EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT
Jan 1, 1981 THROUGH June 30, 1981

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:

$$\sum_i \frac{Qi}{MPC_i} \leq 1300 \text{ m}^3/\text{sec}$$

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

$$\sum_i \frac{Qi}{MPC_i} \leq 67 \text{ m}^3/\text{sec}$$

c. Liquid Effluents:

1. Annual total quantity of radioactive material in liquid waste, excluding tritium and dissolved gases, of 5 Ci per unit.

2. Annual average concentration of radioactive material in liquid waste, prior to dilution in the Mississippi River, excluding tritium and dissolved gases, of 2×10^{-8} μCi/ml.

3. Annual average concentration of tritium in liquid waste, prior to dilution in the Mississippi River, of 5×10^{-6} μCi/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:

10 CFR 20, 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	Geli Geli
b.	Iodines in gaseous releases	Total Nuclide	Geli Geli
c.	Particulates in gaseous releases:	Total Nuclide	Geli Geli
d.	Liquid Effluents:	Total Nuclide	Gross Beta Gamma Geli

BATCH RELEASES

a. Liquid

	QTR 1	QTR 2
Number of Batch Releases	50	33
Total Time Period for a Batch Release (hr)	71.1	49.8
Maximum Time for a Batch Release (hr)	1.87	1.87
Average Time for a Batch Release (hr)	1.42	1.51
Minimum Time for a Batch Release (hr)	1.05	1.1
Ave Mississippi flow during Quarter (CFS)	7.19 E 03	2.05 E 04

b. Gaseous

	QTR 1	QTR 2
Number of Batch Releases	1	0
Total Time Period for Batch Releases (hr)	17.3	0
Maximum Time for a Batch Release (hr)	17.3	0
Average Time for a Batch Release (hr)	17.3	0
Minimum Time for a Batch Release (hr)	17.3	0

ABNORMAL RELEASES

a. Liquid

	QTR 1	QTR 2
Number of Releases	0	0
Total Activity Released (Ci)	0	0
Total Tritium Released (Ci)	0	0

b. Gaseous

	QTR 1	QTR 2
Number of Releases	0	0
Total Activity Releases (Ci)	0	0

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	UNIT	QTR 1	QTR 2	EST TOTAL ERROR %
A. Fission and Activation Gases				
Total Release	Ci	2.61E-02	1.14E-07	± 50%
Average Release Rate	µCi/sec	3.32E-03	1.45E-08	
B. Short Lived Particulate ($t_{1/2}$ < 8 days)				
Total Release	Ci	0	6.82E-05	± 50%
Average Release Rate	µCi/sec	0	8.68E-06	
C. Tritium				
Total Release	Ci	13.5	23.7	± 25%
Average Release Rate	µCi/sec	1.72	3.02	
Total A & B & C	µCi/sec	1.72	3.02	
% of Design Objective	%	6.62E-01	1.18	
D. Iodines				
Total I131	Ci	2.62E-05	1.29E-06	± 50%
Average Release Rate	µCi/sec	3.33E-06	1.64E-07	
E. Long Lived Particulates ($t_{1/2}$ > 8 days)				
Total Release	Ci	7.84E-05	0	± 50%
Average Release Rate	µCi/sec	9.97E-06	0	
Total D & E	µCi/sec	1.33E-05	1.64E-07	
% of Design Objective	%	1.97E-01	5.02E-01	
F. Gross Alpha				
Total Release	Ci	6.19E-08	1.37E-8	± 100%

TABLE 1B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
GASEOUS EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNIT	QTR 1	QTR 2	QTR 1	QTR 2
1. Fission and Activation Gases					
Kr85	Ci		9.70E-09		
Kr85m	Ci				
Kr87	Ci		2.29E-08		
Kr88	Ci				
Xe133	Ci		3.34E-08	2.61E-02	
Xe135	Ci		4.80E-08		
Xe135m	Ci				
Xe138	Ci				
Xe131m	Ci				
Ar41	Ci				
Xe133m	Ci				
Total	Ci		1.14E-07	2.61E-02	
2. Iodines					
I131	Ci	2.62E-05	1.29E-06		
I133	Ci		6.82E-05		
I135	Ci				
Total	Ci	2.62E-05	6.95E-05		

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNIT	QTR 1	QTR 2	QTR 1	QTR 2
3. Particulates					
Sr89	Ci				
Sr90	Ci				
Cs134	Ci				
Cs137	Ci				
Ba-La140	Ci				
Co58	Ci	4.20E-05			
Co60	Ci	3.99E-06			
Cd109	Ci				
Sb124	Ci				
Na24	Ci				
Co57	Ci				
Ce144	Ci	1.82E-06			
Zr-Nb95	Ci				
Rb88	Ci				

TABLE 1B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
GASEOUS EFFLUENTS

3. Particulates

Sr85	Ci				
Mn54	Ci				
Cs138	Ci				
Y88	Ci				
Ag110M	Ci	3.06E-05			

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	UNIT	QTR 1	QTR 2	TOTAL ERROR %
A. Fission and Activation Products				
Total Release W/O H-3, Rad Gas, Alpha	Ci	5.06E-04	1.93E-04	± 50%
Average Diluted Concentration	µCi/ml	3.54E-12	4.99E-13	
% of T. S. Annual Curie Design Objective	%	5.06E-03	1.93E-03	
B. Tritium				
Total Release	Ci	1.50E 02	1.21E 02	± 25%
Average Diluted Concentration	µCi/ml	1.05E-06	3.13E-07	
% of T. S. Annual Design Objective Conc	%	2.10E 01	6.26E 00	
C. Dissolved and Entrained Gases				
Total Release	Ci	1.20E-02	1.56E-03	± 50%
Average Diluted Concentration	µCi/ml	8.39E-11	4.03E-12	
D. Gross Alpha				
Total Release	Ci	2.24E-07	5.60E-08	± 50%
E. Volume of Waste (Prior to Dilution)	liters	3.23E 07	3.38E 07	± 25%
F. Volume of Dilution Water	ters	1.43E 11	3.87E 11	± 50%

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

		Continuous Mode		Batch Mode	
NUCLIDE	UNIT	QTR 1	QTR 2	QTR 1	QTR 2
Sr89	Ci				
Sr90	Ci				
Cs134	Ci				
Cs137	Ci				
I131	Ci				
Co58	Ci	4.00E-07	2.73E-05	1.66E-04	5.25E-06
Co60	Ci	1.54E-05		8.94E-05	
Fe59	Ci				
Zn65	Ci				
Mn54	Ci				
Cr51	Ci				
Zr-Nb95	Ci				
Mo99	Ci				
Ba-la140	Ci				
Ag110m	Ci				
Na24	Ci				
W187	Ci				
Sb124	Ci			2.56E-05	
Sr85	Ci				
Cs136	Ci				
Zr-Nb97	Ci			1.13E-05	
Cd109	Ci				
Rb88	Ci				
Total	Ci	1.58E-05	2.78E-05	2.32E-04	5.25E-06

		Continuous Mode		Batch Mode	
NUCLIDE	UNIT	QTR 1	QTR 2	QTR 1	QTR 2
Xe133	Ci			1.16E-02	1.55E-03
Xe133m	Ci			9.70E-05	
Xe131m	Ci				
Xe135	Ci			3.18E-04	1.34E-05
Kr85m	Ci				
Kr85	Ci				
Kr88	Ci				
Total	Ci			1.20E-02	1.56E-03

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

1-1-81 through 6-30-81

Solid Waste and Irradiatted 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 Ci	332 42	± 50%
b. Dry compressible waste, contaminated equipment, evaporator, bottoms, etc.	ft^3 Ci	4067 4.5	± 50%
c. Irradiated components, control rods, etc.	ft^3 Ci	None	
d. Other (describe)	ft^3 Ci	None	

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

a.	CO-58	2.4 %	
	CO-60	79.6 %	
	CS-134	3.0 %	
	CS-137	11.5 %	
	MN-54	3.5 %	
b.	CO-58	7.4 %	
	CO-60	64.5 %	
	CS-134	2.0 %	
	CS-137	19.5 %	
	Misc	6.6 %	
		%	
c.	None	%	
d.	None	%	

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
9	Truck	US Ecology Richland, WA

B. Irradiated Fuel Shipments (disposition)

None