	1.0903	
Zr-95	%	0.8702	
Tc-99	%	<0.0001	
Ru-106	%	<0.0001	
Ag-110m	%	<0.0001	
Sn-113	%	<0.0001	
Sb-124	%	<0.0001	
Sb-125	%	1.3806	
I-129	%	<0.0001	
Cs-134	%	2.3532	
Cs-137	%	12.2252	
Ce-144	%	1.1221	
Hg-203	%	<0.0001	
Pu-238	%	0.0025	
Pu-239/240	%	0.0009	
Pu-241	%	<0.0001	
Am-241	%	0.0014	
Cm-242	%	0.0036	
Cm-243/244	%	0.0033	

3. Solid Waste Disposition

# of Shipments	Mode of Transport	Destination	Type
2	Truck	G.T.S. Duratek, Oak Ridge, TN	volume reduction
1	Truck	American Ecology, Oak Ridge, TN	volume reduction

4. Containers Shipped

Container	Number	Class A		Class B		Class C	
		Number	Solid Media	Number	Solid Media	Number	Solid Media
For Burial:							
Poly HIC	0		N/A	0		N/A	N/A
Drums	0		N/A	0		N/A	N/A
Steel Liner	0		N/A	0		N/A	N/A
Crates	0		N/A	0		N/A	N/A
Volume Reduction:							
Sea Land Cont.	1		N/A	0		N/A	N/A
Crate	7		N/A	0		N/A	N/A
Six Pack	0		N/A	0		N/A	N/A
Drums	14		N/A	0		N/A	N/A

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E. RADIOLOGICAL IMPACT ON MAN

(not required to be submitted with this report)

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F. METEOROLOGICAL DATA

(not required to be submitted with this report)

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G. OFFSITE DOSE CALCULATION MANUAL,
PROCESS CONTROL PROGRAM, OR LAND USE CENSUS LOCATION CHANGES

FIRST AND SECOND QUARTERS, 1999

The Offsite Dose Calculation Manual was not changed during this reporting period.

The Process Control Program was not changed during this reporting period.

The Radiological Environmental Monitoring Program was not changed during this reporting period.

No new locations for dose calculations and/or environmental monitoring were identified by the land use census.