



MAY 05 2016

L-PI-16-037  
TS 5.5.1.c  
TS 5.6.3

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

Prairie Island Nuclear Generating Plant, Units 1 and 2  
Docket Nos. 50-282 and 50-306  
Renewed Operating License Nos. DPR-42 and DPR-60

2015 Annual Radioactive Effluent Report and Offsite Dose Calculation Manual

Pursuant to the applicable Prairie Island Nuclear Generating Plant (PINGP) Technical Specifications (TS), Appendix A to Renewed Operating Licenses DPR-42 and DPR-60, and the requirements of the Offsite Dose Calculation Manual (ODCM), Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), submits the 2015 Annual Radioactive Effluent Report which is comprised of the following:

Enclosure 1 contains the Off-Site Radiation Dose Assessment for the period January 1, 2015, through December 31, 2015, in accordance with ODCM sections 8.1.1c, e, f, g, h, i, j, and k.

Enclosure 2 contains the Annual Radioactive Effluent Report, Supplemental Information, for the period January 1, 2015, through December 31, 2015, in accordance with TS 5.6.3 and ODCM section 8.1.1b.

Enclosure 3 contains the Low Level Waste Disposal Annual Report, Solid Waste and Irradiated Component Shipments, for the period January 1, 2015, through December 31, 2015, in accordance with TS 5.6.3 and ODCM section 8.1.1d.

Enclosure 4 contains the 2015 supporting data for determination of facility-related dose, including direct sources, demonstrating compliance with 40CFR190.10.

On May 4, 2016, PINGP identified a potential issue regarding the operability of the Waste Gas Holdup System Gas (Oxygen) Monitors listed in ODCM Table 3.2. This issue has been entered into the PINGP Corrective Action Program for evaluation. If necessary, upon completion of the evaluation, PINGP will supplement this radioactive effluent report in accordance with ODCM section 8.1.1h.

Summary of Commitments

This letter contains no new commitment and no revision to an existing commitment.



Scott Northard  
Acting 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, 2015 – December 31, 2015

5 pages to follow

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

January 1, 2015 - December 31, 2015

An Assessment of the radiation dose due to releases from Prairie Island Nuclear Generating Plant during 2015 was performed, in accordance with the Offsite Dose Calculation Manual, and 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 2015.

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 Boundary 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 no (0) abnormal releases for 2015.

40CFR190 COMPLIANCE

REMP environmental TLD results for 2015 were reviewed per ANSI/HPS N13.37-2014 methodology for determining any plant effect above ambient gamma radiation measurements. Attachment 4 demonstrates that facility-related dose for quarterly and annual exposure intervals was not detected for all measurement locations. All measurements are considered to be within the range of variations in natural background radiation.

Neutron sky shine dose from the ISFSI was evaluated. The maximum sky shine dose was determined to be 0.71 mrem, to the nearest resident, at 724 meters from the ISFSI. Neutron sky shine dose is greater than the effluent dose to the Critical Receptor, therefore, 40CFR190 compliance was evaluated to the location of the maximum neutron sky shine dose.

The 40CFR190 evaluation location was determined to be direction W, at 0.7 miles.

Dose due to gaseous effluents were calculated to the 40CFR190 evaluation location.

Gamma Direct Radiation Dose:	0.00E+00 MREM
Neutron sky shine Dose:	7.10E-01 MREM
Gamma Air Dose:	2.65E-05 MREM
Beta Air Dose:	9.78E-05 MREM
Iodine, particulate, H-3 and C-14 Dose:	6.26E-03 MREM*

\*Calculated values identical for Whole Body, Thyroid and Maximum "Other" Organs

40CFR190 DOSE EVALUATION:

	40CFR190 LIMIT (MREM)	40CFR190 DOSE (MREM)
WHOLE BODY	25	7.16E-01
THYROID	75	7.16E-01
OTHER ORGANS (TEEN – WHOLE BODY)	25	7.16E-01

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 2015. The minimum sampling frequency requirements, as specified in ODCM Table 2.1 and 3.1 were met for 2015.

## MONITORING INSTRUMENTATION

For 2015, there were no (0) 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.

## DOSES TO INDIVIDUALS DUE TO EFFLUENT RELEASES FROM THE INDEPENDENT SPENT FUEL STORAGE FACILITY (ISFSI):

Two (2) fuel casks were loaded and placed in the storage facility during the 2015 calendar year. The total number of casks in the ISFSI, as of 12/31/15, was forty (40). There was no (0) releases of radioactive effluents from the ISFSI.

## CURRENT OFFSITE DOSE CALCULATIONS MANUAL (ODCM) REVISION:

The Offsite Dose Calculation Manual was not revised in 2015. The latest revision, revision 29, is dated August 22, 2014.

## CRITICAL RECEPTOR

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

Based on the ISFSI neutron sky shine evaluation, a second location was determined for evaluation of 40CFR190 compliance. The location was determined to be at 0.7 miles, in the W direction.

## PROCESS CONTROL PROGRAM

The Process Control Program for Solidification/Dewatering of Radioactive Waste from Liquid Systems (D 59) was not revised in 2015. Current manual revision is 11. The revision date is October 23, 2014. Revision 11 was submitted with the 2014 report.

## SOLID WASTE SHIPMENTS

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

## INDUSTRY INITIATIVE ON GROUND WATER PROTECTION:

There was zero (0) events for inclusion in the Annual Effluent Report, as part of the NEI Ground Water Initiative.

Table 1

## OFF-SITE RADIATION DOSE ASSESSMENT - PRAIRIE ISLAND

PERIOD: JANUARY 2015 through DECEMBER 2015

10 CFR Part 50  
Appendix I Guidelines  
(2-unit site per year)

## Gaseous Releases

Maximum Site Boundary Gamma Air Dose (mrad)	7.89E-05	20
Maximum Site Boundary Beta Air Dose (mrad)	3.13E-04	40
Maximum Off-site Dose to any organ (mrem)* Organ:	7.23E-02 Child - bone	30
Offshore Location Gamma Dose (mrad)	1.58E-06	20
Total Body (mrem)	4.01E-03	30
Organ (mrem)* Organ:	4.01E-03 Teen - Total Body	30

## Liquid Releases

Maximum Off-site Dose Total Body (mrem)	2.66E-03	6
Maximum Off-site Dose Organ (mrem)	2.98E-03 Adult - Gi-LLi	20

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

Table 2

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

January 1, 2015 – December 31, 2015

**Gaseous Releases**

**Maximum Site Boundary  
Dose Location  
(From Building Vents)**

<b>Sector</b>	<b>W</b>
<b>Distance (miles)</b>	<b>0.36</b>

**Offshore Location  
Within Site Boundary**

<b>Sector</b>	<b>ESE</b>
<b>Distance (miles)</b>	<b>0.2</b>
<b>Pathway</b>	<b>Inhalation</b>

**Maximum Off-site**

<b>Sector</b>	<b>NNW</b>
<b>Distance (miles)</b>	<b>0.60</b>
<b>Pathways</b>	<b>Ground, Inhalation Vegetable</b>
<b>Age Group</b>	<b>Child</b>

**Liquid Releases**

**Maximum Off-site Dose  
Location Downstream**

<b>Pathway</b>	<b>Fish</b>
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**ENCLOSURE 2**

**ANNUAL RADIOACTIVE EFFLUENT REPORT  
SUPPLEMENTAL INFORMATION**

**January 1, 2015 – December 31, 2015**

**8 pages to follow**

## ANNUAL RADIOACTIVE EFFLUENT REPORT

01-JAN-15 THROUGH 31-DEC-15

## SUPPLEMENTAL INFORMATION

Facility: Prairie Island Nuclear Generating Plant

Licensee: Northern States Power Company

License Numbers: DPR-42 &amp; 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

for the year	6.0 mrem to the total body
	20.0 mrem to any organ

## 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

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

I-131, I-133, H-3, LLP	≤ 15 mrem/quarter to any organ
	≤ 30 mrem/year to any organ

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: 29  
 Revision date : August 22, 2014

Prairie Island Nuclear Generating Station  
PI 2015 Annual Release Summary

Batch Release Summary

Liquid Releases	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year
Number of Releases:	50	50	30	47	177
Total Time for All Releases (Minutes):	3798.0	4057.0	2401.0	3597.0	13853.0
Maximum Time for All Releases (Minutes):	101.0	116.0	145.0	117.0	145.0
Average Time for All Releases (Minutes):	76.0	81.1	80.0	76.5	78.3
Minimum Time for All Releases (Minutes):	53.0	59.0	55.0	52.0	52.0

Gaseous Releases	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year
Number of Releases:	26	49	4	44	123
Total Time for All Releases (Minutes):	30252.0	53797.0	1805.0	61773.0	147627.0
Maximum Time for All Releases (Minutes):	2662.0	1440.0	855.0	1440.0	2662.0
Average Time for All Releases (Minutes):	1163.5	1097.9	451.3	1403.9	1200.2
Minimum Time for All Releases (Minutes):	120.0	80.0	74.0	485.0	74.0

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

Prairie Island Nuclear Generating Station  
PI 2015 Annual Release Summary

Gaseous Effluents-Summation of All Releases

Type of Effluent	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Est. Total Error, %
<b>A. Fission &amp; Activation Gases</b>						
1. Total Release	Curies	5.69E-03	4.00E-03	5.44E-03	2.20E-01	2.50E+01
2. Average Release Rate for Period	µCi/sec	7.32E-04	5.09E-04	6.84E-04	2.76E-02	
3. Percent of Applicable Limit	%	1.71E-04	1.03E-04	2.54E-04	1.16E-03	
<b>B. Iodines</b>						
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	
<b>C. Particulates</b>						
1. Total Particulates (Half-lives > 8 days)	Curies	0.00E+00	1.98E-08	0.00E+00	2.36E-06	2.50E+01
2. Average Release Rate for Period	µCi/sec	0.00E+00	2.52E-09	0.00E+00	2.97E-07	
3. Percent of Applicable Limit	%	0.00E+00	5.37E-08	0.00E+00	1.70E-04	
4. Gross Alpha Activity	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+01
<b>D. Tritium</b>						
1. Total Release	Curies	3.17E+00	2.85E+00	4.20E+00	6.35E+00	2.50E+01
2. Average Release Rate for Period	µCi/sec	4.07E-01	3.62E-01	5.28E-01	7.99E-01	
3. Percent of Applicable Limit	%	2.33E-02	2.16E-02	3.09E-02	4.92E-02	
<b>E. Carbon-14</b>						
1. Total Release	Curies	2.22E+00	2.01E+00	2.93E+00	1.87E+00	2.50E+01

Prairie Island Nuclear Generating Station  
PI 2015 Annual Release Summary

Gaseous Effluents - Ground Level Releases

Nuclides Released	Units	Continuous Mode				Batch Mode			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
<b>1. Fission and Activation Gases</b>									
Ar-41	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.38E-04	0.00E+00	9.33E-04	0.00E+00
Kr-85	Curies	0.00E+00	0.00E+00	0.00E+00	8.87E-02	2.68E-03	3.27E-03	4.40E-03	0.00E+00
Xe-131m	Curies	0.00E+00	0.00E+00	0.00E+00	5.87E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	1.31E-01	2.48E-03	7.34E-04	1.07E-04	0.00E+00
Xe-133m	Curies	0.00E+00	0.00E+00	0.00E+00	2.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.74E-07	2.91E-07	0.00E+00
<b>Total for Period</b>	<b>Curies</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>2.20E-01</b>	<b>5.69E-03</b>	<b>4.00E-03</b>	<b>5.44E-03</b>	<b>0.00E+00</b>
<b>2. Iodines</b>									
<b>Total for Period</b>	<b>Curies</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<b>3. Particulates</b>									
Co-58	Curies	0.00E+00	1.98E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	Curies	0.00E+00	0.00E+00	0.00E+00	2.36E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>Total for Period</b>	<b>Curies</b>	<b>0.00E+00</b>	<b>1.98E-08</b>	<b>0.00E+00</b>	<b>2.36E-06</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>	<b>0.00E+00</b>
<b>4. Tritium</b>									
H-3	Curies	3.16E+00	2.82E+00	4.19E+00	6.23E+00	1.79E-03	2.87E-02	3.46E-03	1.14E-01
<b>5. Carbon-14</b>									
C-14	Curies	2.22E+00	2.01E+00	2.93E+00	1.87E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Prairie Island Nuclear Generating Station  
PI 2015 Annual Release Summary

Liquid Effluents - Summation of All Releases

Type of Effluent	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Est. Total Error, %
<b>A. Fission &amp; Activation Products</b>						
1. Total Release (not including Tritium, Gases, and Alpha)	Curies	1.80E-03	4.32E-03	1.60E-03	5.71E-03	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	2.18E-11	4.71E-11	1.70E-11	6.31E-11	
3. Percent of Applicable Limit	%	3.60E-02	8.65E-02	3.20E-02	1.14E-01	
<b>B. Tritium</b>						
1. Total Release	Curies	3.64E+02	1.07E+02	7.14E+01	1.08E+02	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	4.41E-06	1.16E-06	7.60E-07	1.20E-06	
3. Percent of Applicable Limit	%	4.41E-01	1.16E-01	7.60E-02	1.20E-01	
<b>C. Dissolved and Entrained Gases</b>						
1. Total Release	Curies	2.23E-04	2.67E-04	1.26E-05	1.10E-04	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	2.70E-12	2.91E-12	1.34E-13	1.22E-12	
3. Percent of Applicable Limit	%	1.35E-06	1.46E-06	6.69E-08	6.09E-07	
<b>D. Gross Alpha Radioactivity</b>						
1. Total Release	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+01
<b>E. Waste Volume Released (Pre-Dilution)</b>						
E. Waste Volume Released (Pre-Dilution)	Liters	3.66E+07	5.94E+07	4.75E+07	4.42E+07	2.50E+01
<b>F. Volume of Dilution Water Used</b>						
F. Volume of Dilution Water Used	Liters	8.26E+10	9.17E+10	9.39E+10	9.04E+10	2.50E+01

Prairie Island Nuclear Generating Station  
PI 2015 Annual Release Summary

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	2.67E-05	1.41E-05	2.57E-05	5.90E-05
Ar-41	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-05	5.48E-06	0.00E+00	0.00E+00
Co-57	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.82E-06	0.00E+00	3.04E-06	7.84E-06
Co-58	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-03	2.11E-03	1.03E-03	3.83E-03
Co-60	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-04	1.38E-04	1.55E-04	2.09E-04
Cr-51	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E-05	1.47E-04	0.00E+00	6.04E-05
Fe-59	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.46E-06	0.00E+00	2.25E-06
H-3	Curies	1.47E-01	0.00E+00	7.88E-02	6.17E-02	3.64E+02	1.07E+02	7.13E+01	1.08E+02
Mn-54	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.48E-06	1.44E-05	0.00E+00	5.90E-06
Nb-95	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-05	7.65E-05	0.00E+00	4.35E-06
Nb-97	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-05	2.48E-05	5.06E-06	1.64E-05
Ni-63	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.72E-04	3.78E-04	1.22E-03
Sb-125	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E-04	9.70E-04	3.58E-06	2.85E-04
Sr-92	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.94E-06	3.52E-06	0.00E+00	1.73E-06
Te-123M	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.62E-05	0.00E+00	0.00E+00	9.09E-06
W-187	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.08E-06
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-04	2.49E-04	1.26E-05	1.02E-04
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.06E-05	1.24E-05	0.00E+00	8.64E-06
Zr-95	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.89E-06	5.13E-05	0.00E+00	3.52E-06
<b>Total for Period</b>	<b>Curies</b>	<b>1.47E-01</b>	<b>0.00E+00</b>	<b>7.88E-02</b>	<b>6.17E-02</b>	<b>3.64E+02</b>	<b>1.07E+02</b>	<b>7.13E+01</b>	<b>1.08E+02</b>



Prairie Island Nuclear Generating Station  
2015 Annual Dose Summary

Gaseous Effluents

	Parameter	Location	Dose	Dose Limit	% of Limit
Qtr 1	Gamma Air Dose (mrad)	0.58 km W	1.71E-05	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	2.76E-05	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	1.59E-05	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	3.55E-05	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	3.49E-03	1.50E+01	0.02
	Child - Liver				
Qtr 2	Gamma Air Dose (mrad)	0.58 km W	9.11E-07	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	2.06E-05	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	7.76E-07	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	1.43E-05	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	2.40E-02	1.50E+01	0.16
	Child - Bone				
Qtr 3	Gamma Air Dose (mrad)	0.58 km W	2.54E-05	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	3.39E-05	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	2.41E-05	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	5.22E-05	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	4.83E-02	1.50E+01	0.32
	Child - Bone				
Qtr 4	Gamma Air Dose (mrad)	0.58 km W	3.56E-05	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	2.31E-04	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	2.97E-05	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	1.58E-04	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	7.41E-03	1.50E+01	0.05
	Child - Liver				
Year	Gamma Air Dose (mrad)	0.58 km W	7.89E-05	2.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	3.13E-04	4.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	7.05E-05	1.00E+01	0.00
	Skin Dose (mrem)	0.58 km W	2.60E-04	3.00E+01	0.00
	Max Organ Dose (mrem)	0.97 km NNW	7.23E-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 - GI-LLi	1.62E-03	1.00E+01	0.02
	Total Body Dose (mrem)	Adult - Total Body	1.56E-03	3.00E+00	0.05
Qtr 2	Max Organ Dose (mrem)	Adult - GI-LLi	6.52E-04	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	5.24E-04	3.00E+00	0.02
Qtr 3	Max Organ Dose (mrem)	Adult - GI-LLi	1.59E-04	1.00E+01	0.00
	Total Body Dose (mrem)	Adult - Total Body	1.42E-04	3.00E+00	0.00
Qtr 4	Max Organ Dose (mrem)	Adult - Bone	6.61E-04	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	4.31E-04	3.00E+00	0.01
Year	Max Organ Dose (mrem)	Adult - GI-LLi	2.98E-03	2.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	2.66E-03	6.00E+00	0.04

**ENCLOSURE 3**

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

**January 1, 2015 – December 31, 2015**

**4 pages to follow**

PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
 NORTHERN STATES POWER

Period: 1/01/15 to 12/31/15  
 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 Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	Curies
A	6.61E+02	1.87E+01	5.08E+00
B	3.70E+02	1.05E+01	1.25E+01
C	3.70E+02	1.05E+01	4.00E+01
ALL	1.40E+03	3.97E+01	5.76E+01

Major Nuclides for the Above Table:

Fe-55, Co-58, Co-60, Ni-63

Dry Active Waste Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	Curies
A	3.58E+04	1.01E+03	3.19E-01
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	3.58E+04	1.01E+03	3.19E-01

Major Nuclides for the Above Table:

Fe-55, Co-58, Co-60, Ni-63, Zr-95, Nb-95, Sb-125

PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
 NORTHERN STATES POWER

Period: 1/01/15 to 12/31/15  
 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 Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	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 Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	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:

PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
NORTHERN STATES POWER

Period: 1/01/15 to 12/31/15  
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 Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	Curies
A	3.65E+04	1.03E+03	5.40E+00
B	3.70E+02	1.05E+01	1.25E+01
C	3.70E+02	1.05E+01	4.00E+01
ALL	3.72E+04	1.05E+03	5.79E+01

Major Nuclides for the Above Table:

Fe-55, Co-58, Co-60, Ni-63

PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
NORTHERN STATES POWER

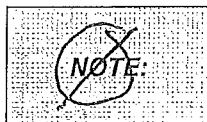
Period: 1/01/15 to 12/31/15  
License No. DPR-42/60

**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: 11 Effective Date: 10/23/2014



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.

**Changes/Justification:**

None

**ENCLOSURE 4**

**2015 Facility-Related Dose**

**1 page to follow**

**2015 Prairie Island Determination of Facility-Related Dose**

Monitoring Location	Quarterly Baseline, B <sub>Q</sub> (mR)	Normalized Quarterly Monitoring Data, M <sub>Q</sub> (mR per standard quarter)				Quarterly Facility Dose * F <sub>Q</sub> = M <sub>Q</sub> - B <sub>Q</sub> (mR)				Annual Baseline, B <sub>A</sub> (mR)	Annual Monitoring Data, M <sub>A</sub> (mR)	Annual Facility Dose **, F <sub>A</sub> = M <sub>A</sub> - B <sub>A</sub> (mR)
		1	2	3	4	1	2	3	4			
1A	13.8	14.5	15.3	13.3	15.7	ND	ND	ND	ND	55.2	58.8	ND
2A	14.9	13.6	16.2	13.4	18.2	ND	ND	ND	ND	59.7	61.4	ND
3A	16.1	13.5	13.7	15.6	14.7	ND	ND	ND	ND	64.4	57.5	ND
4A	16.5	15.2	15.3	15.1	19.6	ND	ND	ND	ND	65.9	65.2	ND
5A	16.5	16.2	17.8	15.4	19.7	ND	ND	ND	ND	65.9	69.1	ND
6A	17.3	13.2	17.3	14.4	20.9	ND	ND	ND	ND	69.3	65.8	ND
7A	17.0	12.3	15.4	13.6	20.5	ND	ND	ND	ND	68.0	61.8	ND
8A	15.8	13.3	16.5	14.2	18.4	ND	ND	ND	ND	63.1	62.4	ND
9A	16.0	13.5	13.7	14.9	14.3	ND	ND	ND	ND	64.0	56.4	ND
10A	15.2	12.6	16.1	13.4	17.1	ND	ND	ND	ND	60.6	59.2	ND
1B	17.3	16.4	18.0	17.0	19.3	ND	ND	ND	ND	69.3	70.7	ND
2B	17.6	16.7	17.1	16.8	20.9	ND	ND	ND	ND	70.4	71.5	ND
3B	17.5	15.8	18.1	19.4	19.7	ND	ND	ND	ND	70.2	73.0	ND
4B	18.4	17.6	17.0	19.9	18.1	ND	ND	ND	ND	73.6	72.6	ND
5B	13.9	13.0	15.5	14.2	16.6	ND	ND	ND	ND	55.8	59.3	ND
6B	14.5	13.6	14.2	15.2	14.6	ND	ND	ND	ND	57.9	57.6	ND
7B	13.9	15.2	13.1	16.2	18.8	ND	ND	ND	ND	55.5	63.3	ND
8B	15.4	16.5	15.0	17.6	15.8	ND	ND	ND	ND	61.4	64.9	ND
9B	15.1	12.4	15.1	14.0	16.2	ND	ND	ND	ND	60.3	57.7	ND
10B	16.7	13.5	16.0	15.7	17.6	ND	ND	ND	ND	66.9	62.8	ND
11B	17.5	12.0	18.4	15.5	20.3	ND	ND	ND	ND	70.1	66.2	ND
12B	17.9	14.1	17.6	17.1	18.3	ND	ND	ND	ND	71.8	67.1	ND
13B	16.5	14.3	16.7	16.7	18.7	ND	ND	ND	ND	65.8	66.4	ND
14B	17.1	15.4	15.4	16.7	16.2	ND	ND	ND	ND	68.3	63.7	ND
15B	17.1	14.4	15.7	16.1	19.3	ND	ND	ND	ND	68.2	65.5	ND
1S	14.2	13.6	12.9	15.0	13.8	ND	ND	ND	ND	56.6	55.3	ND
2S	16.2	14.1	14.1	15.1	14.1	ND	ND	ND	ND	64.7	57.4	ND
3S	17.9	14.4	18.0	15.4	18.0	ND	ND	ND	ND	71.7	65.8	ND
4S	17.4	14.9	15.9	17.3	16.3	ND	ND	ND	ND	69.8	64.4	ND
5S	13.9	14.8	13.7	15.1	12.3	ND	ND	ND	ND	55.4	55.9	ND
6S	14.2	13.2	13.3	15.5	14.7	ND	ND	ND	ND	56.8	56.7	ND
7S	15.0	14.7	12.4	15.5	17.1	ND	ND	ND	ND	59.9	59.7	ND
8S	14.2	13.5	12.6	16.2	19.0	ND	ND	ND	ND	56.7	61.3	ND
Control	16.3	15.6	18.8	16.5	18.8	ND	ND	ND	ND	65.4	69.7	ND

\* ND = Not detected, where  $M_Q \leq (B_Q + MDD_Q)$  and  $MDD_Q = 3 \times 90^{\text{th}}$  percentile location for quarterly data

\*\* ND = Not detected, where  $M_A \leq (B_A + MDD_A)$  and  $MDD_A = 3 \times 90^{\text{th}}$  percentile location for annual data