

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
January 1, 1979 THROUGH June 30, 1979

Supplemental Information

Facility - Prairie Island Nuclear Generating Plant

Licensee - Northern States Power Company License Nos. - DPR-42 DPR-60

1. Regulatory Limits

Action is required if the rate of release of radioactive materials, when averaged over a three-month period, is such that these quantities, if continued at the same release rate for a year, would exceed twice the design objectives. Design objectives are:

- a. Fission and activation gases (and all other radioactive isotopes except halogen and particulate isotopes with half-lives greater than 8 days) in gaseous releases:

$$\sum_1 \frac{Q_1}{MPC_1} \leq 1300 \text{ m}^3/\text{sec}$$

- b. Iodines and particulates with half-lives greater than 8 days in gaseous releases:

$$\sum_1 \frac{Q_1}{MPC_1} \leq 67 \text{ m}^3/\text{sec}$$

- c. Liquid Effluents:

1. Annual total quantity of radioactive materials in liquid waste, excluding tritium and dissolved gases, of 5 Ci per unit.
2. Annual average concentration of radioactive materials in liquid waste, prior to dilution in the Mississippi River, excluding tritium and dissolved gases, of 2×10^{-8} uCi/ml.
3. Annual average concentration of tritium in liquid waste, prior to dilution in the Mississippi River, of 5×10^{-6} uCi/ml.

2. Maximum Permissible Concentrations

- a. Fission and activation gases (and all other radioactive isotopes except halogen and particulate isotopes with half-lives greater than 8 days) in gaseous releases:

10CFR20, Appendix B, Table 2, Column 1

2. Maximum Permissible Concentrations

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

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

- c. Liquid Effluents:

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

3. Average Energy

Not applicable to Prairie Island Regulatory Limits.

4. Measurements and Approximations of Total Radioactivity

a.	Fission and activation gases in gaseous releases:	Total Nuclide	Gel1 Gel1
b.	Iodines in gaseous releases	Total Nuclide	Gel1 Gel1
c.	Particulates in gaseous releases:	Total Nuclide	Gel1 Gel1
d.	Liquid Effluents:	Total Nuclide	Gross Beta Gamma Gel1

BATCH RELEASES

- a. Liquid
Number of Batch Releases
Total Time Period for a Batch Release (hr)
Maximum Time for a Batch Release (hr)
Average Time for a Batch Release (hr)
Minimum Time for a Batch Release (hr)
Ave Mississippi flow during Quarter (CFS)

QTR 1	QTR 2
3.3E01	7.0E01
4.66E01	1.12E02
2.50E00	3.47E00
1.41E00	1.60E00
7.50E-01	1.00E00
9.33E03	5.27E04

- b. Gaseous
Number of Batch Releases
Total Time Period for Batch Releases (hr)
Maximum Time for a Batch Release (hr)
Average Time for a Batch Release (hr)
Minimum Time for a Batch Release (hr)

QTR 1	QTR 2
0	3.00E00
0	6.72E01
0	3.12E01
0	2.24E01
0	1.33E01

ABNORMAL RELEASES

a. Liquid
Number of Releases
Total Activity Released (Ci)
Total Tritium Released (Ci)

QTR	1	QTR	2
	0		0
	0		0
	0		0

b. Gaseous
Number of Releases
Total Activity Releases (Ci)

QTR	1	QTR	2
	0		1.0E00
	0		3.93E00

TABLE 1A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

UNIT	QTR 1	QTR 2	EST TOTAL ERROR %
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A. Fission and Activation Gases

Total Release	Ci	5.14E01	4.14E02	+ 50%
Average Release Rate	µCi/sec	6.54E00	5.27E01	

B. Short Lived Particulates ($t_{1/2} < 8$ days)

Total Release	Ci	-	3.47E-05	+ 50%
Average Release Rate	µCi/sec	-	4.42E-06	

C. Tritium

Total Release	Ci	2.53E01	6.54E01	+ 50%
Average Release Rate	µCi/sec	3.22E00	8.41E00	

Total A & B & C	µCi/sec	9.76E00	6.10E01	
% of Design Objective	%	3.89E00	2.43E01	

D. Iodines

Total I131	Ci	6.30E-05	3.27E-03	+ 50%
Average Release Rate	µCi/sec	8.02E-06	4.20E-04	

E. Long Lived Particulates ($t_{1/2} > 8$ days)

Total Release	Ci	2.91E-06	1.32E-05	+ 50%
Average Release Rate	µCi/sec	3.70E-07	1.68E-06	

Total D & E	µCi/sec	8.39E-06	4.22E-04	
% of Design Objective	%	1.18E-01	6.27E00	

F. Gross Alpha

Total Release	Ci	8.50E-09	1.19E-08	+ 100%
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Note:

"-" indicates that releases were below lower limit of detection (LLD) values.
Maximum allowed values of LLD are given in the Technical Specifications.

TABLE 1B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
GASEOUS EFFLUENTS

CONTINUOUS MODE

BATCH MODE

NUCLIDE	UNIT	QTR <u>1</u>	QTR <u>2</u>	QTR <u>1</u>	QTR <u>2</u>
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1. Fission and Activation Gases

Kr85	Ci	-	-	0	-
Kr85m	Ci	7.41E-01	-	0	-
Kr87	Ci	1.96E00	-	0	-
Kr88	Ci	-	-	0	-
Xel133	Ci	4.07E01	3.86E02	0	2.07E01
Xel135	Ci	5.62E00	6.68E00	0	2.15E-01
Xel135m	Ci	-	-	0	-
Xel138	Ci	-	-	0	-
Xel131m	Ci	-	-	0	-
Ar41	Ci	2.41E00	-	0	2.01E-01
Xel133m	Ci	-	5.06E-01	0	7.03E-02
Total	Ci	5.14E01	3.93E02	0	2.12E01

2. Iodines

I131	Ci	6.30E-05	3.27E-03	0	-
I133	Ci	-	1.43E-04	0	-
I135	Ci	-	-	0	-
Total	Ci	6.30E-05	3.41E-03	0	-

CONTINUOUS MODE

BATCH MODE

NUCLIDE	UNIT	QTR <u>1</u>	QTR <u>2</u>	QTR <u>1</u>	QTR <u>2</u>
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3. Particulates

Sr89	Ci	-	-	0	-
Sr90	Ci	-	-	0	-
Cs134	Ci	-	-	0	-
Cs137	Ci	-	-	0	-
Ba-Lf 140	Ci	-	-	0	-
Co58	Ci	2.06E-06	1.52E-06	0	-
Co60	Ci	8.42E-07	-	0	-
Cd109	Ci	-	-	0	-
Sb124	Ci	-	-	0	-
Na24	Ci	-	-	0	-
Co57	Ci	-	-	0	-
Ce144	Ci	-	1.06E-05	0	-
Zr-Nb95	Ci	-	-	0	-
Rb88	Ci	-	-	0	-

TABLE 1B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
GASEOUS EFFLUENTS

3. Particulates

Sr85	C1	-	-	0	-
Mn54	C1	-	-	0	-
Cs138	C1	-	-	0	-
Y88	C1	-	-	0	8.70E-07
Ce139	C1	-	2.12E-07	0	-

TABLE 2A
EFFLUENT AND WASTE DISPOAL SEMIANNUAL REPORT
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

UNIT	QTR <u>1</u>	QTR <u>2</u>	TOTAL ERROR %
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A. Fission and Activation Products

Total Release W/O H-3, Rad Gas, Alpha	Ci	1.32E-04	7.74E-04	+ 50%
Average Diluted Concentration	µCi/ml	9.71E-13	6.97E-13	
% of T. S. Annual Curie Design Objective	%	1.328-03	7.74E-03	

B. Tritium

Total Release	Ci	6.78E01	2.42E02	± 25%
Average Diluted Concentration	µCi/ml	4.99E-07	2.18E-07	
% of T. S. Annual Design Objective Conc	%	9.98E00	4.36E00	

C. Dissolved and Entrained Gases

Total Release	Ci	1.53E-02	9.81E-02	+50%
Average Diluted Concentration	µCi/ml	1.13E-10	8.84E-11	

D. Gross Alpha

Total Release	Ci	-	3.60E-08	+50%
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E. Volume of Waste (Prior to Dilution)	liters	4.03E07	4.31E07	+25%
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F. Volume of Dilution Water	liters	1.36E11	1.11E12	+50%
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TABLE 2A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

Continuous Mode				Batch Mode	
NUCLIDE	UNIT	QTR <u>1</u>	QTR <u>2</u>	QTR <u>1</u>	QTR <u>2</u>
Sr89	Ci	-	-	-	-
Sr90	Ci	-	-	-	-
Cs134	Ci	-	-	3.80E-06	-
Cs137	Ci	-	-	5.60E-06	-
Il131	Ci	-	-	-	6.05E-04
Co58	Ci	-	-	5.79E-05	2.84E-05
Co60	Ci	-	2.62E-05	1.56E-05	1.59E-05
Fe59	Ci	-	-	-	-
Zn65	Ci	-	-	-	-
Mn54	Ci	-	-	-	-
Cr51	Ci	-	-	-	-
Zr-Nb95	Ci	-	-	-	-
Mo99	Ci	-	-	-	-
Ba-1a140	Ci	-	-	-	-
Ag110m	Ci	-	-	-	-
Na24	Ci	-	-	-	-
W187	Ci	-	-	-	-
Sb124	Ci	-	-	1.63E-06	-
Sr85	Ci	-	-	-	-
Cs136	Ci	-	-	-	-
Zr-Nb97	Ci	-	-	-	-
Cd109	Ci	-	-	-	-
Rb88	Ci	-	-	-	-
Co57	Ci	-	-	-	5.20E-06
Total	Ci	-	2.62E-05	8.45E-05	6.55E-04

Continuous Mode				Batch Mode	
NUCLIDE	UNIT	QTR <u>1</u>	QTR <u>2</u>	QTR <u>1</u>	QTR <u>2</u>
Xe133	Ci	-	-	1.52E-02	9.75E-02
Xe133m	Ci	-	-	5.32E-05	2.95E-04
Xe131m	Ci	-	-	-	-
Xe135	Ci	-	-	7.09E-05	2.57E-04
Kr85m	Ci	-	-	-	-
Kr85	Ci	-	-	-	-
Kr88	Ci	-	-	-	-

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

Jan. 1, 1979 through June 30, 1979

Solid Waste and Irradiated Fuel Shipments

A. Solid waste shipped offsite for burial or disposal (not irradiated fuel)

1. Type of Waste	Unit	6 Month Period	Est. Total Error %
a. Spent Resins	ft ³ C1	80 19.8	+ 25%
b. Dry compressible waste, contaminated equipment, evaporator, bottoms, etc.	ft ³ C1	558.6 1.2	+ 25%
c. Irradiated components, control rods, etc.	ft ³ C1	NONE	
d. Other (describe)	ft ³ C1	NONE	

2. Estimate of major nuclide composition (by type of waste).

a.	CO-60	%	41.9
	CO-58	%	20.4
	CS-137	%	23.5
	CS-134	%	9.4
		%	
b.	CS-137	%	35.4
	CS-134	%	24.2
	Sb-124	%	23.4
	CO-60	%	8.7
		%	
c.	NONE	%	
		%	
d.	NONE	%	
		%	

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
1	Truck	Barnwell S.C.
1	Truck	Richland Wash.

B. Irradiated Fuel Shipments (disposition)