



Entergy Nuclear Northeast
Entergy Nuclear Operations, Inc.
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April 23, 2003
JAFP-03-0056

T.A. Sullivan
Vice President, Operations-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, 2002 through December 31, 2002. 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 2002 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.

Very truly yours,

T.A. SULLIVAN

VICE PRESIDENT - OPERATIONS

TAS/CAB/jbh

Attachments

Xc: Document Control Desk (USNRC)
D. Sherman (ANI Library)
J. Knubel (ENOC/WPO)
C. Faison (ENOC/WPO)
J. Kelly (ENOC/WPO)

B. O'Grady
W. Maguire
T. Kurtz (NMPC)
J. Furfaro (ENOC/WPO)
P. Merges (NYSDEC)

NRC Resident Inspector
RMS (JAF)

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
EFFLUENT AND WASTE DISPOSAL
ANNUAL REPORT

JANUARY 1, 2002 - DECEMBER 31, 2002

DOCKET NO.: 50-333

LICENSE NO.: DPR-59

ENTERGY NUCLEAR OPERATIONS, INC.
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SUPPLEMENTAL INFORMATION

FACILITY: IAENPP 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	7.10E-05
(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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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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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:	NONE	NONE	NONE	3.00E+00
(2) Total time period for batch release: (min)	NONE	NONE	NONE	3.25E+02
(3) Maximum time period for batch release: (min)	NONE	NONE	NONE	1.80E+02
(4) Average time period for batch release: (min)	NONE	NONE	NONE	1.08E+02
(5) Minimum time period for batch release: (min)	NONE	NONE	NONE	7.00E+01
(6) Total Activity Released (Ci)	NONE	NONE	NONE	2.13E-03
(7) Total Volume Released (liters)	NONE	NONE	NONE	9.29E+04
b. <u>Liquid: Non-Canal</u>				
(1) Number of batch releases:	NONE	NONE	1.00E+00	9.00E+00
(2) Total time period for batch release: (min)	NONE	NONE	6.94E+02	5.74E+02
(3) Maximum time period for batch release: (min)	NONE	NONE	6.94E+02	1.75E+02
(4) Average time period for batch release: (min)	NONE	NONE	6.94E+02	6.38E+01
(5) Minimum time period for batch release: (min)	NONE	NONE	6.94E+02	5.00E+01
(6) Total Activity Released (Ci)	NONE	NONE	3.66E-05	3.69E-04
(7) Total Volume Released (liters)	NONE	NONE	2.95E+04	2.09E+05

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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 %
A. FISSION AND ACTIVATION GASES						
1. Total Release	Ci	4.72E+00	7.94E+00	8.63E+01	8.53E+00	≤2.50E+01
2. Average release rate for period	μCi/sec	6.01E-01	1.01E+00	1.08E+01	1.07E+00	
3. Tech. Spec. Limit	%	*	*	*	*	
B. IODINE-131						
1. Total Iodine-131	Ci	4.35E-05	5.17E-05	7.31E-05	1.14E-04	≤2.50E+01
2. Average release rate for period	μCi/sec	5.53E-06	6.57E-06	9.16E-06	1.44E-05	
3. Tech. Spec. Limit	%	*	*	*	*	
C. PARTICULATES						
1. Particulates with half-lives >8 days	Ci	1.06E-05	3.62E-06	2.68E-05	1.26E-04	≤3.60E+01
2. Average release rate for period	μCi/sec	1.35E-06	4.62E-07	3.37E-06	1.59E-05	
3. Tech. Spec. Limit	%	*	*	*	*	
4. Gross alpha radioactivity	Ci	3.79E-07	3.06E-07	6.69E-07	4.19E-07	≤2.50E+01
D. TRITIUM						
1. Total Release	Ci	8.48E+00	6.04E+00	6.49E+00	2.79E+00	≤2.50E+01
2. Average release rate for period	μCi/sec	1.08E+00	7.68E-01	8.16E-01	3.50E-01	
3. Tech. Spec. Limit	%	*	*	*	*	
*E. PERCENT OF TECHNICAL SPECIFICATION LIMITS						
FISSION AND ACTIVATION GASES						
1. Quarterly gamma air dose limit	%	2.91E-03	4.54E-03	4.23E-02	5.02E-03	
2. Quarterly beta air dose limit	%	1.36E-04	2.52E-04	3.32E-03	3.28E-04	
3. Yearly gamma air dose limit	%	1.45E-03	2.27E-03	2.11E-02	2.51E-03	
4. Yearly beta air dose limit	%	6.80E-05	1.26E-04	1.66E-03	1.64E-04	
5. Whole body dose rate limit	%	1.86E-04	2.36E-03	9.80E-03	2.18E-03	
6. Skin dose rate limit	%	3.78E-05	5.07E-04	2.12E-03	4.64E-04	
HALOGENS, TRITIUM AND PARTICULATES WITH HALF-LIVES >8 DAYS						
7. Quarterly dose limit (organ)	%	1.21E-02	1.05E-02	1.63E-02	2.35E-02	
8. Yearly dose limit (organ)	%	6.03E-03	5.27E-03	8.17E-03	1.17E-02	
9. Organ dose rate limit	%	1.71E-05	1.37E-05	1.35E-05	2.27E-05	

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

NUCLIDES RELEASED	UNIT	CONTINUOUS MODE			
		QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4
1. Fission Gases					
Argon-41	Ci	4.26E+00	4.73E+00	1.03E+01	2.31E+00
Krypton-85m	Ci	4.60E-01	8.00E-01	6.72E+00	6.12E-01
Krypton-87	Ci	-----	3.50E-01	1.53E+01	9.64E-01
Krypton-88	Ci	-----	3.64E-01	1.82E+01	1.13E+00
Xenon-133	Ci	-----	1.96E-01	3.29E+00	2.63E-01
Xenon-135	Ci	-----	3.30E-01	2.57E+01	6.35E-01
Xenon-135m	Ci	-----	2.96E-01	1.78E+00	3.60E-01
Xenon-137	Ci	-----	-----	1.61E-01	-----
Xenon-138	Ci	-----	8.78E-01	4.84E+00	2.26E+00
TOTAL	Ci	4.72E+00	7.94E+00	8.63E+01	8.53E+00
2. Iodines					
Iodine-131	Ci	-----	2.13E-05	1.34E-05	8.95E-05
Iodine-133	Ci	-----	2.47E-06	2.29E-06	8.66E-04
Iodine-135	Ci	-----	-----	-----	9.52E-04
TOTAL	Ci	-----	2.38E-05	1.57E-05	1.91E-03
3. Particulates					
Manganese-54	Ci	-----	7.76E-07	8.84E-08	1.64E-06
Cobalt-60	Ci	-----	4.22E-07	3.05E-08	1.61E-07
Arsenic-76	Ci	-----	-----	-----	1.63E-06
Strontium-89	Ci	4.67E-07	7.16E-07	1.27E-06	4.14E-07
Strontium-90	Ci	1.56E-08	6.87E-08	1.19E-07	6.61E-04
Cerium-144	Ci	-----	-----	3.10E-08	3.47E-07
TOTAL	Ci	4.83E-07	1.98E-06	1.54E-06	4.26E-06
4. Tritium					
Hydrogen-3	Ci	5.54E-01	7.05E-01	1.20E+00	6.58E-01

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

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

<u>NUCLIDES RELEASED</u>	<u>UNIT</u>	<u>CONTINUOUS MODE</u>			
		<u>QUARTER 1</u>	<u>QUARTER 2</u>	<u>QUARTER 3</u>	<u>QUARTER 4</u>
1. Fission Gases					
None	Ci	-----	-----	-----	-----
TOTAL	Ci	-----	-----	-----	-----
2. Iodines					
Iodine-131	Ci	4.35E-05	3.04E-05	5.97E-05	2.48E-05
Iodine-133	Ci	1.42E-04	2.69E-05	2.10E-04	-----
TOTAL	Ci	1.86E-04	5.73E-05	2.70E-04	2.48E-05
3. Particulates					
Chromium-51	Ci	-----	-----	-----	2.61E-05
Manganese-54	Ci	-----	-----	-----	4.11E-05
Cobalt-58	Ci	-----	-----	-----	3.90E-06
Iron-59	Ci	-----	-----	-----	1.70E-05
Cobalt-60	Ci	-----	-----	-----	1.66E-05
Zinc-65	Ci	-----	-----	-----	5.76E-06
Strontium-89	Ci	9.28E-06	6.43E-07	2.02E-05	3.19E-06
Strontium-90	Ci	8.38E-07	1.00E-06	5.11E-06	7.20E-06
Antimony-124	Ci	-----	-----	-----	1.27E-06
TOTAL	Ci	1.01E-05	1.64E-06	2.53E-05	1.22E-04
4. Tritium					
Hydrogen-3	Ci	7.93E+00	5.33E+00	5.29E+00	2.13E+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 %
A. FISSION AND ACTIVATION PRODUCTS						
1. Total Release (not including tritium, gases and alpha)	Ci	NONE	NONE	-----	2.75E-03	≤2.50E+01
2. Average diluted concentration during period	μCi/ml	NONE	NONE	-----	3.90E-03	
3. Applicable limit	%	-----	-----	-----	*	
B. TRITIUM						
1. Total Release	Ci	NONE	NONE	3.66E-05	6.25E-01	≤2.50E+01
2. Average diluted concentration during period	μCi/ml	NONE	NONE	1.24E-06	2.11E-06	
3. Applicable limit	%	-----	-----	-----	*	
C. DISSOLVED AND ENTRAINED GASES						
1. Total Release	Ci	NONE	NONE	-----	-----	≤2.50E+01
2. Average diluted concentration during period	μCi/ml	NONE	NONE	-----	-----	
3. Applicable Limit	%	-----	-----	-----	-----	
D. GROSS ALPHA RADIOACTIVITY						
1. Total Release	Ci	NONE	NONE	-----	3.62E-07	≤4.20E+01
E. VOLUME OF WASTE RELEASED (PRIOR TO DILUTION)						
	liters	NONE	NONE	2.95E+04	3.01E+05	
F. VOLUME OF DILUTION WATER USED DURING PERIOD						
	liters	NONE	NONE	-----	2.17E+08	
*G. PERCENT OF TECHNICAL SPECIFICATION LIMITS						
1. Quarterly Whole Body Dose	%	-----	-----	1.17E-06	1.40E-03	
2. Quarterly Organ Dose	%	-----	-----	3.50E-07	7.98E-04	
3. Annual Whole Body Dose	%	-----	-----	5.84E-07	6.98E-04	
4. Annual Organ Dose	%	-----	-----	1.75E-07	3.99E-04	

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TABLE 2B
LIQUID EFFLUENTS CANAL

<u>NUCLIDES RELEASED</u>	<u>UNIT</u>	<u>BATCH MODE</u>			<u>QUARTER 4</u>
		<u>QUARTER 1</u>	<u>QUARTER 2</u>	<u>QUARTER 3</u>	
1. Fission and Activation Products					
Manganese-54	Ci	-----	-----	-----	9.76E-04
Iron-55	Ci	-----	-----	-----	6.32E-04
Iron-59	Ci	-----	-----	-----	1.88E-04
Cobalt-60	Ci	-----	-----	-----	8.44E-04
Zinc-65	Ci	-----	-----	-----	7.88E-05
Strontium-89	Ci	-----	-----	-----	2.74E-07
Strontium-90	Ci	-----	-----	-----	5.47E-07
Cesium-137	Ci	-----	-----	-----	3.14E-05
TOTAL	Ci	-----	-----	-----	2.75E-03
2. Tritium					
HYDROGEN-3	Ci	-----	-----	-----	6.25E-01
3. Dissolved and Entrained Gases					
NONE	Ci	-----	-----	-----	-----

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

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TABLE 2B (SUPPLEMENT)
LIQUID EFFLUENTS NON-CANAL

<u>NUCLIDES RELEASED</u>	<u>UNIT</u>	<u>BATCH MODE</u>			
		<u>QUARTER 1</u>	<u>QUARTER 2</u>	<u>QUARTER 3</u>	<u>QUARTER 4</u>
1. Fission and Activation Products					
NONE	Ci	-----	-----	-----	-----
2. Tritium					
HYDROGEN-3	Ci	-----	-----	3.66E-05	3.69E-04
3. Dissolved and Entrained Gases					
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	12-month Period			Est. Total Error %
		Class A	Class B	Class C	
a. Spent resins, filter sludges evaporator bottoms, etc.	m ³	1.17E+01	0.00E+00	0.00E+00	1.00E+01
	Ci	9.18E+01	0.00E+00	0.00E+00	1.00E+01
b. Dry compressible waste, contaminated equipment, etc.	m ³	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
c. Irradiated components, control rods, etc.	m ³	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Ci	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 ³	6.10E+02	0.00E+00	0.00E+00	1.00E+01
	Ci	6.02E+01	0.00E+00	0.00E+00	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	6.48E+01	5.95E+01	E	Cesium-137	3.26E+00	2.99E+00	E
Cobalt-60	1.93E+01	1.77E+01	M	Nickel-63	1.46E+00	1.34E+00	M
Manganese-54	7.00E+00	6.42E+00	M	Carbon-14	4.54E-01	4.17E-01	E
Zinc-65	3.70E+00	3.40E+00	M	Tritium	1.00E-03	8.94E-04	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	1.26E+02	3.68E+01	E	Zinc-65	5.41E+00	1.58E+00	E
Cobalt-60	4.15E+01	1.38E+01	E	Carbon-14	4.38E+00	1.25E+00	E
Manganese-54	1.11E+01	2.87E+00	E	Nickel-63	2.63E+00	8.77E-01	E
Cesium-137	7.62E+00	2.78E+00	E	Tritium	7.91E-01	2.24E-01	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>
2	Truck	Chem-Nuclear Systems, Inc. Barnwell, SC
1	Truck	*Diversified Scientific Services, Inc. Kingston, TN
10	Truck	* Duratek Oak Ridge, TN
5	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	-----	-----

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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 ³	HIC	10
Dry compressible Waste (DAW), Contaminated Equipment, etc.	Non-compacted	1280 ft ³	STC	14
Dry compressible Waste(DAW), Contaminated Equipment, etc.	Non-compacted	87 ft ³	STC	21
Contaminated Oil	Non-compacted	7 ft ³	STC	21

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.

Revision 17 of the ODCM was approved by the Plant Operating Review Committee on January 29, 2002 at Meeting No. 02-002 and became effective on August 6, 2002. This revision does not reduce the accuracy or reliability of any dose calculations or setpoint determinations. Listed below is a brief summary of the changes incorporated in this revision. Attached to this report is a revised copy of the ODCM.

- Specified current revision number in Section 1.2 of Part 1 (REC) and Section 1.3 of Part 2 (ODCM).
- Changed Part 1 Section 1.3 definition title of Instrument Channel Calibration, Instrument Channel Functional Test, Instrument Check, and Logic System Function Test to Channel Calibration, Channel Functional Test Channel Check, and Logical System Functional Test respectively to be consistent with the titles used in the Improved Technical Specifications. As a result, the order of the definitions were revised to be in alphabetical order.
- Changed references in Part 1 and Part 2 from Appendix A Technical Specifications to Technical Specifications in various locations since the Improved Technical Specifications only includes Appendix B. In addition, references to Appendix B of the Technical Specifications have been deleted since these Specifications have been relocated to this document. The appropriate Part 1 Section has replaced it, as applicable.
- Definition of Dose Equivalent I-131 has been revised to be consistent with CTS/TTS definition.
- The following definitions have been added to Part 1, Section 1.3: Mode, Process Control Program, Solidification, Surveillance Frequency Notation/Intervals.
- Revised Part 1, Section 1.3 and Part 2, Section 2.0 definition of Unrestricted Area to be consistent with regulations.
- Part 1, Section 1.4, Rules for Limiting Conditions for Operation and Surveillance Requirements.
- Part 1 Specifications reference the ODCM. The explicit Part 2 Section has been included for clarity.

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ATTACHMENT NO. 1 (Continued)

CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL (ODCM)

- The Semiannual Radioactive Effluent Release Report has been changed to Radioactive Effluent Release Report to be consistent with changes made to Technical Specifications. In addition, Section 6 has been added to include requirements of both the Radioactive Release Report and the Annual Radiological Environmental Operating Report.
- The clarifying Note in Section 2.1.1.c.2 has been deleted since Section 2.1.1.c.2 clearly identifies when the Report is necessary.
- Part 1, Section 2.1.3 Bases references the limits of 10 CFR 20. This reference has been replaced with Part 1, Section 2.2.1.c.1 since it better prescribes the limit.
- The Frequency of the Logical System Functional Test in Part 1, Table 2.1-2 has been changed from Semiannually to "once per 24 months" to be consistent with the CTS requirements in CTS RETS Table 3.10-2.
- Quarterly Channel Functional Test in Table 2.1-2 for Normal Service Water Effluent monitors has been deleted since it covered by the quarterly Channel Calibration Test. In addition, the quarterly Channel Functional Test in Table 3.1-2 for all Functions has been deleted for the same reason.
- Table 2.1-2 Notes (g) and (h) have been deleted. Note (g) is deleted since there is no time delay relays associated with the logic circuits of this table. The first portion of Note (h) has been deleted since the Channel Functional Test definition in the Technical Specifications provides adequate guidance. The description on the method of calibration has been deleted since it implies a sensor calibration is not required. The same change has been made in Part 1, Table 3.1-2 for Notes (d) and (e).
- NBS replaced with NIST in Part 1, Table 2.1-2 Note (e).
- Part 1 Table 2.1-2 Note (f) and Table 3.1-2 Note (c) require a simulated automatic actuation test to be performed. The definition in the CTS has been deleted. The definition has been included in Note (f) and Note (c), respectively.
- Part 1 Table 2.1-2 Note (g) replaces the old Note (g) that was deleted as described above. This Note describes the proper method for performing a Channel Functional Test of a relay. This detail is consistent with details found in the Improved Technical Specification Bases for Technical Specification equipment. This same Note has been added to Part 1 Table 3.1-2 as Note (d).
- Part 1, 2.2.1.c limit has been changed to be consistent with the limit specified in Improved Technical Specification 5.5.4 (10 CFR 20, Appendix B, Table II, Column 2 has been changed to Appendix B, Table 2, Column 2 to 10 CFR 20.1001-20.2402). The Part 1, Section 2.2.3 Bases and Part 2 (ODCM) has been changed to reflect the new limit.

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ATTACHMENT NO. 1 (Continued)

CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL (ODCM)

- Details of Part 1, Section 3.1.1.c.4 concerning how the Alarm/trip set points are determined has been included in Part 1, Table 3.1-1 Note (b) since most of the details currently reside in the Note.
- CTS numbers changed to appropriate Improved Technical Specifications Sections, as applicable.
- Changed the word 'operable' to 'inoperable' in Part 1, Table 3.1-1 Note (a).
- Main Stack Exhaust Function has been included in Table 3.1-1 to be consistent with Part 1, Section 3.1.1.c.1.a and Part 1 Table 3.1-2.

Title of Table 3.1-1 changed from "Radiation Monitors Systems that Initiate and/or Isolate Systems" to "Radiation Monitoring Systems" since the Main Stack Exhaust Function does not isolate its associated pathway. Notes (c), (d), and (e) have been added to prescribe the appropriate Operability requirements.

The original Note (c), cease operation of the refueling equipment, and Note (d) to isolate secondary containment and start the SBGTS, changed to refer to the Technical Specification 3.3.6.2 for the appropriate actions and in addition the requirements in Note (f) were also added since these requirements are consistent with requirements for the other Functions and also required by Part 1, Section 3.1.1.c.3.

- The Frequency of the Logical System Functional Test in Part 1, Table 3.1-2 changed from Semiannually to "R" to be consistent with the CTS requirements in CTS RETS Table 3.10-2.
- Section 5.0, Part 2 (ODCM) changed to include reference to 10 CFR 20.130.1(a)(1). Section now states that compliance with the limits of 40 CFR 190 are deemed to demonstrate compliance with the 100 mrem/hr limits of 10 CFR 20.1301.
- Section 5.5, Part 2 (ODCM) added to describe how compliance with limits of 10 CFR 20.1301 is evaluated.
- The following Specifications have been added consistent with Improved Technical Specification Licensing Amendment:
 - 3.6 Main Condenser Steam Jet Air Ejector Radiation Monitors
 - 7.0 Major Modifications to Radioactive Liquid, Gaseous, and Solid Waste Treatment Systems
 - 8.0 Purging of the Primary Containment
- Part 2 References to total body changed to whole body consistent with Part 1 Specifications.

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ATTACHMENT NO. 1 (Continued)

CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL (ODCM)

- Added ECL definition to Part 2, Section 2.0 definitions and deleted MPC definition. Revised Section 3.0 calculation methodology to reflect new ECL definition. Incorporated new ECL limits in Table A-1.
- Changed "Radiological and Environmental Services Management" to Chemistry/Environmental Management" in Part 1, Section 3.5.b.
- Deleted Appendix B, Table B-1 (Unrestricted Area MPCs) and renumbered subsequent Appendix B tables.
- Revised Appendix Figure F-4 to delete the 2nd recombiner.
- Changed "On Site Storage" to "Temporary On Site Storage" in Appendix Figure F-6.

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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 11 to the PCP implementing procedure FO-OP-032-41802 Setup and Operating Procedure for RDS-1000 Unit #9 at James A. FitzPatrick Nuclear was approved by the Plant Operating Review Committee on March 19, 2002 at Meeting #02-0078 and became effective on March 22, 2002. 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.

Incorporated changes to vendor procedure during revisions 8, 9, 10 and 11.

Revision 8

- Identified four new references
- Identifies the use of preventative maintenance procedure completion prior to operating RDS-1000.
- Allows operator the option to protect the Hi-Hi float from exposure to the waste stream.
- Incorporates lessons learned to prevent dewatering precoat media in used resin liners.
- Ensures the float is free to operate.

Revision 9

- Added the following statement: This procedure also allows liners to be filled and gross dewatered to meet the shipping cask Certificate of Compliance specifications for free standing water for shipment to an offsite processor for further processing.
- Added Caution and Note about liner to be shipped to offsite vendor for further processing.

Revision 10

- Added a step that had been dropped between Revision 8 and Revision 9.

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ATTACHMENT NO. 2 (CONTINUED)

SUMMARY OF CHANGES TO THE PROCESS CONTROL PROGRAM

Revision 11

- Added a step to allow inline sampling
- Revised Appendix B to clarify signature responsibilities
- Corrected the following referenced steps:

4.1 Bead Resin Liners

Bead Resin Liners will be considered dewatered when the following are performed in accordance with Step 6.12 and all the following acceptance criteria are met:

- 4.1.1 The dewatering pump has been run for one hour after the final flush.
- 4.1.2 The RDS 1000 has been run for a minimum of four hours
- 4.1.3 The moisture separator sight glass level does not increase more than ½ inch during a 30-minute period.

4.2 Precoat Type Liners

Precoat Type Liners will be considered dewatered when the following are performed in accordance with Step 6.13 and all the following acceptance criteria are met:

- 4.2.1 The dewatering pump has been run (after final flush) until requirements of Step 6.13.2 have been met.
- 4.2.2 The RDS 1000 has been run for a minimum of (11) eleven hours.
- 4.2.3 The moisture separator sight glass level does not increase more than 1 inch during a 30-minute period.

Revision 12 to the PCP implementing procedure FO-OP-032-41802 Setup and Operating Procedure for RDS-1000 Unit #9 at James A. FitzPatrick Nuclear was approved by the Plant Operating Review Committee on August 14, 2002 at Meeting 02-017 and became effective on August 23, 2002. 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 requirement that all dewatering performance data for resin and powdex liners be reviewed and signed by the vendor project manager prior to being declared to meet the dewatering requirements.

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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 Off Site Dose Calculation Manual (ODCM), Part 1, Sections 6.2.3 and 6.2.8 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 were made to the Environmental Monitoring Locations sampled to implement the requirements of the ODCM, Part 1, table 5.1-1. Sample location selections were based on the 2002 annual land use census. The 2002 land use census identified a new garden location that was sampled as an optional sample for the 2002 Radiological Environmental Monitoring Program. The garden is located in the east sector (96°) at a distance of 1.7 miles.

NEW LOCATIONS FOR DOSE CALCULATIONS

During the report period, no changes in Dose Calculation Receptor Locations were required based on the results of the land use census.

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ATTACHMENT NO. 4

**DEVIATIONS FROM THE REQUIRED
ENVIRONMENTAL SAMPLING SCHEDULE**

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

EXCEPTIONS TO THE 2002 ENVIRONMENTAL SAMPLING PROGRAM

1. The air sampling pump at the R-1 Environmental Sampling Station was inoperable for approximately 5.5 hours during the period of 02/05/02 through 02/12/02. The inoperability of the sampling pump was the result of an electrical power failure caused by high winds. No corrective action was implemented.
2. The air sampling pumps at the R-1 and R-2 Environmental Sampling Stations were inoperable for approximately 2.5 hours on 05/05/02. The inoperability of the sampling pumps was due to an electrical power outage caused by a tree falling on the near by electrical supply line. The damaged electrical line was repaired and pump operability was restored. No corrective action was implemented.
3. Environmental Thermoluminescent Dosimeter (TLD) at ODCM location no. 91 was found to be missing during the first quarter 2002 change-out. TLD no. 91 is located on County Route 51A (156 degrees @ 4.8 miles). The TLD loss was the result of the phone company replacing the pole on which the TLD was deployed. The TLD was replaced during the quarterly change-out. There is no previous history of TLDs missing from this location. No corrective action was implemented.
4. The air sampling pump at the R-1 Environmental Sampling Station was inoperable for approximately 1.3 hours on 11/02/02. The inoperability of the sampling pumps was the result of an electrical power outage that was weather related. No corrective action was implemented.

The unavailability of these samples was the result of equipment failure or lost sample media. No replacement samples or change in sample locations were required. The ODCM was not revised as a result of the sample unavailability.

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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 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 technical specification, 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 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 2002

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 Semi-Annual Radioactive Effluent Release Reports (1.21 Reports) for the period of January 1, 2002 to December 31, 2002. Historical meteorological data was used to generate tables of average dispersion factors. Locations of interest were identified from the 2002 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 2002

A. LIQUIDS					
QUARTER	1	2	3	4	ANNUAL
			(a)	(c)	(c)
Organ (mrem)	NONE	NONE	1.75E-08	3.99E-05	3.99E-05
% of Limit	-----	-----	3.50E-07	7.98E-04	3.99E-04
			(b)	(d)	(d)
Whole Body (mrem)	NONE	NONE	1.75E-08	2.09E-05	2.09E-05
% of Limit	-----	-----	1.17E-06	1.40E-03	6.98E-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.
 (c) Dose to the Teen Liver primarily by the fresh water fish pathway.
 (d) Dose to the Adult Whole Body primarily by the fresh water fish pathway.

B. NOBLE GASES					
QUARTER	1	2	3	4	ANNUAL
Total Body (mrem/yr)	9.29E-04	1.18E-02	4.90E-02	1.09E-02	4.90E-02
% of Limit	1.86E-04	2.36E-03	9.80E-03	2.18E-03	9.80E-03
Skin (mrem/yr)	1.14E-03	1.52E-02	6.37E-02	1.39E-02	6.37E-02
% of Limit	3.78E-05	5.07E-04	2.12E-03	4.64E-04	2.12E-03
Gamma (mrad)	1.45E-04	2.27E-04	2.11E-03	2.51E-04	2.74E-03
% of Limit	2.91E-03	4.54E-03	4.23E-02	5.02E-03	2.74E-02
Beta (mrad)	1.36E-05	2.52E-05	3.32E-04	3.28E-05	4.04E-04
% of Limit	1.36E-04	2.52E-04	3.32E-03	3.28E-04	2.02E-03

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ADDENDUM 1 (continued)

TABLE 1
ANNUAL DOSE ASSESSMENT 2002

C. IODINES AND PARTICULATES					
QUARTER	1	2	3	4	ANNUAL
	(a)	(b)	(b)	(c)	(b)
Organ (mrem)	9.05E-04	7.90E-04	1.23E-03	1.76E-03	4.39E-03
% of Limit	1.21E-02	1.05E-02	1.63E-02	2.35E-02	2.92E-02
	(d)	(d)	(d)	(d)	(d)
Organ Dose Rate (mrem/yr)	2.56E-04	2.05E-04	2.02E-04	3.40E-04	3.40E-04
% of Limit	1.71E-05	1.37E-05	1.35E-05	2.27E-05	2.27E-05

- (a) Dose to the Child Thyroid primarily by the vegetation pathway.
- (b) Dose to the Infant Thyroid primarily by the goat milk pathway.
- (c) Dose to the Child Bone primarily by the vegetation pathway.
- (d) Dose to the Child Thyroid by the inhalation 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 ³)	D/Q (l/m ²)
1. Garden	0.93 mi @ 82°E	ST	2.86E-08*	1.72E-09
Grazing Season	0.93 mi @ 82°E	RX	1.94E-07*	4.76E-09
Cary	0.93 mi @ 82°E	TB	1.76E-07*	4.57E-09
Location No. 78	0.93 mi @ 82°E	RF	1.94E-07*	4.76E-09
	0.93 mi @ 82°E	RW	3.08E-07*	5.45E-09
2. Meat	1.24 mi @ 126°SE	ST	1.70E-08*	6.51E-10
Grazing Season	1.24 mi @ 126°SE	RX	5.17E-08*	1.24E-09
Parkhurst	1.24 mi @ 126°SE	TB	4.97E-08*	1.21E-09
Location No. 26	1.24 mi @ 126°SE	RF	5.17E-08*	1.24E-09
	1.24 mi @ 126°SE	RW	8.74E-08*	1.39E-09
3. Cow	2.2 mi @ 138°SE	ST	1.65E-08*	3.11E-10
Grazing Season	2.2 mi @ 138°SE	RX	3.04E-08*	5.07E-10
France	2.2 mi @ 138°SE	TB	2.98E-08*	4.97E-10
Location No. 10	2.2 mi @ 138°SE	RF	3.04E-08*	5.07E-10
	2.2 mi @ 138°SE	RW	4.66E-08*	5.39E-10
4. Goat	2.5 mi @ 146°SE	ST	1.67E-08*	2.65E-10
Grazing Season	2.5 mi @ 146°SE	RX	2.76E-08*	4.14E-10
Nickolas	2.5 mi @ 146°SE	TB	2.71E-08*	4.07E-10
Location No. 61	2.5 mi @ 146°SE	RF	2.76E-08*	4.14E-10
	2.5 mi @ 146°SE	RW	4.15E-08*	4.36E-10
5. Resident Annual Average				
a. Inhalation	1.55 mi @ 90°E**	ST	2.99E-08	-
	0.93 mi @ 82°E	RX	1.98E-07	-
	0.93 mi @ 82°E	TB	1.81E-07	-
	0.93 mi @ 82°E	RF	1.98E-07	-
	0.93 mi @ 82°E	RW	2.93E-07	-

*Tritium Dose Calculation Only

**Highest Sector Average X/Q in a populated area.

ENTERGY NUCLEAR OPERATIONS, INC.
 JAMES A. FITZPATRICK NUCLEAR POWER PLANT
 EFFLUENT AND WASTE DISPOSAL
 ANNUAL REPORT JANUARY 2002-DECEMBER 2002

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 ³)	D/Q (l/m ²)
5 b. Deposition	0.70 mi @ 118°SE	ST	-	1.61E-09
	0.70 mi @ 118°ESE	RX	-	5.65E-09
	0.70 mi @ 118°ESE	TB	-	5.42E-09
	0.70 mi @ 118°ESE	RF	-	5.65E-09
	0.70 mi @ 118°ESE	RW	-	6.42E-09
B. NOBLE GASES				
1. Air Dose Annual Average	1.55 mi @ 90°E	ST	2.99E-08	-
	0.6 mi @ 90°E	ST(fc)	1.16E-07	-
	0.6 mi @ 90°E	RX	3.58E-07	-
	0.6 mi @ 90°E	TB	3.19E-07	-
	0.6 mi @ 90°E	RF	3.58E-07	-
	0.6 mi @ 90°E	RW	5.39E-07	-
2. Total Body Annual Average	0.6 mi @ 90°E	ST(fc)	1.16E-07	-
	0.6 mi @ 90°E	RX	3.58E-07	-
	0.6 mi @ 90°E	TB	3.19E-07	-
	0.6 mi @ 90°E	RF	3.58E-07	-
	0.6 mi @ 90°E	RW	5.39E-07	-
3. Skin Annual Average	1.55 mi @ 90°E	ST	2.99E-08	-
	0.6 mi @ 90°E	ST(fc)	1.16E-07	-
	0.6 mi @ 90°E	RX	3.58E-07	-
	0.6 mi @ 90°E	TB	3.19E-07	-
	0.6 mi @ 90°E	RF	3.58E-07	-
	0.6 mi @ 90°E	RW	5.39E-07	-

ST = Main Stack
 RX = Reactor Building
 TB = Turbine Building Vent
 RF = Refuel Floor Vent
 RW = Radwaste Vent
 fc = Finite Cloud