

# NSP

NORTHERN STATES POWER COMPANY

MINNEAPOLIS, MINNESOTA 55401

March 5, 1976

REG



Mr J G Keppler, Director, Region III  
Office of Inspection and Enforcement  
U S Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

Dear Mr Keppler:

MONTICELLO NUCLEAR GENERATING PLANT  
Docket No. 50-263 License No. DPR-22

Release of Radioactive Particulates in Excess of  
Two Percent of Newly Imposed Maximum Release Rates

During the fourth calendar quarter of 1975 the average release rate of radioactive particulates with half-lives greater than eight days was equal to 2.82 percent of the maximum release rate permitted by Section 3.8.A.5 of the Monticello Technical Specifications.

On October 1, 1975 more restrictive limits on airborne releases became effective which reduced the average release rates which required reporting to the Commission by a factor of 50. While actual average release rates for the fourth quarter of 1975 are below those of the fourth quarter of 1974, they exceeded the level requiring reporting to the Commission.

Actual radioactive effluent releases from the Monticello plant have steadily fallen since the Modified Offgas System was placed into operation in November, 1974 and all initial core load fuel was replaced during the autumn 1975 refueling outage.

Attached are two copies of a detailed report describing this event. This report satisfies the requirements of Section 3.8.A.9.c of the Monticello Technical Specifications.

Yours very truly,

*L O Mayer*

L O Mayer, PE  
Manager of Nuclear Support Services

LOM/L W/ak

Attachment

9102110432 760305  
PDR ADDCK 05000263  
PDR  
S

cc: Director, Office of Inspection and Enforcement (20)  
G Charnoff  
MPCA - Attn: J W Ferman



2346

## MONTICELLO NUCLEAR GENERATING PLANT

### Release of Radioactive Particulates in Excess of Two Percent of Newly Imposed Maximum Release Rates

1. Report Date: March 5, 1976
2. Event Date: The release occurred over the fourth quarter of 1975. The event was determined to be reportable on February 16, 1976 when radioactive effluent data was being reduced for the Semi-Annual Operating Report covering the period July through December, 1975.

In a letter dated December 10, 1975 from Mr. L. O. Mayer, NSP, to Mr. D. L. Ziemann, USNRC, we stated that the more restrictive limits on airborne releases contained in Change No. 12 to the Technical Specifications were placed into effect on October 1, 1975. The plant was shutdown during the entire month of October for refueling, however, and the revised release limits were not applied until the plant returned to service in November. The new limits were therefore "backfit" to the October shutdown releases.

3. Identification of the Event:

The release rate of radioactive particulates with half-lives greater than eight days over the fourth calendar quarter of 1975 averaged 2.82 percent of the maximum permitted release rate.

4. Description of Event:

The maximum permitted release rate of radioactive particulates with half-lives greater than eight days (excluding halogens) was reduced by Change Number 12 to the Monticello Technical Specifications. Change Number 12 was placed into effect on October 1, 1975.

The new maximum permitted release rate for long lived radioactive particulates became:

$$\frac{Q_1}{9.5E9 \text{ MPC}_a} + \frac{Q_{RS}}{2.0E8 \text{ MPC}_a} = 1$$

If the release rate for any calendar quarter exceeds two percent of the maximum permitted release rate, a report to the Commission must be made identifying the causes for such release and defining a program for reducing them.

Results of the weekly determination of long lived radioactive particulates released from the Monticello plant stack and the Reactor Building vents for the fourth quarter of 1975 are summarized in Tables 1 and 2. When plant stack and Reactor Building vent releases are compared to the maximum release rate equation for October 1 through December 31, 1975, the average release rate is found to be equal to 2.82 percent of the maximum allowable.

5. Designation of Apparent Cause of the Event:

Two factors contributed to this event:

- a. The new Technical Specifications which became effective on October 1, 1975 reduced the release rates requiring reporting to the Commission. Prior to October 1, 1975, reporting was required only when the annual average release rate calculated in accordance with 10 CFR 20 was exceeded.

The new maximum release limit for long-lived particulates is calculated in an extremely conservative manner. The limit is based on a dose to an individual residing at the site boundary in the worst case sector. A reduction factor of 700 is applied for possible ecological chain effects. This results in a limiting release approximately 100 times more conservative than the limiting release rate calculated for the existing critical dose pathway.

- b. Fuel sipping operations were conducted on the refueling floor in the Reactor Building during October, 1975. The fuel being handled was part of the initial core load which had been removed from the reactor and is being held for off-site shipment. The initial core load fuel had had a history of excessive clad defects.

During the sipping operations, the concentration of long-lived particulates in the Reactor Building ventilation exhaust air increased for a period of several days. This resulted in higher release rates of long-lived particulates from the Reactor Building vent. The release rates were well below permissible levels and did not exceed typical release rates experienced during previous refueling outages.

6. Analysis of the Event:

No increase in average releases rate of radioactive materials was associated with this event.

No measurable increase in radiation dose to any individual occurred as a result of this event.

The actual estimated maximum offsite dose to an individual can be easily estimated. Annual average dispersion factors for the existing critical dose pathway in the vicinity of the Monticello plant are:

Plant Stack Release	$2.5 \text{ E-8 sec/m}^3$
Reactor Building Vent Release	$4.3 \text{ E-7 sec/m}^3$ (assuming a ground level release)

Using these factors, a reduction factor of 700, and the data tabulated in Tables 1 and 2 the average release rate during the fourth quarter of 1975 was:

$$\frac{700}{13} \sum_{i=1}^{i=2} \sum_{j=1}^{j=13} \frac{Q_{i,j} (X/Q)_i}{\overline{MPC}_{a,i,j}} = 0.17 \% \text{ of maximum annual average release rate permitted by 10CFR20}$$

where  $Q_{i,j}$  = release rate (Ci/sec)  
at release point i averaged  
over week j

$X/Q_i$  = Average dispersion factor (sec/m<sup>3</sup>)  
for release point i

$\overline{MPC}_{a,i,j}$  = weighted average MPC<sub>a</sub> determined  
using 10 CFR 20, Appendix B,  
Table II, column 1 (uCi/ml)  
for release point i during week j

Actual conservatively estimated dose to an individual during this period was therefore approximately  $0.17/4 = 0.043\%$  of the annual dose permitted by 10CFR20.

Since the beginning of operation of the Modified Offgas System in November, 1974 release of gross radioactivity from the Monticello plant has been dramatically reduced to less than a few percent of maximum permitted release rates. Releases of radioactive halogens and particulates have also been greatly reduced since replacement of the initial core load fuel during the autumn 1975 refueling outage.

Figure 1 presents a comparison of the results of gross beta analysis at the eight air monitoring stations included in the Monticello Radiation Environmental Monitoring Program. As noted in this figure, environmental samples have generally shown lower levels of particulate activity during the last quarter of 1975 compared to the same period in 1974. We expect this trend to continue.

#### 7. Corrective Action:

Future refueling operations will be conducted with greatly reduced levels of radioactive particulate releases because of the improvement in fuel integrity that resulted from replacement of all initial core load fuel.

Currently pending revisions to the Monticello Technical Specifications will revise the maximum allowable release rate for long-lived particulates in accordance with current Commission models. These models use the actual existing critical dose pathway in determining maximum permitted release rates.

FIGURE 1

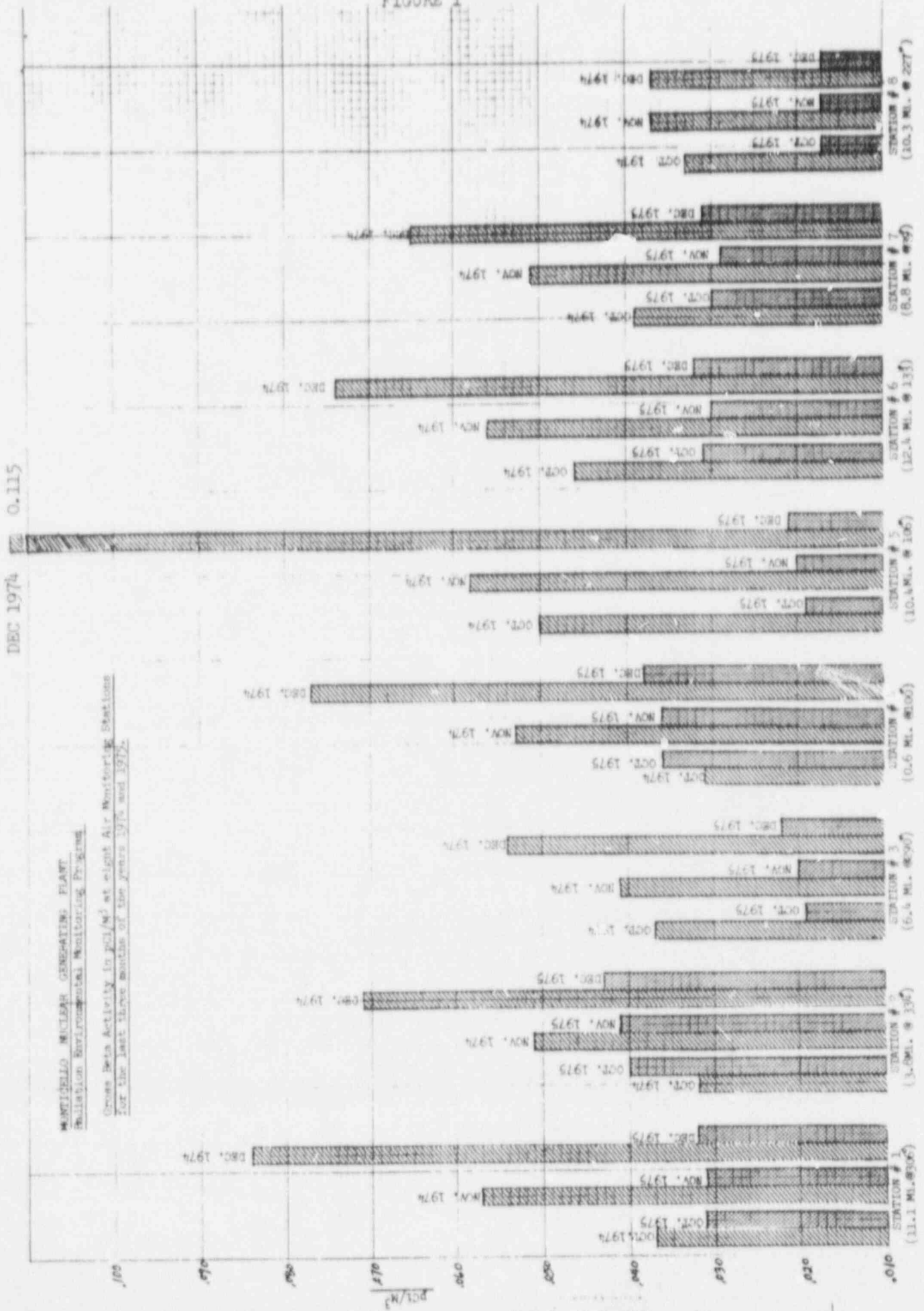




TABLE 1

## INPUT DATA - WEEKLY STACK PARTICULATES (UC1/SEC)

DATE	ND147 SB124 ZN65	CE144 AG110M CO60	CE141 RL106 FE59	RA140 RU103 CC58	CS137 ZR95 CO57	CS136 NR95 MN54	CS134 SP90 CF51	SB126 SR89	MECA BAR TOTAL
75 929	0.0 0.0 1.45E-06	0.0 0.0 0.0	0.0 0.0 0.0	3.35E-06 0.0 0.0	8.12E-05 1.42E-06 0.0	3.49E-06 7.02E-07 2.94E-06	6.74E-05 6.40E-07 0.0	6.71E-07 6.26E-06 0.0	4.36E-10 1.70E-04 3.25E-10
7510 6	0.0 0.0 0.0	0.0 0.0 1.44E-06	0.0 0.0 0.0	0.0 0.0 0.0	8.24E-06 0.0 0.0	1.47E-06 5.34E-07 4.41E-06	3.35E-06 6.40E-07 0.0	0.0 6.26E-06 0.0	2.49E-05 2.49E-05 3.41E-10
751013	0.0 0.0 0.0	3.85E-06 0.0 1.17E-06	9.61E-07 0.0 5.55E-07	0.0 0.0 0.0	1.55E-05 1.10E-06 0.0	1.21E-06 0.0 2.12E-06	1.01E-05 6.40E-07 0.0	2.55E-07 6.26E-06 0.0	3.41E-10 4.37E-05 4.39E-10
751020	0.0 0.0 0.0	2.52E-06 0.0 0.0	6.23E-07 0.0 1.38E-07	1.03E-06 0.0 0.0	1.51E-04 3.62E-07 2.05E-07	3.05E-06 2.00E-06 1.90E-06	1.22E-04 6.40E-07 0.0	0.0 3.78E-06 0.0	2.69E-04 2.69E-04 3.34E-10
751027	0.0 0.0 0.0	3.75E-06 0.0 7.99E-07	0.0 0.0 0.0	0.0 3.12E-07 0.0	8.41E-06 0.0 5.37E-07	1.04E-06 1.21E-06 0.0	5.07E-06 5.94E-07 2.66E-06	0.0 4.15E-06 0.0	3.34E-10 2.65E-05 3.51E-10
7511 3	0.0 0.0 9.45E-07	2.82E-06 0.0 0.0	0.0 0.0 1.63E-06	0.0 0.0 8.08E-07	2.91E-05 1.31E-06 0.0	0.0 1.79E-06 2.87E-06	2.04E-05 5.94E-07 0.0	8.87E-07 4.15E-06 0.0	3.51E-10 6.73E-05 3.18E-10
751110	0.0 3.59E-07 7.30E-07	1.46E-06 0.0 3.93E-07	3.5EF-07 0.0 6.53E-07	1.05E-06 7.70E-07 2.58E-07	2.66E-06 4.62E-07 1.92E-07	3.41E-07 3.11E-07 2.37E-06	3.38E-07 5.94E-07 2.48E-07	3.15E-07 4.15E-06 0.0	3.18E-10 1.61E-05 7.65E-10
751117	0.0 6.24E-05 0.0	3.38E-05 0.0 0.0	2.57E-06 0.0 0.0	3.91E-04 0.0 0.0	8.37E-05 0.0 0.0	8.60E-05 1.70E-05 0.0	5.97E-05 5.94E-07 0.0	0.0 4.15E-06 0.0	7.65E-10 7.41E-04 9.89E-10
751124	0.0 0.0 0.0	3.14E-05 0.0 0.0	0.0 0.0 0.0	7.02E-04 0.0 0.0	1.05E-05 0.0 7.87E-07	1.75E-04 0.0 2.06E-06	0.0 4.66E-07 0.0	0.0 2.42E-06 0.0	9.89E-10 9.25E-04 9.56E-10
7512 1	0.0 0.0 0.0	2.93E-05 0.0 0.0	0.0 0.0 0.0	6.82E-04 0.0 0.0	1.21E-05 0.0 0.0	1.76E-04 0.0 0.0	0.0 4.66E-07 0.0	0.0 2.42E-06 0.0	9.56E-10 9.02E-04 9.64E-10
7512 8	0.0 2.99E-06 0.0	1.82E-05 0.0 0.0	1.05E-06 0.0 0.0	3.74E-04 0.0 0.0	8.10E-06 0.0 0.0	9.96E-05 0.0 2.20E-06	2.82E-06 4.66E-07 0.0	0.0 2.42E-06 0.0	9.64E-10 5.12E-04 9.83E-10
751215	0.0 0.0 0.0	2.03E-05 0.0 0.0	0.0 0.0 0.0	5.17E-04 0.0 0.0	8.16E-06 0.0 0.0	1.18E-04 0.0 2.67E-06	0.0 4.66E-07 0.0	0.0 2.42E-06 0.0	9.83E-10 6.64E-04 6.09E-10
751222	0.0 0.0 0.0	2.56E-05 0.0 0.0	0.0 0.0 0.0	5.71E-04 0.0 0.0	6.67E-06 0.0 0.0	1.30E-04 0.0 1.53E-06	0.0 9.08E-06 0.0	0.0 1.09E-04 0.0	6.09E-10 8.53E-04 5.85E-10
751229	0.0 0.0 0.0	2.30E-05 0.0 0.0	0.0 0.0 0.0	5.11E-04 0.0 0.0	6.03E-06 0.0 0.0	1.15E-04 0.0 2.77E-06	0.0 9.08E-06 0.0	0.0 1.09E-04 0.0	5.85E-10 7.76E-04 0.0

TABLE 2

## INPUT DATA - WEEKLY VENT PARTICULATES (UC1/SEC)

DATE	ND147 SB124 ZN65	CE144 AG110M CO60	CE141 RL106 FE55	HA140 RU103 CO58	CS137 ZR95 CO57	CS136 NB95 MN54	CS134 SR90 CR51	SR126 SR89	MPCA PAR TOTAL
75 929	0.0	1.63E-04	6.53E-05	1.15E-04	1.86E-04	1.36E-05	1.57E-04	0.0	2.45E-10
	0.0	0.0	0.0	2.25E-05	5.38E-05	1.75E-04	9.13E-05	4.43E-04	1.60E-03
	3.16E-05	4.25E-05	0.0	5.94E-06	5.73E-06	2.54E-05	0.0		
75106	0.0	3.12E-03	9.08E-04	1.71E-04	6.99E-04	4.63E-05	5.01E-04	2.46E-05	4.42E-10
	8.68E-06	0.0	0.0	1.16E-03	1.20E-03	2.76E-03	9.13E-05	4.43E-04	1.26E-02
	5.94E-04	6.36E-04	1.41E-05	5.07E-05	8.39E-06	1.23E-04	0.0		
751013	0.0	2.83E-04	1.20E-04	1.10E-04	8.55E-04	9.33E-05	6.70E-04	0.0	8.26E-10
	0.0	0.0	0.0	6.97E-03	1.44E-04	3.30E-04	9.13E-05	4.43E-04	1.04E-02
	1.38E-04	1.51E-04	2.33E-05	1.52E-05	0.0	0.0	0.0		
751020	0.0	2.96E-04	8.87E-05	0.0	4.93E-04	2.69E-05	3.75E-04	1.05E-06	2.50E-10
	0.0	0.0	0.0	2.96E-05	1.31E-04	3.10E-04	9.13E-05	4.43E-04	2.45E-03
	5.99E-05	6.17E-05	1.16E-05	6.91E-06	0.0	1.63E-05	0.0		
751027	0.0	4.89E-04	1.42E-04	2.27E-05	6.45E-04	1.81E-05	4.77E-04	1.70E-05	3.66E-10
	4.17E-04	0.0	0.0	4.20E-05	2.10E-04	3.90E-04	2.89E-05	3.07E-05	2.83E-03
	7.88E-05	2.15E-04	0.0	1.52E-05	8.25E-06	0.0	0.0		
75113	0.0	0.0	1.32E-05	0.0	9.14E-05	0.0	3.39E-05	0.0	2.43E-10
	0.0	0.0	0.0	0.0	1.84E-05	3.84E-05	2.89E-05	3.07E-05	3.71E-04
	0.0	3.11E-05	1.69E-05	2.20E-05	1.13E-05	3.51E-05	0.0		
751110	0.0	2.73E-05	6.68E-06	2.33E-05	1.38E-04	7.04E-06	7.84E-05	6.74E-06	3.19E-10
	8.28E-05	0.0	0.0	1.50E-05	1.02E-05	5.77E-05	2.89E-05	3.07E-05	7.20E-04
	1.70E-05	1.17E-04	1.36E-05	5.79E-06	3.61E-06	4.54E-05	5.05E-06		
751117	0.0	0.0	0.0	0.0	2.50E-04	4.78E-05	1.69E-04	0.0	3.81E-10
	1.77E-04	0.0	0.0	0.0	0.0	1.95E-05	2.89E-05	3.07E-05	8.38E-04
	0.0	4.85E-05	0.0	0.0	4.23E-05	2.45E-05	0.0		
751124	0.0	0.0	0.0	0.0	1.52E-04	1.02E-04	8.50E-05	0.0	4.76E-10
	8.91E-05	0.0	0.0	0.0	0.0	8.96E-06	1.72E-05	1.75E-05	6.28E-04
	0.0	2.89E-05	0.0	0.0	9.08E-05	3.62E-05	0.0		
75121	0.0	0.0	0.0	0.0	1.08E-04	1.33E-04	4.82E-05	0.0	4.77E-10
	5.08E-05	0.0	0.0	0.0	0.0	0.0	1.72E-05	1.75E-05	4.67E-04
	0.0	0.0	0.0	0.0	7.34E-05	3.91E-05	0.0		
75128	0.0	0.0	0.0	0.0	1.17E-04	7.87E-05	7.72E-05	0.0	4.13E-10
	8.09E-05	0.0	0.0	0.0	0.0	8.17E-06	1.72E-05	1.75E-05	4.75E-04
	0.0	1.10E-05	0.0	0.0	3.77E-05	2.93E-05	0.0		
751215	0.0	0.0	0.0	0.0	8.44E-05	7.84E-05	5.93E-05	0.0	4.15E-10
	6.15E-05	0.0	0.0	0.0	0.0	0.0	1.72E-05	1.75E-05	4.12E-04
	0.0	0.0	0.0	0.0	4.78E-05	4.61E-05	0.0		
751222	0.0	0.0	0.0	0.0	1.05E-04	7.07E-05	6.38E-05	0.0	6.05E-10
	6.62E-05	0.0	0.0	0.0	0.0	0.0	3.29E-06	5.39E-05	4.80E-04
	0.0	1.89E-05	0.0	0.0	4.89E-05	4.93E-05	0.0		
751229	0.0	0.0	0.0	0.0	7.27E-05	7.33E-05	3.66E-05	0.0	6.30E-10
	3.80E-05	0.0	0.0	0.0	0.0	9.24E-06	3.29E-06	5.39E-05	4.27E-04
	3.24E-05	2.02E-05	0.0	0.0	4.34E-05	4.35E-05	0.0		

50-263

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PLANT NAME: Monticello

## ENCLOSURE

Detailed report on release of radioactive particulates in excess of 2% of newly imposed maximum release rates...(1 cy encl rec'd)

NOTE: IF PERSONNEL EXPOSURE IS INVOLVED  
SEND DIRECTLY TO KREGER/J. COLLINS

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