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May 14, 2018

L-PI-18-021
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

2017 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 2017 Annual Radioactive Effluent Report which is comprised of the following:

Enclosure 1 contains the Off-Site Radiation Dose Assessment for the period January 1, 2017, through December 31, 2017, in accordance with ODCM sections 8.1.1c, d, e, f, g, h, i, j, k, m and n.

Enclosure 2 contains the Annual Radioactive Effluent Report, Supplemental Information, for the period January 1, 2017, through December 31, 2017, in accordance with TS 5.6.3 and ODCM section 8.1.1b.

Summary of Commitments

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

JA Conboy
FOR SCOTT SHARP
THOMAS CONBOY

Scott Sharp
Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosures (2)

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, 2017 – December 31, 2017

8 pages to follow

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

January 1, 2017 - December 31, 2017

An Assessment of the 2017 radiation dose, due to operation of The Prairie Island Nuclear Generating Plant, 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 2017.

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 and beta doses from noble gas releases and the whole body and organ doses from the inhalation pathway due to Iodine 131, Iodine-133, tritium, 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 was one (1) abnormal release in 2017. An Effluent Release Permit was generated.

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122 WG Compressor Moisture Separator Weld Leak

EVENT:

On 9/10/17, a water leak was identified on a 122 Waste Gas Compressor Moisture Separator weld. There was no indication of loss of gas initially.

On 9/16/17, the water leakage increased. 122 Waste Gas Compressor was stopped. An isolation was established to preclude loss of waste gas.

On 9/23/17, a marked decrease in Waste Gas inventory was noted, indicating that the established isolation was insufficient to preclude loss of waste gas. The isolation was expanded and further leakage was arrested.

EVALUATION:

Per H4, Offsite Dose Calculation Manual (ODCM), this release was determined to meet the definition of an abnormal release. Abnormal release permit PIGB2017-223 was created to account for the release.

The total waste gas loss was determined to be 1,445 cubic feet, based on performance of SP-1201F.

The following activities are attributed to the leakage, based on most recent Waste Gas Decay Tank releases and monthly surveillances of the Waste Gas System:

Nuclide	Activity Concentration (uCi/cc)	Activity Total (Ci)
Ar-41	3.89E-07	1.59E-05
Kr-85	1.80E-04	7.37E-03
Xe-133	5.89E-06	2.41E-04
Xe-135	6.37E-07	2.61E-05
H3	1.48E-05	6.06E-04

Noble Gas Air Dose at the Site Boundary:

Gamma Air Dose (mrad): 1.18E-06

Beta Air Dose (mrad): 4.25E-05

(122 WG Compressor Moisture Separator Weld Leak continued)

I-131, I-133, H3 and Long Lived Particulate Dose Maximum Organ Dose at the Critical Receptor Location:

Dose (mrem): 3.15E-06

Event was captured in the site's corrective action program.

The Maximum Organ Dose due to this release was significantly less than 0.01% of the Annual limit of 30 mrem/year and less than 0.01% of the total site gaseous effluent dose for 2017.

As a result of the 122 WG Compressor Moisture Separator weld leak, the Waste Gas System integrity was assessed. A long term negative trend for waste gas system inventory was noted. The leakage was captured and released via the monitored pathway Auxiliary Building Ventilation. The slow leak rate precluded noting any increase on Auxiliary Building Ventilation Monitors.

Low-level radioactive system leakage resulting from minor equipment failures and component aging (wear and tear) may be expected to occur as an anticipated part of the plant operation.

A Waste Gas Release Permit was generated for 2017, based on a volume of system loss provided by engineering and routine Waste Gas System sampling performed during monthly Waste Gas System Surveillance.

Leakage was assessed for 2016. The Maximum Organ Dose due to leakage that occurred in 2016 was significantly less than 0.01% of the Annual limit of 30 mrem/year and less than 0.02% of the total site gaseous effluent dose for 2016. The leakage was captured and released via the monitored pathway Auxiliary Building Ventilation. No revision to 2016 effluent data will be performed.

Site procedures and processes have been revised. Waste Gas System Leakage will be accounted for by routine scheduled performance of system inventory assessment and activity profiling (sampling).

40 CFR 190 COMPLIANCE

REMP environmental TLD results for 2017 were reviewed per ANSI/HPS N13.37-2014 methodology for determining any plant effect above ambient gamma radiation measurements. 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, 40 CFR190 compliance was evaluated to the location of the maximum neutron sky shine dose.

The 40 CFR 190 evaluation location was determined to be 0.7 miles west of the plant.

Dose due to gaseous effluents was calculated to the 40 CFR 190 evaluation location.

	MREM
Gamma Direct Radiation Dose:	0.00E+00
Neutron sky shine Dose:	7.10E-01
Gamma Dose:	3.44E-05
Beta Dose:	1.53E-04
Iodine, particulate, H-3 and C-14 Dose:	1.48E-02*

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

SUMMATION OF 40 CFR 190 DOSE:

	40 CFR 190 LIMIT (MREM)	40 CFR 190 DOSE (MREM)
WHOLE BODY	25	7.25E-01
THYROID	75	7.25E-01
OTHER ORGANS (TEEN – WHOLE BODY)	25	7.25E-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 2017. The minimum sampling frequency requirements, as specified in ODCM Table 2.1 and 3.1 were met for 2017.

MONITORING INSTRUMENTATION:

For 2017, there zero (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 INSTALLATION (ISFSI):

Zero (0) fuel casks were loaded and placed in the ISFSI during the 2017 calendar year. The total number of casks in the ISFSI, as of 12/31/17, was forty (40). There were zero (0) releases of radioactive effluents from the ISFSI.

CURRENT OFFSITE DOSE CALCULATIONS MANUAL (ODCM) REVISION:

The Offsite Dose Calculation Manual was not revised in 2017. The current revision, Revision 31 is dated October 13, 2016. Revision 31 was submitted with the 2016 report.

PROCESS CONTROL PROGRAM:

The Process Control Program for Solidification/Dewatering of Radioactive Waste from Liquid Systems (D 59) was not revised in 2017. Manual revision 11 was the current revision at year end, 12/31/17. The revision date is October 23, 2014. Revision 11 was submitted with the 2014 report.

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.

CRITICAL RECEPTOR

Based on the Annual Land Use Census, the critical receptor did not change. The critical receptor is defined as The Suter Residence, at 0.6 miles, in the SSE sector.

LOW LEVEL WASTE DISPOSAL ANNUAL REPORT
SOLID WASTE AND IRRADIATED COMPONENTS SHIPMENTS
PERIOD: 1/1/17 TO 12/31/17
LICENSE NUMBER: DPR-42/60

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

Resins, Filters and Evaporator Bottoms	Volume		Curies Shipped
Waste Class	FT3	M3	Curies
A	1.57E+03	4.45E+01	2.66E-01
B	5.55E+02	1.57E+01	1.85E+01
C	1.85E+02	5.24E+00	3.92E-01
ALL	2.31E+03	6.55E+01	1.92E+01
Major Nuclides	H-3, C-14, Cr-51, Mn-54, Fe-55, Co-58, Co-60, Ni-59, Ni-63, Sr-90, Zr-95, Nb-94, Nb-95, Tc-99, Ag-110m, Sb-125, I-129, Cs-137, Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cm-242, Cm-243, Cm-244		

Dry Active Waste	Volume		Curies Shipped
Waste Class	FT3	M3	Curies
A	2.05E+04	5.80E+02	3.04E-01
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	2.05E+04	5.80E+02	3.04E-01
Major Nuclides	H-3, C-14, Fe-55, Co-58, Co-60, Ni-59, Ni-63, Sr-90, Zr-95, Nb-95, Tc-99, Ag-110m, Sb-125, I-129, Cs-137, Pu-241, Cm-242		

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			

Other Waste	Volume		Curies Shipped
Waste Class	FT3	M3	Curies
A	5.25E+01	1.49E+00	2.19E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	5.25E+01	1.49E+00	2.19E+00
Major Nuclides	H-3, C-14, Fe-55, Co-60, Ni-63, Sr-90, Tc-99, I-129, Cs-137, Pu-238, Pu-139, Pu-241, Am-241, Cm-242		

Sum of All Low Level Waste Shipped from Site	Volume		Curies Shipped
Waste Class	FT3	M3	Curies
A	2.21E+04	6.26E+02	2.76E+00
B	5.55E+02	1.57E+01	1.85E+01
C	1.85E+02	5.24E+00	3.92E-01
ALL	2.28E+04	6.47E+02	2.17E+01
Major Nuclides	H-3, C-14, Cr-51, Mn-54, Fe-55, Co-58, C0-60, Ni-59, Ni-63, Sr-90, Zr-95, Nb-94, Nb-95, Tc-99, Ag-110m, Sb-125, I-129, Cs-137, Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cm-242, Cm-243, Cm-244		

Table 1

OFF-SITE RADIATION DOSE ASSESSMENT - PRAIRIE ISLAND

PERIOD: JANUARY 2017 through DECEMBER 2017

		10 CFR Part 50 Appendix I Guidelines (2-unit site per year)
Gaseous Releases		
Maximum Site Boundary Gamma Air Dose (mrad)	9.75E-05	20
Maximum Site Boundary Beta Air Dose (mrad)	4.42E-04	40
Maximum Off-site Dose to any Organ (mrem)*	8.28E-02	30
Organ:	Child – bone	
Offshore Location		
Gamma Air Dose (mrad)	1.95E-06	20
Beta Air Dose (mrad)	8.83E-06	40
Total Body (mrem)	9.81E-03	10
Maximum Off-site Dose to any Organ (mrem)*	9.81E-03	30
Organ:	Teen – Total Body	
Liquid Releases		
Maximum Off-site Dose Total Body (mrem)	3.04E-03	6
Maximum Off-site Dose to any Organ (mrem)	3.31E-03	20
Organ	Adult - Gi-LLi	

* Long-Lived Particulate, I-131, I-133, Tritium and C-14

Table 2

OFF-SITE RADIATION DOSE ASSESSMENT – PRAIRIE ISLAND SUPPLEMENTAL INFORMATION

January 1, 2017 – December 31, 2017

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	SSE
Distance (miles)	0.60
Pathways	Ground Inhalation Vegetable
Age Group	Child

Liquid Releases

Maximum Off-site Dose Location Downstream	
Pathway	Fish

ENCLOSURE 2

ANNUAL RADIOACTIVE EFFLUENT REPORT
SUPPLEMENTAL INFORMATION

January 1, 2017 – December 31, 2017

8 pages to follow

ANNUAL RADIOACTIVE EFFLUENT REPORT

01-JAN-17 THROUGH 31-DEC-17

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
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

   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: 31

   Revision date : October 13, 2016

Batch Release Summary

Liquid Releases	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year
Number of Releases:	28	30	30	35	123
Total Time for All Releases (Minutes):	2095.0	2197.0	2609.0	2733.0	9634.0
Maximum Time for All Releases (Minutes):	114.0	90.0	170.0	88.0	170.0
Average Time for All Releases (Minutes):	74.8	73.2	87.0	78.1	78.3
Minimum Time for All Releases (Minutes):	65.0	62.0	65.0	67.0	62.0

Gaseous Releases	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year
Number of Releases:	2	6	2	31	41
Total Time for All Releases (Minutes):	129776.0	133641.0	152640.0	170993.0	587050.0
Maximum Time for All Releases (Minutes):	129600.0	131040.0	132480.0	132480.0	393120.0
Average Time for All Releases (Minutes):	64888.0	22273.5	76320.0	5515.9	15052.6
Minimum Time for All Releases (Minutes):	176.0	313.0	20160.0	14.0	14.0

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:	1
Total Activity for Abnormal Releases:	8.26E-03 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	2.11E-02	2.32E-02	2.92E-02	5.30E-03	2.50E+01
2. Average Release Rate for Period	µCi/sec	2.72E-03	2.95E-03	3.67E-03	6.67E-04	
3. Percent of Applicable Limit	%	5.89E-04	6.81E-04	8.11E-04	3.42E-04	
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	4.15E-10	1.92E-09	0.00E+00	6.66E-08	2.50E+01
2. Average Release Rate for Period	µCi/sec	5.34E-11	2.44E-10	0.00E+00	8.38E-09	
3. Percent of Applicable Limit	%	4.74E-08	2.19E-07	0.00E+00	2.97E-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	1.18E+01	9.93E+00	9.37E+00	9.43E+00	2.50E+01
2. Average Release Rate for Period	µCi/sec	1.52E+00	1.26E+00	1.18E+00	1.19E+00	
3. Percent of Applicable Limit	%	8.24E-02	6.94E-02	6.52E-02	7.07E-02	
E. Carbon-14						
1. Total Release	Curies	2.82E+00	2.73E+00	2.88E+00	2.30E+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									
Ar-41	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-04	1.93E-03	6.08E-05	1.14E-03
Kr-85	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-02	2.05E-02	2.81E-02	7.36E-04
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.64E-04	6.72E-04	9.20E-04	3.39E-03
Xe-133m	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.99E-05
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.19E-05	7.27E-05	9.95E-05	1.60E-05
Total for Period	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.11E-02	2.32E-02	2.92E-02	5.30E-03
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									
Cd-109	Curies	0.00E+00	0.00E+00	0.00E+00	2.58E-08	4.15E-10	1.92E-09	0.00E+00	0.00E+00
Co-58	Curies	0.00E+00	0.00E+00	0.00E+00	4.09E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total for Period	Curies	0.00E+00	0.00E+00	0.00E+00	6.66E-08	4.15E-10	1.92E-09	0.00E+00	0.00E+00
4. Tritium									
H-3	Curies	1.18E+01	9.92E+00	9.37E+00	9.24E+00	3.13E-03	1.11E-02	2.31E-03	1.85E-01
5. Carbon-14									
C-14	Curies	2.82E+00	2.73E+00	2.88E+00	2.30E+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	1.84E-04	1.61E-04	1.40E-02	8.78E-03	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	2.23E-12	1.83E-12	1.35E-10	1.04E-10	
3. Percent of Applicable Limit	%	3.69E-03	3.22E-03	2.81E-01	1.76E-01	
B. Tritium						
1. Total Release	Curies	1.27E+02	2.66E+02	2.28E+02	1.89E+02	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	1.53E-06	3.02E-06	2.18E-06	2.24E-06	
3. Percent of Applicable Limit	%	1.53E-01	3.02E-01	2.18E-01	2.24E-01	
C. Dissolved and Entrained Gases						
1. Total Release	Curies	1.65E-05	7.35E-05	2.52E-04	1.30E-04	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	1.99E-13	8.36E-13	2.42E-12	1.53E-12	
3. Percent of Applicable Limit	%	9.94E-08	4.18E-07	1.21E-06	7.67E-07	
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	4.66E+07	6.76E+07	1.18E+08	4.29E+07	2.50E+01
F. Volume of Dilution Water Used	Liters	8.28E+10	8.78E+10	1.04E+11	8.43E+10	2.50E+01

Liquid Effluents

		Continuous Mode				Batch Mode			
Nuclides Released	Units	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	0.00E+00	1.65E-05	2.34E-05	5.97E-05
Co-57	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E-05
Co-58	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.20E-05	5.68E-05	1.78E-05	7.77E-03
Co-60	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.14E-05	5.40E-05	5.61E-05	2.79E-04
Fe-55	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E-05	0.00E+00	5.54E-03	0.00E+00
H-3	Curies	1.18E-01	2.55E-01	1.25E-01	1.59E-01	1.27E+02	2.65E+02	2.28E+02	1.89E+02
Mn-54	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.17E-07	0.00E+00	0.00E+00	1.32E-06
Nb-97	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.10E-06	1.04E-05	3.84E-06	1.02E-05
Ni-63	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-05	0.00E+00	8.39E-03	5.43E-04
Sb-125	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-05	1.59E-05	9.46E-06	8.40E-05
Sr-92	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.05E-07	8.37E-07	9.70E-07
Te-123M	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-06	6.61E-06	1.06E-06	1.31E-05
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-05	7.19E-05	2.42E-04	1.27E-04
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-06	1.02E-05	2.51E-06
Total for Period	Curies	1.18E-01	2.55E-01	1.25E-01	1.59E-01	1.27E+02	2.65E+02	2.28E+02	1.89E+02

Prairie Island Nuclear Generating Station
2017 Annual Dose Summary

Gaseous Effluents

	Parameter	Location	Dose	Dose Limit	% of Limit
Qtr 1	Gamma Air Dose (mrad)	0.58 km W	4.98E-06	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	1.18E-04	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	4.63E-06	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	8.58E-05	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km SSE	1.24E-02	1.50E+01	0.08
	Child - Kidney				
Qtr 2	Gamma Air Dose (mrad)	0.58 km W	5.38E-05	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	1.36E-04	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	5.10E-05	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	1.54E-04	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km SSE	3.22E-02	1.50E+01	0.21
	Child - Bone				
Qtr 3	Gamma Air Dose (mrad)	0.58 km W	4.51E-06	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	1.62E-04	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	4.16E-06	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	1.15E-04	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km SSE	5.07E-02	1.50E+01	0.34
	Child - Bone				
Qtr 4	Gamma Air Dose (mrad)	0.58 km W	3.42E-05	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	2.54E-05	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	3.21E-05	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	5.25E-05	1.50E+01	0.00
	Max Organ Dose (mrem)	0.97 km SSE	1.06E-02	1.50E+01	0.07
	Child - Kidney				
Year	Gamma Air Dose (mrad)	0.58 km W	9.75E-05	2.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	4.42E-04	4.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	9.19E-05	1.00E+01	0.00
	Skin Dose (mrem)	0.58 km W	4.08E-04	3.00E+01	0.00
	Max Organ Dose (mrem)	0.97 km SSE	8.28E-02	3.00E+01	0.28
	Child - Bone				

Liquid Effluents

	Parameter	Max Receptor	Dose	Dose Limit	% of Limit
Qtr 1	Max Organ Dose (mrem)	Adult - Gi-LLi	3.65E-04	1.00E+01	0.00
	Total Body Dose (mrem)	Adult - Total Body	3.61E-04	3.00E+00	0.01
Qtr 2	Max Organ Dose (mrem)	Adult - Gi-LLi	1.45E-03	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	1.44E-03	3.00E+00	0.05
Qtr 3	Max Organ Dose (mrem)	Adult - Bone	2.29E-03	1.00E+01	0.02
	Total Body Dose (mrem)	Adult - Total Body	5.26E-04	3.00E+00	0.02
Qtr 4	Max Organ Dose (mrem)	Adult - Gi-LLi	1.00E-03	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	7.14E-04	3.00E+00	0.02
Year	Max Organ Dose (mrem)	Adult - Gi-LLi	3.31E-03	2.00E+01	0.02
	Total Body Dose (mrem)	Adult - Total Body	3.04E-03	6.00E+00	0.05