EFFLUENT SEMIANNUAL REPORT

03-JAN-94 THROUGH 03-JUL-94

SUPPLEMENTAL INFORMATION

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, H-3, LLP	≤1500 mrem/year to any organ

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

noble gases	≤10 mrad/quarter gamma
	≤20 mrad/quarter beta
	≤20 mrad/year gamma
	≤40 mrad/year beta
I-131, H-3, LLP	≤15 mrem/quarter to any organ
	≤30 mrem/year to any organ

B. Maximum Permissible Concentration

1. Fission and activation gases in gaseous releases:

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

2. Iodine and particulates with halflives 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 uCi/ml Total Activity

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

E. Manual Revisions

1. Offsite Dose Calculations Manual latest Revision number: 12

   Revision date : 17-JUN-91

1.0 BATCH RELEASES (LIQUID)	QTR: 01	QTR: 02
1.1 NUMBER OF BATCH RELEASES	2.50E+01	6.30E+01
1.2 TOTAL TIME PERIOD (HRS)	3.84E+01	9.26E+01
1.3 MAXIMUM TIME PERIOD (HRS)	2.57E+00	2.78E+00
1.4 AVERAGE TIME PERIOD (HRS)	1.54E+00	1.47E+01
1.5 MINIMUM TIME PERIOD (HRS)	1.13E+00	1.20E+00
1.6 AVERAGE MISSISSIPPI RIVER FLOW (CFS)	1.83E+04	3.80E+04

2.0 BATCH RELEASES (GASEOUS)	QTR: 01	QTR: 02
2.1 NUMBER OF BATCH RELEASES	3.00E+00	2.20E+01
2.2 TOTAL TIME PERIOD (HRS)	5.10E+00	7.35E+01
2.3 MAXIMUM TIME PERIOD (HRS)	4.60E+00	1.47E+00
2.4 AVERAGE TIME PERIOD (HRS)	1.70E+00	3.34E+00
2.5 MINIMUM TIME PERIOD (HRS)	9.00E-02	1.00E-02

3.0 ABNORMAL RELEASES (LIQUID)	QTR: 01	QTR: 02
3.1 NUMBER OF RELEASES	0.00E+00	0.00E+00
3.2 TOTAL ACTIVITY RELEASED (CI)	0.00E+00	0.00E+00
3.3 TOTAL TRITIUM RELEASED (CI)	0.00E+00	0.00E+00

4.0 ABNORMAL RELEASES (GASEOUS)	QTR: 01	QTR: 02
4.1 NUMBER OF RELEASES	0.00E+00	0.00E+00
4.2 TOTAL ACTIVITY RELEASED (CI)	0.00E+00	0.00E+00

TABLE 1A
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	QTR: 01	QTR: 02
5.0 **FISSION AND ACTIVATION GASES**		
5.1 TOTAL RELEASE (CI)	6.42E-01	7.04E-01
5.2 AVERAGE RELEASE RATE (UCI/SEC)	8.17E-02	8.96E-02
5.3 GAMMA DOSE (MRAD)	4.80E-05	8.69E-05
5.4 BETA DOSE (MRAD)	5.23E-03	5.65E-03
5.5 PERCENT OF GAMMA TECH SPEC (%)	4.80E-04	8.69E-04
5.6 PERCENT OF BETA TECH SPEC (%)	2.62E-02	2.83E-02
6.0 **IODINES**		
6.1 TOTAL I-131 (CI)	0.00E+00	7.68E-07
6.2 AVERAGE RELEASE RATE (UCI/SEC)	0.00E+00	9.77E-08
7.0 **PARTICULATES**		
7.1 TOTAL RELEASE (CI)	1.38E-04	3.87E-05
7.2 AVERAGE RELEASE RATE (UCI/SEC)	1.76E-05	4.93E-06
8.0 **TRITIUM**		
8.1 TOTAL RELEASE (CI)	1.76E+01	1.84E+01
8.2 AVERAGE RELEASE RATE (UCI/SEC)	2.24E+00	2.34E+00
9.0 TOTAL IODINE, PARTICULATE AND TRITIUM (UCI/SEC)	2.24E+00	2.34E+00
10.0 DOSE (MREM)	3.23E-02	3.68E-02
11.0 PERCENT OF TECH SPEC (%)	2.15E-01	2.45E-01
12.0 GROSS ALPHA (CI)	0.00E+00	0.00E+00

TABLE 1C
GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

13.0 FISSION AND ACTIVATION GASES

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 01	QTR: 02	QTR: 01	QTR: 02
KR-85	CI			6.40E-01	6.78E-01
XE-131M	CI			1.00E-03	
XE-133	CI			7.45E-04	2.58E-02
XE-135	CI			2.02E-05	6.38E-06
TOTAL	CI	0.00E+00	0.00E+00	6.42E-01	7.04E-01

14.0 IODINES

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 01	QTR: 02	QTR: 01	QTR: 02
I-131	CI		7.68E-07		
TOTAL	CI	0.00E+00	7.68E-07	0.00E+00	0.00E+00

15.0 PARTICULATES

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 01	QTR: 02	QTR: 01	QTR: 02
NB-97	CI	2.73E-05	1.95E-06	1.11E-04	6.97E-06
CO-58	CI		6.61E-06		1.75E-07
CO-60	CI		4.00E-07		1.72E-05
SR-89	CI		1.70E-07		
AG-110M	CI				4.78E-06
CS-137	CI				4.66E-07
TOTAL	CI	2.73E-05	9.13E-06	1.11E-04	2.96E-05

TABLE 2A
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

		QTR: 01	QTR: 02
16.0	VOLUME OF WASTE PRIOR TO DILUTION (LITERS)	2.90E+07	8.18E+07
17.0	VOLUME OF DILUTION WATER (LITERS)	4.74E+11	2.54E+11
18.0	**FISSION AND ACTIVATION PRODUCTS**		
	18.1 TOTAL RELEASE W/O H-3, RADGAS, ALPHA (CI)	7.94E-02	2.12E-01
	18.2 AVERAGE DILUTED CONCENTRATION (UCI/ML)	1.68E-10	8.34E-10
19.0	**TRITIUM**		
	19.1 TOTAL RELEASE (CI)	1.23E+02	5.96E+01
	19.2 AVERAGE DILUTED CONCENTRATION (UCI/ML)	2.59E-07	2.35E-07
20.0	**DISSOLVED AND ENTRAINED GASES**		
	20.1 TOTAL RELEASE (CI)	1.69E-03	4.03E-05
	20.2 AVERAGE DILUTED CONCENTRATION (UCI/ML)	3.57E-12	1.59E-13
21.0	GROSS ALPHA (CI)	0.00E+00	0.00E+00
22.0	TOTAL TRITIUM, FISSION AND ACTIVATION PRODUCTS (UCI/ML)	2.59E-07	2.35E-07
23.0	TOTAL BODY DOSE (MREM)	4.20E-04	1.38E-03
24.0	**CRITICAL ORGAN**		
	24.1 DOSE (MREM)	2.70E-03	5.08E-03
	24.2 ORGAN	GI TRACT	GI TRACT
25.0	PERCENT OF TOTAL BODY TECH SPEC LIMIT (%)	1.40E-02	4.60E-02
26.0	PERCENT OF CRITICAL ORGAN TECH SPEC LIMIT (%)	2.70E-02	5.08E-02

TABLE 2A
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

27.0 **INDIVIDUAL LIQUID EFFLUENT**

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 01	QTR: 02	QTR: 01	QTR: 02
AG-110M	CI	1.28E-05		1.97E-02	2.47E-02
BE-7	CI			3.33E-04	3.82E-05
CO-57	CI			8.39E-05	2.06E-04
CO-58	CI	7.46E-05	7.62E-04	2.28E-02	1.09E-01
CO-60	CI			1.02E-02	1.99E-02
CR-51	CI			3.27E-04	4.70E-03
CS-134	CI				1.11E-04
CS-137	CI			2.52E-06	6.88E-05
FE-59	CI			8.44E-05	9.38E-04
LA-140	CI			2.99E-06	3.66E-05
LA-142	CI				5.55E-06
MN-54	CI			7.95E-04	7.82E-04
NA-24	CI			8.28E-07	1.64E-06
NB-95	CI			8.50E-06	1.11E-04
NB-97	CI		5.60E-06		
NP-239	CI				7.13E-06
RH-105	CI				1.89E-05
SB-122	CI				3.14E-03
SB-124	CI			1.77E-03	1.13E-02
SB-125	CI			1.52E-03	7.82E-03
SB-126	CI				7.28E-05
SC-47	CI			2.23E-06	7.67E-05
SN-113	CI			1.88E-04	4.51E-04
SR-92	CI				1.31E-05

TABLE 2A
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

27.0 **INDIVIDUAL LIQUID EFFLUENT**(CONTINUED)

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 01	QTR: 02	QTR: 01	QTR: 02
W-187	CI			4.34E-05	
ZN-65	CI			1.66E-05	5.49E-05
ZR-95	CI			8.50E-05	9.33E-05
ZR-97	CI				1.77E-06
FE-55	CI		4.15E-04	2.13E-02	2.79E-02
TOTAL	CI	8.74E-05	1.18E-03	7.93E-02	2.11E-01

28.0 **DISSOLVED AND ENTRAINED GASES**

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 01	QTR: 02	QTR: 01	QTR: 02
XE-133	CI			1.41E-03	4.03E-05
XE-135	CI			2.79E-04	
TOTAL	CI	0.00E+00	0.00E+00	1.69E-03	4.03E-05

Attachment B

Effluent and Waste Disposal Semiannual Report
Period Jul-Dec 1993
Supplemental Report

EFFLUENT SEMIANNUAL REPORT

05-JUL-93 THROUGH 02-JAN-94

SUPPLEMENTAL INFORMATION

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, H-3, LLP	≤1500 mrem/year to any organ

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

noble gases	≤10 mrad/quarter gamma
	≤20 mrad/quarter beta
	≤20 mrad/year gamma
	≤40 mrad/year beta
I-131, H-3, LLP	≤15 mrem/quarter to any organ
	≤30 mrem/year to any organ

B. Maximum Permissible Concentration

1. Fission and activation gases in gaseous releases:

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

2. Iodine and particulates with halflives 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 uCi/ml Total Activity

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

E. Manual Revisions

1. Offsite Dose Calculations Manual latest Revision number: 12

   Revision date : 17-JUN-91

1.0 BATCH RELEASES (LIQUID)	QTR: 03	QTR: 04
1.1 NUMBER OF BATCH RELEASES	3.80E+01	6.50E+01
1.2 TOTAL TIME PERIOD (HRS)	6.10E+01	9.64E+01
1.3 MAXIMUM TIME PERIOD (HRS)	2.25E+00	2.53E+00
1.4 AVERAGE TIME PERIOD (HRS)	1.61E+00	1.48E+00
1.5 MINIMUM TIME PERIOD (HRS)	1.12E+00	1.17E+00
1.6 AVERAGE MISSISSIPPI RIVER FLOW (CFS)	5.59E+04	1.82E+04

2.0 BATCH RELEASES (GASEOUS)	QTR: 03	QTR: 04
2.1 NUMBER OF BATCH RELEASES	1.00E+00	2.10E+01
2.2 TOTAL TIME PERIOD (HRS)	2.10E+00	2.98E+02
2.3 MAXIMUM TIME PERIOD (HRS)	2.10E+00	1.68E+02
2.4 AVERAGE TIME PERIOD (HRS)	2.10E+00	1.42E+01
2.5 MINIMUM TIME PERIOD (HRS)	2.10E+00	1.00E-02

3.0 ABNORMAL RELEASES (LIQUID)	QTR: 03	QTR: 04
3.1 NUMBER OF RELEASES	0.00E+00	0.00E+00
3.2 TOTAL ACTIVITY RELEASED (CI)	0.00E+00	0.00E+00
3.3 TOTAL TRITIUM RELEASED (CI)	0.00E+00	0.00E+00

4.0 ABNORMAL RELEASES (GASEOUS)	QTR: 03	QTR: 04
4.1 NUMBER OF RELEASES	0.00E+00	0.00E+00
4.2 TOTAL ACTIVITY RELEASED (CI)	0.00E+00	0.00E+00

TABLE 1A
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	QTR: 03	QTR: 04
5.0 **FISSION AND ACTIVATION GASES**		
5.1 TOTAL RELEASE (CI)	7.86E-01	3.54E+01
5.2 AVERAGE RELEASE RATE (UCI/SEC)	1.00E-01	4.50E+00
5.3 GAMMA DOSE (MRAD)	2.65E-04	1.71E-02
5.4 BETA DOSE (MRAD)	1.88E-03	5.75E-02
5.5 PERCENT OF GAMMA TECH SPEC (%)	2.65E-03	1.71E-01
5.6 PERCENT OF BETA TECH SPEC (%)	9.40E-03	2.88E-01
6.0 **IODINES**		
6.1 TOTAL I-131 (CI)	0.00E+00	6.71E-04
6.2 AVERAGE RELEASE RATE (UCI/SEC)	0.00E+00	8.54E-05
7.0 **PARTICULATES**		
7.1 TOTAL RELEASE (CI)	0.00E+00	2.26E-05
7.2 AVERAGE RELEASE RATE (UCI/SEC)	0.00E+00	2.87E-06
8.0 **TRITIUM**		
8.1 TOTAL RELEASE (CI)	1.39E+01	1.49E+01
8.2 AVERAGE RELEASE RATE (UCI/SEC)	1.77E+00	1.90E+00
9.0 TOTAL IODINE, PARTICULATE AND TRITIUM (UCI/SEC)	1.77E+00	1.90E+00
10.0 DOSE (MREM)	2.51E-02	7.80E-02
11.0 PERCENT OF TECH SPEC (%)	1.67E-01	5.20E-01
12.0 GROSS ALPHA (CI)	0.00E+00	2.37E-08

TABLE 1C
GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

13.0 **FISSION AND ACTIVATION GASES**

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 03	QTR: 04	QTR: 03	QTR: 04
KR-85	CI			1.37E-01	1.00E+00
XE-131M	CI		2.23E-01	5.38E-04	2.43E-02
XE-133	CI	6.40E-01	3.09E+01	8.36E-03	2.90E+00
XE-133M	CI		8.16E-02	7.86E-05	4.14E-02
XE-135	CI		1.01E-01	1.11E-05	8.97E-02
TOTAL	CI	6.40E-01	3.13E+01	1.46E-01	4.06E+00

14.0 **IODINES**

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 03	QTR: 04	QTR: 03	QTR: 04
I-131	CI		6.65E-04		5.97E-06
I-133	CI		8.55E-05		2.30E-06
TOTAL	CI	0.00E+00	7.51E-04	0.00E+00	8.27E-06

15.0 **PARTICULATES**

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 03	QTR: 04	QTR: 03	QTR: 04
CO-58	CI		3.29E-07		9.72E-06
CO-60	CI				3.21E-06
CS-134	CI				3.11E-06
CS-137	CI				1.46E-06
NB-95	CI				4.10E-06
SR-89	CI		4.21E-07		2.01E-07
TOTAL	CI	0.00E+00	7.50E-07	0.00E+00	2.18E-05

TABLE 2A
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

		QTR: 03	QTR: 04
16.0	VOLUME OF WASTE PRIOR TO DILUTION (LITERS)	2.44E+07	4.20E+07
17.0	VOLUME OF DILUTION WATER (LITERS)	2.59E+11	1.43E+11
18.0	**FISSION AND ACTIVATION PRODUCTS**		
	18.1 TOTAL RELEASE W/O H-3, RADGAS, ALPHA (CI)	1.70E-02	9.03E-02
	18.2 AVERAGE DILUTED CONCENTRATION (UCI/ML)	6.56E-11	6.31E-10
19.0	**TRITIUM**		
	19.1 TOTAL RELEASE (CI)	2.71E+02	1.09E+02
	19.2 AVERAGE DILUTED CONCENTRATION (UCI/ML)	1.05E-06	7.62E-07
20.0	**DISSOLVED AND ENTRAINED GASES**		
	20.1 TOTAL RELEASE (CI)	2.78E-02	1.70E-03
	20.2 AVERAGE DILUTED CONCENTRATION (UCI/ML)	1.07E-10	1.19E-11
21.0	GROSS ALPHA (CI)	0.00E+00	4.20E-05
22.0	TOTAL TRITIUM, FISSION AND ACTIVATION PRODUCTS (UCI/ML)	1.05E-06	7.63E-07
23.0	TOTAL BODY DOSE (MREM)	6.82E-03	3.20E-03
24.0	**CRITICAL ORGAN**		
	24.1 DOSE (MREM)	6.82E-03	3.20E-03
	24.2 ORGAN	TTL BODY	TTL BODY
25.0	PERCENT OF TOTAL BODY TECH SPEC LIMIT (%)	2.27E-01	1.07E-01
26.0	PERCENT OF CRITICAL ORGAN TECH SPEC LIMIT (%)	6.82E-02	3.20E-02

TABLE 2A
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

27.0 **INDIVIDUAL LIQUID EFFLUENT**

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 03	QTR: 04	QTR: 03	QTR: 04
AG-110M	CI			1.13E-03	4.84E-03
BE-7	CI			1.31E-04	7.74E-05
CO-57	CI				3.70E-05
CO-58	CI		2.07E-04	1.16E-03	3.68E-02
CO-60	CI			2.02E-03	1.02E-02
CR-51	CI				2.86E-03
CS-134	CI			4.68E-04	2.36E-04
CS-136	CI				6.99E-06
CS-137	CI		2.97E-05	1.05E-03	3.96E-04
FE-59	CI				1.07E-03
I-131	CI		3.94E-05		3.49E-04
I-133	CI				1.59E-05
LA-140	CI				4.43E-05
MN-54	CI			2.12E-05	5.75E-04
NA-24	CI				3.50E-06
NB-95	CI			3.99E-06	2.47E-04
NB-97	CI			1.04E-05	1.03E-05
RU-103	CI				1.57E-06
RU-105	CI				1.21E-05
SB-122	CI				9.04E-04
SB-124	CI			5.82E-05	1.54E-02
SB-125	CI			7.55E-04	4.61E-03
SB-126	CI				1.32E-05
SC-47	CI				1.45E-04

TABLE 2A
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

27.0 **INDIVIDUAL LIQUID EFFLUENT** (CONTINUED)

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 03	QTR: 04	QTR: 03	QTR: 04
SN-113	CI			1.09E-05	6.09E-04
SR-92	CI				2.89E-05
W-187	CI				3.44E-05
ZN-65	CI				9.72E-05
ZR-95	CI				1.67E-04
ZR-97	CI				1.47E-06
FE-55	CI	2.79E-03	6.95E-04	7.39E-03	9.57E-03
SR-90	CI				
TOTAL	CI	2.79E-03	9.71E-04	1.42E-02	8.93E-02

28.0 **DISSOLVED AND ENTRAINED GASES**

		CONTINUOUS MODE		BATCH MODE	
NUCLIDE	UNITS	QTR: 03	QTR: 04	QTR: 03	QTR: 04
XR-85	CI			3.00E-03	
XE-131M	CI			7.46E-04	
XE-133	CI			2.39E-02	1.68E-03
XE-133M	CI			6.64E-05	9.31E-06
XE-135	CI			3.75E-05	6.94E-06
TOTAL	CI	0.00E+00	0.00E+00	2.78E-02	1.70E-03