Entergy

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Pete Dietrich
Site Vice President - JAF

April 26, 2006
JAFP-06-0067

United States Nuclear Regulatory Commission
Mr. Samuel Collins
Regional Administrator, Region 1
475 Allendale Road
King of Prussia, PA 19406

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, 2005 through December 31, 2005. 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 2005 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.

There are no commitments contained in this letter.

Very truly yours,

Pete Dietrich
Site Vice President

PD/CAB/jbh

Attachments

Xc: Document Control Desk (USNRC)
D. Sherman (ANI Library)
K. Mulligan (JAF)
C. Faison (ENOC/WPO)
J. McCann (ENOC/WPO)
J. Boska, Project Manager, NRR
NRC Resident Inspector
P. Merges (NYSDEC)
T. Kurtz (NMPC)
J. Furfaro (ENOC/WPO)
W. Hamblin (CHEM/JAF)

ENTERGY NUCLEAR OPERATIONS, INC.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY 1, 2005 - DECEMBER 31, 2005

DOCKET NO.: 50-333

LICENSE NO.: DPR-59

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY 2005-DECEMBER 2005

SUPPLEMENTAL INFORMATION

FACILITY: JAFNPP 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).

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 μCi/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:	Quarter 1	Quarter 2	Quarter 3	Quarter 4
(1) Fission and activation products (mixture EC) (μCi/ml)	None	None	None	None
(2) Tritium (μCi/ml)	1.00E-02	1.00E-02	1.00E-02	1.00E-02
(3) Dissolved and entrained gases (μCi/ml)	2.00E-04	2.00E-04	2.00E-04	2.00E-04

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.

SUPPLEMENTAL INFORMATION (continued)

5. **Batch Releases**

a. Liquid: Canal	Quarter 1	Quarter 2	Quarter 3	Quarter 4
(1) Number of batch releases:	6.00E+00	7.00E+00	1.40E+01	5.00E+00
(2) Total time period for batch release: (min)	2.13E+02	9.50E+01	2.06E+02	1.86E+02
(3) Maximum time period for batch release: (min)	7.50E+01	4.00E+01	5.00E+01	6.00E+01
(4) Average time period for batch release: (min)	3.55E+01	1.36E+01	1.47E+01	3.72E+01
(5) Minimum time period for batch release: (min)	3.00E+00	1.00E+00	1.00E+00	3.00E+00
(6) Total Activity Released (Ci)	7.76E-05	1.09E-04	6.62E-04	1.18E-04
(7) Total Volume Released (liters)	1.29E+04	1.07E+04	5.02E+04	1.04E+04
b. Liquid: Non-Canal				
(1) Number of batch releases:	8.00E+00	9.00E+00	1.80E+01	5.00E+00
(2) Total time period for batch release: (min)	7.05E+05	2.04E+04	1.67E+03	3.03E+02
(3) Maximum time period for batch release: (min)	5.04E+04	2.02E+04	4.37E+02	1.13E+02
(4) Average time period for batch release: (min)	8.81E+03	2.26E+03	9.27E+01	6.06E+01
(5) Minimum time period for batch release: (min)	3.00E+00	1.00E+00	1.00E+00	1.00E+00
(6) Total Activity Released (Ci)	2.15E-03	8.21E-04	5.87E-03	2.53E-04
(7) Total Volume Released (liters)	1.82E+06	4.85E+05	5.17E+05	1.14E+05

SUPPLEMENTAL INFORMATION (continued)

c. Gaseous:

There were no gaseous batch releases for this report period.

6. **Abnormal Releases**

a. Liquid:	Quarter 1	Quarter 2	Quarter 3	Quarter 4
(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

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
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TABLE 1A

GASEOUS EFFLUENTS--SUMMATION OF ALL RELEASES

	UNIT	QTR 1	QTR 2	QTR 3	QTR 4	EST TOTAL ERROR %
A. FISSION AND ACTIVATION GASES						
1. Total Release	Ci	1.13E+03	2.49E+02	2.22E+03	7.71E+02	≤2.50E+01
2. Average release rate for period	µCi/sec	1.44E+02	3.17E+01	2.79E+02	9.70E+01	
3. Applicable ODCM Limit	%	*	*	*	*	
B. IODINE-131						
1. Total Iodine-131	Ci	2.72E-03	7.85E-04	5.35E-03	4.93E-04	≤2.50E+01
2. Average release rate for period	µCi/sec	3.46E-04	9.99E-05	6.73E-04	6.21E-05	
3. Applicable ODCM Limit	%	*	*	*	*	
C. PARTICULATES						
1. Particulates with half-lives >8 days	Ci	6.52E-04	1.12E-03	9.94E-04	7.53E-04	≤3.60E+01
2. Average release rate for period	µCi/sec	8.29E-05	1.42E-04	1.25E-04	9.47E-05	
3. Applicable ODCM Limit	%	*	*	*	*	
4. Gross alpha radioactivity	Ci	3.14E-07	3.82E-07	4.40E-07	6.54E-07	≤2.50E+01
D. TRITIUM						
1. Total Release	Ci	3.81E+00	3.24E+00	4.54E+00	5.55E+00	≤2.50E+01
2. Average release rate for period	µCi/sec	4.84E-01	4.12E-01	5.71E-01	6.98E-01	
3. Applicable ODCM Limit	%	*	*	*	*	
***E. PERCENT OF APPLICABLE ODCM LIMITS**						
FISSION AND ACTIVATION GASES						
1. Quarterly gamma air dose limit	%	4.27E-01	5.31E-02	1.10E+00	3.03E-01	
2. Quarterly beta air dose limit	%	6.71E-02	3.42E-02	1.25E-01	1.07E-01	
3. Yearly gamma air dose limit	%	2.13E-01	2.65E-02	5.51E-01	1.52E-01	
4. Yearly beta air dose limit	%	3.36E-02	1.71E-02	6.25E-02	5.35E-02	
5. Whole body dose rate limit	%	1.41E-01	9.86E-03	8.79E-01	7.64E-02	
6. Skin dose rate limit	%	3.04E-02	2.57E-03	1.89E-01	2.75E-02	
HALOGENS, TRITIUM AND PARTICULATES WITH HALF-LIVES >8 DAYS						
7. Quarterly dose limit (organ)	%	3.69E-01	1.37E-01	7.25E-01	8.34E-02	
8. Yearly dose limit (organ)	%	1.84E-01	6.87E-02	3.63E-01	4.17E-02	
9. Organ dose rate limit	%	3.72E-04	6.29E-05	4.07E-04	6.08E-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	1.19E+00	2.01E+00	1.81E+00	4.60E+00
Krypton-85m	Ci	8.84E+01	4.83E+01	1.87E+02	1.88E+02
Krypton-87	Ci	1.61E+02	1.09E+00	2.40E+02	1.78E+01
Krypton-88	Ci	2.07E+02	3.07E+01	3.60E+02	2.24E+02
Xenon-133	Ci	5.98E+01	4.89E+01	1.01E+02	1.51E+02
Xenon-133m	Ci	----------	----------	4.13E-01	----------
Xenon-135	Ci	4.49E+02	9.46E-01	3.24E+02	8.13E+00
Xenon-135m	Ci	2.09E+01	3.55E+00	2.16E+02	8.08E+00
Xenon-137	Ci	1.62E+01	2.08E+01	2.80E+01	2.02E+01
Xenon-138	Ci	5.99E+01	1.19E+01	6.92E+02	2.46E+01
TOTAL	Ci	1.06E+03	1.68E+02	2.15E+03	6.46E+02
2. Iodines					
Iodine-131	Ci	2.38E-03	1.82E-04	4.29E-03	1.49E-04
Iodine-133	Ci	1.52E-02	5.73E-04	8.41E-03	2.20E-04
Iodine-135	Ci	6.90E-03	1.41E-04	7.07E-03	1.71E-05
TOTAL	Ci	2.45E-02	8.96E-04	1.98E-02	3.86E-04
3. Particulates					
Chromium-51	Ci	----------	----------	1.57E-05	----------
Manganese-54	Ci	5.19E-07	----------	1.50E-07	----------
Strontium-89	Ci	5.70E-05	3.68E-05	5.99E-05	6.76E-05
Strontium-90	Ci	1.84E-07	6.50E-08	8.48E-08	1.97E-07
Cesium-136	Ci	----------	----------	6.23E-07	----------
Cesium-137	Ci	----------	----------	----------	6.09E-07
Barium-140	Ci	2.82E-05	3.19E-05	6.92E-05	4.62E-05
TOTAL	Ci	8.59E-05	6.88E-05	1.46E-04	1.15E-04
4. Tritium					
Hydrogen-3	Ci	4.65E-01	3.91E-01	1.02E+00	7.51E-01

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

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
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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. Fission Gases					
Krypton-87	Ci	----------	4.52E+00	----------	2.74E+00
Krypton-88	Ci	----------	----------	----------	8.89E-01
Xenon-133	Ci	1.29E-01	4.97E+00	6.31E+00	2.43E+00
Xenon-135	Ci	5.88E+00	7.21E+00	7.64E+00	5.23E+00
Xenon-135M	Ci	1.32E+01	2.37E+01	1.24E+01	1.24E+01
Xenon-137	Ci	----------	----------	2.06E+01	4.50E+01
Xenon-138	Ci	5.31E+01	4.06E+01	2.76E+01	5.61E+01
TOTAL	Ci	7.23E+01	8.10E+01	7.46E+01	1.25E+02
2. Iodines					
Iodine-131	Ci	3.39E-04	6.03E-04	1.06E-03	3.44E-04
Iodine-133	Ci	1.47E-03	2.02E-03	3.37E-03	1.04E-03
Iodine-135	Ci	----------	7.32E-05	1.90E-04	1.86E-04
TOTAL	Ci	1.81E-03	2.70E-03	4.62E-03	1.57E-03
3. Particulates					
Manganese-54	Ci	----------	----------	1.28E-06	----------
Cobalt-57	Ci	----------	1.08E-06	----------	----------
Strontium-89	Ci	3.91E-04	6.89E-04	6.04E-04	3.69E-04
Strontium-90	Ci	4.49E-07	9.66E-07	5.03E-07	1.51E-07
Barium-140	Ci	1.75E-04	3.58E-04	2.42E-04	2.69E-04
TOTAL	Ci	5.66E-04	1.05E-03	8.48E-04	6.38E-04
4. Tritium					
Hydrogen-3	Ci	3.34E+00	2.85E+00	3.52E+00	4.80E+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	NONE	NONE	≤2.50E+01
2. Average diluted concentration during period	µCi/ml	NONE	NONE	NONE	NONE	
3. Applicable ODCM Limit	%	---------	---------	---------	---------	
B. TRITIUM						
1. Total Release	Ci	2.23E-03	9.30E-04	6.53E-03	3.71E-04	≤2.50E+01
2. Average diluted concentration during period (Note 1)	µCi/ml	1.17E-06	1.66E-06	1.03E-05	2.03E-06	
3. Applicable ODCM Limit	%	*	*	*	*	
C. DISSOLVED AND ENTRAINED GASES						
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	%	---------	---------	---------	---------	
D. GROSS ALPHA RADIOACTIVITY						
1. Total Release	Ci	NONE	NONE	NONE	NONE	≤4.20E+01
E. VOLUME OF WASTE RELEASED (PRIOR TO DILUTION)	liters	1.83E+06	4.96E+05	5.68E+05	1.25E+05	
F. VOLUME OF DILUTION WATER USED DURING PERIOD	liters	2.77E+08	1.34E+08	3.47E+08	1.63E+08	
***G. PERCENT OF APPLICABLE ODCM LIMITS**						
1. Quarterly Whole Body Dose	%	6.60E-05	8.19E-05	8.78E-04	9.28E-05	
2. Quarterly Organ Dose	%	1.98E-05	2.46E-05	2.63E-04	2.78E-05	
3. Annual Whole Body Dose	%	3.30E-05	4.10E-05	4.39E-04	4.64E-05	
4. Annual Organ Dose	%	9.89E-06	1.23E-05	1.32E-04	1.39E-05	

(Note 1) Concentration includes summation from diluted and undiluted values from Canal and Non-Canal releases (Table 2B).

ENTERGY NUCLEAR OPERATIONS, INC.
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TABLE 2B
LIQUID EFFLUENTS CANAL

NUCLIDES RELEASED	UNIT	QUARTER 1	BATCH MODE QUARTER 2	QUARTER 3	QUARTER 4
1. Fission and Activation Products					
NONE	Ci	----------	----------	----------	----------
2. Tritium					
HYDROGEN-3	Ci	7.76E-05	1.09E-04	6.62E-04	1.18E-04
3. Dissolved and Entrained Gases					
NONE	Ci	----------	----------	----------	----------

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

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
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TABLE 2B (SUPPLEMENT)
LIQUID EFFLUENTS NON-CANAL

NUCLIDES RELEASED	UNIT	QUARTER 1	BATCH MODE QUARTER 2	QUARTER 3	QUARTER 4
1. Fission and Activation Products					
NONE	Ci	----------	----------	----------	----------
2. Tritium					
HYDROGEN-3	Ci	2.15E-03	8.21E-04	5.87E-03	2.53E-04
3. Dissolved and Entrained Gases					
NONE	Ci	----------	----------	----------	----------

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

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	Class B	Class C	Est. Total Error %
a. Spent resins, filter sludges	m^3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
evaporator bottoms, etc.	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
b. Dry compressible waste,	m^3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
contaminated equipment, etc.	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
c. Irradiated components,	m^3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
control rods, etc.	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
d. Other: Dry compressible	m^3	6.23E+02	0.00E+00	0.00E+00	1.00E+01
waste, contaminated equipment,	Ci	1.31E+02	0.00E+00	0.00E+00	1.00E+01
spent resins for volume reduction.					

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

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

NONE

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	6.17E+01	8.11E+01	E	Nickel-63	8.40E-01	1.10E+00	E
Cobalt-60	9.40E+00	1.23E+01	E	Tritium	2.15E-01	2.82E-01	E
Manganese-54	7.73E+00	1.01E+01	E	Cesium-134	1.03E+00	1.35E+00	E
Cesium-137	1.98E+00	2.60E+00	E	Nickel-59	7.15E-02	9.39E-02	E
Zinc-65	1.58E+01	2.07E+01	E	Carbon-14	1.62E-03	2.12E-03	E
Iron-59	2.97E-01	3.90E-01	E	Antimony-125	1.61E-02	2.12E-02	E
Cerium-144	2.56E-01	3.36E-01	E	Cobalt-58	3.92E-01	5.14E-01	E
Chromium-51	6.14E-02	8.06E-02	E	Strontium-90	1.79E-01	2.35E-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.

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

3. Solid Waste Disposition

No. of Shipments	Mode of Transportation	Destination
3	Truck	*RACE LLC Memphis, TN
8	Truck	* Duratek Oak Ridge, TN
13	Truck	* Studsvik Erwin, TN
10	Truck	*Alaron Wampum, PA
1	Truck	*DSSI Kingston, TN

*- Volume Reduction Facility

B. IRRADIATED FUEL SHIPMENTS (Disposition)

No. of Shipments	Mode of Transportation	Destination
NONE	----------	----------

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

NRC CLASS A

SOURCE OF WASTE	PROCESSING EMPLOYED	CONTAINER VOLUME	TYPE OF CONTAINER	NUMBER OF CONTAINERS
Spent Resins, Filter Sludges, evaporator Bottoms, etc.	Air Drying Non-compacted	205.8 ft^3	HIC	14
Dry compressible Waste (DAW), Contaminated Equipment, etc.	Non-compacted	1280 ft^3	STC	10
Dry compressible Waste(DAW), Contaminated Eqiupment, etc.	Non-compacted	96 ft^3	STC	50
Contaminated Oil	Non-compacted	7 ft^3	STC	33
Dry compressible Waste(DAW), Contaminated Equipment	Non-compacted	206.1 ft^3	STC	1
Dry compressible Waste(DAW), Contaminated Equipment	Non-compacted	88 ft^3	STC	12

B. NRC CLASS B

SOURCE OF WASTE	PROCESSING EMPLOYED	CONTAINER VOLUME	TYPE OF CONTAINER	NUMBER OF CONTAINERS
NONE	----------	----------	----------	----------

C. NRC CLASS C

SOURCE OF WASTE	PROCESSING EMPLOYED	CONTAINER VOLUME	TYPE OF CONTAINER	NUMBER OF CONTAINERS
NONE	----------	----------	----------	----------

Solidification Agent: NONE

HIC- High Integrity Container
STC-Strong Tight Container

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 Effluent 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 changes to the Offsite Dose Calculation Manual (ODCM).

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 Effluent 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.

There were no changes to the Process Control Program Procedure or implementing procedures.

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, 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 2005 annual land use census.

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.

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.

The following reports samples that were a deviation from the requirements of ODCM Part 1, Table 5.1-1. ODCM Part I, Section 5.1.1.c.1, allows for deviations from the program due to hazardous conditions, seasonal unavailability, theft, uncooperative residents, or to malfunction of automatic sampling equipment.

EXCEPTIONS TO THE 2005 ENVIRONMENTAL SAMPLING PROGRAM

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

Air Sampling Stations

1. The air sampling pump at the R5 Environmental Sampling Station was inoperable for approximately 2.6 hours during the sample period of 2/1/05 through 2/8/05. The air sample pump was running at the time of sample collection. The sample pump out of service time was determined based on the sample pump run time integrator. The inoperability of the pump was due to broken wires on the transmission line to the air station. No corrective action was implemented.

2. The air sampling pump at the R5 Environmental Sampling Station was inoperable for approximately 2.4 hours during the sample period of 5/17/05 through 5/24/05. The air sample pump was running at the time of sample collection. The sample pump out of service time was determined based on the sample pump run time integrator. The inoperability of the pump was due to a short power outage as a downed tree interrupted power during the sample period. No corrective action was implemented.

3. The air sampling pump at the R5 Environmental Sampling Station was temporarily inoperable during the sample period of 6/28/05 through 7/6/05. The inoperability was caused by a power outage in the local electrical power distribution system. The length of inoperability was approximately 8 hours. Operability was restored as power was restored to the electrical grid. No corrective action was implemented.

ATTACHMENT NO. 4 (Continued)

EXCEPTIONS TO THE 2005 ENVIRONMENTAL SAMPLING PROGRAM

4. The air sampling pump at the R5 Environmental Sampling Station was temporarily inoperable during the sample period of 7/12/05 through 7/19/05. The inoperability was caused by a power outage in the local electrical power distribution system. The length of inoperability was approximately 25 hours. Operability was restored as power was restored to the electrical grid. No corrective action was implemented.

5. The air sampling pump at the R3 Environmental Sampling Station was temporarily inoperable during the sample period of 8/16/05 through 8/23/05. The inoperability was caused by a power outage in the local electrical power distribution system. The length of inoperability was approximately 7.4 hours. Operability was restored as power was restored to the electrical grid. No corrective action was implemented.

6. The air sampling pumps at the R3, R4, and R5 Environmental Sampling Stations were temporarily inoperable during the sample period of 7/26/05 through 8/2/05. The inoperability was caused by a power outage in the local electrical power distribution system. The length of inoperability was approximately 2.8, 1.6, and 2.8 hours, respectively. Operability was restored as power was restored to the electrical grid. No corrective action was implemented.

7. The air sampling pumps at the R3 and R4 Environmental Sampling Stations were temporarily inoperable during the sample period of 8/23/05 through 8/30/05. The inoperability was caused by a power outage in the local electrical power distribution system. The length of inoperability was approximately 13 and 3 hours, respectively. Operability was restored as power was restored to the electrical grid. No corrective action was implemented.

8. The air sampling pump at the R4 Environmental Sampling Station was temporarily inoperable during the sample period of 9/27/05 through 10/4/05. The inoperability was caused by a power outage in the local electrical power distribution system. The length of inoperability was approximately 4.6 hours. Operability was restored as power was restored to the electrical grid. No corrective action was implemented.

ATTACHMENT NO. 4 (Continued)

EXCEPTIONS TO THE 2005 ENVIRONMENTAL SAMPLING PROGRAM

9. The air sampling pump at the R5 Environmental Sampling Station was temporarily inoperable during the sample period of 11/29/05 through 12/6/05. The inoperability was caused by a power outage in the local electrical power distribution system. The length of inoperability was approximately 2.5 hours. Operability was restored as power was restored to the electrical grid. No corrective action was implemented.

10. The air sampling pumps at the R1 and R2 Environmental Sampling Stations were temporarily inoperable during the sample period of 12/20/05 through 12/28/05. The inoperability was caused by a power outage in the local electrical power distribution system. The length of inoperability was approximately 1.4 hours. Operability was restored as power was restored to the electrical grid. No corrective action was implemented.

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

ATTACHMENT NO. 5

ANNUAL SUMMARY OF HOURLY METEOROLOGICAL DATA

The James A. FitzPatrick Nuclear Power Plant Offsite Dose Calculation Manual (ODCM), Part 1, Radiological Effluent Controls (REC) Section 6.2 and 6.2.2 states in part: The 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, ENO 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.

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 Effluent 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.

ADDENDUM 1

ASSESSMENT OF RADIATION DOSES TO THE PUBLIC JANUARY - DECEMBER 2005

1. INTRODUCTION

The James A. FitzPatrick Nuclear Power Plant Offsite Dose Calculation Manual (ODCM), Part 1 Radiological Effluent 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.

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.

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.

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, 2005 to December 31, 2005. Historical meteorological data was used to generate tables of average dispersion factors. Locations of interest were identified from the 2005 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.

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)

ADDENDUM 1 (continued)

TABLE 1
ANNUAL DOSE ASSESSMENT 2005

A. LIQUIDS

QUARTER	1	2	3	4	ANNUAL
	(a)	(a)	(a)	(a)	(a)
Organ (mrem)	9.89E-07	1.23E-06	1.32E-05	1.39E-06	1.68E-05
% of Limit	1.98E-05	2.46E-05	2.63E-04	2.78E-05	1.68E-04
	(b)	(b)	(b)	(b)	(b)
Whole Body (mrem)	9.89E-07	1.23E-06	1.32E-05	1.39E-06	1.68E-05
% of Limit	6.60E-05	8.19E-05	8.78E-04	9.22E-05	5.59E-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. NOBLE GASES

QUARTER	1	2	3	4	ANNUAL
Total Body (mrem/yr)	7.03E-01	4.93E-02	4.39E+00	3.82E-01	4.39E+00
% of Limit	1.41E-01	9.86E-03	8.79E-01	7.64E-02	8.79E-01
Skin (mrem/yr)	9.12E-01	7.71E-02	5.67E+00	8.24E-01	5.67E+00
% of Limit	3.04E-02	2.57E-03	1.89E-01	2.75E-02	1.89E-01
Gamma (mrad)	2.13E-02	2.65E-03	5.51E-02	1.52E-02	9.43E-02
% of Limit	4.27E-01	5.31E-02	1.10E+00	3.03E-01	9.43E-01
Beta (mrad)	6.71E-03	3.42E-03	1.25E-02	1.07E-02	3.33E-02
% of Limit	6.71E-02	3.42E-02	1.25E-01	1.07E-01	1.67E-01

ADDENDUM 1 (continued)

TABLE 1
ANNUAL DOSE ASSESSMENT 2005

C. IODINES AND PARTICULATES

QUARTER	1	2	3	4	ANNUAL
	(a)	(b)	(a)	(b)	(a)
Organ (mrem)	2.77E-02	1.03E-02	5.44E-02	6.26E-03	9.86E-02
% of Limit	3.69E-01	1.37E-01	7.25E-01	8.34E-02	6.58E-01
	(c)	(c)	(c)	(c)	(c)
Organ Dose Rate (mrem/yr)	5.58E-03	9.44E-04	6.11E-03	9.12E-04	6.11E-03
% of Limit	3.72E-04	6.29E-05	4.07E-04	6.08E-05	4.07E-04

(a) Dose to the Infant Thyroid primarily by the goats milk pathway.
(b) Dose to the Infant Thyroid primarily by the cows milk pathway.
(c) Dose to the Child Total Body primarily by the vegetation pathway.

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	0.90 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*	----------

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[2]	1.55 mi @ 90°E[1]	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[3]	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[1]	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	----------

ADDENDUM 1 (continued)

TABLE 2
METEOROLOGICAL DATA AND LOCATIONS OF INTEREST

RECEPTOR	GEOGRAPHIC LOCATION		ATMOSPHERIC** DISPERSION FACTOR	
B. NOBLE GASES (continued)	DISTANCE/ DIRECTION	RELEASE POINT	X/Q (sec/m3)	D/Q (l/m2)
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