

MONTICELLO NUCLEAR GENERATING PLANT
NORTHERN STATES POWER COMPANY

PERIOD: JUL - DEC 1979
LICENSE NO. DPR-22

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SUPPLEMENTAL INFORMATION

1. REGULATORY LIMITS - QTRLY LEVELS REQUIRING REPORT TO NRC

A. NOBLE GASES:

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

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

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)	5.94E 00	5.93E 00	1.52E 00	1.57E 00
LBAR (SKIN BETA)	4.56E 01	4.56E 01	1.64E 00	1.70E 00
MBAR (AIR BETA)	4.82E 01	4.82E 01	1.74E 00	1.79E 00
NBAR (AIR GAMMA)	6.27E 00	6.26E 00	1.58E 00	1.63E 00

3. AVERAGE ENERGY:

(NOT APPLICABLE)

8002280 598

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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 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.

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

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	1ST QTR	2ND QTR	PCNT EST ERROR
A. NOBLE GASES:				
1. TOTAL RELEASE:				
A. ELEVATED RELEASE	CI	9.07E 02	8.31E 02	
B. BUILDING VENT RELEASE	CI	2.03E 02	2.72E 02	
C. TOTAL	CI	1.11E 03	1.10E 03	5.00E 01
2. AVERAGE RELEASE RATE:				
A. ELEVATED RELEASE	UCI/SEC	1.14E 02	1.05E 02	
B. BUILDING VENT RELEASE	UCI/SEC	2.55E 01	3.43E 01	
C. TOTAL	UCI/SEC	1.40E 02	1.39E 02	5.00E 01
3. PERCENT TECH SPEC QTRLY REPORTING LEVEL		3.57E 00	4.60E 00	
B. IODINES:				
1. TOTAL I-131:				
A. ELEVATED RELEASE	CI	5.06E-03	2.92E-03	
B. BUILDING VENT RELEASE	CI	1.86E-03	2.19E-03	
C. TOTAL	CI	6.92E-03	5.11E-03	5.00E 01
2. AVERAGE I-131 RELEASE RATE:				
A. ELEVATED RELEASE	UCI/SEC	6.37E-04	3.68E-04	
B. BUILDING VENT RELEASE	UCI/SEC	2.34E-04	2.76E-04	
C. TOTAL	UCI/SEC	8.71E-04	6.43E-04	5.00E 01
C. LONG LIVED PARTICULATES AND GROSS ALPHA RELEASES:				
1. TOTAL PARTICULATES:				
A. ELEVATED RELEASE	CI	9.25E-04	1.81E-03	
B. BUILDING VENT RELEASE	CI	1.43E-03	7.00E-04	
C. TOTAL	CI	2.36E-03	2.51E-03	5.00E 01
2. AVERAGE RELEASE RATE:				
A. ELEVATED RELEASE	UCI/SEC	1.16E-04	2.28E-04	
B. BUILDING VENT RELEASE	UCI/SEC	1.80E-04	8.80E-05	
C. TOTAL	UCI/SEC	2.97E-04	3.16E-04	5.00E 01
3. PERCENT TECH SPEC QTRLY REPORTING LEVEL FOR LONG LIVED IODINES & PARTICULATES		8.61E-01	7.47E-01	

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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	2.41E-07	6.76E-07	
B. BUILDING VENT RELEASE	CI	4.59E-06	2.63E-06	
C. TOTAL	CI	4.84E-06	3.31E-06	1.00E 02
D. TRITIUM:				
1. TOTAL RELEASE:				
A. ELEVATED RELEASE	CI	1.90E 00	1.32E 00	
B. BUILDING VENT RELEASE	CI	1.53E 01	4.47E 01	
C. TOTAL	CI	1.72E 01	4.60E 01	5.00E 01
2. AVERAGE RELEASE RATE:				
A. ELEVATED RELEASE	UCI/SEC	2.39E-01	1.66E-01	
B. BUILDING VENT RELEASE	UCI/SEC	1.93E 00	5.63E 00	
C. TOTAL	UCI/SEC	2.17E 00	5.79E 00	5.00E 01

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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	8.87E 01	5.49E 01	0.0	0.0
XE135	CI	1.20E 01	1.18E 01	0.0	0.0
KR85M	CI	1.83E 00	1.76E 00	0.0	0.0
KR88	CI	6.13E 00	5.92E 00	0.0	0.0
KR87	CI	1.10E 01	1.05E 01	0.0	0.0
XE136	CI	2.41E 02	2.28E 02	0.0	0.0
KR90	CI	7.27E 00	6.90E 00	0.0	0.0
XE139	CI	2.16E 01	2.06E 01	0.0	0.0
KR89	CI	2.14E 02	2.03E 02	0.0	0.0
XE137	CI	2.80E 02	2.66E 02	0.0	0.0
XE135M	CI	1.64E 01	1.56E 01	0.0	0.0
KR83M	CI	2.18E 00	2.10E 00	0.0	0.0
XE133M	CI	2.07E-01	9.58E-02	0.0	0.0
XE131M	CI	5.44E-01	4.33E-01	0.0	0.0
KR85	CI	4.50E 00	3.45E 00	0.0	0.0
TOTAL FOR PERIOD	CI	9.07E 02	8.31E 02	0.0	0.0
2. IODINES:					
I-131	CI	5.06E-03	2.92E-03	0.0	0.0
I-133	CI	1.59E-02	7.18E-03	0.0	0.0
I-135	CI	1.50E-02	3.02E-03	0.0	0.0
TOTAL	CI	3.60E-02	1.31E-02	0.0	0.0

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TABLE 1B 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	1.50E-05	5.12E-06	0.0	0.0
CE141	CI	1.32E-06	0.0	0.0	0.0
BA140	CI	6.26E-04	1.35E-03	0.0	0.0
CS137	CI	7.44E-06	1.11E-05	0.0	0.0
CS136	CI	0.0	0.0	0.0	0.0
CS134	CI	0.0	0.0	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	8.45E-05	2.28E-05	0.0	0.0
SR89	CI	1.90E-04	4.22E-04	0.0	0.0
Nb5	CI	0.0	0.0	0.0	0.0
Co60	CI	4.55E-07	3.98E-07	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	1.28E-06	0.0	0.0	0.0
CR51	CI	0.0	0.0	0.0	0.0
TOTAL	CI	9.25E-04	1.81E-03	0.0	0.0

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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:					
XE135	CI	1.83E-01	2.70E-01	0.0	0.0
XE135	CI	2.93E 00	4.16E 00	0.0	0.0
KR85M	CI	4.53E-01	6.18E-01	0.0	0.0
KR88	CI	1.52E 00	2.07E 00	0.0	0.0
KR87	CI	2.74E 00	3.68E 00	0.0	0.0
XE138	CI	6.03E 01	8.04E 01	0.0	0.0
KR90	CI	1.81E 00	2.43E 00	0.0	0.0
XE139	CI	5.38E 00	7.24E 00	0.0	0.0
KR89	CI	5.32E 01	7.16E 01	0.0	0.0
XE137	CI	6.95E 01	9.36E 01	0.0	0.0
XE135M	CI	4.06E 00	5.50E 00	0.0	0.0
KR85M	CI	5.39E-01	7.38E-01	0.0	0.0
XE133M	CI	8.76E-03	1.26E-02	0.0	0.0
XE131M	CI	3.00E-04	4.43E-04	0.0	0.0
KR85	CI	8.98E-04	1.25E-03	0.0	0.0
TOTAL FOR PERIOD	CI	2.03E 02	2.72E 02	0.0	0.0
2. IODINES:					
I-131	CI	1.86E-03	2.19E-03	0.0	0.0
I-133	CI	6.80E-03	8.96E-03	0.0	0.0
I-135	CI	6.89E-03	5.95E-03	0.0	0.0
TOTAL	CI	1.56E-02	1.71E-02	0.0	0.0

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TABLE IC 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	0.0	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	5.54E-04	3.89E-04	0.0	0.0
CS137	CI	1.09E-04	4.01E-05	0.0	0.0
CS136	CI	0.0	0.0	0.0	0.0
CS134	CI	2.16E-05	3.82E-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	9.43E-07	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	2.97E-06	2.27E-06	0.0	0.0
BR89	CI	2.86E-05	4.48E-05	0.0	0.0
W65	CI	1.66E-04	3.67E-05	0.0	0.0
CU60	CI	1.81E-04	9.62E-05	0.0	0.0
FE54	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	4.39E-06	1.84E-06	0.0	0.0
CR51	CI	3.66E-04	8.49E-05	0.0	0.0
TOTAL	CI	1.43E-03	7.00E-04	0.0	0.0

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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

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TABLE 2B LIQUID EFFLUENTS

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

NONE

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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	1.43E 02	
	CI	5.05E 02	5.00E 01
B. DRY COMPRESSIBLE WASTE, CONTAMINATED EQUIP, ECT.	CU METER	1.59E 02	
	CI	1.76E 00	5.00E 01
C. IRRADIATED COMPONENTS, CONTROL RODS, ECT.	CU METER	1.38E 00	
	CI	1.25E 04	5.00E 01
D. OTHER (DESCRIBED BELOW):			
NONE			

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

TYPE	NUCLIDE	PERCENT
----	-----	-----
A	BA140	3.06E-01
	CS137	3.39E 01
	CS134	1.36E 00
	ZN65	1.42E 01
	CO60	1.71E 01
	CR51	1.31E 00
	LA140	6.34E-01
B	ZN65	6.00E 00
	CO60	8.80E 01
	MN54	4.00E 00
C	CO60	9.30E 01
	MN54	7.00E 00

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TABLE 3 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (CONTINUED)

3. SOLID WASTE DISPOSITION:

NUMBER OF SHIPMENTS	MODE	DESTINATION
26	TRUCK	CHEM NUC INC., BARNWELL, S. C.
5	TRUCK	NUC ENG CO., RICHLAND, WASH.

4. IRRADIATED FUEL SHIPMENTS:

NUMBER OF SHIPMENTS	MODE	DESTINATION
NONE		

NONE

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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 XE136 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 LLD. THEREFORE, FOR VENT RELEASES, THE ISOTOPIC MIXTURE IS ASSUMED TO BE THE SAME AS THE MIXTURE DETERMINED AT THE SJAE.

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 (BELOW LOWER LIMITS OF DETECTION OF ANALYSES) ARE NOT INCLUDED IN QUANTITIES REPORTED RELEASED. VALUES FOR LOWER LIMIT OF DETECTION ARE RECORDED AND MUST BE LESS THAN THE MINIMUM VALUES STATED IN THE TECHNICAL SPECIFICATIONS.