



Monticello Nuclear Generating Plant
2807 W County Road 75
Monticello, MN 55362

May 12, 2011

L-MT-11-021
Technical Specification 5.6.2

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Monticello Nuclear Generating Plant
Docket 50-263
Renewed Facility Operating License No. DPR-22

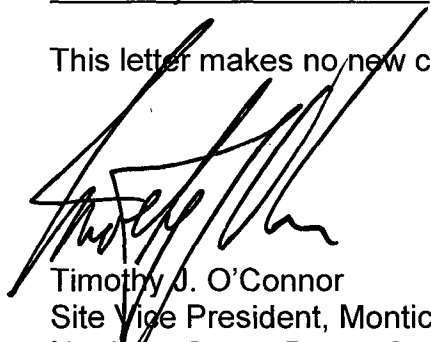
2010 Radioactive Effluent Release Report

In accordance with Monticello Nuclear Generating Plant Technical Specification Section 5.6.2, the Northern States Power Company, (NSPM) a Minnesota corporation is submitting the following information as enclosures:

- ♦ Radioactive Effluent Release Report for January 1 - December 31, 2010 (Enclosure 1)
- ♦ Off-Site Radiation Dose Assessment for January 1 - December 31, 2010 (Enclosure 2), including Carbon-14 release and dose impact to most exposed member of the public (page 3)
- ♦ Offsite Dose Calculation Manual (Enclosure 3)

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.



Timothy J. O'Connor
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (3)

cc: Administrator, Region III, USNRC (w/o Enclosure 3)
Project Manager, Monticello, USNRC (w/o Enclosure 3)
Resident Inspector, Monticello, USNRC (w/o Enclosure 3)
Minnesota Department of Commerce (w/o Enclosure 3)

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ENCLOSURE 1

**RADIOACTIVE EFFLUENT RELEASE REPORT FOR
JANUARY 1 – DECEMBER 31, 2010**

22 pages follow

NUCLEAR MANAGEMENT COMPANY
MONTICELLO NUCLEAR GENERATING PLANT
License No. DPR-22

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Supplemental Information

1. Regulatory Limits - Quarterly levels requiring reporting to
Nuclear Regulatory Commission

A. Noble Gases :

5 mrad/quarter gamma radiation
10 mrad/quarter beta radiation

B. Long Lived Iodines, Particulates, and Tritium :

7.5 mrem/quarter dose to any organ

C. Liquid Effluents :

1.5 mrem/quarter dose to the total body
5.0 mrem/quarter dose to any organ

2. Maximum Permissible Concentrations

A. Noble Gases :

10 CFR Part 20, Appendix B, Table II, Column 1

B. Long Lived Iodines, Particulates, and Tritium :

10 CFR Part 20, Appendix B, Table II, Column 1

C. Liquid Effluents :

10 CFR Part 20, Appendix B, Table II, Column 2
2.0 E-4 uci/ml for dissolved and entrained gases

3. Average Energy

(Not Applicable)

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Supplemental Information (continued)

4. Measurements and Approximations of Total Radioactivity

A. Noble Gases :

Continuous gross activity monitors in Reactor Building Vent and Plant Stack exhaust streams. Weekly isotopic analysis of exhaust streams.

B. Iodines in Gaseous Effluent :

Continuous monitoring with charcoal cartridges in Reactor Building Vent and Plant Stack exhaust streams with weekly analysis.

C. Particulates in Gaseous Effluent :

Continuous monitoring with particulate filters in Reactor Building Vent and Plant Stack exhaust streams with weekly analysis.

D. Tritium in Gaseous Effluent :

Monthly grab samples from Reactor Building Vent and Plant Stack exhaust streams.

E. Liquid Effluents :

Tank sample analyzed prior to each planned release and continuous monitoring of gross activity during planned release.

5. Batch Releases

A. Liquid :

1. Number of Batch Releases	0	
2. Total Time Period for Batch Releases	0.0	min
3. Maximum Time Period for a Batch Release	0.0	min
4. Average Time Period for a Batch Release	0.0	min
5. Minimum Time Period for a Batch Release	0.0	min
6. Average River Flow During Release	0.0	cf/sec

B. Gaseous :

1. Number of Batch Releases	2	
2. Total Time Period for Batch Releases	1220.0	min
3. Maximum Time Period for a Batch Release	876.0	min
4. Average Time Period for a Batch Release	610.0	min
5. Minimum Time Period for a Batch Release	344.0	min

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Supplemental Information (continued)

6. Abnormal Releases

A. Liquid :

1. Number of Releases	0	
2. Total Activity Released	0.0	Ci

B. Gaseous :

1. Number of Releases	0	
2. Total Activity Released	0.0	Ci

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 1A Gaseous Effluents - Summation of all Releases

	Units	1st Qtr	2nd Qtr	Est. Total Error, %
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A. Fission & Activation gases

1. Total Release	Ci	3.83E+02	3.56E+02	2.00E+01
2. Average Release Rate	uci/sec	4.93E+01	4.53E+01	
3. Percent Tech Spec Qtrly Reporting Level				
Gamma Radiation	%	1.62E-01	1.47E-01	
Beta Radiation	%	4.92E-02	4.74E-02	

B. Iodines

1. Total I-131 Release	Ci	3.36E-03	4.03E-03	1.00E+01
2. Average I-131 Release Rate	uci/sec	4.32E-04	5.12E-04	

C. Particulates

1. Total Particulates	Ci	6.00E-04	6.58E-04	3.00E+01
2. Average Release Rate	uci/sec	7.71E-05	8.37E-05	
3. Gross Alpha Radioactivity	Ci	6.43E-07	5.10E-07	

D. Tritium

1. Total Release	Ci	4.52E+00	4.55E+00	1.00E+01
2. Average Release Rate	uci/sec	5.82E-01	5.79E-01	

E. Percent Qtrly Tech Spec Reporting Levels

1. Iodines, Particulates, and Tritium	%	4.20E-01	5.08E-01	
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RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 1A Gaseous Effluents - Summation of all Releases

	Units	3rd Qtr	4th Qtr	Est. Total Error, %
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A. Fission & Activation gases

1. Total Release	Ci	3.98E+02	3.47E+02	2.00E+01
2. Average Release Rate	uci/sec	5.01E+01	4.36E+01	
3. Percent Tech Spec Qtrly Reporting Level				
Gamma Radiation	%	1.85E-01	1.53E-01	
Beta Radiation	%	5.35E-02	4.20E-02	

B. Iodines

1. Total I-131 Release	Ci	4.10E-03	3.77E-03	1.00E+01
2. Average I-131 Release Rate	uci/sec	5.16E-04	4.74E-04	

C. Particulates

1. Total Particulates	Ci	7.76E-04	5.47E-04	3.00E+01
2. Average Release Rate	uci/sec	9.76E-05	6.88E-05	
3. Gross Alpha Radioactivity	Ci	5.11E-07	6.53E-07	

D. Tritium

1. Total Release	Ci	6.03E+00	5.08E+00	1.00E+01
2. Average Release Rate	uci/sec	7.58E-01	6.39E-01	

E. Percent Qtrly Tech Spec Reporting Levels

1. Iodines, Particulates, and Tritium	%	5.03E-01	6.61E-01	
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RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 1B Gaseous Effluents - Elevated Releases

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		1st Qtr	2nd Qtr	1st Qtr	2nd Qtr
1. Fission Gases					
KR-85M	Ci	5.77E-01	6.49E-01	0.00E+00	0.00E+00
KR-87	Ci	3.06E+00	3.20E+00	0.00E+00	0.00E+00
KR-88	Ci	2.16E+00	2.39E+00	0.00E+00	0.00E+00
KR-89	Ci	3.62E+01	1.46E+01	0.00E+00	0.00E+00
XE-133	Ci	1.20E+02	9.71E+01	0.00E+00	0.00E+00
XE-133M	Ci	3.20E+00	2.69E+00	0.00E+00	0.00E+00
XE-135	Ci	9.93E+00	1.27E+01	0.00E+00	0.00E+00
XE-135M	Ci	2.47E+01	2.60E+01	0.00E+00	0.00E+00
XE-137	Ci	1.23E+02	1.31E+02	0.00E+00	0.00E+00
XE-138	Ci	5.34E+01	5.80E+01	0.00E+00	0.00E+00
Total for Period	Ci	3.76E+02	3.49E+02	0.00E+00	0.00E+00
2. Iodines					
I-131	Ci	2.17E-03	2.56E-03	0.00E+00	0.00E+00
I-133	Ci	1.63E-02	1.83E-02	0.00E+00	0.00E+00
I-135	Ci	2.62E-02	2.84E-02	0.00E+00	0.00E+00
Total for Period	Ci	4.47E-02	4.93E-02	0.00E+00	0.00E+00
3. Particulates					
CO-60	Ci	1.28E-06	8.85E-07	0.00E+00	0.00E+00
CS-137	Ci	5.21E-07	5.44E-07	0.00E+00	0.00E+00
BA-140	Ci	2.10E-04	2.61E-04	0.00E+00	0.00E+00
CE-141	Ci	0.00E+00	5.11E-07	0.00E+00	0.00E+00
SR-89	Ci	6.01E-05	6.43E-05	0.00E+00	0.00E+00
SR-90	Ci	3.33E-07	3.54E-07	0.00E+00	0.00E+00
Total for Period	Ci	2.73E-04	3.28E-04	0.00E+00	0.00E+00

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 1B Gaseous Effluents - Elevated Releases

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		3rd Qtr	4th Qtr	3rd Qtr	4th Qtr
1. Fission Gases					
KR-85M	Ci	7.20E-01	1.58E+00	0.00E+00	0.00E+00
KR-87	Ci	3.59E+00	5.09E+00	0.00E+00	0.00E+00
KR-88	Ci	2.46E+00	4.84E+00	0.00E+00	0.00E+00
KR-89	Ci	2.92E+01	9.25E+00	0.00E+00	0.00E+00
XE-133	Ci	8.58E+01	6.15E+01	0.00E+00	0.00E+00
XE-133M	Ci	2.34E+00	6.26E-01	0.00E+00	0.00E+00
XE-135	Ci	1.49E+01	2.98E+01	0.00E+00	8.32E-04
XE-135M	Ci	3.10E+01	3.92E+01	0.00E+00	0.00E+00
XE-137	Ci	1.53E+02	1.28E+02	0.00E+00	0.00E+00
XE-138	Ci	6.75E+01	6.03E+01	0.00E+00	0.00E+00
AR-41	Ci	0.00E+00	0.00E+00	0.00E+00	1.60E-03
Total for Period	Ci	3.91E+02	3.40E+02	0.00E+00	2.43E-03
2. Iodines					
I-131	Ci	2.62E-03	2.91E-03	0.00E+00	1.10E-08
I-133	Ci	1.99E-02	1.54E-02	0.00E+00	0.00E+00
I-135	Ci	3.16E-02	2.25E-02	0.00E+00	0.00E+00
Total for Period	Ci	5.41E-02	4.08E-02	0.00E+00	1.10E-08
3. Particulates					
MN-54	Ci	0.00E+00	3.18E-08	0.00E+00	0.00E+00
CO-60	Ci	1.12E-06	1.12E-06	0.00E+00	0.00E+00
ZN-65	Ci	0.00E+00	5.67E-08	0.00E+00	0.00E+00
CS-137	Ci	1.91E-06	8.37E-07	0.00E+00	0.00E+00
BA-140	Ci	2.53E-04	1.93E-04	0.00E+00	0.00E+00
CE-141	Ci	3.99E-07	6.72E-08	0.00E+00	0.00E+00
CE-144	Ci	1.64E-07	0.00E+00	0.00E+00	0.00E+00
SR-89	Ci	1.39E-04	6.89E-05	0.00E+00	0.00E+00
SR-90	Ci	4.26E-07	3.19E-07	0.00E+00	0.00E+00
Total for Period	Ci	3.96E-04	2.64E-04	0.00E+00	0.00E+00

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 1C Gaseous Effluents - Building Vent Releases

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		1st Qtr	2nd Qtr	1st Qtr	2nd Qtr
1. Fission Gases					
XE-133	Ci	4.95E-01	3.04E-01	0.00E+00	0.00E+00
XE-135	Ci	5.09E+00	4.98E+00	0.00E+00	0.00E+00
XE-135M	Ci	1.90E+00	2.23E+00	0.00E+00	0.00E+00
Total for Period	Ci	7.49E+00	7.51E+00	0.00E+00	0.00E+00
2. Iodines					
I-131	Ci	1.19E-03	1.47E-03	0.00E+00	0.00E+00
I-133	Ci	1.07E-02	1.37E-02	0.00E+00	0.00E+00
I-135	Ci	1.88E-02	2.57E-02	0.00E+00	0.00E+00
Total for Period	Ci	3.07E-02	4.09E-02	0.00E+00	0.00E+00
3. Particulates					
CO-60	Ci	1.03E-04	9.59E-05	0.00E+00	0.00E+00
CS-137	Ci	6.94E-05	1.88E-05	0.00E+00	0.00E+00
BA-140	Ci	9.90E-05	1.53E-04	0.00E+00	0.00E+00
CE-141	Ci	7.18E-07	6.44E-07	0.00E+00	0.00E+00
SR-89	Ci	5.46E-05	6.20E-05	0.00E+00	0.00E+00
Total for Period	Ci	3.27E-04	3.31E-04	0.00E+00	0.00E+00

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 1C Gaseous Effluents - Building Vent Releases

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		3rd Qtr	4th Qtr	3rd Qtr	4th Qtr
1. Fission Gases					
XE-133	Ci	1.24E-01	3.18E-01	0.00E+00	2.57E-02
XE-135	Ci	3.99E+00	3.20E+00	0.00E+00	5.58E-03
XE-135M	Ci	3.26E+00	2.97E+00	0.00E+00	0.00E+00
XE-138	Ci	3.32E-01	0.00E+00	0.00E+00	0.00E+00
Total for Period	Ci	7.70E+00	6.48E+00	0.00E+00	3.13E-02
2. Iodines					
I-131	Ci	1.48E-03	8.53E-04	0.00E+00	2.48E-06
I-133	Ci	1.47E-02	7.79E-03	0.00E+00	3.67E-06
I-135	Ci	2.60E-02	1.44E-02	0.00E+00	0.00E+00
Total for Period	Ci	4.22E-02	2.30E-02	0.00E+00	6.15E-06
3. Particulates					
CO-60	Ci	9.15E-05	6.98E-05	0.00E+00	0.00E+00
CS-137	Ci	2.98E-05	5.95E-05	0.00E+00	0.00E+00
BA-140	Ci	1.67E-04	9.77E-05	0.00E+00	0.00E+00
SR-89	Ci	9.16E-05	5.58E-05	0.00E+00	0.00E+00
Total for Period	Ci	3.80E-04	2.83E-04	0.00E+00	0.00E+00

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 2A Liquid Effluents - Summation of all Releases

	Units	1st Qtr	2nd Qtr	Est. Total Error, %
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A. Fission & Activation products

1. Total Release (not including tritium, gases, alpha)	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

B. Tritium

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

C. Dissolved and Entrained Gases

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

D. Percent Qtrly Tech Spec Reporting Level

1. Whole Body Dose	%	0.00E+00	0.00E+00	
2. Organ Dose	%	0.00E+00	0.00E+00	

E. Gross Alpha Radioactivity

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
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F. Volume of Waste Released	Liters	0.00E+00	0.00E+00	0.00E+00
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F. Volume of Dilution Water Used	Liters	0.00E+00	0.00E+00	0.00E+00
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Table 2B Liquid Effluents

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		1st Qtr	2nd Qtr	1st Qtr	2nd Qtr

None Released This Period

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 2A Liquid Effluents - Summation of all Releases

	Units	3rd Qtr	4th Qtr	Est. Total Error, %
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A. Fission & Activation products

1. Total Release (not including tritium, gases, alpha)	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

B. Tritium

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

C. Dissolved and Entrained Gases

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

D. Percent Qtrly Tech Spec Reporting Level

1. Whole Body Dose	%	0.00E+00	0.00E+00	
2. Organ Dose	%	0.00E+00	0.00E+00	

E. Gross Alpha Radioactivity

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
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F. Volume of Waste Released	Liters	0.00E+00	0.00E+00	0.00E+00
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F. Volume of Dilution Water Used	Liters	0.00E+00	0.00E+00	0.00E+00
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Table 2B Liquid Effluents

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		3rd Qtr	4th Qtr	3rd Qtr	4th Qtr

None Released This Period

RADIOACTIVE EFFLUENT RELEASE REPORT
Period : Jan - Dec 2010

Table 3 Solid Waste and Irradiated Fuel Shipments

* S E E A T T A C H E D R E P O R T S *

NRC Regulatory Guide 1.21 Reports

Report Date : 3/28/2011

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2010 to 12/31/2010 Percent Cutoff: 0

Waste Stream : Resins, Filters, and Evap Bottoms
 Charcoal and Bead 2009 Condensate ResiP0009483-16 Cond

Waste Class	Volume		Curies Shipped	% Error (Ci)
	Ft ³	M ³		
A	6.74E+02	1.91E+01	2.59E+01	+/- 25%
B	0.00E+00	0.00E+00	0.00E+00	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	6.74E+02	1.91E+01	2.59E+01	+/- 25%

Waste Stream : Dry Active Waste
 DAW-U-NA DAW-U-NA Cond Demin Elem Asbestos
 Trash Liner

Waste Class	Volume		Curies Shipped	%Error (Ci)
	Ft ³	M ³		
A	7.91E+03	2.24E+02	5.11E-01	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	7.91E+03	2.24E+02	5.11E-01	+/-25%

Waste Stream : Irradiated Components

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

NRC Regulatory Guide 1.21 Reports

Report Date : 3/28/2011

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2010 to 12/31/2010 Percent Cutoff: 0

Waste Stream : Other Waste
 Drywell Sump Water DW Sump Overpack

Waste Class	Volume		Curies Shipped	% Error (Ci)
	Ft^3	M^3		
A	9.80E+01	2.78E+00	4.44E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	9.80E+01	2.78E+00	4.44E+00	+/-25%

Waste Stream : Sum of All 4 Categories
 DAW-U-NA DAW-U-NA Cond Demin Elem Charcoal and Bead
 Asbestos 2009 Condensate Res Trash Liner P0009483-16 Cond
 Drywell Sump Water DW Sump Overpack

Waste Class	Volume		Curies Shipped	% Error (Ci)
	Ft^3	M^3		
A	8.68E+03	2.46E+02	3.09E+01	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	8.68E+03	2.46E+02	3.09E+01	+/-25%

-Combined Waste Type Shipment, Major Volume Waste Type Shown

NRC Regulatory Guide 1.21 Reports

Report Date : 3/28/2011

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2010 to 12/31/2010 Percent Cutoff: 0

Resins, Filters, and Evap Bottom		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	0.624%	1.62E-01
C-14	0.472%	1.22E-01
Cr-51	0.016%	4.23E-03
Mn-54	1.599%	4.14E-01
Fe-55	25.023%	6.48E+00
Fe-59	0.006%	1.43E-03
Co-57	0.001%	2.02E-04
Co-58	0.281%	7.29E-02
Co-60	24.888%	6.45E+00
Ni-63	1.599%	4.14E-01
Zn-65	2.506%	6.49E-01
Sr-89	0.724%	1.88E-01
Sr-90	0.454%	1.17E-01
Nb-95	0.007%	1.80E-03
Nb-97	0.000%	2.28E-15
Tc-99	0.178%	4.61E-02
Tc-99m	0.000%	4.74E-21
Ag-110m	0.026%	6.81E-03
I-129	0.002%	6.18E-04
I-131	3.603%	9.33E-01
I-133	0.003%	8.06E-04
Cs-134	0.056%	1.45E-02
Cs-137	33.278%	8.62E+00
Ba-140	3.090%	8.00E-01
La-140	0.524%	1.36E-01
Ce-141	0.760%	1.97E-01
Ce-144	0.259%	6.71E-02
Pu-238	0.003%	7.14E-04
Pu-239	0.001%	3.46E-04
Pu-241	0.012%	3.14E-03
Am-241	0.002%	6.29E-04
Cm-242	0.001%	1.34E-04
Cm-243	0.001%	1.91E-04
Cm-244	0.000%	4.15E-06
Resins, Filters, and Evap Bottom		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	0.624%	1.62E-01
C-14	0.472%	1.22E-01
Cr-51	0.016%	4.23E-03
Mn-54	1.599%	4.14E-01
Fe-55	25.023%	6.48E+00
Fe-59	0.006%	1.43E-03
Co-57	0.001%	2.02E-04
Co-58	0.281%	7.29E-02
Co-60	24.888%	6.45E+00

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2010 to 12/31/2010 Percent Cutoff: 0

Ni-63	1.599%	4.14E-01
Zn-65	2.506%	6.49E-01
Sr-89	0.724%	1.88E-01
Sr-90	0.454%	1.17E-01
Nb-95	0.007%	1.80E-03
Nb-97	0.000%	2.28E-15
Tc-99	0.178%	4.61E-02
Tc-99m	0.000%	4.74E-21
Ag-110m	0.026%	6.81E-03
I-129	0.002%	6.18E-04
I-131	3.603%	9.33E-01
I-133	0.003%	8.06E-04
Cs-134	0.056%	1.45E-02
Cs-137	33.278%	8.62E+00
Ba-140	3.090%	8.00E-01
La-140	0.524%	1.36E-01
Ce-141	0.760%	1.97E-01
Ce-144	0.259%	6.71E-02
Pu-238	0.003%	7.14E-04
Pu-239	0.001%	3.46E-04
Pu-241	0.012%	3.14E-03
Am-241	0.002%	6.29E-04
Cm-242	0.001%	1.34E-04
Cm-243	0.001%	1.91E-04
Cm-244	0.000%	4.15E-06
Dry Active Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	0.366%	1.87E-03
C-14	0.033%	1.71E-04
Cr-51	9.258%	4.73E-02
Mn-54	6.460%	3.30E-02
Fe-55	32.588%	1.67E-01
Fe-59	1.868%	9.55E-03
Co-58	1.503%	7.69E-03
Co-60	36.125%	1.85E-01
Ni-63	0.726%	3.71E-03
Zn-65	3.287%	1.68E-02
Sr-89	0.216%	1.10E-03
Sr-90	0.018%	9.21E-05
Zr-95	0.403%	2.06E-03
Nb-95	0.737%	3.77E-03
Ru-103	0.170%	8.71E-04
Ag-110m	0.088%	4.49E-04
Sb-124	0.168%	8.62E-04
I-131	0.625%	3.20E-03
Cs-137	4.267%	2.18E-02
Ba-140	0.152%	7.76E-04
La-140	0.001%	4.94E-06
Ce-141	0.208%	1.06E-03

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
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Ce-144	0.183%	9.38E-04
Pu-238	0.007%	3.62E-05
Pu-239	0.004%	2.21E-05
Pu-240	0.000%	4.09E-07
Pu-241	0.501%	2.56E-03
Am-241	0.037%	1.89E-04
Cm-242	0.000%	2.93E-07
Cm-243	0.000%	9.21E-07
Cm-244	0.000%	9.21E-07
Dry Active Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	0.366%	1.87E-03
C-14	0.033%	1.71E-04
Cr-51	9.258%	4.73E-02
Mn-54	6.460%	3.30E-02
Fe-55	32.588%	1.67E-01
Fe-59	1.868%	9.55E-03
Co-58	1.503%	7.69E-03
Co-60	36.125%	1.85E-01
Ni-63	0.726%	3.71E-03
Zn-65	3.287%	1.68E-02
Sr-89	0.216%	1.10E-03
Sr-90	0.018%	9.21E-05
Zr-95	0.403%	2.06E-03
Nb-95	0.737%	3.77E-03
Ru-103	0.170%	8.71E-04
Ag-110m	0.088%	4.49E-04
Sb-124	0.168%	8.62E-04
I-131	0.625%	3.20E-03
Cs-137	4.267%	2.18E-02
Ba-140	0.152%	7.76E-04
La-140	0.001%	4.94E-06
Ce-141	0.208%	1.06E-03
Ce-144	0.183%	9.38E-04
Pu-238	0.007%	3.62E-05
Pu-239	0.004%	2.21E-05
Pu-240	0.000%	4.09E-07
Pu-241	0.501%	2.56E-03
Am-241	0.037%	1.89E-04
Cm-242	0.000%	2.93E-07
Cm-243	0.000%	9.21E-07
Cm-244	0.000%	9.21E-07
Other Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	0.059%	2.64E-03
Mn-54	0.062%	2.75E-03
Fe-55	73.260%	3.25E+00

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2010 to 12/31/2010 Percent Cutoff: 0

Co-60	23.379%	1.04E+00
Ni-59	0.043%	1.93E-03
Ni-63	3.058%	1.36E-01
Sr-89	0.000%	1.49E-05
Sr-90	0.001%	5.63E-05
Nb-94	0.009%	3.79E-04
Cs-137	0.073%	3.24E-03
Ce-144	0.018%	8.12E-04
Pu-238	0.005%	2.09E-04
Pu-239	0.002%	8.16E-05
Pu-241	0.028%	1.22E-03
Am-241	0.002%	9.05E-05
Cm-242	0.000%	1.05E-06
Cm-243	0.001%	2.85E-05
Other Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	0.059%	2.64E-03
Mn-54	0.062%	2.75E-03
Fe-55	73.260%	3.25E+00
Co-60	23.379%	1.04E+00
Ni-59	0.043%	1.93E-03
Ni-63	3.058%	1.36E-01
Sr-89	0.000%	1.49E-05
Sr-90	0.001%	5.63E-05
Nb-94	0.009%	3.79E-04
Cs-137	0.073%	3.24E-03
Ce-144	0.018%	8.12E-04
Pu-238	0.005%	2.09E-04
Pu-239	0.002%	8.16E-05
Pu-241	0.028%	1.22E-03
Am-241	0.002%	9.05E-05
Cm-242	0.000%	1.05E-06
Cm-243	0.001%	2.85E-05
Sum of All 4 Categories		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
H-3	0.539%	1.66E-01
C-14	0.397%	1.22E-01
Cr-51	0.167%	5.16E-02
Mn-54	1.459%	4.50E-01
Fe-55	32.092%	9.90E+00
Fe-59	0.036%	1.10E-02
Co-57	0.001%	2.02E-04
Co-58	0.261%	8.06E-02
Co-60	24.857%	7.67E+00
Ni-59	0.006%	1.93E-03
Ni-63	1.795%	5.54E-01
Zn-65	2.159%	6.66E-01

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
 During Period From 01/01/2010 to 12/31/2010 Percent Cutoff: 0

Sr-89	0.612%	1.89E-01
Sr-90	0.381%	1.18E-01
Zr-95	0.007%	2.06E-03
Nb-94	0.001%	3.79E-04
Nb-95	0.018%	5.56E-03
Nb-97	0.000%	2.28E-15
Tc-99	0.149%	4.61E-02
Tc-99m	0.000%	4.74E-21
Ru-103	0.003%	8.71E-04
Ag-110m	0.024%	7.26E-03
Sb-124	0.003%	8.62E-04
I-129	0.002%	6.18E-04
I-131	3.035%	9.36E-01
I-133	0.003%	8.06E-04
Cs-134	0.047%	1.45E-02
Cs-137	28.018%	8.64E+00
Ba-140	2.596%	8.01E-01
La-140	0.440%	1.36E-01
Ce-141	0.641%	1.98E-01
Ce-144	0.223%	6.88E-02
Pu-238	0.003%	9.59E-04
Pu-239	0.001%	4.50E-04
Pu-240	0.000%	4.09E-07
Pu-241	0.022%	6.92E-03
Am-241	0.003%	9.09E-04
Cm-242	0.000%	1.36E-04
Cm-243	0.001%	2.20E-04
Cm-244	0.000%	5.08E-06
Sum of All 4 Categories :		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
H-3	0.539%	1.66E-01
C-14	0.397%	1.22E-01
Cr-51	0.167%	5.16E-02
Mn-54	1.459%	4.50E-01
Fe-55	32.092%	9.90E+00
Fe-59	0.036%	1.10E-02
Co-57	0.001%	2.02E-04
Co-58	0.261%	8.06E-02
Co-60	24.857%	7.67E+00
Ni-59	0.006%	1.93E-03
Ni-63	1.795%	5.54E-01
Zn-65	2.159%	6.66E-01
Sr-89	0.612%	1.89E-01
Sr-90	0.381%	1.18E-01
Zr-95	0.007%	2.06E-03
Nb-94	0.001%	3.79E-04
Nb-95	0.018%	5.56E-03
Nb-97	0.000%	2.28E-15
Tc-99	0.149%	4.61E-02

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2010 to 12/31/2010 Percent Cutoff: 0

Tc-99m	0.000%	4.74E-21
Ru-103	0.003%	8.71E-04
Ag-110m	0.024%	7.26E-03
Sb-124	0.003%	8.62E-04
I-129	0.002%	6.18E-04
I-131	3.035%	9.36E-01
I-133	0.003%	8.06E-04
Cs-134	0.047%	1.45E-02
Cs-137	28.018%	8.64E+00
Ba-140	2.596%	8.01E-01
La-140	0.440%	1.36E-01
Ce-141	0.641%	1.98E-01
Ce-144	0.223%	6.88E-02
Pu-238	0.003%	9.59E-04
Pu-239	0.001%	4.50E-04
Pu-240	0.000%	4.09E-07
Pu-241	0.022%	6.92E-03
Am-241	0.003%	9.09E-04
Cm-242	0.000%	1.36E-04
Cm-243	0.001%	2.20E-04
Cm-244	0.000%	5.08E-06

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2010 to 12/31/2010

Number of Shipments	Mode of Transportation	Destination
1	Hittman Transport	Energy Solutions Bear Creek
1	Hittman Transport	Energy Solutions Gallaher Rd.
4	Hittman Transport	EnergySolutions LLC.
1	Hittman Transport	Studsvik Processing Facility Memphis
6	Xcel Energy Trucking	Studsvik Processing Facility Memphis

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2010 to 12/31/2010

Manifest Number	Date Shipped	Waste Volume Used	Burial volume Used
10-55	11/30/2010	Yes	
10-54	11/8/2010	Yes	
10-41	8/6/2010	Yes	
10-34	7/20/2010	Yes	
10-31	7/8/2010	Yes	
10-28	6/25/2010	Yes	
10-27	6/11/2010	Yes	
10-26	6/9/2010	Yes	
10-25	5/25/2010	Yes	
10-23	5/18/2010	Yes	
10-20	5/12/2010	Yes	
10-14	4/16/2010	Yes	
10-06	2/5/2010	Yes	

ENCLOSURE 2

**OFF-SITE RADIATION DOSE ASSESSMENT FOR
JANUARY 1 – DECEMBER 31, 2010**

6 pages follow

MONTICELLO NUCLEAR GENERATING PLANT

Offsite Radiation Dose Assessment for January 1, - December 31, 2010

An assessment of radiation dose due to releases from the Monticello Nuclear Generating Plant during 2010 was performed in accordance with the Offsite Dose Calculation Manual (ODCM). Computed doses were well below the 40 CFR 190 Standards and 10 CFR Part 50, Appendix I Guidelines.

Offsite dose calculation formulas and meteorological data from the Offsite Dose Calculation Manual were used in making this assessment. Source terms were obtained from the Radioactive Effluent Release Report for 2010.

Offsite Dose from Gaseous Releases (ODCM –08.01 section 2.1.3)

Computed dose due to gaseous releases are reported in Table 1. Critical receptor location and pathways for organ dose are reported in Table 2. Whole body and organ dose due to gaseous releases are a small percentage of Appendix I Guidelines.

Offsite Dose From Liquid Releases (ODCM –08.01 section 2.1.3)

Dose from liquid releases are listed in Table 1.

There were no liquid releases in 2010.

Dose to Individuals Due to Their Activities Inside the Site Boundary (ODCM –08.01 section 2.1.3)

Computed dose to the whole body, skin and organ (thyroid), are reported in Table 1. There are several groups of concern, Security Officers training at the rifle range at the old EPA station, cleaning contractors at the Receiving Warehouse and XCEL Energy Company transmission and distribution crews working in the substation. Use of a very conservative assumption of 40 hours/week spent inside the site boundary by these groups would conservatively represent the most exposed individual. The annual whole body, skin and organ dose was computed using plant stack and reactor building vent X/Q and D/Q values for the Substation (a bounding location due to predominant wind direction and nearness to the release points) as input to the GASPAR code. This computed dose was reduced by the factor of 40/168 to account for limited occupancy.

Dose to the Likely Most Exposed Member of the General Public from Reactor Releases and Other Nearby Uranium Fuel Cycle Sources (ODCM –08.01 section 2.1.4)

There are no other uranium fuel facilities in the vicinity of the Monticello site. The only artificial source of exposure to the general public in addition to the plant effluent releases is from direct radiation of the reactor and the steam turbines.

An Independent Spent Fuel Storage Facility (ISFSI) was constructed west of the plant in 2007. The initial loading campaign was completed in 2008 with 10 HCM's loaded with spent fuel. Neutron and Gamma monitoring results at the site boundary show no significant differences between these TLD's and the control TLD's.

Environmental TLD's were used to provide data on direct and skyshine radiation dose and the GASPARD code was used to provide data on dose from airborne pathways.

TLD results from the area of the site boundary and the 5 mile ring show no significant differences between these TLD's and the control TLD's.

Therefore, the likely most exposed member of the general public will not receive an annual radiation dose from reactor effluent releases and all other fuel cycle activities in excess of 40 CFR 190 standards of 25 millirem to the whole body, 75 millirem to the thyroid, and 25 millirem to any other organ.

Changes in Land Use and Non Obtainable Milk or Vegetable Samples
(ODCM –08.01 sections 2.1.8 and 2.1.9)

There were several changes in land use resulting in significant increases in calculated doses. One onsite monitoring well (M-52) was added to the program in the fourth quarter of 2010 and analyzed for tritium and gamma-emitting isotopes. A residence obtaining Goat Milk for retail sale was identified during performance of the Annual Land Use Census and was added to the program (M-16, Kitzman Residence). Additionally a Control Goat Milk residence was added to the program (M-17, Greniger Residence). The goat farms were added to the program in October of 2010. Both goat farms are seasonal and only obtain milk samples from March to November. As a result there were no goat milk samples obtained after November 24th for M-16 and October 28th for the control location (M-17). There were no vegetable samples that could not be obtained during this reporting period.

Carbon 14

C-14 curies generated were determined by calculation, as defined in EPRI "Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents". All curies generated will be assumed to be released within the period of interest, with no credit taken for hold-up.

Release (From EPRI Calc, adjusted for power operation only)

	Total	1st	2nd	3rd	4th
C-14 (Ci)	6.5	1.7	1.7	1.7	1.4

C-14 dose calculations were made using the dose factors and the methodology of Regulatory Guide 1.109.

Dose (based on RG-1.109, growing seasons factored)

	Total	1st	2nd	3rd	4th
C-14 (mrem)	0.01610	0	0.00632	0.00977	0

The inhalation dose was calculated using all the C-14 calculated to be released.

The other pathways, milk and leafy vegetables, depend on the amount consumed by goats and people; forage for goats and vegetables for people. Incorporation only occurs via photosynthesis. Photosynthesis only incorporates $^{14}\text{CO}_2$ and only occurs during the growing season. Monticello conservatively chose to use 50% of the C-14 released for this calculation.

Dose to the Critical Receptor is performed in the fall of each year and reported in the Annual Report for that year. The determination of the Critical Receptor uses the source term from the previous year since the source term for the year of the calculation has not been determined yet. The Critical Receptor parameters used in this report do not use C-14 in the calculation since C-14 release was not calculated for 2009.

Table 1

Offsite Radiation Dose Assessment - Monticello

PERIOD: January 1, through December 31, 2010

GASEOUS RELEASES	DOSE	10CFR50 Appendix I Guidelines
Maximum Site Boundary Gamma Air Dose (mrad/year)	0.0153	10
Maximum Site Boundary Beta Air Dose (mrad/year)	0.0212	20
Maximum Off-Site Dose to Any Organ (mrem/year)	0.1150	15
Maximum Dose to the Likely Most Exposed Member of the General Public (mrem/year)		
Whole Body	0.0446	5
Skin	0.0315	15
Max Organ (Thyroid)	0.1150	15
LIQUID RELEASES		
Maximum Off-Site Dose (mrem)		
Whole Body	0	3
Max Organ (All except bone)	0	10
GASEOUS RELEASES	DOSE	40 CFR 190 LIMITS
Maximum Dose to Individuals due to their Activities Inside the Site Boundary (mrem)		
Whole Body	0.0139	25
Thyroid	0.0178	75
Max Other Organ (Skin)	0.0192	25

Table 2

**Offsite Radiation Dose Assessment - Monticello
Supplemental Information**

PERIOD: January 1, through December 31, 2010

GASEOUS RELEASES		
Maximum Site Boundary Dose Location (from Reactor Building Vents)		
Sector		SSE
Distance (miles)		0.40
Substation		
Sector		S
Distance from Plant Stack (miles)		0.2
Distance from Reactor Building Vents		0.2
Critical Receptor Location		
Sector		SSE
Distance from Reactor Building Vents (miles)		3.0
Pathways		Plume, Ground, Inhalation, Goat Milk
Age Group		INFANT
Organ		THYROID
LIQUID RELEASES		
St. Paul Drinking Water Intake Location		
Pathways		
Age Group		
Organ		
Dilution Factor (drinking water)		
	Drinking Water Infant Whole Body 7:1	Drinking Water, Fish Adult GI Tract 7:1

Bases for Radiation Dose Statements

Thermoluminescent dosimeters (TLD) are stationed around MNGP to measure the ambient gamma radiation field. Monitoring stations are placed near the site boundary and approximately five (5) miles from the reactor, in locations representing sixteen (16) compass sectors. Other locations are chosen to measure the radiation field at places of special interest such as nearby residences, meeting places and population centers. Control sites are located further than ten (10) miles from the site, in areas that should not be affected by plant operations. The results from the TLD's are reported in the Annual Radiological Environmental Monitoring Report (REMP). The results from this effort indicated no excess dose to offsite areas.

Additionally, NUREG-0543, METHODS FOR DEMONSTRATING LWR COMPLIANCE WITH THE EPA URANIUM FUEL CYCLE STANDARD (40 CFR PART 190) states in section IV, "As long as a nuclear plant site operates at a level below the Appendix I reporting requirements, no extra analysis is required to demonstrate compliance with 40 CFR Part 190". The organ and whole body doses reported in Table 1 are determined using 10 CFR 50 Appendix I methodology. The doses reported are well below the limits of Appendix I.