

MONTICELLO NUCLEAR GENERATING PLANT
NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT

SUPPLEMENTAL INFORMATION

1. REGULATORY LIMITS - QTRLY LEVELS REQUIRING REPORT TO NRC

A. NOBLE GASES:

$$50 * (QTV * NBARV + QTS * NBARS) = 1 \quad \text{AND}$$

$$25 * (QTV * MBARV + QTS * MBARS) = 1$$

QTV = NOBLE GAS RELEASE RATE FROM BLDG VENTS (CI/SEC)
QTS = NOBLE GAS RELEASE RATE FROM PLANT STACK (CI/SEC)
NBARV = VENT AVG GAMMA AIR DOSE FACTOR (RAD/YR PER CI/SEC)
NBARS = STACK AVG GAMMA AIR DOSE FACTOR (RAD/YR PER CI/SEC)
MBARV = VENT AVG BETA AIR DOSE FACTOR (RAD/YR PER CI/SEC)
MBARS = STACK AVG BETA AIR DOSE FACTOR (RAD/YR PER CI/SEC)

B. IODINES AND PARTICULATES:

$$50 * (3.7E05 * QV + 2.5E04 * QS) = 1$$

QV = BUILDING VENT RELEASE RATE OF IODINES AND PARTICULATES
WITH HALF-LIVES GREATER THAN 8 DAYS (CI/SEC)

QS = PLANT STACK RELEASE RATE OF IODINES AND PARTICULATES
WITH HALF-LIVES GREATER THAN 8 DAYS (CI/SEC)

C. LIQUID EFFLUENTS:

CONCENTRATION - 10CFR20, APP B, TABLE II, COL 2,
AND NOTES THERETO

TOTAL QUANTITY - 2.5 CI/QUARTER

2. AVERAGE DOSE FACTORS FOR NOBLE GASES
(REM/YEAR PER CI/SEC AND RAD/YEAR PER CI/SEC):

	VENT RELEASES		STACK RELEASES	
	1ST QTR	2ND QTR	1ST QTR	2ND QTR
KBAR (BODY GAMMA)	5.93E 00	5.76E 00	1.60E 00	1.51E 00
LBAR (SKIN BETA)	4.56E 01	4.48E 01	1.73E 00	1.66E 00
MBAR (AIR BETA)	4.82E 01	4.74E 01	1.83E 00	1.76E 00
NBAR (AIR GAMMA)	6.26E 00	6.09E 00	1.66E 00	1.57E 00

3. AVERAGE ENERGY:

(NOT APPLICABLE)

8108020444

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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 ISOTOPIIC ANALYSIS OF STEAM JET AIR EJECTOR STREAM. MONTHLY ANALYSIS OF STORAGE TANK CONTENTS.

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 BIWEEKLY ANALYSIS.

E. LIQUID EFFLUENTS:

TANK SAMPLE ANALYZED PRIOR TO RELEASE WITH CONTINUOUS MONITORING OF GROSS ACTIVITY DURING RELEASE.

5. BATCH RELEASES:

A. LIQUID:

1. NUMBER OF BATCH RELEASES	0	
2. TOTAL TIME PERIOD FOR BATCH RELEASES	NA	MIN
3. MAXIMUM TIME PERIOD FOR A BATCH RELEASE	NA	MIN
4. AVERAGE TIME PERIOD FOR A BATCH RELEASE	NA	MIN
5. MINIMUM TIME PERIOD FOR A BATCH RELEASE	NA	MIN
6. AVERAGE RIVER FLOW DURING RELEASES	NA	CF/SEC

B. GASEOUS:

1. NUMBER OF BATCH RELEASES	0	
2. TOTAL TIME PERIOD FOR BATCH RELEASES	NA	MIN
3. MAXIMUM TIME PERIOD FOR A BATCH RELEASE	NA	MIN
4. AVERAGE TIME PERIOD FOR A BATCH RELEASE	NA	MIN
5. MINIMUM TIME PERIOD FOR A BATCH RELEASE	NA	MIN

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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LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 1A GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	UNITS	1ST QTR	2ND QTR	PCNT EST ERRCR
A. NOBLE GASES:				
1. TOTAL RELEASE:				
A. ELEVATED RELEASE	CI	5.37E 02	6.34E 02	
B. BUILDING VENT RELEASE	CI	5.31E 02	4.13E 02	
C. TOTAL	CI	1.07E 03	1.05E 03	5.00E 01
2. AVERAGE RELEASE RATE:				
A. ELEVATED RELEASE	UCI/SEC	6.75E 01	7.97E 01	
B. BUILDING VENT RELEASE	UCI/SEC	6.68E 01	5.19E 01	
C. TOTAL	UCI/SEC	1.34E 02	1.32E 02	5.00E 01
3. PERCENT TECH SPEC QTRLY REPORTING LEVEL		8.37E 00	6.50E 00	
B. IODINES:				
1. TOTAL I-131:				
A. ELEVATED RELEASE	CI	2.66E-03	2.93E-03	
B. BUILDING VENT RELEASE	CI	2.14E-03	1.43E-03	
C. TOTAL	CI	4.80E-03	4.26E-03	5.00E 01
2. AVERAGE I-131 RELEASE RATE:				
A. ELEVATED RELEASE	UCI/SEC	3.35E-04	3.56E-04	
B. BUILDING VENT RELEASE	UCI/SEC	2.69E-04	1.80E-04	
C. TOTAL	UCI/SEC	6.04E-04	5.35E-04	5.00E 01
C. LONG LIVED PARTICULATES AND GROSS ALPHA RELEASES:				
1. TOTAL PARTICULATES:				
A. ELEVATED RELEASE	CI	8.58E-04	1.53E-03	
B. BUILDING VENT RELEASE	CI	9.19E-04	7.89E-04	
C. TOTAL	CI	1.78E-03	2.32E-03	5.00E 01
2. AVERAGE RELEASE RATE:				
A. ELEVATED RELEASE	UCI/SEC	1.08E-04	1.92E-04	
B. BUILDING VENT RELEASE	UCI/SEC	1.16E-04	9.93E-05	
C. TOTAL	UCI/SEC	2.24E-04	2.91E-04	5.00E 01
3. PERCENT TECH SPEC QTRLY REPORTING LEVEL FOR LONG LIVED IODINES & PARTICULATES		7.67E-01	5.84E-01	

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NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 1A GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES (CONTINUED)

	UNITS	1ST QTR	2ND QTR	PCNT EST ERROR
4. GROSS ALPHA RADIOACTIVITY:				
A. ELEVATED RELEASE	CI	1.11E-06	1.10E-06	
B. BUILDING VENT RELEASE	CI	6.61E-06	6.50E-06	
C. TOTAL	CI	7.72E-06	7.60E-06	1.00E 02
D. TRITIUM:				
1. TOTAL RELEASE:				
A. ELEVATED RELEASE	CI	1.33E 00	1.45E 00	
B. BUILDING VENT RELEASE	CI	1.17E 01	3.86E 01	
C. TOTAL	CI	1.31E 01	4.00E 01	5.00E 01
2. AVERAGE RELEASE RATE:				
A. ELEVATED RELEASE	UCI/SEC	1.68E-01	1.83E-01	
B. BUILDING VENT RELEASE	UCI/SEC	1.47E 00	4.85E 00	
C. TOTAL	UCI/SEC	1.64E 00	5.04E 00	5.00E 01

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NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 1B GASEOUS EFFLUENTS - ELEVATED RELEASE

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE		BATCH MODE	
		1ST QTR	2ND QTR	1ST QTR	2ND QTR
1. NOBLE GASES:					
XE133	CI	2.39E 01	5.62E 01	0.0	0.0
XE135	CI	7.78E 00	8.49E 00	0.0	0.0
KR85M	CI	1.20E 00	1.36E 00	0.0	0.0
KR88	CI	4.01E 00	4.51E 00	0.0	0.0
KR87	CI	7.04E 00	8.00E 00	0.0	0.0
XE138	CI	1.50E 02	1.64E 02	0.0	0.0
KR90	CI	4.55E 00	5.15E 00	0.0	0.0
XE139	CI	1.35E 01	1.53E 01	0.0	0.0
KR89	CI	1.34E 02	1.52E 02	0.0	0.0
XE137	CI	1.75E 02	1.99E 02	0.0	0.0
XE135M	CI	1.03E 01	1.17E 01	0.0	0.0
KR83M	CI	1.40E 00	1.59E 00	0.0	0.0
XE135M	CI	3.90E-02	7.85E-02	0.0	0.0
XE131M	CI	2.60E-01	6.00E-01	0.0	0.0
KR85	CI	3.31E 00	6.39E 00	0.0	0.0
TOTAL FOR PERIOD	CI	5.37E 02	6.34E 02	0.0	0.0
2. IODINES:					
I-131	CI	2.66E-03	2.83E-03	0.0	0.0
I-133	CI	1.27E-02	8.44E-03	0.0	0.0
I-135	CI	5.26E-03	4.06E-03	0.0	0.0
TOTAL	CI	2.06E-02	1.53E-02	0.0	0.0

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NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 18 GASEOUS EFFLUENTS - ELEVATED RELEASE (CONTINUED)

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE		BATCH MODE	
		1ST QTR	2ND QTR	1ST QTR	2ND QTR
3. PARTICULATES:					
ND147	CI	0.0	0.0	0.0	0.0
CE144	CI	0.0	0.0	0.0	0.0
CE141	CI	8.74E-07	4.46E-07	0.0	0.0
BA140	CI	5.70E-04	1.08E-03	0.0	0.0
CS137	CI	8.44E-06	1.27E-05	0.0	0.0
CS136	CI	0.0	0.0	0.0	0.0
CS134	CI	1.25E-07	0.0	0.0	0.0
SO126	CI	0.0	0.0	0.0	0.0
SE124	CI	0.0	0.0	0.0	0.0
RU103	CI	0.0	0.0	0.0	0.0
ZR95	CI	0.0	0.0	0.0	0.0
NB95	CI	0.0	0.0	0.0	0.0
SR90	CI	2.84E-06	3.12E-06	0.0	0.0
SR89	CI	2.73E-04	4.22E-04	0.0	0.0
ZN65	CI	0.0	0.0	0.0	0.0
CO60	CI	2.31E-06	2.71E-06	0.0	0.0
FE59	CI	0.0	0.0	0.0	0.0
CO58	CI	0.0	0.0	0.0	0.0
CO57	CI	0.0	0.0	0.0	0.0
MN54	CI	0.0	1.06E-05	0.0	0.0
CR51	CI	0.0	0.0	0.0	0.0
TOTAL	CI	8.58E-04	1.53E-03	0.0	0.0

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NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 1C GASEOUS EFFLUENTS - BUILDING VENT RELEASE

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE		BATCH MODE	
		1ST QTR	2ND QTR	1ST QTR	2ND QTR
1. NOBLE GASES:					
XE133	CI	5.35E-01	1.04E 01	0.0	0.0
XE135	CI	8.11E 00	6.13E 00	0.0	0.0
KR85M	CI	1.25E 00	9.56E-01	0.0	0.0
KR88	CI	4.18E 00	3.18E 00	0.0	0.0
KR87	CI	7.34E 00	5.62E 00	0.0	0.0
XE138	CI	1.56E 02	1.15E 02	0.0	0.0
KR90	CI	4.74E 00	3.62E 00	0.0	0.0
XE139	CI	1.41E 01	1.03E 01	0.0	0.0
KR89	CI	1.40E 02	1.07E 02	0.0	0.0
XE137	CI	1.83E 02	1.40E 02	0.0	0.0
XE135M	CI	1.08E 01	8.24E 00	0.0	0.0
KR83M	CI	1.45E 00	1.12E 00	0.0	0.0
XE135M	CI	2.57E-02	2.16E-01	0.0	0.0
XE131M	CI	9.22E-04	2.20E-02	0.0	0.0
KR85	CI	2.65E-03	8.05E-02	0.0	0.0
TOTAL FOR PERIOD	CI	5.31E 02	4.13E 02	0.0	0.0
2. IODINES:					
I-131	CI	2.14E-03	1.43E-03	0.0	0.0
I-133	CI	1.46E-02	9.56E-03	0.0	0.0
I-135	CI	2.34E-03	8.04E-04	0.0	0.0
TOTAL	CI	1.90E-02	1.19E-02	0.0	0.0

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NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 1C GASEOUS EFFLUENTS - BUILDING VENT RELEASES (CONTINUED)

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE		BATCH MODE	
		1ST QTR	2ND QTR	1ST QTR	2ND QTR
3. PARTICULATES:					
ND147	CI	0.0	7.68E-07	0.0	0.0
CE144	CI	0.0	0.0	0.0	0.0
CE141	CI	0.0	0.0	0.0	0.0
BA140	CI	4.01E-04	4.07E-04	0.0	0.0
CS137	CI	1.59E-04	9.21E-05	0.0	0.0
CS136	CI	0.0	0.0	0.0	0.0
CS134	CI	2.25E-05	9.20E-06	0.0	0.0
SB126	CI	0.0	0.0	0.0	0.0
SB124	CI	0.0	0.0	0.0	0.0
RU103	CI	0.0	0.0	0.0	0.0
ZR95	CI	0.0	0.0	0.0	0.0
NB95	CI	0.0	0.0	0.0	0.0
SR90	CI	5.33E-06	7.83E-06	0.0	0.0
SR89	CI	8.78E-05	1.59E-04	0.0	0.0
Zn65	CI	6.25E-06	3.88E-06	0.0	0.0
CO60	CI	1.93E-04	9.25E-05	0.0	0.0
FE59	CI	0.0	0.0	0.0	0.0
CO58	CI	0.0	0.0	0.0	0.0
CO57	CI	0.0	3.10E-07	0.0	0.0
MN54	CI	9.44E-06	6.03E-06	0.0	0.0
CR51	CI	3.49E-05	1.11E-05	0.0	0.0
TOTAL	CI	9.19E-04	7.89E-04	0.0	0.0

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NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 2A LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	UNITS	1ST QTR	2ND QTR	PCNT EST ERROR
A. FISSION AND ACTIVATION PRODUCTS:				
1. TOTAL RELEASE (EXCEPT H-3, GASES, AND ALPHA)	CI	0.0	0.0	0.0
2. AVG DILUTED CONCENTRATION	UCI/ML	0.0	0.0	
3. PERCENT QTRLY TECH SPEC REPORTING LEVEL		0.0	0.0	
B. TRITIUM:				
1. TOTAL RELEASE	CI	0.0	0.0	0.0
2. AVG DILUTED CONCENTRATION	UCI/ML	0.0	0.0	
3. PERCENT QTRLY TECH SPEC REPORTING LEVEL		NA	NA	
C. DISSOLVED AND ENTRAINED GASES:				
1. TOTAL RELEASE	CI	0.0	0.0	0.0
2. AVG DILUTED CONCENTRATION	UCI/ML	0.0	0.0	
3. PERCENT QTRLY TECH SPEC REPORTING LEVEL		NA	NA	
D. GROSS ALPHA RADIOACTIVITY:				
1. TOTAL RELEASE	CI	0.0	0.0	0.0
E. VOLUME OF WASTE RELEASED				
	LITERS	0.0	0.0	0.0
F. VOLUME OF DILUTION WATER USED				
	LITERS	0.0	0.0	0.0

MONTICELLO NUCLEAR GENERATING PLANT
NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 2b LIQUID EFFLUENTS

NUCLIDES RELEASED	UNITS	CONTINUOUS MODE		BATCH MODE	
		1ST QTR	2ND QTR	1ST QTR	2ND QTR

NONE

MONTICELLO NUCLEAR GENERATING PLANT
NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 3 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL:

1. TYPE OF WASTE:

	UNITS	TOTAL	PCNT EST ERROR
	-----	-----	-----
A. SPENT RESINS, FILTER SLUDGES, EVAPORATOR BOTTOMS, ECT.	CU METER CI	1.82E 02 5.10E 02	5.00E 01
B. DRY COMPRESSIBLE WASTE, CONTAMINATED EQUIP, ECT.	CU METER CI	8.44E 01 1.98E 00	5.00E 01
C. IRRADIATED COMPONENTS, CONTROL RODS, ECT.	CU METER CI	0.0 0.0	0.0
D. OTHER (DESCRIBED BELOW): NONE			

2. ESTIMATE OF MAJOR NUCLIDE COMPOSITION BY TYPE OF WASTE:

TYPE	NUCLIDE	PERCENT
-----	-----	-----
A	CE141	2.57E-01
	BA140	7.11E 00
	CS137	3.40E 01
	CS134	5.54E 00
	ZN65	1.14E 01
	CO60	1.75E 01
	CO58	2.17E-02
	MN54	1.76E 00
	CR51	2.41E 00
	LA140	7.58E 00
	I 131	7.95E 00
B	CS137	1.80E 00
	ZN65	4.14E 00
	CO60	6.75E 01
	FE59	3.95E 00
	CO58	7.04E 00
	MN54	5.05E 00
	CR51	1.01E 01

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NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1980
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

TABLE 3 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (CONTINUED)

3. SOLID WASTE DISPOSITION:

<u>NUMBER OF SHIPMENTS</u>	<u>MODE</u>	<u>DESTINATION</u>
26	TRUCK	CHEM NUC INC., BARNWELL, S. C.
10	TRUCK	NUC ENG CO., RICHLAND, WASH.

8. IRRADIATED FUEL SHIPMENTS:

<u>NUMBER OF SHIPMENTS</u>	<u>MODE</u>	<u>DESTINATION</u>
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NONE

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LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

NOTES:

1. RELEASE OF INDIVIDUAL NOBLE GAS ISOTOPES FROM THE PLANT STACK WAS DETERMINED USING AN ISOTOPIC ANALYSIS AT THE STEAM JET AIR EJECTOR. XE133, XE135, KR85M, KR88, KR87, AND XE138 WERE MEASURED AND USED TO CHARACTERIZE THE MODE OF GAS RELEASE FROM THE FUEL. OTHER SIGNIFICANT NOBLE GASES WERE DETERMINED USING KNOWN RATIOS, THE MEASURED TOTAL OFFGAS HOLDUP SYSTEM DELAY TIME, AND THE KNOWN FRACTION OF THE OFFGAS STREAM RELEASED VIA THE GLAND EXHAUSTER.

2. AN ISOTOPIC ANALYSIS FOR NOBLE GASES IS NORMALLY NOT POSSIBLE AT THE BUILDING VENTS. INDIVIDUAL ISOTOPES ARE GENERALLY BELOW THEIR LOWER LIMIT OF DETECTION (LLD). THEREFORE, FOR REACTOR BUILDING VENT RELEASES, THE NOBLE GAS ISOTOPIC MIXTURE IS ASSUMED TO BE THE SAME AS THE MIXTURE DETERMINED AT THE STEAM JET AIR EJECTOR

3. INFORMATION SPECIFIED IN REGULATORY GUIDE 1.21 WHICH IS NOT APPLICABLE TO THE MONTICELLO PLANT IS INDICATED BY 'NA'.

4. NUCLIDES NOT DETECTED IN PLANT EFFLUENTS (THOSE BELOW THE LLD OF THE ANALYSIS) ARE NOT INCLUDED IN THE QUANTITIES REPORTED RELEASED. LLD VALUES ARE RECORDED AND MUST BE LESS THAN THE MINIMUM LLD VALUES STATED IN THE MONTICELLO TECHNICAL SPECIFICATIONS.