Entergy

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JAFP-10-0055
April 30, 2010

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: **2009 Annual Radioactive Effluent Release Report**
Entergy Nuclear Operations, Inc.
James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
License No. DPR-59

Dear Sir or Madam:

This letter transmits the James A. FitzPatrick Nuclear Power Plant's (JAF) Annual Radioactive Effluent Release Report, for the period of January 01, 2009, through December 31, 2009. This document is submitted in accordance with the Reporting Requirements of the Technical Specifications, Section 5.6.3, and Appendix H of the Technical Requirements Manual, "Offsite Dose Calculation Manual (ODCM)", Part 1 Section 6.2, Annual Radioactive Effluent Release Report.

This report (Enclosure 1) includes, as an Addendum, an Assessment of the Radiation Doses to the Public due to the radioactive liquid and gaseous effluents released during the 2009 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.

There are no commitments contained in this letter.

If you have any questions concerning the enclosed report, please contact Laurie Rayle, Chemistry Superintendent (Acting), at (315) 349-6748.

Very truly yours,

Joseph Pechacek
Licensing Manager - JAF

JP/LR/jbh

Enclosure: Annual Radioactive Effluent Release Report January 1, 2009 – December 31, 2009

cc: next page

cc:	Samuel Collins	(Region 1 Administrator)	B. Vaidya (USNRC Project Manager)
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	B. Sullivan	(JAF)	T. Kurtz (NMPC)
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ENTERGY NUCLEAR OPERATIONS, INC.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY 1, 2009 - DECEMBER 31, 2009

DOCKET NO.: 50-333

LICENSE NO.: DPR-59

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY 2009-DECEMBER 2009

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:	8.00E+00	1.50E+01	1.50E+01	1.00E+01
(2) Total time period for batch release: (min)	1.55E+02	2.79E+02	2.05E+02	1.79E+02
(3) Maximum time period for batch release: (min)	7.00E+01	1.60E+02	1.00E+02	6.80E+01
(4) Average time period for batch release: (min)	1.94E+01	1.86E+01	1.37E+01	1.79E+01
(5) Minimum time period for batch release: (min)	2.00E+00	1.00E+00	2.00E+00	1.00E+00
(6) Total Activity Released (Ci)	7.40E-05	8.36E-05	7.77E-05	1.64E-04
(7) Total Volume Released (liters)	1.47E+04	2.22E+04	1.95E+04	2.03E+04
b. Liquid: Non-Canal				
(1) Number of batch releases:	5.00E+00	6.00E+00	1.30E+01	1.00E+01
(2) Total time period for batch release: (min)	2.95E+02	4.20E+02	2.25E+02	1.43E+02
(3) Maximum time period for batch release: (min)	1.09E+02	1.86E+02	6.70E+01	5.10E+01
(4) Average time period for batch release: (min)	5.90E+01	7.00E+01	1.73E+01	1.43E+01
(5) Minimum time period for batch release: (min)	1.00E+00	1.00E+00	2.00E+00	1.00E+00
(6) Total Activity Released (Ci)	3.84E-04	3.54E-04	1.75E-04	3.90E-04
(7) Total Volume Released (liters)	1.19E+05	1.59E+05	8.55E+04	1.67E+05

SUPPLEMENTAL INFORMATION (continued)

c. Gaseous:

There were no gaseous batch releases for this report period.

6. Abnormal Releases

a. Liquid Continuous: Canal	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4
(1) Number of releases:	Ci	NONE	1	1	NONE
(2) Total activity released:	Ci	NONE	1.26E-03	2.79E-03	NONE
b. Liquid Continuous: Non-Canal					
(1) Number of releases:	Ci	NONE	NONE	1	1
(2) Total activity released:	Ci	NONE	NONE	6.45E-04	2.00E-02

c. Gaseous

There were no abnormal gaseous releases for this report period.

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY 2009-DECEMBER 2009

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	1.63E+01	1.18E+01	1.31E+01	1.18E+01	≤2.50E+01
2. Average release rate for period	μCi/sec	2.07E+00	1.50E+00	1.64E+00	1.49E+00	
3. Applicable ODCM Limit	%	*	*	*	*	
B. IODINE-131						
1. Total Iodine-131	Ci	5.26E-05	5.15E-05	4.56E-05	6.18E-05	≤2.50E+01
2. Average release rate for period	μCi/sec	6.69E-06	6.56E-06	5.74E-06	7.78E-06	
3. Applicable ODCM Limit	%	*	*	*	*	
C. PARTICULATES						
1. Particulates with half-lives >8 days	Ci	7.52E-06	9.23E-06	1.06E-05	9.87E-06	≤3.60E+01
2. Average release rate for period	μCi/sec	9.56E-07	1.17E-06	1.33E-06	1.24E-06	
3. Applicable ODCM Limit	%	*	*	*	*	
4. Gross alpha radioactivity	Ci	3.03E-07	2.74E-07	3.74E-07	4.44E-07	≤2.50E+01
D. TRITIUM						
1. Total Release	Ci	3.65E+00	3.31E+00	4.55E+00	6.40E+00	≤2.50E+01
2. Average release rate for period	μCi/sec	4.64E-01	4.21E-01	5.72E-01	8.04E-01	
3. Applicable ODCM Limit	%	*	*	*	*	
***E. PERCENT OF APPLICABLE ODCM LIMITS**						
FISSION AND ACTIVATION GASES						
1. Quarterly gamma air dose limit	%	6.59E-03	4.59E-03	4.23E-03	4.27E-03	
2. Quarterly beta air dose limit	%	3.69E-04	3.97E-04	2.48E-04	4.81E-04	
3. Yearly gamma air dose limit	%	3.30E-03	2.29E-03	2.11E-03	2.14E-03	
4. Yearly beta air dose limit	%	1.84E-04	1.99E-04	1.24E-04	2.41E-04	
5. Whole body dose rate limit	%	9.08E-03	1.96E-03	3.43E-04	2.40E-03	
6. Skin dose rate limit	%	1.86E-03	5.22E-04	6.91E-05	5.93E-04	
HALOGENS, TRITIUM AND PARTICULATES WITH HALF-LIVES >8 DAYS						
7. Quarterly dose limit (organ)	%	1.12E-02	1.00E-02	9.69E-03	1.40E-02	
8. Yearly dose limit (organ)	%	5.59E-03	5.02E-03	4.85E-03	7.01E-03	
9. Organ dose rate limit	%	1.16E-05	1.07E-05	1.33E-05	1.66E-05	

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	9.05E+00	3.56E+00	2.97E+00	3.02E+00
Krypton-85m	Ci	2.12E+00	1.67E+00	3.53E+00	2.50E+00
Krypton-87	Ci	----------	5.48E-02	----------	5.26E-02
Krypton-88	Ci	----------	6.33E-01	1.60E+00	1.06E+00
Xenon-133	Ci	4.75E+00	2.67E+00	4.96E+00	2.70E+00
Xenon-135	Ci	----------	9.92E-02	----------	5.16E-02
Xenon-135m	Ci	7.46E-02	4.53E-01	----------	2.25E-01
Xenon-137	Ci	----------	1.16E+00	----------	6.28E-01
Xenon-138	Ci	2.60E-01	1.46E+00	----------	6.98E-01
TOTAL	Ci	1.63E+01	1.18E+01	1.31E+01	1.09E+01
2. Iodines					
Iodine-131	Ci	5.04E-06	1.14E-05	6.80E-06	4.03E-06
Iodine-133	Ci	2.16E-05	6.27E-05	3.90E-05	1.89E-05
TOTAL	Ci	2.66E-05	7.41E-05	4.58E-05	2.29E-05
3. Particulates					
Strontium-89	Ci	7.65E-07	2.17E-06	2.66E-06	1.87E-06
Strontium-90	Ci	1.45E-08	7.70E-08	4.16E-08	----------
Barium-140	Ci	3.38E-07	1.04E-06	----------	----------
TOTAL	Ci	1.12E-06	3.29E-06	2.70E-06	1.87E-06
4. Tritium					
Hydrogen-3	Ci	5.64E-01	5.86E-01	6.68E-01	9.88E-01

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

TABLE 1C
GASEOUS EFFLUENTS--GROUND LEVEL RELEASES

		CONTINUOUS MODE			
NUCLIDES RELEASED	**UNIT**	**QUARTER 1**	**QUARTER 2**	**QUARTER 3**	**QUARTER 4**
1. Fission Gases					
Xenon-133	Ci	----------	----------	----------	8.17E-01
Xenon-135	Ci	----------	----------	----------	6.94E-02
TOTAL	Ci	----------	----------	----------	8.86E-01
2. Iodines					
Iodine-131	Ci	4.76E-05	4.01E-05	3.88E-05	5.78E-05
Iodine-133	Ci	2.02E-04	1.48E-04	1.62E-04	3.67E-04
TOTAL	Ci	2.50E-04	1.88E-04	2.01E-04	4.25E-04
3. Particulates					
Zinc-65	Ci	1.72E-06	----------	----------	----------
Strontium-89	Ci	3.35E-06	5.70E-06	7.77E-06	7.28E-06
Strontium-90	Ci	1.33E-06	2.37E-07	9.88E-08	7.24E-07
TOTAL	Ci	6.40E-06	5.94E-06	7.87E-06	8.00E-06
4. Tritium					
Hydrogen-3	Ci	3.09E+00	2.72E+00	3.88E+00	5.41E+00

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

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	4.58E-04	1.70E-03	3.69E-03	2.06E-02	≤2.50E+01
2. Average diluted concentration during period (Note 1)	µCi/ml	3.04E-06	1.85E-06	1.45E-06	3.49E-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	1.26E+05	1.92E+05	5.67E+05	5.84E+06	
F. VOLUME OF DILUTION WATER USED DURING PERIOD	liters	1.93E+08	6.08E+10	1.34E+11	2.66E+08	
***G. PERCENT OF APPLICABLE ODCM LIMITS**						
1. Quarterly Whole Body Dose	%	1.10E-04	1.41E-04	2.53E-04	6.01E-04	
2. Quarterly Organ Dose	%	3.30E-05	4.23E-05	7.59E-05	1.80E-04	
3. Annual Whole Body Dose	%	5.50E-05	7.04E-05	1.26E-04	3.01E-04	
4. Annual Organ Dose	%	1.65E-05	2.11E-05	3.79E-05	9.02E-05	

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

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	7.40E-5	8.36E-05	7.77E-05	1.64E-4
3. Dissolved and Entrained Gases					
NONE	Ci	----------	----------	----------	----------
TOTAL		----------	----------	----------	----------

TABLE 2B (CONTINUED)
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	3.84E-04	3.54E-04	1.75E-04	3.90E-04
3. Dissolved and Entrained Gases					
NONE	Ci	----------	----------	----------	----------

TABLE 2B (CONTINUED)
ABNORMAL RELEASE
LIQUID EFFLUENTS CANAL

		CONTINUOUS MODE			
NUCLIDES RELEASED	**UNIT**	**QUARTER 1**	**QUARTER 2**	**QUARTER 3**	**QUARTER 4**
1. Fission and Activation Products					
NONE	Ci	----------	----------	----------	----------
2. Tritium					
Hydrogen-3	Ci	----------	1.26E-03	2.79E-03	----------
3. Dissolved and Entrained Gases					
NONE	Ci	----------	----------	----------	----------

TABLE 2B (CONTINUED)
ABNORMAL RELEASE
LIQUID EFFLUENTS NON-CANAL

		CONTINUOUS MODE			
NUCLIDES RELEASED	**UNIT**	**QUARTER 1**	**QUARTER 2**	**QUARTER 3**	**QUARTER 4**
1. Fission and Activation Products					
NONE	Ci	----------	----------	----------	----------
2. Tritium					
Hydrogen-3	Ci	----------	----------	6.45E-04	2.00E-02
3. Dissolved and Entrained Gases					
NONE	Ci	----------	----------	----------	----------

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	1.40E+03	0.00E+00	0.00E+00	1.00E+01
waste, contaminated equipment,	Ci	8.72E+01	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	
Cerium-144	4.19E-02	3.65E-02	E	Cobalt-58	3.08E-02	2.69E-02	E
Cobalt-60	1.52E+01	1.32E+01	E	Cesium-134	6.10E-01	5.32E-01	E
Cesium-137	3.14E+00	2.73E+00	E	Iron-55	6.01E+01	5.24E+01	E
Carbon-14	8.78E-01	7.66E-01	E	Manganese-54	3.73E+00	3.25E+00	E
Nickel-63	5.86E+00	5.11E+00	E	Strontium-90	5.13E-01	4.47E-01	E
Zinc-65	9.73E+00	8.48E+00	E	Barium-140	1.72E-02	1.50E-02	E
Hydrogen-3	1.53E-01	1.34E-01	E	Iodine-131	1.79E-02	1.56E-02	E
Antimony-125	1.97E-02	1.71E-02	E	Lanthanum-140	1.23E-02	1.07E-02	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
8	Truck	* Energy Solutions Oak Ridge, TN
28	Truck	*Energy Solutions Kingston, TN

*- Volume Reduction Facility

B. IRRADIATED FUEL SHIPMENTS (Disposition)

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

TABLE 3B
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. NRC CLASS A

SOURCE OF WASTE	PROCESSING EMPLOYED	CONTAINER VOLUME	TYPE OF CONTAINER	NUMBER OF CONTAINERS
Dry compressible Waste (DAW), Contaminated Equipment, etc.	Non-compacted	1280 ft^3	STC	4
Dry compressible Waste (DAW), Contaminated Equipment, etc.	Non-compacted	96 ft^3	STC	36
Dry compressible Waste(DAW), Contaminated Equipment, etc.	Non-compacted	206.1 ft^3	STC	1
Dry compressible Waste(DAW), Contaminated Equipment, etc.	Non-compacted	1033 ft^3	STC	24
Spent Resins, Filter Sludges, evaporator Bottoms, etc.	Air Drying Non-compacted	205.8 ft^3	HIC	14
Spent Resins, Filter Sludges, evaporator Bottoms, etc.	Air Drying Non-compacted	120.3 ft^3	HIC	2

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				

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 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 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.

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

CHANGES TO THE REMP PROGRAM

The following changes were implemented during the 2008 sampling program:

A. Milk Sampling Program

During the report period, sample location No. 76 was discontinued as herd was sold.

NEW LOCATIONS FOR DOSE CALCULATIONS

During the reporting 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.

A. ODCM Program Deviations

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

1. The air sampling pumps at the R-3 offsite and R-4 offsite environmental sampling stations were inoperable for 6 hours each during the sampling period of 10/20/09 to 10/27/09. 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 loss of power to the sampler. No corrective actions were required to restore unit to service.

2. The air sampling pumps at the R-1 offsite and R-2 offsite environmental sampling stations were inoperable for 6.3 hours each during the sampling period 12/1/09 to 12/8/09. 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 loss of power to the sampler due to adverse weather conditions. No corrective actions were required to restore unit to service.

3. The air sampling pumps at the R-3 offsite and R-4 offsite environmental sampling stations were inoperable for 5 hours each. The air sampling pump at the R-5 offsite environmental sampling station was inoperable for 10.9 hours. This occurred during the sampling period 12/8/09 to 12/15/09. 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 loss of power to the sampler due to adverse weather conditions. No corrective actions were required to restore unit to service.

   A. Air Sampling Station Operability Assessment

   The ODCM required air sampling program consists of 5 individual sampling locations. The collective operable time period for the air monitoring stations was 43,771 hours out of a possible 43,800 hours. The air sampling availability factor for the report period was 99.93%.

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.

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.

ATTACHMENT NO. 7

ONSITE GROUND WATER MONITORING

A) Gamma Isotopic Monitoring

Monitoring Wells (5-9) were sampled and analyzed quarterly to below the required lower limits of detection in accordance with the Offsite Dose Calculation Manual (ODCM) Part 1, Table 2.2-1. These values are as follows:

Radionuclide	LLD Value (μCi/ml)	Radionuclide	LLD Value (μCi/ml)
Manganese-54	5.0E-7	Iodine-131	1.0E-6
Cobalt-58	5.0E-7	Cesium-134	5.0E-7
Iron-59	5.0E-7	Cesium-137	5.0E-7
Cobalt-60	5.0E-7	Cerium-141	5.0E-5
Zinc-65	5.0E-7	Cerium-144	5.0E-5
Molybdenum-99	5.0E-5		

There were no plant related nuclides detected in the samples.

B) Tritium Monitoring

Monitoring Wells (5-9) were sampled and analyzed quarterly for tritium to below the required lower limit of detection in accordance with the Offsite Dose Calculation Manual (ODCM) of 3000 pCi/L.

The results are as follows:

Well	Lower Limit of Detection pCi/L	Sample Result pCi/L
5	1000	<1000
6	1000	<1000
7	1000	<1000
8	1000	<1000
9	1000	<1000

ATTACHMENT NO. 8

LIQUID EFFLUENTS – ABNORMAL CANAL RELEASE

a)	**Date:**	June 3, 2009 – August 31, 2009
b)	**Location:**	Turbine Building Unit Cooler to Inlet Canal
c)	**Duration:**	90 Days
d)	**Flowrate:**	7.00E-02 gpm
e)	**Volume Released:**	9.07E+03 gallons
f)	**Nuclides Released:**	See Table 2B Liquid Effluents – Canal Abnormal Release – Continuous Mode
g)	**Resultant Doses:**	See Addendum 1—Assessment of Radiation Doses to the Public January-December 2009 Table 1.B
h)	**Dose Calculations:**	Doses were calculated in accordance with the Offsite Dose Calculation Manual (ODCM).

ATTACHMENT NO. 9

LIQUID EFFLUENTS – ABNORMAL NON-CANAL RELEASE

a)	**Date:**	September 24, 2009 – December 31, 2009
b)	**Location:**	Reactor Perimeter Sump To the West Storm Drain
c)	**Duration:**	98 Days
d)	**Flowrate:**	1.15E+01 gpm
e)	**Volume Released:**	1.64E+06 gallons
f)	**Nuclides Released:**	See Table 2B Liquid Effluents – Non-Canal Abnormal Release - Continuous Mode
g)	**Resultant Doses:**	See Addendum 1—Assessment of Radiation Doses to the Public January-December 2009 Table 1.C
h)	**Dose Calculations:**	Doses were calculated in accordance with the Offsite Dose Calculation Manual (ODCM).

ADDENDUM 1

ASSESSMENT OF RADIATION DOSES TO THE PUBLIC
JANUARY - DECEMBER 2009

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.

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, 2009 to December 31, 2009. Historical meteorological data was used to generate tables of average dispersion factors. Locations of interest were identified from the 2009 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 2009

A. LIQUIDS

QUARTER	1	2	3	4	ANNUAL
	(a)	(a)	(a)	(a)	(a)
Organ (mrem)	1.65E-06	2.11E-06	3.79E-06	9.02E-06	1.66E-05
% of Limit	3.30E-05	4.23E-05	7.59E-05	1.80E-04	1.66E-04
	(b)	(b)	(b)	(b)	(b)
Whole Body (mrem)	1.65E-06	2.11E-06	3.79E-06	9.02E-06	1.66E-05
% of Limit	1.10E-04	1.41E-04	2.53E-04	6.01E-04	5.52E-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. ABNORMAL LIQUID CANAL RELEASE

QUARTER	1	2	3	4	ANNUAL
		(a)	(a)		(a)
Organ (mrem)	---------	1.26E-09	2.57E-09	----------	3.96E-09
% of Limit	---------	2.51E-08	5.14E-08	----------	3.96E-08
		(b)	(b)		(b)
Whole Body (mrem)	----------	1.26E-09	2.57E-09	----------	3.96E-09
% of Limit	----------	8.37E-08	1.71E-07	----------	1.32E-07

(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.

ADDENDUM 1 (continued)

TABLE 1
ANNUAL DOSE ASSESSMENT 2009

C. ABNORMAL LIQUID NON-CANAL RELEASE

QUARTER	1	2	3	4	ANNUAL
			(a)	(a)	(a)
Organ (mrem)	---------	---------	1.19E-08	2.02E-06	2.03E-06
% of Limit	---------	---------	2.38E-07	4.03E-05	2.03E-05
			(b)	(b)	(b)
Whole Body (mrem)	----------	---------	1.19E-08	2.02E-06	2.03E-06
% of Limit	----------	---------	7.92E-07	1.34E-04	6.76E-05

(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.

D. NOBLE GASES

QUARTER	1	2	3	4	ANNUAL
Total Body (mrem/yr)	4.54E-02	9.80E-03	1.72E-03	1.20E-02	4.54E-02
% of Limit	9.08E-03	1.96E-03	3.43E-04	2.40E-03	9.08E-03
Skin (mrem/yr)	5.59E-02	1.57E-02	2.07E-03	1.78E-02	5.59E-02
% of Limit	1.86E-03	5.22E-04	6.91E-05	5.93E-04	1.86E-03
Gamma (mrad)	3.30E-04	2.29E-04	2.11E-04	2.14E-04	9.84E-04
% of Limit	6.59E-03	4.59E-03	4.23E-03	4.27E-03	9.84E-03
Beta (mrad)	3.69E-05	3.97E-05	2.48E-05	4.81E-05	1.50E-04
% of Limit	3.69E-04	3.97E-04	2.48E-04	4.81E-04	7.48E-04

ADDENDUM 1 (continued)

TABLE 1
ANNUAL DOSE ASSESSMENT 2009

E. IODINES AND PARTICULATES

QUARTER	1	2	3	4	ANNUAL
	(a)	(a)	(a)	(a)	(a)
Organ (mrem)	8.39E-04	7.52E-04	7.27E-04	1.05E-03	3.37E-03
% of Limit	1.12E-02	1.00E-02	9.69E-03	1.40E-02	2.25E-02
	(a)	(a)	(a)	(a)	(a)
Organ Dose Rate (mrem/yr)	1.74E-04	1.60E-04	1.99E-04	2.49E-04	2.49E-04
% of Limit	1.16E-05	1.07E-05	1.33E-05	1.66E-05	1.66E-05

(a) Dose to the Child Thyroid 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