



Entergy Nuclear Northeast  
Entergy Nuclear Operations, Inc.  
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April 21, 2004  
JAFP-04-0054

T.A. Sullivan  
Site Vice President - JAF

United States Nuclear  
Regulatory Commission  
Region 1  
475 Allendale Road  
King of Prussia, PA 19406

ATTENTION: Mr. Hubert Miller  
Regional Administrator

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT  
DOCKET NO. 50-333, LICENSE NO. DPR-59

Gentlemen:

Attached is the Annual Radioactive Effluent Release Report for the period of January 1, 2003 through December 31, 2003. This report is submitted in accordance with the requirements of the James A. FitzPatrick Nuclear Power Plant Offsite Dose Calculation Manual, Part 1, Radiological Controls, Section 6.2.

This report includes, as an Addendum, an Assessment of the Radiation Doses to the public due to the radioactive liquid and gaseous effluents released during the 2003 calendar year. The format used for the effluent data is outlined in Appendix B of Regulatory Guide 1.21, Revision 1. Distribution is in accordance with Regulatory Guide 10.1, Revision 4.

If you have any questions concerning the attached report, please contact Crystal A. Boucher, Chemistry Superintendent, at the James A. FitzPatrick Nuclear Power Plant at (315)349-6748.

Very truly yours,

T.A. SULLIVAN

SITE VICE PRESIDENT - JAF

TAS/CAB/jbh

Attachments

Xc: Document Control Desk (USNRC)  
D. Sherman (ANI Library)  
B. O'Grady (ENOC/WPO)  
C. Faison (ENOC/WPO)  
J. McCann (ENOC/WPO)

K. Mulligan  
W. Maguire  
T. Kurtz (NMPC)  
J. Furfaro (ENOC/WPO)  
P. Merges (NYSDEC)

NRC Resident Inspector  
RMS (JAF)

per Proc  
JE48  
A009

**ENTERGY NUCLEAR OPERATIONS, INC.**  
**JAMES A. FITZPATRICK NUCLEAR POWER PLANT**  
**ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT**

**JANUARY 1, 2003 - DECEMBER 31, 2003**

**DOCKET NO.: 50-333**

**LICENSE NO.: DPR-59**

ENTERGY NUCLEAR OPERATIONS, INC.  
JAMES A. FITZPATRICK NUCLEAR POWER PLANT  
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT  
JANUARY 2003-DECEMBER 2003

SUPPLEMENTAL INFORMATION

FACILITY: JAENPP LICENSEE: ENTERGY NUCLEAR OPERATIONS, INC.

1. Offsite Dose Calculation Manual Part 1 Radiological Controls

a. Fission and Activation Gases:

- (1) The dose rate at or beyond the site boundary due to radioactive materials released from the plant in gaseous effluent shall be limited as follows:
  - (a) Less than or equal to 500 mrem/year to the whole body and less than or equal to 3000 mrem/year to the skin from noble gases.
- (2) The air dose to areas at or beyond the site boundary from noble gases released from the plant in gaseous effluent shall be limited:
  - (a) During any calendar quarter, to less than or equal to 5 mrad from gamma radiation, and less than or equal to 10 mrad from beta radiation; and,
  - (b) During any calendar year, to less than or equal to 10 mrad from gamma radiation and less than or equal to 20 mrad from beta radiation.

b. Tritium, Iodines and Particulates, Half Lives > 8 days:

- (1) The dose to a member of the public at or beyond the site boundary from Iodine-131, Iodine-133, Tritium, and radionuclides in particulate form with half-lives greater than 8 days released from the plant in gaseous effluent shall be limited:
  - (a) During any calendar quarter to less than or equal to 7.5 mrem to any organ; and,
  - (b) During any calendar year to less than or equal to 15 mrem to any organ.
  - (c) Less than 0.1% of the limits of Specification 3.4.1.c.1.a and 3.4.1.c.1.b as a result of burning contaminated oil.
- (2) The dose rate at or beyond the site boundary due to radioactive materials released from the plant in gaseous effluents shall be limited as follows:
  - (a) Less than or equal to 1500 mrem/year to any organ from Iodine-131, Iodine-133, Tritium and for radioactive materials in particulate form with half-lives greater than 8 days (inhalation pathway only).

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**SUPPLEMENTAL INFORMATION (continued)**

**c. Liquid Effluents:**

- (1) The concentration of radioactive materials released to the unrestricted areas shall not exceed ten times the values specified in 10 CFR 20.1001-20.2402, Appendix B, Table 2, Column 2. For dissolved or entrained noble gases the concentration shall be limited to 2.00E-04  $\mu\text{Ci/ml}$ .
- (2) The dose to a member of the public from radioactive materials released from the plant in liquid effluents to unrestricted areas shall be limited as follows:
  - (a) During any calendar quarter, limited to less than or equal to 1.5 mrem to the whole body and to less than or equal to 5 mrem to any organ; and,
  - (b) During any calendar year, limited to less than or equal to 3 mrem to the whole body and to less than or equal to 10 mrem to any organ.

**2. 10X Effluent Concentrations**

- a. Fission and activation gases: (None specified)
- b. Iodines: (None specified)
- c. Particulates, half-lives >8 days: (None specified)

d. Liquid effluents:	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
(1) Fission and activation products (mixture EC) ( $\mu\text{Ci/ml}$ )	None	None	None	None
(2) Tritium ( $\mu\text{Ci/ml}$ )	1.00E-02	1.00E-02	1.00E-02	1.00E-02
(3) Dissolved and entrained gases ( $\mu\text{Ci/ml}$ )	2.00E-04	2.00E-04	2.00E-04	2.00E-04

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SUPPLEMENTAL INFORMATION (continued)

3. Average Energy

(None specified)

4. Measurements and Approximations of Total Radioactivity

- a. Fission and Activation Gases: Continuous monitor on each release path calibrated to a marinelli grab sample analyzed by gamma spectroscopy; bubbler grab sample analyzed for Tritium.
- b. Iodines: Gamma spectral analysis of charcoal cartridge and particulate filter on each release path.
- c. Particulates: Gamma spectral analysis of each particulate filter and charcoal cartridge for each release path. A four week per quarter composite of particulate filters for each release path for Strontium-89 and Strontium-90. One week per month particulate filter for each release path for gross alpha.
- d. Liquid Effluents: Gamma spectral analysis of each batch discharged, except composite analysis for Strontium-89, Strontium-90, Iron-55, Tritium, and Alpha.
- e. Solid Waste: Gamma spectral analysis of a representative sample of each waste shipment. Scaling factors established from off-site composite sample analyses to estimate concentration of non-gamma emitters. Low activity trash shipments, curie content estimated by dose rate measurement and application of appropriate scaling factors.
- f. Error Estimation Method: Overall error for sampling and analysis estimated by combining individual errors using error propagation methods. This process is composed of determinate and undeterminate errors.

Determinate - Pump flowrates, volume measurements and analysis collection yields

Undeterminate - Random counting error estimated using accepted statistical calculations

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**SUPPLEMENTAL INFORMATION (continued)**

**5. Batch Releases**

a. <u>Liquid: Canal</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
(1) Number of batch releases:	1.00E+00	6.00E+00	2.00E+00	6.00E+00
(2) Total time period for batch release: (min)	4.00E+01	2.55E+02	5.00E+01	1.78E+02
(3) Maximum time period for batch release: (min)	4.00E+01	7.00E+01	5.00E+01	4.10E+01
(4) Average time period for batch release: (min)	4.00E+01	4.25E+01	2.55E+01	2.97E+01
(5) Minimum time period for batch release: (min)	4.00E+01	8.00E+00	1.00E+00	1.70E+01
(6) Total Activity Released (Ci)	5.76E-06	1.34E-04	7.02E-05	2.34E-03
(7) Total Volume Released (liters)	6.93E+02	6.62E+03	1.09E+03	2.60E+04
b. <u>Liquid: Non-Canal</u>				
(1) Number of batch releases:	9.00E+00	6.00E+00	8.00E+00	3.00E+00
(2) Total time period for batch release: (min)	8.52E+02	8.59E+02	6.56E+02	1.49E+03
(3) Maximum time period for batch release: (min)	4.89E+02	3.14E+02	2.64E+02	7.81E+02
(4) Average time period for batch release: (min)	9.47E+01	1.43E+02	8.20E+01	4.97E+02
(5) Minimum time period for batch release: (min)	5.00E+00	1.80E+00	9.36E+00	6.06E+01
(6) Total Activity Released (Ci)	4.29E-04	3.27E-03	1.11E-02	1.16E-03
(7) Total Volume Released (liters)	2.54E+05	4.01E+05	2.48E+05	5.62E+05

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SUPPLEMENTAL INFORMATION (continued)

c. Gaseous:

There were no gaseous batch releases for this report period.

6. Abnormal Releases

a. Liquid:	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
(1) Number of releases:	NONE	NONE	NONE	NONE
(2) Total activity released:	NONE	NONE	NONE	NONE
b. Gaseous				
(1) Number of releases:	NONE	NONE	NONE	NONE
(2) Total activity released:	NONE	NONE	NONE	NONE

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**TABLE 1A**  
**GASEOUS EFFLUENTS--SUMMATION OF ALL RELEASES**

	UNIT	QTR1	QTR2	QTR3	QTR4	EST TOTAL ERROR %
<b>A. FISSION AND ACTIVATION GASES</b>						
1. Total Release	Ci	3.57E+00	4.49E+00	7.50E+00	7.09E+00	≤2.50E+01
2. Average release rate for period	μCi/sec	4.59E-01	5.71E-01	9.44E-01	8.92E-01	
3. Applicable ODCM Limit	%	*	*	*	*	
<b>B. IODINE-131</b>						
1. Total Iodine-131	Ci	6.86E-06	2.30E-08	3.70E-05	2.96E-06	≤2.50E+01
2. Average release rate for period	μCi/sec	8.82E-07	2.93E-09	4.65E-06	3.72E-07	
3. Applicable ODCM Limit	%	*	*	*	*	
<b>C. PARTICULATES</b>						
1. Particulates with half-lives >8 days	Ci	1.08E-05	1.45E-06	1.56E-05	1.00E-04	≤3.60E+01
2. Average release rate for period	μCi/sec	1.39E-06	1.84E-07	1.96E-06	1.26E-05	
3. Applicable ODCM Limit	%	*	*	*	*	
4. Gross alpha radioactivity	Ci	7.35E-07	2.20E-07	1.95E-07	2.48E-07	≤2.50E+01
<b>D. TRITIUM</b>						
1. Total Release	Ci	4.23E+00	3.64E+00	4.87E+00	5.53E+00	≤2.50E+01
2. Average release rate for period	μCi/sec	5.44E-01	4.63E-01	6.13E-01	6.96E-01	
3. Applicable ODCM Limit	%	*	*	*	*	
<b>*E. PERCENT OF APPLICABLE ODCM LIMITS</b>						
<b>FISSION AND ACTIVATION GASES</b>						
1. Quarterly gamma air dose limit	%	2.04E-03	2.68E-03	4.47E-03	4.24E-03	
2. Quarterly beta air dose limit	%	1.17E-04	1.26E-04	2.23E-04	1.89E-04	
3. Yearly gamma air dose limit	%	1.02E-03	1.34E-03	2.23E-03	2.12E-03	
4. Yearly beta air dose limit	%	5.86E-05	6.31E-05	1.11E-04	9.46E-05	
5. Whole body dose rate limit	%	1.88E-03	1.94E-04	2.73E-03	2.86E-04	
6. Skin dose rate limit	%	4.06E-04	3.91E-05	5.89E-04	5.73E-05	
<b>HALOGENS, TRITIUM AND PARTICULATES WITH HALF-LIVES &gt;8 DAYS</b>						
7. Quarterly dose limit (organ)	%	2.77E-03	1.35E-03	6.00E-03	3.71E-03	
8. Yearly dose limit (organ)	%	1.39E-03	6.73E-04	3.00E-03	1.85E-03	
9. Organ dose rate limit	%	7.81E-06	6.84E-06	1.24E-05	9.16E-06	



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**TABLE 1B**  
**GASEOUS EFFLUENTS--ELEVATED RELEASE**

NUCLIDES RELEASED	UNIT	CONTINUOUS MODE			
		QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4
1. <u>Fission Gases</u>					
Argon-41	Ci	2.21E+00	3.67E+00	3.34E+00	4.57E+00
Krypton-85m	Ci	4.46E-01	6.90E-01	1.11E+00	1.25E+00
Krypton-87	Ci	2.03E-01	-----	2.96E-01	-----
Krypton-88	Ci	1.34E-01	1.30E-01	1.41E+00	9.40E-01
Xenon-133	Ci	-----	-----	4.34E-01	3.26E-01
Xenon-135	Ci	1.52E-01	-----	2.92E-01	-----
Xenon-135m	Ci	9.03E-02	-----	1.31E-01	-----
Xenon-138	Ci	3.32E-01	-----	4.82E-01	-----
TOTAL	Ci	3.57E+00	4.49E+00	7.50E+00	7.09E+00
2. <u>Iodines</u>					
Iodine-131	Ci	5.31E-06	2.30E-08	2.77E-05	-----
Iodine-133	Ci	-----	-----	1.59E-05	-----
TOTAL	Ci	5.31E-06	2.30E-08	4.36E-05	-----
3. <u>Particulates</u>					
Manganese-54	Ci	3.52E-07	-----	-----	-----
Strontium-89	Ci	2.94E-07	2.85E-07	8.75E-07	6.66E-07
Strontium-90	Ci	2.42E-08	2.66E-08	4.65E-10	-----
TOTAL	Ci	6.70E-07	3.12E-07	8.75E-07	6.66E-07
4. <u>Tritium</u>					
Hydrogen-3	Ci	5.07E-01	1.11E+00	1.62E+00	9.28E-01

Note: There were no batch releases for this report period.

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**TABLE 1C**  
**GASEOUS EFFLUENTS—GROUND LEVEL RELEASES**

NUCLIDES RELEASED	UNIT	CONTINUOUS MODE			
		QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4
1. <u>Fission Gases</u>					
None	Ci	-----	-----	-----	-----
TOTAL	Ci	-----	-----	-----	-----
2. <u>Iodines</u>					
Iodine-131	Ci	1.55E-06	-----	9.28E-06	2.96E-06
Iodine-133	Ci	-----	-----	4.87E-06	-----
TOTAL	Ci	1.55E-06	-----	1.42E-05	2.96E-06
3. <u>Particulates</u>					
Manganse-54	Ci	-----	-----	6.10E-06	4.05E-05
Cobalt-58	Ci	-----	-----	3.90E-07	1.44E-05
Iron-59	Ci	-----	-----	-----	5.63E-06
Cobalt-60	Ci	3.68E-06	-----	2.46E-06	1.49E-05
Zinc-65	Ci	-----	-----	4.43E-07	2.01E-05
Strontium-89	Ci	6.11E-06	1.07E-06	5.26E-06	3.81E-06
Strontium-90	Ci	2.85E-07	6.53E-08	2.55E-09	3.14E-07
TOTAL	Ci	1.01E-05	1.14E-06	1.47E-05	9.97E-05
4. <u>Tritium</u>					
Hydrogen-3	Ci	3.72E+00	2.53E+00	3.25E+00	4.60E+00

Note: There were no batch releases for this report period.

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**TABLE 2A**  
**LIQUID EFFLUENTS--SUMMATION OF ALL RELEASES**

	UNIT	QTR 1	QTR 2	QTR 3	QTR 4	EST TOTAL ERROR %
<b>A. FISSION AND ACTIVATION PRODUCTS</b>						
1. Total Release (not including tritium, gases and alpha)	Ci	NONE	NONE	NONE	NONE	≤2.50E+01
2. Average diluted concentration during period	μCi/ml	NONE	NONE	NONE	NONE	
3. Applicable ODCM Limit	%	-----	-----	-----	-----	
<b>B. TRITIUM</b>						
1. Total Release	Ci	4.41E-04	3.38E-04	9.35E-04	1.06E-03	≤2.50E+01
2. Average diluted concentration during period	μCi/ml	1.71E-06	1.34E-06	3.63E-06	7.05E-07	
3. Applicable ODCM Limit	%	*	*	*	*	
<b>C. DISSOLVED AND ENTRAINED GASES</b>						
1. Total Release	Ci	NONE	NONE	NONE	NONE	≤2.50E+01
2. Average diluted concentration during period	μCi/ml	NONE	NONE	NONE	NONE	
3. Applicable ODCM Limit	%	-----	-----	-----	-----	
<b>D. GROSS ALPHA RADIOACTIVITY</b>						
1. Total Release	Ci	NONE	NONE	NONE	NONE	≤4.20E+01
<b>E. VOLUME OF WASTE RELEASED (PRIOR TO DILUTION)</b>						
	liters	2.55E+05	2.40E+05	2.49E+05	5.88E+05	
<b>F. VOLUME OF DILUTION WATER USED DURING PERIOD</b>						
	liters	5.72E+07	3.73E+08	7.64E+07	2.62E+08	
<b>*G. PERCENT OF APPLICABLE ODCM LIMITS</b>						
1. Quarterly Whole Body Dose	%	1.24E-04	6.73E-05	3.81E-04	1.76E-05	
2. Quarterly Organ Dose	%	3.72E-05	2.02E-05	1.14E-04	5.29E-06	
3. Annual Whole Body Dose	%	6.20E-05	3.36E-05	1.91E-04	8.81E-06	
4. Annual Organ Dose	%	1.86E-05	1.01E-05	5.72E-05	2.64E-06	

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**TABLE 2B**  
**LIQUID EFFLUENTS CANAL**

NUCLIDES RELEASED	UNIT	BATCH MODE			
		QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4
1. <u>Fission and Activation Products</u>					
NONE	Ci	-----	-----	-----	-----
2. <u>Tritium</u>					
HYDROGEN-3	Ci	5.76E-06	1.79E-05	2.99E-05	6.34E-04
3. <u>Dissolved and Entrained Gases</u>					
NONE	Ci	-----	-----	-----	-----

Note: There were no continuous mode discharges during this report period.

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**TABLE 2B (SUPPLEMENT)**  
**LIQUID EFFLUENTS NON-CANAL**

NUCLIDES RELEASED	UNIT	BATCH MODE			
		QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4
1. <u>Fission and Activation Products</u>					
NONE	Ci	-----	-----	-----	-----
2. <u>Tritium</u>					
HYDROGEN-3	Ci	4.35E-04	3.20E-04	9.05E-04	4.15E-04
3. <u>Dissolved and Entrained Gases</u>					
NONE	Ci	-----	-----	-----	-----

Note: There were no continuous mode discharges during this report period.

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**TABLE 3A**  
**SOLID WASTE AND IRRADIATED FUEL SHIPMENTS**

**A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (NOT IRRADIATED FUEL)**

1. Type of Waste	Unit	Class A	6-month Period		Est. Total Error %
			Class B	Class C	
a. Spent resins, filter sludges evaporator bottoms, etc.	m <sup>3</sup> Ci	1.17E+02 9.26E+01	0.00E+00 0.00E+00	0.00E+00 0.00E+00	1.00E+01 1.00E+01
b. Dry compressible waste, contaminated equipment, etc.	m <sup>3</sup> Ci	0.00E+00 0.00E+00	0.00E+00 0.00E+00	0.00E+00 0.00E+00	0.00E+00 0.00E+00
c. Irradiated components, control rods, etc.	m <sup>3</sup> Ci	0.00E+00 0.00E+00	0.00E+00 0.00E+00	0.00E+00 0.00E+00	0.00E+00 0.00E+00
d. Other: Dry compressible waste, contaminated equipment, spent resins for volume reduction.	m <sup>3</sup> Ci	3.18E+02 6.08E-01	0.00E+00 0.00E+00	0.00E+00 0.00E+00	1.00E+01 1.00E+01

**2. Estimate of Major Nuclide Composition (by type of waste)**

**a. Spent resins, filter sludges, evaporator bottoms, etc.**

Isotope	Percent	Curies		Isotope	Percent	Curies	
Iron-55	5.89E+01	5.45E+01	E	Cesium-137	1.45E+00	1.34E+00	E
Cobalt-60	1.79E+01	1.66E+01	M	Nickel-63	1.39E+00	1.29E+00	M
Manganese-54	1.31E+01	1.21E+01	M	Carbon-14	1.20E+00	1.11E+00	E
Zinc-65	4.01E+00	3.71E+00	M	Tritium	1.73E-01	1.61E-01	E

**b. Dry compressible waste, contaminated equipment, etc.**

NONE

**c. Irradiated components, control rods, etc.**

NONE

**d. Other: Dry compressible waste, contaminated equipment, spent resins for volume reduction.**

Isotope	Percent	Curies		Isotope	Percent	Curies	
Iron-55	5.03E+01	3.06E-01	E	Zinc-65	2.81E+00	1.71E-02	E
Cobalt-60	1.25E+01	7.59E-02	E	Carbon-14	1.37E+00	8.35E-03	E
Manganese-54	6.56E+00	3.99E-02	E	Nickel-63	8.03E-01	4.88E-03	E
Cesium-137	1.74E+00	1.06E-02	E	Tritium	6.96E-01	4.23E-03	E

(E- Estimated M- Measured)

Percentage of nuclides and total activities are based on a combination of direct measurements and scaling for non-gamma emitting nuclides.

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**TABLE 3A (continued)**  
**SOLID WASTE AND IRRADIATED FUEL SHIPMENTS**

3. Solid Waste Disposition

<u>No. of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
5	Truck	*RACE LLC Memphis TN
1	Truck	*Diversified Scientific Services, Inc. Kingston, TN
4	Truck	* Duratek Oak Ridge, TN
17	Truck	* Studsvik Erwin, TN

\* - Volume Reduction Facility

B. IRRADIATED FUEL SHIPMENTS (Disposition)

<u>No. of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
NONE	-----	-----

ENTERGY NUCLEAR OPERATIONS, INC.  
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**TABLE 3B**  
**SOLID WASTE AND IRRADIATED FUEL SHIPMENTS**

**A. NRC CLASS A**

<u>SOURCE OF WASTE</u>	<u>PROCESSING EMPLOYED</u>	<u>CONTAINER VOLUME</u>	<u>TYPE OF CONTAINER</u>	<u>NUMBER OF CONTAINERS</u>
Spent Resins, Filter Sludges, evaporator Bottoms, etc.	Air Drying Non-compacted	205.8 ft <sup>3</sup>	HIC	20
Dry compressible Waste (DAW), Contaminated Equipment, etc.	Non-compacted	1280 ft <sup>3</sup>	STC	5
Dry compressible Waste(DAW), Contaminated Equipment, etc.	Non-compacted	87 ft <sup>3</sup>	STC	54
Contaminated Oil	Non-compacted	7 ft <sup>3</sup>	STC	19

**B. NRC CLASS B**

<u>SOURCE OF WASTE</u>	<u>PROCESSING EMPLOYED</u>	<u>CONTAINER VOLUME</u>	<u>TYPE OF CONTAINER</u>	<u>NUMBER OF CONTAINERS</u>
NONE	-----	-----	-----	-----

**C. NRC CLASS C**

<u>SOURCE OF WASTE</u>	<u>PROCESSING EMPLOYED</u>	<u>CONTAINER VOLUME</u>	<u>TYPE OF CONTAINER</u>	<u>NUMBER OF CONTAINERS</u>
NONE	-----	-----	-----	-----

Solidification Agent: NONE

HIC- High Integrity Container  
STC-Strong Tight Container



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**ATTACHMENT NO. 1**

**CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL (ODCM)**

In accordance with the James A. FitzPatrick Nuclear Power Plant Offsite Dose Calculation Manual (ODCM), Part 1 Radiological Controls (REC) Section 6.2.3, changes made to the Offsite Dose Calculation Manual (ODCM) during the reporting period shall be included in the Annual Radioactive Effluent Release Report.

There were no revisions to the Offsite Dose Calculation Manual (ODCM) during this report period.

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**ATTACHMENT NO. 2**

**SUMMARY OF CHANGES TO THE PROCESS CONTROL PROGRAM**

In accordance with the James A. FitzPatrick Nuclear Power Plant Offsite Dose Calculation Manual (ODCM), Part 1 Radiological Controls (REC) Section 6.2.3, changes made to the Process Control Program (PCP) during the reporting period shall be included in the Annual Radioactive Effluent Release Report.

Revision 13 to the PCP implementing procedure FO-OP-032-41802 Setup and Operating Procedure for RDS-1000 Unit #9 at James A. FitzPatrick was approved on May 21, 2003 and became effective June 6, 2003. This revision does not reduce the overall conformance of the solidified waste product to existing criteria for solid wastes. Listed below is a brief summary of the changes incorporated in this revision.

- Added a step to dewater through each lateral at the completion of the fill sequence but prior to the actual start of the dewatering cycle.
- Changed vacuum requirements for Precoat/Ecodex liners from less than 22" Hg to less than 25" Hg.
- Revised Appendix B, Figure 1 for better appearance.
- Revised Appendix B, Figure 2 to provide operating ranges.
- Added Figure 3 to Appendix B to separate performance sheets for bead and powdex resins.

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**ATTACHMENT NO. 3**

**SUMMARY OF CHANGES TO THE ENVIRONMENTAL MONITORING AND  
DOSE CALCULATION LOCATIONS**

In accordance with the James A. FitzPatrick Nuclear Power Plant ODCM, Part 1, Section 6.2.3, a listing of new locations for dose calculation and/or environmental monitoring identified by the land use census shall be included in the Annual Radioactive Effluent Release Report.

**CHANGES IN ENVIRONMENTAL MONITORING LOCATIONS**

During the report period, no changes in the Environmental Monitoring Locations sampled to implement the requirements of ODCM, Part 1, Table 5.1-1 were made. There were no new locations identified in the 2003 Land Use census that required changes to the milch animal sampling program or dose receptor locations.

The 2003 sampling program did not utilize the optional food product vegetation location Fredette that was sampled in 2002. This sample location was replaced in the 2003 Sampling Program with the Kronenbitter location, which has a higher D/Q value. The Kronenbitter garden was not available for sampling in 2002.

**NEW LOCATIONS FOR DOSE CALCULATIONS**

One of the receptors used for dose calculations for the 2003 release calculations changed from the previous year (2002). This change was the result of refining the distance and direction parameters from the JAF site using GPS technology. The previous distance and direction values were determined using map measurements. The GPS determinations are considered to be more accurate.

The change for the 2003 dose calculations was in the goat receptor. The goat receptor is now split between two locations. The goat receptor location for the X/Q grazing season is Nickolas (location 61); while the goat receptor for the grazing season D/Q value is Showers (location 71). The Nickolas location changed meteorological sectors from 146° (SE) to 152° (SSE) as a result of the GPS evaluation of the receptor locations.

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**ATTACHMENT NO. 4**

**UNAVAILABILITY OF SAMPLES  
REQUIRED BY THE ENVIRONMENTAL SAMPLING SCHEDULE**

In accordance with the James A. FitzPatrick Nuclear Power Plant ODCM, Part 1, Section 6.2.7, the cause for unavailability of any environmental samples required during the report period shall be included in the Annual Radioactive Effluent Release Report.

The noted exceptions to the 2003 sample program address only those samples or monitoring requirements, which are required by the ODCM. This section reports samples that were a deviation from the requirements of ODCM Part 1, Table 5.1-1.

The following are deviations from the program specified by the ODCM:

**Air Sampling Stations**

The ice storm of April 04, 2003 resulted in loss of power to the JAF/NMP site environmental monitoring stations. Due to the extent of damage to the municipal electrical distribution system and the wide area affected by the storm, 4 of the 5 stations required by the ODCM experienced a period of inoperability. The R-5 control station was not affected. The control station is located approximately 16 miles northeast of the site and was not within the ice storm area. As utility crews made repairs to the electrical distribution system, the environmental stations were returned to service. The length of the inoperability at each station was related to the time for restoration of municipal power lines. The specific inoperability times are listed in the table below:

<b>Environmental Sample Station Ice Storm Power Loss (April 4-8, 2003)</b>		
<b>Station Location</b>	<b>Loss of Power Hours</b>	<b>Days Off Line 4/4-8, 2003</b>
R1-Offsite	79.3	3.3
R2-Offsite	79.3	3.3
R3-Offsite	43.6	1.8
R4-Offsite	43.6	1.8

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**ATTACHMENT NO. 4 (continued)**

Radiological effluents records from the plant were reviewed and there was no indication of elevated releases during the inoperability period. Sample results from the environmental air sample station for the operable period during this sample week were normal and consistent with results from the previous week. No corrective action was implemented.

The air sampling pumps at the R-1 and R-2 Environmental Sampling Stations were inoperable for approximately 10 hours during the period of September 15 through 22, 2003. The inoperability of the sampling pumps was caused by an electrical power outage that was weather related. No corrective action was implemented.

The air sampling pumps at the R-1 and R-2 Environmental Sampling Stations were inoperable for approximately 4 hours on 9/29/03. The inoperability of the sampling pumps was caused by a power outage that was weather related. No corrective action was implemented.

Environmental Thermoluminescent Dosimeter (TLD) number 14 was removed from a utility pole that was used to deploy the dosimeter during the third quarter 2003. The dosimeter was removed from the pole and placed on the ground by the utility maintenance crew that was replacing the pole. The TLD was considered no longer in a position to correctly monitor direct radiation for that location. The results for this dosimeter are considered to be non-representative and therefore invalid. As a corrective action, the utility company was notified of this occurrence along with a list of all locations where TLDs are stationed on utility poles. Training material for instructing workers on removing and reinstalling dosimeters during maintenance was provided to the utility. The utility conducted a briefing on the subject with the line crew.

The Independent Spent Fuel Storage Installation (ISFSI) thermoluminescent dosimeter (TLD) number I-8 was found to be missing during the fourth quarter 2003 collection. The lost dosimeter was the result of high winds experienced during the deployment period. The damaged holder was replaced and a new dosimeter was installed.

#### Surface Water Sampling

The Oswego Steam Station monthly composite sampler experienced an electrical trip during the period of 8/15/03 to 8/22/03. The GFI breaker on the system did not reset after power was restored. Approximately four of the expected 15 gallons of water was collected during this period. The monthly composite is made up from weekly sample aliquots collected from the system. The GFI breaker was reset at the time of discovery. No additional corrective action was implemented.

The Oswego Steam Station monthly composite sampler experienced an electrical trip during the period of 9/12/03 to 9/19/03. The GFI breaker on the system did not reset after power was restored. Approximately three of the expected 15 gallons of sample was collected during this period. The monthly composite is made up from weekly sample aliquots collected from the system. As a corrective action, the GFI breaker was removed from the system. Subsequent failures of this system have not been experienced as of the date of this report.

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**ATTACHMENT NO. 5**

**ANNUAL SUMMARY OF HOURLY METEOROLOGICAL DATA**

The James A. FitzPatrick Nuclear Power Plant Offsite Dose Calculation Manual (ODCM), Part 1, Radiological Controls (REC) Section 6.2 and 6.2.2 states in part: The Annual Radioactive Effluent Release Report submitted prior to May 1 of each year may include an annual summary of meteorological data collected over the previous year. If the meteorological data is not included, the licensee shall retain it on file and provide it to the U.S. Nuclear Regulatory Commission upon request. In accordance with the aforementioned ODCM requirement, meteorological data is not included in this report. It is retained on file and is available upon request.

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**ATTACHMENT NO. 6**

**MAJOR MODIFICATIONS TO RADIOACTIVE LIQUID, GASEOUS AND SOLID  
WASTE TREATMENT SYSTEMS**

In accordance with the James A. FitzPatrick Nuclear Power Plant Offsite Dose Calculation Manual (ODCM), Part 1 Radiological Controls (REC) Section 7.0, Major Modifications to Radioactive Waste Treatment Systems (liquid, gaseous and solid) shall be reported in the Annual Radioactive Effluent Release Report for the period in which the modification is completed and made operational.

There were no major modifications to any liquid, gaseous, or solid radioactive waste treatment systems.

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**ADDENDUM 1**

**ASSESSMENT OF RADIATION DOSES TO THE PUBLIC JANUARY - DECEMBER 2003**

**1. INTRODUCTION**

The James A. FitzPatrick Nuclear Power Plant Offsite Dose Calculation Manual (ODCM), Part 1 Radiological Controls, requires an assessment of the radiation doses to the public due to radioactive liquid and gaseous effluents. This assessment of doses to the public is based on accepted methodologies found in the Offsite Dose Calculation Manual (ODCM).

**2. DOSE LIMITS**

**A. DOSE FROM LIQUID EFFLUENTS (ODCM, Part 1, REC 2.3)**

Applicability

Applies to doses from radioactive material in liquid effluents.

Objective

To ensure that the dose limitations of 10 CFR 50, Appendix I, are met.

Specifications

The dose to a member of the public from radioactive materials released from the plant in liquid effluents to unrestricted areas shall be limited as follows:

1. During any calendar quarter, limited to less than or equal to 1.5 mrem to the whole body and to less than or equal to 5 mrem to any organ.
2. During any calendar year, limited to less than or equal to 3 mrem to the whole body and to less than or equal to 10 mrem to any organ.

**B. GASEOUS DOSE RATES (ODCM, Part 1, REC 3.2)**

Applicability

Applies to the radiation dose from radioactive material in gaseous effluents.



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**ADDENDUM 1 (continued)**

Objective

To ensure that the dose rates at or beyond the site boundary from gaseous effluents do not exceed the annual dose limits of 10 CFR 20, for unrestricted areas.

Specifications

The dose rate at or beyond the site boundary due to radioactive materials released from the plant in gaseous effluents shall be limited as follows:

1. Less than or equal to 500 mrem/year to the whole body and less than or equal to 3000 mrem/year to the skin from noble gases; and,
2. Less than or equal to 1500 mrem/year to any organ from Iodine-131, Iodine-133, Tritium and for radioactive materials in particulate form with half-lives greater than 8 days (inhalation pathway only).

C. AIR DOSE, NOBLE GASES (ODCM, Part 1, REC 3.3)

Applicability

Applies to the air dose due to noble gases in gaseous effluents.

Objective

To ensure that the noble gas dose limitations of 10 CFR 50, Appendix I, are met.

Specifications

The air dose to areas at or beyond the site boundary from noble gases released from the plant in gaseous effluents shall be limited:

1. During any calendar quarter, to less than or equal to 5 mrad from gamma radiation, and less than or equal to 10 mrad from beta radiation; and,
2. During any calendar year, to less than or equal to 10 mrad from gamma radiation and less than or equal to 20 mrad from beta radiation.

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**ADDENDUM 1 (continued)**

**D. DOSE DUE TO IODINE-131, IODINE-133, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM (ODCM, Part 1, REC 3.4)**

Applicability

Applies to the cumulative dose from Iodine-131, Iodine-133, Tritium, and radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents.

Objective

To ensure that the dose limitations of 10 CFR 50, Appendix I, are met.

Specifications

The dose to a member of the public at or beyond the site boundary from Iodine-131, Iodine-133, Tritium, and radionuclides in particulate form with half-lives greater than 8 days released from the plant in gaseous effluents shall be limited:

1. During any calendar quarter to less than or equal to 7.5 mrem to any organ; and,
2. During any calendar year to less than or equal to 15 mrem to any organ.

**E. TOTAL DOSE FROM URANIUM FUEL CYCLE (ODCM, Part 1, REC 4.0)**

Applicability

Applies to radiation dose from releases of radioactivity and radiation from uranium fuel cycle sources.

Objective

To ensure that the requirements of 40 CFR 190 are met.

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**ADDENDUM 1 (continued)**

**Specifications**

The dose or dose commitment to any member of the public, due to releases of radioactivity and radiation, from uranium fuel cycle sources shall be limited as follows:

1. Less than or equal to 25 mrem/year to the whole body; and,
2. Less than or equal to 25 mrem/year to any organ except the thyroid which shall be limited to less than or equal to 75 mrem/year.

**3. DOSE ASSESSMENT**

**A. METHODOLOGY**

The assessment of radiation doses to the public due to radioactive liquid and gaseous effluents is performed in accordance with the ODCM. The ODCM is based on methodologies and models suggested by the "Guidance Manual For Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants" (NUREG-0133) and "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the purpose of Evaluating Compliance with 10CFR50, Appendix I" (Regulatory Guide 1.109).

**B. ASSUMPTIONS**

Dose calculations are performed using formulas and constants defined in the ODCM. Specific radioactive release activities used in the dose calculations are listed in the Annual Radioactive Effluent Release Report (1.21 Report) for the period of January 1, 2003 to December 31, 2003. Historical meteorological data was used to generate tables of average dispersion factors. Locations of interest were identified from the 2003 land use census. Dispersion factors and locations of interest used in performing the dose calculations are listed in Table 2.

**C. ASSESSMENT RESULTS SUMMARY**

The calculated doses to the public due to radioactive effluents are listed in Table 1. The calculated doses are small fractions of their respective dose limits.

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**ADDENDUM 1 (continued)**

**4. 40 CFR 190 DOSE ASSESSMENT**

**A. METHODOLOGY**

Evaluation to demonstrate compliance with the 40 CFR 190 dose limits must be performed when the doses calculated for 10 CFR 50 compliance exceed twice their respective limits. When additional dose assessment is required to demonstrate compliance with 40 CFR 190 it is performed in accordance with the ODCM.

**B. RESULTS SUMMARY**

The cumulative dose contribution from liquid and gaseous effluents for this report period were calculated and are listed in Table 1. The cumulative dose contribution from direct radiation from the reactor unit and from radwaste storage tanks is measured by environmental thermoluminescent dosimeters for the report period. This data is contained in the Annual Environmental Operating Report. The calculated doses from liquid and gaseous effluents are less than twice their respective 10 CFR 50 limits, therefore, additional calculations are not necessary to demonstrate compliance with 40 CFR 190 dose limits (ODCM, Part 1, REC 4.1.1.c)

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**ADDENDUM 1 (continued)**

**TABLE 1  
ANNUAL DOSE ASSESSMENT 2003**

<b>A. LIQUIDS</b>					
<b>QUARTER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>ANNUAL</b>
	<b>(a)</b>	<b>(a)</b>	<b>(a)</b>	<b>(a)</b>	<b>(a)</b>
Organ (mrem)	1.86E-06	1.01E-06	5.72E-06	2.64E-07	8.85E-06
% of Limit	3.72E-05	2.02E-05	1.14E-04	5.29E-06	8.85E-05
	<b>(b)</b>	<b>(b)</b>	<b>(b)</b>	<b>(b)</b>	<b>(b)</b>
Whole Body (mrem)	1.86E-06	1.01E-06	5.72E-06	2.64E-07	8.85E-06
% of Limit	1.24E-04	6.73E-05	3.81E-04	1.76E-05	2.95E-04
(a) Dose to the Child Liver primarily by the potable water pathway.					
(b) Dose to the Child Whole Body primarily by the potable water pathway.					
<b>B. NOBLE GASES</b>					
<b>QUARTER</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>ANNUAL</b>
Total Body (mrem/yr)	9.39E-03	9.69E-04	1.36E-02	1.43E-03	1.36E-02
% of Limit	1.88E-03	1.94E-04	2.73E-03	2.86E-04	2.73E-03
Skin (mrem/yr)	1.22E-02	1.17E-03	1.77E-02	1.72E-03	1.77E-02
% of Limit	4.06E-04	3.91E-05	5.89E-04	5.73E-05	5.89E-04
Gamma (mrad)	1.02E-04	1.34E-04	2.23E-04	2.12E-04	6.71E-04
% of Limit	2.04E-03	2.68E-03	4.47E-03	4.24E-03	6.71E-03
Beta (mrad)	1.17E-05	1.26E-05	2.23E-05	1.89E-05	6.55E-05
% of Limit	1.17E-04	1.26E-04	2.23E-04	1.89E-04	3.28E-04

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**ADDENDUM 1 (continued)**

**TABLE 1  
ANNUAL DOSE ASSESSMENT 2003**

C. IODINES AND PARTICULATES					
QUARTER	1	2	3	4	ANNUAL
	(a)	(b)	(a)	(a)	(a)
Organ (mrem)	2.08E-04	1.01E-04	4.50E-04	2.78E-04	1.04E-03
% of Limit	2.77E-03	1.35E-03	6.00E-03	3.71E-03	6.91E-03
	(a)	(a)	(a)	(a)	(a)
Organ Dose Rate (mrem/yr)	1.17E-04	1.03E-04	1.85E-04	1.37E-04	1.85E-04
% of Limit	7.81E-06	6.84E-06	1.24E-05	9.16E-06	1.24E-05

- (a) Dose to the Child Thyroid primarily by the vegetation pathway.  
(b) Dose to the Child GILLI primarily by the vegetation pathway.

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ADDENDUM 1 (continued)

TABLE 2  
METEOROLOGICAL DATA AND LOCATIONS OF INTEREST

RECEPTOR	GEOGRAPHIC LOCATION	ATMOSPHERIC** DISPERSION FACTOR		
A. IODINE & PARTICULATES	DISTANCE/ DIRECTION	RELEASE POINT	X/Q (sec/m <sup>3</sup> )	D/Q (l/m <sup>2</sup> )
1. Garden	0.90 mi @ 83°E	ST	2.83E-08*	1.75E-09
Grazing Season	0.90 mi @ 83°E	RX	2.02E-07*	5.01E-09
Cary	0.90 mi @ 83°E	TB	1.83E-07*	4.80E-09
Location No. 78	0.90 mi @ 83°E	RF	2.02E-07*	5.01E-09
	0.90 mi @ 83°E	RW	3.21E-07*	5.76E-09
2. Meat	1.18 mi @ 127°SE	ST	1.72E-08*	6.80E-10
Grazing Season	1.18 mi @ 127°SE	RX	5.36E-08*	1.30E-09
Parkhurst	1.18 mi @ 127°SE	TB	5.14E-08*	1.27E-09
Location No. 26	1.18 mi @ 127°SE	RF	5.36E-08*	1.30E-09
	1.18 mi @ 127°SE	RW	9.12E-08*	1.46E-09
3. Cow	2.50 mi @ 139°SE	ST	1.67E-08*	2.65E-10
Grazing Season	2.50 mi @ 139°SE	RX	2.76E-08*	4.14E-10
France	2.50 mi @ 139°SE	TB	2.71E-08*	4.07E-10
Location No. 10	2.50 mi @ 139°SE	RF	2.76E-08*	4.14E-10
	2.50 mi @ 139°SE	RW	4.15E-08*	4.36E-10
4. Goat (D/Q)	3.62 mi @ 113°ESE	ST	-----	2.28E-10
Grazing Season	3.62 mi @ 113°ESE	RX	-----	3.40E-10
Showers	3.62 mi @ 113°ESE	TB	-----	3.33E-10
Location No. 71	3.62 mi @ 113°ESE	RF	-----	3.40E-10
	3.62 mi @ 113°ESE	RW	-----	3.49E-10
5. Goat (X/Q)	2.64 mi @ 152°SSE	ST	1.94E-08*	-----
Grazing Season	2.64 mi @ 152°SSE	RX	2.58E-08*	-----
Nickolas	2.64 mi @ 152°SSE	TB	2.57E-08*	-----
Location No. 61	2.64 mi @ 152°SSE	RF	2.58E-08*	-----
	2.64 mi @ 152°SSE	RW	3.59E-08*	-----

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ADDENDUM 1 (continued)

TABLE 2  
METEOROLOGICAL DATA AND LOCATIONS OF INTEREST

RECEPTOR	GEOGRAPHIC LOCATION	ATMOSPHERIC** DISPERSION FACTOR		
A. IODINE & PARTICULATES	DISTANCE/ DIRECTION	RELEASE POINT	X/Q (sec/m3)	D/Q (l/m2)
6. Resident Annual Average				
a. Inhalation <sup>(2)</sup>	1.55 mi @ 90°E <sup>(1)</sup>	ST	2.99E-08	-----
Cary	0.90 mi @ 83°E	RX	2.07E-07	-----
Location No. 78	0.90 mi @ 83°E	TB	1.88E-07	-----
	0.90 mi @ 83°E	RF	2.07E-07	-----
	0.90 mi @ 83°E	RW	3.06E-07	-----
b. Deposition <sup>(3)</sup>	0.71 mi @ 118°ESE	ST	-----	1.60E-09
Whaley	0.71 mi @ 118°ESE	RX	-----	5.52E-09
Location No. 199	0.71 mi @ 118°ESE	TB	-----	5.30E-09
	0.71 mi @ 118°ESE	RF	-----	5.52E-09
	0.71 mi @ 118°ESE	RW	-----	6.28E-09
B. NOBLE GASES				
1. Air Dose	1.55 mi @ 90°E <sup>(1)</sup>	ST	2.99E-08	-----
Annual Average	0.60 mi @ 90°E	ST(fc)	1.16E-07	-----
Site Boundary	0.60 mi @ 90°E	RX	3.58E-07	-----
	0.60 mi @ 90°E	TB	3.19E-07	-----
	0.60 mi @ 90°E	RF	3.58E-07	-----
	0.60 mi @ 90°E	RW	5.39E-07	-----
2. Total Body	0.60 mi @ 90°E	ST(fc)	1.16E-07	-----
Annual Average	0.60 mi @ 90°E	RX	3.58E-07	-----
Site Boundary	0.60 mi @ 90°E	TB	3.19E-07	-----
	0.60 mi @ 90°E	RF	3.58E-07	-----
	0.60 mi @ 90°E	RW	5.39E-07	-----



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**ADDENDUM 1 (continued)**

**TABLE 2  
METEOROLOGICAL DATA AND LOCATIONS OF INTEREST**

RECEPTOR	GEOGRAPHIC LOCATION	ATMOSPHERIC** DISPERSION FACTOR		
		RELEASE POINT	X/Q (sec/m3)	D/Q (l/m2)
B. NOBLE GASES (continued)	DISTANCE/ DIRECTION			
3. Skin	1.55 mi @ 90°E	ST	2.99E-08	-----
Annual Average	0.60 mi @ 90°E	ST(fc)	1.16E-07	-----
Site Boundary	0.60 mi @ 90°E	RX	3.58E-07	-----
	0.60 mi @ 90°E	TB	3.19E-07	-----
	0.60 mi @ 90°E	RF	3.58E-07	-----
	0.60 mi @ 90°E	RW	5.39E-07	-----

\* Tritium Dose Calculation

\*\* Based on ODCM X/Q, D/Q Values Rev. 08

- (1) Highest Sector Average X/Q in a populated area, not an identified residence.
- (2) Inhalation uses Annual Average X/Q values. All other receptors use grazing season meteorology.
- (3) Deposition uses Annual Average D/Q values. All other receptors use grazing season meteorology.

ST = Main Stack

RX = Reactor Building Vent

TB = Turbine Building Vent

RF = Refuel Floor Vent

RW = Radwaste Building Vent

fc = Finite Cloud