Xcel Energy®

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May 14, 2021

L-PI-21-022
TS 5.6.3

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

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

2020 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 2020 Annual Radioactive Effluent Report which is comprised of the following:

Enclosure 1 contains the Off-Site Radiation Dose Assessment for the period January 1, 2020, through December 31, 2020, in accordance with ODCM section 8.1.1.

Enclosure 2 contains the Annual Radioactive Effluent Report, Supplemental Information, for the period January 1, 2020, through December 31, 2020, in accordance with TS 5.6.3 and ODCM section 8.1.1.

Summary of Commitments

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

Christopher P. Domingos
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosures (2)

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
Department of Health, State of Minnesota
PI Dakota Community Environmental Coordinator

ENCLOSURE 1

OFF-SITE RADIATION DOSE ASSESSMENT
January 1, 2020 - December 31, 2020

6 pages to follow

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

January 1, 2020 - December 31, 2020

An Assessment of the 2020 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 2020.

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 maximum organ doses from the inhalation pathway due to Iodine 131, Iodine-133, tritium, long-lived particulates and Carbon-14 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.

40 CFR 190 COMPLIANCE:

REMP environmental TLD results for 2020 were reviewed per ANSI/HPS N13.37-2014 methodology for determining any plant effect above ambient gamma radiation measurements. All measurements are within the range of variations in natural background radiation.

Neutron sky shine dose from the ISFSI was evaluated. The maximum neutron sky shine dose was determined to be 0.84 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:	8.49E-01
Noble Gas Gamma Dose:	1.46E-05
Noble Gas Beta Dose:	2.15E-05
Iodine, particulate, H-3 and C-14 Dose:	3.69E-03*

*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**	**8.44E-01**
THYROID	**75**	**8.44E-01**
OTHER ORGANS (TEEN - WHOLE BODY)	**25**	**8.44E-01**

ABNORMAL RELEASES:

There were zero (0) abnormal releases in 2020.

SAMPLING, ANALYSIS AND LLD REQUIREMENTS:

The lower limit of detection (LLD) requirements, as specified in ODCM Tables 2.1 and 3.1, were met for 2020. The minimum sampling frequency requirements, as specified in ODCM Tables 2.1 and 3.1, were met for 2020.

MONITORING INSTRUMENTATION:

For 2020, there were 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):

Three (3) fuel casks were loaded and placed in the ISFSI during the 2020 calendar year. The total number of casks in the ISFSI, as of 12/31/20, was forty-seven (47). 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 2020. Revision 32 is the current revision. Revision 32 is dated May 25, 2018.

PROCESS CONTROL PROGRAM:

D59, The Process Control Program for Solidification/Dewatering of Radioactive Waste from Liquid Systems, was not revised in 2020. Revision 12 is the current revision. Revision 12 is dated January 26, 2018.

INDUSTRY INITIATIVE ON GROUND WATER PROTECTION:

For 2020, 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: 1/1/20 TO 12/31/20 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	2.28E+02	6.46E+00	6.61E+00
B	2.32E+02	6.57E+00	7.84E+01
C	4.00E+01	1.13E+00	1.25E+01
ALL	5.00E+02	1.42E+01	9.75E+01
Major Nuclides	H-3, C-14, 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, Ce-144, 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	9.06E+03	2.56E+02	1.84E+00
B	0.00E+00	0.00E+00	0.00E+00
C	5.00E+00	1.42E-01	1.38E+00
ALL	9.06E+03	2.57E+02	3.22E+00
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, Sn-113, Sb-125, I-129, Cs-137, Ce-144, Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cm-242, Cm-243, Cm-244		

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	4.72E+00	1.34E-01	7.66E-02
ALL	4.72E+00	1.34E-01	7.66E-02
Major Nuclides	H3, C-14, Fe-55, Co-60, Ni-59, Ni-63, Sr-90, Nb-94, Tc-99, I-129, Cs-137, Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cm-242, Cm-244		

Other Waste	Volume		Curies Shipped
Waste Class	ft3	m3	Curies
A	3.84E+03	1.09E+02	1.35E-01
B	7.50E+00	2.12E-01	1.72E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	3.85E+03	1.09E+02	1.86E+00
Major Nuclides	H3, C-14, Mn-54, Fe-55, Co-58, Co-60, Ni-63, Sr-90, Zr-95, Nb-94, Nb-95, Tc-99, Sn-113, Sb-125, I-129, Cs-137, Ce-144, Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cn-243, Cm-244		

Sum of All Low Level Waste Shipped from Site	Volume		Curies Shipped
Waste Class	ft3	m3	Curies
A	1.31E+04	3.72E+02	8.58E+00
B	2.40E+02	6.78E+00	8.01E+01
C	4.97E+01	1.41E+00	1.40E+01
ALL	1.34E+04	3.80E+02	1.03E+02
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, Sn-113, Sb-125, I-129, Cs-137, Ce-144, Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cm-242, Cm-243, Cm-244		

Total curie quantity and principal radionuclides identification are calculated estimates determined for packaged waste using gross gamma radiation measurements, direct sample data or swipe data within WMG's Radman Suite Software. Characterization of radioactive waste is performed in accordance with 10 CFR 20, 10 CFR 61, and NRC's Branch Technical Positions.

Table 1

OFF-SITE RADIATION DOSE ASSESSMENT

JANUARY 2020 THROUGH DECEMBER 2020

	DOSE	LIMIT*
Gaseous Releases		
Maximum Site Boundary Gamma Air Dose (mrad)	4.15E-05	20
Maximum Site Boundary Beta Air Dose (mrad)	1.56E-05	40
Maximum Off-site Dose to any Organ (mrem)**	5.96E-02	30
Organ	Child – bone	
Offshore Location		
Maximum Site Boundary Gamma Air Dose (mrad)	8.30E-07	20
Maximum Site Boundary Beta Air Dose (mrad)	3.13E-07	40
Maximum Off-site Dose to any Organ (mrem)**	4.14E-04	30
Organ	Teen – Total Body	
Liquid Releases		
Maximum Off-site Dose Total Body (mrem)	3.97E-03	6
Maximum Off-site Dose to any Organ (mrem)	4.11E-03	20
Organ	Adult – Gi-LLi	

*10 CFR part 50, Appendix I Guidelines (2-unit site per year)

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

Table 2

OFF-SITE RADIATION DOSE ASSESSMENT- PRAIRIE ISLAND SUPPLEMENTAL INFORMATION

January 1, 2020 - December 31, 2020

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
Critical Receptor Location	
Sector	SSE
Distance (miles)	0.60
Pathways	Ground Inhalation Vegetable
Age Group	Child

Liquid Releases

Maximum Off-site Dose Location	
Sector	SSE
Distance (miles)	0.43
Pathway	Fish

ENCLOSURE 2

ANNUAL RADIOACTIVE EFFLUENT REPORT
SUPPLEMENTAL INFORMATION

January 1, 2020 - December 31, 2020

8 pages to follow

ANNUAL RADIOACTIVE EFFLUENT REPORT

SUPPLEMENTAL INFORMATION

01-JAN-20 THROUGH 31-DEC-20

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, C-14	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, C-14	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:

   Offsite Dose Calculation Manual

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	HPGe	±25%
2. Iodines in gaseous releases:	Total Nuclide	HPGe	±25%
3. Particulates in gaseous releases:	Total Nuclide	HPGe	±25%
4. Liquid effluents	Total Nuclide	HPGe	±25%

E. Manual Revisions

1. Offsite Dose Calculations Manual:

   Latest Revision number: 32

   Revision date May 25, 2018

Prairie Island Nuclear Generating Station
PI 2020 Annual Release Summary

Batch Release Summary

Liquid Releases	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year
Number of Releases:	30	38	54	53	175
Total Time for All Releases (Minutes):	2345.0	3054.0	4426.3	4178.0	14003.3
Maximum Time for All Releases (Minutes):	129.0	166.0	128.0	111.0	166.0
Average Time for All Releases (Minutes):	78.2	80.4	82.0	78.8	80.0
Minimum Time for All Releases (Minutes):	55.0	63.0	55.0	61.0	55.0

Gaseous Releases	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year
Number of Releases:	1	3	12	20	36
Total Time for All Releases (Minutes):	131040.0	131468.0	6878.0	154163.0	423549.0
Maximum Time for All Releases (Minutes):	131040.0	131040.0	1135.0	132480.0	132480.0
Average Time for All Releases (Minutes):	131040.0	43822.7	573.2	7708.2	11765.3
Minimum Time for All Releases (Minutes):	131040.0	60.0	321.0	723.0	60.0

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 2020 Annual Release Summary

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	4.30E-04	3.19E-03	4.16E-03	3.05E-04	2.50E+01
2. Average Release Rate for Period	µCi/sec	5.47E-05	4.06E-04	5.24E-04	3.84E-05	
3. Percent of Applicable Limit	%	1.53E-06	1.54E-04	2.58E-04	1.79E-06	
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	3.23E-09	6.87E-10	0.00E+0	2.50E+01
2. Average Release Rate for Period	µCi/sec	0.00E+00	4.10E-10	8.64E-11	0.00E+00	
3. Percent of Applicable Limit	%	0.00E+00	3.51E-07	7.48E-08	0.00E+00	
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	6.23E+00	5.85E+00	7.61E+00	7.82E+00	2.50E+01
2. Average Release Rate for Period	µCi/sec	7.93E-01	7.44E-01	9.57E-01	9.83E-01	
3. Percent of Applicable Limit	%	1.14E-02	1.08E-02	1.50E-02	1.44E-02	
E. Carbon-14						
1. Total Release	Curies	2.89E+00	2.56E+00	2.51E+00	2.62E+00	2.50E+01

Prairie Island Nuclear Generating Station

PI 2020 Annual Release Summary

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	0.00E+00	2.41E-03	4.16E-03	1.72E-05
Kr-85M	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.05E-06	0.00E+00	0.00E+00
Kr-87	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-06	0.00E+00	0.00E+00
Kr-88	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-05	0.00E+00	0.00E+00
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.19E-04	5.87E-04	0.00E+00	2.83E-04
Xe-133m	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.85E-06	9.84E-06	0.00E+00	0.00E+00
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.15E-06	1.55E-04	0.00E+00	4.53E-06
Total for Period	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.30E-04	3.19E-03	4.16E-03	3.05E-04
2. Iodines									
I-131	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
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	0.00E+00	0.00E+00	3.23E-09	6.87E-10	0.00E+00
Total for Period	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-09	6.87E-10	0.00E+00
4. Tritium									
H-3	Curies	6.23E+00	5.84E+00	7.46E+00	7.81E+00	8.20E-04	6.59E-03	1.51E-01	7.90E-03
5. Carbon-14									
C-14	Curies	2.89E+00	2.56E+00	2.51E+00	2.62E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Prairie Island Nuclear Generating Station

PI 2020 Annual Release Summary

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	6.77E-03	9.89E-03	5.65E-03	6.83E-04	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	9.56E-11	1.43E-10	6.19E-11	8.67E-12	
3. Percent of Applicable Limit	%	1.35E-01	1.98E-01	1.13E-01	1.37E-02	
B. Tritium						
1. Total Release	Curies	3.44E+02	3.25E+02	2.18E+02	1.80E+02	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	4.86E-06	4.68E-06	2.38E-06	2.29E-06	
3. Percent of Applicable Limit	%	4.86E-01	4.68E-01	2.38E-01	2.29E-01	
C. Dissolved and Entrained Gases						
1. Total Release	Curies	1.36E-04	3.19E-04	5.30E-04	5.36E-05	2.50E+01
2. Average Diluted Concentration During Period	µCi/ml	1.92E-12	4.60E-12	5.80E-12	6.80E-13	
3. Percent of Applicable Limit	%	9.60E-07	2.30E-06	2.90E-06	3.40E-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	2.23E+07	2.14E+07	3.69E+07	3.52E+07	2.50E+01
F. Volume of Dilution Water Used	Liters	7.08E+10	6.93E+10	9.13E+10	7.87E+10	2.50E+01

Prairie Island Nuclear Generating Station
PI 2020 Annual Release Summary

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	2.58E-04	6.89E-05	4.57E-04	4.12E-06
Ar-41	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.11E-07	0.00E+00	0.00E+00	1.86E-06
Co-58	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.22E-04	2.29E-04	8.77E-05	8.19E-05
Co-60	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.52E-04	5.88E-05	7.95E-04	4.41E-05
Cr-51	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.71E-05	2.37E-05	1.24E-05	3.65E-05
Fe-55	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.89E-03	3.06E-03	2.75E-03	2.85E-04
Fe-59	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-05	0.00E+00	0.00E+00	0.00E+00
H-3	Curies	7.13E-02	5.66E-02	3.64E-02	6.98E-02	3.44E+02	3.25E+02	2.18E+02	1.80E+02
Mn-54	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.58E-06	0.00E+00	4.15E-05	5.99E-07
Nb-95	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E-05	0.00E+00	0.00E+00	4.37E-06
Nb-97	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.91E-07	3.94E-06	2.27E-06	4.60E-06
Sb-124	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-05	1.27E-05	8.07E-07	0.00E+00
Sb-125	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.51E-03	6.43E-03	1.51E-03	1.56E-04
Sc-46	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-06	0.00E+00	0.00E+00	0.00E+00
Sn-113	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.79E-06	0.00E+00	0.00E+00	8.63E-07
Sr-92	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.50E-07	0.00E+00
Te-123M	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.85E-06	0.00E+00	0.00E+00	6.26E-05
Xe-133	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E-04	3.02E-04	5.13E-04	5.06E-05
Xe-135	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.48E-06	1.71E-05	1.70E-05	1.09E-06
Zr-95	Curies	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-05	0.00E+00	0.00E+00	2.50E-06
Total for Period	Curies	7.13E-02	5.66E-02	3.64E-02	6.98E-02	3.44E+02	3.25E+02	2.18E+02	1.80E+02

Prairie Island Nuclear Generating Station
2020 Annual Dose Summary

Gaseous Effluents

	Parameter	Location	Dose	Dose Limit	% of Limit
Qtr 1	Gamma Air Dose (mrad)	0.58 km W	1.05E-07	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	3.06E-07	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	8.81E-08	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	2.11E-07	1.50E+01	0.00
	Max Organ Dose (mrem) Child - Liver	0.97 km SSE	1.71E-03	1.50E+01	0.01
Qtr 2	Gamma Air Dose (mrad)	0.58 km W	1.54E-05	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	6.00E-06	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	1.47E-05	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	2.17E-05	1.50E+01	0.00
	Max Organ Dose (mrem) Child - Bone	0.97 km SSE	2.54E-02	1.50E+01	0.17
Qtr 3	Gamma Air Dose (mrad)	0.58 km W	2.58E-05	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	9.09E-06	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	2.45E-05	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	3.58E-05	1.50E+01	0.00
	Max Organ Dose (mrem) Child - Bone	0.97 km SSE	3.42E-02	1.50E+01	0.23
Qtr 4	Gamma Air Dose (mrad)	0.58 km W	1.79E-07	1.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	2.43E-07	2.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	1.62E-07	5.00E+00	0.00
	Skin Dose (mrem)	0.58 km W	2.91E-07	1.50E+01	0.00
	Max Organ Dose (mrem) Child - Liver	0.97 km SSE	2.16E-03	1.50E+01	0.01
Year	Gamma Air Dose (mrad)	0.58 km W	4.15E-05	2.00E+01	0.00
	Beta Air Dose (mrad)	0.58 km W	1.56E-05	4.00E+01	0.00
	Total Body Dose (mrem)	0.58 km W	3.94E-05	1.00E+01	0.00
	Skin Dose (mrem)	0.58 km W	5.80E-05	3.00E+01	0.00
	Max Organ Dose (mrem) Child - Bone	0.97 km SSE	5.96E-02	3.00E+01	0.20

Liquid Effluents

	Parameter	Max Receptor	Dose	Dose Limit	% of Limit
Qtr 1	Max Organ Dose (mrem)	Adult - Gi-LLi	1.04E-03	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	9.92E-04	3.00E+00	0.03
Qtr 2	Max Organ Dose (mrem)	Adult - Lung	1.92E-03	1.00E+01	0.02
	Total Body Dose (mrem)	Adult - Total Body	1.82E-03	3.00E+00	0.06
Qtr 3	Max Organ Dose (mrem)	Adult - Gi-LLi	6.55E-04	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	6.03E-04	3.00E+00	0.02
Qtr 4	Max Organ Dose (mrem)	Adult - Gi-LLi	5.57E-04	1.00E+01	0.01
	Total Body Dose (mrem)	Adult - Total Body	5.53E-04	3.00E+00	0.02
Year	Max Organ Dose (mrem)	Adult - Gi-LLi	4.11E-03	2.00E+01	0.02
	Total Body Dose (mrem)	Adult - Total Body	3.97E-03	6.00E+00	0.07