

EFFLUENT SEMI-ANNUAL REPORT

July THROUGH December, 1985

SUPPLEMENTAL INFORMATION

Facility - Prairie Island Nuclear Generating Plant

Licensee - Northern States Power Company License Nos. - 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:

for the Quarter	3.0 mrem Total Body 10.0 mrem Any Organ
for the Year	6.0 mrem Total Body 20.0 mrem 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, H-3, LLP	< 1500 mrem/Year Any Organ

- b. The dose due to radioactive gaseous effluents shall be limited to:

Noble Gases	< 10 mrad/Qtr Gamma < 20 mrad/Qtr Beta < 20 mrad/Year Gamma < 40 mrad/Year Beta
I-131, H-3, LLP	< 15 mrem/Qtr < 30 mrem/Year

8603100682 860301
PDR ADOCK 05000282
R PDR

B. Maximum Permissible Concentrations

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 μ ci/ml Total Activity

C. Average Energy

Not applicable to Prairie Island Regulatory Limits.

D. Measurements and Approximations of Total Radioactivity

1. Fission and activation gases in gaseous releases:	Total Nuclide	Geli Geli
2. Iodines in gaseous releases	Total Nuclide	Geli Geli
3. Particulates in gaseous releases:	Total Nuclide	Geli Geli
4. Liquid Effluents:	Total Nuclide	Geli Geli

1.0 BATCH RELEASES (Liquid)

	QTR #3	QTR #4
1.1 Number of Batch Releases	6.90E+01	4.80E+01
1.2 Total Time Period for a Batch Release (hr.)	1.09E+02	7.95E+01
1.3 Maximum Time for a Batch Release (hr)	1.90E+00	2.37E+00
1.4 Average Time for a Batch Release (hr)	1.58E+00	1.66E+00
1.5 Minimum Time for a Batch Release (hr)	8.30E-01	1.00E+00
1.6 Ave Mississippi flow during Quarter (CFS)	2.44E04	2.57E04

2.0. BATCH RELEASES (Gaseous)

	QTR #3	QTR #4
2.1 Number of Batch Releases	4.00E+00	6.00E+00
2.2 Total Time Period for a Batch Release (hr)	1.44E+01	2.08E+01
2.3 Maximum Time for a Batch Release (hr)	8.00E+00	9.60E+00
2.4 Average Time for a Batch Release (hr)	3.59E+00	3.47E+00
2.5 Minimum Time for a Batch Release (hr)	1.47E-01	1.41E-01

3.0 ABNORMAL RELEASES (Liquid)

	QTR #3	QTR #4
3.1 Number of Batch Releases	0.00E+00	0.00E+00
3.2 Total Activity Release (Ci)	0.00E+00	0.00E+00
3.3 Total Tritium Release (Ci)	0.00E+00	0.00E+00

4.0. ABNORMAL RELEASES (Gaseous)

	QTR #3	QTR #4
4.1 Number of Batch Releases	0.00E+00	0.00E+00
4.2 Total Activity Release (Ci)	0.00E+00	0.00E+00

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

UNIT	QTR #3	QTR #4	EST TOTAL ERROR %
------	--------	--------	----------------------

5.0 FISSION AND ACTIVATION GASES

5.1 Total Release (Ci)	1.94E+01	9.36E+00	2.50E+01
5.2 Average Release Rate (μ Ci/sec)	2.46E+00	1.19E+00	
5.3 Gamma Dose (mrad)	8.29E-03	5.56E-03	
5.4 Beta Dose (mrad)	2.77E-02	1.57E-02	
5.5 % of Gamma T.S. Limit (%)	8.29E-02	5.56E-02	
5.6 % of Beta T.S. Limit (%)	1.39E-01	7.85E-02	

6.0 IODINES

6.1 Total I-131 (Ci)	3.46E-03	4.30E-04	2.50E+01
6.2 Average Release Rate (μ Ci/sec)	4.40E-04	5.47E-05	

7.0 PARTICULATES

7.1 Total Release (Ci)	1.17E-05	8.89E-07	2.50E+01
7.2 Average Release Rate (μ Ci/sec)	1.49E-06	1.13E-07	

8.0 TRITIUM

8.1 Total Release (Ci)	2.19E+01	2.46E+01	2.50E+01
8.2 Average Release Rate (μ Ci/sec)	2.79E+00	3.13E+00	

9.0 TOTAL IODINE PARTICULATES AND TRITIUM (μ Ci/sec)

	2.79E+00	3.13E+00	2.50E+01
--	----------	----------	----------

10.0 DOSE (mrem)

	2.43E-01	6.67E-02	
--	----------	----------	--

11.0 % OF T.S. LIMIT (%)

	1.62E+00	4.45E-01	
--	----------	----------	--

12.0 GROSS ALPHA

12.1 Total Release (Ci)	5.80E-07	7.93E-08	2.50E+01
-------------------------	----------	----------	----------

TABLE 1C

EFFLUENT SEMIANNUAL REPORT
GASEOUS EFFLUENTS
GROUND LEVEL RELEASES

CONTINUOUS MODE

BATCH MODE

NUCLIDE	UNIT	QTR #3	QTR #4	QTR #3	QTR #4
---------	------	--------	--------	--------	--------

13.0 INDIVIDUAL FISSION AND ACTIVATION GASES

Kr85	Ci			5.78E-01	5.42E-01
Kr85m	Ci				
Kr87	Ci				
Kr88	Ci				
Xe133	Ci	1.80E+01	8.41E+00	3.51E-01	3.90E-01
Xe135	Ci	3.60E-01		2.08E-02	3.39E-04
Xe135m	Ci				
Xe138	Ci				
Xe131m	Ci			1.27E-02	8.54E-03
Ar41	Ci				
Xe133m	Ci			1.01E-04	3.70E-03
Total	Ci	1.84E+01	8.41E+00	9.63E-01	9.45E-01

14.0 IODINES (Ci)

I131	Ci	3.46E-03	4.30E-04	1.34E-07	
I133	Ci	1.24E-04	1.17E-05		
I135	Ci				
Total	Ci	3.58E-03	4.42E-04	1.34E-07	0.00E+00

CONTINUOUS MODE

BATCH MODE

NUCLIDE	UNIT	QTR #3	QTR #4	QTR #3	QTR #4
---------	------	--------	--------	--------	--------

15.0 PARTICULATES (Ci)

Sr89	Ci		*		*
Sr90	Ci		*		*
Cs134	Ci				
Cs137	Ci				9.23E-09
Ba-La140	Ci				
Co58	Ci	1.11E-05	1.60E-07		
Co60	Ci	5.95E-07	7.20E-07		
Total	Ci	1.17E-05	8.80E-07	0.00E+00	9.23E-09

*Furnished later

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

UNIT	QTR #3	QTR #4	TOTAL ERROR %	
<u>16.0 VOLUME OF WASTE</u>				
(Prior to Dilution)	Liters	3.63E+07	4.35E+07	2.50E+01
<u>17.0 VOLUME OF DILUTION</u>				
Water (liters)	Liters	2.26E+11	1.65E+11	2.50E+01
<u>18.0 FISSION AND ACTIVATION PRODUCTS</u>				
18.1 Total Release W/O H-3, (Ci) Rad Gas, Alpha		1.23E-02	4.73E-03	2.50E+01
18.2 Average Diluted (µCi/ml) Concentration		5.44E-11	2.87E-11	
<u>19.0 TRITIUM</u>				
19.1 Total Release (Ci)		2.41E+02	1.28E+02	2.50E+01
19.2 Average Diluted (µCi/ml) Concentration		1.07E-06	7.76E-07	
<u>20.0 DISSOLVED AND ENTRAINED GASES</u>				
20.1 Total Release (Ci)		2.24E-02	1.93E-02	2.50E+01
20.2 Average Diluted (µCi/ml) Concentration		9.91E-11	1.17E-10	
<u>21.0 GROSS ALPHA</u>				
21.1 Total Release (Ci)		0.00E+00	0.00E+00	2.50E+01
<u>22.0 TOTAL TRITIUM, FISSION AND ACTIVATION PRODUCTS (µCi/ml)</u>				
		1.07E-06	7.76E-07	2.50E+01

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

UNIT	QTR #3	QTR #4	TOTAL ERROR %
23.0 <u>TOTAL BODY DOSE</u> (mrem)	5.32E-04	4.74E-04	
24.0 <u>CRITICAL ORGAN DOSE</u> (mrem)	5.62E-04	5.46E-04	
(organ)	GI	LIVER	
25.0 <u>% TOTAL BODY T.S. LIMIT</u> (%)	1.77E-02	1.58E-02	
26.0 <u>% OF CRITICAL ORGAN</u> (%)	5.62E-03	5.46E-03	
<u>T.S. Limit</u>			

TABLE 2A
EFFLUENT SEMIANNUAL RPEORT
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

NUCLIDE	UNIT	CONTINUOUS MODE		BATCH MODE	
		QTR #3	QTR #4	QTR #3	QTR #4

27.0 INDIVIDUAL LIQUID EFFLUENT

Sr89	Ci				
Sr90	Ci				
Cs134	Ci		1.47E-05		
Cs137	Ci		2.82E-05	5.93E-06	
I131	Ci		2.33E-05	5.19E-04	
Co58	Ci			4.49E-04	3.26E-04
Co60	Ci		7.50E-06	1.80E-04	3.43E-05
Fe59	Ci			5.25E-05	4.05E-05
Zn65	Ci				
Mn54	Ci				
Cr51	Ci				
Zr-Nb95	Ci				
Mo99	Ci				
Ba-La140	Ci				
Fe-55	Ci			7.24E-03	
*				3.80E-03	4.26E-03
Total	Ci	0.00E+00	7.37E-05	1.23E-02	4.66E-03

* SUM OF NUCLIDE ACTIVITIES FROM ATTACHMENT #1

CONTINUOUS MODE BATCH MODE

NUCLIDE	UNIT	QTR #3	QTR #4	QTR #3	QTR #4
---------	------	--------	--------	--------	--------

28.0 DISSOLVED AND ENTRAINED GASES

Xe133	Ci	3.42E-05		2.00E-02	1.88E-02
Xe133m	Ci				3.12E-05
Xe131m	Ci			4.67E-04	4.65E-04
Xe135	Ci			2.79E-05	4.83E-05
Kr85m	Ci				
Kr85	Ci			1.87E-03	
Kr88	Ci				
Total	Ci	3.42E-05	0.00E+00	2.24E-02	1.93E-02

ATTACHMENT #1
ADDITIONAL RADIONUCLIDES

LIQUID BATCH RELEASE
Quarter #3, 1985

AG-110M	1.59E-04 Ci
CS-138	1.03E-05 Ci
I-133	3.18E-06 Ci
NA-24	5.48E-06 Ci
NB-97	3.62E-06 Ci
SB-122	1.84E-04 Ci
SB-124	2.34E-03 Ci
SB-125	9.71E-04 Ci
SC-47	8.31E-05 Ci
SN-113	3.52E-06 Ci
SR-85	8.09E-06 Ci
SR-92	2.19E-05 Ci
TC-99M	7.70E-06 Ci
TE-132	3.08E-06 Ci
-----	-----
TOTAL	3.80E-03 Ci

LIQUID BATCH RELEASE
Quarter #4, 1985

AG-110M	2.40E-04 Ci
CS-136	1.24E-05 Ci
CS-138	7.27E-06 Ci
NA-24	1.95E-06 Ci
NB-97	6.99E-06 Ci
SB-124	2.94E-03 Ci
SF-125	8.61E-04 Ci
SC-47	1.24E-04 Ci
SN-113	4.61E-05 Ci
SR-92	1.02E-05 Ci
ZR-97	9.00E-06 Ci
-----	-----
TOTAL	4.26E-03 Ci

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
NORTHERN STATES POWER

Period: 7/1/85 to 1/1/86
License No. DPR-42

SOLID RADIOACTIVE WASTE DISPOSAL SEMI-ANNUAL REPORT

Table I: Solid Waste and Irradiated Fuel Shipments

A. Solid Waste Total Volumes and Measured Curie Quantities:

1. Type of Waste:

		<u>Units</u>	<u>Total</u>	<u>Container Volumes</u>
A.	<u>Resin</u>	<u>Ft 3</u>	<u>340</u>	<u>170</u>
		<u>Ci</u>	<u>3,008</u>	
B.	<u>Dry Compacted</u>	<u>Ft 3</u>	<u>0</u>	
		<u>Ci</u>	<u>0</u>	
C.	<u>Non-Compacted</u>	<u>Ft 3</u>	<u>0</u>	
		<u>Ci</u>	<u>0</u>	
D.	<u>Wst. Concentrates</u>	<u>Ft 3</u>	<u>0</u>	
		<u>Ci</u>	<u>0</u>	
S.	<u>Spent Fuel</u>	<u>Ft 3</u>	<u>0</u>	
		<u>Ci</u>	<u>0</u>	

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
NORTHERN STATES POWER

Period: 7/1/85 to 1/1/86
License No. DPR-42

SOLID RADIOACTIVE WASTE DISPOSAL SEMI-ANNUAL REPORT

Table I: Solid Waste and Irradiated Fuel Shipments (Continued)

3. Solid Waste Disposition:

<u>Number of Shipments</u>	<u>Mode</u>	<u>Destination</u>
<u>2</u>	<u>Truck</u>	<u>Richland, WA</u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

B. Irradiated Fuel Shipments:

<u>Number of Shipments</u>	<u>Mode</u>	<u>Destination</u>
<u>0</u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
OFFSITE RADIATION DOSE ASSESSMENT FOR
January 1 - December 31, 1985

An assessment of radiation dose due to releases from the Prairie Island Nuclear Generating Plant during 1985 was performed in accordance with the Technical Specifications. Computed doses were well below the 40 CFR Part 190 and 10 CFR Part 50, Appendix I standards and guidelines.

Offsite dose calculation formulas and meteorological data were used from the Offsite Dose Calculation Manual in making this assessment. Source terms were obtained from the two Effluent and Waste Disposal Semi-Annual reports prepared for NRC review during the year.

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. Doses, both whole body and organ, are a small percentage of Appendix I guidelines.

Offsite Doses from Liquid Release

Computed doses due to liquid releases are reported in Table 1. Receptor information is reported in Table 2. Doses, both whole body and organ, are a small percentage of Appendix I guidelines.

Doses to Individuals Due to Activities Inside the Site Boundary

Occasional sportsmen will enter the Prairie Island site 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 dose due to recreational and river 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 main plant buildings (ESE at 0.2 miles). Whole body and inhalation organ doses were calculated for this location and occupancy time. These doses were reported in Table 1.

Doses to Most Exposed Member of the General Public from Reactor Releases and Other Nearby Uranium Fuel Cycle Sources

There are no uranium fuel cycle facilities in the vicinity of the Prairie Island site.

The only other source of exposure to the general public in addition to the plant gaseous and liquid effluents is from direct radiation. Pressurized water reactor direct radiation has been shown to be negligible. An array of TLD monitoring locations at the site boundary has consistently indicated that plant operation in recent years has had no effect on ambient gamma radiation.

Therefore, the most exposed member of the general public will not receive a radiation dose from reactor releases and all other fuel cycle activities in excess of the sum of the liquid and gaseous whole body and organ doses reported in Table 1 for the site boundary and critical receptor, respectively. These doses are well within the 40 CFR Part 190 standards of 25 mrem to the whole body or any organ (except the thyroid) and 75 mrem to the thyroid every 12 months.

TABLE 1
OFFSITE RADIATION DOSE ASSESSMENT - PRAIRIE ISLAND
PERIOD: JANUARY 1 THROUGH DECEMBER 31, 1985

<u>Gaseous Releases</u>		<u>10 CFR Part 50 Appendix I Guideline Per Unit Per Year</u>
Maximum Site Boundary Gamma Air Dose (mrad)	<u>.023</u>	20
Maximum Site Boundary Beta Air Dose (mrad)*	<u>.072</u>	40
Maximum Offsite Dose to Any Organ (mrem) Total	<u>0.56</u>	30
Offshore Location (mrem, 7 days/year)		
Whole Body	<u>0.0002</u>	10
Organ	<u>0.0003</u>	30
<u>Liquid Releases</u>		
Maximum Offsite Whole Body Dose (mrem) Total	<u>.003</u>	6
Maximum Offsite Organ Dose (mrem)* Total	<u>.036</u>	20

*Long lived particulates, I-131 & tritium.

TABLE 2

OFFSITE RADIATION DOSE ASSESSMENT
SUPPLEMENTAL INFORMATION - PRAIRIE ISLAND

PERIOD: JANUARY 1 THROUGH DECEMBER 31, 1985

Gaseous Effluents

Maximum Site Boundary

Dose Location
(from building vents)

Sector	WNW
Distance (mi)	0.36

Offshore Location
Within Site
Boundary

Sector	ESE
Distance	0.2

Maximum Offsite
Dose Location

Sector	SSE
Distance (mi)	0.6
Pathways	Ground, Inhalation, Vegetables

Age Group	Child
Organ	Thyroid

Liquid Releases

Maximum Offsite
Dose Location Downstream

Pathways	Fish
Age Group	Adult
Organ	Thyroid

TRANSMITTAL MANIFEST
 NORTHERN STATES POWER COMPANY
 NUCLEAR GENERATION DEPARTMENT

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Effluent and Waste Disposal Semi-Annual Report
for July 1, 1985 through December 31, 1985

Manifest Date: March 1, 1986

USNRC			
Regional Admin-III	1	ANI Library	1
NRR Project Manager, NRC	1	Westinghouse Electric	2
DCD	1	W J Johnson	
Resident Inspector	1	R T Meyer	
R J Jensen	1	J N Sorensen (NUS)	1
L R Eliason	1	C E Agan (FPSI)	3
G T Goering/G H Neils	1	(C E Agan, Al Garrow	
G Charnoff	1	and Corporate Library)	
M B Sellman	1	PI SAC Secretary	1
B W Clark	1	D C Lowens	1
ERAD Dept.	1	Safety Audit Committee	8
Attn: Records Clerk		D M Musolf	
MDH	1	K J Albrecht	
Attn: Commissioner of Health		C W Giesler	
MPCA	1	F W Hartley	
Attn: J W Ferman		H S Isbin	
Prairie Island Plant Manager	10	J A Thie	
Monticello Plant	1	F P Tierney	
(W A Shamla)		E L Watzl	
Media Services Dept.	1	SAC File (Manifest Only)	
NSS File	1		
NG File	1		