

Attachment A

Effluent and Waste Disposal Semiannual Report
Period Jul-Dec 1994

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NORTHERN STATES POWER COMPANY
MONTICELLO NUCLEAR GENERATING PLANT
License No. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
Period : Jul - Dec 1994

Supplemental Information

1. Regulatory Limits - Quarterly levels requiring reporting to
Nuclear Regulatory Commission

A. Noble Gases :

5 mrad/quarter gamma radiation
10 mrad/quarter beta radiation

B. Long Lived Iodines, Particulates, and Tritium :

7.5 mrem/quarter dose to any organ

C. Liquid Effluents :

1.5 mrem/quarter dose to the total body
5.0 mrem/quarter dose to any organ

2. Maximum Permissible Concentrations

A. Noble Gases :

10 CFR Part 20, Appendix B, Table II, Column 1

B. Long Lived Iodines, Particulates, and Tritium :

10 CFR Part 20, Appendix B, Table II, Column 1

C. Liquid Effluents :

10 CFR Part 20, Appendix B, Table II, Column 2
2.0 E-4 uci/ml for dissolved and entrained gases

3. Average Energy

(Not Applicable)

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Supplemental Information (continued)

4. Measurements and Approximations of Total Radioactivity

A. Noble Gases :

Continuous gross activity monitors in Reactor Building Vent and Plant Stack exhaust streams. Weekly isotopic analysis of exhaust streams.

B. Iodines in Gaseous Effluent :

Continuous monitoring with charcoal cartridges in Reactor Building Vent and Plant Stack exhaust streams with weekly analysis.

C. Particulates in Gaseous Effluent :

Continuous monitoring with particulate filters in Reactor Building Vent and Plant Stack exhaust streams with weekly analysis.

D. Tritium in Gaseous Effluent :

Continuous monitoring with silica gel cartridges in Reactor Building Vent and Plant Stack exhaust streams with weekly analysis.

E. Liquid Effluents :

Tank sample analyzed prior to each planned release and continuous monitoring of gross activity during planned release.

5. Batch Releases

A. Liquid :

1. Number of Batch Releases	0	
2. Total Time Period for Batch Releases	0.0	min
3. Maximum Time Period for a Batch Release	0.0	min
4. Average Time Period for a Batch Release	0.0	min
5. Minimum Time Period for a Batch Release	0.0	min
6. Average River Flow During Release	0.0	cf/sec

B. Gaseous :

1. Number of Batch Releases	4	
2. Total Time Period for Batch Releases	3137.0	min
3. Maximum Time Period for a Batch Release	1782.0	min
4. Average Time Period for a Batch Release	784.3	min
5. Minimum Time Period for a Batch Release	293.0	min

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Supplemental Information (continued)

6. Abnormal Releases

A. Liquid :

1. Number of Releases	0	
2. Total Activity Released	0.0	Ci

B. Gaseous :

1. Number of Releases	0	
2. Total Activity Released	0.0	Ci

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Table 1A Gaseous Effluents - Summation of all Releases

	Units	3rd Qtr	4th Qtr	Est. Total Error, %
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A. Fission & Activation gases

1. Total Release	Ci	1.06E+02	9.67E+01	2.00E+01
2. Average Release Rate	uci/sec	1.33E+01	1.22E+01	
3. Percent Tech Spec Qtrly Reporting Level				
Gamma Radiation	%	8.34E-02	6.14E-02	
Beta Radiation	%	4.13E-02	2.04E-02	

B. Iodines

1. Total I-131 Release	Ci	2.54E-03	8.39E-04	1.00E+01
2. Average I-131 Release Rate	uci/sec	3.19E-04	1.06E-04	

C. Particulates

1. Total Particulates	Ci	8.34E-04	5.52E-04	3.00E+01
2. Average Release Rate	uci/sec	1.05E-04	6.94E-05	
3. Gross Alpha Radioactivity	Ci	6.41E-06	3.98E-06	

D. Tritium

1. Total Release	Ci	2.11E+01	1.33E+01	1.00E+01
2. Average Release Rate	uci/sec	2.65E+00	1.68E+00	

E. Percent Qtrly Tech Spec Reporting Levels

1. Iodines, Particulates, and Tritium	%	4.28E-01	1.06E-01	
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EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
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Table 1B Gaseous Effluents - Elevated Releases

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		3rd Qtr	4th Qtr	3rd Qtr	4th Qtr
1. Fission Gases					
KR-85M	Ci	1.27E-02	1.21E+00	0.00E+00	0.00E+00
KR-87	Ci	7.42E-01	1.79E+00	0.00E+00	0.00E+00
KR-88	Ci	7.96E-01	2.86E+00	0.00E+00	0.00E+00
KR-89	Ci	9.39E-01	0.00E+00	0.00E+00	0.00E+00
XE-133	Ci	3.65E+01	2.50E+01	0.00E+00	8.08E-03
XE-133M	Ci	4.70E-01	3.58E-01	0.00E+00	0.00E+00
XE-135	Ci	2.86E+00	1.83E+01	0.00E+00	4.76E-03
XE-135M	Ci	5.68E+00	8.12E+00	0.00E+00	0.00E+00
XE-137	Ci	3.04E+01	1.48E+01	0.00E+00	0.00E+00
XE-138	Ci	1.59E+01	1.89E+01	0.00E+00	0.00E+00
AR-41	Ci	0.00E+00	6.46E-02	0.00E+00	1.87E-02
Total for Period	Ci	9.43E+01	9.13E+01	0.00E+00	3.15E-02
2. Iodines					
I-131	Ci	5.73E-04	5.80E-04	0.00E+00	0.00E+00
I-133	Ci	2.13E-03	2.19E-03	0.00E+00	0.00E+00
I-135	Ci	2.69E-03	1.17E-03	0.00E+00	0.00E+00
Total for Period	Ci	5.39E-03	3.94E-03	0.00E+00	0.00E+00
3. Particulates					
CR-51	Ci	7.54E-07	0.00E+00	0.00E+00	0.00E+00
MN-54	Ci	1.97E-07	8.40E-07	0.00E+00	0.00E+00
CO-60	Ci	2.79E-06	6.54E-06	0.00E+00	1.47E-07
ZN-65	Ci	4.37E-06	4.66E-06	0.00E+00	0.00E+00
RU-103	Ci	0.00E+00	4.63E-08	0.00E+00	0.00E+00
CS-137	Ci	1.05E-06	2.01E-06	0.00E+00	0.00E+00
BA-140	Ci	1.36E-04	9.73E-05	0.00E+00	0.00E+00
HG-203	Ci	0.00E+00	4.08E-07	0.00E+00	0.00E+00
SR-89	Ci	7.38E-05	0.00E+00	0.00E+00	0.00E+00
SR-90	Ci	4.00E-07	0.00E+00	0.00E+00	0.00E+00
Total for Period	Ci	2.19E-04	1.11E-04	0.00E+00	1.47E-07

Analysis of Sr-89 & 90 for the 4th Qtr was not completed in time for this report, results will be included with the next semiannual report.

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
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Table 1C Gaseous Effluents - Building Vent Releases

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		3rd Qtr	4th Qtr	3rd Qtr	4th Qtr
1. Fission Gases					
XE-133	Ci	3.94E-01	0.00E+00	7.31E-03	3.24E-03
XE-135	Ci	1.04E+01	4.68E+00	6.01E-03	0.00E+00
XE-135M	Ci	8.29E-01	5.99E-01	0.00E+00	0.00E+00
AR-41	Ci	0.00E+00	0.00E+00	1.23E-03	1.41E-02
Total for Period	Ci	1.16E+01	5.28E+00	1.46E-02	1.73E-02
2. Iodines					
I-131	Ci	1.96E-03	2.59E-04	0.00E+00	0.00E+00
I-133	Ci	1.24E-02	1.32E-03	0.00E+00	0.00E+00
I-135	Ci	1.92E-02	2.13E-04	0.00E+00	0.00E+00
Total for Period	Ci	3.36E-02	1.79E-03	0.00E+00	0.00E+00
3. Particulates					
MN-54	Ci	3.91E-06	6.03E-06	0.00E+00	0.00E+00
CO-58	Ci	5.57E-06	0.00E+00	0.00E+00	0.00E+00
CO-60	Ci	1.96E-04	1.45E-04	2.02E-06	0.00E+00
ZN-65	Ci	2.87E-04	2.64E-04	0.00E+00	1.35E-05
CS-137	Ci	6.80E-05	1.18E-05	0.00E+00	0.00E+00
BA-140	Ci	3.24E-05	0.00E+00	0.00E+00	0.00E+00
CE-141	Ci	1.00E-06	0.00E+00	0.00E+00	0.00E+00
SR-89	Ci	1.85E-05	0.00E+00	0.00E+00	0.00E+00
SR-90	Ci	9.26E-08	0.00E+00	0.00E+00	0.00E+00
Total for Period	Ci	6.13E-04	4.27E-04	2.02E-06	1.35E-05

Analysis of Sr-89 & 90 for the 4th Qtr was not completed in time for this report, results will be included with the next semiannual report.

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
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Table 2A Liquid Effluents - Summation of all Releases

	Units	3rd Qtr	4th Qtr	Est. Total Error, %
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A. Fission & Activation products

1. Total Release (not including tritium, gases, alpha)	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

B. Tritium

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

C. Dissolved and Entrained Gases

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
2. Avg Diluted Concentration	uci/ml	0.00E+00	0.00E+00	

D. Percent Qtrly Tech Spec Reporting Level

1. Whole Body Dose	%	0.00E+00	0.00E+00	
2. Organ Dose	%	0.00E+00	0.00E+00	

E. Gross Alpha Radioactivity

1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00
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F. Volume of Waste Released	Liters	0.00E+00	0.00E+00	0.00E+00
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F. Volume of Dilution Water Used	Liters	0.00E+00	0.00E+00	0.00E+00
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Table 2B Liquid Effluents

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		3rd Qtr	4th Qtr	3rd Qtr	4th Qtr

None Released This Period

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Table 3 Solid Waste and Irradiated Fuel Shipments
A. Solid Waste Shipped Offsite for Burial or Disposal (not irradiated fuel)

1. Type of Waste	Units	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	Cu. Meter Ci	0.00E+00 0.00E+00	0.00E+00
b. Dry compressible waste, contaminated equipment, etc.	Cu. Meter Ci	0.00E+00 0.00E+00	0.00E+00
c. Irradiated components, control rods, etc.	Cu. Meter Ci	0.00E+00 0.00E+00	0.00E+00
d. Other (describe)	Cu. Meter Ci	0.00E+00 0.00E+00	0.00E+00

2. Estimate of major nuclide composition (by type of waste)				
Nuclide	Type A percent	Type B percent	Type C percent	Type D percent

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Table 3 Solid Waste and Irradiated Fuel Shipments

3. Solid waste disposal

Number of Shipments	Mode of Transportation	Destination

B. Irradiated Fuel Shipments

1. Disposition

Number of Shipments	Mode of Transportation	Destination

None This Period

C. Shipping Container and Solidification Method

No.	Volume M3	Activity Ci	Type of Waste	Container Code	Solidification Code

Container Codes :

L - LSA
A - Type A
B - Type B
Q - Large Quantity

Solidification Codes :

C - Cement
U - Urea Formaldehyde
D - Dewatering
N - Not Applicable

Attachment B

Off-Site Radiation Dose Assessment for
January 1, - December 31, 1994

**NORTHERN STATES POWER COMPANY
MONTICELLO NUCLEAR GENERATING PLANT**

**Off-Site Radiation Dose Assessment
for January 1, - December 31, 1994**

An assessment of radiation dose due to releases from the Monticello Nuclear Generating Plant during 1994 was performed in accordance with the Technical Specifications. Computed doses were well below the 40 CFR 190 Standards and 10 CFR Part 50, Appendix I Guidelines.

Off-site dose calculation formulas and meteorological data from the Off-site Dose Calculation Manual were used in making this assessment. Source terms were obtained from the two Semi-Annual Effluent Release Reports for 1994.

Off-Site Doses from Gaseous Releases

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.

Off-Site Doses From Liquid Releases

There were no Liquid releases in 1994 as listed in Table 1.

Doses to Individuals Due to Activities Inside the Site Boundary

Occasionally sportsmen enter the Monticello site for recreational activities, in addition, an Environmental Protection Agency Field Station is located at the Monticello site (see Figure 3.8.1 and 3.8.2 of the Monticello Technical Specifications). Workers at this field station, spending an average of 40 hours/week, are the most exposed individuals. Whole body doses to these individuals have been computed using stack and vent X/Q values for the Field Station location. Annual computed doses were reduced by the factor of 40/168 to account for the limited occupancy for workers at this location. Organ doses to workers at the EPA Field Station due to gaseous releases have been computed. Doses at this location are reported in Table 1.

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

There are no other uranium fuel facilities in the vicinity of the Monticello site. The only other artificial source of exposure to the general public in addition to the plant effluent releases is from direct radiation of the reactor and the steam turbines. MNGP started a hydrogen water chemistry (HWC) program in February 1989. Prior to the installation of HWC, a study was conducted to determine the direct and skyshine radiation contribution from HWC.

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

This study determined the maximum exposed member of the public from direct and sky shine radiation to be a residence located 0.6 miles from the reactor at the SW sector. Using conservative assumptions, calculations indicated a maximum annual dose of 4 mrem to this residence. However, a review of TLD results from 1987 through 1994 revealed no noticeable increase in direct and skyshine radiation as a result of the HWC program installed in early 1989.

A calculation of the total annual dose to this residence from all existing pathways of radioactive effluents was performed by running GASPAC computer codes. Adding 4 mrem/year to this calculation results in a maximum whole body dose of 4.02 mrem in 1994.

Therefore, the most exposed member of the general public will not receive an annual radiation dose from reactor effluent releases and all other fuel cycle activities in excess of 40 CFR 190 standards of 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ.

Radiological Environmental Monitoring Program Sampling Deviations

There were no milk or vegetable sampling deviations during this reporting period. Two Dairy locations did change as a result of farmers going out of business. The final dairy sample from the Control Dairy (location; NW sector, 323 degrees at 11.5 miles) farm was taken on December 12, 1994. Therefore all samples for 1994 were taken at this location. The monthly control dairy sample was resumed in January 1995 at location; NW sector, 321 degrees at 12.5 miles. The Holthaus farm at location; S sector, 175 degrees at 4.2 miles sold their dairy herd. The final sample taken at this location was November 8, 1994. The highest D/Q dairy farm for 1994 was unaffected by these changes.

Table 1**Off-Site Radiation Dose Assessment - Monticello****PERIOD: January 1, through December 31, 1994**

GASEOUS RELEASES	DOSE	10CFR50 App. I Guidelines per year.
Max. Site Boundary Gamma Air Dose (mrad)	0.220	10
Max. Site Boundary Beta Air Dose (mrad)	0.390	20
Max. Off-site Dose to Any Organ (mrem)	0.050	15
EPA Field Station (mrem, 40 hours/week)		
Whole Body	0.003	5
Organ (skin)	0.005	15
Liquid Releases		
Max. Off-Site Dose Whole Body (mrem)	0.000	3
Max. Off-Site Dose Organ, Total (mrem)	0.000	10

Table 2
Off-Site Radiation Dose Assessment - Monticello
Supplemental Information

PERIOD: January 1, through December 31, 1994

Gaseous Releases	
Max. Site Boundary Dose Location (from building vents)	
Sector	SSE
Distance (miles)	0.43 (vent)
EPA Field Station	
Sector	SE
Distance (miles)	0.26 (Stack) 0.36 (Vent)
Maximum Off-site Dose Location	
Sector	SSW
Distance	0.70
Pathways	Ground, Inhalation, Vegetable
Age Group	Child
Organ	Thyroid
Liquid Releases	
Max. Off-Site Dose Location Downstream	
Pathways	Drinking Water Drinking Water Fish
Age Group	Infant Adult
Organ	W.Body GI-LLI
Dilution Factor (drinking water)	7.1 7.1