EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT

July ____ THROUGH December 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^{-6} µCi/ml.

3. Annual average concentration of tritium in liquid waste, prior to dilution in the Mississippi River, of 5×10^{-3} 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 3	QTR 4
Number of Batch Releases	79	47
Total Time Period for a Batch Release (hr)	128.56	77.69
Maximum Time for a Batch Release (hr)	2.50	2.93
Average Time for a Batch Release (hr)	1.63	1.65
Minimum Time for a Batch Release (hr)	1.13	1.17
Ave Mississippi flow during Quarter (CFS)	1.72E04	1.53E04

b. Gaseous

	QTR 3	QTR 4
Number of Batch Releases	1	2
Total Time Period for Batch Releases (hr)	8.00	2.94
Maximum Time for a Batch Release (hr)	8.00	1.82
Average Time for a Batch Release (hr)	8.00	1.47
Minimum Time for a Batch Release (hr)	8.00	1.12

ABNORMAL RELEASES

a. Liquid

	QTR 3	QTR 4
Number of Releases	0	0
Total Activity Released (Ci)	0	0
Total Tritium Released (Ci)	0	0

b. Gaseous

	QTR 3	QTR 4
Number of Releases	0	1 *
Total Activity Releases (Ci)	0	2.79E01

Notes:

* - This release consisted of two small leaks in the low level waste gas system. Approximately 2000 cubic feet over seven days was released before the leakage sources were found and isolated.

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	UNIT	QTR 3	QTR 4	EST TOTAL ERROR %
A. Fission and Activation Gases				
Total Release	Ci	9.55	3.69E01	± 50%
Average Release Rate	µCi/sec	1.21	4.70	
B. Short Lived Particulate ($t_{1/2}$ < 8 days)				
Total Release	Ci	2.87	3.43E-01	± 50%
Average Release Rate	µCi/sec	3.66E-01	4.36E-02	
C. Tritium				
Total Release	Ci	1.78E01	1.85E01	± 25%
Average Release Rate	µCi/sec	2.26	2.36	
Total A & B & C	µCi/sec	3.84	7.10	
% of Design Objective	%	3.52	6.51	
D. Iodines				
Total I131	Ci	4.69E-06	3.29E-04	± 50%
Average Release Rate	µCi/sec	5.96E-07	4.19E-05	
E. Long Lived Particulates ($t_{1/2}$ > 8 days)				
Total Release	Ci	9.91E-06	0	± 50%
Average Release Rate	µCi/sec	1.26E-06	0	
Total D & E	µCi/sec	1.86E-06	4.19E-05	
% of Design Objective	%	1.52E-02	3.41E-01	
F. Gross Alpha				
Total Release	Ci	6.99E-09	0	± 100%

TABLE 1B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
GASEOUS EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNIT	QTR 3	QTR 4	QTR 3	QTR 4
1. Fission and Activation Gases					
Kr85	Ci				1.21E-01
Kr85m	Ci		3.49E-01		
Kr87	Ci	2.81E-01	3.25E-01		
Kr88	Ci	1.48	3.99E-01		
Xe133	Ci	1.02	4.97	4.58E-02	2.78E01
Xe135	Ci	2.19	1.99	2.37E-06	9.51E-03
Xe135m	Ci		4.70E-01		
Xe138	Ci	1.36	3.43E-01		
Xe131m	Ci				
Ar41	Ci	3.02		1.50E-01	
Xe133m	Ci		2.94E-02		1.40E-01
Total	Ci	1.66E01	8.88	1.96E-01	2.81E01
2. Iodines					
I131	Ci	4.69E-06	3.29E-04		
I133	Ci		6.69E-04		
I135	Ci				
Total	Ci	4.69E-06	9.98E-04		

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNIT	QTR 3	QTR 4	QTR 3	QTR 4
3. Particulates					
Sr89	Ci				
Sr90	Ci				
Cs134	Ci				
Cs137	Ci				
Ba-La140	Ci				
Co58	Ci	2.75E-10			
Co60	Ci			9.91E-06	
Cd109	Ci				
Sb124	Ci				
Na24	Ci				
Co57	Ci				
Ce144	Ci				
Zr-Nb95	Ci				
Rb88	Ci	1.48			

TABLE 1B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
GASEOUS EFFLUENTS

3. Particulates

Sr85	Ci				
Mn54	Ci				
Cs138	Ci	1.36	3.43E-01		
Y88	Ci	3.52E-02			
Total	Ci	2.88	3.43E-01	9.91E-06	0

TABLE 2A

EFFLUENT AND WASTE DISPOAL SEMIANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	UNIT	QTR 3	QTR 4	TOTAL ERROR %
A. Fission and Activation Products				
Total Release W/O H-3, Rad Gas, Alpha	Ci	7.29E-03	1.13E-03	± 50%
Average Diluted Concentration	µCi/ml	1.98E-11	3.50E-12	
% of T. S. Annual Curie Design Objective	%	7.29E-02	1.13E-02	
B. Tritium				
Total Release	Ci	2.21E02	7.04E01	± 25%
Average Diluted Concentration	µCi/ml	5.99E-07	2.18E-7	
% of T. S. Annual Design Objective Conc	%	1.20E01	4.36	
C. Dissolved and Entrained Gases				
Total Release	Ci	1.47E-04	2.42E-04	± 50%
Average Diluted Concentration	µCi/ml	3.98E-13	7.49E-13	
D. Gross Alpha				
Total Release	Ci	2.02E-06	7.52E-06	± 50%
E. Volume of Waste (Prior to Dilution)	liters	4.93E07	4.95E07	± 25%
F. Volume of Dilution Water	liters	3.69E11	3.23E11	± 50%

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

		Continuous Mode		Batch Mode	
NUCLIDE	UNIT	QTR 3	QTR 4	QTR 3	QTR 4
Sr89	Ci				
Sr90	Ci				
Cs134	Ci				
Cs137	Ci	1.78E-05			
I131	Ci				
Co58	Ci	1.70E-03	1.08E-04	1.25E-03	5.84E-04
Co60	Ci			1.17E-03	1.03E-04
Fe59	Ci				
Zn65	Ci				
Mn54	Ci	5.31E-05			
Cr51	Ci				
Zr-Nb95	Ci				
Mo99	Ci				
Ba-la140	Ci	2.82E-05			
Ag110m	Ci				
Na24	Ci				
W187	Ci				
Sb124	Ci			5.50E-04	
Sr85	Ci				
Cs136	Ci				
Zr-Nb97	Ci				
Cd109	Ci				
Rb88	Ci				
Total	Ci	1.80E-03	1.08E-04	3.07E-03	6.87E-04

		Continuous Mode		Batch Mode	
NUCLIDE	UNIT	QTR 3	QTR 4	QTR 3	QTR 4
Xe133	Ci			1.41E-04	2.42E-04
Xe133m	Ci				
Xe131m	Ci				
Xe135	Ci			6.30E-06	
Kr85m	Ci				
Kr85	Ci				
Kr88	Ci				
Total	Ci	0	0	1.47E-04	2.42E-04

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

July through December 1981

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	400 1.6	± 50%
b. Dry compressible waste, contaminated equipment, evaporator, bottoms, etc.	ft^3 Ci	2370.7 8.2	± 50%
c. Irradiated components, control rods, etc.	ft^3 Ci	NONE	
d. Other (describe) Spent Fuel Racks	ft^3 Ci	3314.5 0.096	± 50%

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

a.	Co58	2 %	± 25%
	Co60	36 %	
	Mn54	2 %	
	Cs134	15 %	
	Cs137	45 %	
b.	Co58	15 %	
	Co60	35 %	
	Cs137	25 %	
	Cs134	10 %	
	Mn54	15 %	
c.	NONE	%	
		%	
d.	Co58	8.5 %	
	C060	91.5 %	

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
9	Truck	U.S. Ecology, Richland, Washington

B. Irradiated Fuel Shipments (disposition)

NONE