



L-PI-13-037
TS 5.5.1.c
TS 5.6.3

MAY 03 2013

U S Nuclear Regulatory Commission
ATTN: Document Control Desk
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Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282, 50-306 and 72-10
Renewed License Nos. DPR-42, DPR-60
License No. SNM-2506

2012 Annual Radioactive Effluent Report and Offsite Dose Calculation Manual (ODCM)

Pursuant to the applicable Prairie Island Nuclear Generating Plant (PINGP) Technical Specifications (TS), Appendix A to Operating Licenses DPR-42 and DPR-60, and the requirements of the Offsite Dose Calculation Manual, Northern States Power Company, a Minnesota Corporation, doing business as Xcel Energy (hereafter "NSPM"), submits the 2012 Annual Radioactive Effluent Report which is comprised of the following reports:

Enclosure 1 contains the Off-Site Radiation Dose Assessment for the period January 1, 2012 through December 31, 2012 in accordance with the requirements of the ODCM.

Enclosure 2 contains the Annual Radioactive Effluent Report, Supplemental Information, for the period January 1, 2012 through December 31, 2012 in accordance with the requirements of TS 5.6.3 and the ODCM.

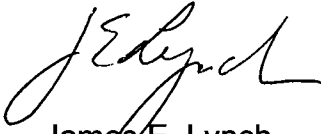
Enclosure 3 contains the Low Level Waste Disposal Annual Report, Solid Waste and Irradiated Component Shipments, for the period January 1, 2012 through December 31, 2012 in accordance with the requirements of TS 5.6.3 and the ODCM.

Enclosure 4 contains a complete copy of H4, Offsite Dose Calculation Manual (ODCM), Revision 27, dated June 27, 2012. In accordance with the requirements of TS 5.5.1.c., the changes are identified by markings in the margin of the affected pages. The manual also contains a Record of Revisions which includes a summary of the revision changes (refer to page 11 of the ODCM).

The Process Control Program (PCP) for Solidification/Dewatering of Radioactive Waste from Liquid Systems (D59) has not been revised since the 2010 Annual Effluent report was submitted, therefore it is not included with this report.

A009
IE48
NM5526

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

A handwritten signature in black ink, appearing to read 'J. E. Lynch', with a stylized, cursive script.

James E. Lynch
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (4)

cc: Regional Administrator, USNRC, Region III
Project Manager, Prairie Island Nuclear Generating Plant, USNRC, NRR
NRC Resident Inspector – Prairie Island Nuclear Generating Plant
Department of Health, State of Minnesota
PI Dakota Community Environmental Coordinator

ENCLOSURE 1

OFF-SITE RADIATION DOSE ASSESSMENT

January 1, 2012 – December 31, 2012

11 pages to follow

**PRAIRIE ISLAND NUCLEAR GENERATING PLANT
OFF-SITE RADIATION DOSE ASSESSMENT FOR**

January 1, 2012 - December 31, 2012

An Assessment of the radiation dose due to releases from Prairie Island Nuclear Generating Plant during 2012 was performed, in accordance with the Offsite Dose Calculation Manual, as required by Technical Specifications. Computed doses were well below the 40 CFR Part 190 Standards and 10 CFR Part 50 Appendix I Guidelines.

Off-site dose calculation formulas and historical meteorological data were used in making this assessment. Source terms were obtained from the Annual Radioactive Effluent and Waste Disposal Report and prepared for NRC review, for the year of 2012.

OFFSITE DOSES FROM GASEOUS RELEASE:

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

OFFSITE DOSES FROM LIQUID RELEASE:

Computed doses due to liquid releases are reported in Table 1. Critical receptor information is reported in Table 2. Liquid release doses, both whole body and organ, are a small percentage of Appendix I Guidelines.

DOSES TO INDIVIDUALS DUE TO ACTIVITIES INSIDE THE SITE BOUNDARY:

Occasionally sportsmen enter the Prairie Island site for recreational activities. These individuals are not expected to spend more than a few hours per year within the site boundary. Commercial and recreational river traffic exists through this area.

For purposes of estimating the dose due to recreational and river water transportation activities within the site boundary, it is assumed that the limiting dose within the site boundary would be received by an individual who spends a total of seven days per year on the river just off-shore from the plant buildings (ESE at 0.2 miles). The gamma dose from noble gas releases and the whole body and organ doses from the inhalation pathway due to Iodine 131, Iodine-133, tritium and long-lived particulates were calculated for this location and occupancy time. These doses are reported in Table 1.

Critical Receptor location and pathways for organ doses are reported in Table 2.

ABNORMAL RELEASES

There were four (4) abnormal releases for 2012.

1 11 Steam Generator Pressure Operated Relief Valve Lifting

EVENT:

On 1/7/2012, 11 Steam Generator PORV (Pressure Operated Relief Valve) indicated an increase in down stream temperature, as read on control room monitoring. The control room review of the 11 Steam Generator PORV Position Indication determined that the valve opened about 8% for about 3 minutes.

EVALUATION:

Data review indicated that no overpressure condition existed.

The cause was determined to be set point drift of the Foxboro Module.

Reporting is not required, based on the minimal contribution to curies released and dose generated, as compared to annual total curies released and annual total dose generated. However, for completeness this event is captured as an abnormal release and will be quantified and documented.

Abnormal release permit PIGB2012-230 was created to account for the release.

Volume released was conservatively based on the PORV being 100% open for 3 minutes.

Activity released was based on routine weekly samples taken from the 11 Steam Generator.

This activity was reviewed and determined to be representative. $5.68\text{E}+03$ uCi of tritium were released.

Associated dose from the release tritium was $2.59\text{E}-05$ mrem, maximum organ dose at the critical receptor location.

The dose from the activity released represented a small percentage of the total dose and a very small percentage of limits. Maximum organ dose for this release, as calculated for the critical receptor location, was less than 1% of the total 2012 maximum organ dose, as calculated for the critical receptor location. The dose did not impose upon the health and safety of the public.

This event was captured and evaluated in the site Action Request Program.

2 11 Steam Generator Pressure Operated Relief Valve Lifting

EVENT:

On 2/4/2012, 11 Steam Generator Pressure Operated Relief Valve (PORV) indicated an increase in down stream temperature, as read on control room monitoring. The control room review of the 11 Steam Generator PORV Position Indication determined that the valve opened about 8%, for about 5 minutes.

EVALUATION:

Data review indicated that no overpressure condition existed.

The cause was determined to be set point drift of the Foxboro Module.

Reporting is not required, based on the minimal contribution to curies released and dose generated, as compared to annual total curies released and annual total dose generated. However, for completeness this event is captured as an abnormal release and will be quantified and documented.

Abnormal release permit PIGB2012-231 was created to account for the release.

Volume released was based on the PORV being 100% open for 5 minutes.

Activity released was based on routine weekly samples taken from the 11 Steam Generator.

This activity was reviewed and determined to be representative. $4.08\text{E}+03$ uCi of tritium were released.

Associated dose from the release was $1.86\text{E}-05$ mrem, maximum organ dose, at the critical receptor location.

The dose from the activity released represented a small percentage of the total dose and a very small percentage of limits. Maximum organ dose for this release, as calculated for the critical receptor location, was less than 1% of the total 2012 maximum organ dose, as calculated for the critical receptor location. The dose did not impose upon the health and safety of the public.

This event was captured and evaluated in the site Action Request Program.

3 Loss of Waste Gas

EVENT:

Routine trending of total Waste Gas Inventory indicated a potential loss of gas. Engineering data review confirmed the loss of waste gas.

EVALUATION:

Repairs were made to 121 Waste Gas Compressor. Upon restoration, it was determined that the leakage existed and the compressor was isolated. Additionally, Waste Gas was lost during replacement of the 21 Chemical and Volume Control System Holdup Tank Relief Valve. Leakage was determined to be isolated to these events and verified to not be on-going after these events.

Engineering determined the total loss to be 3106 standard cubic feet. Gas loss, due to the 121 Waste Gas Compressor leak occurred between 1/1/12 to 3/1/12. Gas loss due to relief valve work occurred between 4/6/12 and 4/23/12.

Per H4, Offsite Dose Calculation Manual (ODCM) this meets the criteria of an abnormal release.

Abnormal release file PIGB2012-213 was created to account for the release.

Release activity concentrations were based on review of monthly waste gas inventory samples and Waste Gas Decay Tank releases. This activity was reviewed and determined to be representative and bounding.

Activity Released:

Kr-85	4.43E+04 uCi
Xe-133	2.37E+03 uCi
H-3	8.00E+02 uCi

Noble Gas Dose at the Site Boundary:

Gamma Dose:	4.62E-06 mrad
Beta Dose :	2.57E-04 mrad

The Maximum Organ Dose at the Critical Receptor Location, due to release of tritium, was 3.65E-06 mrem.

The dose from the activity released represented a small percentage of the total dose and a very small percentage of limits. The dose did not impose upon the health and safety of the public.

This event was captured and evaluated in the site Action Request Program.

4. 21 SG PORV FAILS TO RESEAT

EVENT:

Following performance of a routine surveillance procedure, the control room noted that 21 Steam Generator Pressure Operated Relief Valve (PORV) down stream temperatures were elevated above normal. It was determined that the 21 Steam Generator PORV did not fully reseal following the surveillance procedure.

Valve was reseated.

Engineering determined that the 21 Steam Generator PORV was a maximum of 1 percent open.

EVALUATION:

It was determined that no overpressure condition existed.

Reporting is not required, based on the minimal contribution to curies released and dose generated, as compared to annual total curies released and annual total dose generated. However, for completeness this event is captured as an abnormal release and will be quantified and documented.

Abnormal release file PIGB2012-2304 was created to account for the release.

Based on trending of down stream temperatures, the release occurred from 9/8/12 at 22:40 to 9/25/12 at 06:40.

Activity released was based on routine weekly samples taken from the 21 Steam Generator.

This activity was reviewed and determined to be representative. $7.69\text{E}+04$ uCi of tritium were released.

Associated dose from the release was $3.5\text{E}-04$ mrem, maximum organ dose, at the critical receptor location.

The dose from the activity released represented a small percentage of the total dose and a very small percentage of limits. Maximum organ dose for this release, as calculated for the critical receptor location, was less than 1% of the total 2012 maximum organ dose, as calculated for the critical receptor location. The dose did not impose upon the health and safety of the public.

This event was captured and evaluated in the site Action Request Program.

40CFR190 COMPLIANCE

The calculated dose from the release of radioactive materials in liquid or gaseous effluents **did not** exceed twice the limits of 10CFR50, Appendix I, therefore compliance with 40CFR190 **was not** required to be assessed, in this report.

SAMPLING, ANALYSIS AND LLD REQUIREMENTS

The lower limit of detection (LLD) requirements, as specified in ODCM Table 2.1 and 3.1 **were met** for 2012. The minimum sampling frequency requirements, as specified in ODCM Table 2.1 and 3.1 **were** met for 2012.

MONITORING INSTRUMENTATION

There **were** two (2) occurrences, when less than the minimum required radioactive liquid and/or gaseous effluent monitoring instrumentation channels were operable, as required by ODCM Tables 2.2 and 3.2.

1 1R30, Unit 1 Auxiliary Building Ventilation

EVENT:

1R30, Unit 1 Auxiliary Building Ventilation Monitor failure was due to an electrical failure of breaker 122G-8. Breaker was replaced and 1R30 was restored.

EVALUATION:

Monitor was out of service on 7/22/2012 at 19:03. Monitor was returned to service on 8/24/2012 at 04:03 for a total out of service time of 32.4 days.

Redundant monitoring was available in 1R37, Unit 1 Auxiliary Building Ventilation Monitor.

The delay in returning the monitor to service in a timely manner, was determined to be a resource issue.

2 2R30 Flow Totalizer, Unit 2 Auxiliary Ventilation

EVENT:

2R30, Unit 2 Auxiliary Building Ventilation Sample Flow Totalizer was determined to be functional, but degraded.

EVALUATION:

Monitor was out of service on 6/10/2012 at 00:00. Monitor was returned to service on 1/24/2013 at 13:32 for a total out of service time of 228.6 days.

Redundant monitoring was available in 2R37, Unit 2 Auxiliary Building Ventilation Sample Flow Totalizer.

The delay in returning the monitor to service in a timely manner, was determined to be a parts issue associated the time delay in sending the totalizer to and receiving the totalizer back from an offsite vendor following maintenance and calibration.

Doses to Individuals Due to Effluent Releases from the Independent Spent Fuel Storage Facility (ISFSI):

Zero (0) fuel casks were loaded and placed in the storage facility during the 2012 calendar year. The total number of casks in the ISFSI is twenty-nine (29). There **was no** release of radioactive effluents from the ISFSI.

Current Offsite Dose Calculation Manual (ODCM) Revision:

The Offsite Dose Calculation Manual **was** revised in 2012. The 2012 revision is revision 27. The date of revision 27 is June 27, 2012. A copy of revision 27 is submitted with this year's report as Enclosures 4.

CRITICAL RECEPTOR

Based on the Annual Land Use Census, **no change** in critical receptor was implemented.

PROCESS CONTROL PROGRAM

The Process Control Program for Solidification/Dewatering of Radioactive Waste from Liquid Systems (D 59) **was not** revised in 2012. Current manual revision is 10. The revision date is May 24, 2010.

SOLID WASTE SHIPMENTS

A copy of the "LOW LEVEL WASTE DISPOSAL ANNUAL REPORT SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS" is included as enclose 3.

INDUSTRY INITIATIVE ON GROUND WATER PROTECTION:**1 Condensate leak to ground****EVENT:**

On February 3, 2012, it was noted that secondary steam condensate was leaking to the ground at the east side of the main warehouse due to failure of a condensate return pump.

EVALUATION:

The leak was terminated within 2.2 hours and approximately 27 gallons were spilled. This water had a tritium concentration of 15,000 pCi/L. It is assumed that the discharged water could potentially enter the groundwater and be incorporated in drinking water at the nearest resident.

This event meets the reporting criteria of the Industry Initiative on Groundwater Protection, as described in the Offsite Dose Calculations Manual.

For the purpose of dose calculation, the dose-maximizing assumption was made that the receptor's concentration of tritium in body water and organic molecules is equal to the concentration of the released water diluted by a factor of 1000 for a period of one year (a dilution factor of approximately 1000 was calculated when tritium was discharged into the discharge canal versus sample results from a well 700 feet from the canal). (In this case, the receptor is 0.6 miles from the release point.) The tritium dose conversion factor is taken from page 9-3 of NUREG/CR-3332. Its value is 1.02E-4 mrem/year per pCi/liter of tritium in the body.

The nearest resident to the spill is located 0.6 miles to the SSE of the Prairie Island site. The leaked water would have to travel in the groundwater under the recycle canal and discharge canal to reach this resident. This assumed water flow maximizes the dose because the normal groundwater flow is towards the Vermillion River which would not carry the tritium toward the nearest resident.

Dose Calculation:

Dose Conversion Factor (mrem/per pCi/L)	Diluted X Tritium Concentration (pCi/L)	Whole Body Dose = (mrem)
1.04E-4	1.50E+1	1.56E-3

Table 1

OFF-SITE RADIATION DOSE ASSESSMENT – PRAIRIE ISLAND**PERIOD: JANUARY through DECEMBER 2012**10 CFR Part 50 Appendix I
Guidelines
2-unit site per year**Gaseous Releases**

Maximum Site Boundary Gamma Air Dose (mrad)	3.13E-04	20
Maximum Site Boundary Beta Air Dose (mrad)	8.29E-04	40
Maximum Off-site Dose to any organ (mrem)*	9.76E-02	30
Offshore Location Gamma Dose (mrad)	5.62E-07	
Total Body (mrem)*	4.83E-07	
Organ (mrem)*	5.72E-04	30

Liquid Releases

Maximum Off-site Dose Total Body (mrem)	1.52E-03	6
Maximum Off-site Dose Organ – GI TRACT (mrem)	2.01E-03	20
Limiting Organ Dose Organ – TOTAL BODY (mrem)	1.52E-03	6

- Long-Lived Particulate, I-131, I-133 and Tritium

Table 2

**OFF-SITE RADIATION DOSE ASSESSMENT – PRAIRIE ISLAND
SUPPLEMENTAL INFORMATION**

January 1, 2012 – December 31, 2012

Gaseous Releases

Maximum Site Boundary
Dose Location
(From Building Vents)

Sector	W
Distance (miles)	0.36

Offshore Location
Within Site Boundary

Sector	ESE
Distance (miles)	0.2
Pathway	Inhalation

Maximum Off-site

Sector	NNW
Distance (miles)	0.60
Pathways	Ground, Inhalation Vegetable
Age Group	Child

Liquid Release

Maximum Off-site Dose
Location Downstream

Pathway	Fish
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ENCLOSURE 2

**ANNUAL RADIOACTIVE EFFLUENT REPORT
SUPPLEMENTAL INFORMATION**

January 1, 2012 – December 31, 2012

8 pages to follow

ANNUAL RADIOACTIVE EFFLUENT REPORT

01-JAN-12 THROUGH 31-DEC-12

SUPPLEMENTAL INFORMATION

Facility: Prairie Island Nuclear Generating Plant

Licensee: Northern States Power Company

License Numbers: DPR-42 & DPR-60

A. Regulatory Limits

1. Liquid Effluents:

- a. The dose or dose commitment to an individual from radioactive materials in liquid effluents released from the site shall be limited to:

for the quarter	3.0 mrem to the total body 10.0 mrem to any organ
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for the year	6.0 mrem to the total body 20.0 mrem to any organ
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2. Gaseous Effluents:

- a. The dose rate due to radioactive materials released in gaseous effluents from the site shall be limited to:

noble gases	≤ 500 mrem/year total body ≤ 3000 mrem/year skin
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I-131, I-133, H-3, LLP	≤ 1500 mrem/year to any organ
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- b. The dose due to radioactive gaseous effluents released from the site shall be limited to:

noble gases	≤ 10 mrad/quarter gamma ≤ 20 mrad/quarter beta ≤ 20 mrad/year gamma ≤ 40 mrad/year beta
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I-131, I-133, H-3, LLP	≤ 15 mrem/quarter to any organ ≤ 30 mrem/year to any organ
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B. Effluent Concentration

1. Fission and activation gases in gaseous releases:

10 CFR 20, Appendix B, Table 2, Column 1

2. Iodine and particulates with half lives greater than 8 days in gaseous releases:

10 CFR 20, Appendix B, Table 2, Column 1

3. Liquid effluents for radionuclides other than dissolved or entrained gases:

10 CFR 20, Appendix B, Table 2, Column 2

4. Liquid effluent dissolved and entrained gases:

2.0E-04 uCi/ml Total Activity

C. Average Energy

Not applicable to Prairie Island regulatory limits.

D. Measurements and approximations of total activity

1. Fission and activation gases in gaseous releases:	Total Nuclide	Gem Gem	±25%
2. Iodines in gaseous releases:	Total Nuclide	Gem Gem	±25%
3. Particulates in gaseous releases:	Total Nuclide	Gem Gem	±25%
4. Liquid effluents	Total Nuclide	Gem Gem	±25%

E. Manual Revisions

1. Offsite Dose Calculations Manual:

Latest Revision number: 27

Revision date : June 27, 2012

Batch Release Summary

Liquid Releases	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year
Number of Releases:	43	37	49	73	202
Total Time for All Releases (Minutes):	3253.0	2982.0	3735.0	6618.0	16588.0
Maximum Time for All Releases (Minutes):	100.0	191.0	91.0	176.0	191.0
Average Time for All Releases (Minutes):	75.7	80.6	76.2	90.7	82.1
Minimum Time for All Releases (Minutes):	65.0	67.0	49.0	66.0	49.0

Gaseous Releases	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year
Number of Releases:	12	26	9	28	75
Total Time for All Releases (Minutes):	16414.0	37440.0	35040.0	35177.0	124071.0
Maximum Time for All Releases (Minutes):	1440.0	1440.0	23520.0	1440.0	23520.0
Average Time for All Releases (Minutes):	1367.8	1440.0	3893.3	1256.3	1654.3
Minimum Time for All Releases (Minutes):	574.0	1440.0	1440.0	194.0	194.0

Abnormal Release Summary

Liquid Releases

Number of Abnormal Releases:	0
Total Activity for Abnormal Releases:	0.00E+00 Curies

Gaseous Releases

Number of Abnormal Releases:	4
Total Activity for Abnormal Releases:	1.34E-01 Curies

Gaseous Effluents-Summation of All Releases

Type of Effluent	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Est. Total Error, %
A. Fission & Activation Gases						
1. Total Release	Curies	3.81E-03	4.67E-02	0.00E+00	1.05E-04	2.50E+01
2. Average Release Rate for Period	µCi/sec	4.85E-04	5.94E-03	0.00E+00	1.32E-05	
3. Percent of Applicable Limit	%	5.77E-05	1.28E-03	0.00E+00	4.10E-07	
B. Iodines						
1. Total Iodine-131	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+01
2. Average Release Rate for Period	µCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3. Percent of Applicable Limit	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
C. Particulates						
1. Total Particulates (Half-lives > 8 days)	Curies	0.00E+00	2.61E-05	1.45E-08	4.74E-07	2.50E+01
2. Average Release Rate for Period	µCi/sec	0.00E+00	3.32E-06	1.83E-09	5.96E-08	
3. Percent of Applicable Limit	%	0.00E+00	6.59E-03	3.93E-08	3.97E-06	
4. Gross Alpha Activity	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+01
D. Tritium						
1. Total Release	Curies	3.00E+00	4.09E+00	1.65E-01	1.08E-01	2.50E+01
2. Average Release Rate for Period	µCi/sec	3.82E-01	5.21E-01	2.08E-02	1.36E-02	
3. Percent of Applicable Limit	%	2.52E-02	3.01E-02	4.08E-03	3.24E-03	
E. Carbon-14						
1. Total Release	Curies	2.26E+00	1.82E+00	2.81E+00	1.80E+00	2.50E+01

Gaseous Effluents - Ground Level Releases

		Continuous Mode				Batch Mode			
Nuclides Released	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
1. Fission and Activation Gases									
Kr-85	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.43E-02	0.00E+00	0.00E+00
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	1.05E-04	3.81E-03	2.37E-03	0.00E+00	0.00E+00
Total for Period	Curies	0.00E+00	0.00E+00	0.00E+00	1.05E-04	3.81E-03	4.67E-02	0.00E+00	0.00E+00
2. Iodines									
Total for Period	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3. Particulates									
Co-58	Curies	0.00E+00	1.28E-07	1.45E-08	4.66E-07	0.00E+00	5.71E-06	0.00E+00	7.51E-09
Cs-137	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-05	0.00E+00	0.00E+00
Total for Period	Curies	0.00E+00	1.28E-07	1.45E-08	4.66E-07	0.00E+00	2.60E-05	0.00E+00	7.51E-09
4. Tritium									
H-3	Curies	2.87E+00	4.09E+00	4.06E-02	1.88E-03	1.36E-01	8.00E-04	1.24E-01	1.06E-01
5. Carbon-14									
C-14	Curies	2.26E+00	1.82E+00	2.81E+00	1.80E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Liquid Effluents - Summation of All Releases

Type of Effluent	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Est. Total Error, %
A. Fission & Activation Products						
1. Total Release (not including Tritium, Gases, and Alpha)	Curies	1.03E-02	1.20E-02	5.47E-03	6.14E-03	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	1.07E-10	1.47E-10	7.22E-11	6.28E-11	
3. Percent of Applicable Limit	%	2.06E-01	2.40E-01	1.09E-01	1.23E-01	
B. Tritium						
1. Total Release	Curies	7.06E+01	8.91E+01	2.04E+02	1.09E+02	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	7.34E-07	1.09E-06	2.69E-06	1.11E-06	
3. Percent of Applicable Limit	%	7.34E-103	1.09E-102	2.69E-102	1.11E-102	
C. Dissolved and Entrained Gases						
1. Total Release	Curies	5.99E-04	2.36E-05	5.59E-04	2.05E-04	2.50E+01
2. Average Diluted Concentration During Period	µCi/ses	6.23E-12	2.90E-13	7.38E-12	2.10E-12	
3. Percent of Applicable Limit	%	3.12E-06	1.45E-07	3.69E-06	1.05E-06	
D. Gross Alpha Radioactivity						
1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+01
E. Waste Volume Released (Pre-Dilution)						
	Liters	2.44E+07	2.19E+07	2.60E+07	3.22E+07	2.50E+01
F. Volume of Dilution Water Used						
	Liters	9.61E+10	8.16E+10	7.58E+10	9.76E+10	2.50E+01

Liquid Effluents

Nuclides Released	Units	Continuous Mode				Batch Mode			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Ag-110m	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-03	7.71E-04	8.21E-05	5.79E-05
Ar-41	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E-06	0.00E+00
Co-57	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E-05	2.55E-05	4.10E-06	1.28E-05
Co-58	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.78E-03	4.87E-03	1.72E-03	3.91E-03
Co-60	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.83E-04	7.68E-04	7.71E-04	2.88E-04
Cr-51	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-04	1.08E-03	2.09E-04	1.25E-03
Cs-137	Curies	0.00E+00	2.86E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.71E-07
Fe-55	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E-03	1.39E-03	1.16E-03	0.00E+00
Fe-59	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.05E-05	1.08E-04	2.78E-05	3.20E-05
H-3	Curies	1.71E-01	5.51E-02	5.99E-01	8.05E-01	7.04E+01	8.91E+01	2.03E+02	1.08E+02
I-132	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-06	0.00E+00
Kr-85	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.55E-04	0.00E+00	0.00E+00	0.00E+00
Mn-54	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.38E-05	7.41E-05	6.68E-05	5.56E-05
Nb-95	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E-05	6.06E-04	3.62E-04	2.31E-04
Nb-97	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-04	8.21E-06	1.69E-05	1.98E-05
Ni-63	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-03	1.66E-03	6.87E-04	0.00E+00
Ru-103	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.63E-06	3.10E-06	0.00E+00	0.00E+00
Sb-124	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-06	2.28E-05	4.95E-06	0.00E+00
Sb-125	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.55E-05	3.88E-05	2.16E-05	2.81E-05
Sn-113	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-05	5.82E-05	4.42E-05	6.51E-06
Sr-92	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.55E-06	2.27E-06
Te-123M	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.23E-05	1.14E-04	9.93E-05	1.00E-04
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.27E-04	2.36E-05	5.13E-04	2.02E-04
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-05	0.00E+00	4.46E-05	3.21E-06
Zn-65	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-05	1.10E-05	5.79E-06
Zr-95	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-05	3.55E-04	1.84E-04	1.38E-04
Zr-97	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.87E-07
Total for Period	Curies	1.71E-01	5.51E-02	5.99E-01	8.05E-01	7.04E+01	8.91E+01	2.03E+02	1.08E+02

Gaseous Effluents

	Parameter	Location	Dose	Dose Limit	% of Limit
Qtr 1	Gamma Air Dose (mrad)	0.58 km W	3.88E-06	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	1.15E-05	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	3.23E-06	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	7.64E-06	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	3.78E-03	1.50E+01	0.03
Child - Liver					
Qtr 2	Gamma Air Dose (mrad)	0.58 km W	4.62E-06	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	2.57E-04	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	4.07E-06	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	1.79E-04	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	2.48E-02	1.50E+01	0.17
Child - Bone					
Qtr 3	Gamma Air Dose (mrad)	0.58 km W	0.00E+00	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	0.00E+00	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	0.00E+00	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	0.00E+00	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	4.64E-02	1.50E+01	0.31
Child - Bone					
Qtr 4	Gamma Air Dose (mrad)	0.58 km W	2.76E-08	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	8.21E-08	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	2.30E-08	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	5.43E-08	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	4.86E-04	1.50E+01	0.00
Child - Lung					
Year	Gamma Air Dose (mrad)	0.58 km W	8.53E-06	2.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	2.68E-04	4.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	7.33E-06	1.00E+01	0.00
	Skin Dose (mrem)	0.58 km W	1.86E-04	3.00E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	7.12E-02	3.00E+01	0.24
Child - Bone					

Liquid Effluents

	Parameter	Max Receptor	Dose	Dose Limit	% of Limit
Qtr 1	Max Organ Dose (mrem)	Adult - Bone	9.29E-04	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	3.15E-04	3.00E+00	0.01
Qtr 2	Max Organ Dose (mrem)	Adult - Bone	2.63E-03	1.00E+01	0.03
	Total Body Dose (mrem)	Adult - Total Body	1.42E-03	3.00E+00	0.05
Qtr 3	Max Organ Dose (mrem)	Adult - Gi-LLi	6.38E-04	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	4.59E-04	3.00E+00	0.02
Qtr 4	Max Organ Dose (mrem)	Adult - Gi-LLi	1.19E-03	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	5.28E-04	3.00E+00	0.02
Year	Max Organ Dose (mrem)	Adult - Gi-LLi	4.16E-03	2.00E+01	0.02
	Total Body Dose (mrem)	Adult - Total Body	2.72E-03	6.00E+00	0.05

ENCLOSURE 3

**LOW LEVEL WASTE DISPOSAL ANNUAL REPORT
SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS**

January 1, 2012 – December 31, 2012

10 pages to follow

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
 NORTHERN STATES POWER

Period: 1/01/12 to 12/31/12
 License No. DPR-42/60

LOW LEVEL WASTE DISPOSAL ANNUAL REPORT
SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS

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

1. Solid Waste Total Volumes, Total Curie Quantities, and Major Nuclides:

Resins, Filters, and Evaporator Bottoms	Volume		Curies Shipped
Waste Class	ft ³	m ³	Curies
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	0.00E+00	0.00E+00	0.00E+00

Major Nuclides for the Above Table:

Dry Active Waste	Volume		Curies Shipped
Waste Class	ft ³	m ³	Curies
A	3.71E+04	1.05E+03	6.10E-01
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	3.71E+04	1.05E+03	6.10E-01

Major Nuclides for the Above Table:

Fe-55, Co-58, Ni-63, Nb-95, Co-60, Zr-95, Ni-59, Cr-51

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
NORTHERN STATES POWER

Period: 1/01/12 to 12/31/12
License No. DPR-42/60

**LOW LEVEL WASTE DISPOSAL ANNUAL REPORT
SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS**

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

Irradiated Components	Volume		Curies Shipped
Waste Class	ft³	m³	Curies
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	0.00E+00	0.00E+00	0.00E+00

Major Nuclides for the Above Table:

Other Waste	Volume		Curies Shipped
Waste Class	ft³	m³	Curies
A	1.28E+03	3.62E+01	2.24E-2
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	1.28E+03	3.62E+01	2.24E-2

Major Nuclides for the Above Table:

Fe-55, Co-58, Ni-63, Nb-95, Co-60, Zr-95, Ni-59, Cr-51

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
NORTHERN STATES POWER

Period: 1/01/12 to 12/31/12
License No. DPR-42/60

**LOW LEVEL WASTE DISPOSAL ANNUAL REPORT
SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS**

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

Sum of All Low Level Waste Shipped from Site	Volume		Curies Shipped
Waste Class	ft ³	m ³	Curies
A	3.84E+04	1.09E+03	6.32E-01
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	3.84E+04	1.09E+03	6.32E-01

Major Nuclides for the Above Table:

Fe-55, Co-58, Ni-63, Nb-95, Co-60, Zr-95, Ni-59, Cr-51

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
NORTHERN STATES POWER


Period: 1/01/12 to 12/31/12
License No. DPR-42/60

**LOW LEVEL WASTE DISPOSAL ANNUAL REPORT
SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS**

**B. PROCESS CONTROL PROGRAM CHANGES
(NOT IRRADIATED FUEL) [continued]**

**2. Process Control for Solidification/Dewatering of Radioactive
Waste from Liquid Systems**

Current Revision Number: 10 Effective Date: 5/24/2010

 NOTE:	If the effective date of the PCP is within the period covered by this report, then a description and justification of the changes to the PCP is required H4 (ODCM) 8.1 m. Attach the sidelined pages to this report.
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Changes/Justification:

None

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Page 1

Report Date : 3/7/2013

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2012 to 12/31/2012

Manifest Number	Date Shipped	Waste Volume Used	Burial volume Used
12-049	12/17/2012		Yes
12-047	12/10/2012		Yes
12-046	12/3/2012		Yes
12-045	11/26/2012		Yes
12-042	11/12/2012		Yes
12-041	11/5/2012		Yes
12-040	10/22/2012		Yes
12-034	9/24/2012		Yes
12-022	5/14/2012		Yes
12-017	4/30/2012		Yes
12-015	4/23/2012		Yes
12-010	4/2/2012		Yes
12-009	3/26/2012		Yes
12-008	3/16/2012		Yes
12-007	3/12/2012		Yes
12-002	1/30/2012		Yes

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Page 1

Report Date : 3/7/2013

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2012 to 12/31/2012 Percent Cutoff: 1

Waste Stream : Resins, Filters, and Evap Bottoms

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%

Waste Stream : Dry Active Waste
DAW-C-NA NORMAL DAW/Equipment

Waste Class	Volume		Curies Shipped	%Error (Ci)
	Ft^3	M^3		
A	3.71E+04	1.05E+03	6.10E-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	3.71E+04	1.05E+03	6.10E-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%

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Page 2

Report Date : 3/7/2013

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2012 to 12/31/2012 Percent Cutoff: 1

Waste Stream : Other Waste
Combined Packages

Waste Class	Volume Ft^3	M^3	Curies Shipped	% Error (Ci)
A	1.28E+03	3.62E+01	2.24E-02	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	1.28E+03	3.62E+01	2.24E-02	+/-25%

Waste Stream : Sum of All 4 Categories
Combined Packages DAW-C-NA NORMAL DAW/Equipment

Waste Class	Volume Ft^3	M^3	Curies Shipped	% Error (Ci)
A	3.84E+04	1.09E+03	6.32E-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	3.84E+04	1.09E+03	6.32E-01	+/-25%

-Combined Waste Type Shipment, Major Volume Waste Type Shown

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Page 1

Report Date : 3/7/2013

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2012 to 12/31/2012 Percent Cutoff: 1

Dry Active Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
Cr-51	1.482%	9.04E-03
Fe-55	36.652%	2.24E-01
Co-58	28.734%	1.75E-01
Co-60	5.369%	3.28E-02
Ni-59	1.267%	7.73E-03
Ni-63	12.252%	7.47E-02
Zr-95	3.357%	2.05E-02
Nb-95	7.795%	4.76E-02
Dry Active Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
Cr-51	1.482%	9.04E-03
Fe-55	36.652%	2.24E-01
Co-58	28.734%	1.75E-01
Co-60	5.369%	3.28E-02
Ni-59	1.267%	7.73E-03
Ni-63	12.252%	7.47E-02
Zr-95	3.357%	2.05E-02
Nb-95	7.795%	4.76E-02
Other Waste		
Waste Class A		
Nuclide Name	Percent Abundance	Curies
Cr-51	1.577%	3.53E-04
Fe-55	44.892%	1.00E-02
Co-58	14.294%	3.20E-03
Co-60	6.274%	1.40E-03
Ni-59	1.589%	3.56E-04
Ni-63	12.609%	2.82E-03
Zr-95	3.720%	8.32E-04
Nb-95	10.674%	2.39E-03
Other Waste		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
Cr-51	1.577%	3.53E-04
Fe-55	44.892%	1.00E-02
Co-58	14.294%	3.20E-03
Co-60	6.274%	1.40E-03
Ni-59	1.589%	3.56E-04
Ni-63	12.609%	2.82E-03
Zr-95	3.720%	8.32E-04
Nb-95	10.674%	2.39E-03
Sum of All 4 Categories		
Waste Class A		

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Report Date : 3/7/2013

Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2012 to 12/31/2012 Percent Cutoff: 1

Nuclide Name	Percent Abundance	Curies
Cr-51	1.485%	9.39E-03
Fe-55	36.943%	2.34E-01
Co-58	28.223%	1.79E-01
Co-60	5.401%	3.42E-02
Ni-59	1.278%	8.09E-03
Ni-63	12.264%	7.76E-02
Zr-95	3.370%	2.13E-02
Nb-95	7.897%	4.99E-02
Sum of All 4 Categories		
Waste Class All		
Nuclide Name	Percent Abundance	Curies
Cr-51	1.485%	9.39E-03
Fe-55	36.943%	2.34E-01
Co-58	28.223%	1.79E-01
Co-60	5.401%	3.42E-02
Ni-59	1.278%	8.09E-03
Ni-63	12.264%	7.76E-02
Zr-95	3.370%	2.13E-02
Nb-95	7.897%	4.99E-02

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Page 1

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Solid Waste Shipped Offsite for Disposal and Estimates of Major Nuclides by Waste Class and Stream
During Period From 01/01/2012 to 12/31/2012

Number of Shipments	Mode of Transportation	Destination
5	Xcel Energy Company Vehicle	IMPACT Services, Inc.
1	Xcel Energy Company Vehicle	Perma-Fix of Florida, Inc.
3	R&R Trucking, Inc.	SPFM, LLC
7	Xcel Energy Company Vehicle	SPFM, LLC