Entergy

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T.R. Jones
Manager, Licensing

April 25, 2007

Re: Indian Point Units No 1, 2, 3
Docket Nos. 50-3, 50-247, 50-286
NL-07-050

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Subject: 2006 Annual Radioactive Effluent Release Report

Dear Sir or Madam:

Enclosed is the 2006 Annual Effluent and Waste Disposal Report for Indian Point Unit Nos. 1, 2, and 3. Entergy Nuclear Operations, Inc. (Entergy) is submitting this report in accordance with Technical Specification 5.6.3 and Regulatory Guide 1.21.

Entergy Nuclear Operations, Inc. is making no new commitments in this letter.

Should you have any questions regarding this matter, please contact Mr. T.R. Jones, Manager, Licensing, at (914) 734-6670.

Respectfully,

T.R. Jones
Manager, Licensing
Indian Point Energy Center

Enclosure: 2006 Annual Radioactive Effluent Release Report

cc: next page

IE48

cc: Mr. Samuel J. Collins, Regional Administrator, NRC Region I
Mr. John P. Boska, Senior Project Manager, NRC NRR DORL
NRC Resident Inspector's Office, Indian Point 2
NRC Resident Inspector's Office, Indian Point 3
Chief, Compliance Section, New York State DEC, Division of Water
Regional Water Engineer, New York State DEC
Mr. Paul Eddy, NYS Department of Public Service
Mr. Robert Oliveira, American Nuclear Insurers
Mr. Robert Snyder, NYS Department of Health
Mr. Larry Wilson, NYS Department of Environmental Conservation
Director, Spent Fuel Project Office, Office of Nuclear Material Safety & Safeguards

ENCLOSURE TO NL-07-050

Indian Point Energy Center

2006 Annual Radioactive Effluent Release Report

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT UNIT 1, 2, AND 3 NUCLEAR POWER PLANTS
DOCKET NOS. 50-03, 50-247, AND 50-286

Radioactive Effluent Release Report: 2006

Facility Indian Point Energy Center (Indian Point Units 1, 2, and 3)

Licensee Entergy Nuclear Operations, Inc (Entergy)

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 Guide, pages 10 to 12. This report includes effluent information from Indian Point units 1, 2, and 3. Units 1 and 2 share effluent processing equipment, Technical Specifications, and an Offsite Dose Calculation Manual. Therefore, radioactive effluent from Unit 1 is included with Unit 2 in this report.

A. Supplemental Information

1. Regulatory Limits

Indian Point Energy Center is subject to limits on radioactive waste releases that are set forth in the Offsite Dose Calculation Manual (ODCM), Parts I and II, as defined in the Technical Specifications. ODCM Part I, also known as the Radiological Effluent Controls (or RECS) contains the specific requirements and controls, while ODCM Part II (calculational methodologies) contains the details necessary to perform offsite dose calculations from the sampling and monitoring outlined in the RECS.

2. Maximum Permissible Concentration

a) Airborne Releases

Maximum concentrations and compliance with 10CFR20 release rate limits are controlled by the application of Radiation Monitor setpoints, preliminary grab sampling, and conservative procedural guidance for batch and continuous releases. These measures, in conjunction with plant design, preclude approaching release rate limits, per the ODCM.

b) Liquid Effluents

Proximity to release rate and total release limits is controlled through the application of a calculated Allowed Diluted Concentration (ADC) and ALARA guidance with regard to dilution flow and maximum tank concentration. The ADC is used to determine a Radiation Monitor setpoint associated with an estimated amount of Beta activity, as well as the measured gamma activity. It is defined in each unit's ODCM as the basis for the release concentration limits, and applies to the applicable version of 10CFR20 to which the unit is licensed. Unit 2's limit is defined at the higher of the those limits specified in the OLD 10CFR20, while Unit 3 is limited to "EC*10" from the NEW Part 20.

> Unit 2's technical specifications were updated in late December, 2006, and the unit 2 ODCM was updated in Jan, 2007 to reflect the new 10CFR20. As of January 1, 2007, liquid effluent controls at both units are now identical, using the NEW version of 10CFR20.

Liquid effluents are further controlled by the application of proceduralized ALARA limits such as a MINIMUM dilution flow of 100,000 gpm required for batch discharges, and a maximum gamma concentration of 5E-5 uCi/ml (without gas or tritium) for these routine effluents.

3. Average Energy

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

Units 1 and 2:

1st Quarter	$\bar{E}_\beta$ =	1.56E-01 Mev/dis	$\bar{E}_\gamma$ =	4.15E-02 Mev/dis
2nd Quarter	$\bar{E}_\beta$ =	1.46E-01 Mev/dis	$\bar{E}_\gamma$ =	5.21E-02 Mev/dis
3rd Quarter	$\bar{E}_\beta$ =	2.52E-01 Mev/dis	$\bar{E}_\gamma$ =	2.70E-02 Mev/dis
4th Quarter	$\bar{E}_\beta$ =	2.45E-01 Mev/dis	$\bar{E}_\gamma$ =	4.67E-02 Mev/dis

Unit 3:

1st Quarter	$\bar{E}_\beta$ =	3.47E-01 Mev/dis	$\bar{E}_\gamma$ =	8.42E-01 Mev/dis
2nd Quarter	$\bar{E}_\beta$ =	3.66E-01 Mev/dis	$\bar{E}_\gamma$ =	9.10E-01 Mev/dis
3rd Quarter	$\bar{E}_\beta$ =	2.72E-01 Mev/dis	$\bar{E}_\gamma$ =	5.59E-01 Mev/dis
4th Quarter	$\bar{E}_\beta$ =	1.55E-01 Mev/dis	$\bar{E}_\gamma$ =	1.22E-01 Mev/dis

4. Measurements and Approximations of Total Radioactivity

a) Fission and Activation Gases

Analyses of effluent gases have been performed in compliance with the requirements of the RECS (ODCM Part I). In the case of isolated tanks (batch releases), 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 and pressure relief (vent) discharges routinely total less than 150 hours/quarter in duration have been treated as batch releases. However, 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.

b/c) Iodines and Particulates

Iodine-131 and particulate releases are quantified by collecting a continuous sample of ventilation air on a Triethylenediamine (TEDA) impregnated, activated charcoal cartridge and a glass-fiber filter paper. These samples are changed weekly as required in the RECS. 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.

If no I-131 is identified in weekly vent samples, "-" is entered in Table 1A. A typical Minimum Detectable Activity (MDA) for weekly I-131 analyses is 1.0E-13 uCi/cc, which is 100 times lower than ODCM requirements.

If I-131 is identified in any routine weekly sample, it is added to the table and other iodine isotopic concentrations are then determined on a 24-hour sample at least once per month. The concentration of each isotope is analytically determined by ratioing the activities with weekly media for I-131. This activity is combined with the volume of air discharged during the sampling period to calculate the quantity of activity discharged.

A compositing method of analyzing for gross alpha is used per the station ODCMs. An absence of any positive Gross Alpha value for the quarter is identified on Table 1A as "-". A typical MDA for gross alpha is 8.0E-14 uCi/cc, which is over 100 times lower than ODCM requirements.

d) Liquid Effluents

A sample of each batch discharge is taken and an isotopic analysis is performed in compliance with requirements specified in the RECS. Proportional composite samples of continuous discharges are taken and analyzed in compliance with the applicable RECS table, as well. Isotopic concentration data are combined with the information on volume discharged to determine the amount of each isotope discharged.

A compositing method of analyzing for gross alpha is used per the station ODCMs. When there has been no positive Gross Alpha identified in a quarter, "-" is entered in Table 2A. A typical MDA value for Gross Alpha in liquids is 5E-8 uCi/ml, which is two times lower than ODCM requirements.

Liquid Effluent volumes of waste released on Table 2A are differentiated between processed fluids (routine liquid waste and Unit 1's North Curtain Drain), and water discharged through monitored pathways identified in the ODCM, but NOT processed (SG Blowdown and Unit 1's Sphere Foundation Drain Sump). Because the unprocessed water may contain trace levels of Tritium, etc, it is included in the report, but the volumes are differentiated to prevent confusion regarding the total volume of waste released to the Hudson River. The curies reported in the following tables, however, are totals of all liquid effluent, continuous and batch, whether processed or not.

5. Batch Releases

Airborne:

Unit 1 and 2 Airborne Releases		Qtr 1	Qtr 2	Qtr 3	Qtr 4	2006
Number of Batch Releases		53	56	45	39	193
Total Time Period	(min)	2770	5330	2100	2640	12840
Maximum Time Period	(min)	134	630	130	119	630
Average Time Period	(min)	52.2	95.3	46.6	67.6	66.5
Minimum Time Period	(min)	3	2	3	2	2

Unit 3 Airborne Releases		Qtr 1	Qtr 2	Qtr 3	Qtr 4	2006
Number of Batch Releases		21	21	24	17	83
Total Time Period	(min)	3680	3950	3620	3650	14900
Maximum Time Period	(min)	275	290	348	289	348
Average Time Period	(min)	175	188	151	215	179
Minimum Time Period	(min)	3	6	1	17	1

Liquid:

Unit 1 and 2 Liquid Releases		Qtr 1	Qtr 2	Qtr 3	Qtr 4	2006
Number of Batch Releases		25	42	10	7	84
Total Time Period	(min)	3240	7660	1030	895	12825
Maximum Time Period	(min)	580	720	120	234	720
Average Time Period	(min)	129	182	103	128	153
Minimum Time Period	(min)	90	60	50	100	50

Unit 3 Liquid Releases		Qtr 1	Qtr 2	Qtr 3	Qtr 4	2006
Number of Batch Releases		10	8	20	10	48
Total Time Period	(min)	1020	859	2200	1070	5149
Maximum Time Period	(min)	121	114	120	170	170
Average Time Period	(min)	102	107	110	107	107
Minimum Time Period	(min)	61	95	103	53	53

Average Stream Flow :

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 the effluents report as the data become available.

Estimated Average Stream Flows of the Hudson River at Indian Point:

Year	Quarter	Flow (cfs)
2004	Fourth	23000
2005	First	28000
2005	Second	28467
2005	Third	6667

6. Abnormal Releases

a) Liquid
The effluent contribution via ground water (broken up into storm drain and bedrock pathways) is discussed in Section H. Effluent dose calculations were performed from samples of numerous Monitoring Wells and Storm Drains, along with release and dilution flow rate analyses. Dose calculation results identified in the summary of Section H are added to the site total summary in the opening discussion of Section E, dose to man report.

b) Gaseous
None

7. ODCM Reporting Requirements

The ODCM (RECS) requires reporting of prolonged outages of effluent monitoring equipment. Also required in this report is notification of any changes in the land use census, the Radiological Environmental Monitoring Program (REMP), or exceeding the total curie content limitations in outdoor tanks.

During this reporting period, the following ODCM required effluent monitoring equipment was out of service (OOS) for periods greater than 30 consecutive days:

Instrument	Out of Service Period	Details
Unit 1, Sphere Foundation Drain Sump Monitor, R-62	Jan 01, 2006 to Feb 15, 2006	The monitor was declared inoperable due to intermittent functionality during this time period. Delay in returning to service was a result of the age of equipment, significant troubleshooting, and delays in procuring parts. Compensatory grab samples were obtained during this interval.
Unit 1, Sphere Foundation Drain Sump Flow Integrator	Mar 14, 2006 to Jun 30, 2006	The instrument was originally taken out of service for troubleshooting. During subsequent investigation, it was determined that the existing instrument was not suitable for the application. Ultimately, a modification was required to be generated and installed to support resolution. This included modification design, equipment procurement, scheduling and installation. Compensatory estimates were performed during this interval.

During this reporting period, no tank curie limits in outdoor tanks were exceeded.

There were no changes to the Process Control Programs during this reporting period.

There were no changes to the ODCMs during this reporting period. However, several significant additions to the ODCM were completed in Jan, 2007 to describe the ongoing actions from the Ground Water investigation. While these actions included significant analyses performed in 2006, the ODCMs were not updated until sufficient learnings could be captured. Since this occurred in January 2007, the ODCM updates will be included in the 2007 annual report. They are also available any time upon request.

Indian Point Energy Center

(Units 1, 2, and 3)

RADIOACTIVE EFFLUENT RELEASE REPORT

B. GASEOUS EFFLUENTS

2006

TABLE 1A

INDIAN POINT 1 and 2 RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

A. Fission & Activation Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006	Est. Total % Error
1. Total Release	Ci	4.30E+01	1.73E+02	1.64E+00	5.70E-01	2.19E+02	± 25
2. Average release rate	uCi/sec	5.53E+00	2.20E+01	2.07E-01	7.17E-02	6.93E+00	

B. Iodines

1. Total Iodine-131	Ci	2.15E-06	7.85E-04	-	-	7.87E-04	± 25
2. Average release rate	uCi/sec	2.77E-07	9.99E-05	-	-	2.50E-05	

C. Particulates

1. Total Release, with half-life > 8 days	Ci	9.84E-06	1.83E-05	1.94E-05	-	4.76E-05	± 25
2. Average release rate	uCi/sec	1.27E-06	2.33E-06	2.44E-06	-	1.51E-06	
3. Gross Alpha	Ci	-	-	-	-	-	± 25

D. Tritium

1. Total release	Ci	1.74E+00	6.12E+00	3.68E+00	2.83E+00	1.44E+01	± 25
2. Average release rate	uCi/sec	2.24E-01	7.79E-01	4.63E-01	3.57E-01	4.56E-01	

- Indicates < MDA

TABLE 1C
INDIAN POINT 1 and 2 CONTINUOUS GASEOUS EFFLUENTS
RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)

Nuclides Released

1) Fission Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006
Xe-131m	Ci	-	1.91E-02	-	-	1.91E-02
Xe-133	Ci	3.28E+00	4.02E+01	-	-	4.34E+01
Xe-135	Ci	-	6.12E-02	-	-	6.12E-02
Total for Period	Ci	3.28E+00	4.02E+01	0.00E+00	0.00E+00	4.35E+01

2) Iodines						
I-131	Ci	2.15E-06	7.85E-04	-	-	7.87E-04
I-133	Ci	-	1.21E-04	-	-	1.21E-04
I-135	Ci	-	-	-	-	-
Total for Period	Ci	2.15E-06	9.07E-04	0.00E+00	0.00E+00	9.09E-04

3) Particulates						
Co-58	Ci	-	2.75E-06	-	-	2.75E-06
Cs-137	Ci	9.07E-06	1.39E-05	1.17E-05	-	3.46E-05
Ni-63	Ci	7.66E-07	1.72E-06	7.75E-06	-	1.02E-05
Total for Period	Ci	9.84E-06	1.83E-05	1.94E-05	0.00E+00	4.76E-05

- Indicates < MDA

TABLE 1C
INDIAN POINT 1 and 2 RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)
BATCH GASEOUS EFFLUENTS

Nuclides Released

1) Fission Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006
Ar-41	Ci	4.79E-02	1.33E-01	2.52E-02	1.64E-02	2.23E-01
Kr-85	Ci	7.13E+00	7.40E+00	1.57E+00	4.90E-01	1.66E+01
Kr-85m	Ci	1.55E-02	2.77E-01	1.00E-03	1.98E-04	2.94E-01
Kr-87	Ci	5.15E-03	1.01E-03	6.90E-04	3.05E-05	6.88E-03
Kr-88	Ci	1.79E-02	1.43E-01	1.51E-03	1.97E-04	1.63E-01
Xe-131m -	Ci	6.18E-01	1.34E+00	-	0	1.95E+00
Xe-133	Ci	3.16E+01	1.18E+02	2.96E-02	5.65E-02	1.49E+02
Xe-133m	Ci	1.60E-01	1.48E+00	2.32E-04	4.64E-04	1.64E+00
Xe-135	Ci	1.62E-01	4.73E+00	1.17E-02	5.65E-03	4.90E+00
Xe-135m	Ci	5.83E-03	2.34E-03	1.47E-03	1.81E-05	9.66E-03
Xe-138	Ci	1.49E-03	6.16E-04	-	4.45E-06	2.11E-03
Total for Period	Ci	3.98E+01	1.33E+02	1.64E+00	5.70E-01	1.75E+02

2) Iodines

Not Applicable for Batch Releases

3) Particulates

Not Applicable for Batch Releases

- Indicates < MDA

TABLE 1A

INDIAN POINT 3 RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

A. Fission & Activation Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006	Est. Total % Error
1. Total Release	Ci	3.51E-02	4.31E-02	6.93E-02	6.45E-01	7.93E-01	± 25
2. Average release rate	uCi/sec	4.52E-03	5.49E-03	8.72E-03	8.12E-02	2.51E-02	

B. Iodines

1. Total Iodine-131	Ci	-	-	-	-	-	± 25
2. Average release rate	uCi/sec	-	-	-	-	-	

C. Particulates

1. Total Release, with half-life > 8 days	Ci	-	-	-	-	-	± 25
2. Average release rate	uCi/sec	-	-	-	-	-	
3. Gross Alpha	Ci	-	-	-	-	-	± 25

D. Tritium

1. Total release	Ci	1.14E+00	1.66E+00	2.23E+00	1.42E+00	6.45E+00	± 25
2. Average release rate	uCi/sec	1.47E-01	2.11E-01	2.81E-01	1.79E-01	2.05E-01	

- Indicates < MDA

TABLE 1C
INDIAN POINT 3 - CONTINUOUS GASEOUS EFFLUENTS
RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)

Nuclides Released

1) Fission Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006
Xe-133	Ci	0.00E+00	0.00E+00	0.00E+00	5.21E-01	5.21E-01
Total for Period	Ci	0.00E+00	0.00E+00	0.00E+00	5.21E-01	5.21E-01

2) Iodines						
I-131	Ci	-	-	-	-	-
I-133	Ci	-	-	-	-	-
I-135	Ci	-	-	-	-	-
Total for Period	Ci	-	-	-	-	-

3) Particulates						
Total for Period	Ci	-	-	-	-	-

- indicates < MDA

TABLE 1C
INDIAN POINT 3 RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)
BATCH GASEOUS EFFLUENTS

Nuclides Released

1) Fission Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006
Ar-41	Ci	2.26E-02	3.01E-02	2.87E-02	3.94E-02	1.21E-01
Kr-85	Ci	-	-	-	-	-
Kr-85m	Ci	-	-	-	-	-
Kr-87	Ci	-	-	-	-	-
Kr-88	Ci	-	-	-	-	-
Xe-131m	Ci	-	-	-	-	-
Xe-133	Ci	1.25E-02	1.27E-02	4.05E-02	8.40E-02	1.50E-01
Xe-133m	Ci	-	-	-	-	-
Xe-135	Ci	-	4.07E-04	9.02E-05	4.77E-04	9.74E-04
Xe-135m	Ci	-	-	-	-	-
Total for Period	Ci	3.51E-02	4.31E-02	6.93E-02	1.24E-01	2.72E-01

2) Iodines

Not Applicable for Batch Releases

3) Particulates

Not Applicable for Batch Releases

Indian Point Energy Center

(Units 1, 2, and 3)

RADIOACTIVE EFFLUENT REPORT

C. LIQUID EFFLUENTS

2006

TABLE 2A

INDIAN POINT 1 and 2 RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

A. Fission & Activation Products	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006	Est. Total % Error
1. Total Release (not including Tritium, Gr Alpha, & Gases)	Ci	3.45E-02	1.49E-02	2.02E-03	2.21E-03	5.37E-02	± 25
2. Average Diluted Conc	uCi/ml	5.89E-11	2.35E-11	2.36E-12	3.09E-12	1.92E-11	

B. Tritium

1. Total Release	Ci	5.74E+02	2.06E+02	1.35E+01	3.29E+01	8.27E+02	± 25
2. Average Diluted Conc	uCi/ml	9.78E-07	3.24E-07	1.57E-08	4.60E-08	2.96E-07	

C. Dissolved & Entrained Gases

1. Total Release	Ci	2.54E-01	1.27E-01	-	-	3.81E-01	± 25
2. AverageDiluted Conc	uCi/ml	4.33E-10	2.00E-10	-	-	1.36E-10	

D. Gross Alpha

1. Total Release	Ci	-	-	-	-	-	± 25

E. Volume of Waste Released

1. Processed (LW, NCD)	liters	3.66E+06	4.34E+06	2.36E+06	2.50E+06	1.29E+07	± 10
2. Unprocessed (SGBD, SFDS)	liters	5.88E+07	4.84E+07	4.17E+07	4.27E+07	1.92E+08	± 10

F. Volume of Dilution Water	liters	5.87E+11	6.36E+11	8.55E+11	7.15E+11	2.79E+12	± 10

- Indicates < MDA

TABLE 2B

INDIAN POINT 1 and 2 LIQUID RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)

CONTINUOUS RADIOACTIVE EFFLUENT

Nuclides Released	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006
Cs-137	Ci	1.41E-02	5.92E-04	3.58E-05	1.36E-04	1.49E-02
Ni-63	Ci	3.28E-04	7.74E-05	4.29E-05	-	4.48E-04
Sr-89	Ci	4.34E-05	8.66E-05	3.05E-05	-	1.60E-04
Sr-90	Ci	3.56E-04	4.62E-04	1.80E-04	2.22E-04	1.22E-03
Total for Period	Ci	1.49E-02	1.22E-03	2.89E-04	3.58E-04	1.67E-02

- Indicates < MDA

INDIAN POINT 1 and 2 LIQUID RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)

BATCH RADIOACTIVE EFFLUENT

Nuclides Released	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006
Ag-110m	Ci	1.98E-03	3.58E-04	-	-	2.34E-03
Co-57	Ci	1.04E-05	-	-	-	1.04E-05
Co-58	Ci	4.53E-04	3.92E-03	4.58E-04	9.75E-05	4.93E-03
Co-60	Ci	9.04E-03	2.32E-03	3.61E-05	7.33E-06	1.14E-02
Cr-51	Ci	-	1.22E-04	-	-	1.22E-04
Cs-134	Ci	-	1.47E-05	-	1.82E-05	3.29E-05
Cs-137	Ci	3.50E-04	8.59E-05	5.94E-06	1.51E-04	5.93E-04
I-131	Ci	-	1.47E-03	-	-	1.47E-03
I-132	Ci	-	1.39E-05	-	-	1.39E-05
Mn-54	Ci	2.91E-04	-	-	-	2.91E-04
Nb-95	Ci	1.14E-05	-	-	-	1.14E-05
Ni-63	Ci	2.01E-03	1.04E-03	5.23E-05	-	3.11E-03
Sb-124	Ci	1.48E-05	2.95E-04	6.39E-05	-	3.74E-04
Sb-125	Ci	5.51E-03	3.96E-03	1.11E-03	1.57E-03	1.22E-02
Te-123m	Ci	-	6.88E-05	8.38E-06	-	7.72E-05
Te-132	Ci	-	2.88E-05	-	-	2.88E-05
Total for Period	Ci	1.97E-02	1.37E-02	1.73E-03	1.85E-03	3.70E-02

Dissolved & Entrained Gas

Kr-85	Ci	1.30E-03	3.73E-03	-	-	5.03E-03
Xe-131m	Ci	5.35E-03	2.83E-03	-	-	8.18E-03
Xe-133	Ci	2.45E-01	1.20E-01	-	-	3.65E-01
Xe-133m	Ci	1.55E-03	5.62E-04	-	-	2.11E-03
Xe-135	Ci	1.51E-04	6.85E-05	-	-	2.20E-04
Total for Period	Ci	2.54E-01	1.27E-01	0.00E+00	0.00E+00	3.81E-01

- Indicates < MDA

TABLE 2A

INDIAN POINT 3 RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

A. Fission & Activation Products	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2006	Est. Total % Error
1. Total Release (not including Tritium, Gr Alpha, & Gases)	Ci	2.32E-03	1.38E-03	1.36E-03	4.90E-04	5.55E-03	± 25
2. Average Diluted Conc	uCi/ml	3.96E-12	2.16E-12	1.59E-12	6.85E-13	1.99E-12	

B. Tritium

1. Total Release	Ci	3.23E+01	8.64E+01	4.52E+02	1.60E+02	7.31E+02	± 25
2. Average Diluted Conc	uCi/ml	5.51E-08	1.36E-07	5.29E-07	2.24E-07	2.62E-07	

C. Dissolved & Entrained Gases

1. Total Release	Ci	0.00E+00	0.00E+00	3.80E-04	4.74E-04	8.55E-04	± 25
2. AverageDiluted Conc	uCi/ml	0.00E+00	0.00E+00	4.45E-13	6.63E-13	3.06E-13	

D. Gross Alpha

1. Total Release	Ci	-	-	-	-	-	± 25

E. Volume of Waste Released

1. Processed Fluids (Mon Tanks)	liters	2.29E+05	2.01E+05	5.24E+05	2.62E+05	1.22E+06	± 10
2. Unprocessed Fluids (SGs)	liters	1.60E+06	1.62E+06	5.48E+06	1.21E+07	2.08E+07	± 10

F. Volume of Dilution Water	liters	5.87E+11	6.36E+11	8.55E+11	7.15E+11	2.79E+12	± 10

TABLE 2B
INDIAN POINT 3 LIQUID RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2006)
BATCH and CONTINUOUS RADIOACTIVE LIQUID EFFLUENT

Batch Fission/Activation Products	Units	**Qtr 1**	**Qtr 2**	**Qtr 3**	**Qtr 4**	**2006**
Ag-110m	Ci	8.73E-05	1.25E-05	7.99E-06	-	1.08E-04
Co-58	Ci	3.88E-05	8.60E-06	7.91E-05	-	1.26E-04
Co-60	Ci	2.95E-04	4.04E-05	5.59E-04	2.93E-04	1.19E-03
Cs-134	Ci	2.96E-05	-	-	-	2.96E-05
Cs-137	Ci	7.13E-05	1.15E-05	4.98E-05	1.37E-05	1.46E-04
Fe-55	Ci	-	1.03E-04	-	-	1.03E-04
Mn-54	Ci	1.26E-05	-	-	-	1.26E-05
Ni-63	Ci	2.28E-04	5.12E-05	2.20E-04	-	5.00E-04
Sb-125	Ci	1.56E-03	1.15E-03	4.48E-04	1.79E-04	3.33E-03
Sn-113	Ci	-	-	-	4.58E-06	4.58E-06
Total for Period	Ci	2.32E-03	1.38E-03	1.36E-03	4.90E-04	5.55E-03

Dissolved and Entrained Gas (Batch)

Xe-131m	Ci				6.12E-05	6.12E-05
Xe-133	Ci			3.80E-04	4.13E-04	7.93E-04
Total for Period	Ci	0.00E+00	0.00E+00	3.80E-04	4.74E-04	8.55E-04

Continuous Releases (SG Blowdown)

H-3 (only)	Ci	2.79E-03	3.80E-03	1.43E-02	1.70E-02	3.79E-02

Indian Point Energy Center

(Units 1, 2, and 3)

RADIOACTIVE EFFLUENT REPORT

D. SOLID WASTE

2006

Units 1 and 2 Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream 01/01/2006 to 12/31/2006

Percent Cutoff: 0 (all identified isotopes are included)

Waste Stream : Resins, Filters, and Evap Bottoms
LWS Resin Plant Resin 8-120 Cartridge Filters

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	8.23E+02	2.33E+01	1.26E+01	+/- 25%
B	1.00E+03	2.84E+01	3.82E+02	+/- 25%
C	4.59E+02	1.30E+01	4.28E+02	+/- 25%
All	2.28E+03	6.47E+01	8.22E+02	+/- 25%

Waste Stream : Dry Active Waste DAW 40' Sea Land
DAW/Dirt;B-25 Box DAW 20' Sea Land Soil/Debris - Intermodal

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	4.38E+04	1.24E+03	2.49E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	4.38E+04	1.24E+03	2.49E+00	+/-25%

Waste Stream : Irradiated Components

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%

Waste Stream : Other Waste Combined Packages

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	2.56E+03	7.25E+01	9.66E-01	+/-25%
B	1.28E+03	3.62E+01	5.51E+00	+/-25%
C	1.20E+02	3.41E+00	1.38E+01	+/-25%
All	3.96E+03	1.12E+02	2.03E+01	+/-25%

Waste Stream : Sum of All 4 Categories Combined Packages:
DAW/Dirt; B-25 Box DAW 20' Sea Land LWS Resin
DAW-40' Sea Land Cartridge Filters Plant Resin 8-120
Soil/Debris - Intermodal

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	4.72E+04	1.34E+03	1.61E+01	+/-25%
B	2.28E+03	6.46E+01	3.88E+02	+/-25%
C	5.79E+02	1.64E+01	4.41E+02	+/-25%
All	5.01E+04	1.42E+03	8.45E+02	+/-25%

Combined Waste Type Shipment, Major Volume Waste Type Shown

Units 1 and 2 Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream 01/01/2006 to 12/31/2006

Percent Cutoff: 0

Number of Shipments	Mode of Transportation	Destination
5	Hittman Transport	Duratek, Inc. – GIC
15	Hittman Transport	GTS Duratek
11	Hittman Transport	Studsvik Processing Facility
1	R & R Trucking Inc.	Studsvik Processing Facility
1	Hittman Transport	Studsvik RACE
1	R & R Trucking Inc.	Studsvik RACE
8	Studsvik Logistics	Studsvik RACE

Resins, Filters, and Evap Bottoms
Waste Class A

Nuclide Name	Percent Abundance	Curies
H-3	9.67%	1.22E+00
Cr-51	0.00%	4.55E-04
Mn-54	0.21%	2.61E-02
Fe-55	8.64%	1.09E+00
Co-57	0.06%	7.27E-03
Co-58	0.43%	5.43E-02
Co-60	3.76%	4.74E-01
Ni-63	25.05%	3.16E+00
Sr-90	0.18%	2.23E-02
Ag-110m	0.07%	8.84E-03
Sb-125	0.28%	3.55E-02
Cs-134	18.39%	2.32E+00
Cs-137	33.06%	4.17E+00
Ce-144	0.21%	2.59E-02
Pu-238	0.00%	1.31E-06
Pu-239	0.00%	1.92E-06
Am-241	0.00%	3.26E-06
Cm-243	0.00%	8.34E-08

Resins, Filters, and Evap Bottoms
Waste Class B

Nuclide Name	Percent Abundance	Curies
H-3	7.01%	2.68E+01
Cr-51	0.00%	1.83E-02
Mn-54	0.40%	1.53E+00
Fe-55	2.04%	7.81E+00
Co-57	0.03%	1.30E-01
Co-58	0.63%	2.39E+00
Co-60	1.77%	6.78E+00
Ni-63	9.37%	3.58E+01
Sr-90	0.18%	6.91E-01
Nb-95	0.07%	2.66E-01

Ag-110m	0.01%	2.88E-02
Sn-113	0.05%	1.76E-01
Sb-124	0.00%	6.03E-04
Sb-125	0.23%	8.76E-01
Cs-134	9.29%	3.55E+01
Cs-137	68.28%	2.61E+02
Ce-144	0.64%	2.43E+00
Pu-238	0.00%	1.51E-03
Pu-239	0.00%	1.01E-03
Pu-241	0.01%	2.71E-02
Am-241	0.00%	1.52E-03
Cm-242	0.00%	1.42E-04
Cm-243	0.00%	3.67E-04

Resins, Filters, and Evap Bottoms
Waste Class C

Nuclide Name	Percent Abundance	Curies
H-3	0.10%	4.31E-01
Mn-54	0.17%	7.22E-01
Fe-55	1.38%	5.91E+00
Co-57	0.02%	7.26E-02
Co-58	0.10%	4.27E-01
Co-60	1.90%	8.14E+00
Ni-63	13.45%	5.75E+01
Sr-90	0.09%	3.66E-01
Ag-110m	0.00%	5.06E-03
Sb-125	0.49%	2.11E+00
Cs-134	6.41%	2.74E+01
Cs-137	75.31%	3.22E+02
Ce-144	0.58%	2.47E+00
Pu-238	0.00%	2.27E-03
Pu-239	0.00%	1.82E-03
Pu-241	0.01%	3.28E-02
Am-241	0.00%	2.85E-03
Cm-242	0.00%	5.78E-05
Cm-243	0.00%	4.77E-04

Resins, Filters, and Evap Bottoms
Waste Class All

Nuclide Name	Percent Abundance	Curies
H-3	3.45%	2.84E+01
Cr-51	0.00%	1.88E-02
Mn-54	0.28%	2.28E+00
Fe-55	1.80%	1.48E+01
Co-57	0.03%	2.10E-01
Co-58	0.35%	2.88E+00
Co-60	1.87%	1.54E+01

Ni-63	11.73%	9.64E+01
Sr-90	0.13%	1.08E+00
Nb-95	0.03%	2.66E-01
Ag-110m	0.01%	4.27E-02
Sn-113	0.02%	1.76E-01
Sb-124	0.00%	6.03E-04
Sb-125	0.37%	3.02E+00
Cs-134	7.93%	6.52E+01
Cs-137	71.40%	5.87E+02
Ce-144	0.60%	4.92E+00
Pu-238	0.00%	3.79E-03
Pu-239	0.00%	2.84E-03
Pu-241	0.01%	5.98E-02
Am-241	0.00%	4.38E-03
Cm-242	0.00%	2.00E-04
Cm-243	0.00%	8.44E-04

Dry Active Waste
Waste Class A

Nuclide Name	Percent Abundance	Curies
C-14	0.02%	4.50E-04
Mn-54	4.38%	1.09E-01
Fe-55	44.96%	1.12E+00
Co-58	21.08%	5.25E-01
Co-60	24.33%	6.06E-01
Ni-63	4.50%	1.12E-01
Sr-90	0.07%	1.78E-03
Cs-137	0.10%	2.41E-03
Ce-144	0.25%	6.14E-03
Pu-238	0.01%	1.78E-04
Pu-239	0.00%	4.57E-05
Pu-241	0.29%	7.15E-03
Am-241	0.00%	4.03E-05
Cm-242	0.02%	4.08E-04
Cm-243	0.01%	2.56E-04

Dry Active Waste
Waste Class All

Nuclide Name	Percent Abundance	Curies
C-14	0.02%	4.50E-04
Mn-54	4.38%	1.09E-01
Fe-55	44.96%	1.12E+00
Co-58	21.08%	5.25E-01
Co-60	24.33%	6.06E-01
Ni-63	4.50%	1.12E-01
Sr-90	0.07%	1.78E-03
Cs-137	0.10%	2.41E-03
Ce-144	0.25%	6.14E-03
Pu-238	0.01%	1.78E-04

Pu-239	0.00%	4.57E-05
Pu-241	0.29%	7.15E-03
Am-241	0.00%	4.03E-05
Cm-242	0.02%	4.08E-04
Cm-243	0.01%	2.56E-04

Other Waste
Waste Class A

Nuclide Name	Percent Abundance	Curies
H-3	0.00%	2.11E-06
C-14	0.02%	1.81E-04
Mn-54	3.80%	3.67E-02
Fe-55	42.04%	4.06E-01
Co-57	0.04%	3.40E-04
Co-58	13.05%	1.26E-01
Co-60	23.40%	2.26E-01
Ni-63	7.32%	7.07E-02
Sr-90	0.07%	7.02E-04
Cs-134	4.27%	4.12E-02
Cs-137	5.37%	5.19E-02
Ce-144	0.32%	3.10E-03
Pu-238	0.01%	6.62E-05
Pu-239	0.00%	1.70E-05
Pu-241	0.27%	2.64E-03
Am-241	0.00%	1.50E-05
Cm-242	0.01%	1.17E-04
Cm-243	0.01%	9.49E-05

Other Waste
Waste Class B

Nuclide Name	Percent Abundance	Curies
C-14	0.02%	1.20E-03
Mn-54	4.32%	2.38E-01
Fe-55	50.67%	2.79E+00
Co-58	10.55%	5.81E-01
Co-60	28.33%	1.56E+00
Ni-63	5.32%	2.93E-01
Sr-90	0.08%	4.67E-03
Cs-137	0.08%	4.45E-03
Ce-144	0.24%	1.31E-02
Pu-238	0.01%	4.74E-04
Pu-239	0.00%	1.22E-04
Pu-241	0.34%	1.88E-02
Am-241	0.00%	1.07E-04
Cm-242	0.01%	7.41E-04
Cm-243	0.01%	6.78E-04

Other Waste
Waste Class C

Nuclide Name	Percent Abundance	Curies
H-3	0.01%	1.40E-03
C-14	0.00%	2.25E-05
Mn-54	0.45%	6.29E-02
Fe-55	5.42%	7.51E-01
Co-57	0.04%	5.88E-03
Co-58	0.14%	1.96E-02
Co-60	5.94%	8.23E-01
Ni-59	0.00%	1.25E-04
Ni-63	27.08%	3.75E+00
Sr-90	0.08%	1.05E-02
Nb-94	0.00%	4.60E-07
Tc-99	0.00%	2.35E-06
Ag-110m	0.01%	1.95E-03
Sb-125	1.66%	2.30E-01
Cs-134	21.95%	3.04E+00
Cs-137	36.90%	5.11E+00
Ce-144	0.29%	3.95E-02
U-235	0.00%	9.65E-07
Np-237	0.00%	1.14E-09
Pu-238	0.00%	1.45E-04
Pu-239	0.00%	3.12E-05
Pu-240	0.00%	1.29E-08
Pu-241	0.03%	3.86E-03
Am-241	0.00%	2.33E-05
Am-243	0.00%	1.16E-15
Cm-242	0.00%	3.83E-06
Cm-243	0.00%	4.87E-05
Cm-244	0.00%	6.65E-16

Other Waste
Waste Class All

Nuclide Name	Percent Abundance	Curies
H-3	0.01%	1.40E-03
C-14	0.01%	1.40E-03
Mn-54	1.66%	3.37E-01
Fe-55	19.39%	3.94E+00
Co-57	0.03%	6.22E-03
Co-58	3.58%	7.27E-01
Co-60	12.85%	2.61E+00
Ni-59	0.00%	1.25E-04
Ni-63	20.28%	4.12E+00
Sr-90	0.08%	1.59E-02
Nb-94	0.00%	4.60E-07
Tc-99	0.00%	2.35E-06
Ag-110m	0.01%	1.95E-03
Sb-125	1.13%	2.30E-01

Cs-134	15.16%	3.08E+00
Cs-137	25.40%	5.16E+00
Ce-144	0.27%	5.57E-02
U-235	0.00%	9.65E-07
Np-237	0.00%	1.14E-09
Pu-238	0.00%	6.84E-04
Pu-239	0.00%	1.70E-04
Pu-240	0.00%	1.29E-08
Pu-241	0.12%	2.53E-02
Am-241	0.00%	1.46E-04
Am-243	0.00%	1.16E-15
Cm-242	0.00%	8.62E-04
Cm-243	0.00%	8.22E-04
Cm-244	0.00%	6.65E-16

Sum of All 4 Categories
Waste Class A

Nuclide Name	Percent Abundance	Curies
H-3	7.60%	1.22E+00
C-14	0.00%	6.30E-04
Cr-51	0.00%	4.55E-04
Mn-54	1.07%	1.72E-01
Fe-55	16.25%	2.61E+00
Co-57	0.05%	7.61E-03
Co-58	4.39%	7.05E-01
Co-60	8.16%	1.31E+00
Ni-63	20.80%	3.34E+00
Sr-90	0.15%	2.48E-02
Ag-110m	0.06%	8.84E-03
Sb-125	0.22%	3.55E-02
Cs-134	14.69%	2.36E+00
Cs-137	26.27%	4.22E+00
Ce-144	0.22%	3.51E-02
Pu-238	0.00%	2.45E-04
Pu-239	0.00%	6.46E-05
Pu-241	0.06%	9.78E-03
Am-241	0.00%	5.86E-05
Cm-242	0.00%	5.25E-04
Cm-243	0.00%	3.51E-04

Sum of All 4 Categories
Waste Class B

Nuclide Name	Percent Abundance	Curies
H-3	6.91%	2.68E+01
C-14	0.00%	1.20E-03
Cr-51	0.00%	1.83E-02
Mn-54	0.46%	1.77E+00
Fe-55	2.73%	1.06E+01
Co-57	0.03%	1.30E-01

Co-58	0.77%	2.98E+00
Co-60	2.15%	8.34E+00
Ni-63	9.31%	3.61E+01
Sr-90	0.18%	6.96E-01
Nb-95	0.07%	2.66E-01
Ag-110m	0.01%	2.88E-02
Sn-113	0.05%	1.76E-01
Sb-124	0.00%	6.03E-04
Sb-125	0.23%	8.76E-01
Cs-134	9.15%	3.55E+01
Cs-137	67.31%	2.61E+02
Ce-144	0.63%	2.45E+00
Pu-238	0.00%	1.99E-03
Pu-239	0.00%	1.13E-03
Pu-241	0.01%	4.59E-02
Am-241	0.00%	1.63E-03
Cm-242	0.00%	8.83E-04
Cm-243	0.00%	1.04E-03

Sum of All 4 Categories
Waste Class C

Nuclide Name	Percent Abundance	Curies
H-3	0.10%	4.32E-01
C-14	0.00%	2.25E-05
Mn-54	0.18%	7.85E-01
Fe-55	1.51%	6.66E+00
Co-57	0.02%	7.85E-02
Co-58	0.10%	4.47E-01
Co-60	2.03%	8.96E+00
Ni-59	0.00%	1.25E-04
Ni-63	13.87%	6.12E+01
Sr-90	0.09%	3.77E-01
Nb-94	0.00%	4.60E-07
Tc-99	0.00%	2.35E-06
Ag-110m	0.00%	7.01E-03
Sb-125	0.53%	2.34E+00
Cs-134	6.91%	3.05E+01
Cs-137	74.09%	3.27E+02
Ce-144	0.57%	2.51E+00
U-235	0.00%	9.65E-07
Np-237	0.00%	1.14E-09
Pu-238	0.00%	2.42E-03
Pu-239	0.00%	1.86E-03
Pu-240	0.00%	1.29E-08
Pu-241	0.01%	3.66E-02
Am-241	0.00%	2.87E-03
Am-243	0.00%	1.16E-15
Cm-242	0.00%	6.16E-05
Cm-243	0.00%	5.26E-04
Cm-244	0.00%	6.65E-16

Sum of All 4 Categories
Waste Class All

Nuclide Name	Percent Abundance	Curies
H-3	3.36%	2.84E+01
C-14	0.00%	1.85E-03
Cr-51	0.00%	1.88E-02
Mn-54	0.32%	2.72E+00
Fe-55	2.35%	1.99E+01
Co-57	0.03%	2.16E-01
Co-58	0.49%	4.13E+00
Co-60	2.20%	1.86E+01
Ni-59	0.00%	1.25E-04
Ni-63	11.95%	1.01E+02
Sr-90	0.13%	1.10E+00
Nb-94	0.00%	4.60E-07
Nb-95	0.03%	2.66E-01
Tc-99	0.00%	2.35E-06
Ag-110m	0.01%	4.46E-02
Sn-113	0.02%	1.76E-01
Sb-124	0.00%	6.03E-04
Sb-125	0.38%	3.25E+00
Cs-134	8.08%	6.83E+01
Cs-137	70.04%	5.92E+02
Ce-144	0.59%	4.99E+00
U-235	0.00%	9.65E-07
Np-237	0.00%	1.14E-09
Pu-238	0.00%	4.65E-03
Pu-239	0.00%	3.05E-03
Pu-240	0.00%	1.29E-08
Pu-241	0.01%	9.23E-02
Am-241	0.00%	4.56E-03
Am-243	0.00%	1.16E-15
Cm-242	0.00%	1.47E-03
Cm-243	0.00%	1.92E-03
Cm-244	0.00%	6.65E-16

Unit 3 Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream 01/01/2006 to 12/31/2006

Percent Cutoff: 0 (all identified isotopes are included)

Waste Stream : Resins, Filters, and Evap Bottoms
LWS Resin 14-170 Primary Resin 8-120

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	3.42E+02	9.67E+00	7.07E+00	+/- 25%
B	2.91E+02	8.24E+00	9.65E+01	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	6.33E+02	1.79E+01	1.04E+02	+/- 25%

Waste Stream : Dry Active Waste
Unit 3 DAW-20' Sealand Unit 3 DAW B-25

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	2.42E+03	6.86E+01	5.20E-02	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	2.42E+03	6.86E+01	5.20E-02	+/-25%

Waste Stream : Irradiated Components

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%

Waste Stream : Other Waste

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%

Waste Stream : Sum of All 4 Categories LWS Resin 14-170
Unit 3 DAW-20' Sealand Unit 3 DAW-B25 Primary Resin 8-120

Waste Class	Volume ft^3	Volume m^3	Curies Shipped	% Error (Ci)
A	2.76E+03	7.83E+01	7.12E+00	+/-25%
B	2.91E+02	8.24E+00	9.65E+01	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	3.05E+03	8.65E+01	1.04E+02	+/-25%

Combined Waste Type Shipment, Major Volume Waste Type Shown

Unit 3 Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream 01/01/2006 to 12/31/2006

Percent Cutoff: 0

Number of Shipments	Mode of Transportation	Destination
3	Hittman Transport	GTS Duratek Bear Creek Ops
4	Hittman Transport	Studsvik Processing Facility

Resins, Filters, and Evap Bottoms
Waste Class A

Nuclide Name	Percent Abundance	Curies
H-3	13.66%	9.66E-01
Cr-51	0.00%	2.00E-04
Mn-54	0.44%	3.12E-02
Fe-55	5.92%	4.19E-01
Co-57	0.26%	1.87E-02
Co-58	5.12%	3.62E-01
Co-60	5.84%	4.13E-01
Ni-63	16.82%	1.19E+00
Sr-89	0.42%	3.00E-02
Sr-90	0.15%	1.05E-02
Ag-110m	0.23%	1.63E-02
Sb-124	2.60%	1.84E-01
Sb-125	6.74%	4.77E-01
Cs-134	12.67%	8.96E-01
Cs-137	22.05%	1.56E+00
Ce-144	7.05%	4.99E-01
Pu-238	0.00%	1.93E-04
Pu-239	0.00%	5.91E-05
Am-241	0.00%	9.97E-05
Cm-242	0.00%	6.24E-05
Cm-243	0.00%	3.20E-04

Resins, Filters, and Evap Bottoms
Waste Class B

Nuclide Name	Percent Abundance	Curies
Mn-54	0.08%	7.64E-02
Fe-55	8.73%	8.43E+00
Co-57	0.00%	0.00E+00
Co-58	0.15%	1.49E-01
Co-60	17.71%	1.71E+01
Ni-63	47.96%	4.63E+01
Sr-90	0.03%	2.63E-02
Sb-125	0.96%	9.27E-01
Cs-134	8.06%	7.78E+00
Cs-137	15.85%	1.53E+01
Ce-144	0.45%	4.33E-01

Pu-238	0.00%	1.88E-04
Pu-239	0.00%	4.83E-05
Pu-241	0.01%	6.76E-03
Am-241	0.00%	9.07E-05
Cm-242	0.00%	4.49E-04
Cm-243	0.00%	5.19E-04

Resins, Filters, and Evap Bottoms
Waste Class All

Nuclide Name	Percent Abundance	Curies
H-3	0.93%	9.66E-01
Cr-51	0.00%	2.00E-04
Mn-54	0.10%	1.08E-01
Fe-55	8.55%	8.85E+00
Co-57	0.02%	1.87E-02
Co-58	0.49%	5.11E-01
Co-60	16.90%	1.75E+01
Ni-63	45.88%	4.75E+01
Sr-89	0.03%	3.00E-02
Sr-90	0.04%	3.68E-02
Ag-110m	0.02%	1.63E-02
Sb-124	0.18%	1.84E-01
Sb-125	1.35%	1.40E+00
Cs-134	8.38%	8.68E+00
Cs-137	16.23%	1.68E+01
Ce-144	0.90%	9.32E-01
Pu-238	0.00%	3.81E-04
Pu-239	0.00%	1.07E-04
Pu-241	0.01%	6.76E-03
Am-241	0.00%	1.90E-04
Cm-242	0.00%	5.11E-04
Cm-243	0.00%	8.39E-04

Dry Active Waste
Waste Class A

Nuclide Name	Percent Abundance	Curies
Cr-51	11.23%	5.84E-03
Mn-54	0.37%	1.94E-04
Fe-55	2.56%	1.33E-03
Co-57	0.18%	9.56E-05
Co-58	68.87%	3.58E-02
Co-60	1.77%	9.21E-04
Ni-63	3.64%	1.89E-03
Nb-95	0.23%	1.17E-04
Sb-124	5.04%	2.62E-03
Sb-125	4.81%	2.50E-03
Cs-134	0.71%	3.69E-04
Cs-137	0.59%	3.06E-04

Dry Active Waste
Waste Class All

Nuclide Name	Percent Abundance	Curies
Cr-51	11.23%	5.84E-03
Mn-54	0.37%	1.94E-04
Fe-55	2.56%	1.33E-03
Co-57	0.18%	9.56E-05
Co-58	68.87%	3.58E-02
Co-60	1.77%	9.21E-04
Ni-63	3.64%	1.89E-03
Nb-95	0.23%	1.17E-04
Sb-124	5.04%	2.62E-03
Sb-125	4.81%	2.50E-03
Cs-134	0.71%	3.69E-04
Cs-137	0.59%	3.06E-04

Sum of All 4 Categories
Waste Class A

Nuclide Name	Percent Abundance	Curies
H-3	13.56%	9.66E-01
Cr-51	0.08%	6.04E-03
Mn-54	0.44%	3.14E-02
Fe-55	5.90%	4.20E-01
Co-57	0.26%	1.88E-02
Co-58	5.59%	3.98E-01
Co-60	5.81%	4.14E-01
Ni-63	16.70%	1.19E+00
Sr-89	0.42%	3.00E-02
Sr-90	0.15%	1.05E-02
Nb-95	0.00%	1.17E-04
Ag-110m	0.23%	1.63E-02
Sb-124	2.62%	1.87E-01
Sb-125	6.74%	4.80E-01
Cs-134	12.58%	8.96E-01
Cs-137	21.90%	1.56E+00
Ce-144	7.00%	4.99E-01
Pu-238	0.00%	1.93E-04
Pu-239	0.00%	5.91E-05
Am-241	0.00%	9.97E-05
Cm-242	0.00%	6.24E-05
Cm-243	0.00%	3.20E-04
		7.12E+00

Sum of All 4 Categories
Waste Class B

Nuclide Name	Percent Abundance	Curies
Mn-54	0.08%	7.64E-02
Fe-55	8.73%	8.43E+00
Co-57	0.00%	0.00E+00
Co-58	0.15%	1.49E-01
Co-60	17.71%	1.71E+01
Ni-63	47.96%	4.63E+01
Sr-90	0.03%	2.63E-02
Sb-125	0.96%	9.27E-01
Cs-134	8.06%	7.78E+00
Cs-137	15.85%	1.53E+01
Ce-144	0.45%	4.33E-01
Pu-238	0.00%	1.88E-04
Pu-239	0.00%	4.83E-05
Pu-241	0.01%	6.76E-03
Am-241	0.00%	9.07E-05
Cm-242	0.00%	4.49E-04
Cm-243	0.00%	5.19E-04

Sum of All 4 Categories
Waste Class All

Nuclide Name	Percent Abundance	Curies
H-3	0.93%	9.66E-01
Cr-51	0.01%	6.04E-03
Mn-54	0.10%	1.08E-01
Fe-55	8.54%	8.85E+00
Co-57	0.02%	1.88E-02
Co-58	0.53%	5.47E-01
Co-60	16.89%	1.75E+01
Ni-63	45.85%	4.75E+01
Sr-89	0.03%	3.00E-02
Sr-90	0.04%	3.68E-02
Nb-95	0.00%	1.17E-04
Ag-110m	0.02%	1.63E-02
Sb-124	0.18%	1.87E-01
Sb-125	1.36%	1.41E+00
Cs-134	8.38%	8.68E+00
Cs-137	16.22%	1.68E+01
Ce-144	0.90%	9.32E-01
Pu-238	0.00%	3.81E-04
Pu-239	0.00%	1.07E-04
Pu-241	0.01%	6.76E-03
Am-241	0.00%	1.90E-04
Cm-242	0.00%	5.11E-04
Cm-243	0.00%	8.39E-04

Indian Point Energy Center
(Units 1, 2, and 3)

RADIOACTIVE EFFLUENT REPORT

E. RADIOLOGICAL IMPACT ON MAN

Jan 1, 2006 - Dec 31, 2006

RADIOLOGICAL IMPACT ON MAN

Routine Effluent Dose Calculations:

The radiological impact on man is determined by conservatively calculating doses to a hypothetical maximally exposed individual offsite based on plant effluents. These calculations are divided into 3 categories: Noble Gases, Particulates and Iodine, and Liquid Releases (fish and invertebrate consumption).

A computer code is used to perform liquid and gaseous dose calculations according to the models and parameters presented in the Indian Point Offsite Dose Calculation Manuals (ODCMs). Annual average dispersion and deposition factors are used in airborne effluent calculations. Liquid calculations involve fish and invertebrate consumption pathways. Details of these calculations are presented in the ODCM, along with the applicable assumptions in Regulatory Guide 1.109 and NUREG 0133.

Indian Point Energy Center is a multi-unit site owned and operated by Entergy Nuclear Operations, Incorporated.

Carbon-14:

Concentrations and offsite dose from Carbon-14 have been estimated using data generated at IP3 from August 1980 to June 1982 after a study conducted by the NY State Department of Health. These estimates are consistent with NUREG 0017, Rev. 1. The maximum expected annual dose from Carbon 14 releases at IP2 and IP3 have been calculated using the maximum dependable gross electrical capacity, which is approximately 1000 MW(e) maintained for the entire year. The resultant worst case doses are based upon site specific assumptions of source term released for an entire year at 1000 MW(e) output, as outlined in the ODCM.

> The annual dose to the maximally exposed individual (child) from gaseous releases of Carbon-14 is 0.254 mRem to the critical organ (bone) and 0.0508 mRem to the total body. The annual dose to the maximally exposed individual (child) from liquid releases of Carbon-14 is 0.00583 mRem to the critical organ (bone) and 0.00117 mRem to the total body.
>
> These curies and doses are reported in this section, specifically to exclude them in the earlier tables, to avoid confusion. The data is listed separately from other isotopes (in the familiar table format) to preserve consistency with the format of Reg Guide 1.21 and the listed isotopes of concern, which do NOT include C-14.

Groundwater:

Curies and dose contribution from activity discovered in onsite ground water and storm drain pathways during the year are discussed in detail in Section H. The offsite dose calculation involves multiple source term measurements (by quarter), as well as determinations for release and dilution flow. A summary of the quantification methodology, and the resulting calculated doses, is provided at the end of Section H. The Total Dose table at the end of this section provides a means to compare ground water doses with those of other components making up the site's total dose.

Members of the Public:

Doses to members of the public from airborne and liquid releases are minimal due to the relatively insignificant total duration of these individuals on site. Their doses can be calculated from standard ODCM methodology, with typical occupancy factors employed. These factors are determined by comparing the expected hours on site to 8760 hours (the number of hours in a year, used in calculations in the ODCM).

example 1: Several students visit the site for an 8-hour guided tour. Their occupancy factor is: 8 / 8760 or **.0009**.

example 2: A man drives his wife to work and drops her off at the security gate each morning, with a total stay-time on site for 2 minutes per day. His occupancy factor is calculated as follows: 2 min/60 min per hour =.0333 hr ; 0.0333 / 8760 = **3.8E-6**

These factors, when multiplied by doses calculated per the ODCM, demonstrate that dose to MEMBERS OF THE PUBLIC within the site boundary is negligible, despite a potential reduction in the atmospheric dispersion.

Total Dose:

In compliance with 40CFR190, the following table indicates the Total Dose, including any measured direct shine component from the site property for 2006:

		Whole Body (mrem)	Max Organ (mrem)
40 CFR 190 limit ===→	**IPEC**	**25**	**75**
Routine Airborne Effluents	Units 1 and 2	1.19E-02	1.19E-02
Routine Liquid Effluents	Units 1 and 2	8.80E-04	1.26E-03
Routine Airborne Effluents	Unit 3	1.07E-03	1.07E-03
Routine Liquid Effluents	Unit 3	1.27E-04	1.60E-04
Carbon-14 Liquid & Airborne Totals	IPEC	5.20E-02	2.60E-01
Ground Water & Storm Drain Totals	IPEC[1]	1.78E-03	7.21E-03
Radwaste Storage, Direct Shine	IPEC[2]	< 7	< 7
Indian Point Energy Center Total Dose, per 40 CFR 190	**IPEC**	**< 7.07**	**< 7.28**

Note 1: Groundwater curie and dose calculations are provided in Section H.

Note 2: The direct shine component is indistinguishable from background. Seven mrem is conservatively used from a one mrem siting criteria established for each area.

INDIAN POINT UNITS 1 and 2 NUCLEAR POWER PLANTS
RADIOLOGICAL IMPACT ON MAN
JANUARY - DECEMBER 2006

Maximum exposed individual doses in mrem or mrad

A. LIQUID DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Organ Dose	(mrem)	1.03E-03	2.67E-04	6.26E-05	9.66E-05	1.26E-03
Applicable Limit	(mrem)	5	5	5	5	10
Percent of Limit	(%)	2.06E-02	5.33E-03	1.25E-03	1.93E-03	1.26E-02
Age Group		Child	Adult	Adult	Adult	Adult
Critical Organ		Bone	Bone	Bone	Bone	Bone

Adult Total Body	(mrem)	7.04E-04	1.22E-04	1.78E-05	3.64E-05	8.80E-04
Applicable Limit	(mrem)	1.5	1.5	1.5	1.5	3
Percent of Limit	(%)	4.69E-02	8.15E-03	1.19E-03	2.43E-03	2.93E-02

B. AIRBORNE NOBLE GAS DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Gamma Air	(mrad)	8.31E-04	4.16E-03	1.42E-05	8.70E-06	5.01E-03
Applicable Limit	(mrad)	5	5	5	5	10
Percent of Limit	(%)	1.66E-02	8.32E-02	2.84E-04	1.74E-04	5.01E-02

Beta Air	(mrad)	3.67E-03	1.38E-02	2.26E-04	7.63E-05	1.78E-02
Applicable Limit	(mrad)	10	10	10	10	20
Percent of Limit	(%)	3.67E-02	1.38E-01	2.26E-03	7.63E-04	8.89E-02

C. AIRBORNE IODINE and PARTICULATE DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Iodine/Part	(mrem)	3.64E-04	1.04E-02	7.12E-04	4.75E-04	1.19E-02
Applicable Limit	(mrem)	7.5	7.5	7.5	7.5	15
Percent of Limit	(%)	4.85E-03	1.39E-01	9.49E-03	6.33E-03	7.93E-02

Age Group		Child	Child	Child	Child	Child
Critical Organ		Liver	Thyroid	Liver	Liver	Thyroid

INDIAN POINT 3 NUCLEAR POWER PLANT
RADIOLOGICAL IMPACT ON MAN
JANUARY - DECEMBER 2006

Maximum exposed individual doses in mrem or mrad

A. LIQUID DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Organ Dose	(mrem)	2.84E-05	2.27E-05	7.58E-05	3.32E-05	1.60E-04
Applicable Limit	(mrem)	5	5	5	5	10
Percent of Limit	(%)	5.68E-04	4.54E-04	1.52E-03	6.64E-04	1.60E-03
Age Group		Adult	Adult	Adult	Adult	Adult
Critical Organ		GILLI	GILLI	GILLI	GILLI	GILLI

Adult Total Body	(mrem)	1.21E-05	1.77E-05	6.82E-05	2.88E-05	1.27E-04
Applicable Limit	(mrem)	1.5	1.5	1.5	1.5	3
Percent of Limit	(%)	8.07E-04	1.18E-03	4.55E-03	1.92E-03	4.23E-03

B. AIRBORNE NOBLE GAS DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Gamma Air	(mrad)	6.75E-06	8.90E-06	9.28E-06	2.87E-05	5.36E-05
Applicable Limit	(mrad)	5	5	5	5	10
Percent of Limit	(%)	1.35E-04	1.78E-04	1.86E-04	5.74E-04	5.36E-04

Beta Air	(mrad)	1.24E-05	1.60E-05	1.94E-05	1.09E-04	1.57E-04
Applicable Limit	(mrad)	10	10	10	10	20
Percent of Limit	(%)	1.24E-04	1.60E-04	1.94E-04	1.09E-03	7.84E-04

C. AIRBORNE IODINE and PARTICULATE DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Iodine/Part	(mrem)	1.89E-04	2.74E-04	3.69E-04	2.35E-04	1.07E-03
Applicable Limit	(mrem)	7.5	7.5	7.5	7.5	15
Percent of Limit	(%)	2.52E-03	3.65E-03	4.92E-03	3.13E-03	7.11E-03

Age Group		Child	Child	Child	Child	Child
Critical Organ		Liver	Liver	Liver	Liver	Liver

Indian Point Energy Center
(Units 1, 2, and 3)

RADIOLOGICAL EFFLUENT REPORT

F. METEOROLOGICAL DATA

Jan 1, 2006 - Dec 31, 2006

This data is stored onsite and is available in printed or electronic form.

Indian Point Energy Center
(Units 1, 2, and 3)

RADIOACTIVE EFFLUENT REPORT

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

2006

There were no changes in the REMP locations for dose calculations and/or environmental monitoring in year 2006.

There were no changes to the Land Use Census in year 2006.

The were no changes to the PCPs or ODCMs in this period.

Indian Point Energy Center
(Units 1, 2, and 3)

RADIOACTIVE EFFLUENT REPORT

H. GROUNDWATER and STORM WATER ACTIVITY ON SITE

Jan 1, 2006 - Dec 31, 2006

IPEC Groundwater and Storm Water Activity and Dose Calculation, 2006

The water mass balance methodology applied in 2005 was used to determine the effluent curie and dose impact from Groundwater for the 2006 annual effluent report. Significant data was accumulated in 2006 from Monitoring Wells across the site, and, as such, the concentrations at the release points were significantly updated from the bounding estimates applied in 2005. The source terms applied to releases in affected areas and zones were based on multiple samples and integrated on a quarterly bases. Despite significant improvements in obtaining accurate and abundant source term information at the points of release, it should be understood that effluent curie and dose calculations are highly dependant upon the release and dilution flow rates determined. Therefore, the specific processes for release and dilution flow determination is defined in the following text.

The basic methodology for this dose assessment was based on an overall mass balance driven by precipitation. The hydrology portion of this assessment was performed by representatives from IPEC's consultant company, GZA GeoEnvironmental, Inc. IPEC concurs with this methodology. This "watershed analysis" partitions the precipitation falling on the watershed catchment area (i.e., that portion of the Facility area where the surface topography is sloped towards the river) into water that infiltrates the ground to become groundwater (GW), water that flows off the surface as storm water (SW) and that water which directly moves back into the atmosphere via evapotranspiration and other processes. Relative porosity is applied in each area and zone to determine the average flow rate to the river or discharge canal, from each source location. This "top down" method of analysis is based on well established hydrologic principles of relative porosity of each area and zone applied.

Over the entire watershed catchment area of 3.2 million ft^2, the GW and SW has been segmented relative to the areas of the facility through which it flows (primarily established based on H^3 concentrations in the various facility areas). The bulk of the GW activity however, is identified near the transformer yard of Unit 2.

Overall, the partitioning was established as follows for infiltration areas contributing to GW flow (does not include paved or building areas):

GROUNDWATER AREAS:

- **AREA 1.** The northwestern most area where GW appears to move directly to the river, but passes to the north of the Unit 2 Turbine Building Road (area of 0.25 million ft^2). This GW is unlikely to contain appreciable H^3 concentrations based on the data available to date and the lack of likely H^3 sources;
- **AREA 2.** The area where the GW appears to move through Unit 2 facilities (area of 0.57 million ft^2);
- **AREA 3a.** The area where the GW appears to move through Unit 1 facilities (area of 0.963 million ft^2);
- **AREA 3b.** The area where the GW appears to move through Unit 1/3 facilities (area of 0.737 million ft^2);
- **AREA 4.** The southwestern most area where GW appears to move directly to the river, but passes to the south of the Unit 3 Turbine Building Road (area of 0.67 million ft^2). This GW is unlikely to contain appreciable H^3 concentrations based on the data available to date and the lack of likely H^3 sources.

SW flow from paved areas and building roof areas has also been partitioned into various zones within the above Facility GW areas as follows:

STORM WATER AREAS:

- **ZONE A.** The eastern most parking lots which likely drain along flow paths where the SW is unlikely to contain H^3, and storm drain exfiltration into the GW flow zone is also unlikely to pick up H^3 (area of 0.35 million ft^2);
- **ZONE B.** Within the Unit 2 Facility, the eastern and western zones where SW appears to discharge to the river, but does not pass through the Unit 2 Transformer Yard (area of 0.21 million ft^2);
- **ZONE C.** Within the Unit 2 Facility, the middle zone where SW flows to the Discharge Canal, and does pass through the Unit 2 Transformer Yard (area of 0.15 million ft^2);
- **ZONE D.** Within the Unit 1 Facility where SW flows to the Discharge Canal (area of 0.13 million ft^2); and
- **ZONE E.** Within the Unit 3 Facility where SW flows to the Discharge Canal (area of 0.75 million ft^2).

A portion of the SW has been assumed to leak out of storm drains and thus increases the GW flow to the river as follows:

- **ZONE A.** Storm drain exfiltration =0% - Exfiltration from pipes in this zone are unlikely to contribute flow to GW which contains H^3 and the SW itself is unlikely to contain H^3;
- **ZONE B.** Storm drain exfiltration =0% - Exfiltration from pipes in this zone are unlikely to contribute flow to GW which contains H^3 and the SW itself is unlikely to contain H^3;
- **ZONE C.** Storm drain exfiltration =25% - set to a relatively high value to result in higher than anticipated GW flow through the Unit 2 Transformer Yard which contains the highest H^3 GW values, so as to be conservative;
- **ZONE D.** Storm drain exfiltration =50%; set very high given current knowledge of these drains; and
- **ZONE E.** Storm drain exfiltration =10%; set to a nominal value given current lack of specific data and limited impact on overall H^3 flux due to low H^3 concentrations.

Concentrations of identified radioisotopes have been established for all Areas and Zones using accumulated Monitoring Well and Storm Drain sample data in 2006. Analyses by gamma spectroscopy were conducted, as well as specific analyses for H-3, Ni-63, and Sr-90.

On a quarterly basis, all results (from all levels) of effected wells in the effluent locations were ranked, and a 75 percentile value was used to define this location's source term. If, due to the predominance of tests with no detectable activity, the 75 percentile (3^{rd} quartile) value resulted in a ZERO, the MEAN value was used instead, to avoid using a zero value for any location that had an identified positive value, at any given time within the quarter. Similarly, conservative historical values were used for the quarterly determination, if there were insufficient data in the effected quarter.

Inclusion of all data pieces in the effluent sectors, for each quarter, provided the desired confidence of obtaining a proper source term for these sectors. This resulted in a significant improvement over the 2005 assessment of Groundwater's dose contribution, in that, unlike 2005, hundreds of data results were available to formulate a defendable statistical basis for the 2006 source term.

The 3rd quartile function was applied to incorporate a good balance of conservativism with actual data results. The application of a MEAN, in place of a ZERO (value when the 3rd quartile function would otherwise suggest the zero), provided additional conservativism.

As expected, after accumulating source term data over the year, we verified that our 2005 assessment was in fact conservative and 2006's assessment is significantly more accurate.

Selected Source Terms (uCi/ml) for Areas and Zones, in 2006, using the 3rd quartile value from all analytical results of effected wells/drains indicating plant effluent in the selected area or zone:

	Area 2	Area 3a	Area 3b	Zone B	Zone C	Zone D/E
Qtr 1	H-3) 3.03E-5 Ni-63) 4.56E-8 Sr-90) 1.79E-8 Cs-137) 1.19E-9	H-3) 1.13E-5 Sr-90) 2.09E-8	H-3) 4.28E-7	H-3) 5.24E-8	H-3) 1.04E-5	H-3) 5.68E-7
Qtr 2	H-3) 1.89E-5 Ni-63) 3.39E-8 Sr-90) 1.33E-8 Cs-137) 1.24E-9	H-3) 1.01E-5 Sr-90) 1.90E-8	H-3) 7.10E-7 Sr-90) 2.80E-10	none	H-3) 7.19E-8	H-3) 8.48E-7
Qtr 3	H-3) 1.28E-5 Ni-63) 3.82E-8 Sr-90) 1.50E-8	H-3) 8.72E-6 Ni-63) 7.34E-9 Sr-90) 1.83E-8	H-3) 3.16E-7	none	H-3) 5.61E-6	H-3) 3.83E-7
Qtr 4	H-3) 1.20E-5 Ni-63) 3.82E-8 Sr-90) 1.50E-8	H-3) 3.54E-6 Sr-90) 1.64E-8 Cs-137) 2.99E-8	H-3) 3.00E-7	none	H-3) 2.67E-6	H-3) 1.69E-7

These source terms, sample results from all wells and drains on site, and documents showing the application of the 3rd quartile function from all quarterly data, are available in plant records.

No source term was applied to Areas 1 and 4, nor to Zone A. These areas and zones have not exhibited contamination in the ground water, and they include no known sources. Additionally, hydrological studies show that flow through these areas/zones is driven from areas East of the plant and unrelated to potential contamination from within the site boundary.

The infiltration rate in non-paved/building areas was established at 0.46 feet/year based on the USGS report: Water Use, Groundwater Recharge and Availability, and Quality in the Greenwich Area, Fairfield County, CT and Westchester County, NY, 2000 - 2002. The precipitation rate for the area was set at 3.74 feet/year based on onsite meteorological data.

There remain some conservative assumptions with the 2006 assessment, including the following:

- All GW flow has been assumed to discharge directly to the river. Some of this GW flow must infiltrate the Discharge Canal thus reducing the apportionment to the river;
- All storm drain pipe leakage has been assumed to be exfiltration which will increase GW flow values. However, current data in the Unit 2 Transformer Yard indicates that significant GW infiltrates the storm drain during rainfall events, thus flowing to the Discharge Canal via SW rather than directly to the river as GW. In addition, it is noted that SW H^3 concentrations were typically obtained during non-storm events and thus represent the high end of H^3 values associated with low flow conditions. However, these high H^3 concentrations, were then applied to the much higher storm flows where much lower H^3 values should exist;

- All precipitation falling on paved/building areas was assumed to result in SW flow. Some of this water actually evaporates directly to atmosphere from pavement and buildings; and
- The very large value of GW flow extracted from the GW system via the Unit 1 curtain and footing drains has not been subtracted from the GW flows adopted in the analysis.

Results:

The results of the assessment are shown on the following table. These dose values were added to the Total Dose table in the opening summary of the Dose to Man section of this report (Section E).

Based on the above analysis, it is estimated that approximately 0.19 Curies of Tritium migrated directly to the river via the GW flow path in 2006, resulting in an approximate total body dose of 2.1E-6 mrem. The curies of Tritium released via this pathway is approximately 0.015 percent of the Tritium released to the river from routine releases. Tritium releases in total (ground water as well as routine liquid effluent), represent less than 0.001 percent of the Federal dose limits for radioactive effluents from the site.

Strontium-90, Nickel-63, and Cesium-137 collectively contributed approximately 0.00057 Curies from the Ground Water pathway. Combined Ground Water releases from IPEC in 2006 resulted in a calculated annual dose of approximately 0.00178 mrem to the total body, and 0.00721 mrem to the critical organ, which was the Adult Bone (due primarily to Strontium-90).

Storm Drain releases to the Discharge Canal were conservatively calculated to be approximately 0.094 curies of Tritium, resulting in an approximate total body dose of 0.00000002 mrem.

The annual dose from combined groundwater and storm water pathways at IPEC (with all conservativism described above) remains well below the applicable limits.

ODCM Updates:

The ODCM was updated to include the Ground Water Monitoring Program in January, 2007. Therefore, per Reg Guide 1.21, the changes to the ODCM are NOT included in this report, despite the fact that corrective action has been ongoing throughout 2006. The ODCM updates reflect both the requirements of the Ground Water Monitoring Program, and specifics on calculating offsite dose. Detailed discussion of each change will be included in the 2007 annual report, per Reg Guide 1.21

Groundwater-related updates to the ODCM have been a product of communication with multiple stakeholders, NEI, the NRC, and industry peers.

Like all records or procedures on site, the specific methods applied to administer the IPEC Ground Water Monitoring Program are available upon request at any time.

Dose Summary:

See the following groundwater annual offsite dose summary table.

2006 *Adult mrem*

Sum of IPEC monitoring well calculations for units 1, 2, & 3 (Areas 2, 3a, & 3b)

ADULT Doses, in mrem

ISOTOPE	BONE	LIVER	TOT BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E+00	2.08E-06	2.08E-06	2.08E-06	2.08E-06	2.08E-06	2.08E-06
Ni-63	4.49E-04	3.11E-05	1.51E-05	0.00E+00	0.00E+00	0.00E+00	6.49E-06
Sr-90	6.61E-03	0.00E+00	1.62E-03	0.00E+00	0.00E+00	0.00E+00	1.90E-04
Cs-137	1.60E-04	2.19E-04	1.44E-04	0.00E+00	7.44E-05	2.47E-05	4.23E-06
totals	7.21E-03	2.52E-04	1.78E-03	2.08E-06	7.65E-05	2.68E-05	2.03E-04

	uCi
H-3	*1.86E+05*
Ni-63	*2.27E+02*
Sr-90	*2.63E+02*
Cs-137	*7.62E+01*
	1.87E+05

Storm Drain Water from Zone B, East/West Unit 2, near MH-2, going to river directly

Doses, in mrem

ISOTOPE	BONE	LIVER	TOT BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E+00	2.64E-09	2.64E-09	2.64E-09	2.64E-09	2.64E-09	2.64E-09

uCi
2.36E+02

Storm Drain Water from Zones C and D/E (Central U2 & U1/U3) to Discharge Canal

Doses, in mrem

ISOTOPE	BONE	LIVER	TOT BODY	THYROID	KIDNEY	LUNG	GI-LLI
H-3	0.00E+00	1.74E-08	1.74E-08	1.74E-08	1.74E-08	1.74E-08	1.74E-08

uCi
9.34E+04

Totals: Doses, in mrem

H-3 only	0.00E+00	2.11E-06	2.11E-06	2.11E-06	2.11E-06	2.11E-06	2.11E-06
	BONE	LIVER	TOT BODY	THYROID	KIDNEY	LUNG	GI-LLI
All identified isotopes	7.21E-03	2.52E-04	1.78E-03	2.11E-06	7.65E-05	2.68E-05	2.03E-04

2.80E+05
uCi H-3
see above

% Annual Limit	***0.072***	*0.003*	***0.059***	*0.0000*	*0.0008*	*0.0003*	*0.002*

teen mrem, total	6.14E-03	2.62E-04	1.46E-03	1.62E-06	7.93E-05	3.18E-05	1.94E-04
% limit	*0.061*	*0.003*	*0.049*	*0.000*	*0.001*	*0.000*	*0.002*
child mrem, total	5.73E-03	2.42E-04	1.30E-03	1.35E-06	6.91E-05	2.57E-05	7.07E-05
% limit	*0.057*	*0.002*	*0.043*	*0.000*	*0.001*	*0.000*	*0.001*